ADDENDUM NO. 1

TO

MILLER ROAD INTERSECTION & CURVE RECONSTRUCTION PROJECTS

PHASE 1 STP-5403(680) & PHASE 3 STP-5403(681)

COUNTY OF JEFFERSON, MISSOURI

August 11th, 2021

This addendum forms a part of the bidding and contract documents and modifies the original bidding documents. Acknowledge receipt of this addendum per the instructions given in the bidding documents. **Failure to acknowledge this or any other addenda may subject bidder to disqualification.**

PROJECT SPECIFICATIONS:

STP-5403 (680) & STP-5403 (681) BID FORM:

Remove pages 14-16, and replace with new pages ADD-1 14 through ADD-1 16. The purpose of the replacement is to add the additional reinforcing crushed rock and slope face protection system on the slope of Spring Forrest Road. Revised quantity for pay item 2035500 "Embankment in Place" from 4107 CY to 1825 CY, added quantity 3049907 "Type 1 Aggregate for Base (Compacted in 6" Lifts) added quantity of 1903 CY, revised quantity for pay item 6113020 "Furnishing Type 2 Rock Blanket" from 748 CY to 294 CY, revised quantity for pay item 6113040 "Placing Type 2 Rock Blanket" from 748 Cy to 294 CY, and added pay item 7209904 "Reinforced Crushed Rock and Slope Face Protection System (Design Build) added quantity 5143 SF.

STP-5403 (680) & STP-5403 (681) AGREEMENT FORMS:

Remove pages 28-30, and replace with new pages ADD-1 28 through ADD-1 30. The purpose of the replacement is to add the additional reinforcing crushed rock and slope face protection system on the slope of Spring Forrest Road. Revised quantity for pay item 2035500 "Embankment in Place" from 4107 CY to 1825 CY, added quantity 3049907 "Type 1 Aggregate for Base (Compacted in 6" Lifts) added quantity of 1903 CY, revised quantity for pay item 6113020 "Furnishing Type 2 Rock Blanket" from 748 CY to 294 CY, revised quantity for pay item 6113040 "Placing Type 2 Rock Blanket" from 748 Cy to 294 CY, and added pay item 7209904 "Reinforced Crushed Rock and Slope Face Protection System (Design Build) added quantity 5143 SF.

STP-5403 (680) & STP-5403 (681) JSP:

Remove page 90 and 109 from the project specifications, and replace with new pages ADD-1 90, ADD-1 109A, & ADD-109B. The purpose of the replacement is add the technical specification

the reinforcing crushed rock and slope face protections system on the slope of Spring Forrest Road.

ADD pages ADD-1 109C to ADD-1 109Z. The purposed of the additional of the specifications are the geotechnical investigation referencing the additional reinforcing crushed rock and slope face protection system on Spring Forrest Road.

CONSTRUCTION PLANS:

STP-5403 (680) T-001

Remove plan sheet T-001 and replace with plans sheet T-001, revised 8/11/21 – Bid Addendum #1. Reason: revised the additional reinforcing crushed rock and slope face protection system on the slope of Spring Forrest Road.

STP-5403 (680) T-003

Remove plan sheet T-003 and replace with plans sheet T-003, revised 8/11/21 - 21 – Bid Addendum #1. Reason: revised the additional reinforcing crushed rock and slope face protection system on the slope of Spring Forrest Road.

STP-5403 (680) T-004

Remove plan sheet T-004 and replace with plans sheet T-004, revised 8/11/21 - 21 – Bid Addendum #1. Reason: revised quantity summary table for the additional reinforcing crushed rock and slope face protection system on the slope of Spring Forrest Road.

STP-5403 (680) T-005

Remove plan sheet T-005 and replace with plans sheet T-005, revised 8/11/21 - 21 – Bid Addendum #1. Reason: Revised Quantity Summary Table 2B quantity for pay item 2035500 “Embankment in Place” from 4107 CY to 1825 CY, added quantity 3049907 “Type 1 Aggregate for Base (Compacted in 6” Lifts) added quantity of 1903 CY, revised quantity for pay item 6113020 “Furnishing Type 2 Rock Blanket” from 748 CY to 294 CY, revised quantity for pay item 6113040 “Placing Type 2 Rock Blanket” from 748 Cy to 294 CY, and added pay item 7209904 “Reinforced Crushed Rock and Slope Face Protection System (Design Build) added quantity 5143 SF.

STP-5403 (680) T-006

Remove plan sheet T-006 and replace with plans sheet T-006, revised 8/11/21 - 21 – Bid Addendum #1. Reason: revised item no. on the quantity summary 2B Table Continued.

STP-5403 (680) C-102

Remove plan sheet C-102 and replace with plans sheet C-102, revised 8/11/21 - 21 – Bid Addendum #1. Reason: Added the standard detail drawing for the reinforced rushed rock and slope face protection including notes.

STP-5403 (680) C-203

Remove plan sheet C-203 and replace with plans sheet C-203, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have the reinforced crushed rock and slope face protection system shown on the plans with the areas of the Type 2 Rock Blanket.

STP-5403 (680) C-301

Remove plan sheet C-301 and replace with plans sheet C-301, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have the reinforced crushed rock and slope face protection system shown on the plans with the transition from 1:1 slope to 1.5:1 slope over 20'.
Remove plan sheet C-409 and replace with plans sheet C-409, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have shown the revised cross-sectional area at STA 100+50.00.

STP-5403 (680) C-410

Remove plan sheet C-410 and replace with plans sheet C-410, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have shown the revised cross-sectional area at STA 101+00.00.

STP-5403 (680) C-411

Remove plan sheet C-411 and replace with plans sheet C-411, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have shown the revised cross-sectional area at STA 101+50 and STA 102+00 showing the slope face protection system.

STP-5403 (680) C-412

Remove plan sheet C-412 and replace with plans sheet C-412, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have shown the revised cross-sectional area at STA 103+00 and STA 102+50 showing the slope face protection system.

STP-5403 (680) C-413

Remove plan sheet C-413 and replace with plans sheet C-413, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have shown the revised cross-sectional area at STA 103+50.

STP-5403 (680) R-103

Remove plan sheet R-103 and replace with plans sheet R-103, revised 8/11/21 - 21 – Bid Addendum #1. Reason: the revised plans have the reinforced crushed rock and slope face protection system shown on the ROW Plan sheets. Note that the Easement and ROW lines are not affected by this change.

BID FORM

MILLER ROAD IMPROVEMENTS - PHASE 1 - STP-5403(680)					
ITEM NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
	DESCRIPTION				
2013000	Clearing and Grubbing	AC	0.8		
2022010	Removal of Improvements	LS	1		
2031000	Class A Excavation	CY	711		
* 2035500	Embankment in Place	CY	1825		
2036000	Compacting Embankment	CY	640		
2051010	Modified Subgrade	SY	72		
3040504	Type 5 Aggregate for Base (4" Thick, Roadway) (4" Thick, Driveway)	SY	3467		
* 3049907	Type 1 Aggregate for Base (Compacted in 6" Lifts)	CY	1903		
4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Roadway) (2" Thick, Driveway)	TON	344.4		
4013000	Bituminous Pavement Mixture PG64-22, (Base) (8" Thick, Roadway) (4" Thick, Driveway)	TON	1283.7		
4071005	Tack Coat	Gal	60		
5021106	Concrete Pavement (6 IN. Non-Reinf)	SY	253		
6042097	Adjust Water Valve	EA	5		
6042098	Adjust Water Meter	EA	2		
6042099	Adjust Fire Hydrant	EA	1		
6061060	MGS Guardrail	LF	212.5		
6063014	Type A Crashworthy End Terminal (MASH)	EA	2		
6071011A	Chain-link Fence (48IN.)	LF	25		
6091052	Curb and Gutter Type B	LF	435		
6097000	Rock Lining	CY	16		
* 6113020	Furnishing Type 2 Rock Blanket	CY	294		
* 6113040	Placing Type 2 Rock Blanket	CY	294		
6161005	Constructions Signs	SF	180		
6161031	Type III Moveable Barricade with Light	EA	9		
6161034	Directional Indicator Barricade with Light	EA	2		
6161099	Changeable Message Sign with Communication Interface, Contractor Furnished, Contractor Retained	EA	3		
6181000	Mobilization	LS	1		
6274000	Contractor Furnished Surveying and Staking (MoDOT Spec.)	LS	1		
7209904	Small Block Retaining Wall (Self Supporting)	SF	360		
7261015	15" Pipe Group A, Class V RCP	LF	28		
7269903	14"x23" Elliptical Pipe Group A, Class III RCP	LF	26		
7269903	14"x23" Elliptical Pipe Group A, Class V RCP	LF	25		
7320615A	15" Group A Flared End Section	EA	2		
7329902	14"x23" Elliptical Group A Flared End Section	EA	4		
8052000A	Seeding - Warm Season Mixtures	AC	0.6		
8061019	Silt Fence	LF	1815		
8064138	Type 2D Erosion Control Blanket	SY	561		
8080099	Landscape Restoration	LS	1		
9029400	Temporary Traffic Signals	LS	1		

*	7209904	Reinforced Crushed Rock and Slope Face Protection System (Design Build)	SF	5143		
			SUBTOTAL ROADWAY ITEMS			

	SIGNING/STRIPING ITEMS:				
6161010	Relocated Signs	SF	50		
6206000B	Acrylic Waterbourne Pav't. Paint 4 Inch White	LF	1964		
6206001B	Acrylic Waterbourne Pav't. Paint 4 Inch Yellow	LF	1900		
		SUBTOTAL SIGNING/STRIPING ITEMS			

MILLER ROAD IMPROVEMENTS - PHASE 1 - STP-5403(680) TOTAL _____

MILLER ROAD IMPROVEMENTS - PHASE 3 - STP-5403(681)

ITEM NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
	SIGNALS/STRIPING:				
2022010	Removal of Improvements	LS	1		
2026050	Backfill (Pipes)	CY	178		
2035000	Unclassified Excavation	CY	1164		
2051010	Modified Subgrade	SY	20		
3040504	Type 5 Aggregate for Base (4" Thick - Roadway)	SY	1656		
4011209	Bituminous Pavement Mixture PG64-22, (BP-1)(2" Thick - Driving Lanes)	TON	150.1		
4011209	Bituminous Pavement Mixture PG64-22, (BP-1)(6" Thick Private - Driveways)	TON	49.5		
4013000	Bituminous Pavement Mixture PG64-22, (Base)(8" Thick - Driving Lanes)	TON	573.4		
6042020	Adjust Inlet to Grade	EA	2		
6046006A	Slotted Drain	LF	20		
6085006	Paved Approach, 6"	SY	110		
6091010	6" Vertical Curb & Gutter (MODOT Type B)	LF	784		
6092013	6" Rolled Curb (Type M)	LF	184		
6113010	Furnishing Type 1 Rock Blanket	CY	34		
6113030	Placing Type 1 Rock Blanket	CY	34		
6143011	Manhole Frame and Cover, Type 1-B	EA	1		
6143020	Grate Inlet with Side Intake	EA	2		
6161005	Construction Signs	SF	105		
6161031	Type III Moveable Barricade with Light	EA	5		
6161098A	Changeable Message Sign	EA	2		
6181000	Mobilization	LS	1		
6274000	Contractor Furnished Surveying and Staking	LS	1		
7250342A	42 in. Class V Reinforced Concrete Pipe	LF	91		
7261015	15" Class III Reinforced Concrete Pipe	LF	68		
7261099	14" x 23" Class V Elliptical Reinforced Concrete Pipe	LF	34		
7309915	15 in. HDPE Pipe	LF	44		
7310072	Precast Concrete Manhole - 72 in.	LF	7		
7320042A	42 in. Concrete Flared End Section	EA	1		
8051000	Seeding and Mulching	AC	0.2		

8061019	Silt Fence	LF	1068		
8090098	Vinyl Fence Removal and Reinstallation	LS	1		
8090099	Landscape Block Retaining Wall & Rock Parking Area Removal & Reinstallation	LS	1		
		SUBTOTAL ROADWAY ITEMS			

	SIGNING/STRIPING ITEMS:				
6206000B	Acrylic Waterbourne Pav't. Paint 4 Inch White	LF	760		
6206001B	Acrylic Waterbourne Pav't. Paint 4 Inch Yellow	LF	760		
		SUBTOTAL SIGNING/STRIPING ITEMS			

MILLER ROAD IMPROVEMENTS - PHASE 3 - STP-5403(681) TOTAL _____

PHASE 1 - STP 5403(680) & PHASE 3 - 5403(681) COMBINED BID _____

AGREEMENT FORM

MILLER ROAD IMPROVEMENTS - PHASE 1 - STP-5403(680)					
ITEM NUMBER	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
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8061019	Silt Fence	LF	1815		
8064138	Type 2D Erosion Control Blanket	SY	561		
8080099	Landscape Restoration	LS	1		
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*	7209904	Reinforced Crushed Rock and Slope Face Protection System (Design Build)	SF	5143		
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MILLER ROAD IMPROVEMENTS - PHASE 1 - STP-5403(680) TOTAL _____

MILLER ROAD IMPROVEMENTS - PHASE 3 - STP-5403(681)					
ITEM NUMBER	**DESCRIPTION**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL**
	SIGNALS/STRIPING:				
2022010	Removal of Improvements	LS	1		
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6085006	Paved Approach, 6"	SY	110		
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8051000	Seeding and Mulching	AC	0.2		

8061019	Silt Fence	LF	1068		
8090098	Vinyl Fence Removal and Reinstallation	LS	1		
8090099	Landscape Block Retaining Wall & Rock Parking Area Removal & Reinstallation	LS	1		
			SUBTOTAL ROADWAY ITEMS		

	SIGNING/STRIPING ITEMS:				
6206000B	Acrylic Waterbourne Pav't. Paint 4 Inch White	LF	760		
6206001B	Acrylic Waterbourne Pav't. Paint 4 Inch Yellow	LF	760		
			SUBTOTAL SIGNING/STRIPING ITEMS		

MILLER ROAD IMPROVEMENTS - PHASE 3 - STP-5403(681) TOTAL _____

PHASE 1 - STP 5403(680) & PHASE 3 - 5403(681) COMBINED BID _____

Jefferson County, Missouri
Miller Road Phase 1 – At Spring Forest Road (Project No. STP-5403(680))
Miller Road Phase 3 – Curve Alignment & Storm Sewer Improvements (Project No. STP-5403 (681))

JOB SPECIAL PROVISIONS – TABLE OF CONTENTS

	**JEFFERSON COUNTY** **DEPARTMENT OF PUBLIC WORKS** 729 Maple Street, PO Box 100 Hillsboro, MO 63050 Phone 636-797-5369
	CDG Engineers, Inc. *One Campbell Plaza* *St. Louis, MO 63139* Certificate of Authority: 1271 Consultant Phone: (314) 781-7770
	JOB NUMBER: STP-5403(680) Miller Road Phase 1 At Spring Forest Road Jefferson County, Missouri DATE PREPARED: December 18, 2020
Date: December 18, 2020	ADDENDUM DATE: August 11, 2021
Only the above Job Special Provisions A thru R are authenticated by this seal:	

	**JEFFERSON COUNTY** **DEPARTMENT OF PUBLIC WORKS** 729 Maple Street, PO Box 100 Hillsboro, MO 63050 Phone 636-797-5369
	CDG Engineers, Inc. *One Campbell Plaza* *St. Louis, MO 63139* Certificate of Authority: 1271 Consultant Phone: (314) 781-7770
	JOB NUMBER: STP-5403(680) Miller Road Phase 3 Curve Alignment & Storm Sewer Improvements Jefferson County, Missouri DATE PREPARED: December 18, 2020
Date: December 18, 2020	ADDENDUM DATE:
Only the above Job Special Provisions A thru O and S thru U are authenticated by this seal:	

2.0 Construction Requirements.

2.1 Granular backfill material shall be 2" clean rock used behind the landscape block retaining wall. Backfill not conforming to this specification shall not be used without the written consent of the Director of Public Works. The Contractor shall furnish to the Director of Public Works a Certificate of Compliance certifying the selected granular backfill material complies with this section of the specifications.

2.2 The foundation for the structure shall be graded level for the length of the block retaining wall. At each wall unit foundation level, a six-inch thick by eighteen-inch-wide compacted Type 1 or Type 5 Aggregate leveling pad shall be provided. Prior to wall construction, the foundation shall be compacted as directed by the Director of Public Works. Any foundation soils found to be unsuitable shall be removed and replaced, as directed by the Director of Public Works.

2.3 Backfill placement shall closely follow the erection of each course of blocks. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Director of Public Works. Any misalignment or distortion of the wall blocks due to placement of backfill outside the limits of this specification shall be corrected, as directed by the Director of Public Works.

3.0 Method of Measurement. The unit of measurement for removing and replacing all materials for the landscape retaining walls, including modular blocks, excavation, leveling pad, granular backfill as specified above, and incidentals, will be per lump sum contract price. The quantity shown for Landscape Block Retaining Wall Removal & Replacement in the bid is approximate.

4.0 Basis of Payment. The accepted quantity, determined as provided above, will be paid for at the lump sum contract price, for the pay item shown on the design plans. The contract unit price and payment will be full compensation for removing all materials, replacing wall blocks, excavation, leveling pad placement, and granular backfill material.

V. REINFORCED CRUSHED ROCK AND SLOPE FACE PROTECTION SYSTEM (ADDENDUM #1)

1.0 Description.

1.1 This work consists of the design and construction of a reinforced crushed rock and slope face protection system as indicated on the plans.

1.2 The reinforced crushed rock and slope face protection detail shown on the plans is provided for reference only. The contractor is responsible for final design of the system.

1.3 Final design plans for the reinforced crushed rock and slope face protection system are to be signed and sealed by a professional engineer licensed in the state of Missouri.

1.4 The contractor is to submit final plans to Jefferson County for review prior to construction of the system.

2.0 Construction Requirements.

2.1 The design of the reinforced crushed rock and slope face protection system shall be based on the attached geotechnical report and designed for standard highway loading.

2.2 A slope face system such as Strata - StrataWeb®, Presto Geosystems - GEOWEB®, or Tensar -Sierra Slope® shall be provided.

2.3 All slopes steeper than 1.5:1 shall be reinforced crushed rock with slope face protection.

3.0 Method of Measurement. The unit of measurement for design and construction of the reinforced crushed rock and slope face protection system will be per square foot of slope face. The quantity shown for Reinforced Crushed Rock and Slope Face Protection System (Design Build) in the bid is approximate.

4.0 Basis of Payment. All design, labor, equipment, and material costs to complete the described work will be completely covered in the contract unit price for Item No. 7209904 – Reinforced Crushed Rock and Slope Face Protection System (Design Build) per square foot.

END OF JOB SPECIAL PROVISIONS

GEOTECHNOLOGY

A Universal Engineering Sciences Company

GEOTECHNICAL EXPLORATION & SLOPE STABILITY EVALUATION SPRING FOREST ROAD JEFFERSON COUNTY, MISSOURI

Prepared for:

JEFFERSON COUNTY DEPARTMENT OF PUBLIC WORKS
HILLSBORO, MISSOURI

Prepared by:

GEOTECHNOLOGY, INC.
ST. LOUIS, MISSOURI

Date:

JULY 26, 2021

Geotechnology Project No.:

J035244.06

SAFETY
QUALITY
INTEGRITY
PARTNERSHIP
OPPORTUNITY
RESPONSIVENESS

GEOTECHNOLOGY
A Universal Engineering Sciences Company

July 26, 2021

Mr. J.R. Hamilton
Jefferson County Department of Public Works
729 Maple Street
P.O. Box 100
Hillsboro, Missouri 63050

Re: Geotechnical Exploration & Slope Stability Evaluation
Spring Forest Road
Jefferson County, Missouri
Geotechnology Project No. J035244.06

Dear Mr. Hamilton:

Presented in this report are the results of a geotechnical exploration conducted for the referenced project. This report includes our project understanding, observed site conditions, conclusions and/or recommendations, and support data as given in the Table of Contents.

It has been our pleasure to provide geotechnical services to you, and we would welcome the opportunity to provide other services during the course of the project. Please contact us if you need further information or clarification about this document.

Very truly yours,

GEOTECHNOLOGY, INC.

STATE OF MISSOURI
SENTHIL KUMAR
NUMBER E-023728
PROFESSIONAL ENGINEER

Senthil Kumar, P.E.
Principal Engineer

Anthony W. Roth, P.E.
Project Manager

SK/AWR/DWG:sk/jf

Copies submitted: (1) pdf

TABLE OF CONTENTS

LIST OF TABLES

GEOTECHNOLOGY
A Universal Engineering Sciences Company

GEOTECHNICAL EXPLORATION & SLOPE STABILITY EVALUATION
SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI
July 26, 2021 | Geotechnology Project No. J035244.06

1.0 INTRODUCTION

The services documented in this report were provided in accordance with the terms, conditions and scope of services described in Geotechnology's April 26, 2021 proposal numbered P035244.06. The project was authorized by issuance of the Design Consultant Memorandum of Understanding #21-1 between Geotechnology and Jefferson County dated April 29, 2021, and the subsequent Notice to Proceed dated April 30, 2021.

The purposes of the geotechnical exploration were to develop a general subsurface profile at the site and prepare recommendations for the geotechnical aspects of the design and construction of the project as defined in our proposal. Our scope of services included site reconnaissance, geotechnical borings, laboratory testing, engineering analyses, and preparation of this report.

A copy of "Important Information about This Geotechnical-Engineering Report," published by the Geotechnical Business Council (GBC) of the Geoprofessional Business Association (GBA), is included in Appendix A for your review. The publication discusses report limitations and ways to manage risk associated with subsurface conditions.

2.0 PROJECT INFORMATION

The project consists of design and construction of the re-alignment of Miller Road at Spring Forest Road in Jefferson County, Missouri. The site location and general topography of the area as per the 2017 USGS map of the vicinity are shown on Figure 1 included in Appendix B. As part of the project, a portion of Spring Forest Road will be re-aligned and raised. Slopes for the filled portion of Spring Forest Road are planned to be inclined 1.5H:1V to 1H:1V (horizontal:vertical). Existing grades adjacent to Spring Forest Road below the planned slopes also appear steeper than 2H:1V.

3.0 GEOTECHNICAL EXPLORATION

The field exploration consisted of drilling two borings, designated as Borings B-1 and B-2, at the approximate locations shown on Figure 2 in Appendix B. The borings were located in the field by Geotechnology by measuring distances from existing site features. The elevations at the boring locations, as shown on the boring logs, were estimated using the elevations shown on a topographic site plan provided by the client. If more precise data are required, the client should retain a registered surveyor to establish boring locations and elevations.

Boring B-1 was drilled to auger refusal. Boring B-2 was terminated at a depth of 35 feet. Both borings were drilled using a Geoprobe rotary drill rig equipped with hollow stem augers. Standard Penetration Tests (SPTs) were performed using an automatic hammer. Split-spoon and a Shelby tube sample were obtained at the depths indicated on the boring logs presented in Appendix C. Rock was cored in Boring B-1 using double-tube NQ2 wireline methods. A photograph of recovered rock core samples is included in Appendix D. A legend of the terms and symbols used on the boring logs and rock core descriptions are included in Appendix C.

An engineer of Geotechnology provided direction during field exploration, observed drilling and sampling, assisted in obtaining samples and prepared logs of the material encountered. The boring logs represent conditions observed at the time of exploration, and have been edited to incorporate results of the laboratory tests.

Unless noted on the boring logs, the lines designating the changes between various strata represent approximate boundaries. The transition between materials could be gradual or could occur between recovered samples. The stratification given on the boring logs, or described herein, is for use by Geotechnology in its analyses and should not be used as the basis of design or construction cost estimates without realizing that there can be variation from that shown or described.

The boring logs and related information depict subsurface conditions only at the specific locations and times where sampling was conducted. The passage of time could result in changes in conditions, interpreted to exist, at or between the locations where sampling was conducted.

4.0 LABORATORY TESTING

Laboratory testing was performed on the soil samples to estimate index properties. Moisture contents and Atterberg limits tests were performed on selected cohesive samples. Laboratory test results are presented on the boring logs.

5.0 SUBSURFACE CONDITIONS

5.1 Stratigraphy

Asphalt pavement occurs to an approximate depth of 11 to 11.5 inches at the boring locations. Below the asphalt pavement, fill occurs to a depth of approximately 3 feet. The fill is generally comprised of brown, lean clay/silt with some gravel. SPT 'N'-values[1] in the fill were

[1] The standard penetration resistance, or N-value, is defined as the number of blows required to drive the split-spoon sampler 12 inches with a 140-pound hammer falling 30 inches. Since the split spoon sampler is driven 18 inches or until refusal, the blows for the first 6 inches are for seating the sampler, and the number of blows for the final 12 inches is the N-value. Additionally, "refusal" of the split-spoon sampler occurs when the sampler is driven less than 6 inches with 50 blows of the hammer.

4 and 15 blows per foot (bpf). Moisture content percentages of the fill ranged from mid- to upper teens.

Below the fill, the natural soil consists of high plasticity, fat clay to a depth of approximately 12 feet in Boring B-1 and to the 35-foot depth of exploration in Boring B-2. The fat clay is generally reddish brown in color and stiff to hard, occasionally soft in consistency. The fat clay in Boring B-1 is underlain by weathered limestone. At Boring B-2, the fat clay is mixed with fragments of weathered limestone with increasing depth.

Auger refusal occurred in Boring B-1 at an approximate depth of 24 feet (El 695[2]). Bedrock consists generally of weak to strong, gray, aphanitic limestone. The rock is medium bedded and slightly weathered to unweathered. Bedrock core samples obtained recoveries of 100 percent and rock quality designation (RQD)[3] values of 73 to 92 percent, indicating good quality limestone.

5.2 Groundwater

Groundwater was not observed in the borings during the subsurface exploration program. Groundwater levels might not have stabilized before backfilling, which is typical in less permeable cohesive soil. The lack of observed groundwater levels might not represent present or future levels. Groundwater levels can vary over time due to the effects of seasonal variation in precipitation, recharge, and presence of creeks or other factors not evident at the time of exploration. Free water could be trapped in permeable zones of fill, in pavement base course, and in utility trenches backfilled with clean rock. Excavations that remain open might collect water.

6.0 DESIGN CONSIDERATIONS

6.1 Global Stability Analysis

A global slope stability analysis was performed for a representative slope geometry provided on site plan dated October 22, 2020. Slope stability analysis consists of comparing the driving forces within a slope to the resisting forces and determining the factor of safety. Gravity forces tend to move the slope downwards (driving force), while resisting forces derived from the soil shear strength tend to keep the slope in place. When the driving force acting on the slope is greater than the resisting force, sliding can occur. The factor of safety of the slope is the ratio of the restraining force divided by the driving force. Generally, when the factor of safety is 1 or less, the slope is considered to be unstable. The accepted standard in local practice is to have a factor of safety of 1.5 for long term stability of a slope.

The location of a typical cross-section of the over-steepened slope (i.e., where the slope is steeper than the existing 1V:1.4H to 1V:3H) is represented by Section AA' (i.e., Sta 101+50) shown on Figure 2. We understand that a below-grade utility is present within the existing slope

[2] Elevations herein are in units of feet and refer to North American Vertical Datum (NAVD) 1988.
[3] Rock quality designation is the ratio of the sum of the pieces of core measuring 4 inches or longer to the total length of the cored interval, expressed as a percentage.

approximately at the location shown on the figure included in Appendix E. Hence, lateral excavation on the existing slope is limited. To achieve the accepted minimum factor of safety, a 7-foot deep reinforced rock/concrete key near the toe of the existing slope was considered. In addition, the fill above the existing slope was assumed to consist of 10-foot wide reinforced crushed rock. Long-term conditions are considered critical, effective stress soil properties were used in the analyses. The soil properties used in our analyses are based on empirical correlations from the laboratory soil index tests, our experience with similar materials, and are summarized in Table 1.

Table 1. Soil Properties for Global Stability Analysis

Soil Type	Density (pcf)	Cohesion (psf)	Friction Angle (°)
Fat Clay	120	15	30
Crushed Rock	140	0	40
Reinforced Crushed Rock	140	Infinite Strength	

The Morgenstern-Price procedure was used to compute factors of safety. The computer program SLOPE/W was used to perform the computations. Groundwater was not included in the analysis. The calculated resultant factor of safety was 1.5. The analyzed section with the critical failure arc is presented in Appendix E.

Our analysis indicates that the factor of safety for the slope section analyzed is satisfactory. Slope face protection for the 1:1 slope should be provided by installing a system such as Strata StrataWeb, Presto Geosystems GEOWEB Geocells, Tensar Sierra Slope, or similar.

If the soils within the slope become saturated, a significant reduction in the factor of safety is likely. The geogrid lengths and key used in the global stability analysis result shown in Appendix E should be incorporated into the design. Utility installations near the top of the slopes or within the slopes should be avoided. If this is not possible, special design and construction techniques will be required, such as the use of leak-proof joints, impermeable backfill or drain tiles.

6.2 Site Grading

Site Preparation. In general, all cut areas and areas to receive fill should be stripped of vegetation and associated root zone, soft soil, and other deleterious materials, if any. The exposed subgrade should be proofrolled. Areas that exhibit excessive pumping and deflection should be overexcavated to firm material and backfilled with compacted soil fill.

Suitable Fill Materials. Recommended materials to be used for fill above the existing slope is 1- or 3/4-inch minus crushed limestone such as MoDOT Type 1 base. Under no circumstance should deleterious material (e.g. organics, or other unapproved material) be included in the fill.

Filling on Slopes. Existing slopes should be benched before placement of fill directly on them. Bench shelves should be approximately 10 feet wide, and bench faces should not be higher than 4 feet. Fill slopes should be constructed by extending the compacted fill beyond the planned slope profile and then trimming the slope to the desired configuration.

Fill Placement. Placement and compaction of fill should comply with the current version of MoDOT Standard Specifications for Highway Construction.

Subgrade Protection. Proper drainage of the construction areas should be provided to protect the soil subgrade from the detrimental effects of weather conditions during construction. Soil subgrade will be exposed to weather and disturbances from normal construction traffic. Disturbed areas are generally relatively easy to restore in the drier summer and fall months by reworking the upper soils, but more difficult in the wetter spring and winter months. We recommend limiting construction traffic on prepared subgrades.

Collection and Disposal of Site Water. Control of surface runoff should be maintained in compliance with the rules and regulations set forth in the Federal Water Pollution Control Act. Additionally, permits related to site grading activities and control of storm water during construction activities should be obtained from the applicable governmental jurisdiction(s).

7.0 RECOMMENDED ADDITIONAL SERVICES

The conclusions and recommendations given in this report are based on: Geotechnology's understanding of the proposed design and construction, as outlined in this report; site observations; interpretation of the exploration data; and our experience. Since the intent of the design recommendations is best understood by Geotechnology, we recommend that Geotechnology be included in the final design and construction process, and be retained to review the project plans and specifications to confirm that the recommendations given in this report have been correctly implemented. We recommend that Geotechnology be retained to participate in prebid and preconstruction conferences to reduce the risk of misinterpretation of the conclusions and recommendations in this report relative to the proposed construction of the subject project.

Since actual subsurface conditions between boring locations could vary from those encountered in the borings, our design recommendations are subject to adjustment in the field based on the subsurface conditions encountered during construction. Therefore, we recommend that Geotechnology be retained to provide construction observation services as a continuation of the design process to confirm the recommendations in this report and to revise them accordingly to accommodate differing subsurface conditions. Construction observation is intended to enhance compliance with project plans and specifications. It is not insurance, nor does it constitute a warranty or guarantee of any type. Regardless of construction observation, contractors, suppliers, and others are solely responsible for the quality of their work and for adhering to plans and specifications.

8.0 LIMITATIONS

This report has been prepared on behalf of, and for the exclusive use of, the client for specific application to the named project as described herein. If this report is provided to other parties, it should be provided in its entirety with all supplementary information. In addition, the client should make it clear that the information is provided for factual data only, and not as a warranty of subsurface conditions presented in this report.

Geotechnology has attempted to conduct the services reported herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions. The recommendations and conclusions contained in this report are professional opinions. The report is not a bidding document and should not be used for that purpose.

Our scope for this phase of the project did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors noted or unusual or suspicious items or conditions observed are strictly for the information of our client. Our scope did not include an assessment of the effects of flooding and erosion of creeks or rivers adjacent to or on the project site.

The analyses, conclusions, and recommendations contained in this report are based on the data obtained from the geotechnical exploration. The field exploration methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Consequently, subsurface conditions could vary gradually, abruptly, and/or nonlinearly between sample locations and/or intervals.

The conclusions or recommendations presented in this report should not be used without Geotechnology's review and assessment if the nature, design, or location of the facilities is changed, if there is a lapse in time between the submittal of this report and the start of work at the site, or if there is a substantial interruption or delay during work at the site. If changes are contemplated or delays occur, Geotechnology must be allowed to review them to assess their impact on the findings, conclusions, and/or design recommendations given in this report. Geotechnology will not be responsible for any claims, damages, or liability associated with any other party's interpretations of the subsurface data or with reuse of the subsurface data or engineering analyses in this report.

The recommendations included in this report have been based in part on assumptions about variations in site stratigraphy that can be evaluated further during earthwork and foundation construction. Geotechnology should be retained to perform construction observation and continue its geotechnical engineering service using observational methods. Geotechnology cannot assume liability for the adequacy of its recommendations when they are used in the field without Geotechnology being retained to observe construction.

APPENDIX A – IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

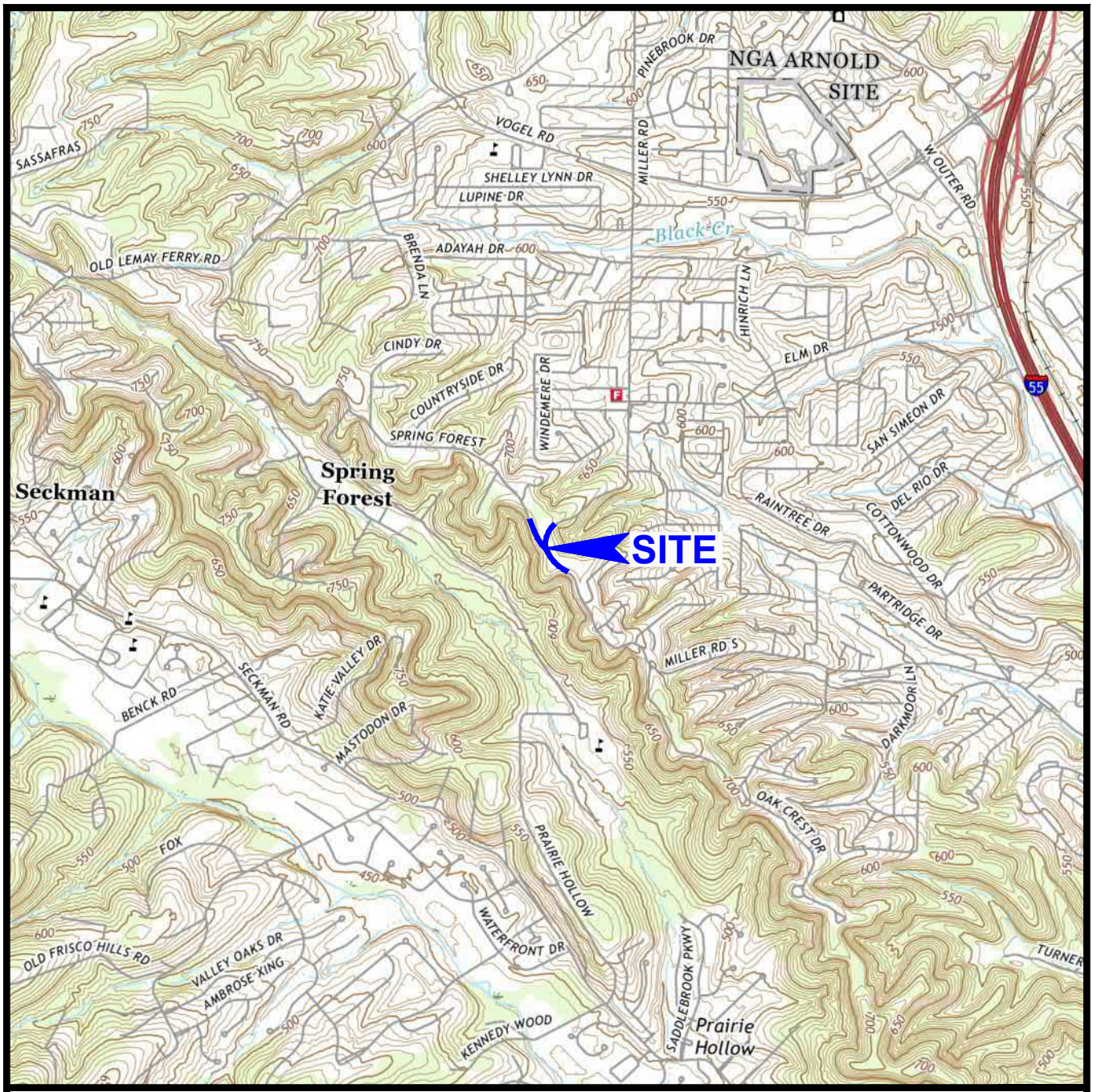
GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX B – FIGURES

Figure 1 - Site Location and Topography

Figure 2 - Aerial Photograph of Site and Boring Locations



NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Maxville, Missouri quadrangle, last revised in 2017.

0 2,000 4,000

SCALE IN FEET

N

Drawn By: WAH	Ck'd By: SK	App'vd By: AWR
Date: 5-18-21	Date: 7-26-21	Date: 7-26-21

GEOTECHNOLOGY
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Spring Forest Road
Jefferson County, Missouri

SITE LOCATION AND TOPOGRAPHY

Project Number	FIGURE 1
J035244.06	

NOTES

1. Plan adapted from "2015 Aerial Imagery for the St. Louis Region" supplied by East-West Gateway Council of Governments and a drawing dated April 21, 2021, titled "Boring Location Plan", prepared by CDG Engineers.

2. Borings were located in the field with reference to site features and are shown approximate only.

LEGEND

Boring Location

Slope Stability Section

N

0 20 40 80

SCALE IN FEET

Drawn By: WAH	Ck'd By: SK	App'vd By: AWR
Date: 5-18-21	Date: 7-26-21	Date: 7-26-21

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A Universal Engineering Sciences Company

Spring Forest Road
Jefferson County, Missouri

AERIAL PHOTOGRAPH OF SITE AND BORING LOCATIONS

Project Number	
J035244.06	FIGURE 2

APPENDIX C – BORING INFORMATION

Boring Logs

Boring Log Terms and Symbols

Rock Core Descriptions

Surface Elevation: 719 Completion Date: 5/12/21

Datum: NAVD 88

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt - 11.5 inches			
	FILL: brown, lean clay to silt, some gravel		8-9-6	SS1
	Hard, reddish-brown, FAT CLAY and weathered limestone - CH		4-13-26	SS2
5			9-16-20	SS3
10			7-13-46	SS4
	Weathered LIMESTONE		7-10-9	SS5
15				
20			6-11-14	SS6
	some clay			
25	Strong, gray, aphanitic, highly fracturesd, unweathered to slightly weathered LIMESTONE		100% / 92%	NQ1
			100% / 73%	NQ2
30	Boring terminated at 29.6 feet.			
35				

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

▲ N-VALUE (BLOWS PER FOOT)

(ASTM D 1586)

WATER CONTENT, %

PL 10 20 30 40 50 LL

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM ___ FEET

JCF DRILLER DLD LOGGER

Geoprobe DRILL RIG

HAMMER TYPE Auto

HAMMER EFFICIENCY 98 %

REMARKS: Rough drilling at a depth of 12 inches.

Drawn by: WAH	Checked by: SK	App'vd. by: AWR
Date: 5/18/21	Date: 7/26/21	Date: 7/26/21

GEOTECHNOLOGY
A Universal Engineering Sciences Company

Spring Forest Road
Jefferson County, Missouri

LOG OF BORING: B-1

Project No. J035244.06

LOG OF BORING 2002 N/E J035244.06 BORING LOGS.GPJ 00 CLONE ME.GPJ 7/14/21

Surface Elevation: 722 Completion Date: 5/12/21

Datum: NAVD 88

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES
	Asphalt - 11 inches			
	FILL: brown, lean clay to silt		1-2-2	SS1
	Stiff to hard, reddish-brown, FAT CLAY and weathered limestone - CH		*	ST2
5				
10			9-13-16	SS3
15			15-21-21	SS4
20			6-9-6	SS5
	Stiff to soft, reddish-brown, FAT CLAY, some weathered limestone - (CH)		5-7-5	SS6
25				
30			2-4-4	SS7
35			1-2-2	SS8
	Boring terminated at 35 feet.			

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

▲ N-VALUE (BLOWS PER FOOT)

(ASTM D 1586)

WATER CONTENT, %

PL 10 20 30 40 50 LL

SS7: 69 >>

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

LOG OF BORING 2002 N/E J035244.06 BORING LOGS.GPJ 00 CLONE ME.GPJ 7/14/21

GROUNDWATER DATA

X FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

___ AUGER 3 3/4" HOLLOW STEM

WASHBORING FROM ___ FEET

JCF DRILLER DLD LOGGER

Geoprobe DRILL RIG

HAMMER TYPE Auto

HAMMER EFFICIENCY 98 %

REMARKS:

*** - Disturbed sample.**

Drawn by: WAH	Checked by: SK	App'vd. by: AWR
Date: 5/18/21	Date: 7/26/21	Date: 7/26/21

GEOTECHNOLOGY

A Universal Engineering Sciences Company

Spring Forest Road
Jefferson County, Missouri

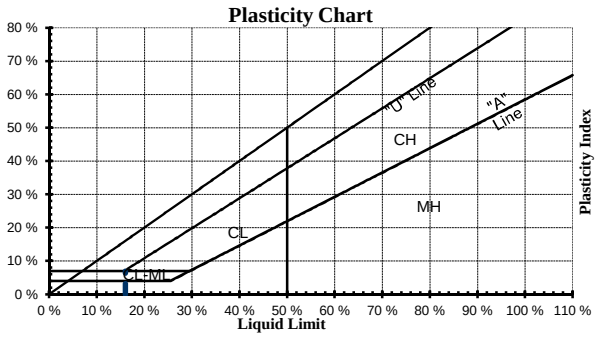
LOG OF BORING: B-2

Project No. J035244.06

BORING LOG: TERMS AND SYMBOLS

LEGEND

CS	Continuous Sampler
GB	Grab Sample
NQ	NQ Rock Core
PST	Three-Inch Diameter Piston Tube Sample
SS	Split-Spoon Sample (Standard Penetration Test)
ST	Three-Inch Diameter Shelby Tube Sample
*	Sample Not Recovered
PL	Plastic Limit (ASTM D4318)
LL	Liquid Limit (ASTM D4318)
SV	Shear Strength from Field Vane (ASTM D2573)
UU	Shear Strength from Unconsolidated-Undrained Triaxial Compression Test (ASTM D2850)
QU	Shear Strength from Unconfined Compression Test (ASTM D2166)



SOIL GRAIN SIZE

US STANDARD SIEVE

12"	3"	3/4"	4	10	40	200	
BOULDERS	COBBLES	GRAVEL		SAND			SILT / CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
300	76.2	19.1	4.76	2.00	0.42	0.074	0.005

SOIL GRAIN SIZE IN MILLIMETERS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Symbol	Description
Coarse-Grained Soils (More than 50% Larger than No. 200 Sieve Size)	Gravel and Gravelly Soil	Clean Gravels Little or no Fines	GW	Well-Graded Gravel, Gravel- Sand Mixture
			GP	Poorly-Graded Gravel, Gravel-Sand Mixture
		Gravels with Appreciable Fines	GM	Silty Gravel, Gravel-Sand-Silt Mixture
			GC	Clayey-Gravel, Gravel-Sand-Clay Mixture
	Sand and Sandy Soils	Clean Sands Little or no Fines	SW	Well-Graded Sand, Gravelly Sand
			SP	Poorly-Graded Sand, Gravelly Sand
		Sands with Appreciable Fines	SM	Silty Sand, Sand-Silt Mixture
			SC	Clayey-Sand, Sand-Clay Mixture
Fine-Grained Soils (More than 50% Smaller than No. 200 Sieve Size)	Silts and Clays	Liquid Limit Less Than 50	ML	Silt, Sandy Silt, Clayey Silt, Slight Plasticity
			CL	Lean Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity
			OL	Organic Silts or Lean Clays, Low Plasticity
	Silts and Clays	Liquid Limit Greater Than 50	MH	Silt, High Plasticity
			CH	Fat Clay, High Plasticity
			OH	Organic Clay, Medium to High Plasticity
	Highly Organic Soils		PT	Peat, Humus, Swamp Soil

STP-5403(680) & STP-5403(681)

ADD-1 109S

STRENGTH OF COHESIVE SOILS

Consistency	Undrained Shear Strength (tsf)	Unconfined Comp. Strength (tsf)
Very Soft	less than 0.125	less then 0.25
Soft	0.125 to 0.25	0.25 to 0.5
Medium Stiff	0.25 to 0.5	0.5 to 1.0
Stiff	0.5 to 1.0	1.0 to 2.0
Very Stiff	1.0 to 2.0	2.0 to 3.0
Hard	greater than 2.0	greater than 4.0

DENSITY OF GRANULAR SOILS

Descriptive Term	Approximate N_{60}-Value Range
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	>50

N-Value (Blow Count) is the last two, 6-inch drive increments (i.e. 4/7/9, N = 7 + 9 = 16). Values are shown as a summation on the grid plot and shown in the Unit Dry Weight/SPT column.

RELATIVE COMPOSITION

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35 to 50%

OTHER TERMS

Layer - Inclusion greater than 3 inches thick.

Seam - Inclusion 1/8-inch to 3 inches thick

Parting - Inclusion less than 1/8-inch thick

Pocket - Inclusion of material that is smaller than sample diameter

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Relative composition and Unified Soil Classification System (USCS) designations are based on visual descriptions and are approximate only. If laboratory tests were performed to classify the soil, the USCS designation is shown in parenthesis.

ROCK CORE DESCRIPTIONS

TERM

Strength
Color
Crystallinity
Grain Size
Mass Bedding
Weathering
Voids
Quality

SEDIMENTARY ROCK TYPE

Sandstone - Predominantly quartz grains cemented by silica, iron, clay or carbonate material. Color depends on cementing agent; porous and pervious; hard and generally thickly bedded.

Siltstone - Composition similar to sandstone but at least 50% grains 0.002 to 0.02 millimeters in size. Rarely forms thick beds, but often hard.

Shale - Predominant particles are less than 0.002 millimeters with a well defined fissile fabric. Commonly interbedded with sandstone or limestone and relatively soft.

Limestone - Contains more than 50% calcium carbonate. The calcite can be precipitated chemically, organically, or it may be detrital in origin. Reacts with dilute HCL.

Dolomite - Harder and heavier than limestone. Forms by alteration of limestone or by direct precipitation from sea water. Reacts with dilute HCL only when powdered.

Coal - Composed of highly altered plant remains and varying amounts of clay, generally black in color.

Chert - Formed by silica deposited from solution in water. May occur as nodules or relatively thick beds.

GEOLOGIC DEFINITIONS

Stylolite - A term applied to parts of certain limestones which have a column like development that is grooved, sutured or striated and irregular in cross-section.

Fissility - A property of splitting along closely spaced parallel planes.

Argillaceous - A term applied to rock or substances having a notable portion, greater then 30%, clay in composition.

Oolitic - A spherical or ellipsoidal texture, 0.25 to 2.0 mm in diameter, with concentric or radial structure.

Brecciated - A rock texture which is composed of angular fragments which correspond in size to gravel and/or pebbles.

Slickenside - A polished or striated surface on or within a rock.

REFERENCE

STRENGTH

Description	*Uniaxial Compressive Strength (psi)*
Extremely Weak	less than 150
Very Weak	150 to 700
Weak	700 to 4,000
Medium Strong	4,000 to 7,000
Strong	7,000 to 15,000
Very Strong	15,000 to 36,000
Extremely Strong	greater than 36,000

COLOR

Common colors are gray, brown, black and white. Exotic colors such as green, blue, maroon can be used when necessary.

CRYSTALLINITY

Description	*Criteria*
Aphanitic	Crystals cannot be seen with the naked eye
Very Finely Crystalline	Crystals are barely visible with the naked eye
Finely Crystalline	Crystals are easily visible with the naked eye
Medium Crystalline	Crystals are medium size; up to 1/8-inch diameter
Coarsely Crystalline	Crystals are 1/8- to 1/4-inch in diameter
Very Coarsely Crystalline	Crystals are larger than 1/4-inch in diameter

GRAIN SIZE

Description	*Criteria*
Very Finely Grained	Grains cannot be seen with the naked eye
Fine Grained	Grains are barely visible with the naked eye
Medium Grained	Grains up to 2 mm in diameter
Coarse Grained	Grains are larger than 2 mm in diameter

BEDDING

Description	*Criteria*
Thin	less than 2 inches
Medium	2 to 24 inches
Thick	24 to 48 inches
Massive	greater than 48 inches

WEATHERING

Description	*Criteria*
Unweathered	No visible alteration of rock mass
Slightly Weathered	Slight discoloration inward from fractures
Moderately Weathered	Discoloration throughout, slight loss of strength, texture intact
Highly Weathered	Entire rock mass appears discolored and dull, texture indistinct, fabric intact
Severely Weathered	Majority of rock mass reduced to soil-like state with relic rock structure

VOIDS

Description	*Criteria*
Dense	Usually not visible with the naked eye
Pitted	Visible to 1/4-inch
Vuggy	1/4-inch to diameter of the core
Cavity	Larger than 6 inches in diameter

QUALITY

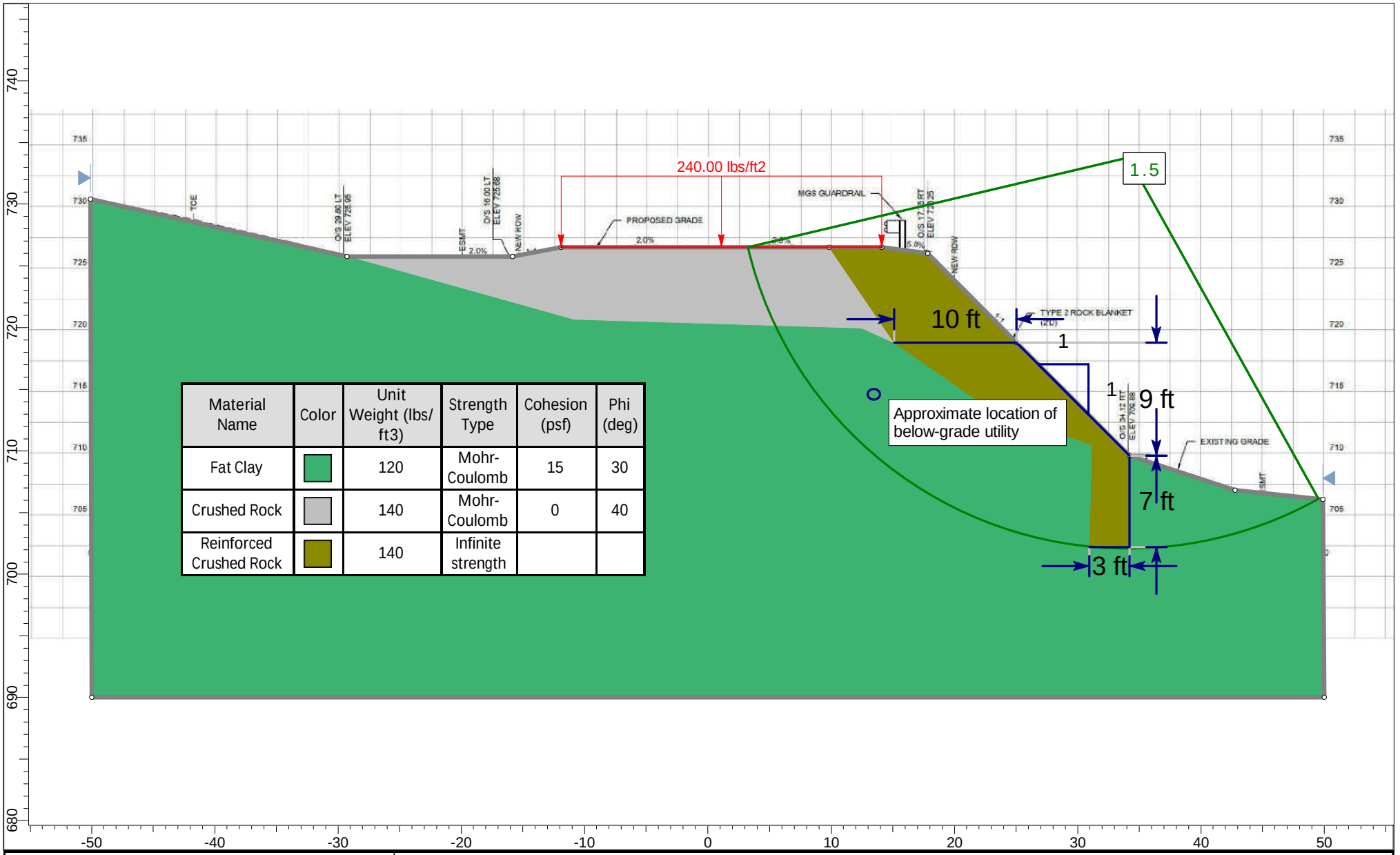
Percent RQD	*Description*
90 to 100	Excellent
75 to 90	Good
50 to 75	Fair
25 to 50	Poor
0 to 25	Very Poor

APPENDIX D – ROCK CORE PHOTOGRAPH

J035244.06	Spring Forest Road Jefferson County, Missouri	B-1 Box 1 of 1

RUN	DEPTH, FT	RECOVERY, %	RQD, %
1	24.0 – 26.5	100	92
2	26.5 – 29.6	100	73

APPENDIX E – SLOPE STABILITY ANALYSIS RESULT



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Fat Clay		120	Mohr-Coulomb	15	30
Crushed Rock		140	Mohr-Coulomb	0	40
Reinforced Crushed Rock		140	Infinite strength		

GEOTECHNOLOGY
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SLIDEINTERPRET 9.018

Project	Spring Forest Road
Analysis Description	Section AA' (Sta 101+50)
Drawn By	sk
Figure	
File	Spring Forest Road.slmd

JEFFERSON COUNTY MISSOURI

MILLER ROAD PHASE 1, AT SPRING FOREST ROAD JEFFERSON COUNTY, MISSOURI SECTION 1, TOWNSHIP T42N, RANGE 5E PROJECT NO. STP-5403(680)

SHEET INDEX

DESIGN CRITERIA:

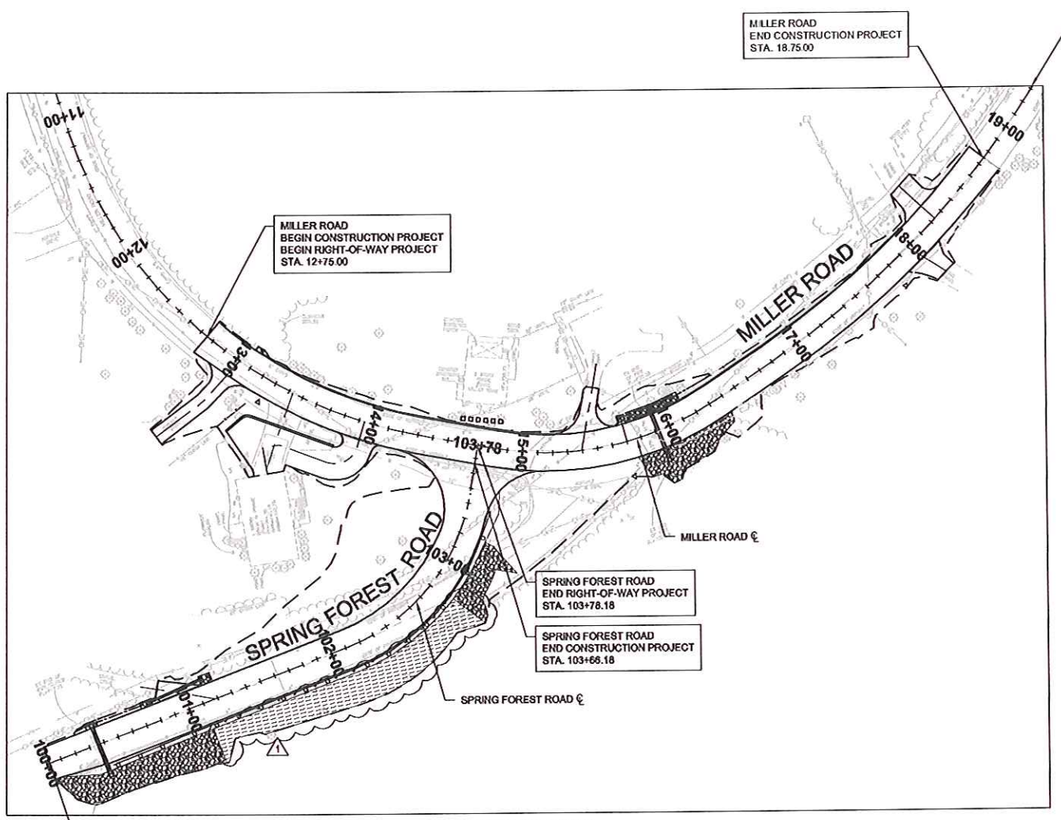
1. A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS (AASHTO "GREEN BOOK" EDITION 2018)
2. 2020 MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION
3. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) EDITION 2009
4. MODOT ENGINEERING POLICY GUIDE

DESIGN DESIGNATION:

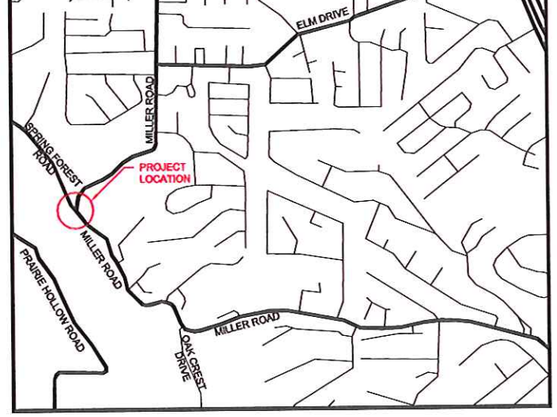
FUNCTIONAL CLASSIFICATION	COLLECTOR
CURRENT POSTED SPEED	30 MPH
DESIGN SPEED	30 MPH
CURRENT ADT	6482 (2015)
FUTURE ADT (EST)	10622 (2035)
TRUCK %	6.0%

LENGTH OF PROJECT:

MILLER ROAD	
BEGINNING STATION	12+75.00
ENDING STATION	18+75.00
APPARENT LENGTH	600.00 FEET
SPRING FOREST ROAD	
BEGINNING STATION	100+02.00
ENDING STATION	103+66.18
APPARENT LENGTH	364.18 FEET
EQUATION AND EXCEPTION	NONE
TOTAL CORRECTIONS	NONE
NET LENGTH OF PROJECT	964.18 FEET (0.18 MI)



PROJECT SITE MAP
SCALE: 1" = 50'



VICINITY MAP
NOT TO SCALE

LOCAL UTILITY COMPANIES:

ELECTRIC
AMEREN UE
BRIAN FLIER
6450 HWY MM
HOUSE SPRINGS, MO 63051
(636) 671-6178

TELEPHONE
AT&T DISTRIBUTION
MIKE RAULS
12851 MANCHESTER ROAD, SUITE 2-E-303
DES PERES, MO 63131
(314) 972-2733

GAS
SPIRE ENERGY
BRIAN LANGEBACHER
4118 SHREWSBURY AVE.
SHREWSBURY, MO 63119
(314) 768-7767

SEWER
ROCK CREEK SEWER DISTRICT
JASON SEGER
4133 W. OUTER ROAD
ARNOLD, MO 63010
(636) 461-2578

WATER
JEFFERSON COUNTY PWSD C-1
JUSTIN MADDING
P. O. BOX 430
BARNHART, MO 63012
(636) 375-8897

CABLE
CHARTER SPECTRUM
815 CHARTER COMMONS
TOWN & COUNTRY, MO 63017
(314) 366-1640

NOTE: NO OTHER KNOWN UTILITIES.
UTILITY LOCATE: 1.800.DIGRITE

APPROVED BY
JEFFERSON COUNTY, MISSOURI

SIGNATURE — DATE 8-11-2021

JASON JONAS, P.E.
DIRECTOR OF PUBLIC WORKS

THE UNDERGROUND UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NONEXISTENCE, SIZE, TYPE, NUMBER, OR LOCATION OF THESE OR OTHER UTILITIES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UNDERGROUND UTILITIES, SHOWN OR NOT SHOWN, AND SHALL LOCATE THE UTILITIES IN THE FIELD PRIOR TO ANY GRADING, EXCAVATION, OR CONSTRUCTION IMPROVEMENTS.

REV.	DATE	DESCRIPTION	APPROVED
1	08/11/21	BID ADDENDUM #1	KTO

PLOT SCALE FACTOR 0.5

CDG ENGINEERS
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T. 314.781.7770
F. 314.781.9075
Missouri State Certificate of Authority # 1272

DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
KEVIN THOMAS FOY O'SHAUGHNESSY
NUMBER PE-2017000345
PROFESSIONAL ENGINEER
8-11-21

KEVIN THOMAS FOY O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 14, 2021

TITLE SHEET
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
T-001

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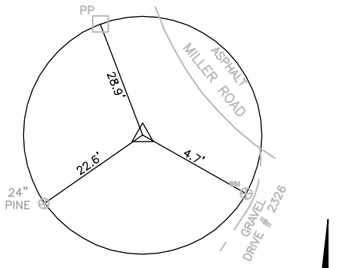
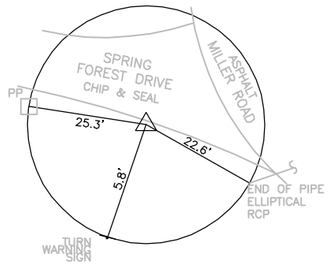
koshaughnessy 08/03/21-18:00

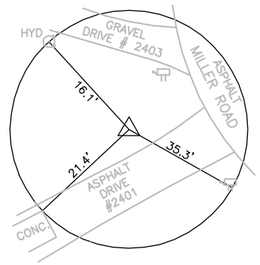
SURVEY CONTROL:



CONTROL POINT NO. 1
IRON ROD W/CAP
N: 934908.016
E: 846330.364
EL: 740.64



CONTROL POINT NO. 2
IRON ROD W/CAP
N: 935088.022
E: 846206.651
EL: 732.37



CONTROL POINT NO. 3
IRON ROD W/CAP
N: 935336.715
E: 846257.233
EL: 735.19

VERTICAL CONTROL STATEMENT:

VERTICAL DATUM IS NAVD 88. ELEVATION WAS ESTABLISHED ON CONTROL POINT 1 USING A CELLULAR EQUIPPED SPECTRA PRECISION RANGER, AND BASED ON THE MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION GLOBAL NAVIGATION SATELLITE REAL TIME NETWORK FOR CONTINUOUS OPERATING REFERENCE STATIONS. A CONVENTIONAL BENCHMARK LEVEL LOOP WAS USED TO ESTABLISH ELEVATIONS ON CONTROL POINTS 2 THROUGH 3.

BENCHMARK DATA:

PROJECT BENCHMARK:
JE-BM-101 (MISSOURI GEOGRAPHIC REFERENCE SYSTEM)
ELEVATION=428.02: STANDARD DNR ALUMINUM DISK STAMPED "JEBM101, 1996", GROUTED IN THE SOUTHEAST CORNER OF THE TURNER CAMP ROAD BRIDGE OVER BLACK CREEK AND SITUATED IN JEFFERSON COUNTY, MO. IT IS 14.9 FEET SOUTH OF THE CENTERLINE OF TURNER CAMP ROAD; 56.7 FEET SOUTHWEST OF A NAIL AND SHINER IN A UTILITY POLE; AND 33.5 FEET NORTHWEST OF A NAIL AND SHINER IN A UTILITY POLE.

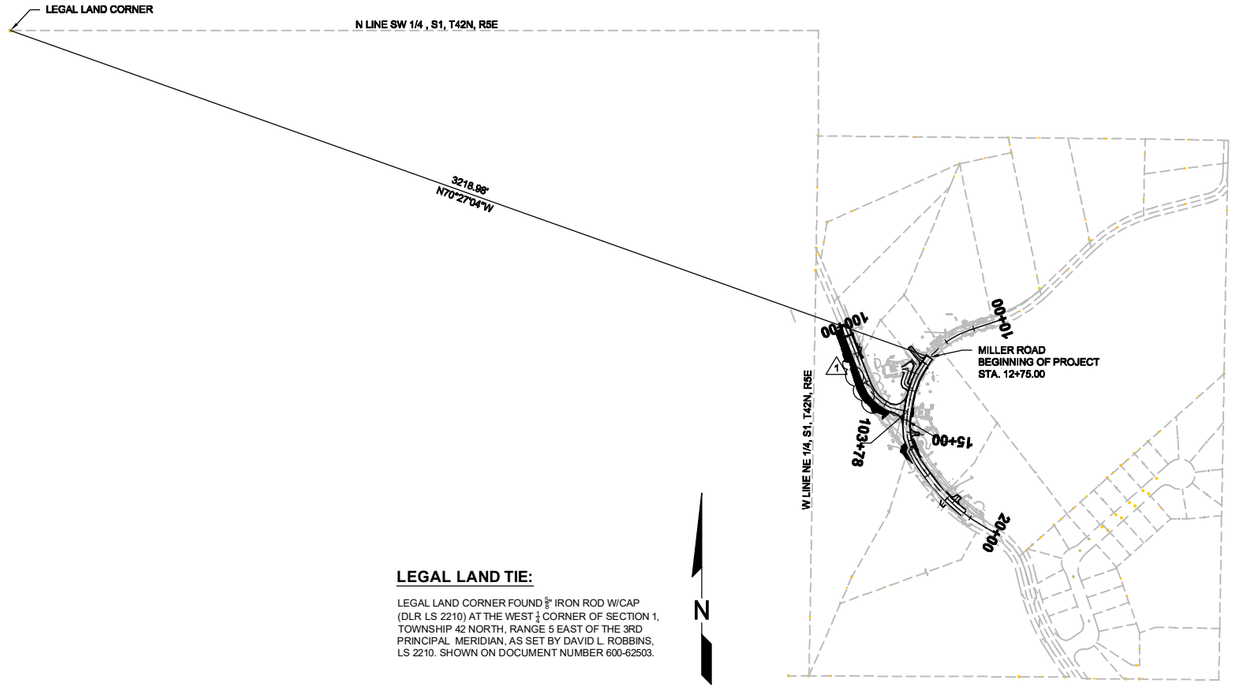
TBM "A" ELEVATION=742.80: "O" IN OPEN ON TOP OF A FIRE HYDRANT NORTH OF THE GRAVEL DRIVE FOR #2325 MILLER ROAD, 40 FEET NORTHEAST OF THE CENTERLINE OF MILLER ROAD.

TBM "B" ELEVATION=737.91: "O" IN OPEN ON TOP OF A FIRE HYDRANT BETWEEN # 2401 AND # 2403 MILLER ROAD, 24 FEET NORTHWEST OF THE CENTERLINE OF MILLER ROAD.

HORIZONTAL CONTROL STATEMENT:

STATE PLANE COORDINATES ON THIS PROJECT WERE ESTABLISHED UTILIZING THE MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION GLOBAL NAVIGATION SATELLITE REAL TIME NETWORK FOR CONTINUOUSLY OPERATING REFERENCE STATIONS DURING JANUARY, 2019, AND ARE BASED ON THE MISSOURI COORDINATE SYSTEM OF 1983, EAST ZONE. THE AVERAGE COMBINED PROJECT GRID FACTOR IS 0.9999122 AS CALCULATED BY TRIMBLE GEOMATICS OFFICE.

PROJECT COORDINATES ARE MODIFIED MISSOURI STATE PLANE COORDINATES AND WERE ESTABLISHED BY APPLYING THE INVERSE OF THE PROJECT GRID FACTOR (1.0000878) ABOUT THE ORIGIN (0,0).



LEGAL LAND TIE:

LEGAL LAND CORNER FOUND $\frac{5}{8}$" IRON ROD W/CAP (DLR LS 2210) AT THE WEST $\frac{1}{4}$ CORNER OF SECTION 1, TOWNSHIP 42 NORTH, RANGE 5 EAST OF THE 3RD PRINCIPAL MERIDIAN, AS SET BY DAVID L. ROBBINS, LS 2210. SHOWN ON DOCUMENT NUMBER 600-62503.

LEGEND:

△ = CONTROL POINT; DESCRIPTION AS CALLED OUT

N: = NORTHING COORDINATE

E: = EASTING COORDINATE

EL: = ELEVATION

GENERAL NOTES:

1. BASIS OF BEARINGS: MISSOURI STATE PLANE COORDINATE SYSTEM (MISSOURI EAST 2401).
2. HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83).
3. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

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REV.	DATE	DESCRIPTION	APPROVED
1	08/11/21	BID ADDENDUM #1	KTO

CDG ENGINEERS
One Campbell Plaza
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Missouri State Certificate of Authority # 1271

JEFFERSON COUNTY, MISSOURI
DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas Foy O'Shaughnessy
NUMBER PE-2017000345
PROFESSIONAL ENGINEER
8-11-21

KEVIN THOMAS FOY O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
January 8, 2021

SURVEY CONTROL
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
T-003

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PLOT SCALE FACTOR 0.5

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QUANTITY SUMMARY (2A) TABLE

ITEM NO.	MODOT BID ITEM	JSP	ITEM DESCRIPTION	UNIT	QTY	
ROADWAY SUBTOTAL						
1	2013000		Clearing and Grubbing	AC	0.8	
2	2022010	H	Removal of Improvements	LS	1	
3	2031000		Class A Excavation	CY	711	1
4	2035500		Embankment in Place	CY	1825	
5	2036000		Compacting Embankment	CY	846	
6	2051010	I	Modified Subgrade	SY	72	
7	3040504		Type 5 Aggregate for Base (4" Thick, Roadway) (4" Thick, Driveway)	SY	3467	1
7A	3049907		Type 1 Aggregate for Base (Compacted in 6" Lifts)	CY	1903	
8	4011209		Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Roadway) (2" Thick, Driveway)	TON	344.4	
9	4013000		Bituminous Pavement Mixture PG64-22, (Base) (8" Thick, Roadway) (4" Thick, Driveway)	TON	1283.7	
10	4071005		Tack Coat	Gal	60	
11	5021106		Concrete Pavement (6 IN. Non-Reinf)	SY	253	
12	6042097		Adjust Water Valve	EA	5	
13	6042098		Adjust Water Meter	EA	2	
14	6042099		Adjust Fire Hydrant	EA	1	
15	6061060		MGS Guardrail	LF	212.5	
16	6063014		Type A Crashworthy End Terminal (MASH)	EA	2	
17	6071011A		Chain-link Fence (48IN.)	LF	25	
18	6091052		Curb and Gutter Type B	LF	435	
19	6097000		Rock Lining	CY	16	1
20	6113020		Fumishing Type 2 Rock Blanket	CY	294	
21	6113040		Placing Type 2 Rock Blanket	CY	294	
22	6161005	J	Constructions Signs	SF	180	
23	6161031	J	Type III Moveable Barricade with Light	EA	9	
24	6161034	J	Directional Indicator Barricade with Light	EA	2	
25	6161099	J	Changeable Message Sign with Communication Interface, Contractor Furnished, Contractor Retained	EA	3	
26	6181000		Mobilization	LS	1	
27	6274000	M	Contractor Fumished Surveying and Staking (MoDOT Spec.)	LS	1	
28	7209904		Small Block Retaining Wall (Self Supporting)	SF	360	
29	7261015		15" Pipe Group A, Class V RCP	LF	28	
30	7269903		14"x23" Elliptical Pipe Group A, Class III RCP	LF	26	
31	7269903		14"x23" Elliptical Pipe Group A, Class V RCP	LF	25	
32	7320615A		15" Group A Flared End Section	EA	2	
33	7329902		14"x23" Elliptical Group A Flared End Section	EA	4	
34	8052000A		Seeding - Warm Season Mixtures	AC	0.6	
35	8061019	K	Silt Fence	LF	1815	
36	8064138		Type 2D Erosion Control Blanket	SY	561	
37	8080099		Landscape Restoration	LS	1	
38	9029400		Temporary Traffic Signals	LS	1	
39	7209904	V	Reinforced Crushed Rock and Slope Face Protection System (Design Build)	SF	5143	1
SIGNAGE/STRIPING/SIGNALS SUBTOTAL						
40	6161010		Relocated Signs	SF	50	1
41	6206000B		Acrylic Waterboume Pavt. Paint 4 Inch White	LF	1964	
42	6206001B		Acrylic Waterboume Pavt. Paint 4 Inch Yellow	LF	1900	

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REV.	DATE	DESCRIPTION	APPROVED
1	08/11/21	BID ADDENDUM #1	KTO

CDG ENGINEERS
One Campbell Plaza
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T. 314.781.7770
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Missouri State Certificate of Authority # 1271

JEFFERSON COUNTY MISSOURI
DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas Foy O'Shaughnessy
NUMBER PE-2017000345
8-11-21
PROFESSIONAL ENGINEER

KEVIN THOMAS FOY O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 14, 2021

QUANTITY SUMMARY (2A) TABLE
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
T-004

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koshaughnessy 08/03/21-18:00

PLOT SCALE FACTOR 0.5

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QUANTITY SUMMARY (2B) TABLE

ITEM NO.	BID ITEM	DESCRIPTION	SHEET	STATION	LOCATION	QUANITITY	UNIT
ROADWAY							
1	2013000	Clearing and Grubbing	C-201	12+75 - 16+75	LT & RT	0.2	AC
1	2013000	Clearing and Grubbing	C-202	16+75 - 18+75	LT & RT	0.1	AC
1	2013000	Clearing and Grubbing	C-203	102+00 - 13+78.18	LT & RT	0.5	AC
TOTAL						**0.8**	**AC**
2	2022010	Removal of Improvements	C-201 - C-203	PROJECT		1	LS
TOTAL						**1**	**LS**
3	2031000	Class A Excavation	C-301	PROJECT		711	CY
TOTAL						**711**	**CY**
4	2035500	Embankment in Place	C-301	PROJECT		1825	CY
TOTAL						**1825**	**CY**
5	2036000	Compacting Embankment	C-301	PROJECT		640	CY
TOTAL						**640**	**CY**
6	2051010	Modified Subgrade	C-301	PROJECT		72	SY
TOTAL						**72**	**SY**
7	3040504	Type 5 Aggregate for Base (4" Thick, Roadway)	C-201 - C-202	12+75 - 18+75	LT & RT	1738	SY
7	3040504	Type 5 Aggregate for Base (4" Thick, Roadway)	C-203	102+00 -103+78.18	LT & RT	1202	SY
7	3040504	Type 5 Aggregate for Base (4" Thick, Driveway.)	C-201	13+93.75	RT	273	SY
7	3040504	Type 5 Aggregate for Base (4" Thick, Driveway.)	C-201	13+01.93	RT	90	SY
7	3040504	Type 5 Aggregate for Base (4" Thick, Driveway.)	C-201	15+40	LT	54	SY
7	3040504	Type 5 Aggregate for Base (4" Thick, Driveway.)	C-202	17+97.10	RT	40	SY
7	3040504	Type 5 Aggregate for Base (4" Thick, Driveway.)	C-202	18+23.46	LT	47	SY
7	3040504	Type 5 Aggregate for Base (4" Thick, Driveway.)	C-203	101+18.47	LT	23	SY
TOTAL						**3467**	**SY**
7A	3049907	Type 1 Aggregate for Base (Compacted in 6" Lifts)	C-203	100+02 - 103+16	LT & RT	1903	CY
TOTAL						**1903**	**CY**
8	4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Roadway)	C-201 - C-202	12+75 - 18+75	LT & RT	186.9	TON
8	4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Roadway)	C-203	102+00 -103+78.18	LT & RT	130.1	TON
8	4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Driveway)	C-201	13+01.93	RT	9.5	TON
8	4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Driveway)	C-201	15+40	LT	5.3	TON
8	4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Driveway)	C-202	17+97.10	RT	4.5	TON
8	4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Driveway)	C-202	18+23.46	LT	5.4	TON
8	4011209	Bituminous Pavement Mixture PG64-22, (BP-1) (2" Thick, Driveway)	C-203	101+18.47	LT	2.7	TON
TOTAL						**344.4**	**TON**
9	4013000	Bituminous Pavement Mixture PG64-22, (Base) (6" Thick, Roadway)	C-201 - C-202	12+75 - 18+75	LT & RT	708.0	TON
9	4013000	Bituminous Pavement Mixture PG64-22, (Base) (8" Thick, Roadway)	C-203	102+00 -103+78.18	LT & RT	521.2	TON
9	4013000	Bituminous Pavement Mixture PG64-22, (Base) (4" Thick, Driveway)	C-201	13+01.93	RT	18.9	TON
9	4013000	Bituminous Pavement Mixture PG64-22, (Base) (4" Thick, Driveway)	C-201	15+40	LT	10.5	TON
9	4013000	Bituminous Pavement Mixture PG64-22, (Base) (4" Thick, Driveway)	C-202	17+97.10	RT	9.0	TON
9	4013000	Bituminous Pavement Mixture PG64-22, (Base) (4" Thick, Driveway)	C-202	18+23.46	LT	10.7	TON
9	4013000	Bituminous Pavement Mixture PG64-22, (Base) (4" Thick, Driveway)	C-203	101+18.47	LT	5.4	TON
TOTAL						**1283.7**	**TON**
10	4071005	Tack Coat	PROJECT			60	Gal
TOTAL						**60**	**Gal**
11	5021106	Concrete Pavement (6 IN. Non-Reinf)	C-201	13+93.75	RT	253	SY
TOTAL						**253**	**SY**
12	6042097	Adjust Water Valve	C-201	13+12.84	RT	1	EA
12	6042097	Adjust Water Valve	C-203	103+50.76	RT	1	EA
12	6042097	Adjust Water Valve	C-203	103+55.33	RT	1	EA
12	6042097	Adjust Water Valve	C-203	103+55.74	RT	1	EA
12	6042097	Adjust Water Valve	C-203	103+56.27	RT	1	EA
TOTAL						**5**	**EA**
13	6042098	Adjust Water Meter	C-201	13+87.44	RT	1	EA
13	6042098	Adjust Water Meter	C-202	17+83.23	RT	1	EA
TOTAL						**2**	**EA**
14	6042099	Adjust Fire Hydrant	C-201	13+12.80	RT	1	EA
TOTAL						**1**	**EA**
15	6061060	MGS Guardrail	C-203	100+90 - 102+93	RT	212.5	LF
TOTAL						**212.5**	**LF**
16	6063014	Type A Crashworthy End Terminal (MASH)	C-203	100+40.13	RT	1	EA
16	6063014	Type A Crashworthy End Terminal (MASH)	C-203	103+37.77	RT	1	EA
TOTAL						**2**	**EA**
17	6071011A	Chain-link Fence (48IN.)	C-201	13+12 - 13+20	RT	25	LF
TOTAL						**25**	**LF**
18	6091052	Curb and Gutter Type B	C-201 - C-202	13+12 - 18+08	LT	435	LF
TOTAL						**435**	**LF**

ITEM NO.	BID ITEM	DESCRIPTION	SHEET	STATION	LOCATION	QUANITITY	UNIT
ROADWAY							
19	6097000	Rock Lining	C-201	13+06 - 13+12	LT	1	CY
19	6097000	Rock Lining	C-201	15+67 - 16+15	LT	9	CY
19	6097000	Rock Lining	C-203	100+70 - 100+79	LT	2	CY
19	6097000	Rock Lining	C-203	100+70 - 100+79	LT	2	CY
19	6097000	Rock Lining	C-203	101+13 - 101+21	LT	2	CY
TOTAL						**16**	**CY**
20	6113020	Furnishing Type 2 Rock Blanket	C-202	15+74 - 16+41	RT	87	CY
20	6113020	Furnishing Type 2 Rock Blanket	C-203	100+02 - 101+10	RT	195	CY
20	6113020	Furnishing Type 2 Rock Blanket	C-203	102+82 - 103+20	RT	12	CY
TOTAL						**294**	**CY**
21	6113040	Placing Type 2 Rock Blanket	C-202	15+74 - 16+41	RT	87	CY
21	6113040	Placing Type 2 Rock Blanket	C-203	100+02 - 101+10	RT	195	CY
21	6113040	Placing Type 2 Rock Blanket	C-203	102+82 - 103+20	RT	12	CY
TOTAL						**294**	**CY**
22	6161005	Constructions Signs	TCP-101	Varies	Varies	180	SF
TOTAL						**180**	**SF**
23	6161031	Type III Moveable Barricade with Light	TCP-101	Varies	Varies	9	EA
TOTAL						**9**	**EA**
24	6161034	Directional Indicator Barricade with Light	TCP-101	Varies	Varies	2	EA
TOTAL						**2**	**EA**
25	6161099	Changeable Message Sign with Communication Interface, Contractor Furnished, Contractor Retained	TCP-101	Varies	Varies	3	EA
TOTAL						**3**	**EA**
26	6181000	Mobilization		PROJECT		1	LS
TOTAL						**1**	**LS**
27	6274000	Contractor Furnished Surveying and Staking (MoDOT Spec.)		PROJECT		1	LS
TOTAL						**1**	**LS**
28	7209904	Small Block Retaining Wall (Self Supporting)	C-201	10+18 - 13+80	RT	285	SF
28	7209904	Small Block Retaining Wall (Self Supporting)	C-201	14+56 - 14+84	LT	75	SF
TOTAL						**360**	**SF**
29	7261015	15" Pipe Group A, Class V RCP	C-501	100+75.41 - 101+15.41	LT	28	LF
TOTAL						**28**	**LF**
30	7269903	14"x23" Elliptical Pipe Group A, Class III RCP	C-501	15+92	LT & RT	26	LF
TOTAL						**26**	**LF**
31	7269903	14"x23" Elliptical Pipe Group A, Class V RCP	C-501	100+36.31	LT & RT	25	LF
TOTAL						**25**	**LF**
32	7320615A	15" Group A Flared End Section	C-501	100+75.41	LT	1	EA
32	7320615A	15" Group A Flared End Section	C-501	101+15.41	LT	1	EA
TOTAL						**2**	**EA**
33	7329902	14"x23" Elliptical Group A Flared End Section	C-501	15+92.00	LT	1	EA
33	7329902	14"x23" Elliptical Group A Flared End Section	C-501	15+92.00	RT	1	EA
33	7329902	14"x23" Elliptical Group A Flared End Section	C-501	100+36.56	LT	1	EA
33	7329902	14"x23" Elliptical Group A Flared End Section	C-501	100+36.56	RT	1	EA
TOTAL						**4**	**EA**
34	8052000A	Seeding - Warm Season Mixtures	C-201	12+75 - 16+75	LT & RT	0.2	AC
34	8052000A	Seeding - Warm Season Mixtures	C-202	16+75 - 18+75	LT & RT	0.1	AC
34	8052000A	Seeding - Warm Season Mixtures	C-203	102+00 - 13+78.18	LT & RT	0.3	AC
TOTAL						**0.6**	**AC**
35	8061019	Silt Fence	C-301	PROJECT	LT & RT	1815	LF
TOTAL						**1815**	**LF**
36	8064138	Type 2D Erosion Control Blanket	C-301	PROJECT	LT & RT	561	SY
						561	**SY**
37	8080099	Landscape Restoration	C-301	PROJECT		1	LS
TOTAL						**1**	**LS**
38	9029400	Temporary Traffic Signals		PROJECT		1	LS
TOTAL						**1**	**LS**
39	7209904	Reinforced Crushed Rock and Slope Face Protection System (Design Build)	C-203	101+10 - 102+82	RT	5143	SF
TOTAL						**5143**	**SF**

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DEPARTMENT OF PUBLIC WORKS

KEVIN THOMAS FOY O'SHAUGHNESSY
NUMBER PE-2017000345
8-11-21
PROFESSIONAL ENGINEER

Koshaughnessy
July 14, 2021

QUANTITY SUMMARY (2B) TABLE
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
T-005

THE UNDERGROUND UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NONEXISTENCE, SIZE, TYPE, NUMBER, OR LOCATION OF THESE OR OTHER UTILITIES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UNDERGROUND UTILITIES, SHOWN OR NOT SHOWN, AND SHALL LOCATE THE UTILITIES IN THE FIELD PRIOR TO ANY GRADING, EXCAVATION, OR CONSTRUCTION IMPROVEMENTS.

REV.	DATE	DESCRIPTION	APPROVED
1	08/11/21	BID ADDENDUM #1	KTO

QUANTITY SUMMARY (2B) TABLE (CONTINUED)

ITEM NO.	BID ITEM	DESCRIPTION	SHEET	STATION	LOCATION	QUANITITY	UNIT
SIGNAGE/STRIPING/SIGNALS							
40	6161010	Relocated Signs	C-201 - C-203	PROJECT		50	SF
TOTAL						**50**	**SF**
41	6206000B	Acrylic Waterboume Pavt. Paint 4 Inch White	C-201	12+75 - 16+75.61	LT & RT	802	LF
41	6206000B	Acrylic Waterboume Pavt. Paint 4 Inch White	C-202	16+75.61 - 18+75	LT & RT	401	LF
41	6206000B	Acrylic Waterboume Pavt. Paint 4 Inch White	C-203	102+00 - 103+50	LT & RT	761	LF
TOTAL						**1964**	**LF**
42	6206001B	Acrylic Waterboume Pavt. Paint 4 Inch Yellow	C-201	12+75 - 16+75.61	LT & RT	800	LF
42	6206001B	Acrylic Waterboume Pavt. Paint 4 Inch Yellow	C-202	16+75.61 - 18+75	LT & RT	400	LF
42	6206001B	Acrylic Waterboume Pavt. Paint 4 Inch Yellow	C-203	102+00 - 103+50	LT & RT	700	LF
TOTAL						**1900**	**LF**

1

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JEFFERSON COUNTY MISSOURI 1845
DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas O'Shaughnessy
NUMBER PE-2017000345
8-11-21
PROFESSIONAL ENGINEER

KEVIN THOMAS FOY
O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 14, 2021

QUANTITY SUMMARY (2B) TABLE
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
T-006

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REV.	DATE	DESCRIPTION	APPROVED
1	08/11/21	BID ADDENDUM #1	KTO

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PLOT SCALE FACTOR 0.5

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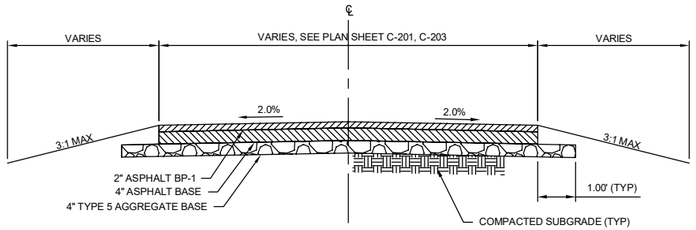
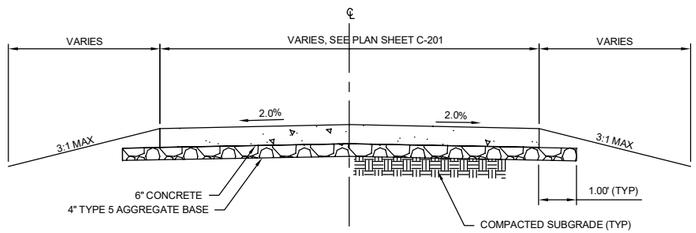


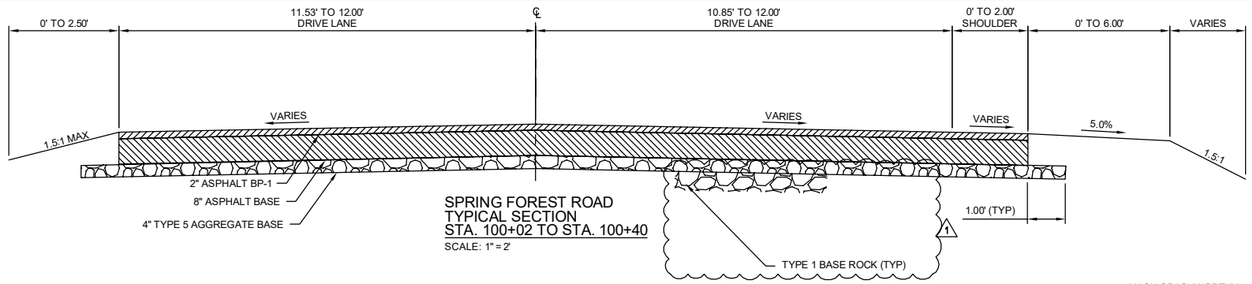
ASPHALT DRIVEWAY
TYPICAL SECTION
SCALE: 1" = 2'



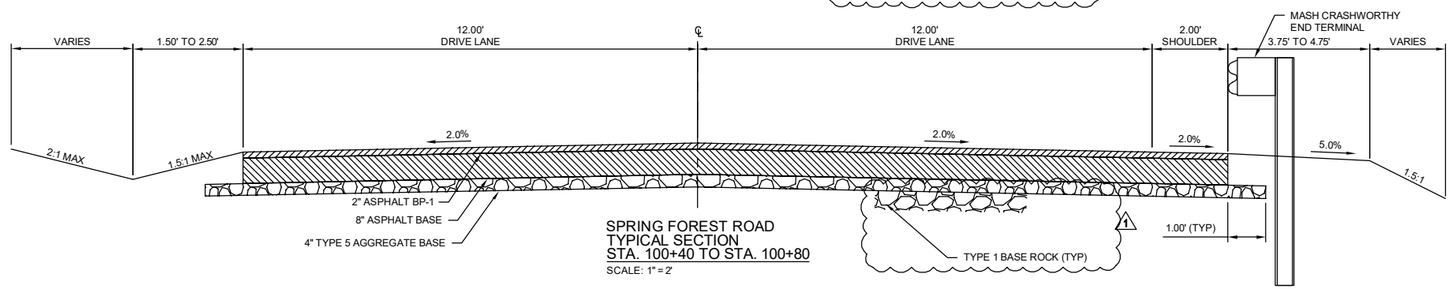
CONCRETE DRIVEWAY
TYPICAL SECTION
SCALE: 1" = 2'

GENERAL NOTES:

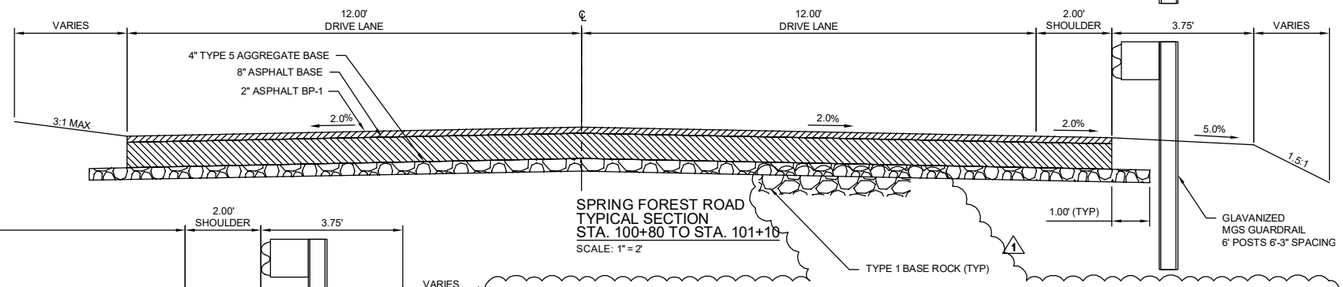
1. TYPE 1 BASE ROCK IS TO BE COMPACTED ON LEVEL BENCHES IN 6" LIFTS.
2. CONTRACTOR TO VERIFY THAT INSTALLING GALVANIZED MGS GUARDRAIL WILL NOT DAMAGE REINFORCED CRUSHED ROCK AND SLOPE FACE PROTECTION SYSTEM.



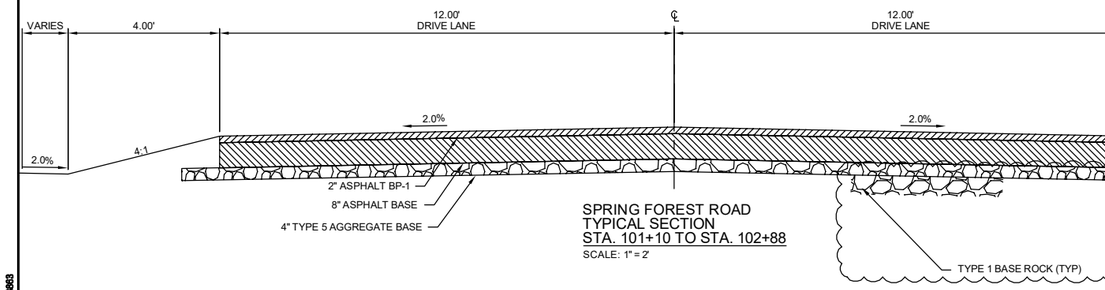
SPRING FOREST ROAD
TYPICAL SECTION
STA. 100+02 TO STA. 100+40
SCALE: 1" = 2'



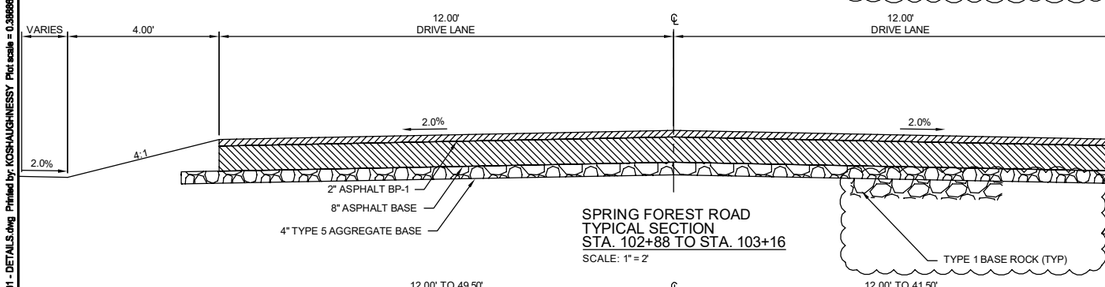
SPRING FOREST ROAD
TYPICAL SECTION
STA. 100+40 TO STA. 100+80
SCALE: 1" = 2'



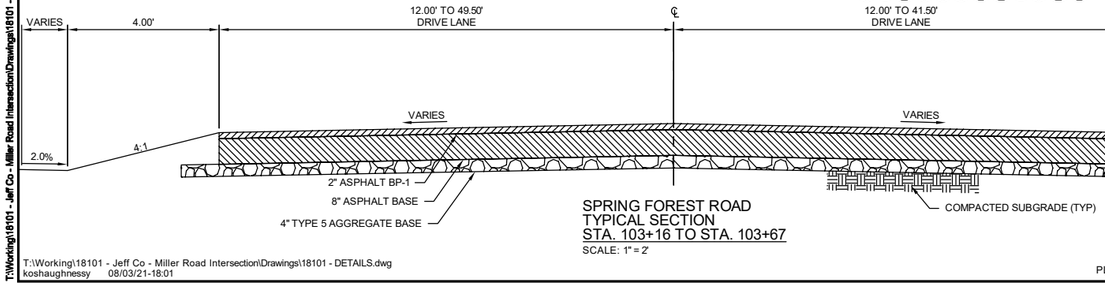
SPRING FOREST ROAD
TYPICAL SECTION
STA. 100+80 TO STA. 101+10
SCALE: 1" = 2'



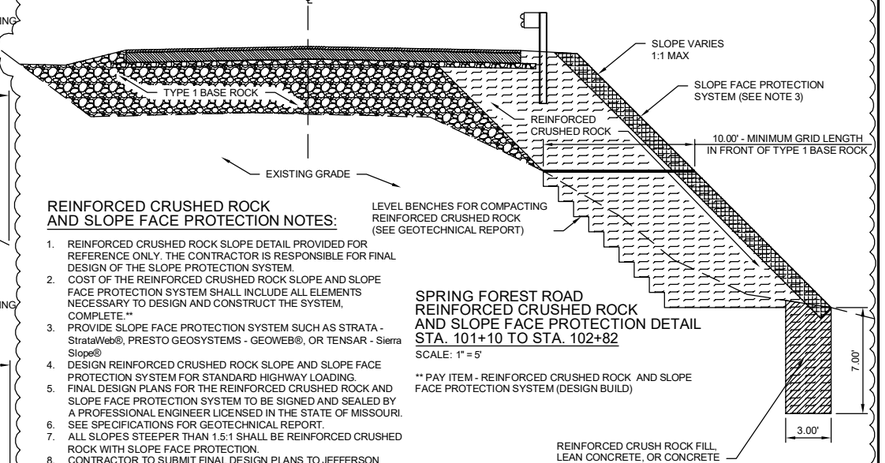
SPRING FOREST ROAD
TYPICAL SECTION
STA. 101+10 TO STA. 102+88
SCALE: 1" = 2'



SPRING FOREST ROAD
TYPICAL SECTION
STA. 102+88 TO STA. 103+16
SCALE: 1" = 2'



SPRING FOREST ROAD
TYPICAL SECTION
STA. 103+16 TO STA. 103+67
SCALE: 1" = 2'



REINFORCED CRUSHED ROCK AND SLOPE FACE PROTECTION NOTES:

1. REINFORCED CRUSHED ROCK SLOPE DETAIL PROVIDED FOR REFERENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FINAL DESIGN OF THE SLOPE PROTECTION SYSTEM.
2. COST OF THE REINFORCED CRUSHED ROCK SLOPE AND SLOPE FACE PROTECTION SYSTEM SHALL INCLUDE ALL ELEMENTS NECESSARY TO DESIGN AND CONSTRUCT THE SYSTEM, COMPLETE.**
3. PROVIDE SLOPE FACE PROTECTION SYSTEM SUCH AS STRATA - StrataWeb®, PRESTO GEOSYSTEMS - GEOWEB®, OR TENSAR - Sierra Slope®
4. DESIGN REINFORCED CRUSHED ROCK SLOPE AND SLOPE FACE PROTECTION SYSTEM FOR STANDARD HIGHWAY LOADING.
5. FINAL DESIGN PLANS FOR THE REINFORCED CRUSHED ROCK AND SLOPE FACE PROTECTION SYSTEM TO BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MISSOURI.
6. SEE SPECIFICATIONS FOR GEOTECHNICAL REPORT.
7. ALL SLOPES STEEPER THAN 1.5:1 SHALL BE REINFORCED CRUSHED ROCK WITH SLOPE FACE PROTECTION.
8. CONTRACTOR TO SUBMIT FINAL DESIGN PLANS TO JEFFERSON COUNTY FOR REVIEW PRIOR TO SYSTEM CONSTRUCTION.

SPRING FOREST ROAD
REINFORCED CRUSHED ROCK
AND SLOPE FACE PROTECTION DETAIL
STA. 101+10 TO STA. 102+82
SCALE: 1" = 5'

** PAY ITEM - REINFORCED CRUSHED ROCK AND SLOPE FACE PROTECTION SYSTEM (DESIGN BUILD)

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REV.	DATE	DESCRIPTION	APPROVED
1	08/11/21	BID ADDENDUM #1	KTO

PLOT SCALE FACTOR 0.5

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JEFFERSON COUNTY MISSOURI
DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas Foy O'Shaughnessy
NUMBER
PE-2017000345
8-11-21
PROFESSIONAL ENGINEER

KEVIN THOMAS FOY
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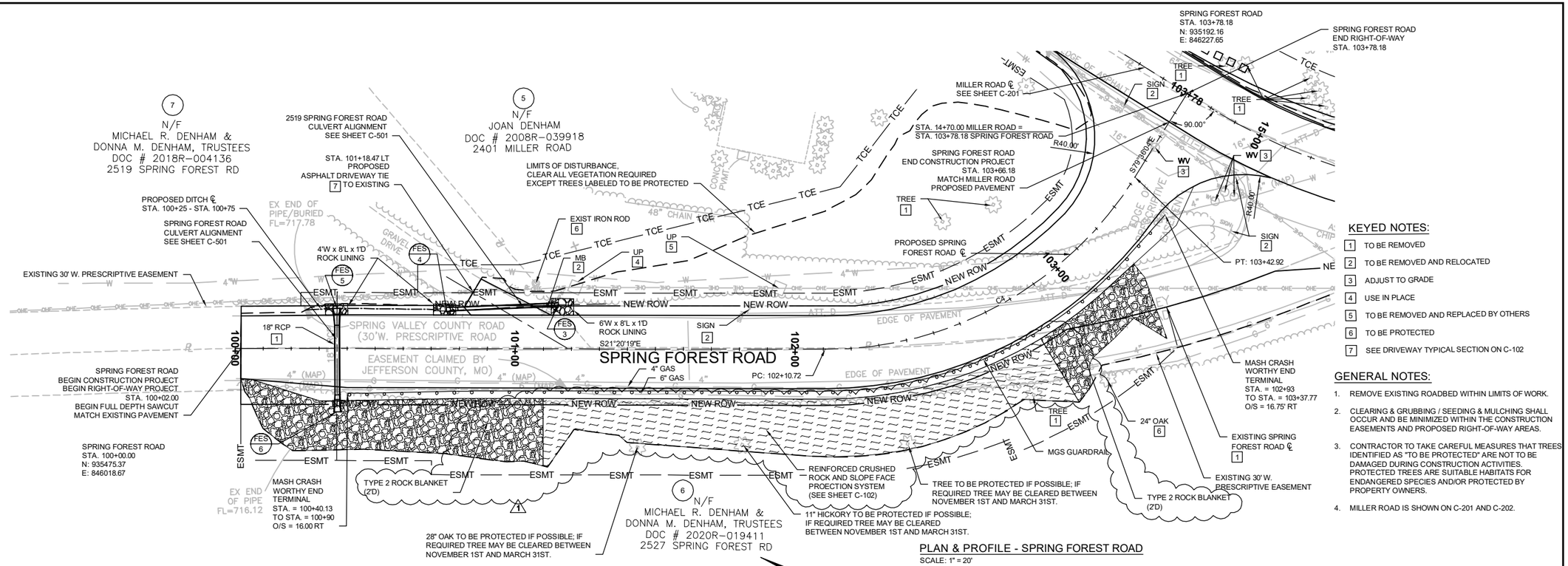
PE-2017000345

Koshaughnessy
July 26, 2021

TYPICAL DETAILS
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
C-102



KEYED NOTES:

1. TO BE REMOVED
2. TO BE REMOVED AND RELOCATED
3. ADJUST TO GRADE
4. USE IN PLACE
5. TO BE REMOVED AND REPLACED BY OTHERS
6. TO BE PROTECTED
7. SEE DRIVEWAY TYPICAL SECTION ON C-102

GENERAL NOTES:

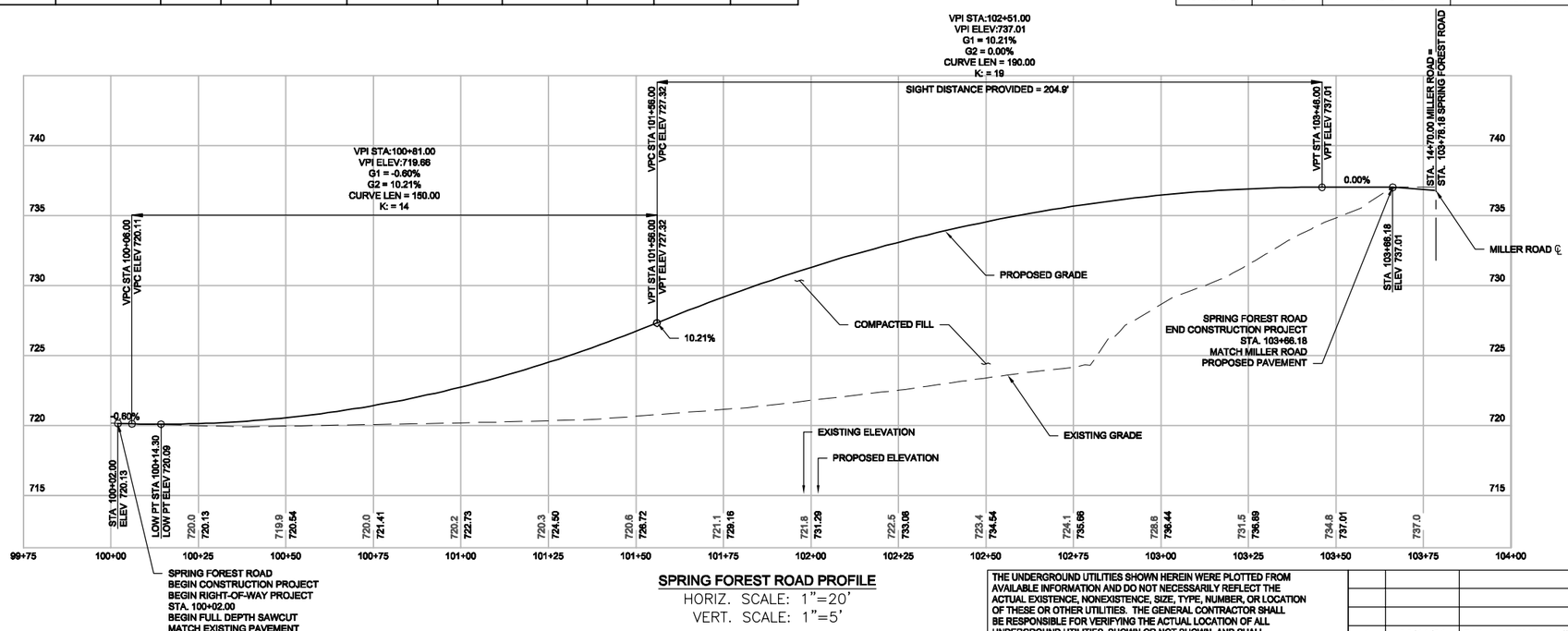
1. REMOVE EXISTING ROADBED WITHIN LIMITS OF WORK.
2. CLEARING & GRUBBING / SEEDING & MULCHING SHALL OCCUR AND BE MINIMIZED WITHIN THE CONSTRUCTION EASEMENTS AND PROPOSED RIGHT-OF-WAY AREAS.
3. CONTRACTOR TO TAKE CAREFUL MEASURES THAT TREES IDENTIFIED AS "TO BE PROTECTED" ARE NOT TO BE DAMAGED DURING CONSTRUCTION ACTIVITIES. PROTECTED TREES ARE SUITABLE HABITATS FOR ENDANGERED SPECIES AND/OR PROTECTED BY PROPERTY OWNERS.
4. MILLER ROAD IS SHOWN ON C-201 AND C-202.

CURVE TABLE

CURVE #	DEFLECTION ANGLE (IC)	DEGREE OF CURVE - ARC (DA)	CHORD DIRECTION (CH)	TANGENT (T) (FT)	RADIUS (R) (FT)	ARC LENGTH (L) (FT)	CHORD LENGTH (C) (FT)	EXTERNAL (E) (FT)	MID-ORDINATE (M) (FT)	PI STATION	PI NORTHING	PI EASTING
C4	58° 15' 45"	44° 04' 25"	S50° 28' 11"E	72.45	130.00	132.19	126.57	18.82	16.44	102+83.17	935211.60	846121.70

DRIVEWAY LOCATION TABLE

STATION	WIDTH	LENGTH	EXISTING SLOPE	PROPOSED SLOPE	MATERIAL
101+18.47 LT	12'-0"	15'-0"	13.2%	0.7%	ASPHALT



SPRING FOREST ROAD PROFILE

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=5'

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REV.	DATE	DESCRIPTION	APPROVED
1	08/11/21	BID ADDENDUM #1	KTO

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DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas Foy O'Shaughnessy
NUMBER
PE-2017000345
8-11-21
PROFESSIONAL ENGINEER

KEVIN THOMAS FOY
O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 14, 2021

PLAN & PROFILE - SPRING FOREST ROAD
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
C-203

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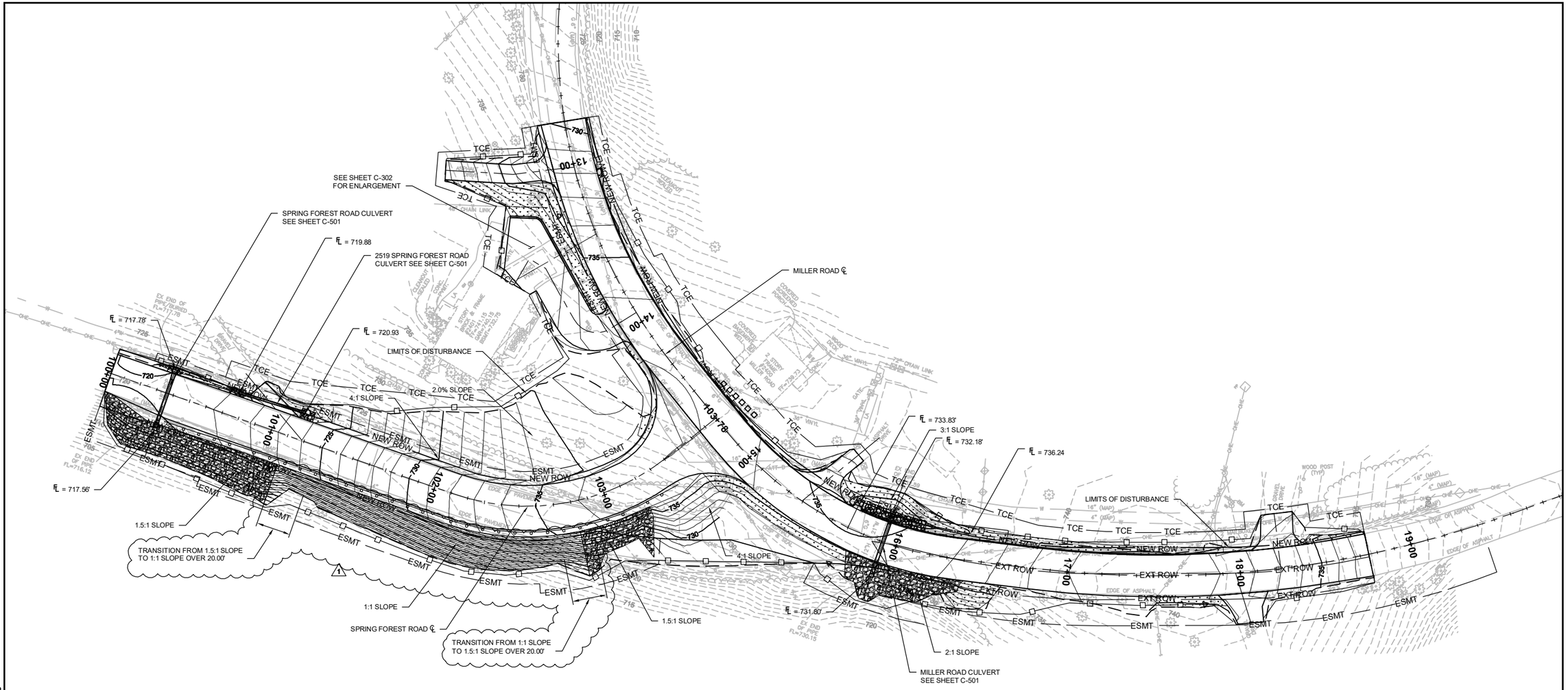

GRADING PLAN

SCALE: 1" = 30'

0 30' 60' 90'

1" = 30'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL DESIGN, INSTALL, AND MAINTAIN EROSION CONTROL MEASURES DURING CONSTRUCTION AS NECESSARY TO CONTROL AND PREVENT POLLUTION OF STORMWATER AND ADJUST AS DIRECTED BY THE COUNTY AS NECESSARY.
2. CONTRACTOR TO PLACE WASHDOWN STATION AT THE CONSTRUCTION SITE ENTRANCE TO THE PROJECT SITE.
3. EROSION CONTROL METHODS SHALL BE INSPECTED WEEKLY AND AFTER RAINFALL EVENTS OF 1 INCH OR MORE.
4. EROSION CONTROL MEASURES SHALL BE REMOVED ONCE VEGETATION HAS BEEN FULLY ESTABLISHED AFTER THE COMPLETION OF THE PROJECT.
5. SEEDING SHALL OCCUR UPON THE IMMEDIATE COMPLETION OF GRADING ACTIVITIES.
6. THIS PLAN IS GIVEN AS A GUIDE TO THE CONTRACTOR FOR PLACEMENT OF EROSION CONTROL. CONTRACTOR TO PREPARE AND SUBMIT A SEPARATE SWPPP/EROSION CONTROL PLAN FOR COUNTY APPROVAL. SEE JOB SPECIAL PROVISION FOR ADDITIONAL INFORMATION.
7. CONTRACTOR TO TAKE CAREFUL MEASURES THAT TREES IDENTIFIED AS "TO BE PROTECTED" ON C-201, C-202, AND C-203 ARE NOT TO BE DAMAGED DURING CONSTRUCTION ACTIVITIES. PROTECTED TREES ARE SUITABLE HABITATS FOR ENDANGERED SPECIES AND/OR PROTECT AGAINST EROSION.
8. CONTRACTOR TO INSTALL TYPE 2D EROSION CONTROL BLANKET ON ALL SLOPES 3:1 AND STEEPER, EXCEPT WHERE OTHER EROSION CONTROL MEASURES ARE PROPOSED.

LEGEND:

- TYPE 2 ROCK BLANKET
- ROCK LINING
- SILT FENCE
- TYPE 2D EROSION CONTROL BLANKET
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- REINFORCED CRUSHED ROCK AND SLOPE FACE PROTECTION SYSTEM (1)

THE UNDERGROUND UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NONEXISTENCE, SIZE, TYPE, NUMBER, OR LOCATION OF THESE OR OTHER UTILITIES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UNDERGROUND UTILITIES, SHOWN OR NOT SHOWN, AND SHALL LOCATE THE UTILITIES IN THE FIELD PRIOR TO ANY GRADING, EXCAVATION, OR CONSTRUCTION IMPROVEMENTS.

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PLOT SCALE FACTOR 0.5

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JEFFERSON COUNTY MISSOURI
ESTABLISHED 1818
DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas Foy O'Shaughnessy
NUMBER PE-2017000345
8-11-21
PROFESSIONAL ENGINEER

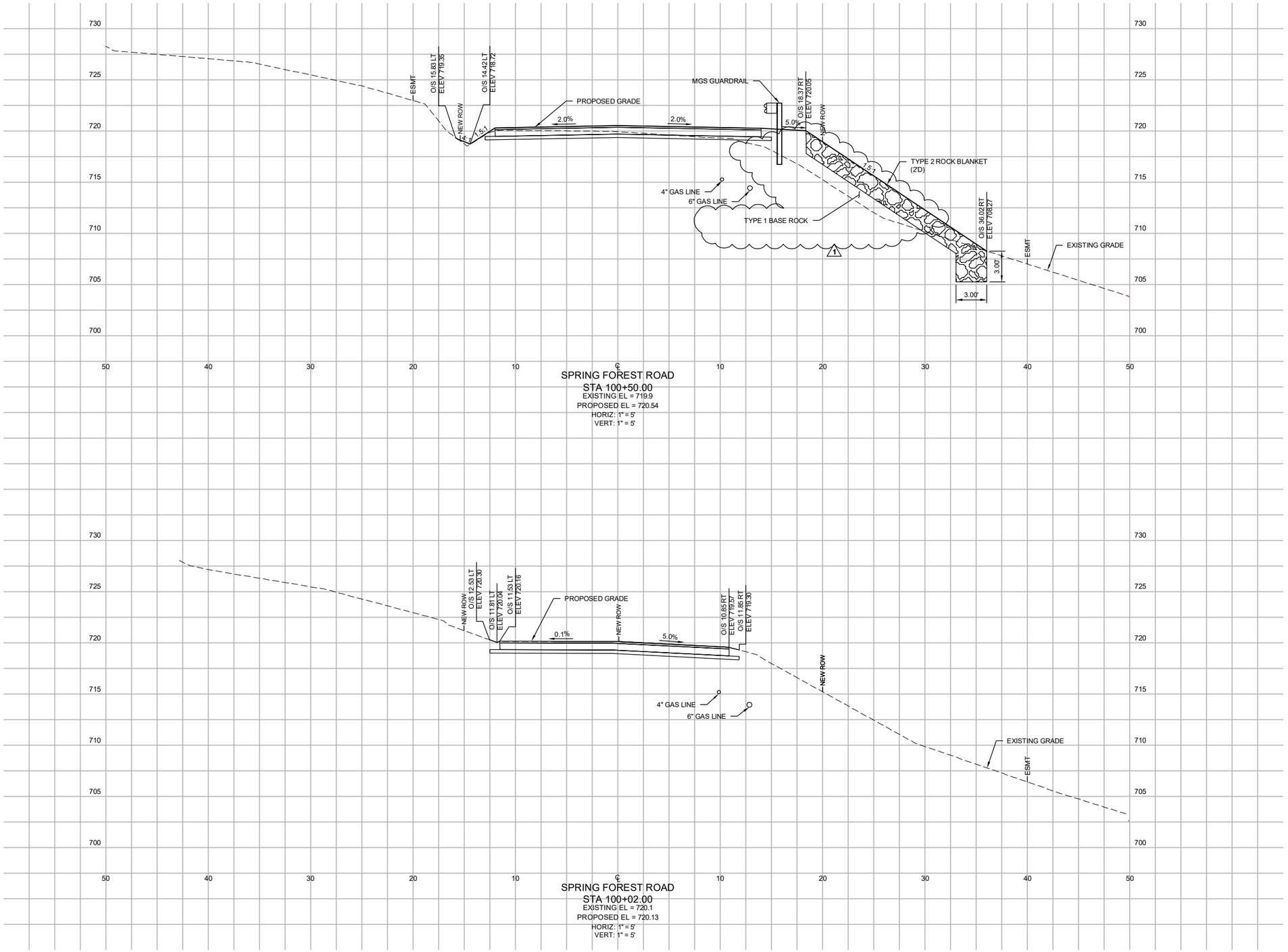
KEVIN THOMAS FOY O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 26, 2021

GRADING PLAN
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
C-301



SPRING FOREST ROAD
STA 100+50.00
EXISTING EL = 719.9
PROPOSED EL = 720.54
HORIZ: 1" = 5'
VERT: 1" = 5'

SPRING FOREST ROAD
STA 100+02.00
EXISTING EL = 720.1
PROPOSED EL = 720.13
HORIZ: 1" = 5'
VERT: 1" = 5'

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DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas Foy O'Shaughnessy
NUMBER PE-2017000345
8-11-21
PROFESSIONAL ENGINEER

KEVIN THOMAS FOY
O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 26, 2021

SPRING FOREST ROAD - CROSS SECTIONS
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
C-409

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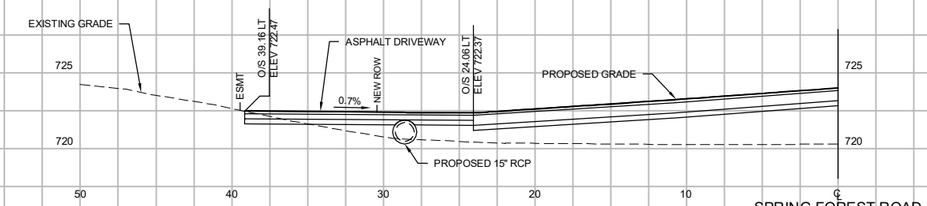
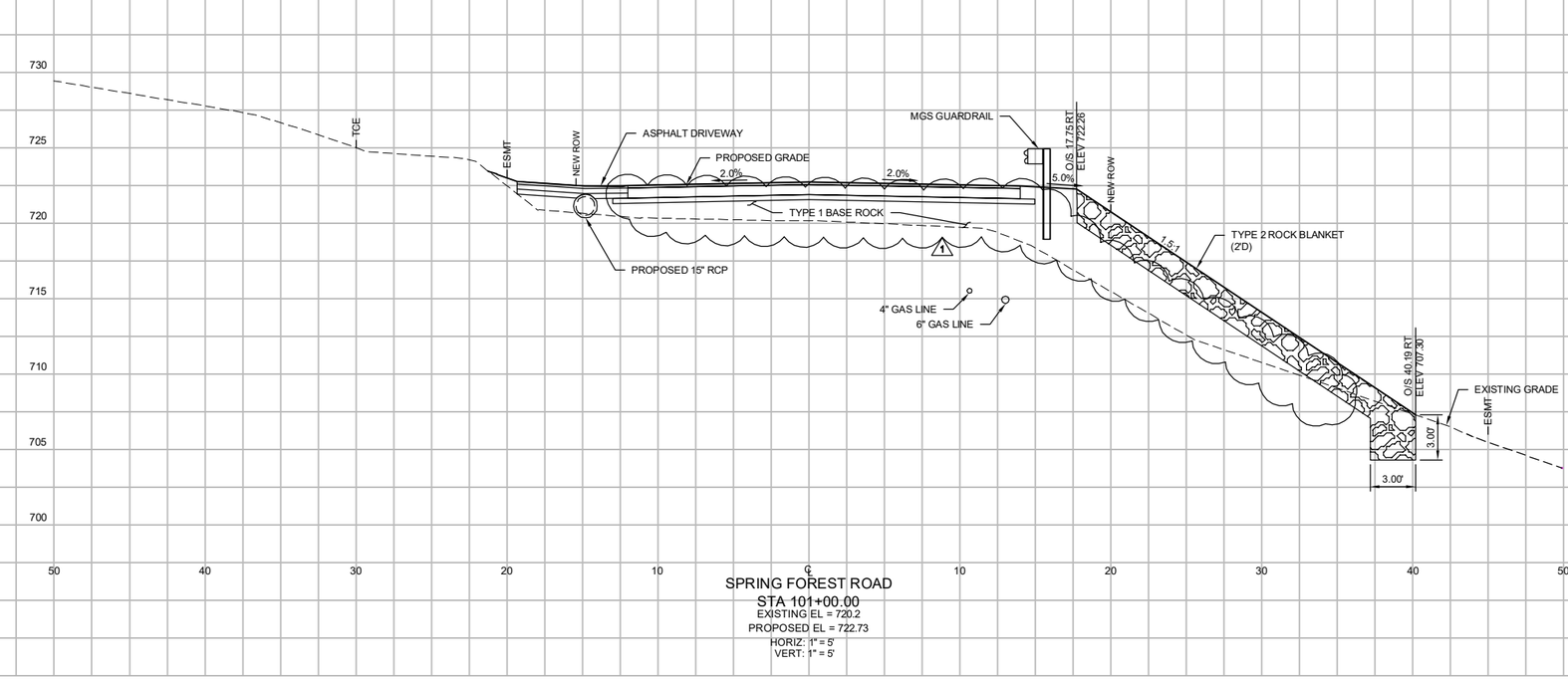


SPRING FOREST ROAD
STA 101+18.47
EXISTING EL = 720.3
PROPOSED EL = 723.99
HORIZ: 1" = 5'
VERT: 1" = 5'
SKEW ANGLE = 59.54° RHF



SPRING FOREST ROAD
STA 101+00.00
EXISTING EL = 720.2
PROPOSED EL = 722.73
HORIZ: 1" = 5'
VERT: 1" = 5'

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JEFFERSON COUNTY MISSOURI
DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
Kevin Thomas Foy O'Shaughnessy
NUMBER PE-2017000345
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PROFESSIONAL ENGINEER

KEVIN THOMAS FOY
O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 26, 2021

SPRING FOREST ROAD - CROSS SECTIONS
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
C-410

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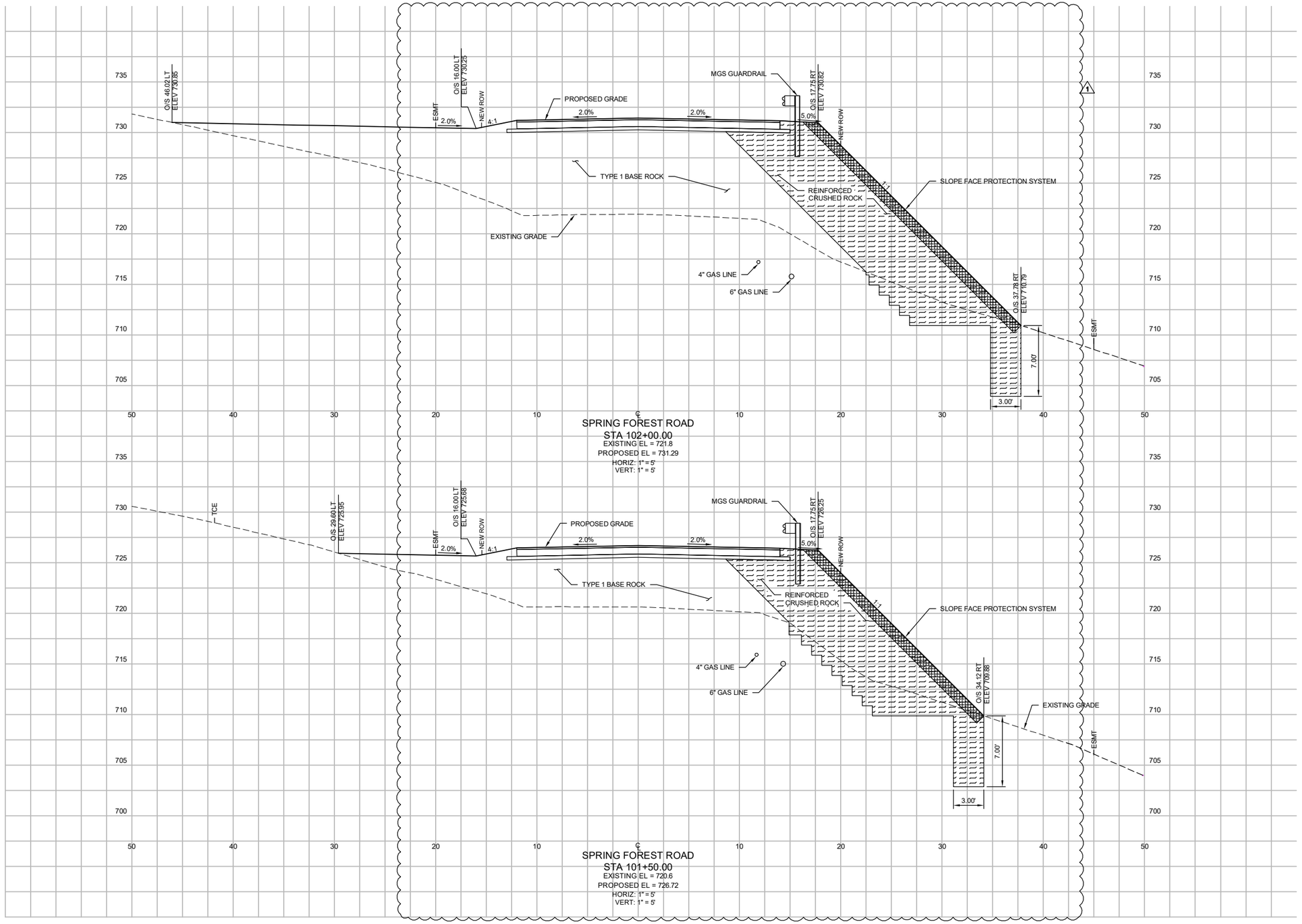

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8-11-21
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KEVIN THOMAS FOY
O'SHAUGHNESSY
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Koshaughnessy
July 26, 2021

SPRING FOREST ROAD - CROSS SECTIONS
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
C-411

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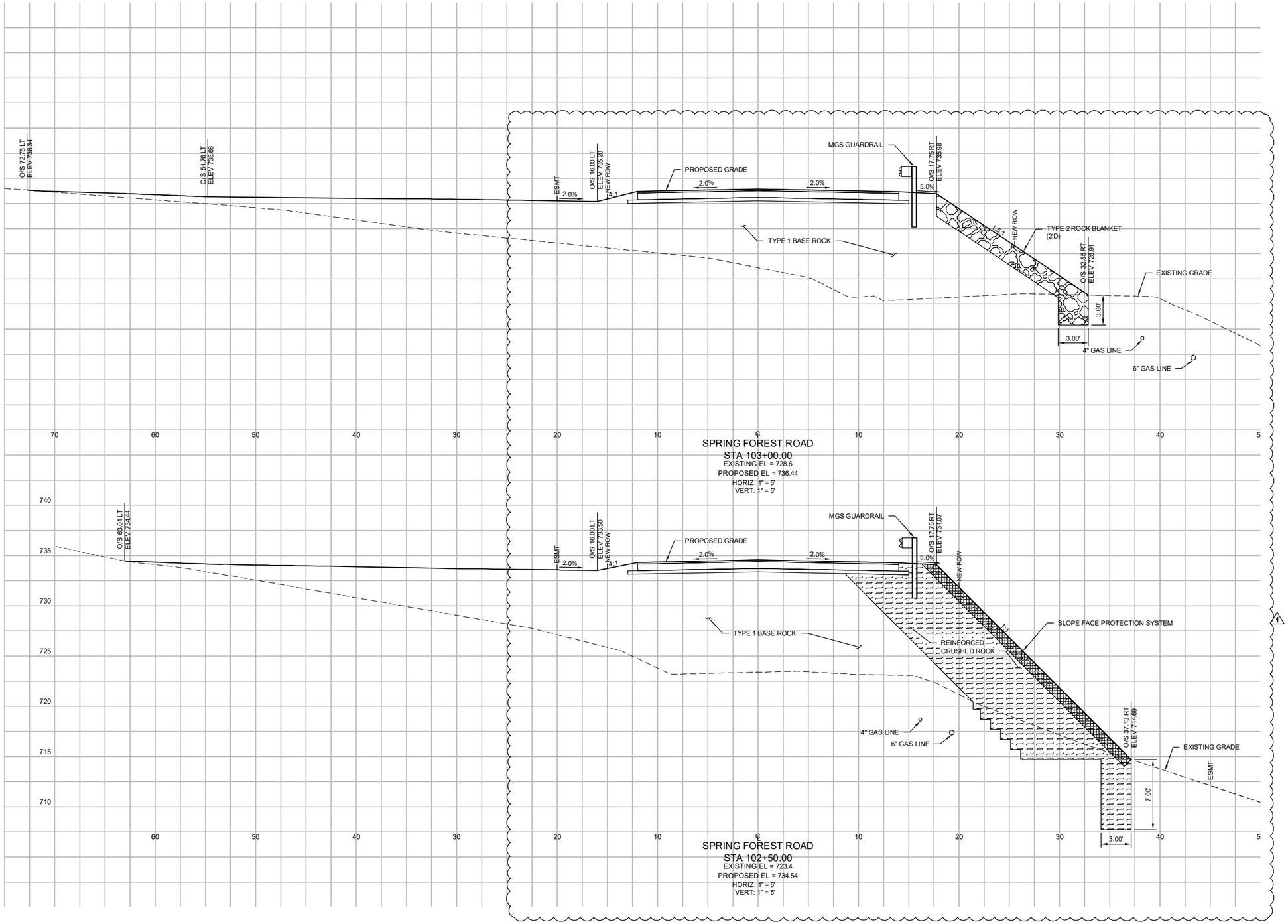

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JEFFERSON COUNTY MISSOURI
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Kevin Thomas Foy O'Shaughnessy
NUMBER PE-2017000345
PROFESSIONAL ENGINEER
8-11-21

KEVIN THOMAS FOY
O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 26, 2021

SPRING FOREST ROAD - CROSS SECTIONS
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
C-412

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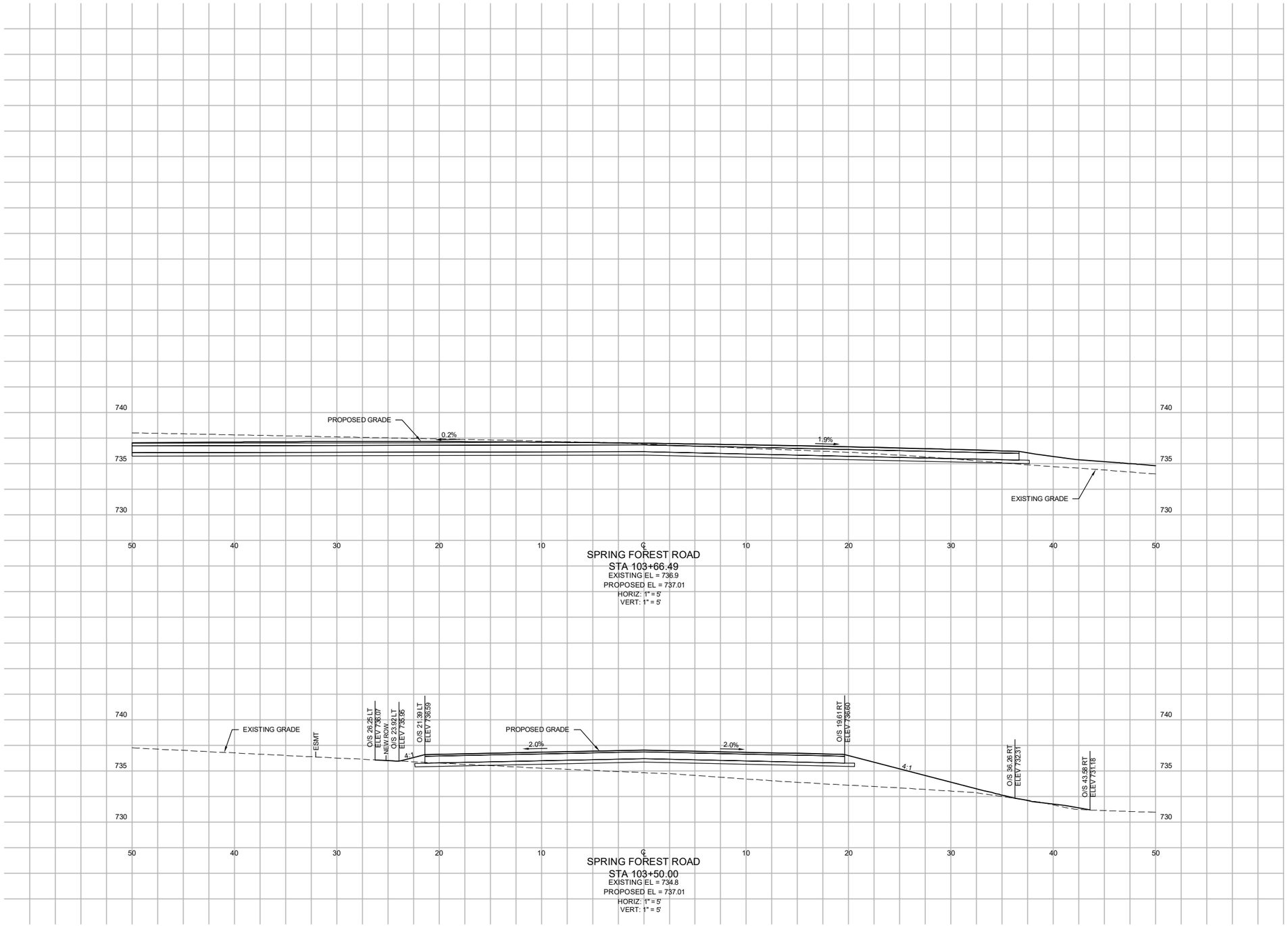

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JEFFERSON COUNTY MISSOURI 1845
DEPARTMENT OF PUBLIC WORKS

STATE OF MISSOURI
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KEVIN THOMAS FOY
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PE-2017000345

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SPRING FOREST ROAD - CROSS SECTIONS
FEDERAL PROJECT NO. STP-5403(680)
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JEFFERSON COUNTY, MISSOURI

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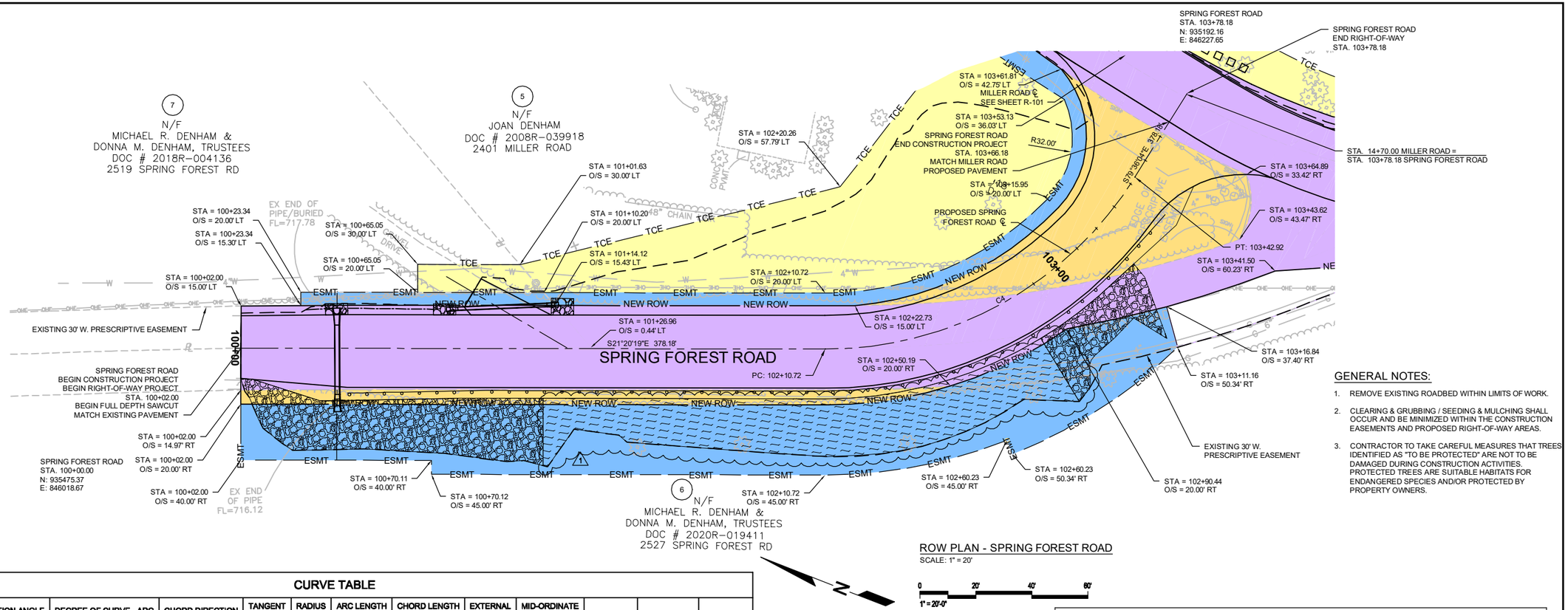

GENERAL NOTES:

1. REMOVE EXISTING ROADBED WITHIN LIMITS OF WORK.
2. CLEARING & GRUBBING / SEEDING & MULCHING SHALL OCCUR AND BE MINIMIZED WITHIN THE CONSTRUCTION EASEMENTS AND PROPOSED RIGHT-OF-WAY AREAS.
3. CONTRACTOR TO TAKE CAREFUL MEASURES THAT TREES IDENTIFIED AS "TO BE PROTECTED" ARE NOT TO BE DAMAGED DURING CONSTRUCTION ACTIVITIES. PROTECTED TREES ARE SUITABLE HABITATS FOR ENDANGERED SPECIES AND/OR PROTECTED BY PROPERTY OWNERS.

ROW PLAN - SPRING FOREST ROAD

SCALE: 1" = 20'

0 20' 40' 60'

1" = 20'-0"

CURVE TABLE

CURVE #	DEFLECTION ANGLE (IC)	DEGREE OF CURVE - ARC (DA)	CHORD DIRECTION (CH)	TANGENT (T) (FT)	RADIUS (R) (FT)	ARC LENGTH (L) (FT)	CHORD LENGTH (C) (FT)	EXTERNAL (E) (FT)	MID-ORDINATE (M) (FT)	PI STATION	PI NORTHING	PI EASTING
C4	58° 15' 45"	44° 04' 25"	S50° 28' 11"E	72.45	130.00	132.19	126.57	18.82	16.44	102+83.17	935211.60	846121.70

DRIVEWAY LOCATION TABLE

STATION	WIDTH	LENGTH	EXISTING SLOPE	PROPOSED SLOPE	MATERIAL
101+18.47 LT	12'-0"	15'-0"	13.2%	0.7%	ASPHALT

PARCEL #	N/F OWNER NAME	ADDRESS	PARCEL ID	DEED	TOTAL ACRES	NEW ROW	PRESCRIPTIVE TO ROW	PERMANENT EASEMENT	TCE ACQUISITION	ACQUIRED DEDICATED EASEMENT	REMAINDER
5	JOAN DENHAM	2401 MILLER ROAD	PID:08100104002031	DOC.# 2008R-039918	0.951 AC	3,769 SF (0.086 AC)	8,493 SF (0.195 AC)	1,855 SF	10,662 SF	-	0.670 AC
6	MICHAEL R. DENHAM & DONNA M. DENHAM, TRUSTEES	2527 SPRING FOREST ROAD	PID:0810010400203003	DOC.# 2020R-019411	4.875 AC	1,288 SF (0.030 AC)	5,104 SF (0.117 AC)	9,583 SF	-	-	4.728 AC
7	MICHAEL R. DENHAM & DONNA M. DENHAM, TRUSTEES	2519 SPRING FOREST ROAD	PID:0810010400203002	DOC.# 2018R-004136	1.393 AC	-	1,778 SF (0.041 AC)	409 SF	409 SF	-	1.352 AC

LEGEND:

- = EXISTING R/W OR EXISTING ROAD EASEMENT
- = NEW R/W
- = PRESCRIPTIVE ROAD EASEMENT
- = PERMANENT EASEMENT
- = TEMPORARY CONSTRUCTION EASEMENT
- = ACQUIRE DEDICATED EASEMENT

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NUMBER PE-2017000345
8-11-21
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KEVIN THOMAS FOY O'SHAUGHNESSY
PE-2017000345

Koshaughnessy
July 14, 2021

ROW PLAN - SPRING FOREST ROAD
FEDERAL PROJECT NO. STP-5403(680)
MILLER ROAD PHASE 1, AT SPRING FOREST ROAD
JEFFERSON COUNTY, MISSOURI

CDG PROJECT NO.
18101

DRAWING NO.
R-103