THIS PROJECT IS COVERED BY THE IOWA DEPARTMENT OF NATURAL RESOURCES NPDES GENERAL PERMIT NO. 2. THE CONTRACTOR SHALL CARRY OUT THE TERMS AND CONDITIONS OF GENERAL PERMIT NO. 2 AND THE STORM WATER POLLUTION PREVENTION PLAN WHICH IS PART OF THESE CONTRACT DOCUMENTS.

SECTION 404 PERMIT AND CONDITIONS

CONSTRUCT THIS PROJECT ACCORDING TO THE REQUIREMENTS OF U.S. ARMY CORPS OF ENGINEERS NWP 42, PERMIT NO. CEMVR-OD-P-2015-0268 AND PERMIT NO. CEMVR-OD-P-2020-_____. A COPY OF THESE PERMITS ARE AVAILABLE FROM THE IOWA DOT WEBSITE (HTTP://ENVPERMITS.IOWADOT.GOV). THE U.S. ARMY CORPS OF ENGINEERS RESERVES THE RIGHT TO VISIT THE SITE WITHOUT PRIOR NOTICE.

THIS PROJECT IS COVERED BY IOWA DNR FLOOD PLAIN CONSTRUCTION PERMIT NO.

CONSTRUCTION PLANS FOR

CITY OF WEST DES MOINES

DALLAS COUNTY, IOWA

SUGAR CREEK GREENWAY TRAIL PHASE 1

WDM PROJECT # 0510 048 2020

VICINITY MAP

INDEX OF SHEETS

A.1 TITLE SHEET
A.2 LEGEND AND UTILITY CONTACTS
B.1-B.3 TYPICAL SECTIONS AND DETAILS
C.1 GENERAL NOTES AND QUANTITIES
C.2 POLLUTION PREVENTION NOTES
C.3-C.4 POLLUTION PREVENTION PLANS
D.1-D.8 SUGAR CREEK GREENWAY TRAIL PLAN AND PROFILE
E.1 BOONEVILLE ROAD CONNECTION PLAN AND PROFILE
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E.4 STAGECOACH DRIVE CONNECTION PLAN AND PROFILE
E.5 STAGECOACH DRIVE PLAN AND PROFILE
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V.1-V.9 BRIDGE SITUATION PLAN
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W.1-W.22 SUGAR CREEK GREENWAY TRAIL CROSS SECTIONS
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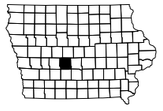

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INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1	TYLER N. JENSEN P.E.	PRIMARY SIGNATURE BLOCK
V.1	STEVEN M. KUNZ P.E.	STRUCTURAL DESIGN
V.3	ADAM R. BULLERMAN P.E.	HYDRAULIC DESIGN

LICENSED PROFESSIONAL ENGINEER
TYLER N. JENSEN
P24526
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

June 30, 2020
Tyler N. Jensen, P.E. — Date

License Number P24526

My License Renewal Date is December 31, 2021

Pages or sheets covered by this seal:
A.1-A.2, B.1-B.3, C.1-C.4, D.1-D.8, E.1-E.5, G.1-G.3, L.1-L.2, S.1, V.10-V.18, W.1-W.22, X.1-X.3, Y.1-Y.13

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet A.1

SUGAR CREEK GREENWAY TRAIL PHASE 1
TITLE SHEET
WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet A.1

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LEGEND

Features	Existing
Spot Elevation	93.0
Contour Elevation	93
Fence (Barbed, Field, Hog)	
Fence (Chain Link)	
Fence (Wood)	
Fence (Silt)	
Tree Line	
Tree Stump	
Deciduous Tree or Shrub	
Coniferous Tree or Shrub	
Communication	C(*)
Overhead Communication	OC(*)
Fiber Optic	FO(*)
Underground Electric	E(*)
Overhead Electric	OE(*)
Gas Main with Size	4" G(*)
High Pressure Gas Main with Size	4" HPG(*)
Water Main with Size	8" W(*)
Sanitary Sewer with Size	8" S(*)
Duct Bank	DUCT(*)
Test Hole Location for SUE w/ID	1

(*) Denotes the survey quality service level for utilities

Features	Existing
Sanitary Manhole	
Storm Sewer with Size	12" ST
Storm Manhole	
Single Storm Sewer Intake	
Double Storm Sewer Intake	
Field Tile Intake	
Fire Hydrant	
Fire Hydrant on Building	
Water Main Valve	
Water Service Valve	
Well	W
Utility Pole	
Guy Anchor	
Utility Pole with Light	
Utility Pole with Transformer	
Street Light	
Yard Light	
Electric Box	EB
Electric Transformer	E
Traffic Sign	
Communication Pedestal	C
Communication Manhole	C
Communication Handhole	C
Fiber Optic Manhole	FO
Fiber Optic Handhole	FO
Gas Valve	
Gas Manhole	G
Gas Apparatus	G
Fence Post or Guard Post	
Underground Storage Tank	UST
Above Ground Storage Tank	AST
Sign	
Satellite Dish	
Mailbox	
Sprinkler Head	SH
Irrigation Control Valve	ICV

UTILITY CONTACT INFORMATION

UTILITY CONTACT FOR MAPPING INFORMATION SHOWN AS RECEIVED FROM THE IOWA ONE CALL DESIGN REQUEST SYSTEM, TICKET NUMBER 551906447.

CLEAR PER MAP RECEIVED	AT&T TRANSMISSION Lenny Vohs 816-275-4014 lv2121@att.com
C1-COMMUNICATION FO1-FIBER OPTIC	CENTURYLINK Tom Sturmer 720-578-8090 Thomas.sturmer@centurylink.com
NO MAPS RECEIVED	DES MOINES METRO WASTEWATER Nick Carter 515-323-8135 nfcarter@dmgov.org
CLEAR PER MAPS RECEIVED	IOWA COMMUNICATIONS NETWORK Shannon Marlow 800-572-3940 icnoutsideplantiowaonecall@iowa.gov
E1-ELECTRIC OE1-OVERHEAD ELECTRIC G1-GAS	MIDAMERICAN ENERGY Craig Ranfeld 515-252-6632 MECDSMDesignLocates@midamerican.com
NO MAPS RECEIVED	MI-FIBER Mark Harvey 515-897-9192 mharvey@mi-fiber.net
NO MAPS RECEIVED	PRECISION UNDERGROUND UTILITY Doug Rose 515-782-6733 doug.r@precisionundergroundia.com
CLEAR PER MAPS RECEIVED	SPRINT NEXTEL Michael Chebul 402-880-8720 michael.j.chebul@sprint.com
NO MAPS RECEIVED	MEDIACOM COMMUNICATIONS CORP Paul May 515-246-2252 pmay@mediacomcc.com
CLEAR PER MAPS RECEIVED	WATER DEVELOPMENT COMPANY Tom W Thorpe 515-289-2345 tom@thorpewater.com
W1-WATER MAIN	WEST DES MOINES WATER WORKS William Mabuce 515-222-3510 design_locates@wdmww.com
NO MAPS RECEIVED	WEST DES MOINES TRAFFIC Jim Dickinson 515-222-3482 Jim.Dickinson@wdm.iowa.gov
CLEAR PER EMAIL	CITY OF WAUKEE Tim Royer 515-987-4363 troyer@waukee.org
CLEAR PER MAPS RECEIVED	XENIA RURAL WATER DISTRICT Laird Van Dee 515-676-2117 lvandee@xeniawater.org

UTILITY WARNING

THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND/OR RECORDS OBTAINED. THE SURVEYOR MAKES NO GUARANTEE THAT THE UTILITIES OR SUBSURFACE FEATURES SHOWN COMPRISE ALL SUCH ITEMS IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES OR SUBSURFACE FEATURES SHOWN ARE IN THE EXACT LOCATION INDICATED EXCEPT WHERE NOTED AS QUALITY LEVEL A.

UTILITY QUALITY SERVICE LEVELS

QUALITY LEVELS OF UTILITIES ARE SHOWN IN THE PARENTHESES WITH THE UTILITY TYPE AND WHEN APPLICABLE, SIZE. THE QUALITY LEVELS ARE BASED ON THE CI/ ASCE 38-02 STANDARD.

QUALITY LEVEL (D) INFORMATION IS DERIVED FROM EXISTING UTILITY RECORDS OR ORAL RECOLLECTIONS.

QUALITY LEVEL (C) INFORMATION IS OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE-GROUND UTILITY FEATURES AND USING PROFESSIONAL JUDGMENT IN CORRELATING THIS INFORMATION WITH QUALITY D INFORMATION.

QUALITY LEVEL (B) INFORMATION IS OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES.

QUALITY LEVEL (A) IS HORIZONTAL AND VERTICAL POSITION OF UNDERGROUND UTILITIES OBTAINED BY ACTUAL EXPOSURE OR VERIFICATION OF PREVIOUSLY EXPOSED SUBSURFACE UTILITIES, AS WELL AS THE TYPE, SIZE, CONDITION, MATERIAL, AND OTHER CHARACTERISTICS.

CONTROL POINTS

IOWA STATE PLANE SOUTH COORDINATE SYSTEM
NAD83(2011)(EPOCH 2010.00) IARTN DERIVED - US SURVEY FEET

CP2 N=562884.27 E=1546534.26 Z=80.26
1/2" REBAR WITH RED PLASTIC CAP, ±30' WEST OF CREEK BANK, ±400' NORTH OF BOONEVILLE ROAD.

CP3 N=563240.13 E=1546553.18 Z=83.30
1/2" REBAR WITH RED PLASTIC CAP, ±35' WEST OF CREEK BANK, ±800' NORTH OF BOONEVILLE ROAD.

CP4 N=563555.83 E=1546318.17 Z=82.99
CUT "X" SOUTH SIDE OF MANHOLE STRUCTURE, ±50' WEST OF CREEK, WHERE IT BENDS SOUTH TO EAST.

CP5 N=563999.40 E=1546195.37 Z=84.64
CUT "X" WEST SIDE OF MANHOLE STRUCTURE, ±75' WEST OF CREEK BANK.

CP6 N=564304.29 E=1546121.16 Z=84.37
CUT "X" NORTH SIDE OF MANHOLE STRUCTURE, ±60' WEST OF CREEK, WHERE IT BEND SOUTH.

CP7 N=564858.31 E=1545943.43 Z=86.18
CUT "X" ON NORTH SIDE OF MANHOLE STRUCTURE, SOUTH OF DRAINAGE DITCH, SOUTH OF NEW BRIDGE.

DATE OF SURVEY

SEPTEMBER 24, 2019

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BENCHMARKS

CITY OF WEST DES MOINES VERTICAL DATUM
IARTN DERIVED - US SURVEY FEET

CONVERSION FROM CITY OF WEST DES MOINES DATUM TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) IS (+)774.01

BM1 N=562593.00 E=1546901.00 Z=81.38
CITY BENCHMARK #85 - MONUMENT ON NORTH SIDE OF BOONEVILLE ROAD, EAST OF CREEK.

GENERAL NOTES:

1. COMPLETE ALL CONSTRUCTION IN ACCORDANCE WITH THE 2020 IOWA STATEWIDE URBAN DESIGN AND SPECIFICATIONS (SUDAS), CITY OF WEST DES MOINES SUPPLEMENTAL SPECIFICATIONS TO THE 2017 IOWA SUDAS AND CONTRACT DOCUMENTS. INCLUDING THE IOWA DOT STANDARD SPECIFICATIONS WHEN REFERENCED.
2. NOTIFY THE OWNER AT LEAST 7 DAYS PRIOR TO THE START OF CONSTRUCTION.
3. AVOID DAMAGE TO EXISTING TRAIL AND SIDEWALK. CONTRACTOR SHALL REPLACE TRAIL AND SIDEWALK DAMAGED DURING CONSTRUCTION ACTIVITIES AT NO ADDITIONAL COST TO OWNER. SURFACE PROTECTION MEASURES ARE RECOMMENDED.
4. DO NOT RESTRICT PUBLIC ACCESS ON THE ADJACENT TRAIL AND SIDEWALK DURING CONSTRUCTION. KEEP THE TRAIL AND SIDEWALK CLEAR OF EQUIPMENT AND MATERIALS AT ALL TIMES. PROVIDE PLANKING OR GRANULAR SURFACING AS NECESSARY TO KEEP TRAIL AND SIDEWALK OPEN (INCIDENTAL). CLEARLY MARK TRAIL AND SIDEWALK CLOSURES AND BARRICADE AS NECESSARY TO PROTECT THE WORK AREA. REFER TO PLANS FOR TEMPORARY TRAIL CONNECTIONS. REFER TO J-SHEETS FOR OTHER REQUIREMENTS RELATED TO TRAIL CLOSURES.
5. PROVIDE TEMPORARY SUPPORT FOR EXISTING UTILITY LINES THAT ARE ENCOUNTERED DURING CONSTRUCTION UNTIL BACKFILLING IS COMPLETED.
6. NOTIFY UTILITY COMPANIES PRIOR TO COMMENCING WORK. AVOID DAMAGE TO UTILITIES AND SERVICES DURING CONSTRUCTION. REPAIR ANY DAMAGE CAUSED BY THE CONTRACTOR'S CARELESSNESS AT THE CONTRACTOR'S EXPENSE.
7. DO NOT STORE EQUIPMENT AND/OR MATERIALS ON PAVEMENT OR WITHIN PUBLIC RIGHT OF WAY ON STREETS OPEN TO TRAFFIC. CONTRACTOR SHALL PROVIDE AREAS AS NEEDED FOR STORAGE OF EQUIPMENT AND/OR MATERIALS.
8. ALL FIELD TILES ENCOUNTERED DURING CONSTRUCTION SHALL BE RECONNECTED AND NOTED ACCORDINGLY ON THE AS-BUILT DOCUMENTS.
9. IN THE EVENT OF A DISCREPANCY BETWEEN THE QUANTITY ESTIMATES AND THE DETAILED PLANS, THE DETAILED PLANS SHALL GOVERN.
10. THE CONTRACTOR SHALL PROVIDE WASTE AREAS OR DISPOSAL SITES FOR WASTE MATERIAL REMOVED FROM THE PROJECT WHICH IS NOT DESIRABLE TO BE INCORPORATED INTO THE WORK. NO EXTRA PAYMENTS WILL BE MADE FOR MATERIAL HAULED TO THESE SITES. DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS. DO NOT PLACE WASTE MATERIAL WITHIN THE RIGHT OF WAY. KEEP CONSTRUCTION DEBRIS AND DIRT OFF OF ADJACENT PROPERTIES AND STREETS.
11. PROVIDE EROSION CONTROL MEASURES NECESSARY TO PROTECT AGAINST SILTATION, EROSION AND DUST POLLUTION. COMPLY WITH THE SOIL EROSION CONTROL REQUIREMENTS OF THE IOWA CODE AND ALL LOCAL ORDINANCES AND WITH THE STORM WATER POLLUTION PREVENTION PLAN.
12. DO NOT RESTRICT DRAINAGE CHANNELS AND PROTECT ALL EXISTING DRAINAGE STRUCTURES UNLESS OTHERWISE NOTED. CONTRACTOR IS FULLY LIABLE FOR ALL DAMAGES TO PUBLIC OR PRIVATE PROPERTY CAUSED BY THEIR ACTION OR INACTION IN PROVIDING FOR THE HANDLING OF STORM WATER FLOW DURING CONSTRUCTION.
13. CONTRACTOR SHALL RESTORE ALL SEEDING AND VEGETATION DAMAGED WITHIN THE CONSTRUCTION LIMITS AS PER CONTRACT ITEMS. ANY VEGETATION OR INFRASTRUCTURE THAT IS DAMAGED BY THE CONTRACTOR OUTSIDE THE CONSTRUCTION LIMTS SHALL BE REPLACED OR REPAIRED AT CONTRACTOR'S EXPENSE.
14. THE TOP SIX INCHES OF ALL DISTURBED AREAS SHALL BE FREE OF ROCK AND DEBRIS AND SHALL BE SUITABLE FOR THE ESTABLISHMENT OF VEGETATION, SUBJECT TO THE APPROVAL OF THE OWNER.
15. AVOID DAMAGE TO PRIVATE PROPERTY DURING CONSTRUCTION. REPAIR ANY DAMAGE CAUSED BY THE CONTRACTOR'S CARELESSNESS AT THE CONTRACTOR'S EXPENSE.
16. CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO OCCUR MONDAY THROUGH FRIDAY BETWEEN 7:00 A.M. AND 9:00 P.M. AND SATURDAY BETWEEN 7:00 A.M. AND 6:00 P.M. UNLESS NIGHT-WORK IS REQUIRED OR PRE-APPROVED BY THE ENGINEER. NO CONSTRUCTION ACTIVITIES ARE ALLOWED ON SUNDAYS WITHOUT APPROVAL OF THE OWNER. REFER TO J-SHEET AND OTHER CONTRACT DOCUMENTS FOR OTHER DATE AND TIME RESTRICTIONS ON CONSTRUCTION WORK.
17. SWPPP PREPARATION TO BE PERFORMED BY ENGINEER AND INSPECTION TO BE PERFORMED BY THE CITY OF WEST DES MOINES AND CONTRACTOR.
18. CONTRACTOR TO INSTALL TRAFFIC CONTROL SIGNAGE FOR SIDEWALK AND ROAD WORK CLOSURE AND DETOURS DURING WORK OR AFFECTED EXISTING SIDEWALKS AND ROADWAYS. ALL SIGNAGE SHALL COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS, AS ADOPTED BY THE IOWA DOT PER 761 OF THE IOWA ADMINISTRATIVE CODE 9IAC), CHAPTER 130.
19. PROTECT EXISTING DRIVEWAYS AND STREET SURFACING UNLESS SPECIFICALLY NOTED OTHERWISE. REMOVE AND REPLACE DAMAGED SURFACING WITHOUT ADDITIONAL COMPENSATION. SAW CUT AND REMOVE EXISTING PAVEMENT AS NECESSARY. PROVIDE AND MAINTAIN TEMPORARY GRANULAR SURFACING AS NECESSARY TO MAINTAIN ACCESS ON SITE.
20. THE CONTRACTOR IS EXPECTED TO PROVIDE ADEQUATE PERSONNEL AND EQUIPMENT TO PERFORM WORK WITHIN SPECIFIED TIME OF CONSTRUCTION. ONCE WORK WITHIN A SPECIFIED AREA HAS COMMENCED THE CONTRACTOR SHALL PUT FULL AND CONTINUOUS WORKFORCE TO COMPLETE THE AREA AS SOON AS POSSIBLE TO MINIMIZE INCONVENIENCE TO TRAVELING PUBLIC AND TO ADJACENT PROPERTY OWNERS.
21. CONTRACTOR SHALL COORDINATE WITH CONTRACTOR FOR OVERLAPPING PROJECT FOR WASTEWATER RECLAMATION AUTHORITY (WRA) SUGAR CREEK STREAMBANK AND CONVEYANCE IMPROVEMENTS. WRA PROJECT WILL INCLUDE TREE PLANTING IN THE PROJECT AREA, OUTSIDE THE SUGAR CREEK GREENWAY TRAIL PROJECT CONSTRUCTION LIMITS, ANTICIPATED IN FALL 2020.
22. CONTRACTOR TO NOTIFY WEST DES MOINES WATER WORKS (WDMWW), 515-222-3510, ONE WEEK PRIOR TO CONSTRUCTION.

LEGEND:

- CONSTRUCT PCC TRAIL
- PROPOSED GRADING LIMITS
- PROPOSED CONSTRUCTION LIMITS
- PLACE FILTER SOCK, 12"
- TREE PROTECTION
- TREE REMOVAL

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet A.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

LEGEND, GENERAL NOTES AND UTILITY CONTACTS — WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

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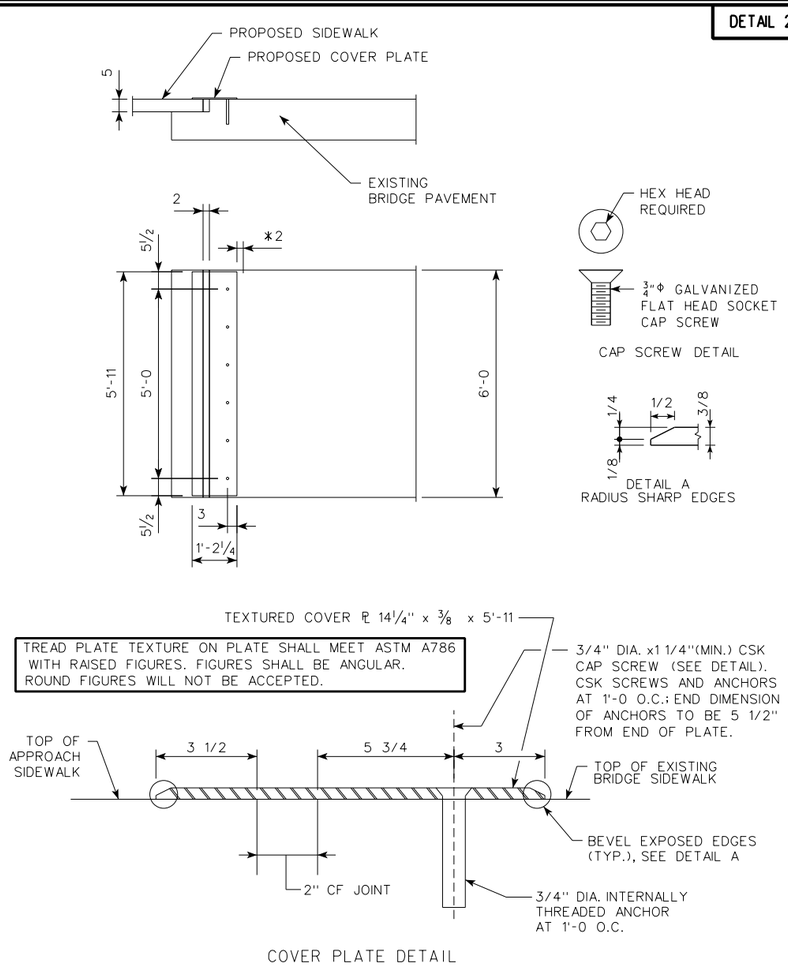
DETAIL 2



COVER PLATE DETAIL

CONTRACTOR SHALL TAKE APPROPRIATE CARE TO FORM SURFACE OF CONCRETE APPROACH SIDEWALK IN ORDER TO ACHIEVE CONTINUOUS CONTACT BETWEEN THE BOTTOM OF PLATE AND BOTH SIDEWALK SECTIONS FOR THE FULL WIDTH OF PLATE.

NOTES:

✳ CONTRACTOR TO VERIFY WIDTH OF TEXTURED COVER PLATE DOES NOT INTERFERE WITH EXISTING ORNAMENTAL METAL RAILING BASE PLATE. CONTACT THE ENGINEER IF INTERFERENCE IS ENCOUNTERED.

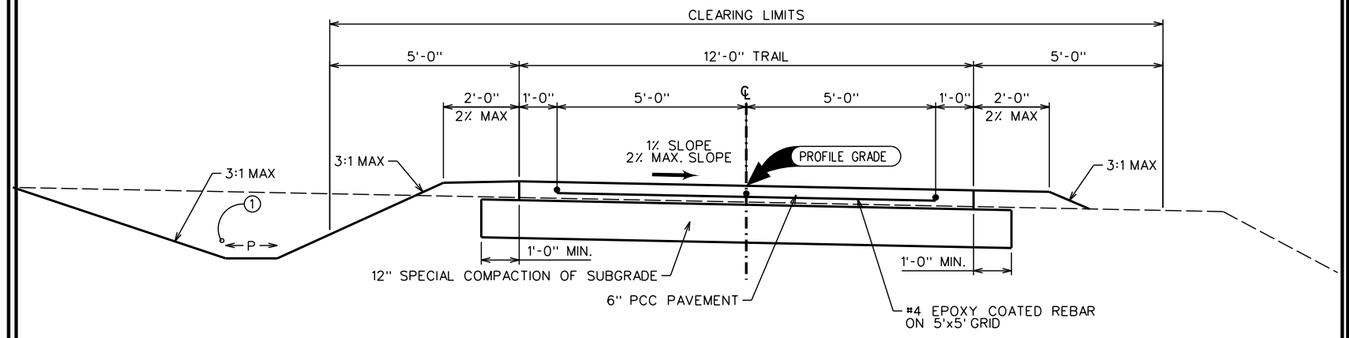
THE 3/4" DIAMETER ANCHORS SHALL BE STAINLESS STEEL WITH INTERNAL THREADS BY APPROVED MANUFACTURERS AS FOLLOWS:
1. HILTI "HIS-N"
2. DEWALT "IT-SS INTERNAL THREADED SLEEVE"
3. MCMASTER-CARR "ADHESIVE-GRIP FEMAIL-THREADED ANCHOR FOR CONCRETE"
4. APPROVED EQUAL

THE 3/4" DIAMETER INTERNALLY THREADED ANCHORS SHALL BE DRILLED AND GROUTED IN PLACE. THE ADHESIVE MATERIALS SHALL BE IN ACCORDANCE WITH IOWA DOT I.M. 491.11. THE 3/4" DIAMETER ANCHORS SHALL BE STAINLESS STEEL AND SHALL MEET REQUIREMENTS OF ARTICLE 4187.01, C, 1 OF THE STANDARD SPECIFICATIONS. ANCHORS SHALL HAVE 8" EMBEDMENT.

THE MATERIAL USED FOR THE COVER PLATE AND CAP SCREWS IS TO BE ASTM A36 STEEL. THE PLATE AND CAP SCREWS ARE TO BE GALVANIZED IN ACCORDANCE WITH IOWA DOT MATERIALS I.M. 410.01.

LOCATION
STATION
STAGECOACH DRIVE STA 14+01.74

DETAIL 1

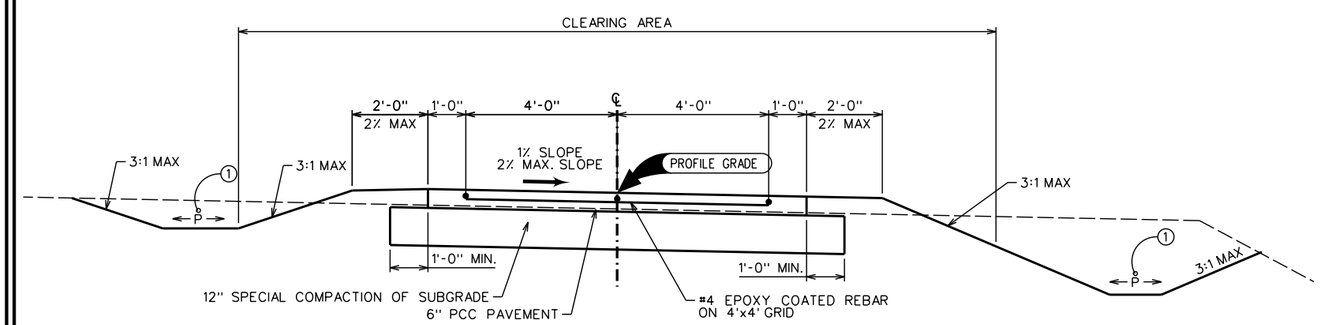


LOCATION		CROSS SLOPE 1.5% DOWN
STATION TO STATION		
12+20.00	25+00.00	RT
25+00.00	25+50.00	TRANSITION TO LEFT
25+50.00	27+50.00	LT
27+50.00	28+00.00	TRANSITION TO RIGHT
28+00.00	46+75.00	RT

① REFER TO D SHEETS FOR DITCH WIDTH AND DEPTH.

SUGAR CREEK TRAIL - 12' WIDTH
TYPICAL CROSS SECTION

DETAIL 3



LOCATION		CROSS SLOPE 1.5% DOWN
STATION TO STATION		
1200+06.00	1201+85.00	LT
1201+85.00	1202+10.90	TRANSITION TO RIGHT

① REFER TO D SHEETS FOR DITCH WIDTH AND DEPTH.

SUGAR CREEK TRAIL - 10' WIDTH
BOONEVILLE ROAD CONNECTION
TYPICAL CROSS SECTION

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet B.1

SUGAR CREEK GREENWAY TRAIL PHASE 1
TYPICAL SECTIONS
WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet B.1

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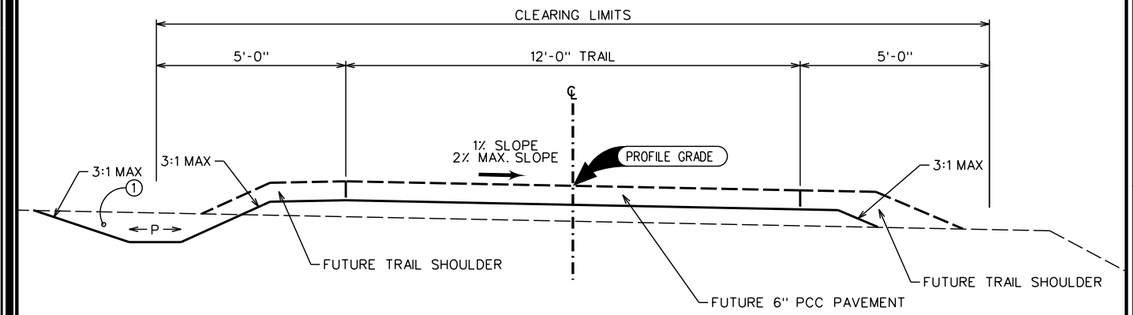
DETAIL 4



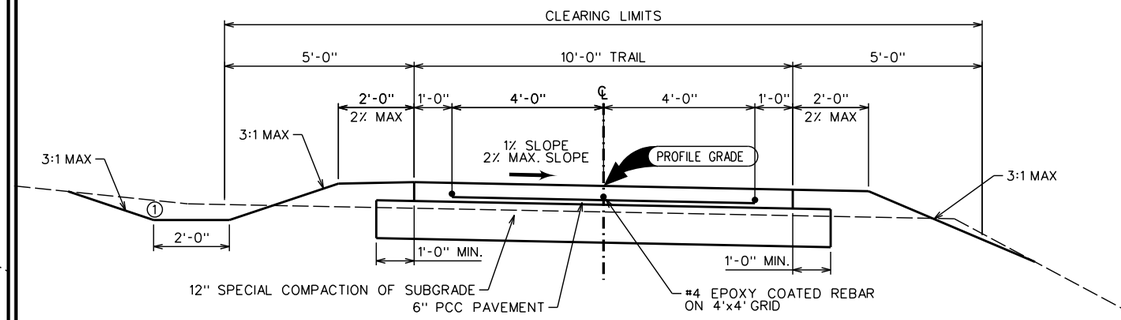
LOCATION		CROSS SLOPE 1.5% DOWN
STATION TO STATION		
11+15.00	12+20.00	RT

NOTES:

1 REFER TO D SHEETS FOR DITCH WIDTH AND DEPTH.

SUGAR CREEK TRAIL - 12' WIDTH
GRADING FOR FUTURE TRAIL
TYPICAL CROSS SECTION

DETAIL 5



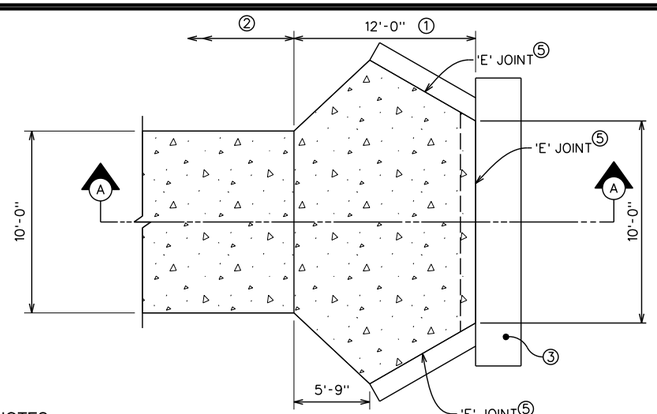
LOCATION		CROSS SLOPE 1.5% DOWN
STATION TO STATION		
263+06.00	263+20.00	RT
263+20.00	263+43.14	TRANSITION RT TO BRIDGE CROSS-SLOPE
264+63.14	264+90.00	TRANSITION BRIDGE CROSS-SLOPE TO RT
269+30.00	273+13.75	RT
273+44.73	273+87.76	RT

NOTES:

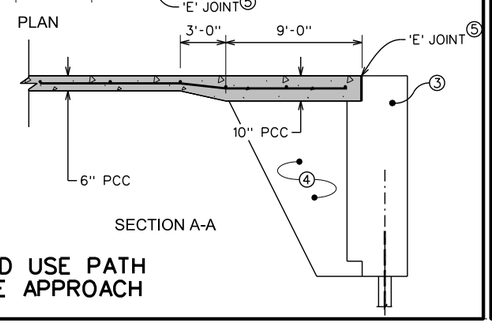
1 REFER TO D SHEETS FOR DITCH WIDTH AND DEPTH.

SUGAR CREEK TRAIL - 10' WIDTH
95TH STREET CONNECTION
TYPICAL CROSS SECTION

DETAIL 6



PLAN



SECTION A-A

KEYED NOTES:

1 SHARED USE PATH BRIDGE APPROACH PAVEMENT.

2 SHARED USE PATH PAVEMENT.

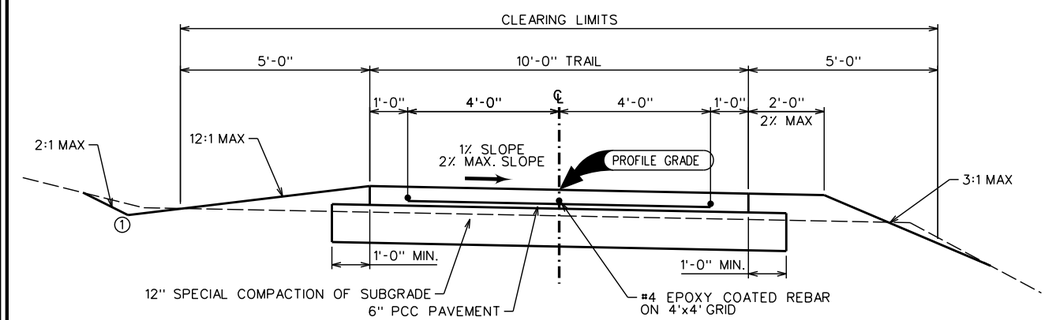
3 BRIDGE ABUTMENT, REFER TO V SHEETS.

4 REFER TO V SHEETS FOR BACKFILL DETAILS

5 1" EXPANSION JOINT, REFER TO SUDAS DETAIL 7010.101

SHARED USE PATH
BRIDGE APPROACH

DETAIL 7



LOCATION		CROSS SLOPE 1.5% DOWN
STATION TO STATION		
267+50.00	269+30.00	RT

NOTES:

1 REFER TO D SHEETS FOR DITCH WIDTH AND DEPTH.

SUGAR CREEK TRAIL - 10' WIDTH
95TH STREET CONNECTION
TYPICAL CROSS SECTION

MARK	REVISION	DATE	BY

Engineer:	RP	Checked By:	TNJ
Technician:	MLB	Date:	06/26/20
Scale:	AS SHOWN	T-R-S:	78N-26W-22
Project No:	1190863	Sheet	B.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

TYPICAL SECTIONS

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863

Sheet B.2

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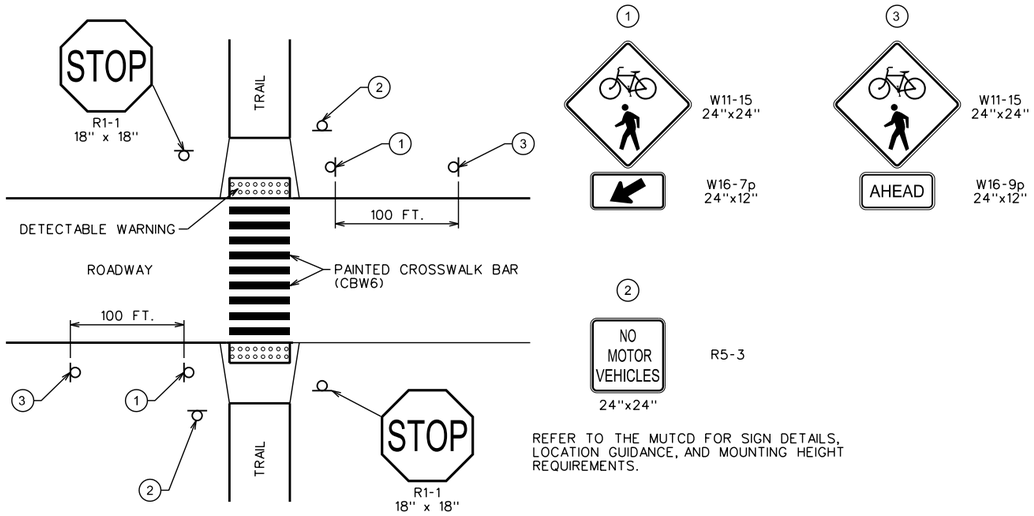
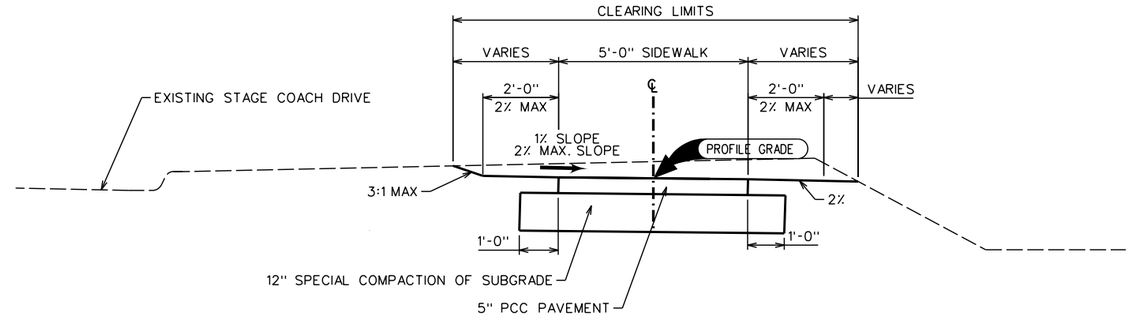
DETAIL 8



REFER TO THE MUTCD FOR SIGN DETAILS, LOCATION GUIDANCE, AND MOUNTING HEIGHT REQUIREMENTS.

SOUTH 95TH STREET CROSSING SIGN PLACEMENT INFORMATION
POSTED SPEED LIMIT 35 MPH OR LESS (IN TOWN USE)

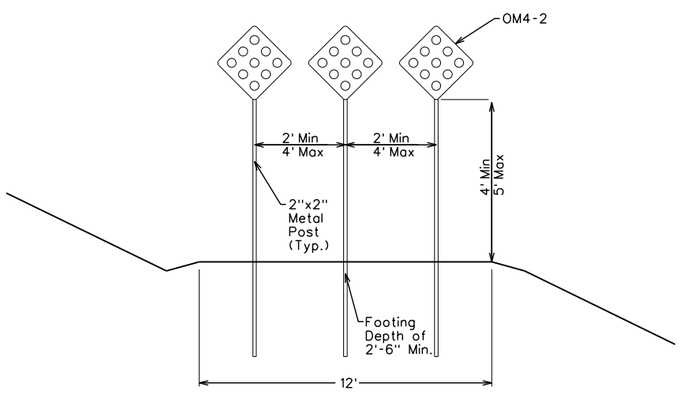
DETAIL 9



LOCATION		CROSS SLOPE 1.5% DOWN
STATION TO STATION		
11+63.65	14+01.74	RT

STAGECOACH DRIVE SIDEWALK
TYPICAL CROSS SECTION

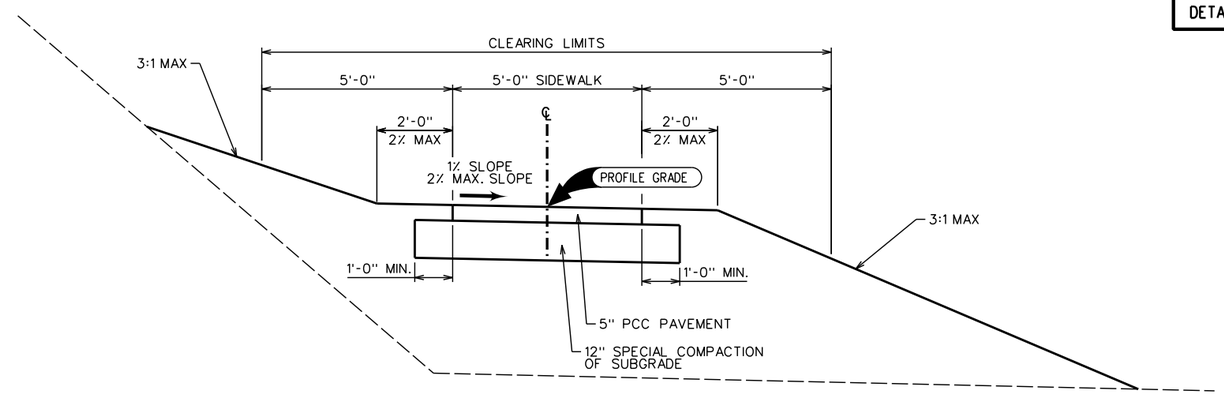
DETAIL 10



LOCATION
STATION
12+19.00
46+76.00

END OF TRAIL WARNING SIGN

DETAIL 11



LOCATION		CROSS SLOPE 1.5% DOWN
STATION TO STATION		
4000+06.00	4000+25.00	TRANSITION FROM SUGAR CREEK MAINLINE TO RT
4000+25.00	4001+83.97	RT

STAGECOACH DRIVE CONNECTION
TYPICAL CROSS SECTION

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet B.3

SUGAR CREEK GREENWAY TRAIL PHASE 1

TYPICAL SECTIONS

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet B.3

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ESTIMATED PROJECT QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL QUANTITY	AS BUILT QTY.
		EARTHWORK			
2.01	2010-108-C-0	Clearing and Grubbing	LS	1	
2.02	2010-108-D-0	Topsoil, Strip, Salavage & Spread	CY	2699	
2.03	2010-108-E-0	Excavation, Class 10	CY	4718	
2.04	2010-108-E-1	Excavation, Class 20	CY	410	
		TRENCH AND TRENCHLES CONSTRUCTION			
3.01	3010-108-C-0	Trench Foundation	TON	166	
		SEWERS AND DRAINS			
4.01	4030-108-A-1	Pipe Culvert, Trenched, RCP, 12 Inch	LF	18	
4.02	4030-108-A-1	Pipe Culvert, Trenched, RCP, 15 Inch	LF	206	
4.03	4030-108-B-0	Pipe Apron, RCP, 12 Inch, with Footing	EA	2	
4.04	4030-108-B-1	Pipe Apron, RCP, 15 Inch, with Footing	EA	17	
		STRUCTURES FOR SANITARY AND STORM SEWERS			
6.01	6010-108-B-0	Intake, SW-512, 24"	EA	2	
6.02	6010-108-F-0	Manhole Adjustment, Major	EA	2	
6.03	6010-108-G-0	Connection to Existing Manhole	EA	1	
		STREETS AND RELATED WORK			
7.01	7030-108-A-0	Removal of Sidewalk	SY	66	
7.02	7030-108-C-0	Shared Use Path, Reinforced PCC, 6 Inch	SY	5963	
7.03	7030-108-D-0	Special Subgrade Preparation for Shared Use Path	SY	8049	
7.04	7030-108-E-0	Sidewalk, PCC, 5 Inch	SY	265	
7.05	- - -	Shared Use Path, Reinforced Bridge Approach	SY	38	
		PAVEMENT MARKINGS			
8.01	8020-108-B-0	Painted Pavement Markings, Solvent/Waterborne	STA	4.2	
		TRAFFIC CONTROL			
8.02	8030-108-A-0	Traffic Control	LS	1	
8.03	- - -	Signs	LS	1	
		SITE WORK AND LANDSCAPING			
9.01	9010-108-B-0	Hydraulic Seeding, Seeding, Fertilizing, and Mulching, BFM, Type 1 Mix	ACRE	1.5	
9.02	9010-108-B-1	Hydraulic Seeding, Seeding, Fertilizing, and Mulching, BFM, Native Mix	ACRE	1.76	
9.03	9040-108-A-2	SWPPP Management	LS	1	
9.04	9040-108-D-1	Filter Sock, 12 Inch	LF	1400	
9.05	9040-108-D-2	Filter Sock, Removal	LF	1400	
9.06	9040-108-E-0	Temporary RECP, Type 3	SY	1796	
9.07	9040-108-J-0	Rip Rap, Class E	TON	659	
9.08	9040-108-N-1	Silt Fence	LF	4675	
9.09	9040-108-N-2	Silt Fence, Removal	LF	4675	
9.10	9040-108-O-1	Stabilized Construction Entrance	SY	350	
9.11	9040-108-Q-2	Erosion Control Mulching, Hydromulching	ACRE	4.7	
		MISCELLANEOUS			
11.01	11,010-108-A	Construction Survey	LS	1	
11.02	11,020-108-A	Mobilization	LS	1	
11.03	11,050-108-A-0	Concrete Washout	LS	1	
11.04	---	Reinforcing Steel	LB	17258	
11.05	---	Structural Concrete	CY	128.55	
11.06	---	Cover Plate	LS	1	
		STRUCTURE QUANTITIES			
		Refer to Sheet V.1 for Structure Quantities			

ESTIMATE REFERENCE NOTES

ITEM NO.	ITEM CODE	DESCRIPTION
2.01	2010-108-C-0	Clearing and Grubbing Remove all trees and shrubs as directed by engineer to construct trail as shown in the plans. Owner to approve tree removals prior to construction. Trim all trees and shrubs to maintain a 10' vertical clearance above trail and a 5' horizontal clearance from edge of trail. Contractor must coordinate with engineer prior to trimming operations. All material removed shall became property of the contractor and shall be removed from the project site. Item includes compensation for all labor, equipment, and materials necessary to prune trees and brushes and to properly dispose of material by removing off site. Tree clearing operations for bat tree to be completed from October 1 through March 31.
2.02	2010-108-D-0	Topsoil, On-Site Quantities are approximately onsite Strip = 2,699 cy, Placement +30% Shrink = 2,148 cy, with 551 cy of contractor waste. Quantity is based on 6 inch depth over vegetative disturbed areas. Topsoil placement to be a uniform 6 inches over all disturbed areas. Item shall be paid plan quantity and no measurement made. Topsoil waste may be spread on foreslopes and backslopes as approved by Engineer.
2.03	2010-108-E-0	Excavation, Class 10 Quantities are approximately Cut = 1,757 cy, Fill +30% Shrink = 4,718 cy, with a contractor furnish of 2,961 cy. Cut and fill volumes were determined based on the difference between 3-dimensional surface models for existing conditions based on contract quantity and the finished grading/paving. The quantities of cut and fill account for all earthwork necessary for trail construction, finishing shoulders and slopes adjacent to trail per the contract documents. Hauling is considered incidental to this item. Item shall be paid plan quantity and no measurement will be made. Refer to W Sheets for trail cross-sections.
2.04	2010-108-E-1	Excavation, Class 20 Item to be used for all excavation for the installation of twin 8'x5' RCBC. Cut = 410 CY, Fill+30% Shrink = 45 CY, with a balance of 365 CY of Contractor Furnish. Over excavation for twin 8'x5' RCBC is included in this quantity. Hauling and dewatering is considered incidental to this item. Item shall be paid plan quantity and no field measurements shall be made.
3.01	3010-108-C-0	Trench Foundation Item to be used for of Twin 8'x5' Reinforced Concrete Box Culvert. Refer to V Sheets for details. Engineering fabric is considered incidental to this item.
4.01 4.02	4030-108-A-1 4030-108-A-1	Pipe Culvert, Trenched, RCP, 12 Inch Pipe Culvert, Trenched, RCP, 15 Inch Class III Pipe shall be used. Refer to D Sheets for locations. Flowlines shall be verified in the field. Class R-2 Bedding shall be used.
4.03 4.04	4030-108-B-0 4030-108-B-0	Pipe Apron, RCP, 12 Inch, With Footing Pipe Apron, RCP, 15 Inch, With Footing Refer to D Sheets for locations. Installation shall conform to Iowa DOT Standard Road Plans DR-103, DR-201 and DR-205 refer to SUDAS 4030.221. Concrete footing is considered incidental to this item.
6.01	6010-108-B-0	Intake, SW-512, 24" Refer to D Sheets for locations. Item includes SW-604 Type 3B Casting.

ESTIMATE REFERENCE NOTES

ITEM NO.	ITEM CODE	DESCRIPTION
6.02	6010-108-F-0	Manhole Adjustment, Major Refer to D Sheets for locations and additional information.
6.03	6010-108-G-0	Connection to Existing Manhole Refer to D Sheets for location.
7.01	7030-108-A-0	Removal of Sidewalk Refer to D Sheets for location.
7.02	7030-108-C-0	Shared Use Path, Reinforced PCC, 6 Inch See Sheet B.1-B.3 for typical section. PCC mix shall be C-4. Curing of PCC per specifications shall be included in this item. Slipform paving equipment is required.
7.03	7030-108-D-0	Special Subgrade Preparation for Shared Use Path See Sheet B.1-B.3 for typical section.
7.04	7030-108-E-0	Sidewalk, PCC, 5 Inch See B Sheets for typical sections. PCC mix shall be C-4. Curing of PCC per specifications shall be included in this item.
7.05	- - -	Shared Use Path, Reinforced Bridge Approach See B Sheets for typical section and D Sheets for locations. Construction shall comply with Section 2301 of the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2015, and detailed in the plans. Item includes all material, equipment, and labor for construction Shared Use Path Bridge Approach. The Contractor will be paid the contract unit price per square yard of bridge approach constructed.
8.01	8020-108-B-0	Painted Pavement Markings, Solvent/Waterborne Refer to B Sheet for pavement markings crossing detail and D Sheets for locations. Contractor to coordinate with Engineer and Owner prior to placement.
8.02	8030-108-A-0	Traffic Control This item includes supply, erection, maintenance and removal of all signs, construction fence, barricades and other traffic control devices necessary for the construction of Trail. The contractor shall comply with Section 2528 of the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2015, and all supplemental specifications for utilizing flaggers. Flaggers are considered incidental to this item. All traffic control devices shall be in accordance with the current Manual on Uniform Traffic Control Devices (MUTCD) for the Streets and Highways as adopted by the Iowa Department of Transportation per 761 of the Iowa Administrative Code (IAC), Chapter 130. The Contractor is responsible to furnish, maintain, mobilize, and remove the traffic control devices during and after construction.
8.03	---	Signs All materials, specifications and construction methods shall comply with Section 2524 of the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2015, and all supplemental specifications. The Contractor shall also comply with the current Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways as adopted by the Iowa Department of Transportation per 761 of the Iowa Administrative Code (IAC), Chapter 130 Refer to Detail 7 & 9 on Sheet B.3 for additional information. Metal posts shall be included in this item. This item shall be paid as a lump sum for all labor, equipment, and materials needed to properly install signage per plan set, specifications, and MUTCD.
9.01	9010-108-B-0	Hydraulic Seeding, Seeding, Fertilizing, and Mulching, BFM, Type 1 Mix Includes quantity for restoration of all areas within the construction limits as shown in the plans If Contractor goes outside of proposed grading limits the additional disturbed area will be reseeded at the Contractors expense without reimbursement. Refer to C Sheets for Seeding Plan. Bonded Fiber Matrix (BFM) shall be used as a mulching agent, product submittal is required prior to construction. Seeding shall be Type 1, Permanent Lawn Mixture. Contractor shall provide seed, fertilization, and mulching tickets for quantity and quality verification prior to each application. Watering per SUDAS Specification 9010 is considered incidental to this items.
9.02	9010-108-B-0	Hydraulic Seeding, Seeding, Fertilizing, and Mulching, BFM, Native Mix Includes quantity for restoration of all areas within the construction limits as shown in the plans If Contractor goes outside of proposed grading limits the additional disturbed area will be reseeded at the Contractors expense without reimbursement. Refer to C Sheets for Seeding Plan. Bonded Fiber Matrix (BFM) shall be used as a mulching agent, product submittal is required prior to construction. Seeding shall be Native Grass and Forbs Mixture per Type A Native Seed Mix on Sheet C.3. Seeding dates are April 1 to June 30 or August 1 to August 31. Contractor shall provide seed, fertilization, and mulching tickets for quantity and quality verification prior to each application. Watering per SUDAS Specification 9010 is considered incidental to this items.
9.03	9040-108-A-2	SWPPP Management The Contractor shall be responsible for SWPPP management. Payment shall be made as a percentage of work completed at each monthly payment. The Contractor shall have all SWPPP work installed and inspected by the Owner prior to any work on the project.
9.04	9040-108-D-1	Filter Sock, 12 Inch Refer to D Sheets for locations.
9.05	9040-108-D-2	Filter Sock, Removal Refer to D Sheets for locations.
9.06	9040-108-E-0	Temporary RECP, Type 3 Refer to D Sheets for locations.
9.07	9040-108-J-0	Rip Rap, Class E See Details on Sheet B.1. Refer to C Sheets for locations.
9.08	9040-108-N-1	Silt Fence Refer to D Sheets for locations.
9.09	9040-108-N-2	Silt Fence, Removal Refer to D Sheets for locations.
9.10	9040-108-O-1	Stabilized Construction Entrance Contractor to coordinate with Owner and Engineer for locations. Refer to C Sheets for details.
9.11	9040-108-Q-1	Erosion Control Mulching, Conventional Item includes all disturbed areas within project limits. Includes quantity for restoration of all areas within the construction limits as shown in the plans as required by NPDES permit. Mulching areas outside of the construction limits shall be the responsibility of the Contractor at no additional cost to the Owner.
11.01	11,020-108-A	Construction Survey
11.02	11,050-108-A-0	Mobilization Include all costs associated with mobilization for entire project, including all Bridge and Trail work.
11.03	---	Concrete Washout Coordinate washout location with Owner and Engineer prior to installation.
11.04	---	Reinforcing Steel Item is to be used for the construction of the twin 8'x5' RCBC. Refer to D and V Sheets for location and additional information. Construction shall comply with Section 2404 of the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2015, and detailed in the plans. The Contractor will be paid the contract unit price to the nearest pound of reinforcing steel used for construction of twin 8'x5' RCBC.
11.05	---	Structural Concrete Item is to be used for the construction of the twin 8'x5' RCBC. Refer to D and V Sheets for location and additional information. Construction shall comply with Section 2403 of the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2015, and detailed in the plans. The Contractor will be paid the contract unit price to the nearest cubic yard of structural concrete used for construction of twin 8'x5' RCBC.
11.06	---	Cover Plate Item to be used for the joint between the proposed Stagecoach Drive sidewalk connection to the existing bridge pavement. Refer to B & D Sheets for location and additional information. This item shall be paid as a lump sum for all labor, equipment, and materials needed to properly install Cover Plate per plain details.

MARK | DATE | BY | REVISION

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet C.1

SUGAR CREEK GREENWAY TRAIL PHASE 1
WEST DES MOINES, IOWA
QUANTITIES

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet C.1

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POLLUTION PREVENTION NOTES

A. POLLUTION PREVENTION AND EROSION PROTECTION

1. CODE COMPLIANCE: THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH ALL POTENTIAL POLLUTION AND SOIL EROSION CONTROL REQUIREMENTS OF THE IOWA CODE, THE IOWA DEPARTMENT OF NATURAL RESOURCES (IDNR) NPDES PERMIT, THE U.S. CLEAN WATER ACT AND ANY LOCAL ORDINANCES. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO PROTECT AGAINST EROSION AND POLLUTION FROM THIS PROJECT SITE AND ALL OFF-SITE BORROW OR DEPOSIT AREAS DURING PERFORMANCE OR AS A RESULT OF PERFORMANCE.

2. DAMAGE CLAIMS: THE CONTRACTOR WILL HOLD THE OWNER AND ARCHITECT / ENGINEER HARMLESS FROM ANY AND ALL CLAIMS OF ANY TYPE WHATSOEVER RESULTING FROM DAMAGES TO ADJOINING PUBLIC OR PRIVATE PROPERTY, INCLUDING REASONABLE ATTORNEY FEES INCURRED TO OWNER. FURTHER, IF THE CONTRACTOR FAILS TO TAKE NECESSARY STEPS TO PROMPTLY REMOVE EARTH SEDIMENTATION OR DEBRIS WHICH COMES ONTO ADJOINING PUBLIC OR PRIVATE PROPERTY, THE OWNER MAY, BUT NEED NOT, REMOVE SUCH ITEMS AND DEDUCT THE COST THEREOF FROM AMOUNTS DUE TO THE CONTRACTOR.

B. STORM WATER DISCHARGE PERMIT

1. THIS PROJECT REQUIRES COVERAGE UNDER THE NPDES GENERAL PERMIT NO. 2 FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES FROM THE IDNR, AS REQUIRED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS ARE RESPONSIBLE FOR COMPLIANCE WITH AND FULFILLMENT OF ALL REQUIREMENTS OF THE NPDES GENERAL PERMIT NO. 2 INCLUDING CREATING OR MAINTAINING THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND POSSIBLY OBTAINING THE GENERAL PERMIT COVERAGE FROM THE IDNR.

2. ALL DOCUMENTS RELATED TO THE STORM WATER DISCHARGE PERMIT, INCLUDING, BUT NOT LIMITED TO, THE NOTICE OF INTENT, PROOF OF PUBLICATIONS, DISCHARGE AUTHORIZATION LETTER, CURRENT SWPPP, SITE INSPECTION LOG, AND OTHER ITEMS, SHALL BE KEPT ON SITE AT ALL TIMES AND MUST BE PRESENTED TO ANY JURISDICTIONAL AGENCIES UPON REQUEST. FAILURE TO COMPLY WITH THE NPDES PERMIT REQUIREMENTS IS A VIOLATION OF THE CLEAN WATER ACT AND THE CODE OF IOWA.

C. POLLUTION PREVENTION PLAN:

1. THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IS A SEPARATE DOCUMENT IN ADDITION TO THESE PLAN DRAWINGS. THE CONTRACTOR SHOULD REFER TO THE SWPPP FOR ADDITIONAL REQUIREMENTS AND MODIFICATIONS TO THE POLLUTION PREVENTION PLAN MADE DURING CONSTRUCTION.

2. THE SWPPP ILLUSTRATES GENERAL MEASURES AND BEST MANAGEMENT PRACTICES (BMP) FOR COMPLIANCE WITH THE PROJECT'S NPDES PERMIT COVERAGE. ALL BMP'S AND EROSION CONTROL MEASURES REQUIRED AS A RESULT OF CONSTRUCTION ACTIVITIES ARE THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY, NOTE AND IMPLEMENT. ADDITIONAL BMP'S FROM THOSE SHOWN ON THE PLAN MAY BE REQUIRED.

3. THE SWPPP AND SITE MAP SHOULD BE EXPEDITIOUSLY REVISED TO REFLECT CONSTRUCTION PROGRESS AND CHANGES AT THE PROJECT SITE.

4. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH ALL REQUIREMENTS OF THE GENERAL PERMIT AND SWPPP, INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING BMP'S UNLESS INFEASIBLE OR NOT APPLICABLE:

a. UTILIZE OUTLET STRUCTURES THAT WITHDRAW WATER FROM THE SURFACE WHEN DISCHARGING FROM BASINS, PROVIDE AND MAINTAIN NATURAL BUFFERS AROUND SURFACE WATERS, DIRECT STORM WATER TO VEGETATED AREAS TO INCREASE SEDIMENT REMOVAL AND MAXIMIZE STORM WATER INFILTRATION, AND MINIMIZE SOIL COMPACTION.

b. INSTALL PERIMETER AND FINAL SEDIMENT CONTROL MEASURES SUCH AS SILT BARRIERS, DITCH CHECKS, DIVERSION BERMS, OR SEDIMENTATION BASINS DOWNSTREAM OF SOIL DISTURBING ACTIVITIES PRIOR TO SITE CLEARING AND GRADING OPERATIONS.

c. PRESERVE EXISTING VEGETATION IN AREAS NOT NEEDED FOR CONSTRUCTION AND LIMIT TO A MINIMUM THE TOTAL AREA DISTURBED BY CONSTRUCTION OPERATIONS AT ANY TIME.

d. MAINTAIN ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES IN WORKING ORDER, INCLUDING CLEANING, REPAIRING, REPLACEMENT, AND SEDIMENT REMOVAL THROUGHOUT THE PERMIT PERIOD. CLEAN OR REPLACE SILT CONTROL DEVICES WHEN THE MEASURES HAVE LOST 50% OF THEIR ORIGINAL CAPACITY.

e. INSPECT THE PROJECT AREA AND CONTROL DEVICES (BY QUALIFIED PERSONNEL ASSIGNED BY THE CONTRACTOR) EVERY SEVEN CALENDAR DAYS. RECORD THE FINDINGS OF THESE INSPECTIONS AND ANY RESULTING ACTIONS IN THE SWPPP WITH A COPY SUBMITTED WEEKLY TO THE OWNER OR ENGINEER DURING CONSTRUCTION. REVISE THE SWPPP AND IMPLEMENT ANY RECOMMENDED MEASURES WITHIN 7 DAYS.

f. PREVENT ACCUMULATION OF EARTH AND DEBRIS FROM CONSTRUCTION ACTIVITIES ON ADJOINING PUBLIC OR PRIVATE PROPERTIES, INCLUDING STREETS, DRIVEWAYS, SIDEWALKS, DRAINAGEWAYS, OR UNDERGROUND SEWERS. REMOVE ANY ACCUMULATION OF EARTH OR DEBRIS IMMEDIATELY AND TAKE REMEDIAL ACTIONS FOR FUTURE PREVENTION.

g. INSTALL NECESSARY CONTROL MEASURES SUCH AS SILT BARRIERS, EROSION CONTROL MATS, MULCH, DITCH CHECKS OR RIPRAP AS SOON AS AREAS REACH THEIR FINAL GRADES AND AS CONSTRUCTION OPERATIONS PROGRESS TO ENSURE CONTINUOUS RUNOFF CONTROL. PROVIDE INLET AND OUTLET CONTROL MEASURES AS SOON AS STORM SEWERS ARE INSTALLED.

POLLUTION PREVENTION NOTES (CONT.)

h. RESPREAD A MINIMUM OF 6 INCHES OF TOPSOIL (INCLUDING TOPSOIL FOUND IN SOD) ON ALL DISTURBED AREAS, EXCEPT WHERE PAVEMENT, BUILDINGS OR OTHER IMPROVEMENTS ARE LOCATED.

i. STABILIZE UNDEVELOPED, DISTURBED AREAS WITH MULCH, TEMPORARY SEED MIX, PERMANENT SEED MIX, OR SOD AS SOON AS PRACTICAL UPON COMPLETION OR DELAY OF GRADING OPERATIONS. INITIATE STABILIZATION OF DISTURBED AREA IMMEDIATELY AFTER CLEARING, GRADING, EXCAVATING, OR OTHER EARTH DISTURBING ACTIVITIES HAVE: 1. PERMANENTLY CEASED ON ANY PORTION OF THE SITE, OR 2. TEMPORARY CEASED ON ANY PORTION OF THE SITE AND WILL NOT RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS.

j. COORDINATE LOCATIONS OF STAGING AREAS WITH THE OWNER AND RECORD IN THE SWPPP. UNLESS NOTED OTHERWISE, STAGING AREAS SHOULD CONTAIN THE FOLLOWING: JOB TRAILERS, FUELING / VEHICLE MAINTENANCE AREA, TEMPORARY SANITARY FACILITIES, MATERIALS STORAGE, AND CONCRETE WASHOUT FACILITY. CONTROL RUNOFF FROM STAGING AREAS WITH DIVERSION BERMS AND/OR SILT BARRIERS AND DIRECT TO A SEDIMENT BASIN OR OTHER CONTROL DEVICE WHERE POSSIBLE. CONCRETE WASHOUT MUST BE CONTAINED ONSITE.

k. REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND SITE WASTE PRIOR TO FILING OF THE "NOTICE OF DISCONTINUATION". THE NOTICE OF DISCONTINUATION TO BE FILED BY THE CITY.

l. COLLECTION OF CONCRETE SLURRY FROM SAWCUTTING OPERATIONS TO BE COLLECTED PRIOR TO ENTERING STORM SEWER SYSTEM. REFER TO NPDES GENERAL PERMIT #2 FOR ADDITIONAL INFORMATION.

POLLUTION PREVENTION PLAN NOTES

A. EXISTING CONTOURS ARE SHOWN IN THIN GRAY SCALE AND PROPOSED CONTOURS ARE SHOWN IN THICK GRAY SCALE.

B. PROPOSED CONTOURS ARE SHOWN FOR GRAPHICAL PURPOSES ONLY AND SHALL NOT BE CONSIDERED FOR FINAL GRADING PURPOSES. REFER TO OTHER PLAN SHEETS FOR DETAILED CONSTRUCTION GRADING INFORMATION.

C. GRAPHICAL PROPOSED CONTOURS ARE SHOWN FOR FINAL SURFACE ONLY.

D. CONSTRUCTION ACTIVITIES ADJACENT TO THE CREEK SHALL BE CONDUCTED DURING LOW FLOW PERIODS IF POSSIBLE.

NOTICE: NEW REQUIREMENTS REGARDING STABILIZATION TO COMPLY WITH NEW NPDES GENERAL PERMIT NO. 2.

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet C.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

POLLUTION PREVENTION NOTES

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet C.2

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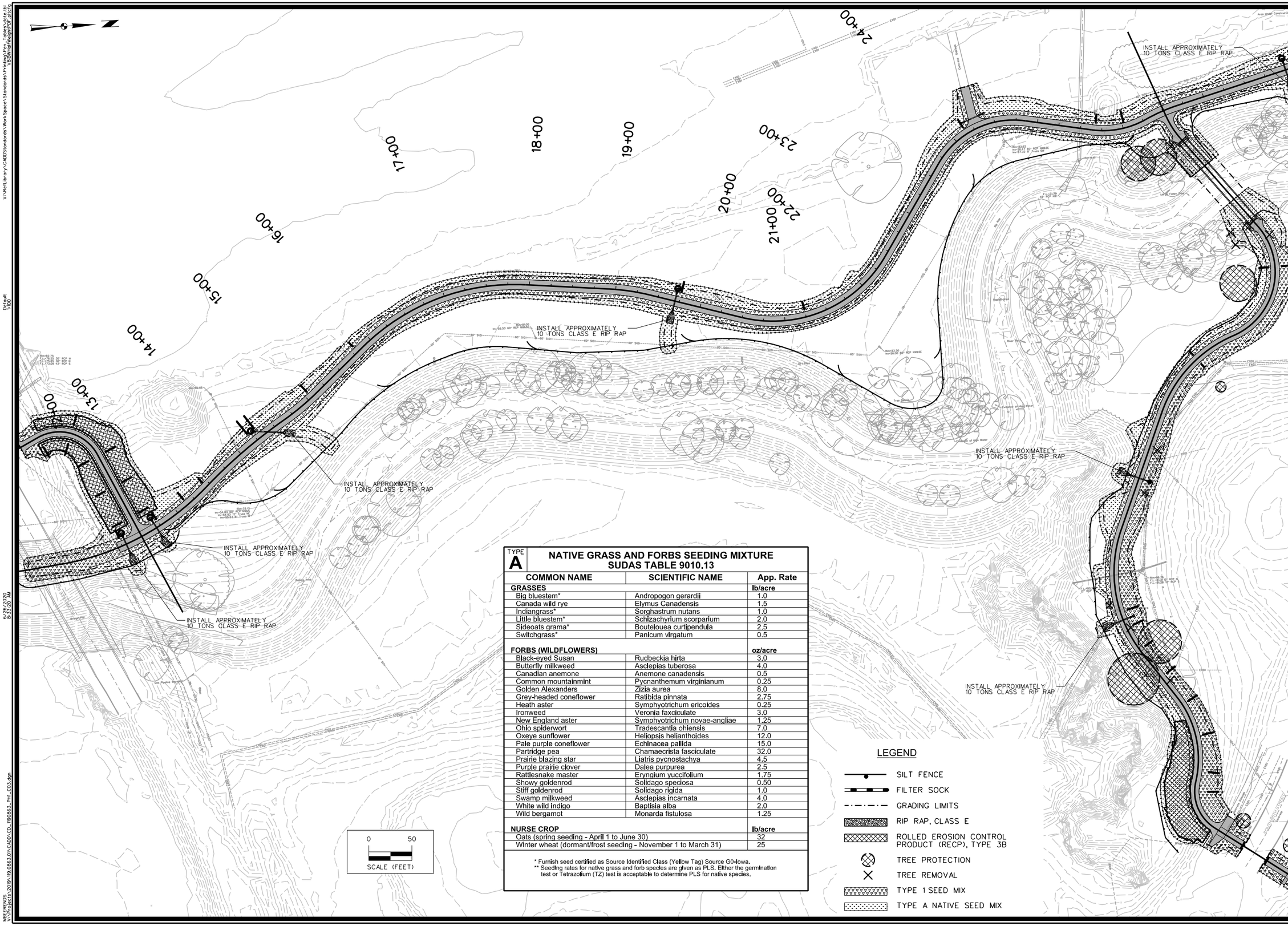

TYPE A

NATIVE GRASS AND FORBS SEEDING MIXTURE
SUDAS TABLE 9010.13

COMMON NAME	SCIENTIFIC NAME	App. Rate
GRASSES		**lb/acre**
Big bluestem*	Andropogon gerardii	1.0
Canada wild rye	Elymus Canadensis	1.5
Indiangrass*	Sorghastrum nutans	1.0
Little bluestem*	Schizachyrium scorparium	2.0
Sideoats grama*	Bouteloua curtipendula	2.5
Switchgrass*	Panicum virgatum	0.5
FORBS (WILDFLOWERS)		**oz/acre**
Black-eyed Susan	Rudbeckia hirta	3.0
Butterfly milkweed	Asclepias tuberosa	4.0
Canadian anemone	Anemone canadensis	0.5
Common mountainmint	Pycnanthemum virginianum	0.25
Golden Alexanders	Zizia aurea	8.0
Grey-headed coneflower	Ratibida pinnata	2.75
Heath aster	Symphyotrichum ericoides	0.25
Ironweed	Veronia faxciculate	3.0
New England aster	Symphyotrichum novae-angliae	1.25
Ohio spiderwort	Tradescantia ohiensis	7.0
Oxeye sunflower	Heliopsis helianthoides	12.0
Pale purple coneflower	Echinacea pallida	15.0
Partridge pea	Chamaecrista fasciculate	32.0
Prairie blazing star	Liatris pycnostachya	4.5
Purple prairie clover	Dalea purpurea	2.5
Rattlesnake master	Eryngium yuccifolium	1.75
Showy goldenrod	Solidago speciosa	0.50
Stiff goldenrod	Solidago rigida	1.0
Swamp milkweed	Asclepias incarnata	4.0
White wild indigo	Baptisia alba	2.0
Wild bergamot	Monarda fistulosa	1.25
NURSE CROP		**lb/acre**
Oats (spring seeding - April 1 to June 30)		32
Winter wheat (dormant/frost seeding - November 1 to March 31)		25

* Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa.
** Seedling rates for native grass and forb species are given as PLS. Either the germination test or Tetrazolium (TZ) test is acceptable to determine PLS for native species.

LEGEND

- SILT FENCE
- FILTER SOCK
- GRADING LIMITS
- RIP RAP, CLASS E
- ROLLED EROSION CONTROL PRODUCT (RECP), TYPE 3B
- TREE PROTECTION
- TREE REMOVAL
- TYPE 1 SEED MIX
- TYPE A NATIVE SEED MIX

MARK	REVISION	DATE	BY
	AS SHOWN		

Engineer: RP	Checked By: TNJ	Scale: C.3	
Technician: MLB	Date: 06/26/20	T-R-S: 78N-26W-22	

Project No: 1190863 Sheet

SUGAR CREEK GREENWAY TRAIL PHASE 1

POLLUTION PREVENTION PLAN

WEST DES MOINES, IOWA

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Sheet C.3

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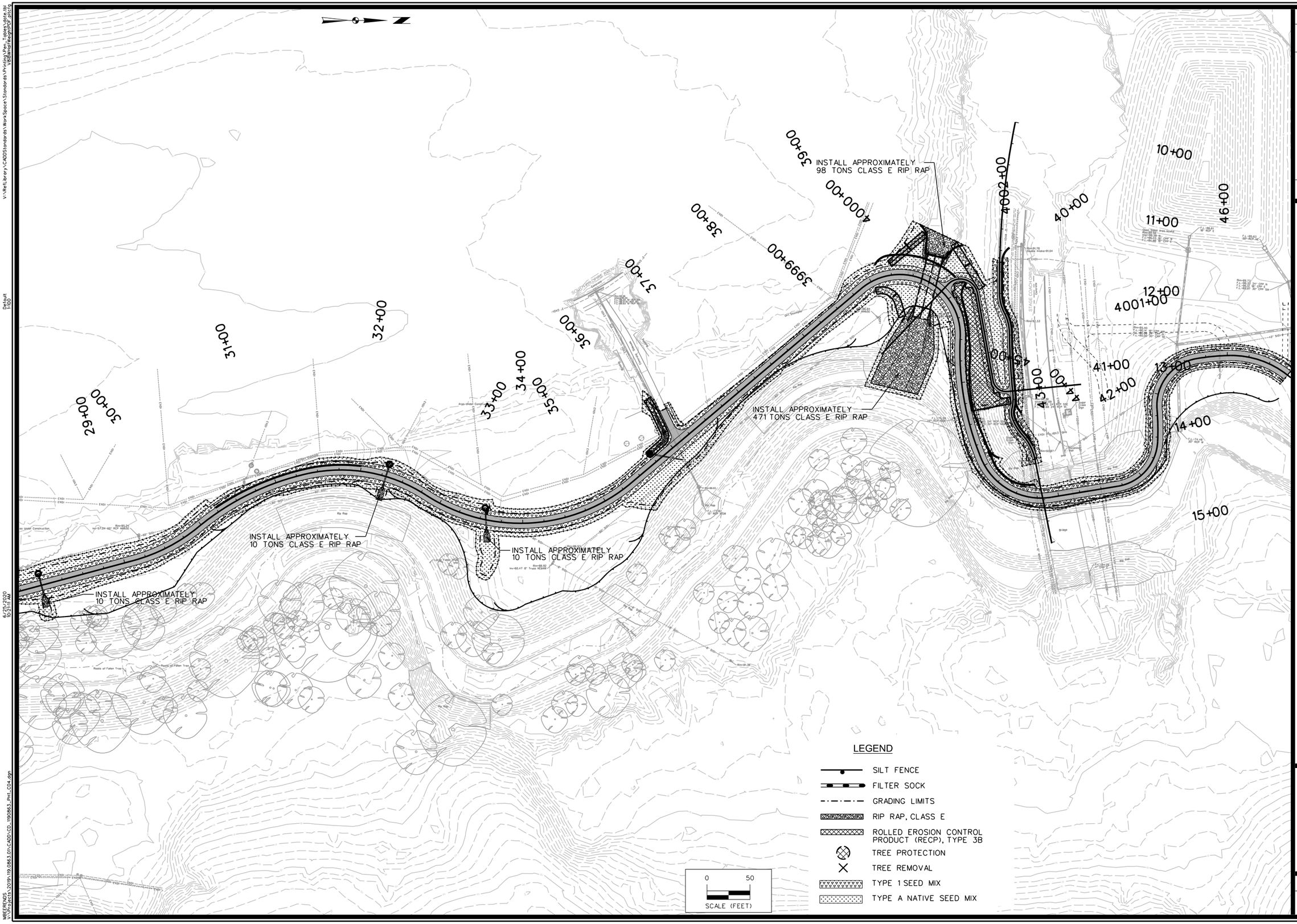

MARK	REVISION	DATE	BY

Engineer:	RP	Checked By:	TNJ
Technician:	MLB	Date:	06/26/20
Scale:	AS SHOWN		
T-R-S:	78N-26W-22		

Project No: 1190863

Sheet C.4

SUGAR CREEK GREENWAY TRAIL PHASE 1

POLLUTION PREVENTION PLAN

WEST DES MOINES, IOWA

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Sheet C.4

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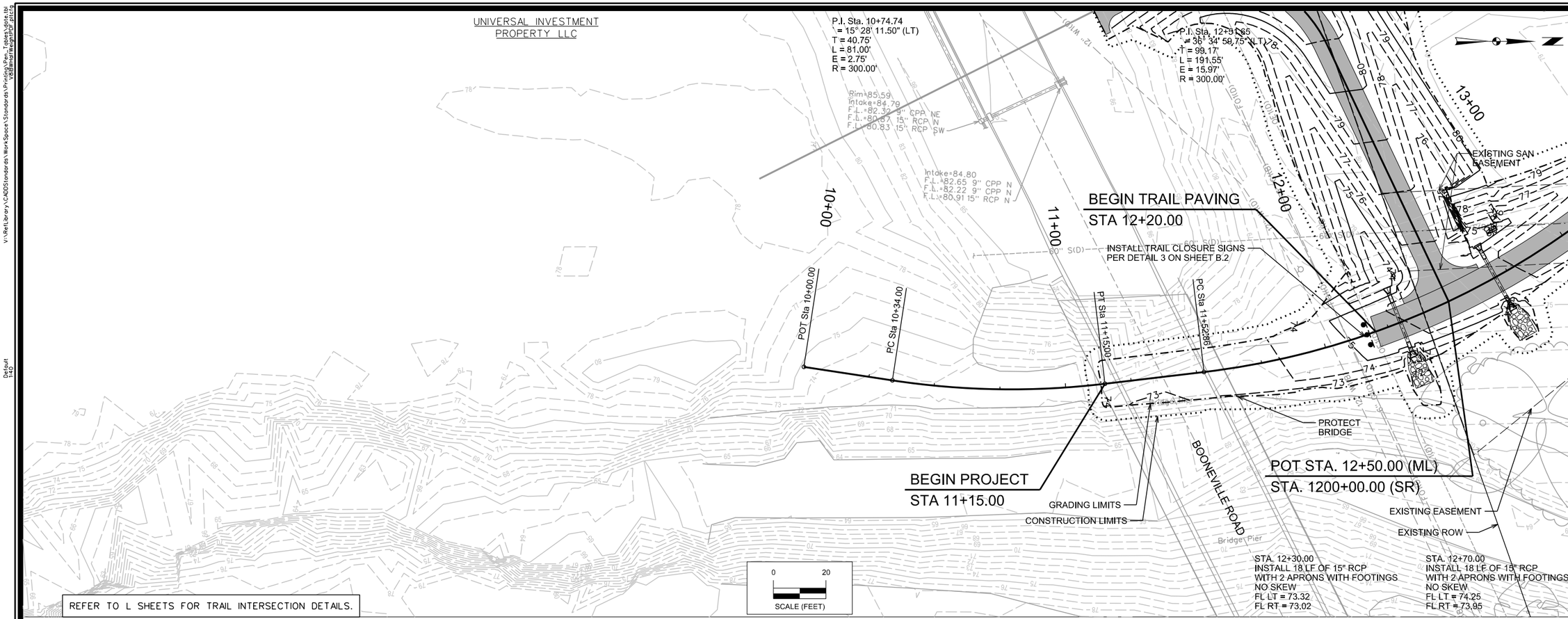
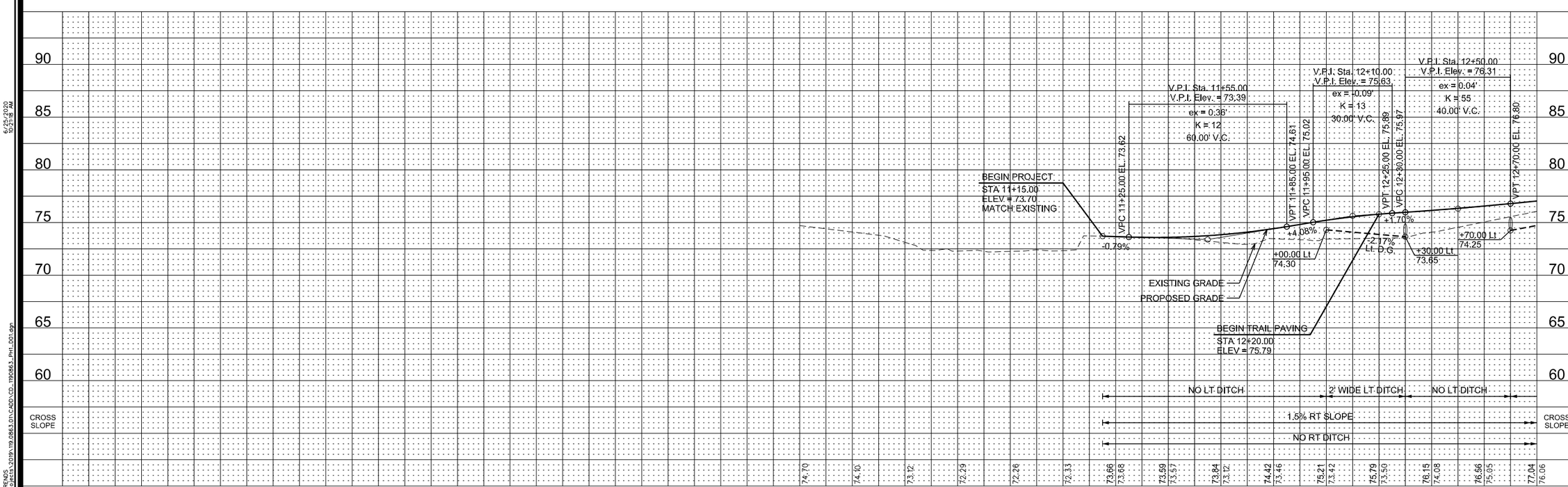


REFER TO L SHEETS FOR TRAIL INTERSECTION DETAILS.



MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet D.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

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Project No: 1190863
Sheet D.1

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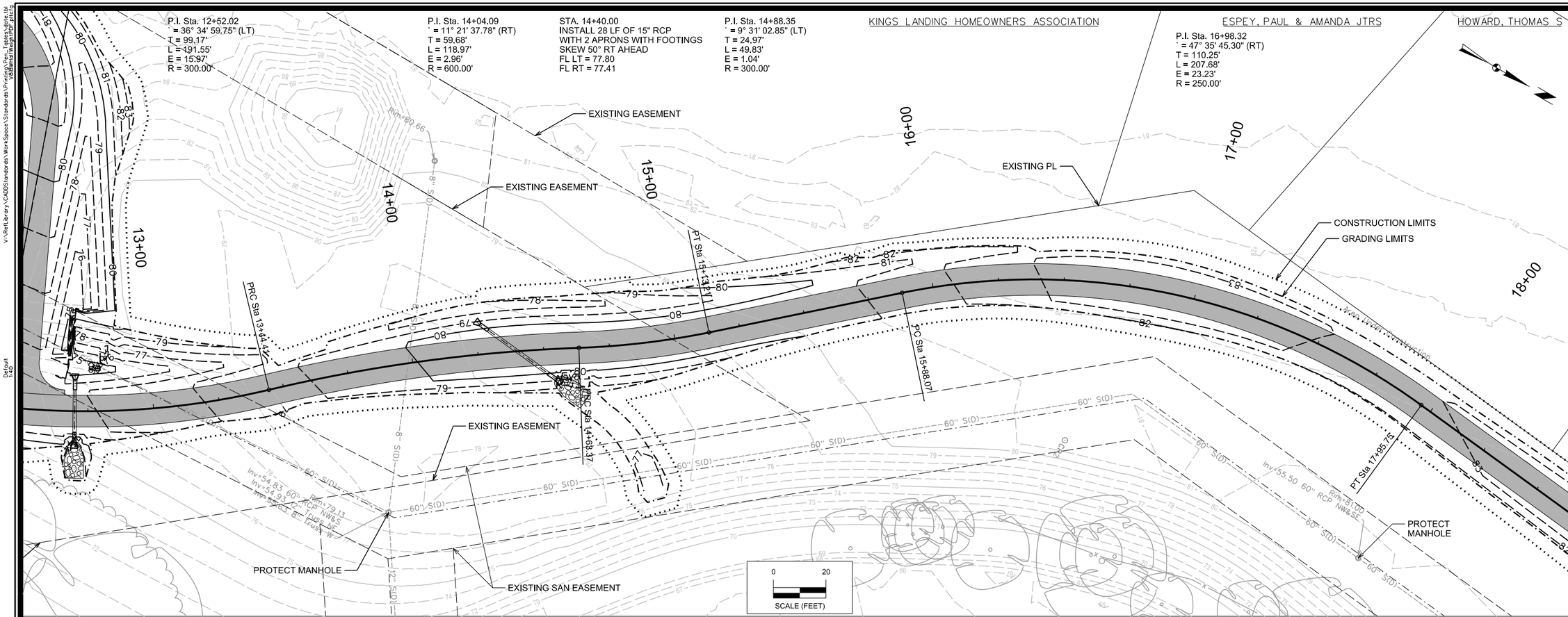

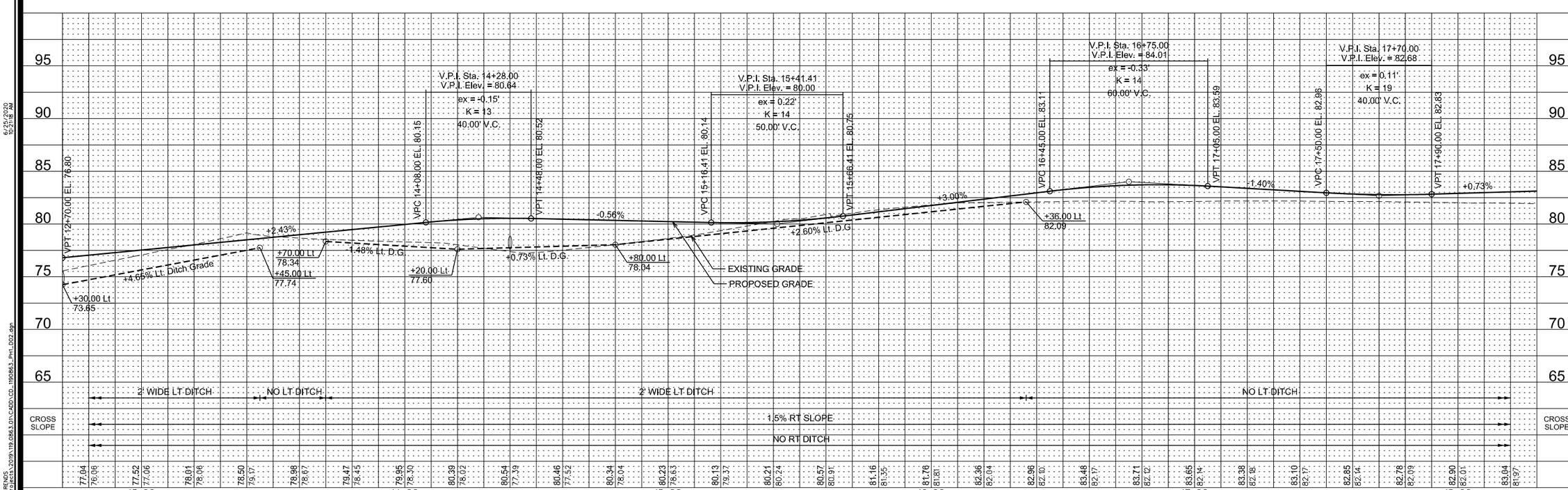

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet D.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

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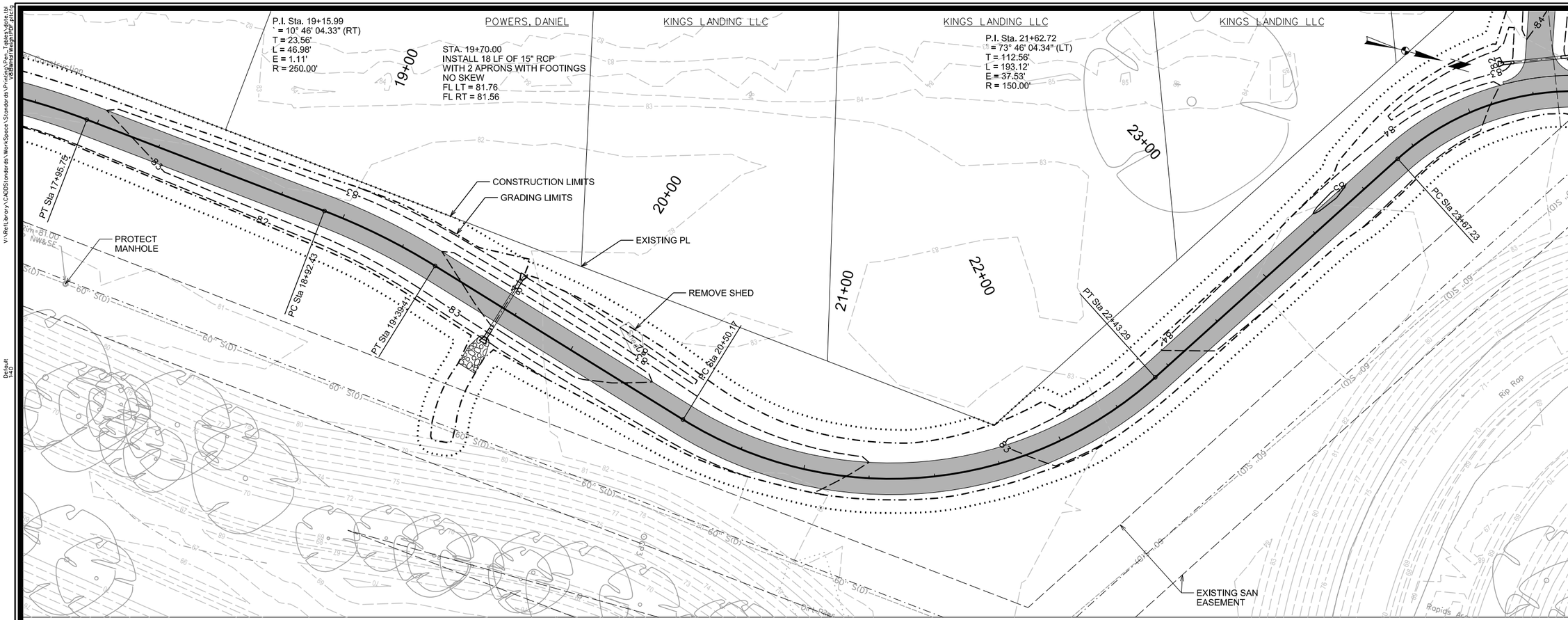
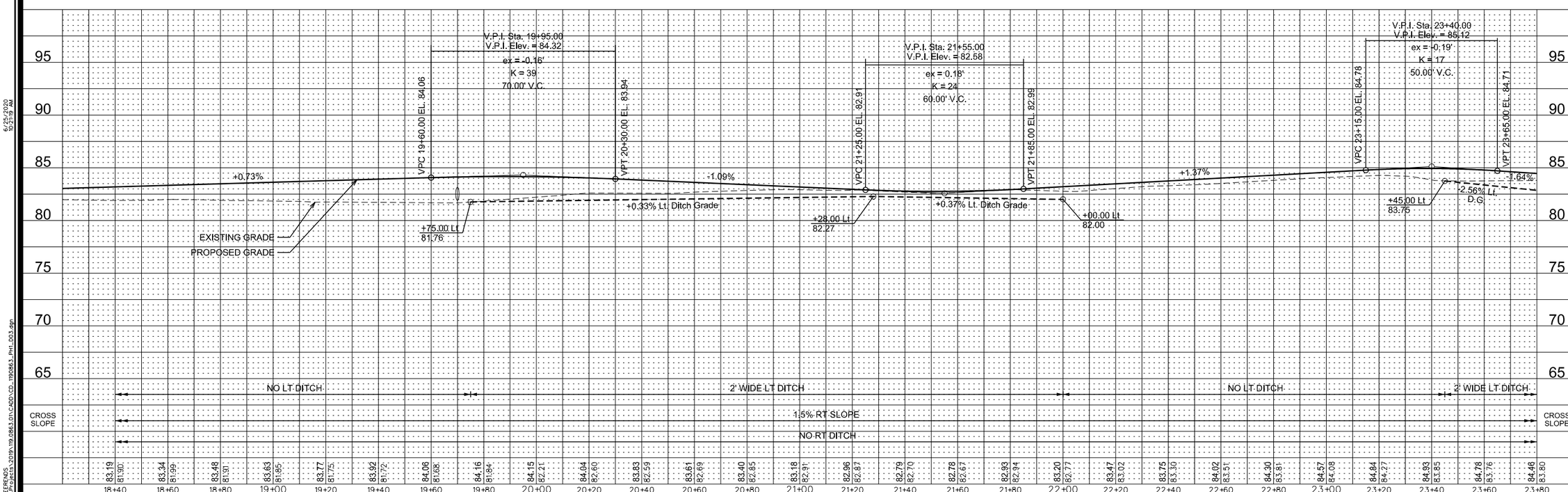
Project No: 1190863
Sheet D.2





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Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet D.3

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

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Sheet D.3

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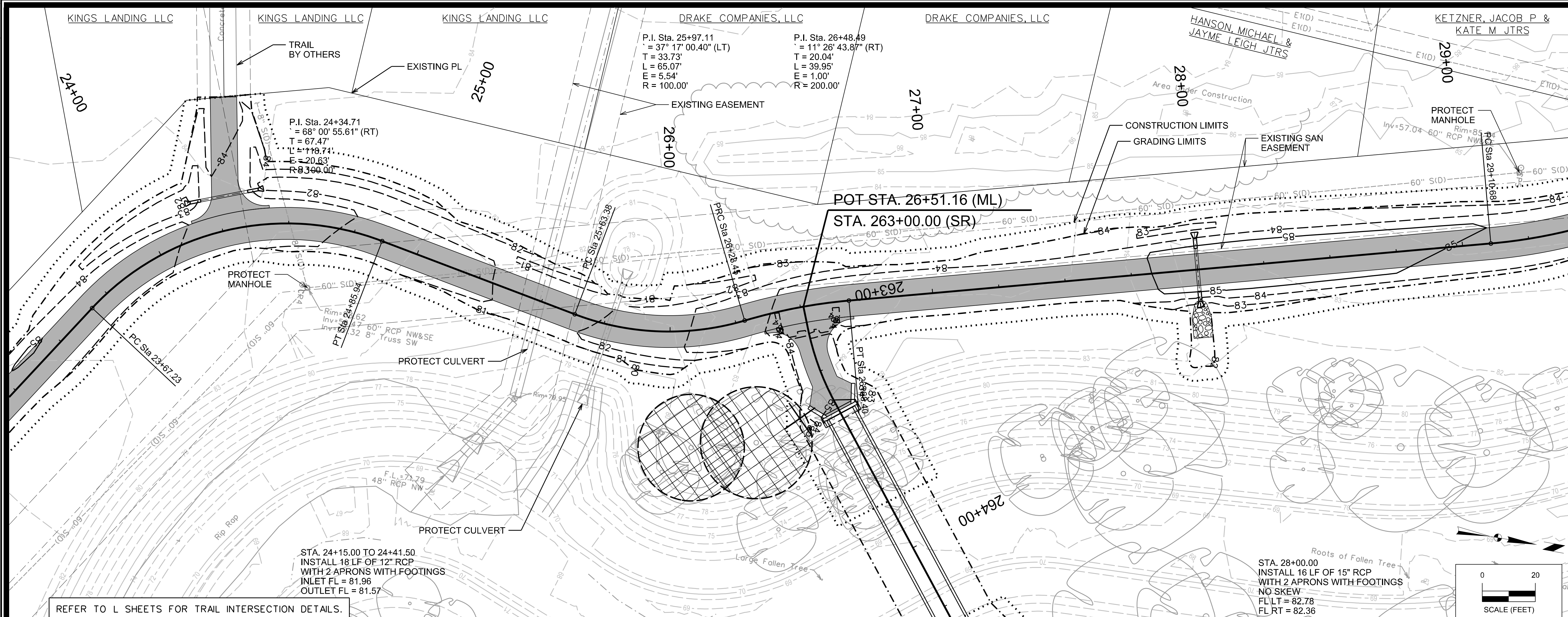

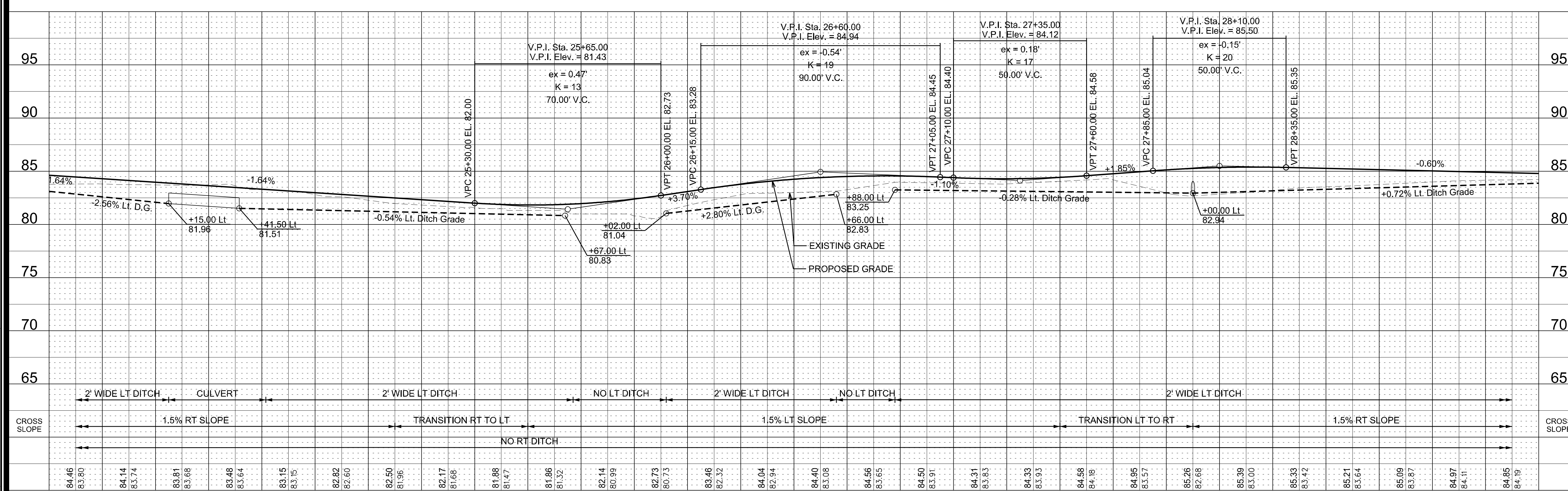

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

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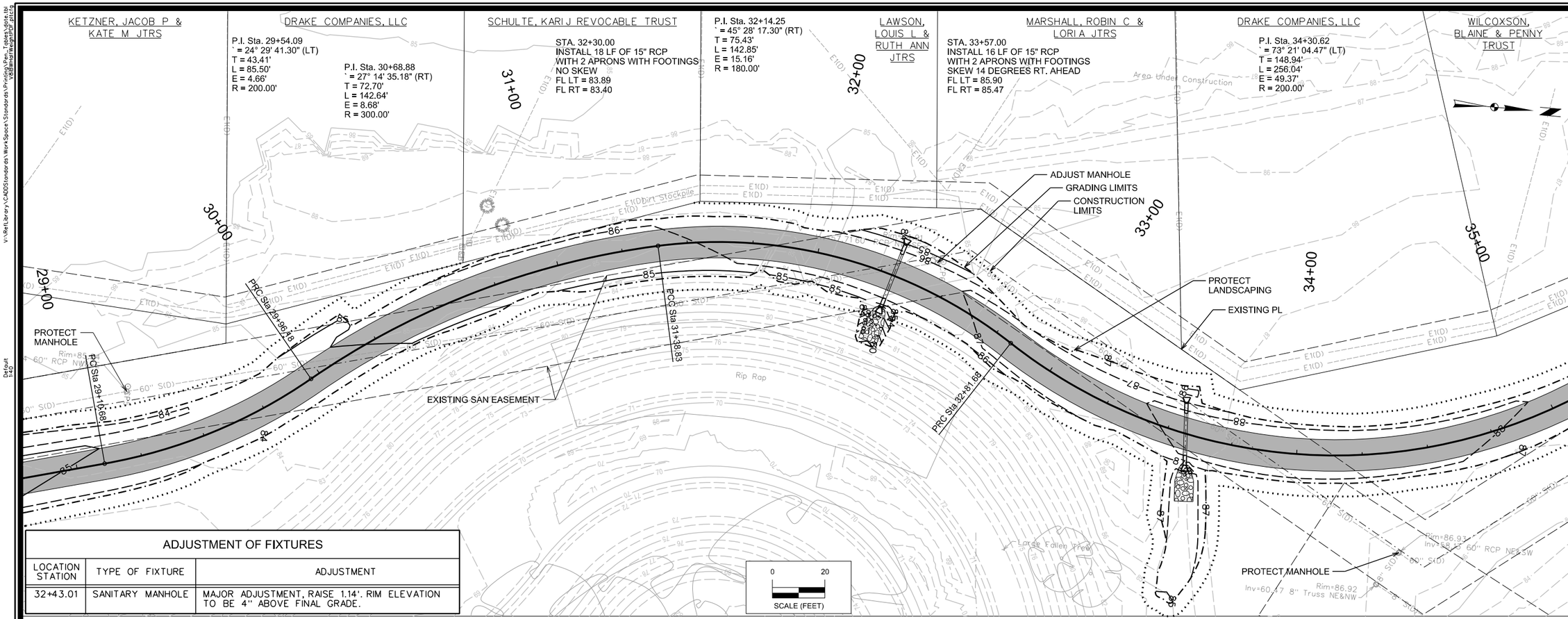
MARK	REVISION	DATE	BY

Engineer:	RP	Scale:	1"= 20'
Checked By:	TNJ	T-R-S:	78N-26W-22
Technician:	MLB	Date:	06/26/20
Project No:	1190863	Sheet	D.4

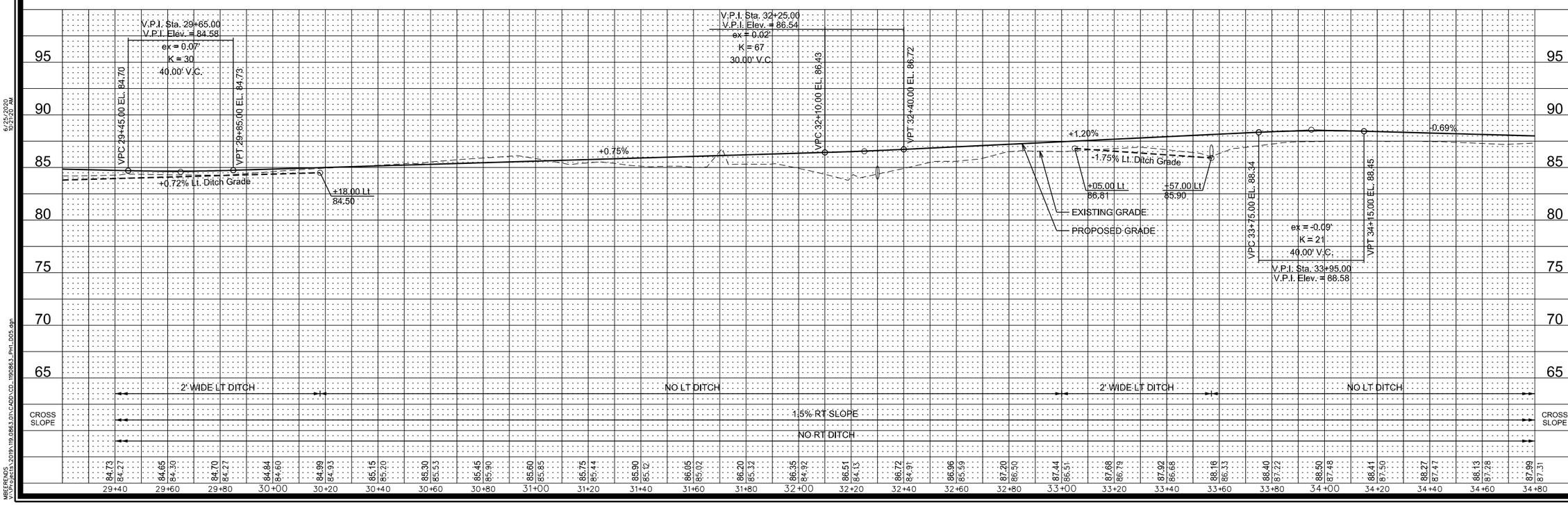
Project No: 1190863

Sheet D.4



ADJUSTMENT OF FIXTURES

LOCATION STATION	TYPE OF FIXTURE	ADJUSTMENT
32+43.01	SANITARY MANHOLE	MAJOR ADJUSTMENT, RAISE 1.14'. RIM ELEVATION TO BE 4" ABOVE FINAL GRADE.



MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet D.5

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

PLAN AND PROFILE

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Project No: 1190863
Sheet D.5

WILCOXSON, BLAINE & PENNY TRUST

ARBOR HOME BUILDERS, LLC

ARBOR HOME BUILDERS, LLC

KINGS LANDING LLC

ARBOR HOMES BUILDERS, LLC

STA. 36+13.30, 62.52' LT
SPOT GRADE
ELEV = 88.73

STA. 36+12.46, 52.40' LT
SPOT GRADE
ELEV = 88.59

STA. 36+06.23, 28.19' LT
SPOT GRADE
ELEV = 88.17

STA. 35+91.02, 12.47' LT
SPOT GRADE
ELEV = 87.75

EXISTING EASEMENT

TRAIL BY OTHERS

CONSTRUCTION LIMITS

GRADING LIMITS

EXISTING PL

POT STA. 39+87.98 (ML)
STA. 4000+06.00 (SR)

P.I. Sta. 40+46.52
= 132° 57' 50.03" (RT)
T = 160.85'
L = 162.45'
E = 105.42'
R = 70.00'

STA. 39+70.00
INSTALL 8'x5'x50' TWIN RCBC
SKEW 15° RT. AHEAD

PT Sta 35+37.72

PC Sta 38+85.67

PT Sta 40+48.11

PROTECT MANHOLE

PROTECT MANHOLE

EXISTING SAN EASEMENT

STAGECOACH DRIVE

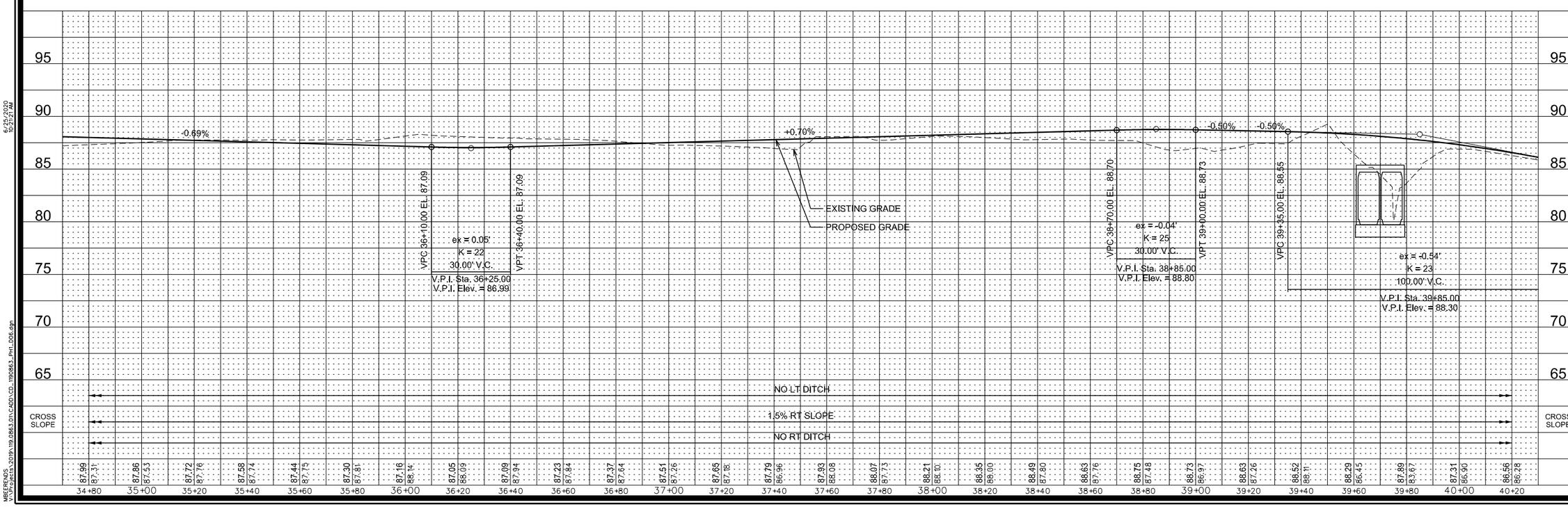
35+00 36+00 37+00 38+00 39+00 40+00

REFER TO L SHEETS FOR TRAIL INTERSECTION DETAILS.

REFER TO V SHEETS FOR CULVERT DETAILS.

1 STORM SEWER
A. STA. 35+75.00, OFFSET 12.01 FT LEFT
RIM ELEVATION OF PROPOSED 24" SW-512 = 87.46
WITH SW-604 TYPE 3B CASTING
FLOWLINE OF PROPOSED 15" RCP PIPE (S) = 84.01
FLOWLINE OF PROPOSED 15" RCP PIPE (N) = 83.61
SKEW 52 DEGREES
B. STA. 36+01.15, OFFSET 19.69 FT RIGHT
UAC EXISTING STORM SEWER STRUCTURE

0 20
SCALE (FEET)



MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet D.6

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

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Project No: 1190863
Sheet D.6

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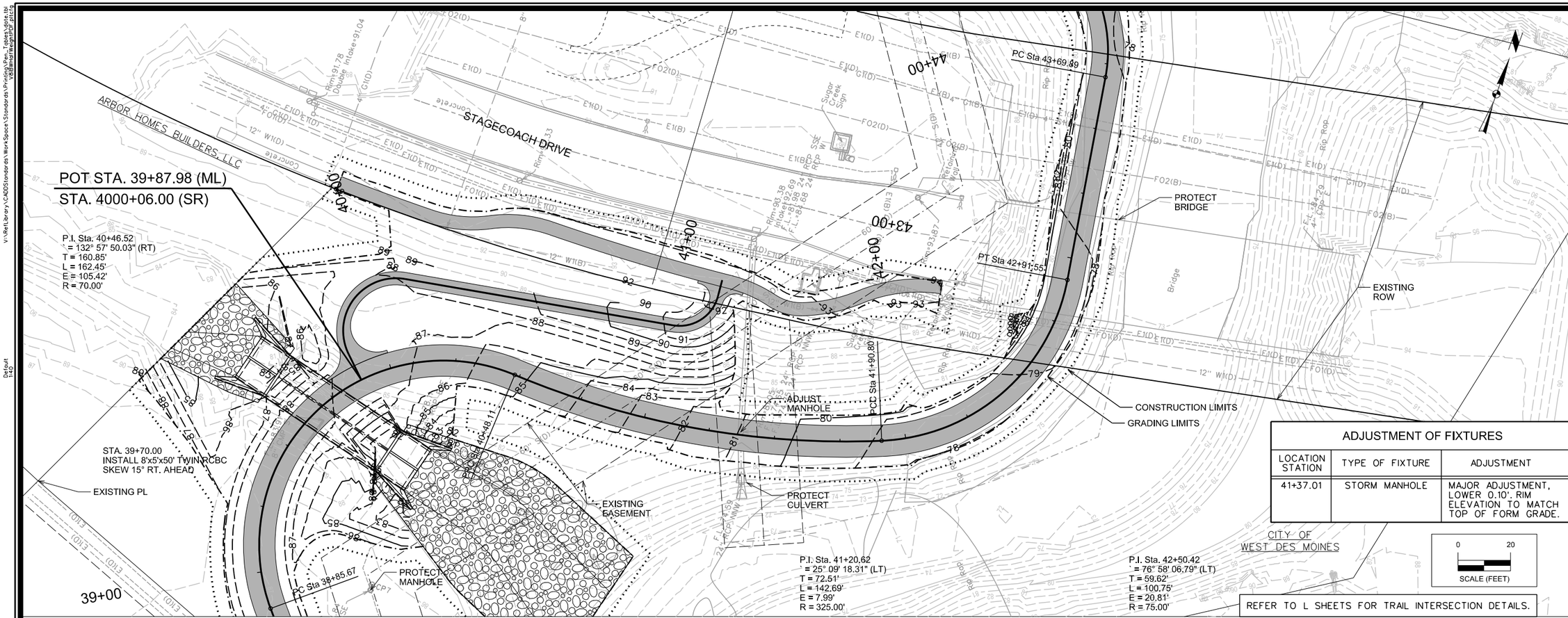
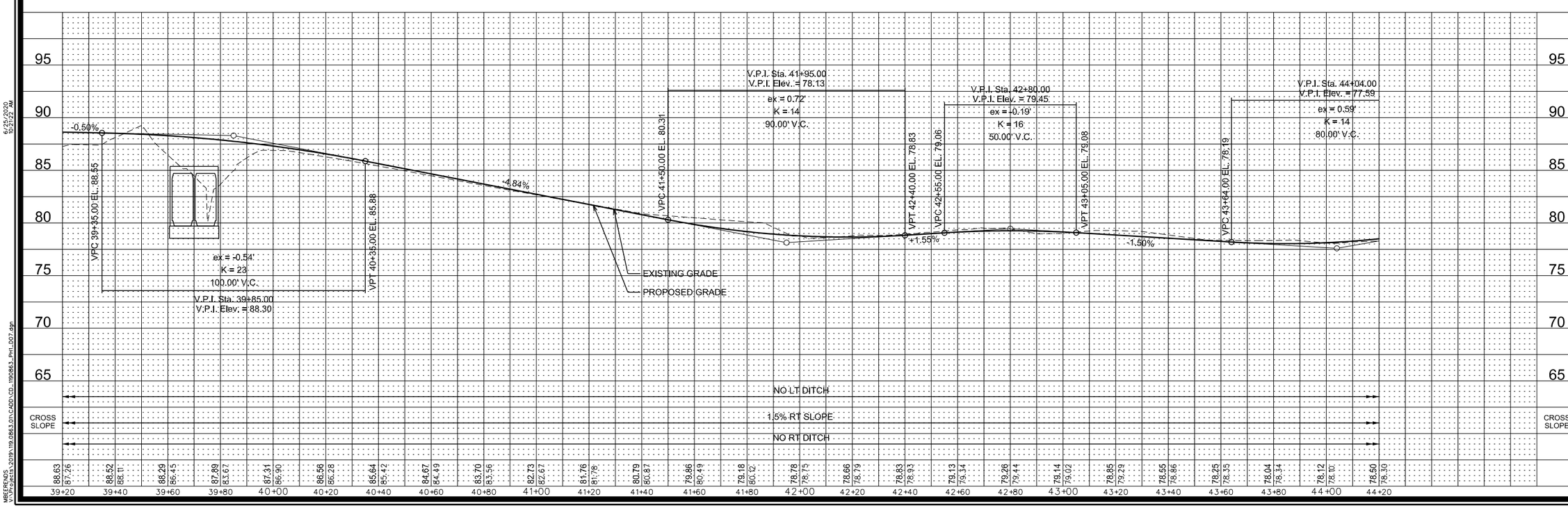


ADJUSTMENT OF FIXTURES		
LOCATION STATION	TYPE OF FIXTURE	ADJUSTMENT
41+37.01	STORM MANHOLE	MAJOR ADJUSTMENT, LOWER 0.10', RIM ELEVATION TO MATCH TOP OF FORM GRADE.

REFER TO L SHEETS FOR TRAIL INTERSECTION DETAILS.



MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet D.7

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

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Project No: 1190863
Sheet D.7

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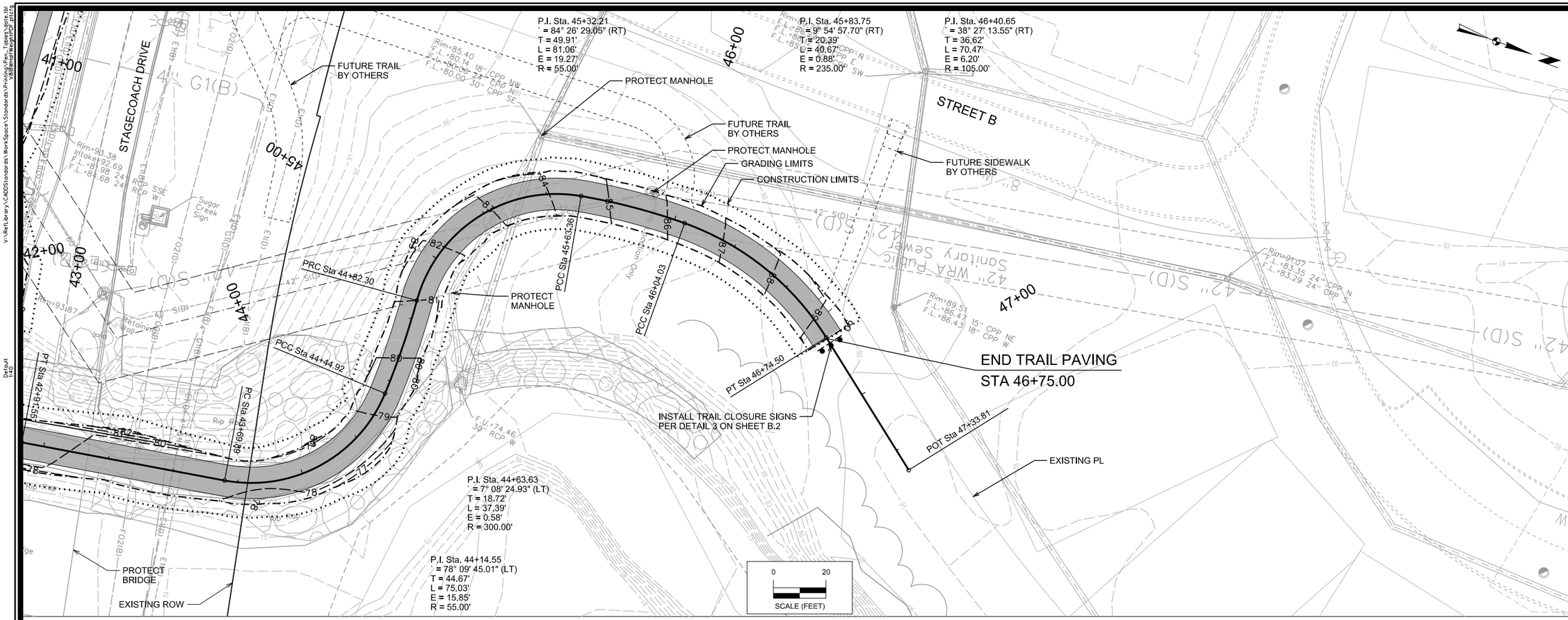

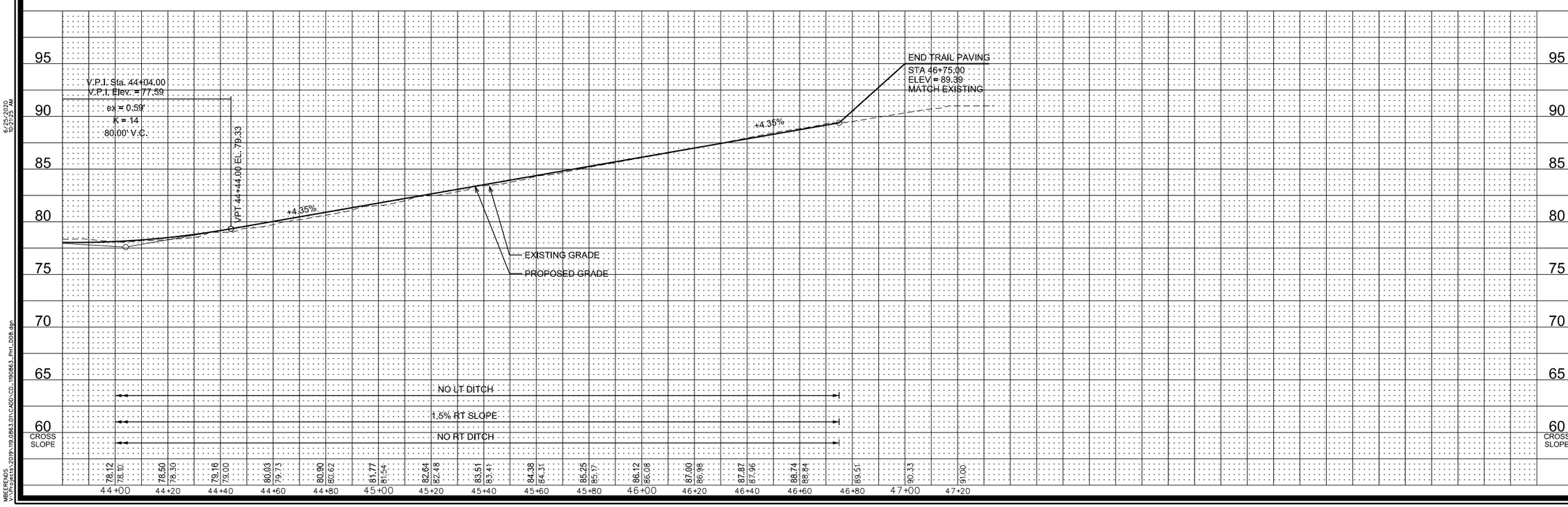

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet D.8

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

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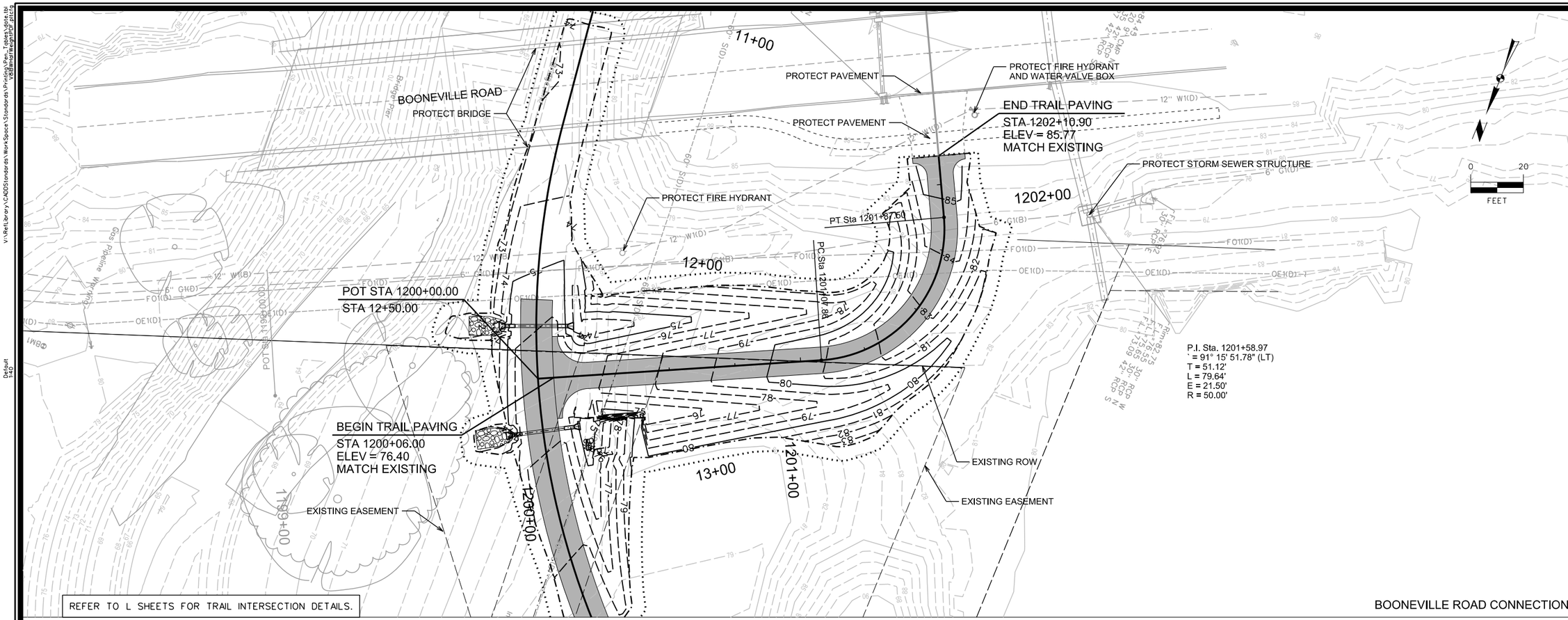
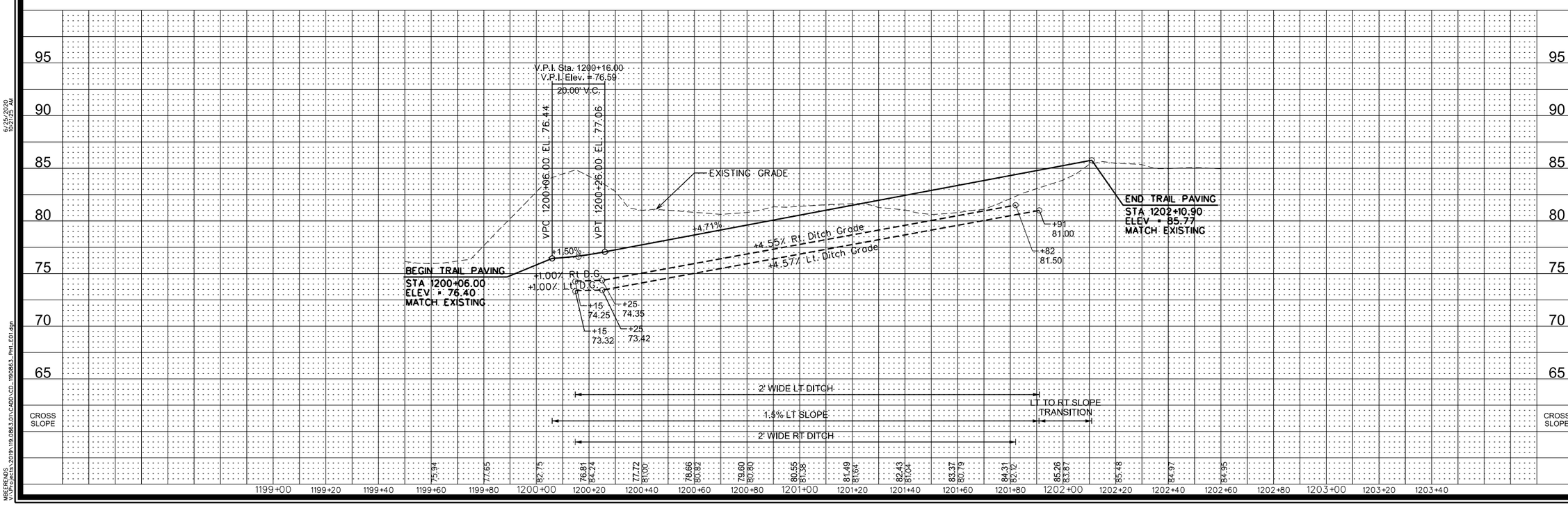
Project No: 1190863
Sheet D.8





MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet E.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
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Project No: 1190863
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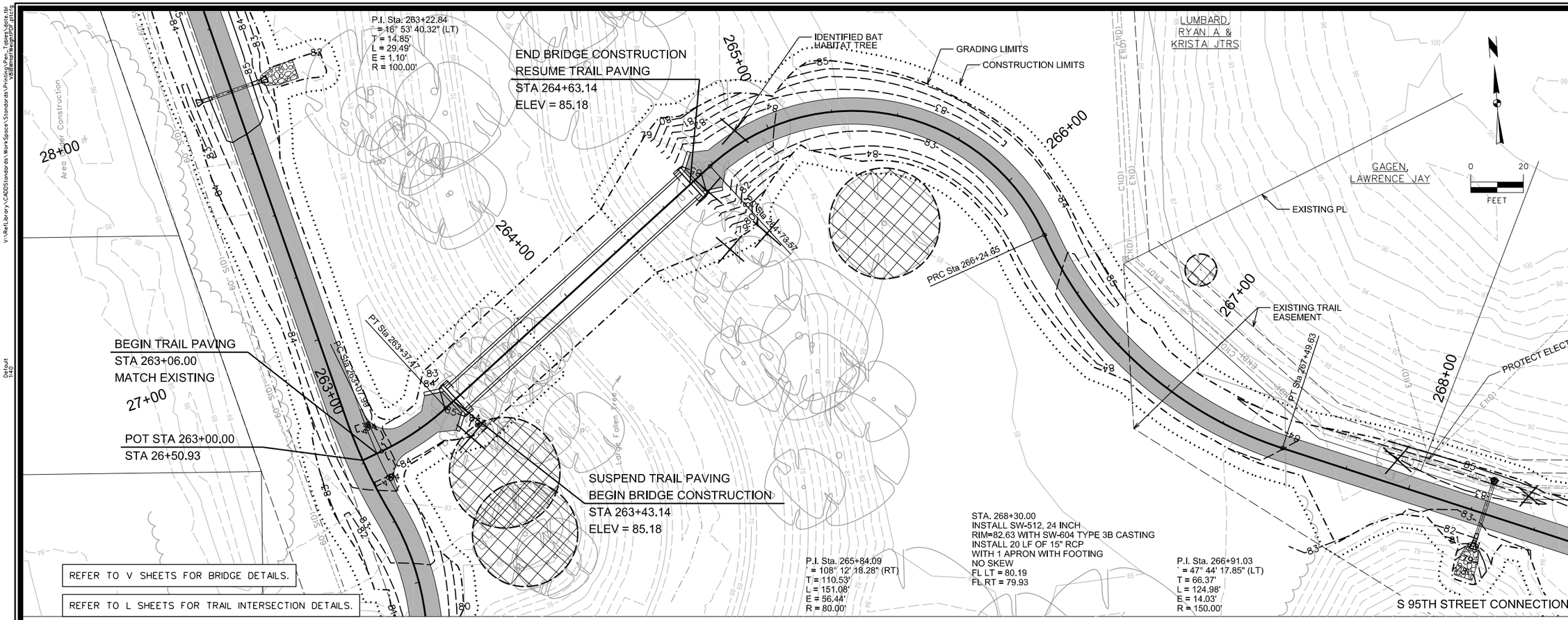

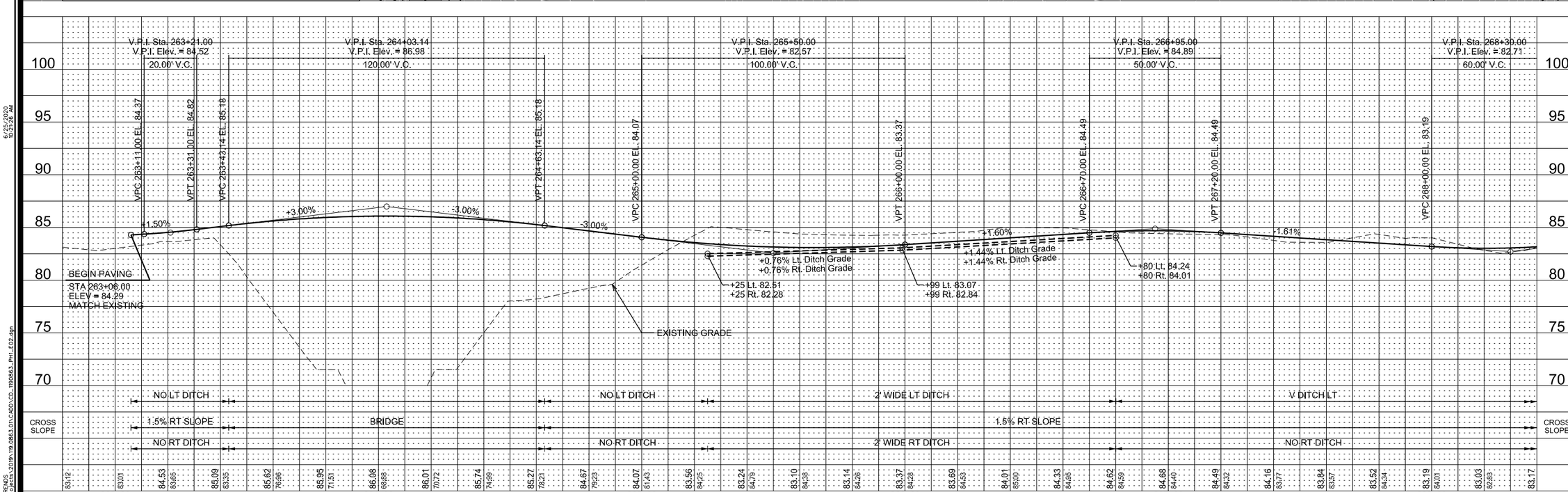

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet E.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

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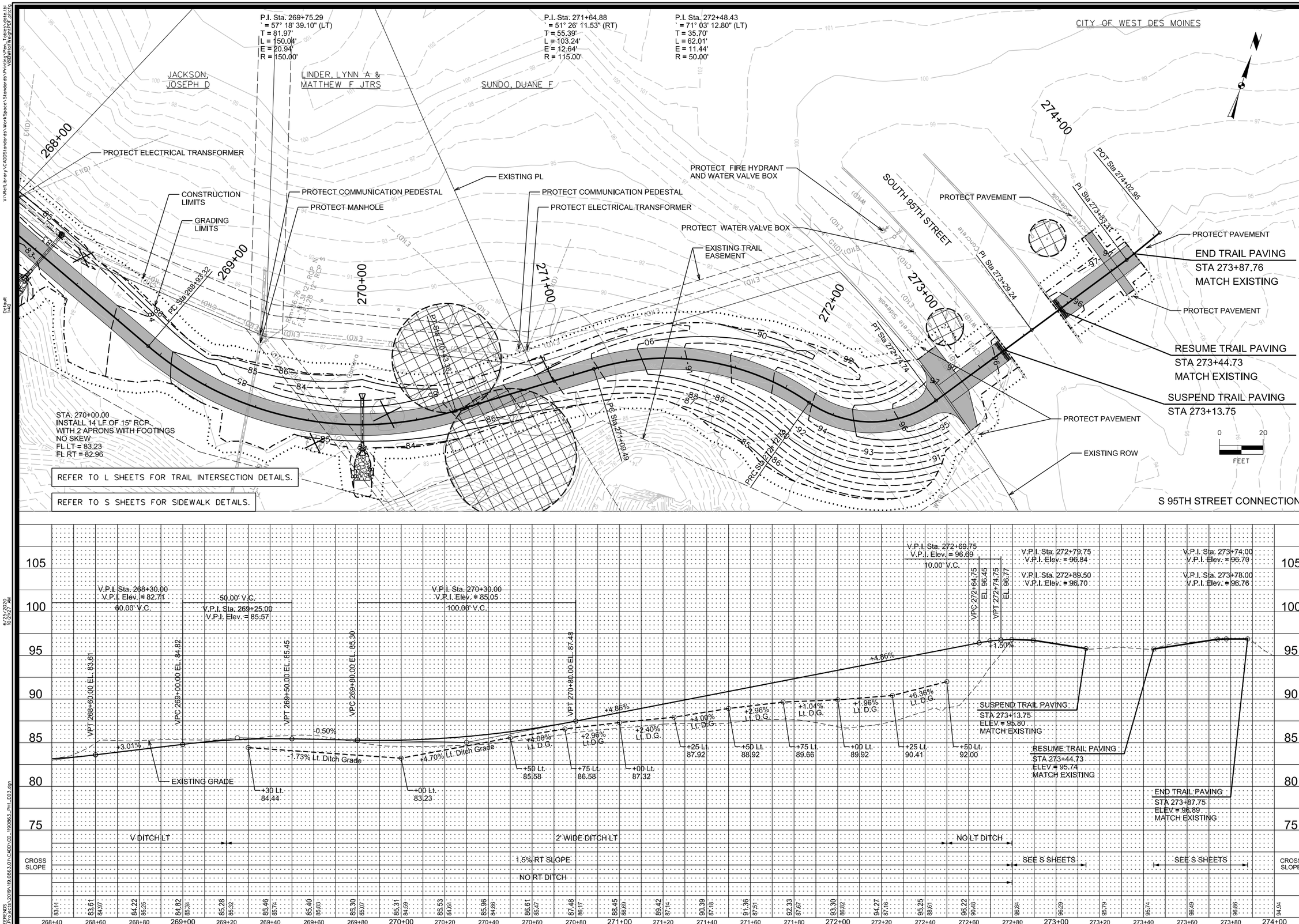

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Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet E.3

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

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P.I. Sta. 4000+50.29
` = 126° 15' 30.72" (RT)
T = 39.47'
L = 44.07'
E = 24.25'
R = 20.00'

P.I. Sta. 4001+72.10
` = 85° 20' 46.57" (LT)
T = 13.83'
L = 22.34'
E = 5.40'
R = 15.00'

EXISTING ROW

PROTECT PAVEMENT

STAGECOACH DRIVE

END SIDEWALK PAVING
STA 4001+84.97
MATCH EXISTING

POT STA 4001+86.97
STA 13+14.96

PROTECT SIDEWALK

PT Sta 4001+80.62

PT Sta 4000+54.89

ARBOR HOMES BUILDERS, LLC

LODDEN, TELFORD A & JUDITH L JTRS

CONSTRUCTION LIMITS

GRADING LIMITS

PC Sta 4001+58.28

BEGIN SIDEWALK PAVING
STA 4000+06.00
MATCH EXISTING

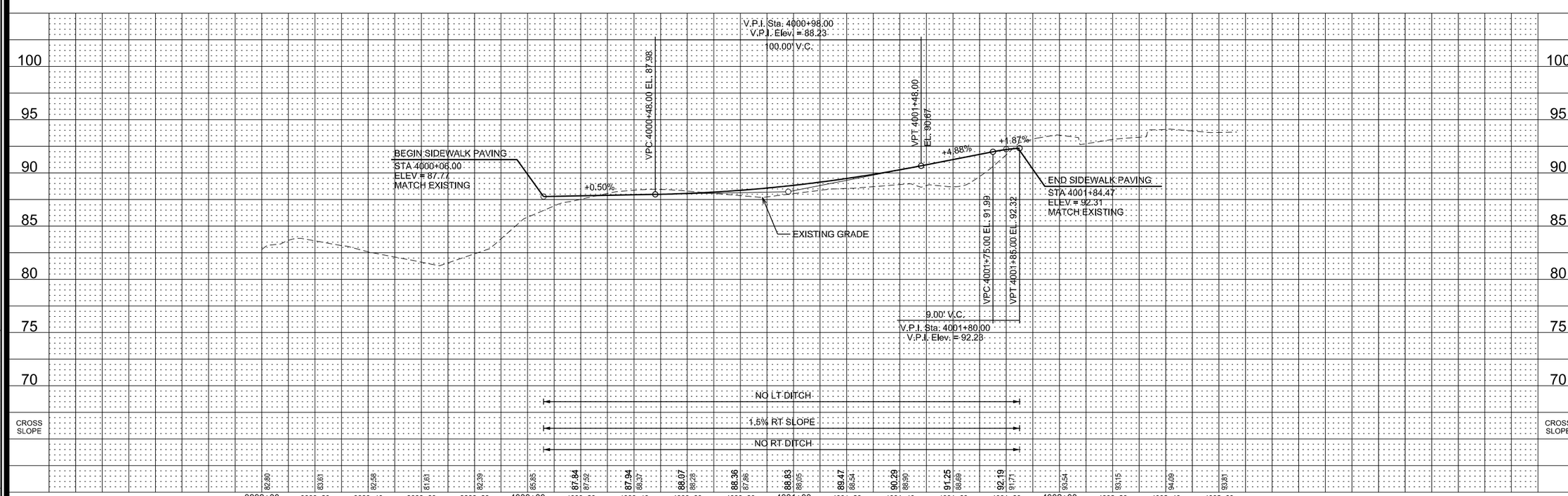
POT STA 4000+00.00
STA 39+82.71

PC Sta 4000+79.83

REFER TO L SHEETS FOR TRAIL INTERSECTION DETAILS.

STAGECOACH DRIVE CONNECTION

FEET 0 20



MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet E.4

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet E.4

P.I. Sta. 11+00.57
= 12° 22' 58.98" (LT)
T = 100.57'
L = 200.35'
E = 5.44'
R = 927.00'

P.I. Sta. 12+11.94
= 26° 05' 59.29" (LT)
T = 11.59'
L = 22.78'
E = 1.33'
R = 50.00'

P.I. Sta. 12+35.37
= 27° 31' 31.21" (RT)
T = 12.25'
L = 24.02'
E = 1.48'
R = 50.00'

P.I. Sta. 12+82.83
= 5° 00' 49.95" (LT)
T = 35.68'
L = 71.32'
E = 0.78'
R = 815.00'

P.I. Sta. 13+27.06
= 19° 30' 00.51" (RT)
T = 8.59'
L = 17.02'
E = 0.73'
R = 50.00'

P.I. Sta. 13+41.84
= 35° 16' 06.94" (LT)
T = 6.36'
L = 12.31'
E = 0.99'
R = 20.00'

P.I. Sta. 13+59.19
= 20° 49' 51.56" (LT)
T = 11.40'
L = 22.54'
E = 1.04'
R = 62.00'

P.I. Sta. 13+86.50
= 81° 09' 11.99" (RT)
T = 16.17'
L = 31.84'
E = 2.21'
R = 58.00'

P.I. Sta. 4000+50.29
= 126° 15' 30.72" (RT)
T = 39.47'
L = 44.07'
E = 24.25'
R = 20.00'

P.I. Sta. 4001+72.10
= 85° 20' 46.57" (LT)
T = 13.83'
L = 22.34'
E = 5.40'
R = 15.00'

PROTECT FIRE HYDRANT
PROTECT COMMUNICATION PEDESTAL
PROTECT SIGN

POT STA. 13+14.96(ML)
STA. 4001+86.97 (SR)

BEGIN SIDEWALK PAVING
STA 11+63.65
MATCH EXISTING

STAGECOACH DRIVE

CONSTRUCTION LIMITS

GRADING LIMITS

PROTECT PAVEMENT

EXISTING ROW

PROTECT SIDEWALK

ARBOR HOMES BUILDERS, LLC

ADJUST WATER VALVE BOX TO FINAL GRADE AND CONVERT TO SLIDE TYPE BOX TOP

PROTECT BRIDGE

END SIDEWALK PAVING
STA 14+01.74
MATCH EXISTING

SEE NOTE 1

PROTECT LIGHT POLE

EXISTING ROW

ADJUST WATER VALVE BOX TO FINAL GRADE AND CONVERT TO SLIDE TYPE BOX TOP

CITY OF WEST DES MOINES

STAGECOACH DRIVE

0 20
FEET

NOTE
1. INSTALL COVER PLATE AT BRIDGE. REFER TO DETAIL IN B SHEETS FOR ADDITIONAL INFORMATION.

REFER TO L SHEETS FOR TRAIL INTERSECTION DETAILS.

V.P.I. Sta. 12+90.00
V.P.I. Elev. = 91.97
40.00' V.C.

V.P.I. Sta. 13+70.00
V.P.I. Elev. = 93.22
10.00' V.C.

BEGIN SIDEWALK PAVING
STA 11+63.65
ELEV = 92.20
MATCH EXISTING

END SIDEWALK PAVING
STA 14+01.74
ELEV = 94.00
MATCH EXISTING

+3.00% +0.51% -1.80% -1.80% +1.56% +3.00% +1.53%

EXISTING GRADE

VPC 11+65.00 EL. 92.24
VPT 11+85.00 EL. 92.59
VPC 12+15.00 EL. 92.74
VPT 12+65.00 EL. 92.42
VPC 12+70.00 EL. 92.33
VPT 13+10.00 EL. 92.28
VPC 13+65.00 EL. 93.14
VPT 13+75.00 EL. 93.37
VPC 13+80.00 EL. 93.52
VPT 14+00.00 EL. 93.97

20.00' V.C.
V.P.I. Sta. 11+75.00
V.P.I. Elev. = 92.54

50.00' V.C.
V.P.I. Sta. 12+40.00
V.P.I. Elev. = 92.87

20.00' V.C.
V.P.I. Sta. 13+90.00
V.P.I. Elev. = 93.82

NO LT DITCH

CROSS SLOPE — 1.5% RT SLOPE

NO RT DITCH

105 100 95 90 85 80 75

88.92 88.78 88.60 89.92 92.51 92.01 91.35 92.05 92.55 92.76 92.67 92.94 92.76 93.01 92.73 93.12 92.50 93.07 92.19 93.23 92.17 93.07 92.44 92.92 92.75 92.98 93.06 93.33 93.52 93.39 93.97 93.31 92.11 80.47 77.21 72.97 72.91

10+20 10+40 10+60 10+80 11+00 11+20 11+40 11+60 11+80 12+00 12+20 12+40 12+60 12+80 13+00 13+20 13+40 13+60 13+80 14+00 14+20 14+40 14+60 14+80 15+00

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 20'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet E.5

SUGAR CREEK GREENWAY TRAIL PHASE 1

PLAN AND PROFILE

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet E.5

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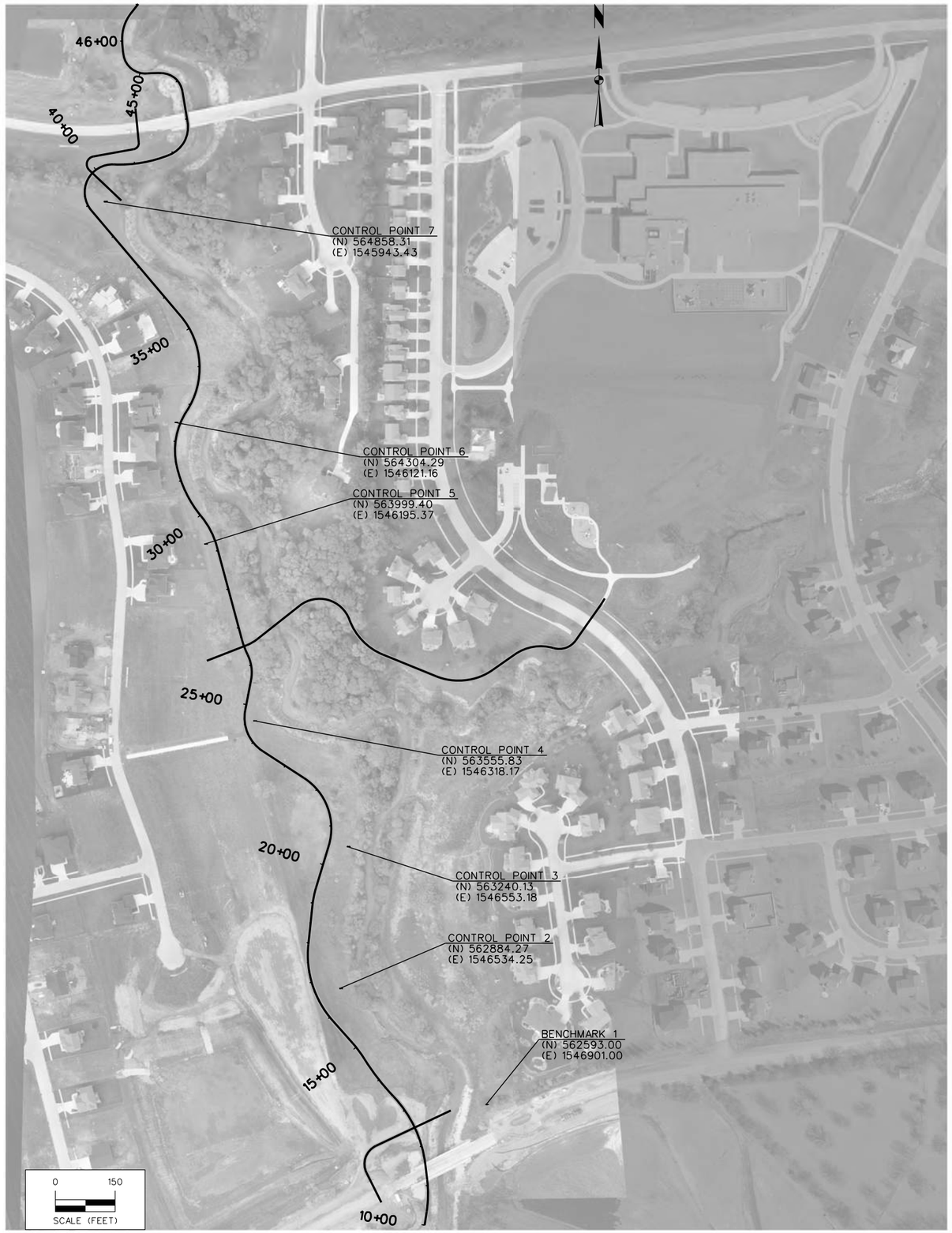

BENCHMARKS

CITY OF WEST DES MOINES VERTICAL DATUM
IARTN DERIVED - US SURVEY FEET

CONVERSION FROM CITY OF WEST DES MOINES DATUM TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) IS (+)774.01

BM1 N=562593.00 E=1546901.00 Z=81.38
CITY BENCHMARK #85 - MONUMENT ON NORTH SIDE OF BOONEVILLE ROAD, EAST OF CREEK.

CONTROL POINTS

IOWA STATE PLANE SOUTH COORDINATE SYSTEM
NAD83(2011)(EPOCH 2010.00) IARTN DERIVED - US SURVEY FEET

CP2 N=562884.27 E=1546534.26 Z=80.26
1/2" REBAR WITH RED PLASTIC CAP, ±30' WEST OF CREEK BANK, ±400' NORTH OF BOONEVILLE ROAD.

CP3 N=563240.13 E=1546553.18 Z=83.30
1/2" REBAR WITH RED PLASTIC CAP, ±35' WEST OF CREEK BANK, ±800' NORTH OF BOONEVILLE ROAD.

CP4 N=563555.83 E=1546318.17 Z=82.99
CUT "X" SOUTH SIDE OF MANHOLE STRUCTURE, ±50' WEST OF CREEK, WHERE IT BENDS SOUTH TO EAST.

CP5 N=563999.40 E=1546195.37 Z=84.64
CUT "X" WEST SIDE OF MANHOLE STRUCTURE, ±75' WEST OF CREEK BANK.

CP6 N=564304.29 E=1546121.16 Z=84.37
CUT "X" NORTH SIDE OF MANHOLE STRUCTURE, ±60' WEST OF CREEK, WHERE IT BEND SOUTH.

CP7 N=564858.31 E=1545943.43 Z=86.18
CUT "X" ON NORTH SIDE OF MANHOLE STRUCTURE, SOUTH OF DRAINAGE DITCH, SOUTH OF NEW BRIDGE.

```
<*      1  DESCRIBE CHAIN TRAIL_SUGAR

Chain TRAIL_SUGAR contains:
 687 CUR TRAIL_SUGAR_3 CUR TRAIL_SUGAR_6 CUR
TRAIL_SUGAR_7 CUR TRAIL_SUGAR_8 CU-
R TRAIL_SUGAR_11 CUR TRAIL_SUGAR_14 CUR TRAIL_SUGAR_17
CUR TRAIL_SUGAR_20 CUR T-
RAIL_SUGAR_23 CUR TRAIL_SUGAR_24 CUR TRAIL_SUGAR_27 CUR
TRAIL_SUGAR_28 CUR TRAI-
L_SUGAR_29 CUR TRAIL_SUGAR_30 CUR TRAIL_SUGAR_33 CUR
TRAIL_SUGAR_34 CUR TRAIL_S-
UGAR_35 CUR TRAIL_SUGAR_38 CUR TRAIL_SUGAR_39 CUR
TRAIL_SUGAR_40 CUR TRAIL_SUGA-
R_41 CUR TRAIL_SUGAR_42 688

Beginning chain TRAIL_SUGAR description
Feature: Geom_Centerline
================================================================================

Point 687                N      562,290.3460 E
1,546,746.7259 Sta       10+00.00

Course from 687 to PC TRAIL_SUGAR_3 N 8° 40' 03.77" E Dist
33.9958

                                        Curve Data
                                        *----------*
Curve TRAIL_SUGAR_3
P.I. Station             10+74.74   N          562,364.2360   E
1,546,757.9901
Delta          =       15° 28' 11.50" (LT)
Degree         =       19° 05' 54.94"
Tangent        =            40.7478
Length         =            81.0000
Radius         =           300.0000
External       =            2.7547
Long Chord     =            80.7542
Mid. Ord.      =            2.7296
P.C. Station             10+34.00   N          562,323.9536   E
1,546,751.8492
P.T. Station             11+15.00   N          562,404.6970   E
1,546,753.1639
C.C.                 N          562,369.1647   E
1,546,455.2755
Back          = N    8° 40' 03.77" E
Ahead         = N    6° 48' 07.72" W
Chord Bear    = N    0° 55' 58.03" E

Course from PT TRAIL_SUGAR_3 to PC TRAIL_SUGAR_6 N 6° 48'
09.62" W Dist 37.8622

                                        Curve Data
                                        *----------*
Curve TRAIL_SUGAR_6
P.I. Station             12+52.02   N          562,540.7615   E
1,546,736.9327
Delta          =       36° 34' 59.75" (LT)
Degree         =       19° 05' 54.94"
Tangent        =            99.1669
Length         =           191.5495
Radius         =           300.0000
External       =           15.9653
Long Chord     =           188.3123
Mid. Ord.      =           15.1586
P.C. Station             11+52.86   N          562,442.2927   E
1,546,748.6791
P.T. Station             13+44.41   N          562,612.8303   E
1,546,668.8141
C.C.                 N          562,406.7576   E
1,546,450.7911
Back          = N    6° 48' 09.62" W
Ahead         = N   43° 23' 09.37" W
Chord Bear    = N   25° 05' 39.49" W
```

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 150'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet G.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

SURVEY CONTROL AND REFERENCE INFORMATION

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet G.1

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Curve Data

Curve TRAIL_SUGAR_7
P.I. Station 14+04.09 N 562,656.2017 E 1,546,627.8200
Delta = 11° 21' 37.78" (RT)
Degree = 9° 32' 57.47"
Tangent = 59.6791
Length = 118.9668
Radius = 600.0000
External = 2.9607
Long Chord = 118.7720
Mid. Ord. = 2.9461
P.C. Station 13+44.41 N 562,612.8303 E 1,546,668.8141
P.T. Station 14+63.37 N 562,706.7984 E 1,546,596.1724
C.C. N 563,024.9758 E 1,547,104.8601
Back = N 43° 23' 09.37" W
Ahead = N 32° 01' 31.58" W
Chord Bear = N 37° 42' 20.48" W

Curve Data

Curve TRAIL_SUGAR_8
P.I. Station 14+88.35 N 562,727.9717 E 1,546,582.9288
Delta = 9° 31' 02.85" (LT)
Degree = 19° 05' 54.94"
Tangent = 24.9741
Length = 49.8333
Radius = 300.0000
External = 1.0377
Long Chord = 49.7760
Mid. Ord. = 1.0341
P.C. Station 14+63.37 N 562,706.7984 E 1,546,596.1724
P.T. Station 15+13.21 N 562,746.6638 E 1,546,566.3664
C.C. N 562,547.7096 E 1,546,341.8286
Back = N 32° 01' 31.58" W
Ahead = N 41° 32' 34.44" W
Chord Bear = N 36° 47' 03.01" W

Course from PT TRAIL_SUGAR_8 to PC TRAIL_SUGAR_11 N 41° 35' 15.21" W Dist 74.8639

Curve Data

Curve TRAIL_SUGAR_11
P.I. Station 16+98.32 N 562,885.1200 E 1,546,443.4927
Delta = 47° 35' 45.30" (RT)
Degree = 22° 55' 05.92"
Tangent = 110.2525
Length = 207.6764
Radius = 250.0000
External = 23.2318
Long Chord = 201.7563
Mid. Ord. = 21.2565
P.C. Station 15+88.07 N 562,802.6577 E 1,546,516.6745
P.T. Station 17+95.75 N 562,994.7669 E 1,546,455.0329
C.C. N 562,968.5991 E 1,546,703.6596
Back = N 41° 35' 15.71" W
Ahead = N 6° 00' 29.58" E
Chord Bear = N 17° 47' 23.06" W

Course from PT TRAIL_SUGAR_11 to PC TRAIL_SUGAR_14 N 6° 00' 29.58" E Dist 96.6827

Curve Data

Curve TRAIL_SUGAR_14
P.I. Station 19+15.99 N 563,114.3503 E 1,546,467.6190
Delta = 10° 46' 04.33" (RT)
Degree = 22° 55' 05.92"
Tangent = 23.5612
Length = 46.9837
Radius = 250.0000
External = 1.1078
Long Chord = 46.9146
Mid. Ord. = 1.1029
P.C. Station 18+92.43 N 563,090.9185 E 1,546,465.1528
P.T. Station 19+39.41 N 563,136.9088 E 1,546,474.4195
C.C. N 563,064.7507 E 1,546,713.7795
Back = N 6° 00' 29.58" E
Ahead = N 16° 46' 33.91" E
Chord Bear = N 11° 23' 31.75" E

Course from PT TRAIL_SUGAR_14 to PC TRAIL_SUGAR_17 N 16° 46' 33.91" E Dist 110.7519

Curve Data

Curve TRAIL_SUGAR_17
P.I. Station 21+62.72 N 563,350.7141 E 1,546,538.8738
Delta = 73° 46' 04.34" (LT)
Degree = 38° 11' 49.87"
Tangent = 112.5574
Length = 193.1238
Radius = 150.0000
External = 37.5345
Long Chord = 180.0588
Mid. Ord. = 30.0221
P.C. Station 20+50.17 N 563,242.9471 E 1,546,506.3861
P.T. Station 22+43.29 N 563,412.0308 E 1,546,444.4840
C.C. N 563,286.2419 E 1,546,362.7701
Back = N 16° 46' 33.91" E
Ahead = N 56° 59' 30.43" W
Chord Bear = N 20° 06' 28.26" W

Course from PT TRAIL_SUGAR_17 to PC TRAIL_SUGAR_20 N 56° 59' 33.85" W Dist 123.9449

Curve Data

Curve TRAIL_SUGAR_20
P.I. Station 24+34.71 N 563,516.3044 E 1,546,283.9633
Delta = 68° 00' 55.61" (RT)
Degree = 57° 17' 44.81"
Tangent = 67.4705
Length = 118.7093
Radius = 100.0000
External = 20.6328
Long Chord = 111.8609
Mid. Ord. = 17.1038
P.C. Station 23+67.23 N 563,479.5492 E 1,546,340.5436
P.T. Station 24+85.94 N 563,582.5299 E 1,546,296.8646
C.C. N 563,563.4085 E 1,546,395.0195
Back = N 56° 59' 30.43" W
Ahead = N 11° 01' 25.18" E
Chord Bear = N 22° 59' 02.63" W

Course from PT TRAIL_SUGAR_20 to PC TRAIL_SUGAR_23 N 10° 45' 32.08" E Dist 77.4357

Curve Data

Curve TRAIL_SUGAR_23
P.I. Station 25+97.11 N 563,691.7461 E 1,546,317.6176
Delta = 37° 17' 00.40" (LT)
Degree = 57° 17' 44.81"
Tangent = 33.7348
Length = 65.0719
Radius = 100.0000
External = 5.5369
Long Chord = 63.9299
Mid. Ord. = 5.2464
P.C. Station 25+63.38 N 563,658.6044 E 1,546,311.3201
P.T. Station 26+28.45 N 563,721.9301 E 1,546,302.5523
C.C. N 563,677.2720 E 1,546,213.0780
Back = N 10° 45' 32.08" E
Ahead = N 26° 31' 28.33" W
Chord Bear = N 7° 52' 58.12" W

Curve Data

Curve TRAIL_SUGAR_24
P.I. Station 26+48.49 N 563,739.8634 E 1,546,293.6015
Delta = 11° 26' 43.87" (RT)
Degree = 28° 38' 52.40"
Tangent = 20.0429
Length = 39.9524
Radius = 200.0000
External = 1.0018
Long Chord = 39.8860
Mid. Ord. = 0.9968
P.C. Station 26+28.45 N 563,721.9301 E 1,546,302.5523
P.T. Station 26+68.40 N 563,759.2162 E 1,546,288.3873
C.C. N 563,811.2463 E 1,546,481.5009
Back = N 26° 31' 28.33" W
Ahead = N 15° 04' 44.46" W
Chord Bear = N 20° 48' 06.39" W

Course from PT TRAIL_SUGAR_24 to PC TRAIL_SUGAR_27 N 15° 04' 44.46" W Dist 242.2744

Curve Data

Curve TRAIL_SUGAR_27
P.I. Station 29+54.09 N 564,035.0685 E 1,546,214.0650
Delta = 24° 29' 41.30" (LT)
Degree = 28° 38' 52.40"
Tangent = 43.4148
Length = 85.5030
Radius = 200.0000
External = 4.6579
Long Chord = 84.8534
Mid. Ord. = 4.5519
P.C. Station 29+10.68 N 563,993.1486 E 1,546,225.3594
P.T. Station 29+96.18 N 564,068.5328 E 1,546,186.4067
C.C. N 563,941.1184 E 1,546,032.2458
Back = N 15° 04' 44.46" W
Ahead = N 39° 34' 25.76" W
Chord Bear = N 27° 19' 35.11" W

Curve Data

Curve TRAIL_SUGAR_28
P.I. Station 30+68.88 N 564,124.5680 E 1,546,140.0934
Delta = 27° 14' 35.18" (RT)
Degree = 19° 05' 54.94"
Tangent = 72.6971
Length = 142.6446
Radius = 300.0000
External = 8.6825
Long Chord = 141.3046
Mid. Ord. = 8.4383
P.C. Station 29+96.18 N 564,068.5328 E 1,546,186.4067
P.T. Station 31+38.83 N 564,195.5881 E 1,546,124.5686
C.C. N 564,259.6543 E 1,546,417.6480
Back = N 39° 34' 25.76" W
Ahead = N 12° 19' 50.58" W
Chord Bear = N 25° 57' 08.17" W

Curve Data

Curve TRAIL_SUGAR_29
P.I. Station 32+14.25 N 564,269.2757 E 1,546,108.4608
Delta = 45° 28' 17.30" (RT)
Degree = 31° 49' 51.56"
Tangent = 75.4276
Length = 142.8528
Radius = 180.0000
External = 15.1649
Long Chord = 139.1333
Mid. Ord. = 13.9865
P.C. Station 31+38.83 N 564,195.5881 E 1,546,124.5686
P.T. Station 32+81.68 N 564,332.4334 E 1,546,149.6969
C.C. N 564,234.0278 E 1,546,300.4163
Back = N 12° 19' 50.58" W
Ahead = N 33° 08' 26.71" E
Chord Bear = N 10° 24' 18.06" E

Curve Data

Curve TRAIL_SUGAR_30
P.I. Station 34+30.62 N 564,457.1479 E 1,546,231.1237
Delta = 73° 21' 04.47" (LT)
Degree = 28° 38' 52.40"
Tangent = 148.9314
Length = 256.0441
Radius = 200.0000
External = 49.3673
Long Chord = 238.9136
Mid. Ord. = 39.5940
P.C. Station 32+81.68 N 564,332.4334 E 1,546,149.6969
P.T. Station 35+37.72 N 564,570.8925 E 1,546,134.9664
C.C. N 564,441.7730 E 1,545,982.2308
Back = N 33° 08' 26.71" E
Ahead = N 40° 12' 37.76" W
Chord Bear = N 3° 32' 05.52" W

Course from PT TRAIL_SUGAR_30 to PC TRAIL_SUGAR_33 N 40° 12' 37.76" W Dist 347.9432

Curve Data

Curve TRAIL_SUGAR_33
P.I. Station 40+46.52 N 564,959.4468 E 1,545,806.4906
Delta = 132° 57' 50.03" (RT)
Degree = 81° 51' 04.01"
Tangent = 160.8504
Length = 162.4460
Radius = 70.0000
External = 105.4219
Long Chord = 128.3708
Mid. Ord. = 42.0673
P.C. Station 38+85.67 N 564,836.6090 E 1,545,910.3352
P.T. Station 40+48.11 N 564,951.7200 E 1,545,967.1552
C.C. N 564,881.8008 E 1,545,963.7926
Back = N 40° 12' 37.76" W
Ahead = S 87° 14' 47.73" E
Chord Bear = N 26° 16' 17.25" E

Curve Data

Curve TRAIL_SUGAR_34
P.I. Station 41+20.62 N 564,948.2367 E 1,546,039.5839
Delta = 25° 09' 18.31" (LT)
Degree = 17° 37' 46.09"
Tangent = 72.5124
Length = 142.6877
Radius = 325.0000
External = 7.9911
Long Chord = 141.5445
Mid. Ord. = 7.7993
P.C. Station 40+48.11 N 564,951.7200 E 1,545,967.1552
P.T. Station 41+90.80 N 564,975.8709 E 1,546,106.6241
C.C. N 565,276.3448 E 1,545,982.7674
Back = S 87° 14' 47.73" E
Ahead = N 67° 35' 53.96" E
Chord Bear = N 80° 10' 33.11" E

Curve Data

Curve TRAIL_SUGAR_35
P.I. Station 42+50.42 N 564,998.5935 E 1,546,161.7487
Delta = 76° 58' 06.79" (LT)
Degree = 76° 23' 39.74"
Tangent = 59.6241
Length = 100.7516
Radius = 75.0000
External = 20.8125
Long Chord = 93.3450
Mid. Ord. = 16.2916
P.C. Station 41+90.80 N 564,975.8709 E 1,546,106.6241
P.T. Station 42+91.55 N 565,057.4221 E 1,546,152.0411
C.C. N 565,045.2111 E 1,546,078.0418
Back = N 67° 35' 53.97" E
Ahead = N 9° 22' 12.82" W
Chord Bear = N 29° 06' 50.58" E

Course from PT TRAIL_SUGAR_35 to PC TRAIL_SUGAR_38 N 9° 22' 11.06" W Dist 78.3344

Curve Data

Curve TRAIL_SUGAR_38
P.I. Station 44+14.55 N 565,178.7827 E 1,546,132.0154
Delta = 78° 09' 45.01" (LT)
Degree = 104° 10' 26.92"
Tangent = 44.6674
Length = 75.0306
Radius = 55.0000
External = 15.8532
Long Chord = 69.3464
Mid. Ord. = 12.3061
P.C. Station 43+69.89 N 565,134.7113 E 1,546,139.2879
P.T. Station 44+44.92 N 565,180.7056 E 1,546,087.3894
C.C. N 565,125.7566 E 1,546,085.0217
Back = N 9° 22' 12.82" W
Ahead = N 87° 31' 57.84" W
Chord Bear = N 48° 27' 05.33" W

Curve Data

Curve TRAIL_SUGAR_39
P.I. Station 44+63.63 N 565,181.5113 E 1,546,068.6894
Delta = 7° 08' 24.93" (LT)
Degree = 19° 05' 54.93"
Tangent = 18.7174
Length = 37.3863
Radius = 300.0000
External = 0.5833
Long Chord = 37.3621
Mid. Ord. = 0.5822
P.C. Station 44+44.92 N 565,180.7056 E 1,546,087.3894
P.T. Station 44+82.30 N 565,179.9865 E 1,546,050.0342
C.C. N 564,880.9837 E 1,546,074.4748
Back = N 87° 31' 57.84" W
Ahead = S 85° 19' 37.23" W
Chord Bear = S 88° 53' 49.70" W

Curve Data

Curve TRAIL_SUGAR_40
P.I. Station 45+32.21 N 565,175.9206 E 1,546,000.2929
Delta = 84° 26' 29.05" (RT)
Degree = 104° 10' 26.92"
Tangent = 49.9072
Length = 81.0579
Radius = 55.0000
External = 19.2679
Long Chord = 73.9187
Mid. Ord. = 14.2691
P.C. Station 44+82.30 N 565,179.9865 E 1,546,050.0342
P.T. Station 45+63.36 N 565,225.0341 E 1,545,991.4280
C.C. N 565,234.8036 E 1,546,045.5534
Back = S 85° 19' 37.23" W
Ahead = N 10° 13' 53.72" W
Chord Bear = N 52° 27' 08.24" W

Curve Data

Curve TRAIL_SUGAR_41
P.I. Station 45+83.75 N 565,245.0963 E 1,545,987.8069
Delta = 9° 54' 57.70" (RT)
Degree = 24° 22' 52.26"
Tangent = 20.3863
Length = 40.6708
Radius = 235.0000
External = 0.8826
Long Chord = 40.6201
Mid. Ord. = 0.8793
P.C. Station 45+63.36 N 565,225.0341 E 1,545,991.4280
P.T. Station 46+04.03 N 565,265.4823 E 1,545,987.6946
C.C. N 565,266.7766 E 1,546,222.6910
Back = N 10° 13' 53.72" W
Ahead = N 0° 18' 56.02" W
Chord Bear = N 5° 16' 24.87" W

Curve Data

Curve TRAIL_SUGAR_42
P.I. Station 46+40.65 N 565,302.1018 E 1,545,987.4929
Delta = 38° 27' 13.55" (RT)
Degree = 54° 34' 02.67"
Tangent = 36.6201
Length = 70.4702
Radius = 105.0000
External = 6.2027
Long Chord = 69.1550
Mid. Ord. = 5.8567
P.C. Station 46+04.03 N 565,265.4823 E 1,545,987.6946
P.T. Station 46+74.50 N 565,330.9044 E 1,546,010.1080
C.C. N 565,266.0606 E 1,546,092.6930
Back = N 0° 18' 56.02" W
Ahead = N 38° 08' 17.53" E
Chord Bear = N 18° 54' 40.75" E

Course from PT TRAIL_SUGAR_42 to 688 N 38° 08' 17.53" E Dist 59.3088

Point 688 N 565,377.5522 E 1,546,046.7348 Sta 47+33.81

Ending chain TRAIL_SUGAR description

<* 1 DESCRIBE CHAIN TRAIL_95TH

Chain TRAIL_95TH contains:
615 CUR TRAIL_95TH_3 CUR TRAIL_95TH_6 CUR TRAIL_95TH_7 CUR TRAIL_95TH_10 CUR T-RAIL_95TH_13 CUR TRAIL_95TH_14 616 617 618

Beginning chain TRAIL_95TH description
Feature: Geom_Centerline

Point 615 N 563,706.3148 E 1,546,200.4708 Sta 262+00.00

Course from 615 to PC TRAIL_95TH_3 N 68° 36' 41.26" E Dist 107.9867

Curve Data

Curve TRAIL_95TH_3
P.I. Station 263+22.84 N 563,751.1125 E 1,546,314.8485
Delta = 16° 53' 40.32" (LT)
Degree = 57° 17' 44.81"
Tangent = 14.8510
Length = 29.4865
Radius = 100.0000
External = 1.0967
Long Chord = 29.3798
Mid. Ord. = 1.0849
P.C. Station 263+07.99 N 563,745.6965 E 1,546,301.0203
P.T. Station 263+37.47 N 563,760.3134 E 1,546,326.5060
C.C. N 563,838.8094 E 1,546,264.5513
Back = N 68° 36' 41.26" E
Ahead = N 51° 43' 00.95" E
Chord Bear = N 60° 09' 51.10" E

Course from PT TRAIL_95TH_3 to PC TRAIL_95TH_6 N 51° 43' 00.95" E Dist 136.0954

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Curve Data

Curve TRAIL_95TH_6
P.I. Station 265+84.09 N 563,913.1070 E
1,546,520.0938
Delta = 108° 12' 18.28" (RT)
Degree = 71° 37' 11.01"
Tangent = 110.5260
Length = 151.0828
Radius = 80.0000
External = 56.4404
Long Chord = 129.6108
Mid. Ord. = 33.0931
P.C. Station 264+73.57 N 563,844.6310 E
1,546,433.3354
P.T. Station 266+24.65 N 563,809.2981 E
1,546,558.0373
C.C. N 563,781.8342 E
1,546,482.8992
Back = N 51° 43' 00.95" E
Ahead = S 20° 04' 40.78" E
Chord Bear = S 74° 10' 49.92" E

Curve Data

Curve TRAIL_95TH_7
P.I. Station 266+91.03 N 563,746.9577 E
1,546,580.8235
Delta = 47° 44' 17.85" (LT)
Degree = 38° 11' 49.87"
Tangent = 66.3742
Length = 124.9786
Radius = 150.0000
External = 14.0291
Long Chord = 121.3948
Mid. Ord. = 12.8292
P.C. Station 266+24.65 N 563,809.2981 E
1,546,558.0373
P.T. Station 267+49.63 N 563,721.8963 E
1,546,642.2845
C.C. N 563,860.7930 E
1,546,698.9212
Back = S 20° 04' 40.78" E
Ahead = S 67° 48' 58.63" E
Chord Bear = S 43° 56' 49.70" E

Course from PT TRAIL_95TH_7 to PC TRAIL_95TH_10 S 67° 48' 58.63" E Dist 143.6878

Curve Data

Curve TRAIL_95TH_10
P.I. Station 269+75.29 N 563,636.6926 E
1,546,851.2396
Delta = 57° 18' 39.10" (LT)
Degree = 38° 11' 49.87"
Tangent = 81.9710
Length = 150.0395
Radius = 150.0000
External = 20.9364
Long Chord = 143.8623
Mid. Ord. = 18.3721
P.C. Station 268+93.32 N 563,667.6430 E
1,546,775.3362
P.T. Station 270+43.36 N 563,683.8581 E
1,546,918.2818
C.C. N 563,806.5397 E
1,546,831.9729
Back = S 67° 48' 58.63" E
Ahead = N 54° 52' 22.27" E
Chord Bear = N 83° 31' 41.82" E

Course from PT TRAIL_95TH_10 to PC TRAIL_95TH_13 N 54° 52' 22.27" E Dist 66.1358

Curve Data

Curve TRAIL_95TH_13
P.I. Station 271+64.88 N 563,753.7837 E
1,547,017.6758
Delta = 51° 26' 11.53" (RT)
Degree = 49° 49' 20.70"
Tangent = 55.3909
Length = 103.2397
Radius = 115.0000
External = 12.6446
Long Chord = 99.8077
Mid. Ord. = 11.3920
P.C. Station 271+09.49 N 563,721.9122 E
1,546,972.3728
P.T. Station 272+12.73 N 563,738.2286 E
1,547,070.8377
C.C. N 563,627.8563 E
1,547,038.5430
Back = N 54° 52' 22.27" E
Ahead = S 73° 41' 26.20" E
Chord Bear = N 80° 35' 28.03" E

Curve Data

Curve TRAIL_95TH_14
P.I. Station 272+48.43 N 563,728.2032 E
1,547,105.1010
Delta = 71° 03' 12.80" (LT)
Degree = 114° 35' 29.61"
Tangent = 35.6999
Length = 62.0059
Radius = 50.0000
External = 11.4368
Long Chord = 58.1083
Mid. Ord. = 9.3078
P.C. Station 272+12.73 N 563,738.2286 E
1,547,070.8377
P.T. Station 272+74.74 N 563,757.3552 E
1,547,125.7081
C.C. N 563,786.2166 E
1,547,084.8789
Back = S 73° 41' 26.20" E
Ahead = N 35° 15' 21.00" E
Chord Bear = N 70° 46' 57.40" E

Course from PT TRAIL_95TH_14 to 616 N 35° 15' 21.00" E Dist 54.4999

Point 616 N 563,801.8589 E 1,547,157.1669
Sta 273+29.24

Course from 616 to 617 N 35° 15' 21.01" E Dist 54.0759

Point 617 N 563,846.0163 E 1,547,188.3811
Sta 273+83.31

Course from 617 to 618 N 32° 18' 22.74" E Dist 19.6382

Point 618 N 563,862.6146 E 1,547,198.8766
Sta 274+02.95

==
Ending chain TRAIL_95TH description

<* 1 DESCRIBE CHAIN TRAIL_BOONE

Chain TRAIL_BOONE contains:
705 CUR TRAIL_BOONE_3 CUR TRAIL_BOONE_4 706

Beginning chain TRAIL_BOONE description
Feature: Geom_Centerline
==

Point 705 N 562,578.0505 E 1,546,812.2586
Sta 1199+00.00

Course from 705 to PC TRAIL_BOONE_3 S 64° 38' 40.46" W Dist 207.8581

Curve Data

Curve TRAIL_BOONE_3
P.I. Station 1201+58.97 N 562,467.1495 E
1,546,578.2320
Delta = 91° 15' 51.78" (LT)
Degree = 114° 35' 29.61"
Tangent = 51.1157
Length = 79.6432
Radius = 50.0000
External = 21.5040
Long Chord = 71.4866
Mid. Ord. = 15.0369
P.C. Station 1201+07.86 N 562,489.0389 E
1,546,624.4237
P.T. Station 1201+87.50 N 562,421.4521 E
1,546,601.1353
C.C. N 562,443.8555 E
1,546,645.8353
Back = S 64° 38' 40.46" W
Ahead = S 26° 37' 11.32" E
Chord Bear = S 19° 00' 44.57" W

Curve Data

Curve TRAIL_BOONE_4
P.I. Station 1201+93.33 N 562,416.2392 E
1,546,603.7480
Delta = 0° 00' 00.00" (LT)
Degree = 0° 00' 00.00"
Tangent = 5.8310
Length = 11.6620
Radius = 55,900,550,485.9141
External = 0.0000
Long Chord = 11.6620
Mid. Ord. = 0.0000
P.C. Station 1201+87.50 N 562,421.4522 E
1,546,601.1353
P.T. Station 1201+99.16 N 562,411.0263 E
1,546,606.3607
C.C. N 25,047,822,477.7997 E
49,976,603,462.5130
Back = S 26° 37' 11.32" E
Ahead = S 26° 37' 11.32" E
Chord Bear = S 26° 37' 11.32" E

Course from PT TRAIL_BOONE_4 to 706 S 26° 37' 11.29" E Dist 61.7338

Point 706 N 562,355.8364 E 1,546,634.0216
Sta 1202+60.90

==
Ending chain TRAIL_BOONE description

<* 1 DESCRIBE CHAIN TRAIL_STAGE_W

Chain TRAIL_STAGE_W contains:
CUR TRAIL_STAGE_W_1 CUR TRAIL_STAGE_W_2 CUR
TRAIL_STAGE_W_3 CUR TRAIL_STAGE_W_-
4 CUR TRAIL_STAGE_W_5 CUR TRAIL_STAGE_W_6 CUR
TRAIL_STAGE_W_7 CUR TRAIL_STAGE_W-
_8 20

Beginning chain TRAIL_STAGE_W description
Feature: Geom_Centerline
==

Curve Data

Curve TRAIL_STAGE_W_1
P.I. Station 11+00.57 N 564,995.7058 E
1,545,815.6503
Delta = 12° 22' 58.98" (LT)
Degree = 6° 10' 50.79"
Tangent = 100.5657
Length = 200.3479
Radius = 927.0000
External = 5.4390
Long Chord = 199.9582
Mid. Ord. = 5.4073
P.C. Station 10+00.00 N 565,015.6799 E
1,545,717.0881
P.T. Station 12+00.35 N 564,997.3327 E
1,545,916.2028
C.C. N 565,924.2114 E
1,545,901.2062
Back = S 78° 32' 38.03" E
Ahead = N 89° 04' 22.99" E
Chord Bear = S 84° 44' 07.52" E

Curve Data

Curve TRAIL_STAGE_W_2
P.I. Station 12+11.94 N 564,997.5196 E
1,545,927.7906
Delta = 26° 05' 59.29" (LT)
Degree = 114° 35' 29.61"
Tangent = 11.5893
Length = 22.7764
Radius = 50.0000
External = 1.3255
Long Chord = 22.5800
Mid. Ord. = 1.2913
P.C. Station 12+00.35 N 564,997.3327 E
1,545,916.2028
P.T. Station 12+23.12 N 565,002.7852 E
1,545,938.1145
C.C. N 565,047.3262 E
1,545,915.3967
Back = N 89° 04' 34.63" E
Ahead = N 62° 58' 35.34" E
Chord Bear = N 76° 01' 34.98" E

Curve Data

Curve TRAIL_STAGE_W_3
P.I. Station 12+35.37 N 565,008.5911 E
1,545,948.8975
Delta = 27° 31' 31.21" (RT)
Degree = 114° 35' 29.61"
Tangent = 12.2466
Length = 24.0204
Radius = 50.0000
External = 1.4780
Long Chord = 23.7901
Mid. Ord. = 1.4355
P.C. Station 12+23.12 N 565,002.7852 E
1,545,938.1145
P.T. Station 12+47.14 N 565,008.7564 E
1,545,961.1430
C.C. N 564,958.7610 E
1,545,961.8182
Back = N 61° 42' 03.35" E
Ahead = N 89° 13' 34.56" E
Chord Bear = N 75° 27' 48.95" E

Curve Data

Curve TRAIL_STAGE_W_4
P.I. Station 12+82.83 N 565,009.2468 E
1,545,996.8222
Delta = 5° 00' 49.95" (LT)
Degree = 7° 01' 48.57"
Tangent = 35.6825
Length = 71.3195
Radius = 815.0000
External = 0.7808
Long Chord = 71.2968
Mid. Ord. = 0.7800
P.C. Station 12+47.14 N 565,008.7564 E
1,545,961.1430
P.T. Station 13+18.46 N 565,012.8535 E
1,546,032.3220
C.C. N 565,823.6795 E
1,545,949.9434
Back = N 89° 12' 45.45" E
Ahead = N 84° 11' 55.50" E
Chord Bear = N 86° 42' 20.47" E

Curve Data

Curve TRAIL_STAGE_W_5
P.I. Station 13+27.06 N 565,013.7217 E
1,546,040.8697
Delta = 19° 30' 00.51" (RT)
Degree = 114° 35' 29.61"
Tangent = 8.5916
Length = 17.0171
Radius = 50.0000
External = 0.7328
Long Chord = 16.9351
Mid. Ord. = 0.7222
P.C. Station 13+18.46 N 565,012.8535 E
1,546,032.3220
P.T. Station 13+35.48 N 565,011.6867 E
1,546,049.2168
C.C. N 564,963.1094 E
1,546,037.3744
Back = N 84° 12' 01.87" E
Ahead = S 76° 17' 57.62" E
Chord Bear = S 86° 02' 57.87" E

Curve Data

Curve TRAIL_STAGE_W_6
P.I. Station 13+41.84 N 565,010.1810 E
1,546,055.3935
Delta = 35° 16' 06.94" (LT)
Degree = 286° 28' 44.03"
Tangent = 6.3576
Length = 12.3111
Radius = 20.0000
External = 0.9861
Long Chord = 12.1176
Mid. Ord. = 0.9398
P.C. Station 13+35.48 N 565,011.6867 E
1,546,049.2168
P.T. Station 13+47.79 N 565,012.5181 E
1,546,061.3059
C.C. N 565,031.1177 E
1,546,053.9537
Back = S 76° 17' 58.51" E
Ahead = N 68° 25' 54.55" E
Chord Bear = N 86° 03' 58.02" E

Curve Data

Curve TRAIL_STAGE_W_7
P.I. Station 13+59.19 N 565,016.7075 E
1,546,071.9044
Delta = 20° 49' 51.56" (LT)
Degree = 92° 24' 45.17"
Tangent = 11.3965
Length = 22.5413
Radius = 62.0000
External = 1.0387
Long Chord = 22.4174
Mid. Ord. = 1.0216
P.C. Station 13+47.79 N 565,012.5181 E
1,546,061.3059
P.T. Station 13+70.33 N 565,024.3920 E
1,546,080.3203
C.C. N 565,070.1769 E
1,546,038.5142
Back = N 68° 25' 54.55" E
Ahead = N 47° 36' 02.99" E
Chord Bear = N 58° 00' 58.77" E

Curve Data

Curve TRAIL_STAGE_W_8
P.I. Station 13+86.50 N 565,035.2943 E
1,546,092.2601
Delta = 31° 09' 11.99" (RT)
Degree = 98° 47' 08.98"
Tangent = 16.1684
Length = 31.5362
Radius = 58.0000
External = 2.2114
Long Chord = 31.1492
Mid. Ord. = 2.1302
P.C. Station 13+70.33 N 565,024.3920 E
1,546,080.3203
P.T. Station 14+01.87 N 565,038.4474 E
1,546,108.1181
C.C. N 564,981.5611 E
1,546,119.4292
Back = N 47° 36' 02.99" E
Ahead = N 78° 45' 14.98" E
Chord Bear = N 63° 10' 38.98" E

Course from PT TRAIL_STAGE_W_8 to 20 N 78° 45' 14.98" E Dist 99.3421

Point 20 N 565,057.8210 E 1,546,205.5528
Sta 15+01.21

==
Ending chain TRAIL_STAGE_W description

<* 1 DESCRIBE CHAIN TRAIL_STAGE_T

Chain TRAIL_STAGE_T contains:
21 CUR TRAIL_STAGE_T_3 CUR TRAIL_STAGE_T_6 22

Beginning chain TRAIL_STAGE_T description
Feature: Geom_Centerline
==

Point 21 N 564,861.1378 E 1,545,985.5421 Sta 3999+00.00

Course from 21 to PC TRAIL_STAGE_T_3 N 46° 28' 02.47" W Dist 110.8176

Curve Data

Curve TRAIL_STAGE_T_3
P.I. Station 4000+50.29 N 564,964.6524 E
1,545,876.5848
Delta = 126° 15' 30.72" (RT)
Degree = 286° 28' 44.03"
Tangent = 39.4721
Length = 44.0725
Radius = 20.0000
External = 24.2498
Long Chord = 35.6811
Mid. Ord. = 10.9604
P.C. Station 4000+10.82 N 564,937.4653 E
1,545,905.2013
P.T. Station 4000+54.89 N 564,971.6483 E
1,545,915.4320
C.C. N 564,951.9650 E
1,545,918.9767
Back = N 46° 28' 02.47" W
Ahead = N 79° 47' 28.25" E
Chord Bear = N 16° 39' 42.89" E

Course from PT TRAIL_STAGE_T_3 to PC TRAIL_STAGE_T_6 N 79° 47' 28.25" E Dist 103.3862

Curve Data

Curve TRAIL_STAGE_T_6
P.I. Station 4001+72.10 N 564,992.4230 E
1,546,030.7910
Delta = 85° 20' 46.57" (LT)
Degree = 381° 58' 18.71"
Tangent = 13.8286
Length = 22.3436
Radius = 15.0000
External = 5.4017
Long Chord = 20.3345
Mid. Ord. = 3.9715
P.C. Station 4001+58.28 N 564,989.9721 E
1,546,017.1814
P.T. Station 4001+80.62 N 565,006.1867 E
1,546,029.4524
C.C. N 565,004.7346 E
1,546,014.5229
Back = N 79° 47' 28.25" E
Ahead = N 5° 33' 18.32" W
Chord Bear = N 37° 07' 04.97" E

Course from PT TRAIL_STAGE_T_6 to 22 N 5° 33' 18.32" W Dist 86.1714

Point 22 N 565,091.9534 E 1,546,021.1108
Sta 4002+66.79

==
Ending chain TRAIL_STAGE_T description

MARK	DATE	REVISION	BY

Engineer: RP | Checked By: TNJ | Scale: NONE
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet G.3

SUGAR CREEK GREENWAY TRAIL PHASE 1

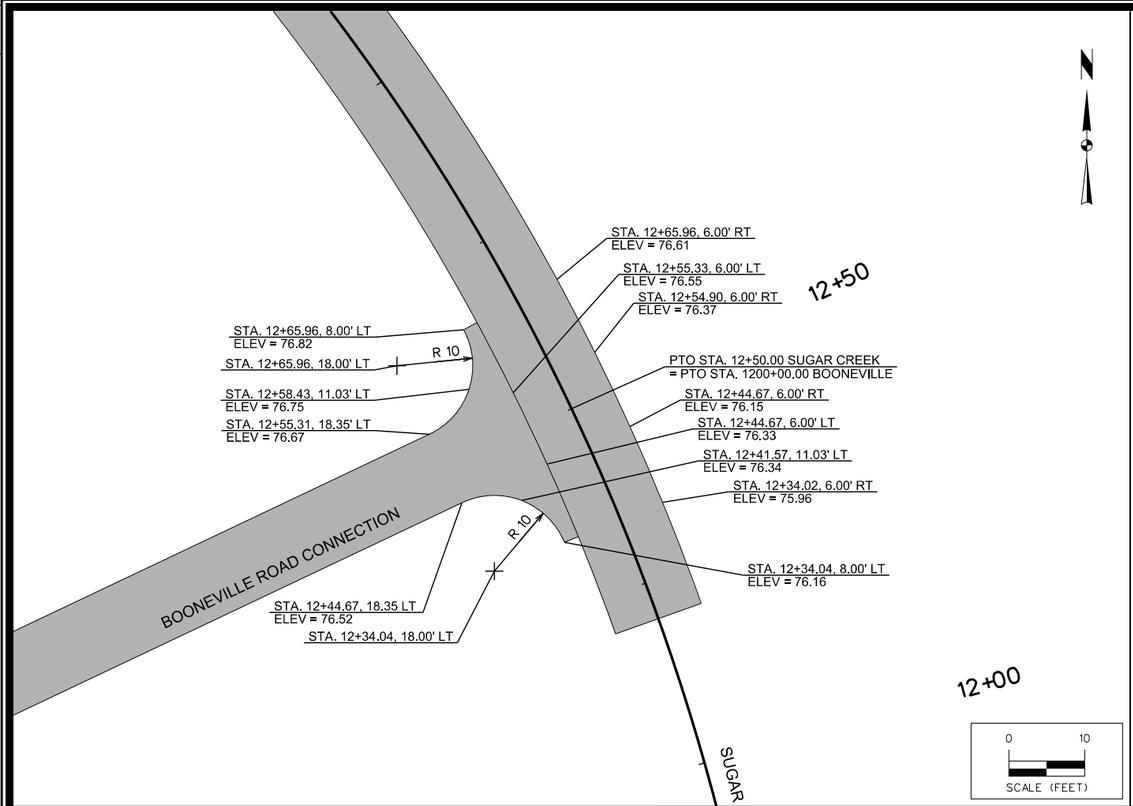
SURVEY CONTROL AND REFERENCE INFORMATION

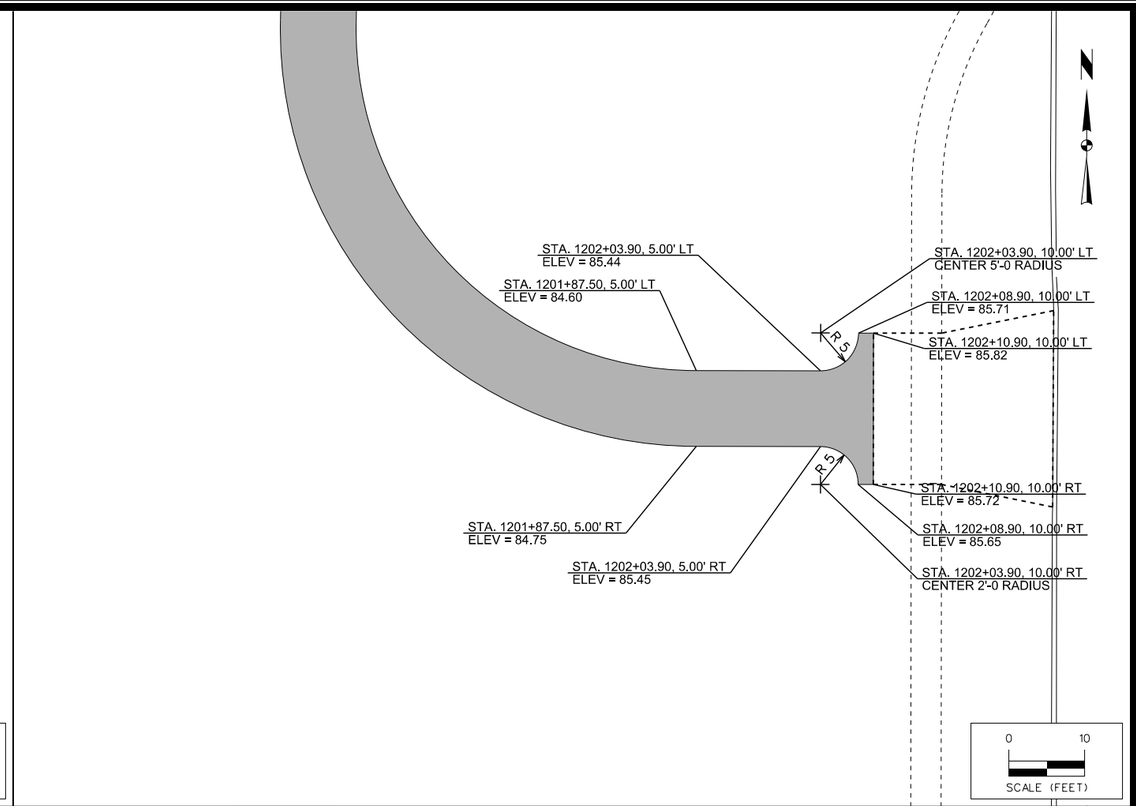
WEST DES MOINES, IOWA

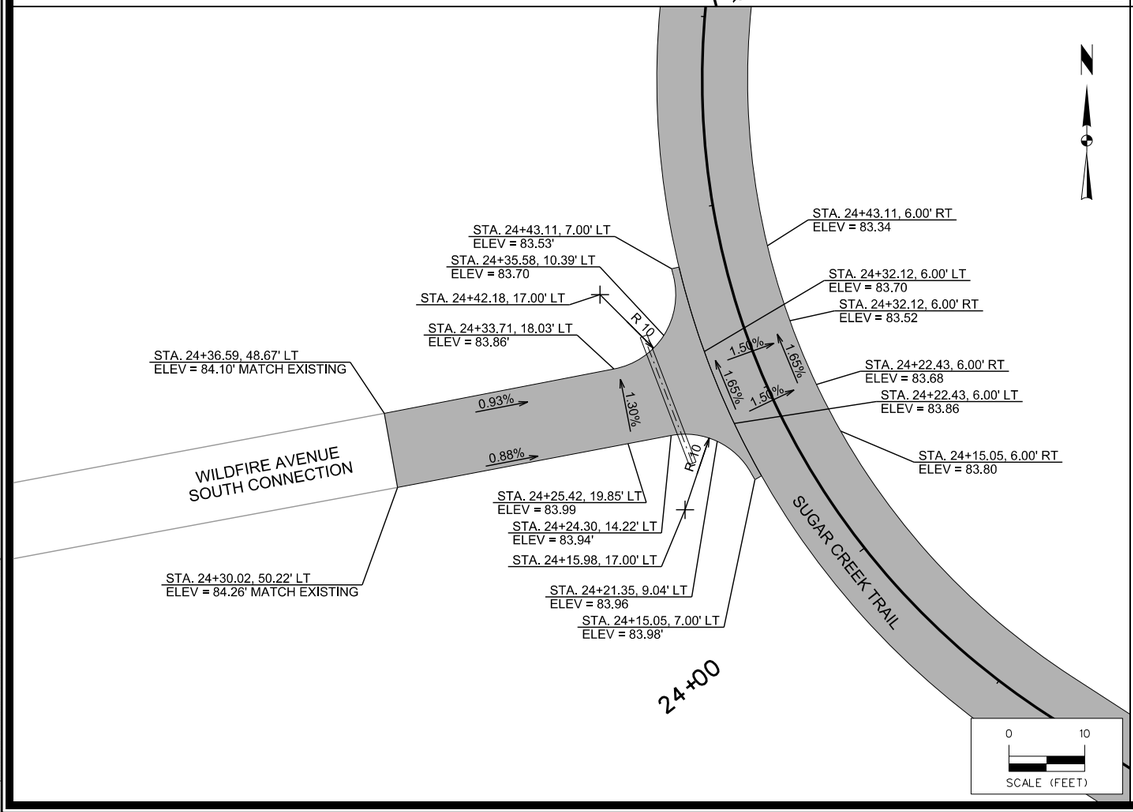
SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

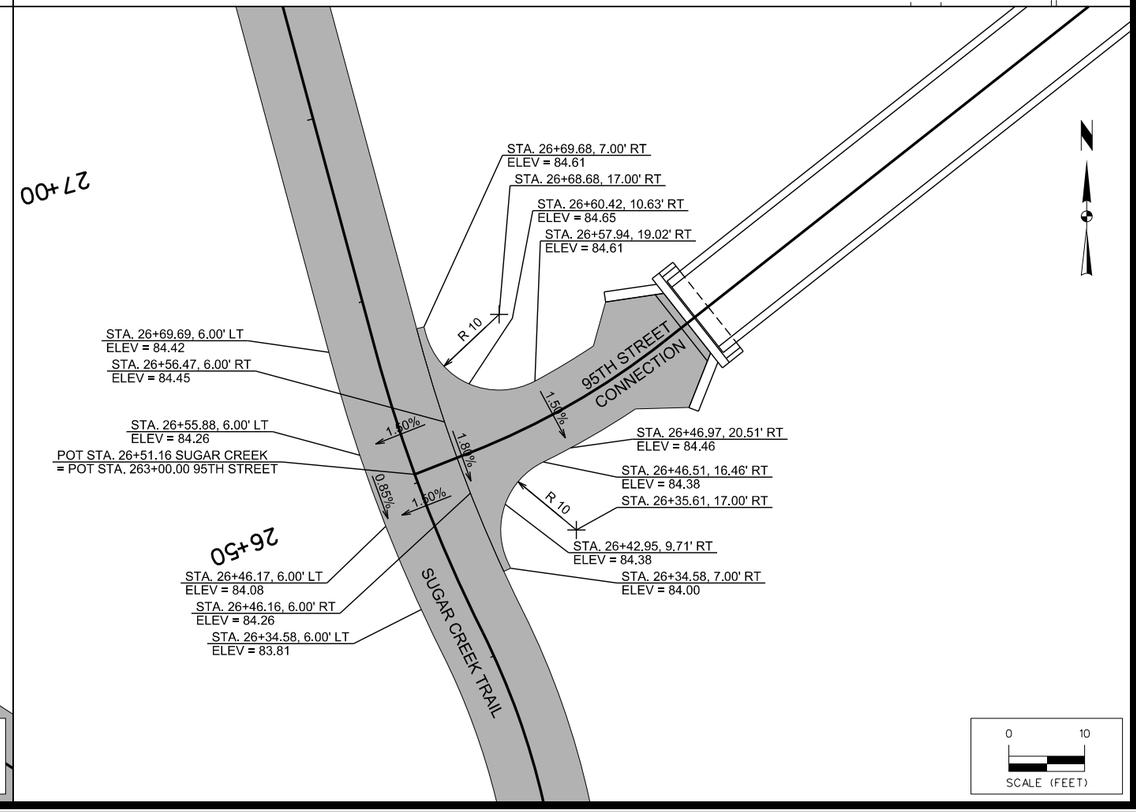
SNYDER & ASSOCIATES

Project No: 1190863
Sheet G.3









MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 10'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet L.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

GEOMETRIC SHEET

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet L.1

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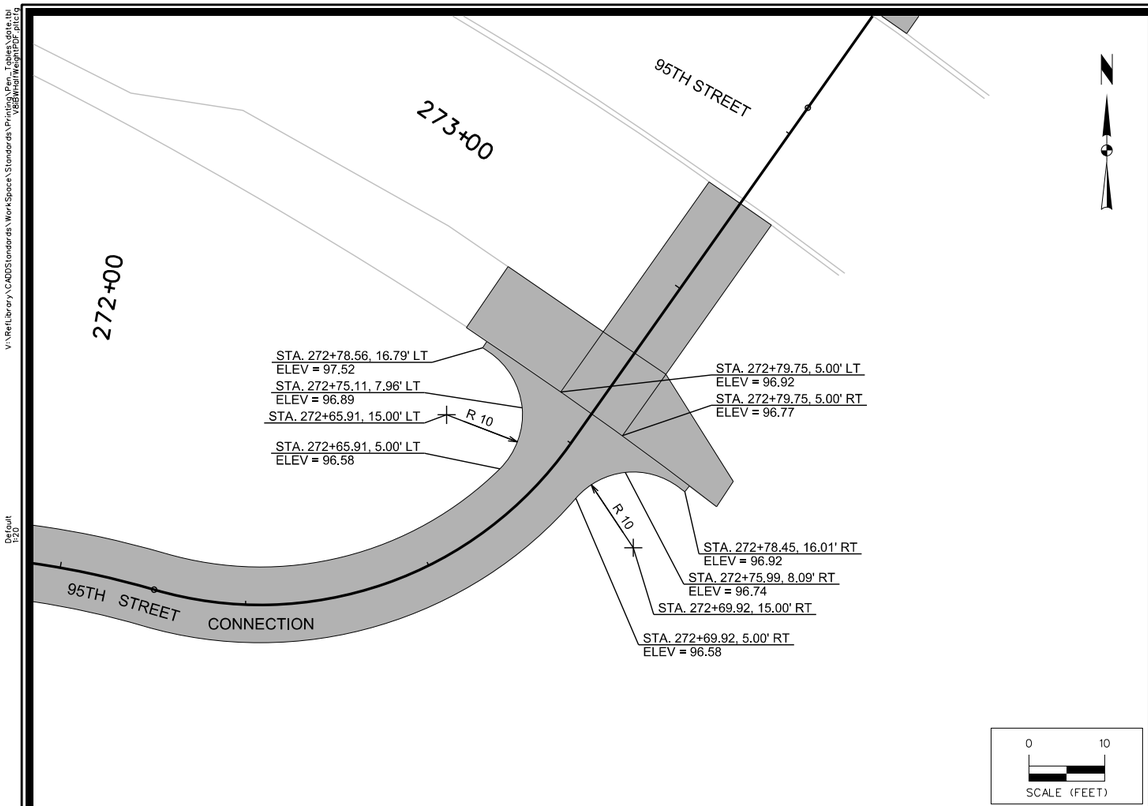

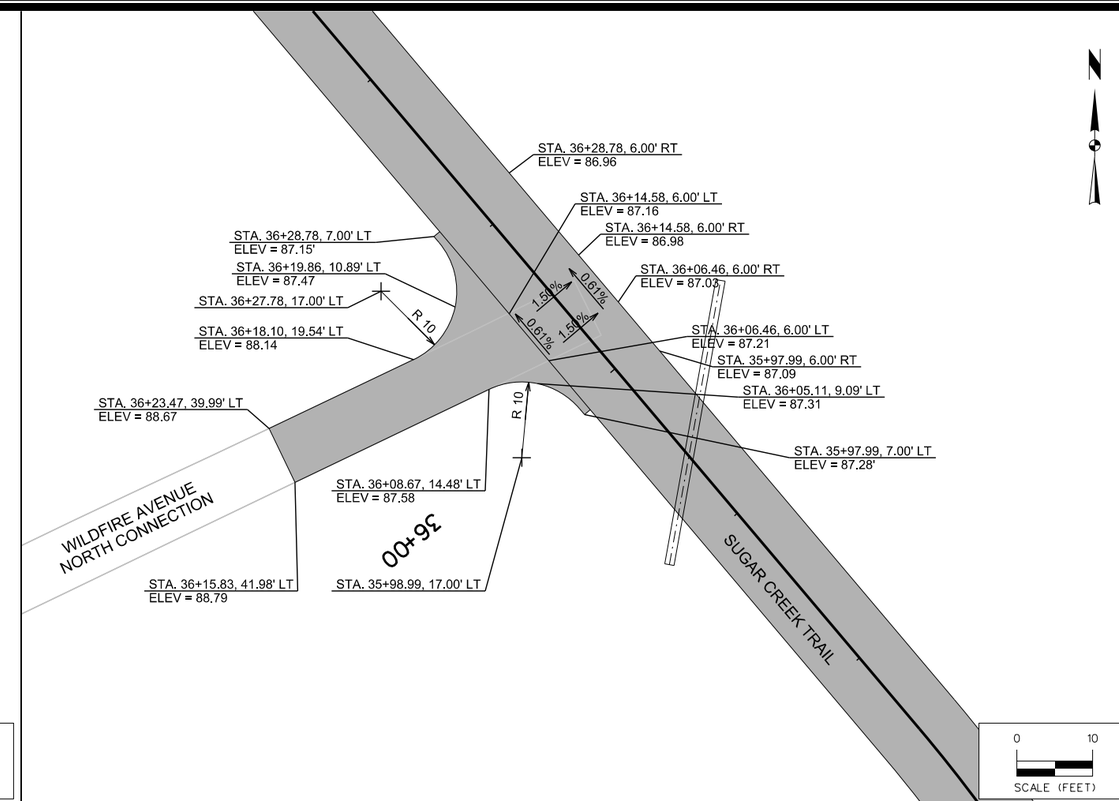

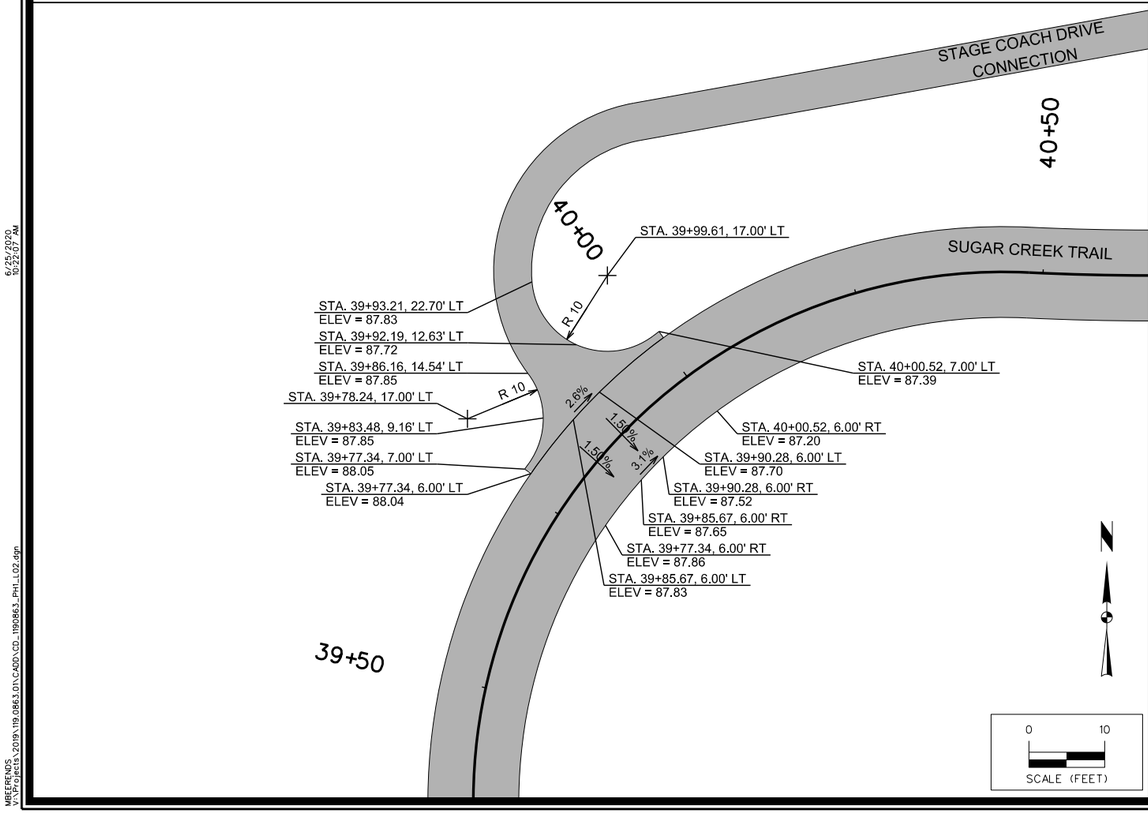

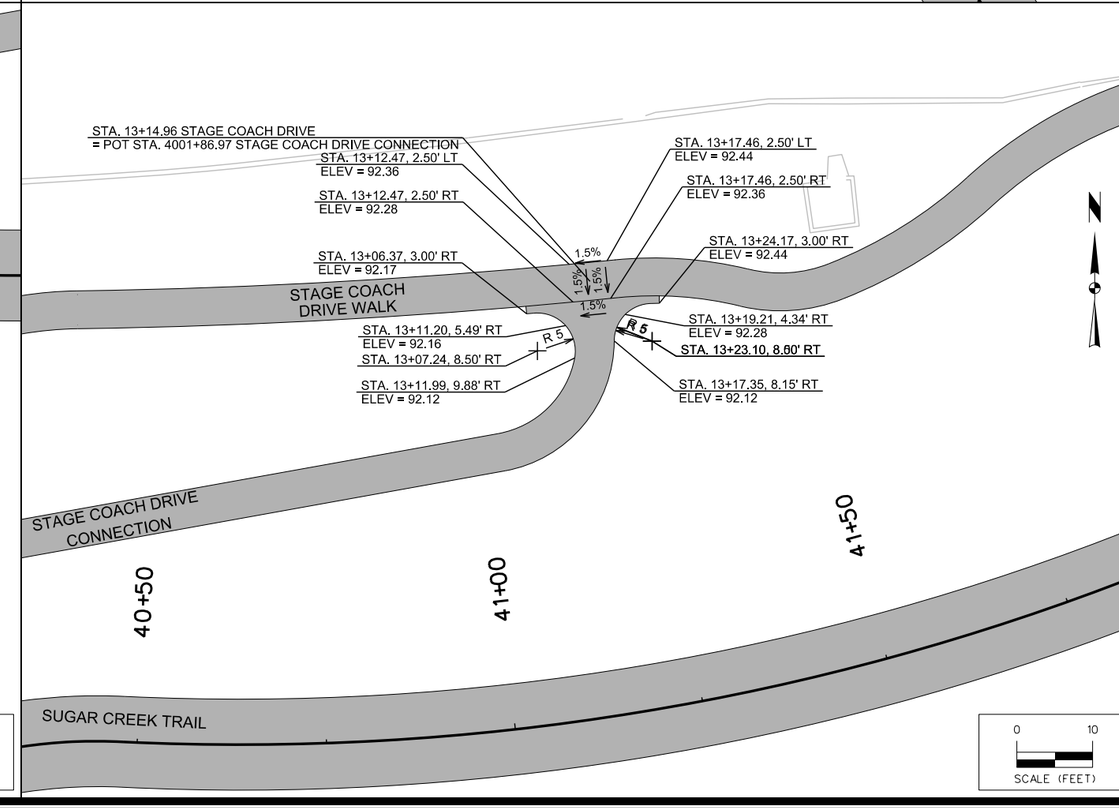

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1" = 10'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet L.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

GEOMETRIC SHEET

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863

Sheet L.2

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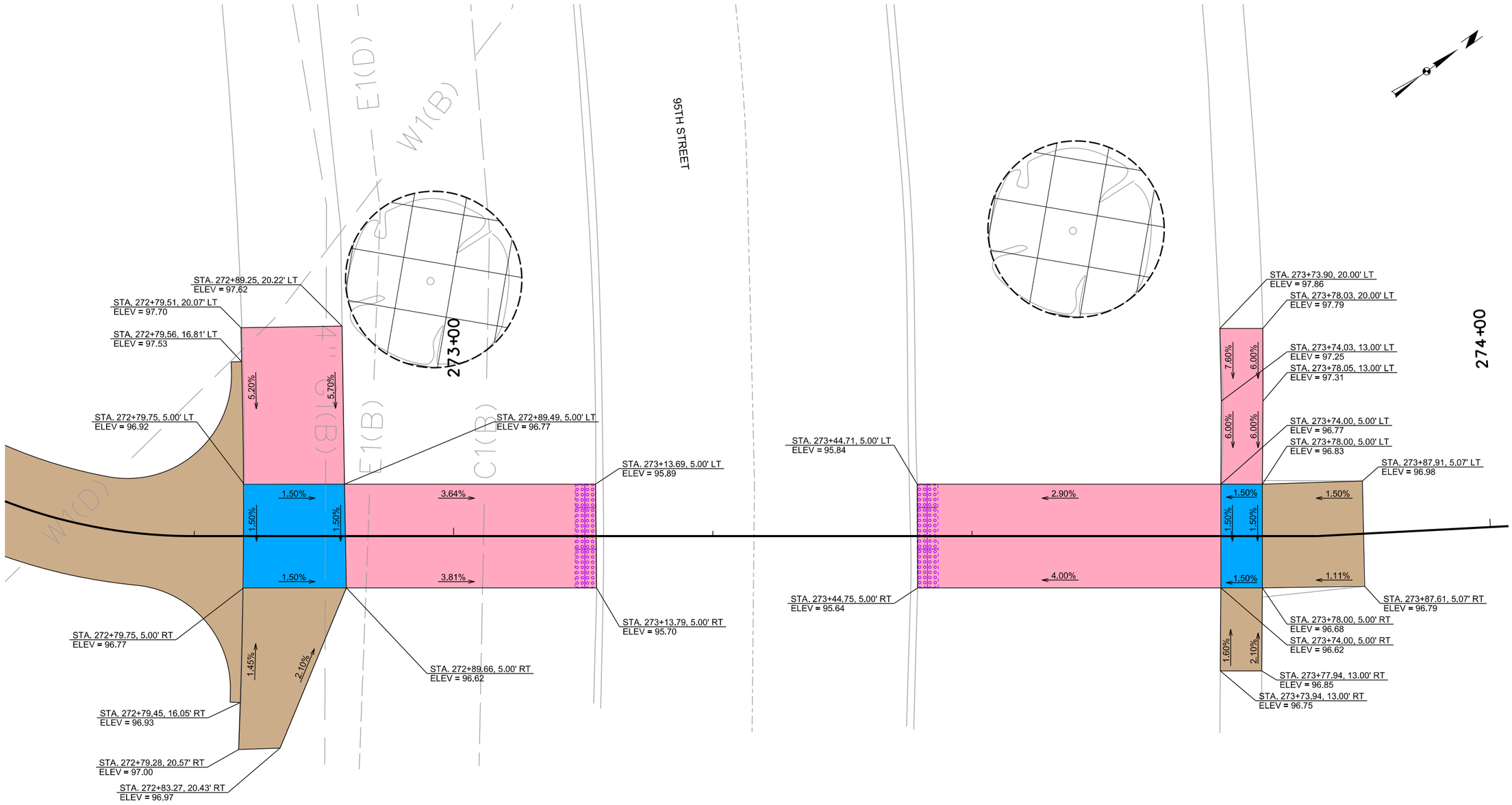

LEGEND

- DETECTABLE WARNING
- PROPOSED SIDEWALK
- PROPOSED SIDEWALK RAMP
- PROPOSED SIDEWALK LANDING

0 5
SCALE (FEET)

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 5'
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet S.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

SIDEWALK LAYOUT - 95TH STREET

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

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Project No: 1190863
Sheet S.1

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ESTIMATED BRIDGE QUANTITIES (120'-10 x 10'-0)

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QTY.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	162.0	
2	2402-2720000	EXCAVATION, CLASS 20	CY	114	
3	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	33.8	
4	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	4848	
5	2429-0000100	PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE, 120'-10 X 10'-0	EACH	1	
6	2501-0201057	PILES, STEEL, HP10 X 57	LF	360	
7	2507-3250005	ENGINEERING FABRIC	SY	305.0	
8	2507-6800061	REVETMENT, CLASS E	TON	260.0	
9	2526-8285000	CONSTRUCTION SURVEY	LS	1.00	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	**EXCAVATION, CLASS 10, CHANNEL** CONSISTS OF EXCAVATION REQUIRED TO EMBED THE REVETMENT, ENGINEERING FABRIC, AND CLASS E REVETMENT. SEE SHEET V.3 FOR DETAILS AND V.6 FOR QUANTITY ITEMIZATION. SUITABLE CLASS 10 CHANNEL OR CLASS 20 EXCAVATION MATERIAL MAY BE USED TO CONSTRUCT THE ABUTMENT BERM OR MAY BE WASTED ON THE APPROACH TRAIL FORESLOPES, AS DIRECTED BY THE ENGINEER. SUITABLE EXCAVATION MATERIAL SHALL BE AS DESIGNATED IN IOWA DOT STANDARD SPECIFICATIONS SECTION 2102.02, D, 2&3.
2	2402-2720000	**EXCAVATION, CLASS 20** QUANTITIES ASSUME THAT THE CHANNEL GRADING AND APPROACH TRAIL GRADING ARE COMPLETE. SUITABLE CLASS 10 CHANNEL OR CLASS 20 EXCAVATION MATERIAL MAY BE USED TO CONSTRUCT THE ABUTMENT BERM OR MAY BE WASTED ON THE APPROACH TRAIL FORESLOPES, AS DIRECTED BY THE ENGINEER. SUITABLE EXCAVATION MATERIAL SHALL BE AS DESIGNATED IN IOWA DOT STANDARD SPECIFICATIONS SECTION 2102.02, D, 2&3.
3	2403-0100010	**STRUCTURAL CONCRETE (BRIDGE)** THIS BID ITEM INCLUDES THE CONCRETE FOR THE BRIDGE ABUTMENTS, MASKWALLS, PAVING NOTCHES, AND WINGS. THIS BID ITEM INCLUDES ALL COSTS ASSOCIATED WITH FURNISHING ITEMS AND COMPLETING THE WORK AND INSTALLATION ASSOCIATED WITH SUBDRAINS AND ABUTMENT BACKFILL AS NOTED ON SHEETS V.8 AND V.9. INCLUDES ALL RESILIENT JOINT FILLER REQUIRED. INCLUDES FURNISHING AND PLACING CONCRETE SEALER ON ABUTMENT SEATS AS NOTED IN THESE PLANS. PAYMENT SHALL BE MADE BASED ON PLAN QUANTITIES. NO ADDITIONAL PAYMENT SHALL BE MADE FOR ADJUSTMENTS TO THE ABUTMENT DETAILS AS NOTED IN THESE PLANS. CONTRACTOR SHALL PROVIDE CERTIFIED PLANT INSPECTION IN ACCORDANCE WITH IOWA DOT STANDARD SPECIFICATIONS SECTION 2521.
4	2404-7775005	**REINFORCING STEEL, EPOXY COATED** THIS BID ITEM INCLUDES THE REINFORCING STEEL FOR THE BRIDGE ABUTMENTS, MASKWALLS, PAVING NOTCHES, AND WINGS. PAYMENT SHALL BE MADE BASED ON PLAN QUANTITIES. NO ADDITIONAL PAYMENT SHALL BE MADE FOR ADJUSTMENTS TO THE ABUTMENT DETAILS AS NOTED IN THESE PLANS.
5	2429-0000100	**PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE, 120'-10 X 10'-0** BRIDGE SHALL BE A BOWSTRING TRUSS WITH A PRATT WEB CONFIGURATION. STEEL FINISH SHALL BE WEATHERING STEEL. ALL BRIDGE DETAILS, MATERIALS, AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH IOWA DOT STANDARD SPECIFICATIONS SECTION 2429 UNLESS OTHERWISE NOTED IN THE GENERAL NOTES INCLUDED IN THESE PLANS. THE BRIDGE SHALL INCLUDE SAFETY RAILS WITH VERTICAL PICKETS. INCLUDES ALL COSTS ASSOCIATED WITH DESIGNING, FABRICATING AND INSTALLING THE ORNAMENTAL APPROACH FENCE AS DETAILED AND NOTED IN THESE PLANS. ALL MATERIALS AND CONSTRUCTION FOR ALL CONCRETE AND REINFORCING STEEL FOR THE BRIDGE DECK SHALL BE IN ACCORDANCE WITH IOWA DOT STANDARD SPECIFICATIONS SECTION 2403 AND 2404, RESPECTIVELY. INCLUDES ALL COSTS ASSOCIATED WITH FABRICATING AND INSTALLING THE COVER PLATES AS DETAILED ON SHEET V.5. CONTRACTOR SHALL PROVIDE CERTIFIED PLANT INSPECTION FOR ALL CONCRETE IN ACCORDANCE WITH IOWA DOT STANDARD SPECIFICATIONS SECTION 2521.

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
6	2501-0201057	**PILES, STEEL, HP10 X 57** - -
7	2507-3250005	**ENGINEERING FABRIC** SEE SHEET V.3 FOR DETAILS AND SHEET V.6 FOR QUANTITY ITEMIZATION. ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH IOWA DOT STANDARD SPECIFICATIONS SECTION 4196.01, B, 3.
8	2507-6800061	**REVETMENT, CLASS E** SEE SHEET V.3 FOR DETAILS AND SHEET V.6 FOR QUANTITY ITEMIZATION. ESTIMATED AT 1.6 TON/CY.
9	2526-8285000	**CONSTRUCTION SURVEY** THIS BID ITEM INCLUDES ALL COSTS ASSOCIATED WITH MONITORING SETTLEMENT PLATES INITIALLY, AND DURING AND FOLLOWING PLACEMENT OF APPROACH EMBANKMENT FILL AT THE NORTH ABUTMENT IN ORDER TO DETERMINE THE RATE OF SETTLEMENT AND FOR EVALUATION OF WHEN PILE DRIVING MAY BEGIN AT THE NORTH ABUTMENT AS INDICATED IN THESE PLANS. INCLUDES ALL COSTS ASSOCIATED WITH FURNISHING, LOCATING, INSTALLING, AND EXTENDING PLACING SETTLEMENT PLATES AND MONITORING AND REPORTING OF THE SETTLEMENT PLATE DATA PER SECTION 2106 OF THE STANDARD SPECIFICATIONS AND CHAPTER 6.43 OF THE CONSTRUCTION MANUAL. SEE IOWA DOT STANDARD ROAD PLAN EW-212 FOR SETTLEMENT PLATE DETAILS.

TRAIL QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

STRUCTURAL DESIGN

LICENSED PROFESSIONAL ENGINEER
Steven M. Kunz
14321
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: Steven M. Kunz — Date: 06-17-2020

Printed or Typed Name: Steven M. Kunz

My license renewal date is December 31, 2021

Pages or sheets covered by this seal: SHEETS V.1 THRU V.9 (EXCLUDING HYDRAULIC DATA, CHANNEL GRADING, AND REVETMENT)

SHUCK-BRITSON

DESIGN FOR 0° SKEW

120'-10 TRUSS SPAN 10'-0 TRAIL PRE-ENGINEERED STEEL TRUSS RECREATIONAL TRAIL BRIDGE

ESTIMATED QUANTITIES

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

CITY OF WEST DES MOINES

SPECIFICATIONS:

DESIGN: AASHTO LRFD 7th Ed, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th Ed, SERIES OF 2014, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'c = 4.0 KSI

BRIDGE DECK CONCRETE f'c = 4.0 KSI.

STRUCTURAL STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 6. ASTM A709 GRADE 50 (AASHTO M270 GRADE 50) UNLESS NOTED OTHERWISE.

GENERAL NOTES:

THE INTENT OF THIS DESIGN IS TO CONSTRUCT A PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE OVER SUGAR CREEK ALONG SUGAR CREEK GREENWAY TRAIL IN THE CITY OF WEST DES MOINES.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THE CHANNEL GRADING IS SHOWN ON SHEET V.3 AND IS TO BE COMPLETED BEFORE ABUTMENT PILES ARE DRIVEN. THE BRIDGE CONTRACTOR IS TO LEVEL OFF AND SHAPE THE BERMS AT ABUTMENT LOCATIONS TO THE ELEVATIONS AND DIMENSIONS SHOWN. DRESSING OF SLOPES OUTSIDE THE BRIDGE AREA NOT DISTURBED BY THE BRIDGE CONTRACTOR SHALL BE PAID FOR AS EXTRA WORK.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 IS A $\frac{5}{8}$ INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

THE CITY AND UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE BRIDGE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

THE "ENGINEER", AS REFERENCED IN THESE PLANS, IS A REPRESENTATIVE FOR THE CITY OF WEST DES MOINES OR A DESIGNATED REPRESENTATIVE.

WELDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED. THE CONTRACTOR SHALL OBTAIN A TEMPLATE FROM THE MANUFACTURER / FABRICATOR FOR PROPER PLACEMENT OF THE ANCHOR BOLTS.

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

1	PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE
2	PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE DESIGN CALCULATIONS
3	ORNAMENTAL APPROACH FENCE
4	ORNAMENTAL APPROACH FENCE DESIGN CALCULATIONS

SHUCK-BRITSON

PRE-ENGINEERED STEEL TRUSS NOTES:

THE BRIDGE SHALL BE A 120'-10 TRUSS SPAN X 10'-0 TRAIL PRE-ENGINEERED STEEL TRUSS. THE BRIDGE SHALL HAVE A 10'-0 WIDE CLEAR TRAIL WIDTH.

THE TRUSS TYPE SHALL BE A BOWSTRING TRUSS WITH A PRATT WEB CONFIGURATION.

THE PRE-ENGINEERED STEEL TRUSS SHALL BE FABRICATED USING WEATHERING STEEL IN ACCORDANCE WITH SECTION 2429.02, B, 2, OF THE STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION.

DEICING SALTS AND OTHER CORROSION INDUCING COMPOUNDS SHALL NOT BE APPLIED TO THIS BRIDGE DECK OR APPROACHES.

SAFETY RAILINGS SHALL HAVE VERTICAL PICKETS AND RUB RAILS SHALL BE HORIZONTAL, WITH THE TOP RAILINGS A MINIMUM OF 54 INCHES ABOVE THE BRIDGE DECK, AND SHALL MEET THE REQUIREMENTS OF SECTION 2429 OF THE STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION.

THE BRIDGE RAILING SHALL EXTEND AS REQUIRED TO MEET THE APPROACH FENCE. THE TOP OF THE BRIDGE RAIL SHALL MATCH THE TOP OF THE APPROACH FENCE. THE MAXIMUM OPENING BETWEEN THE BRIDGE RAIL AND THE APPROACH FENCE SHALL BE AS NOTED ON SHEET V.7.

VEHICULAR LIVE LOAD SHALL BE THE CONTROLLING LOAD OF THE FOLLOWING:

1. SINGLE H-5 (10,000 LB.) TRUCK PLACED TO PRODUCE THE MAXIMUM LOAD EFFECTS. THE DYNAMIC LOAD ALLOWANCE NEED NOT BE CONSIDERED FOR THIS LOADING.
2. CONCENTRATED VERTICAL LOAD IN ACCORDANCE WITH STANDARD SPECIFICATIONS 2429.02, A, 2, B.

PEDESTRIAN LOAD SHALL BE 90 PSF (NON-REDUCIBLE), PATTERNED TO PRODUCE THE MAXIMUM LOAD EFFECTS. CONSIDERATION OF DYNAMIC LOAD ALLOWANCE IS NOT REQUIRED WITH THIS LOADING. THIS LOADING SUPERSEDES THE PEDESTRIAN LOADING IN STANDARD SPECIFICATIONS 2429.02, A, 2, B.

PEDESTRIAN AND VEHICULAR LOAD SHALL NOT BE APPLIED SIMULTANEOUSLY.

ALL OTHER LOADS SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS 2429.02, A, 2, UNLESS NOTED OR DETAILED OTHERWISE.

MAXIMUM ALLOWABLE DEFLECTION DUE TO LIVE LOAD AS DESCRIBED IN THE CONTRACT DOCUMENTS SHALL NOT EXCEED L/500 WHERE L IS THE LENGTH OF THE TRUSS FROM CENTER TO CENTER OF BEARING IN THE LONGITUDINAL DIRECTION.

THE HORIZONTAL DEFLECTION DUE TO LATERAL WIND LOAD SHALL NOT EXCEED 1/500 OF THE LENGTH OF THE SPAN.

THE DECK SHALL CONSIST OF REINFORCED CONCRETE AND BE DESIGNED BY THE PREFABRICATED TRUSS MANUFACTURER TO MEET ALL APPLICABLE REQUIREMENTS OF AASHTO LRFD, THE PROJECT SPECIFICATIONS AND THE STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION. ALL REINFORCING BARS IN THE DECK SHALL BE EPOXY COATED.

THE CONCRETE DECK SURFACE FINISH SHALL BE IN ACCORDANCE WITH THE IOWA DOT STANDARD SPECIFICATIONS SECTION 2412.03, D, 5.

THE CONCRETE DECK SHALL BE CROWNED AT THE CENTERLINE WITH CROSS SLOPES OF 1.5%. TRANSITION BRIDGE APPROACH PAVEMENT TO MATCH THE TYPICAL TRAIL CROSS SECTION.

TWO DECK JOINT COVER PLATES SHALL BE FURNISHED AND INSTALLED BY THE TRUSS MANUFACTURER AS DETAILED ON SHEET V.5.

FINAL BRIDGE CAMBER SHALL MATCH PROFILE GRADE SHOWN ON SHEET V.3. PROFILE GRADE IS BASED ON A BRIDGE CAMBER AT THE CENTER OF BRIDGE SPAN OF 0.75% OF THE TOTAL BRIDGE SPAN. THE BRIDGE SHALL BE CAMBERED TO OFFSET FULL DEAD LOAD DEFLECTIONS (TRUSS LOAD PLUS CONCRETE DECK).

TRUSS BEARING DESIGN VALUES USED FOR ABUTMENT DESIGN (PER BASE PLATE):

DL (VERTICAL) = 29.2 K	WIND UPLIFT - WINDWARD (VERTICAL) = -10.2 K
LL (VERTICAL) = 27.0 K	WIND UPLIFT - LEEWARD (VERTICAL) = -3.4 K
THERMAL (LONGITUDINAL) = 5.8 K	WIND (HORIZONTAL) = 7.6 K
THERMAL MOVEMENT = $\frac{11}{16}$ INCHES	WIND (VERTICAL) = 6.6 K

THERMAL MOVEMENT CALCULATED AT EACH ABUTMENT. DEVIATIONS FROM THESE DESIGN VALUES SHALL BE REPORTED TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATING THE BRIDGE.

THE TRUSS MANUFACTURER SHALL DESIGN THE ANCHOR BOLTS INCLUDING EMBEDMENT DEPTH IN THE FOOTING. CERTAIN DIMENSIONS AS SHOWN IN THESE PLANS MAY REQUIRE ADJUSTMENT TO MATCH THE DIMENSIONS OF THE ACTUAL TRUSS PROVIDED. ALL ADJUSTED DIMENSIONS, ANCHOR BOLT REQUIREMENTS, AND ANCHOR BOLT LOADS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION. THE TRUSS BEARING PLATE SHALL BE SIZED SO THAT THE APPROPRIATE ALLOWABLE SERVICE LIMIT AND/OR STRENGTH LIMIT STATE BEARING STRESSES ON THE ABUTMENT ARE NOT EXCEEDED.

THE TRUSS MANUFACTURER SHALL PROVIDE A TABLE FOR SETTING OF ANCHOR BOLTS FOR VARIOUS CONSTRUCTION TEMPERATURES THAT MAY BE ENCOUNTERED IN THE FIELD. TRUSS BEARING PLATES SHALL INCLUDE SLOTTED HOLES TO ACCOMMODATE THE ANTICIPATED THERMAL MOVEMENTS OF THE TRUSS SPAN.

CONCRETE AND REINFORCING STEEL NOTES:

ALL REINFORCING STEEL SHALL BE SECURELY WIRE IN PLACE BEFORE CONCRETE IS PLACED. BAR CHAIRS SPACED AT NOT MORE THAT 3'-0 CENTERS IN EITHER DIRECTION SHALL BE USED TO SUPPORT ALL REINFORCING IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

ALL EXPOSED CORNERS 90 DEGREES OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$" DRESSED AND BEVELED STRIP.

CONSTRUCTION JOINT KEYWAYS ARE TO BE FORMED WITH BEVELED 2 x 8's, EXCEPT AS NOTED.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

CONCRETE SEALER IS TO BE APPLIED TO THE EXPOSED BRIDGE SEAT SURFACE AT THE ABUTMENTS ACCORDING TO SECTION 2403 OF THE STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION.

ABUTMENT DETAILS SHOWN IN THESE PLANS HAVE BEEN ESTABLISHED FOR A 3'-6 HEIGHT FROM THE ABUTMENT BEARING SEAT TO TOP OF DECK AT THE CENTERLINE TRAIL AND PROFILE GRADE LINE. FOR OTHER HEIGHTS, THE CONTRACTOR MAY MODIFY DIMENSIONS SHOWN IN THESE PLANS. THE CONTRACTOR SHALL SUBMIT DETAILS OF ALL MODIFICATIONS TO THE ENGINEER FOR APPROVAL BEFORE FABRICATION. ALL PROPOSED CHANGES MUST MAINTAIN THE SPECIFIED PROFILE GRADE AND CAMBER. ANY CHANGES IN PLAN QUANTITIES DUE TO THE CHANGE OF DIMENSIONS SHOWN ON THESE PLANS WILL NOT BE MEASURED FOR PAYMENT, AND NO ADJUSTMENTS TO PAYMENT WILL BE MADE.

EMBANKMENT CONSTRUCTION & PILE INSTALLATION:

NORTH AND SOUTH ABUTMENT PILES SHALL NOT BE DRIVEN PRIOR TO APPROACH TRAIL EMBANKMENT PLACEMENT.

THE CONTRACTOR SHALL MONITOR SETTLEMENT DURING AND FOLLOWING PLACEMENT OF THE BRIDGE APPROACH EMBANKMENT FILL AT THE NORTH ABUTMENT IN ORDER TO DETERMINE THE RATE OF SETTLEMENT AND FOR EVALUATION OF WHEN PILE DRIVING MAY BEGIN AT THE NORTH ABUTMENT. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER IN THE MONITORING AND EVALUATION OF SETTLEMENT TO DETERMINE WHEN ABUTMENT PILE DRIVING MAY BEGIN AT THE NORTH ABUTMENT. THE CONTRACTOR SHALL DEVELOP A CONSTRUCTION SEQUENCE AND CONSTRUCTION SCHEDULE TO ALLOW FOR A CONSOLIDATION PERIOD OF 21 DAYS.

A TOTAL OF TWO SETTLEMENT PLATES WILL BE REQUIRED TO MONITOR SETTLEMENT FOR CONSTRUCTION OF THE NORTH ABUTMENT AND PILE DRIVING. EACH SETTLEMENT PLATE SHALL BE PLACED ON TOP OF NATIVE SOIL AND ALIGNED AS NEARLY AS PRACTICABLE TO THE CENTERLINE OF ABUTMENT; ONE SHALL BE PLACED NEAR THE WEST EDGE OF ABUTMENT AND ONE NEAR THE EAST EDGE OF ABUTMENT. THESE TWO PLATES WILL BE USED TO MONITOR SETTLEMENT OF THE NATIVE SOIL BENEATH THE NEW EMBANKMENT.

THE CONTRACTOR SHALL SURVEY THE SETTLEMENT PLATES AT THREE DAY INTERVALS AND PROVIDE A MEASUREMENT LOG TO THE ENGINEER AT MATCHING INTERVALS UNTIL SETTLEMENT IS COMPLETE AS DIRECTED BY THE ENGINEER. THE FIRST SURVEY MEASUREMENT SHALL BE TAKEN THE SAME DAY THE SETTLEMENT PLATE IS INSTALLED.

NORTH ABUTMENT PILES SHALL NOT BE DRIVEN FOR A MINIMUM OF 21 DAYS FOLLOWING COMPLETION OF THE APPROACH FILL. THE TIME PERIOD BETWEEN APPROACH FILL COMPLETION AND DRIVING ABUTMENT PILES MAY BE DECREASED OR INCREASED AS DIRECTED BY THE ENGINEER BASED UPON REVIEW OF SETTLEMENT PLATE RESULTS.

ALL BRIDGE APPROACH AND TRAIL EMBANKMENT FILL AND FOUNDATION CONSTRUCTION SHALL CONFORM TO ALLENDER BUTZKE GEOTECHNICAL EXPLORATION REPORT, PN 191375, DATED APRIL 16, 2020. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BE FAMILIAR WITH THE SOIL REPORT WHICH WILL BE MADE AVAILABLE TO THE CONTRACTOR.

WETLAND PROTECTION NOTES:

EQUIPMENT FOR HANDLING AND CONVEYING MATERIALS DURING CONSTRUCTION SHALL BE OPERATED TO PREVENT DUMPING OR SPILLING THE MATERIAL INTO WATER BODIES, STREAMS OR WETLANDS EXCEPT AS APPROVED HEREIN.

CARE SHALL BE TAKEN TO PREVENT ANY PETROLEUM PRODUCTS, CHEMICALS, OR OTHER DELETERIOUS MATERIALS FROM ENTERING WATER BODIES, STREAMS OR WETLANDS.

CONSTRUCTION EQUIPMENT, ACTIVITIES, AND MATERIALS SHALL BE KEPT OUT OF THE STREAMS AND WETLANDS TO THE MAXIMUM EXTENT POSSIBLE.

POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW

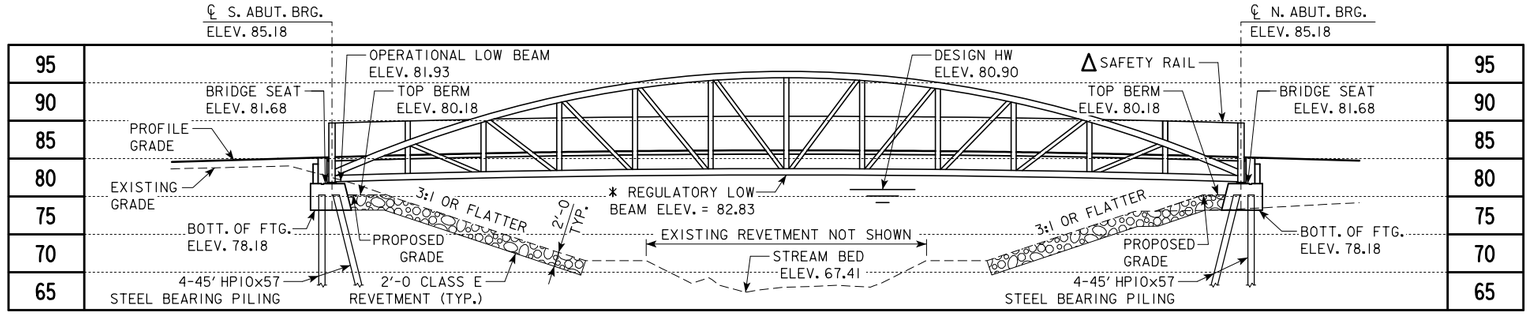
120'-10 TRUSS SPAN 10'-0 TRAIL
PRE-ENGINEERED STEEL TRUSS
RECREATIONAL TRAIL BRIDGE

GENERAL NOTES

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

CITY OF WEST DES MOINES

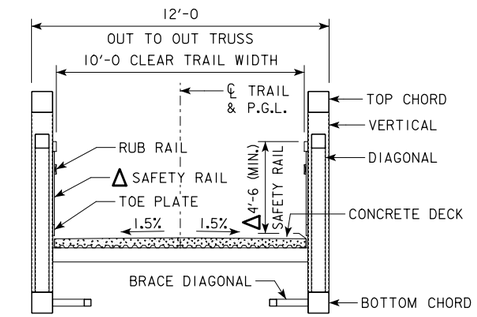
BENCH MARK NO. CP4 N=563555.83 E=1546318.17 Z=82.99
CUT "X" SOUTH SIDE OF MANHOLE STRUCTURE, ±50' WEST OF CREEK, WHERE IT BENDS SOUTH TO EAST.



LONGITUDINAL SECTION ALONG ℄ TRAIL

* REGULATORY LOW BEAM ELEVATION INCLUDES A FINAL BRIDGE CAMBER OF 0.75% (MIDDLE ORDINATE OF BRIDGE CAMBER IS 10⅛" HIGHER AT MIDSPAN THAN ELEVATION AT ℄ ABUT. BRG.)

Δ SAFETY RAIL SHALL INCLUDE VERTICAL PICKETS. PROVIDE END RAIL AND INTERIOR RAIL POSTS AS REQUIRED TO SUPPORT SAFTEY RAIL.

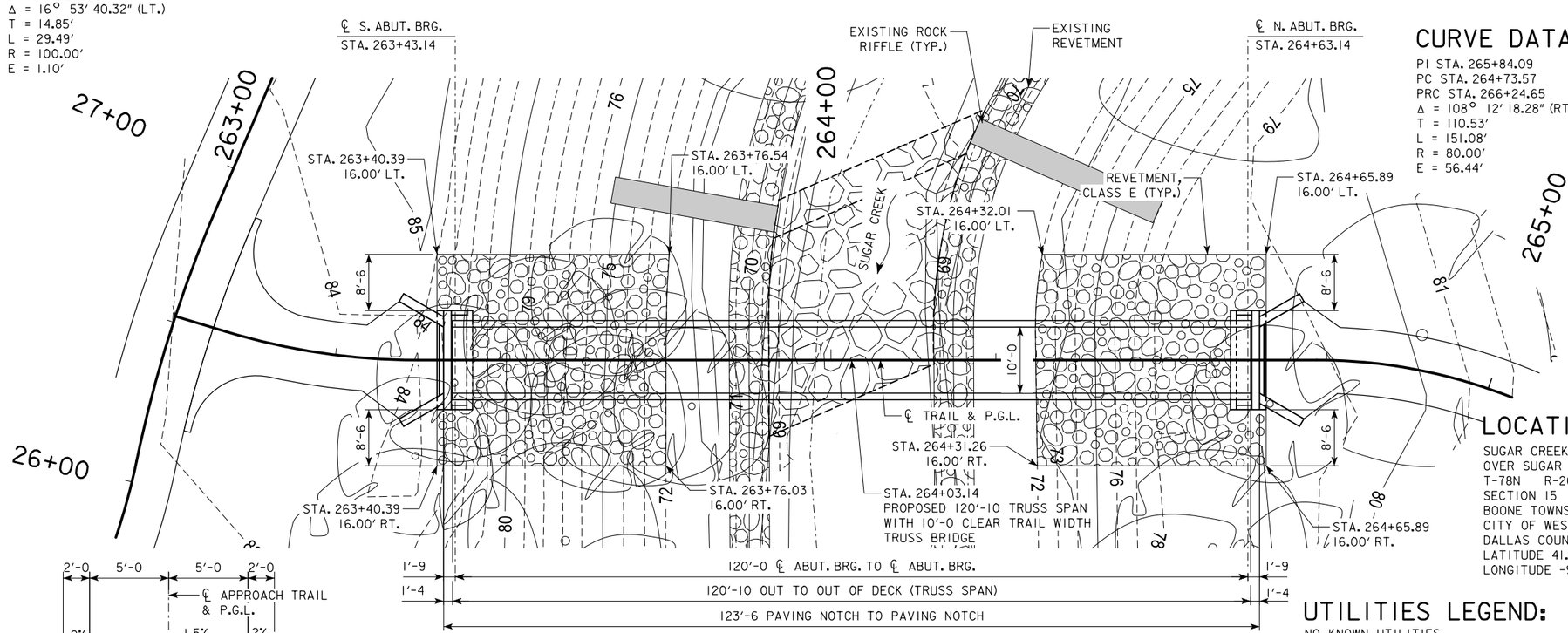


SECTION THRU TRUSS

(LOOKING NORTH)

CURVE DATA

PI STA. 263+22.84
PC STA. 263+07.99
PT STA. 263+37.47
Δ = 16° 53' 40.32" (LT.)
T = 14.85'
L = 29.49'
R = 100.00'
E = 1.10'

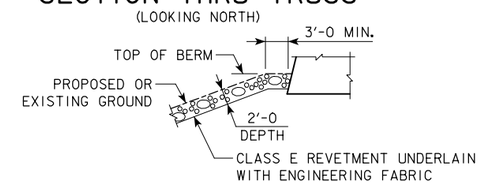


SITUATION PLAN

ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED

CURVE DATA

PI STA. 265+84.09
PC STA. 264+73.57
PRC STA. 266+24.65
Δ = 108° 12' 18.28" (RT.)
T = 110.53'
L = 151.08'
R = 80.00'
E = 56.44'



SECTION THRU BERM

HYDRAULIC DATA

DRAINAGE AREA = 19.9 SQ. MI.
STREAM SLOPE = 14.42 FT./MI.

Q_{50} = 3,940 CFS
STAGE = 79.71
REGULATORY LOW BEAM = 82.83
BACKWATER = 0.04 FT.
AVG. BRIDGE VELOCITY = 5.32 FPS

Q_{100} = 4,790 CFS
STAGE = 80.90
OPERATIONAL LOW BEAM = 81.93
BACKWATER = 0.05 FT.
AVG. BRIDGE VELOCITY = 5.47 FPS

Q_{200} = 5,870 CFS
STAGE = 82.21
CALCULATED DESIGN SCOUR = 65.48

Q_{500} = 7,220 CFS
STAGE = 83.36
AVG. BRIDGE VELOCITY = 6.87 FPS
CALCULATED CHECK SCOUR = 64.84

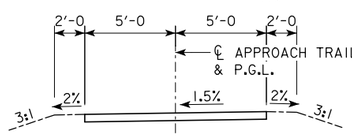
ROADWAY OVERTOP 82.75
STA. 265+85.00

TEMPORARY STREAM CROSSINGS SHALL COMPLY WITH IOWA ADMINISTRATIVE CODE 567-72.1(6).

ELEVATIONS LISTED IN WEST DES MOINES VERTICAL DATUM. WEST DES MOINES VERTICAL DATUM = NAVD88 - 774.01.

LOCATION

SUGAR CREEK GREENWAY TRAIL
OVER SUGAR CREEK
T-78N R-26W
SECTION 15
BOONE TOWNSHIP
CITY OF WEST DES MOINES
DALLAS COUNTY
LATITUDE 41.546901°
LONGITUDE -93.843489°



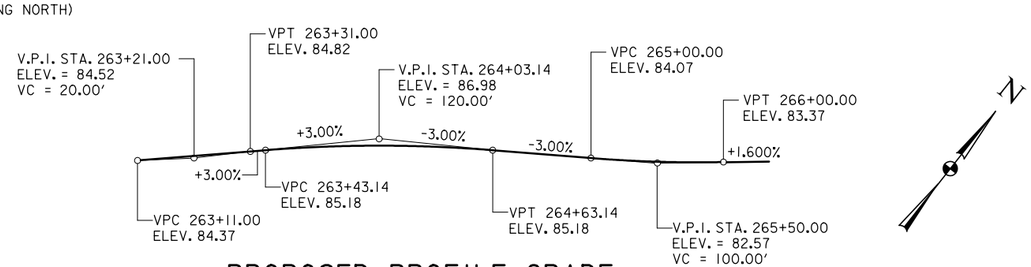
TYPICAL APPROACH SECTION

(LOOKING NORTH)

UTILITIES LEGEND:

NO KNOWN UTILITIES

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE TRAIL DESIGN SHEETS FOR FINAL UTILITY INFORMATION.



PROPOSED PROFILE GRADE

SHUCK-BRITSON

HYDRAULIC DESIGN

LICENSED PROFESSIONAL ENGINEER
Adam R. Bullerman
17362
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: Adam Bullerman Date: 06-17-2020

Printed or Typed Name: Adam R. Bullerman

My license renewal date is December 31, 2020

Pages or sheets covered by this seal: SHEET V.3 - HYDRAULIC DATA, CHANNEL GRADING, AND REVETMENT

DESIGN FOR 0° SKEW

120'-10 TRUSS SPAN 10'-0 TRAIL PRE-ENGINEERED STEEL TRUSS RECREATIONAL TRAIL BRIDGE

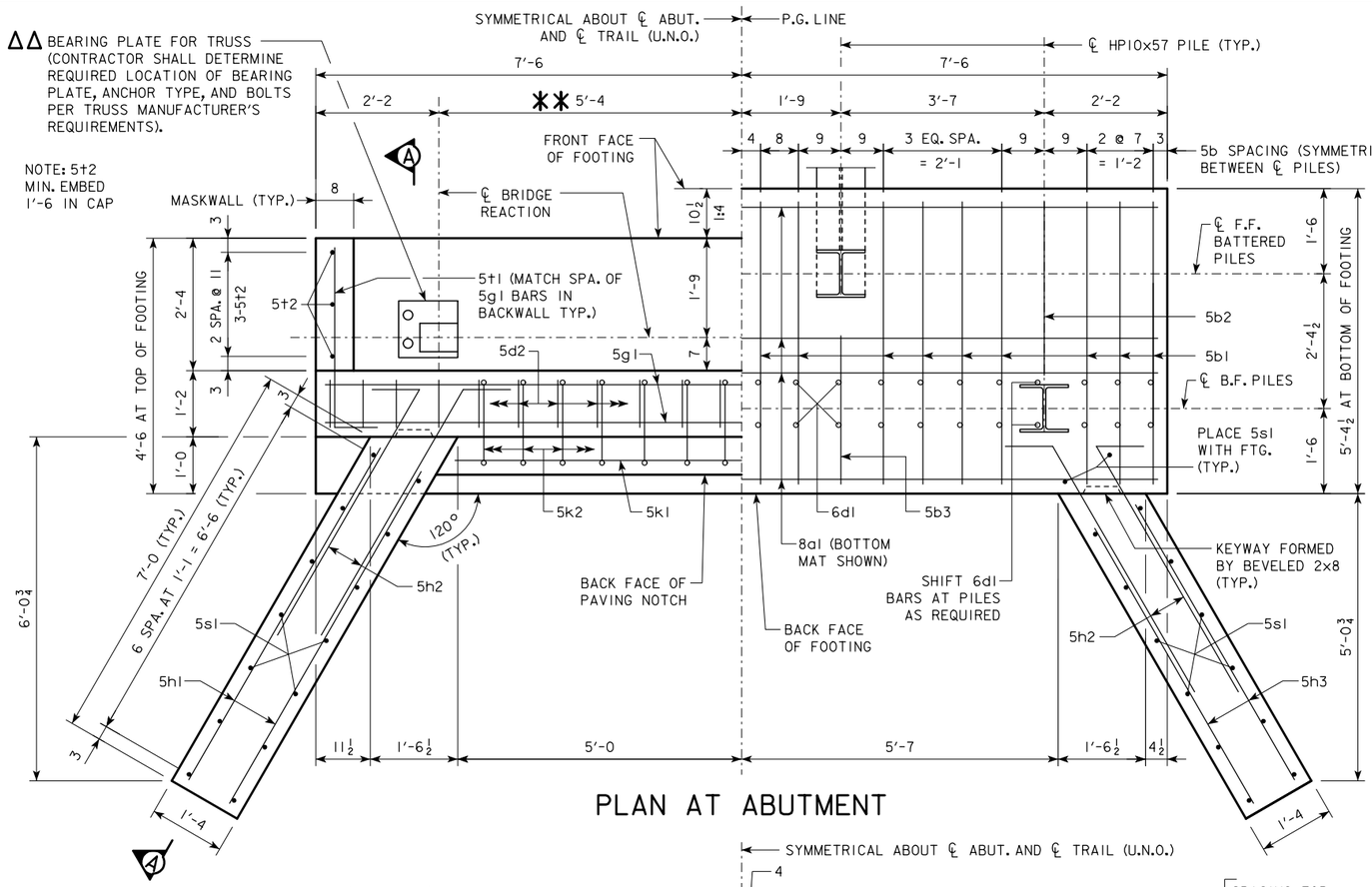
SITUATION PLAN

STA. 264+03.14 — DALLAS COUNTY — JUNE, 2020

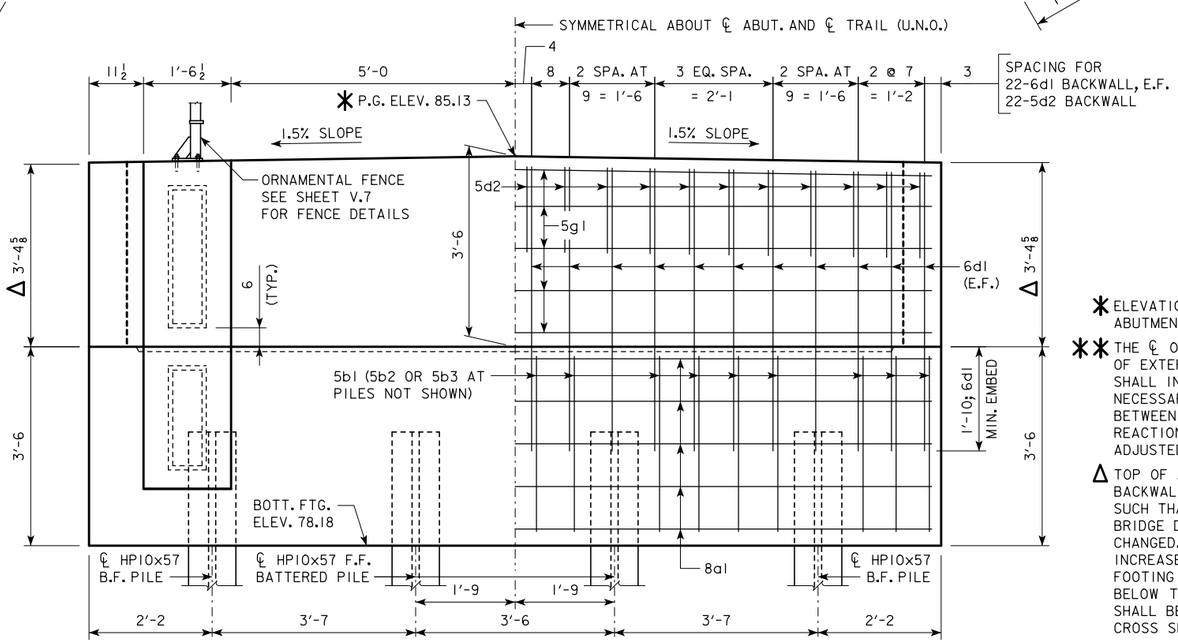
CITY OF WEST DES MOINES

DESIGN TEAM SMK/TJT/SR	S.B.I. NO. 119.0863.01	CITY OF WEST DES MOINES - DALLAS COUNTY	PROJECT NUMBER 0510-034-2018	SHEET NUMBER V.3

BENCH MARK NO. CP4 N=563555.83 E=1546318.17 Z=82.99
CUT "X" SOUTH SIDE OF MANHOLE STRUCTURE, 150' WEST OF CREEK, WHERE IT BENDS SOUTH TO EAST.



PLAN AT ABUTMENT



REAR ELEVATION
(SOUTH ABUTMENT SHOWN, NORTH ABUTMENT OPPOSITE HAND; PAVING NOTCH NOT SHOWN)

NOTES:
SEE SHEET V.5 FOR SECTION A-A.

ΔΔ SEE SHEET V.5 FOR TRUSS BEARING AND ANCHOR BOLT NOTES.

SEE SHEET V.5 FOR ADDITIONAL PILE AND PILE BATTER INFORMATION.

SEE SHEET V.6 FOR CONCRETE PLACEMENT QUANTITIES.

SEE SHEET V.6 FOR PAVING NOTCH REINFORCING DETAILS.

SEE SHEET V.6 FOR ABUTMENT PILE DRIVING NOTES.

✱ ELEVATION AT TOP OF BACK FACE OF ABUTMENT BACKWALL (TYP. - BOTH ABUTMENTS)

✱✱ THE ℄ OF BRIDGE REACTIONS ALIGNS WITH ℄ OF EXTERIOR PILES. THE TRUSS SHOP DRAWINGS SHALL INCLUDE DIMENSIONS AND DETAILS NECESSARY TO INDICATE THE RELATIONSHIP BETWEEN ℄ OF PILES AND ℄ OF BRIDGE REACTIONS. DIMENSIONS SHALL NOT BE ADJUSTED WITHOUT APPROVAL BY THE ENGINEER.

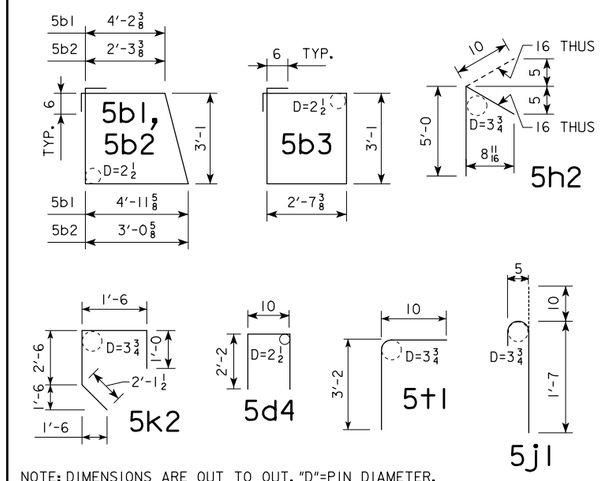
Δ TOP OF ABUTMENT FOOTING ELEVATION AND BACKWALL HEIGHT MAY BE ADJUSTED BY CONTRACTOR SUCH THAT THE GRADE ELEVATION FOR TOP OF BRIDGE DECK AT THE ℄ OF THE ABUTMENT IS NOT CHANGED. THE BACKWALL HEIGHT MAY NOT BE INCREASED MORE THAN 3 INCHES. BOTTOM OF FOOTING SHALL BE PLACED A MINIMUM OF 2 FT. BELOW THE FINISH BERM ELEVATION. BAR LENGTHS SHALL BE ADJUSTED TO PROVIDE 2" CLEAR. THE 1.5% CROSS SLOPES SHALL NOT BE ADJUSTED.

REINFORCING BAR LIST - ONE ABUTMENT

EPOXY COATED BARS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8a1	CAP, LONGITUDINAL	—	16	14'-8	627
5b1	CAP, HOOPS	⏢	18	16'-4	307
5b2	CAP, HOOPS, BACK PILES	⏢	2	12'-6	26
5b3	CAP, HOOPS, FORNT PILES	□	2	12'-5	26
6d1	BACKWALL, VERTICAL	—	44	5'-2	342
5d2	BACKWALL, HAIRPIN	⊓	22	5'-2	119
5g1	BACKWALL, LONGITUDINAL	—	10	14'-8	153
5h1	WING, LONGITUDINAL	—	20	6'-9	141
5h2	WING, LONGITUDINAL	⌐	32	5'-10	195
5h3	WING, LONGITUDINAL	—	12	5'-7	70
5j1	PAVING NOTCH, DOWEL BAR	⁊	14	2'-5	35
5k1	PAVING NOTCH, LONGITUDINAL	—	4	10'-2	42
5k2	PAVING NOTCH, VERTICAL	⁊	14	7'-2	105
5s1	WING, VERTICAL	—	28	5'-7	163
5t1	MASKWALL, HORIZONTAL	⌐	10	4'-0	42
5t2	MASKWALL, VERTICAL	—	6	5'-0	31
	REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)				2424

BENT BAR DETAILS



DESIGN FOR 0° SKEW

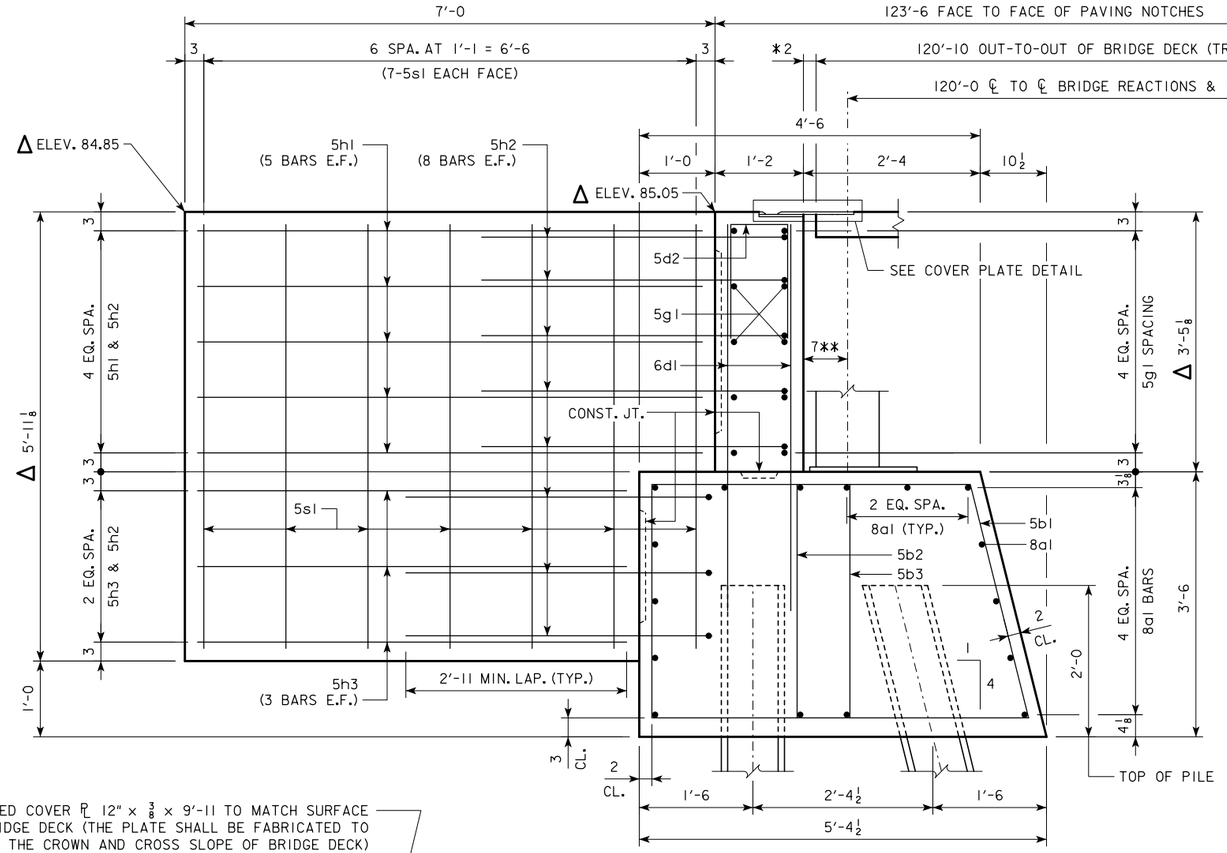
120'-10 TRUSS SPAN 10'-0 TRAIL PRE-ENGINEERED STEEL TRUSS RECREATIONAL TRAIL BRIDGE

ABUTMENT DETAILS

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

CITY OF WEST DES MOINES

SHUCK-BRITSON



SEE SHEET V.6 FOR PAVING NOTCH AND PERMISSIBLE CONSTRUCTION JOINT DETAILS.

NOTE:
DIMENSIONS SHOWN FOR PILES ARE AT BOTTOM OF FOOTING. BATTER PILES IN THE DIRECTION SHOWN.

4 - HP10x57 STEEL BEARING PILES REQUIRED AT EACH ABUTMENT.

Δ ELEVATIONS AND DIMENSIONS SHOWN AT INSIDE FACE OF WING AND BACK FACE OF ABUTMENT BACKWALL. SEE SHEET V.4 FOR ELEVATION ADJUSTMENT NOTE.

*CONTRACTOR VERIFY 2" CLEARANCE BETWEEN END OF THE DECK AND FACE OF ABUTMENT BACKWALL IS IN ACCORDANCE WITH TRUSS MANUFACTURER'S RECOMMENDATIONS

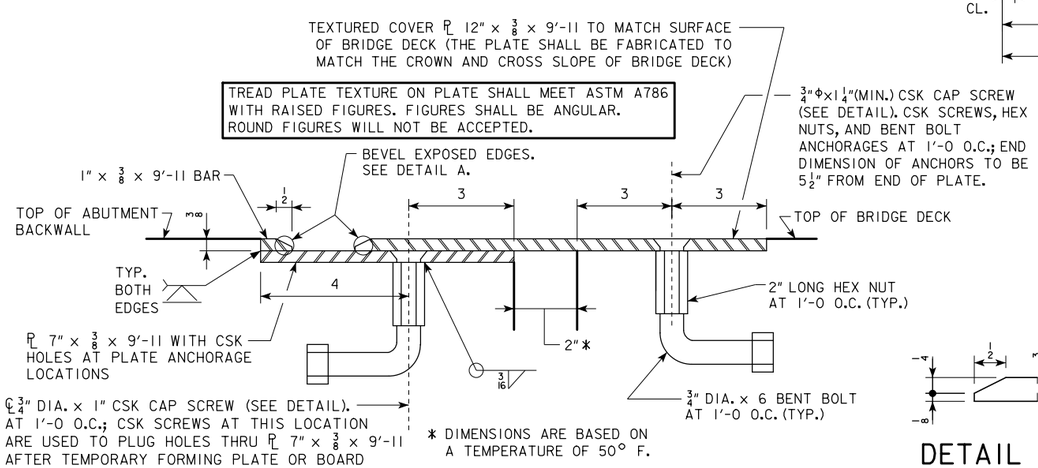
**IT IS INTENDED THAT THE ℄ OF BRIDGE REACTIONS ALIGNS WITH ℄ OF EXTERIOR PILES. THE TRUSS SHOP DRAWINGS SHALL INCLUDE DIMENSIONS AND DETAILS NECESSARY TO INDICATE THE RELATIONSHIP BETWEEN ℄ OF PILES AND ℄ OF BRIDGE REACTIONS. DIMENSIONS SHALL NOT BE ADJUSTED WITHOUT APPROVAL BY THE ENGINEER.

ΔΔ THE CONTRACTOR SHALL COORDINATE REINFORCING STEEL PLACEMENT IN THE PILE CAP WITH THE DRILLED-IN-PLACE ANCHOR BOLT LOCATIONS DETAILED IN THE PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE SHOP DRAWINGS. A MINIMUM OF 2 INCHES OF CLEARANCE SHALL BE PROVIDED BETWEEN THE EDGE OF REINFORCING BARS AND THE EDGE OF SLOTTED OR STANDARD ANCHOR BOLT HOLES, AS DETAILED IN THE PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE SHOP DRAWINGS. LONGITUDINAL AND TRANSVERSE BARS MAY BE SHIFTED UP TO 2 INCHES TO ALLOW DRILLING AND INSTALLATION OF BRIDGE ANCHOR BOLTS. THE CONTRACTOR SHALL INDICATE THE INTENDED BOLT LOCATIONS IN THE FORMS FOR OBSERVATION BY THE ENGINEER PRIOR TO PLACEMENT OF ABUTMENT CONCRETE.

THE CONTRACTOR SHALL CONFIRM THAT THE DIMENSIONS OF THE REINFORCING BARS WILL PERMIT NECESSARY ADJUSTMENT OF BAR LOCATIONS PRIOR TO ORDERING MATERIAL. DRILLING THROUGH REINFORCING STEEL FOR ANCHOR BOLT INSTALLATION IS NOT PERMITTED. LONGITUDINAL BARS SHALL BE PLACED INSIDE TRANSVERSE HOOP BARS AS DETAILED. BAR SHIFTS EXCEEDING 2 INCHES ARE NOT PERMITTED WITHOUT APPROVAL BY THE ENGINEER.

SECTION A-A

(MASKWALL AND PAVING NOTCH NOT SHOWN)
(WEST WING SHOWN ALONG OUTSIDE FACE, EAST WING SIMILAR)

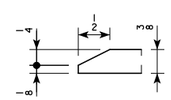


COVER PLATE DETAIL

(TYPICAL BOTH ABUTMENTS)

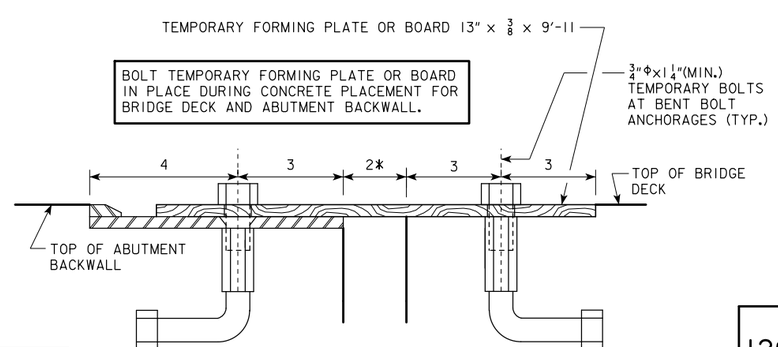
NOTES:
CONTRACTOR TO VERIFY EMBEDMENT OF BENT BOLTS AND CSK CAP SCREWS INTO 2" LONG HEX NUTS WILL ALLOW FULL EMBEDMENT OF CAP SCREW UPON INSTALLATION OF COVER PLATE.

THE MATERIAL USED FOR THE COVER PLATE ASSEMBLY IS TO BE ASTM A36 STEEL. THE BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A307. THE PLATES, BOLTS, NUTS AND CAP SCREWS ARE TO BE GALVANIZED IN ACCORDANCE WITH IOWA DOT MATERIALS I.M. 410.01.



DETAIL A

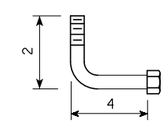
CONTRACTOR SHALL TAKE APPROPRIATE CARE TO ANCHOR PLATES IN CONCRETE TO ACHIEVE A FLUSH SURFACE BETWEEN THE COVER ℙ AND TOP OF BRIDGE DECK, AND ADJOINING TOP OF ABUTMENT BACKWALL.



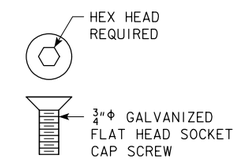
FORMING DETAIL

SHOWING TEMPORARY FORMING PLATE OR BOARD FOR BRIDGE JOINT COVER PLATE.

NOTE: TEMPORARY FORMING PLATE OR BOARD MAY BE RE-USED AT OTHER BRIDGE ABUTMENT AT CONTRACTOR'S OPTION.



BENT BOLT DETAIL



CAP SCREW DETAIL

NOTES:
SEE SHEETS V.4 AND V.6 FOR ADDITIONAL ABUTMENT DETAILS.

SEE SHEET V.4 FOR ABUTMENT REINFORCING BAR LIST.

ΔΔ SEE SHEET V.4 FOR TRUSS BEARING AND ANCHOR BOLT NOTES.

SEE SHEET V.6 FOR CONCRETE PLACEMENT QUANTITIES.

SEE SHEET V.6 FOR ABUTMENT PILE DRIVING NOTES.

DESIGN FOR 0° SKEW

120'-10 TRUSS SPAN 10'-0 TRAIL PRE-ENGINEERED STEEL TRUSS RECREATIONAL TRAIL BRIDGE

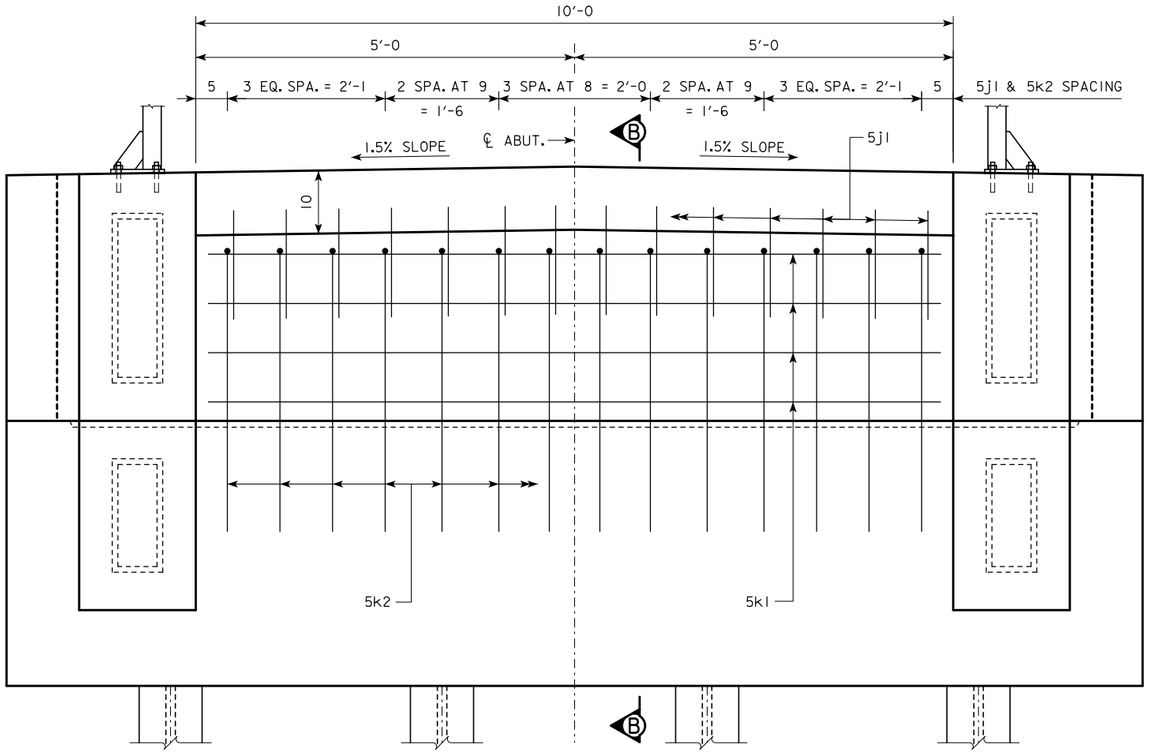
ABUTMENT DETAILS

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

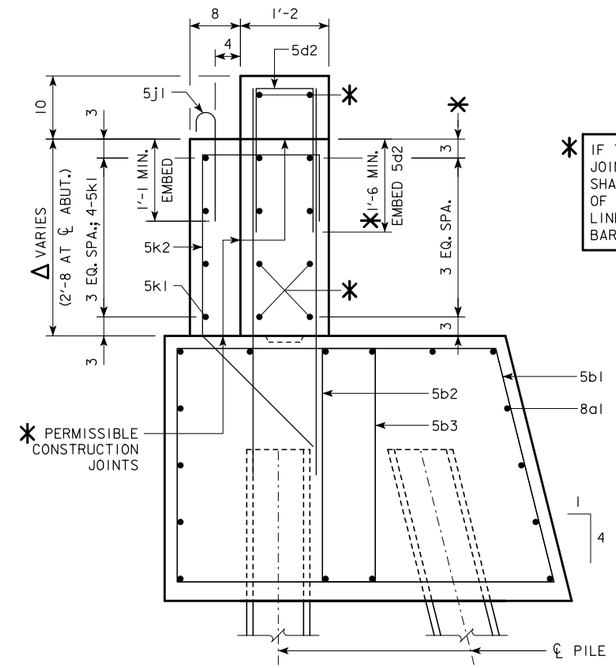
CITY OF WEST DES MOINES

SHUCK-BRITSON

DESIGN TEAM SMK/TJT/SR S.B.I. NO. 119.0863.01	CITY OF WEST DES MOINES - DALLAS COUNTY	PROJECT NUMBER 0510-034-2018	SHEET NUMBER V.5



REAR ELEVATION
(SHOWING PAVING NOTCH)



✱ IF THE PERMISSIBLE CONSTRUCTION JOINTS ARE USED, THE CONTRACTOR SHALL PROVIDE A ROUGHENED SURFACE OF $\frac{1}{4}$ INCH AMPLITUDE AT THE JOINT LINES. BACKWALL, MASKWALL, AND WING BARS SHALL BE SHIFTED AS DETAILED.

SECTION B-B

SOUTH ABUTMENT PILE DRIVING NOTES:

THE CONTRACT LENGTH OF 45 FEET FOR THE SOUTH ABUTMENT PILES IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 101 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A NON-COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.7 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING. DESIGN SCOUR (200-YEAR) WAS ASSUMED TO AFFECT THE UPPER 13 FEET OF EMBEDDED PILE LENGTH AND CAUSE 10 KIPS OF DRIVING RESISTANCE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR SOUTH ABUTMENT PILES IS 81 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

NORTH ABUTMENT PILE DRIVING NOTES:

THE CONTRACT LENGTH OF 45 FEET FOR THE NORTH ABUTMENT PILES IS BASED ON A MIXED SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 101 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.7 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A MIXED SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.7 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING. DESIGN SCOUR (200-YEAR) WAS ASSUMED TO AFFECT THE UPPER 13 FEET OF EMBEDDED PILE LENGTH AND CAUSE 13 KIPS OF DRIVING RESISTANCE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR NORTH ABUTMENT PILES IS 80 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

ABUTMENT PILES SHALL NOT BE DRIVEN PRIOR TO APPROACH TRAIL EMBANKMENT PLACEMENT. NORTH ABUTMENT PILES SHALL NOT BE DRIVEN FOR A MINIMUM OF 21 DAYS FOLLOWING COMPLETION OF APPROACH FILLS. THE TIME PERIOD BETWEEN COMPLETION OF FILLS AND DRIVING OF PILES MAY BE CHANGED AS ORDERED BY THE ENGINEER BASED UPON REVIEW OF SETTLEMENT PLATES. THE INSTALLATION AND MONITORING OF SETTLEMENT PLATES IS INCLUDED IN THE GENERAL NOTES.

NOTES:
SEE SHEETS V.4 AND V.5 FOR ADDITIONAL ABUTMENT DETAILS.

SEE SHEET V.4 FOR ABUTMENT REINFORCING BAR LIST.

Δ SEE SHEET V.4 FOR ELEVATION ADJUSTMENT NOTE.

CONCRETE PLACEMENT QUANTITIES
(ONE ABUTMENT)

LOCATION	QUANTITY
PILE CAP	9.6
BACKWALL, ABOVE PERMISSIBLE JOINT	0.5
BACKWALL, BELOW PERMISSIBLE JOINT	1.7
MASKWALLS (2 AT 0.2)	0.4
WINGWALLS (2 AT 2.0)	4.0
PAVING NOTCH	0.7
TOTAL (CU. YDS.)	16.9

ESTIMATED QUANTITIES-TWO ABUTMENTS

ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU. YDS.	33.8
REINFORCING STEEL - EPOXY COATED	LBS.	4848
HP10x57 STEEL BEARING PILING 4 AT 45 FT. (S. ABUT.) 4 AT 45 FT. (N. ABUT.)	LIN. FT.	360
EXCAVATION, CLASS 20	CU. YDS.	114

ESTIMATED BERM ARMORING QUANTITIES

ITEM	REVETMENT, CLASS E (TON)	ENGINEERING FABRIC (SY)	EXCAVATION, CLASS 10, CHANNEL (CY)
BERM LINING - SOUTH ABUTMENT	130	153	81
BERM LINING - NORTH ABUTMENT	130	152	81
TOTALS	260	305	162

REVETMENT ESTIMATED AT 1.6 TON/CY

SHUCK-BRITSON

DESIGN FOR 0° SKEW

120'-10 TRUSS SPAN 10'-0 TRAIL
PRE-ENGINEERED STEEL TRUSS
RECREATIONAL TRAIL BRIDGE

ABUTMENT DETAILS

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

CITY OF WEST DES MOINES

ORNAMENTAL APPROACH FENCE NOTES

THE ORNAMENTAL APPROACH FENCE SHALL BE SUPPLIED BY THE PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE MANUFACTURER. THE APPROACH FENCE SHALL MATCH THE MATERIAL, CONSTRUCTION AND DIMENSIONS OF THE BRIDGE RAILING.

THE ANCHOR BOLTS AND BASE PLATES SHALL BE SUPPLIED BY THE PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE MANUFACTURER. THE BASE PLATES SHALL MATCH THE MATERIALS AND CONSTRUCTION OF THE BRIDGE RAILING. THE ANCHOR BOLTS SHALL BE IN ACCORANCE WITH IOWA DOT MATERIALS I.M. 453.09.

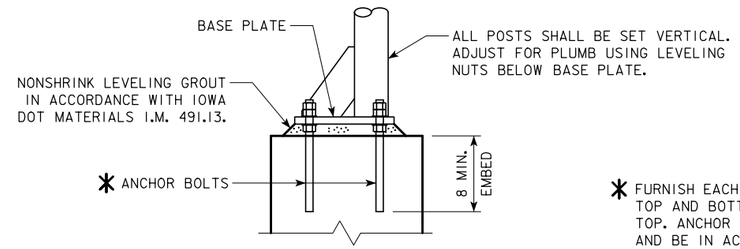
THE APPROACH FENCE AND ITS ANCHORAGES SHALL BE DESIGNED BY AN ENGINEER LICENSED IN THE STATE OF IOWA. THE DESIGN SHALL BE IN ACCORDANCE WITH THE REFERENCED DESIGN STANDARDS.

DESIGN CALCULATIONS AND SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION.

THE ORNAMENTAL APPROACH FENCE SHALL BE CONSIDERED INCIDENTAL TO THE PRICE BID FOR "PRE-ENGINEERED STEEL TRUSS TRAIL BRIDGE".

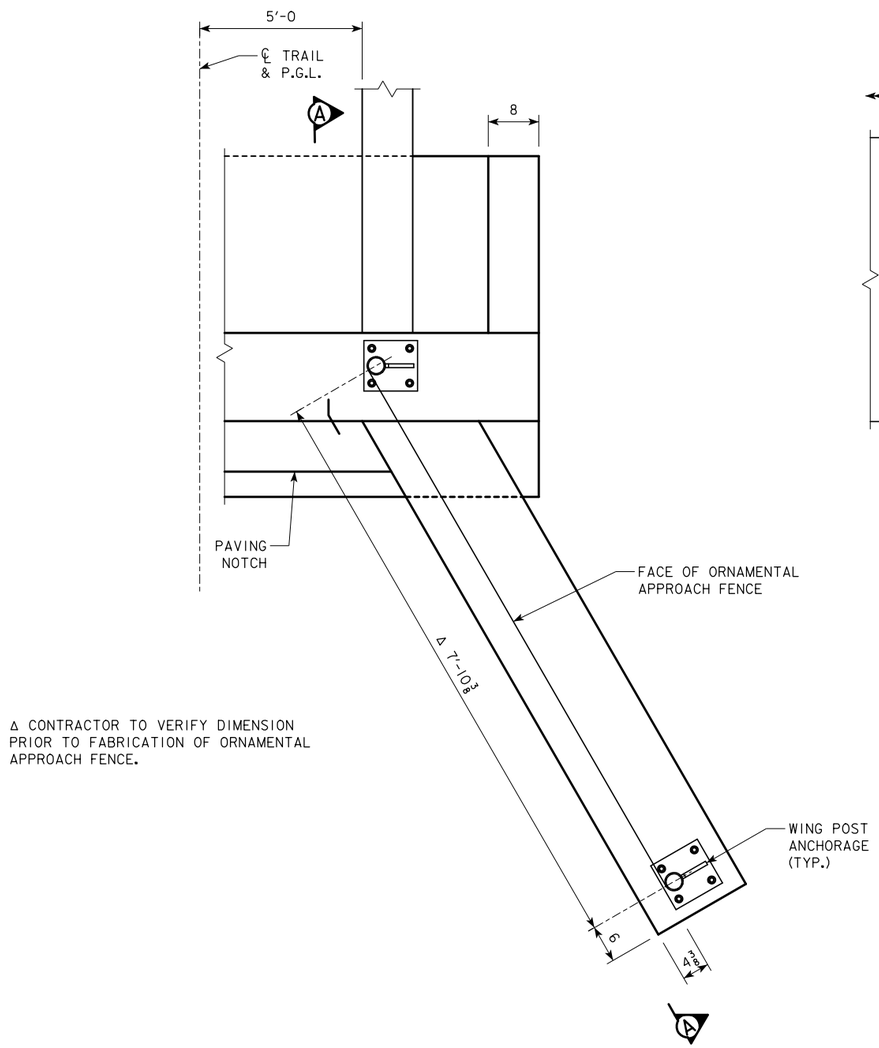
ESTIMATED FENCE QUANTITIES

ITEM	UNITS	AMOUNT
ORNAMENTAL APPROACH FENCE	LIN. FT.	31.5
(FOR INFORMATION ONLY)		



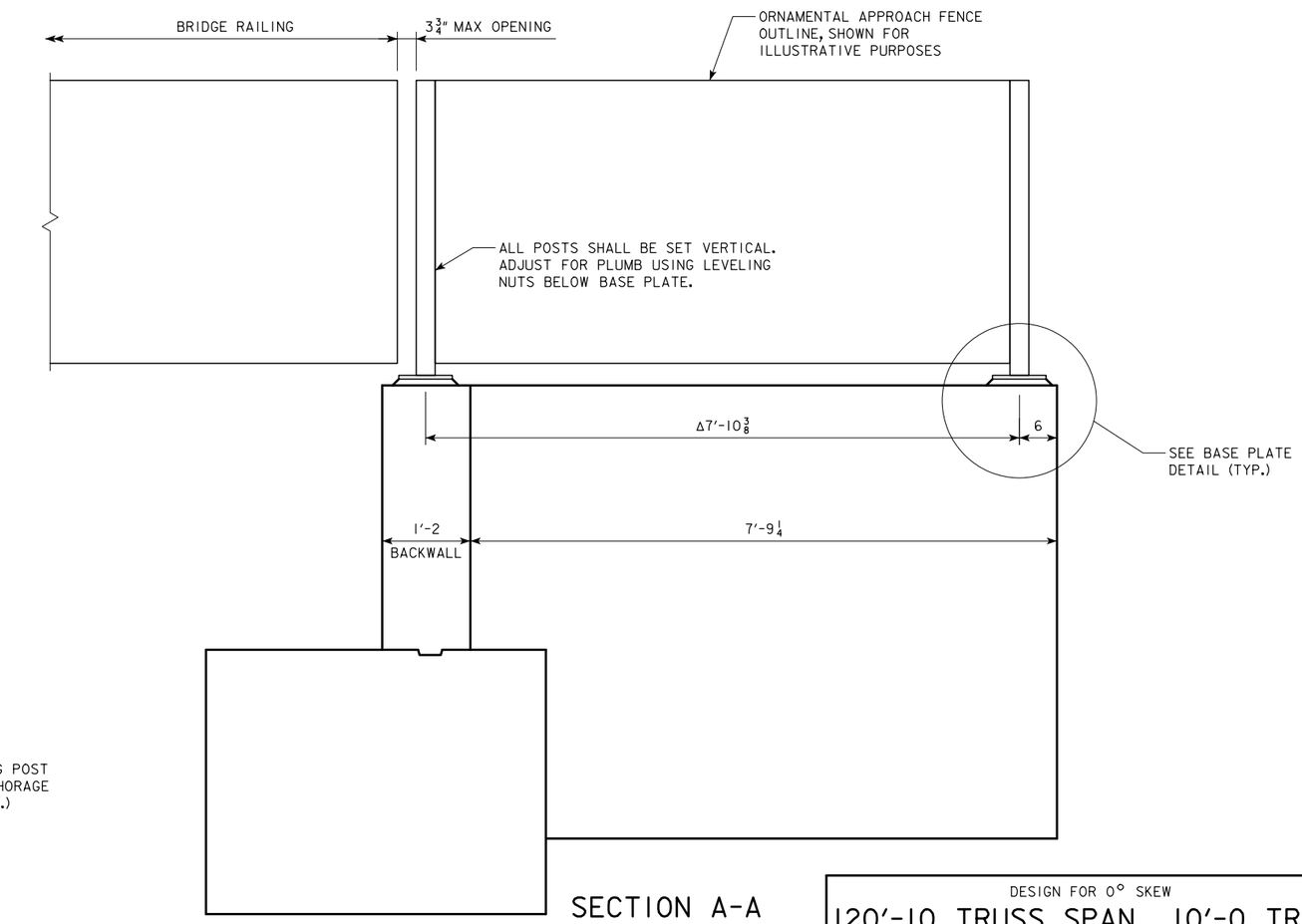
✱ FURNISH EACH ANCHOR BOLT WITH ONE NUT AND WASHER ON TOP AND BOTTOM OF THE BASE PLATE AND ONE JAM NUT ON TOP. ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED, AND BE IN ACCORDANCE WITH IOWA DOT MATERIALS I.M. 453.09.

BASE PLATE DETAIL



Δ CONTRACTOR TO VERIFY DIMENSION PRIOR TO FABRICATION OF ORNAMENTAL APPROACH FENCE.

FENCE LAYOUT
(TYPICAL 4 LOCATIONS)



SECTION A-A

CONTRACTOR NOTE:
THE CONTRACTOR SHALL TAKE APPROPRIATE CARE TO COORDINATE ANCHOR BOLT LOCATIONS WITH WING REINFORCING. CUTTING OF REINFORCING STEEL FOR INSTALLATION OF RAIL ANCHOR BOLTS WILL NOT BE PERMITTED.

DESIGN FOR 0° SKEW

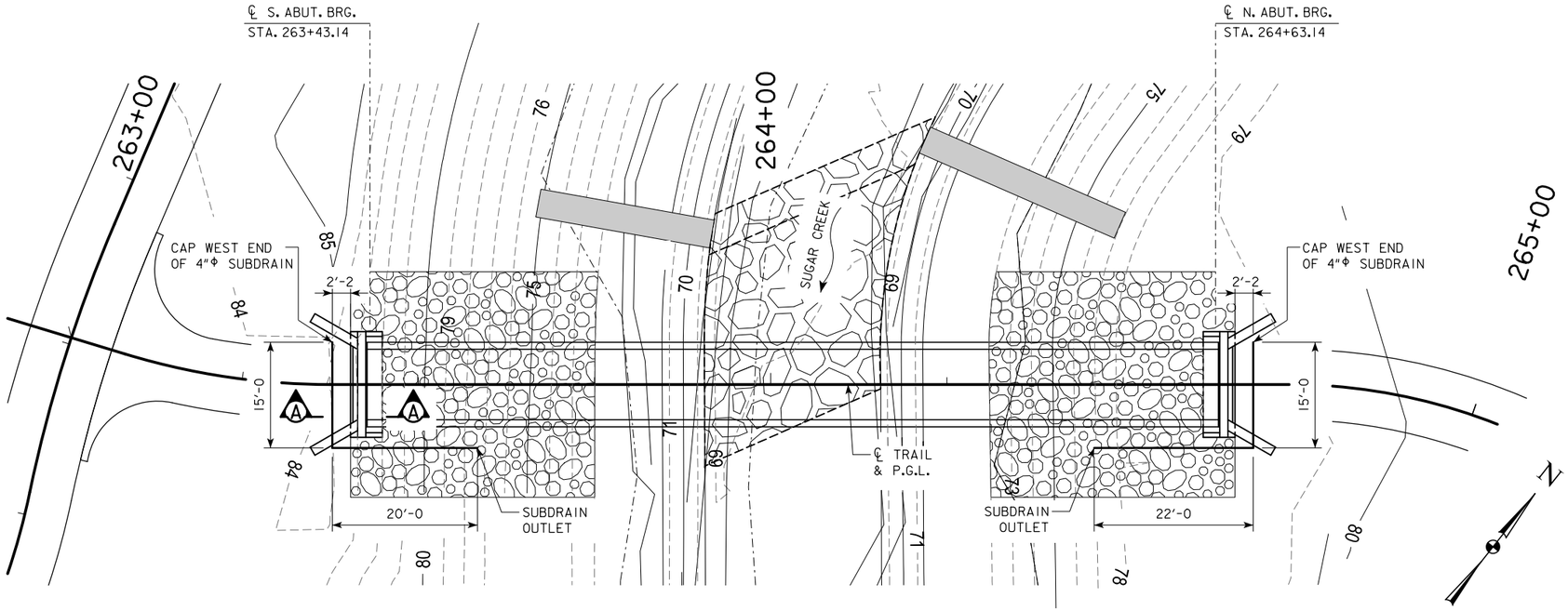
120'-10 TRUSS SPAN 10'-0 TRAIL
PRE-ENGINEERED STEEL TRUSS
RECREATIONAL TRAIL BRIDGE

FENCE DETAILS

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

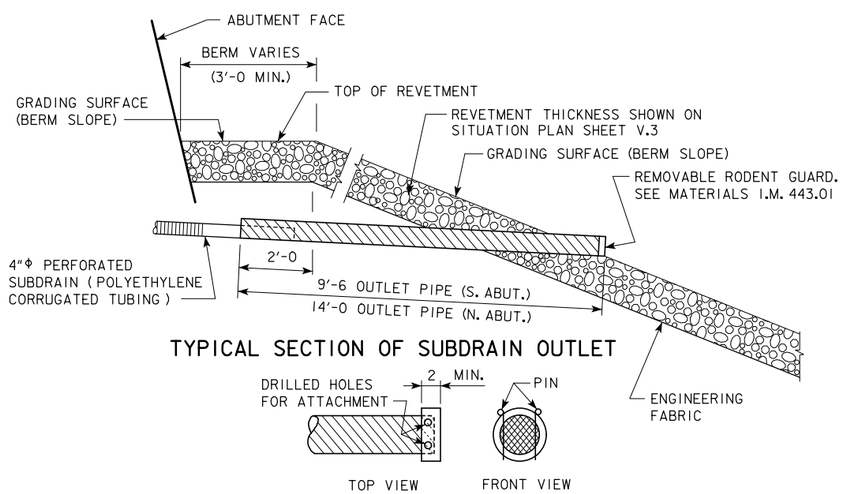
CITY OF WEST DES MOINES

SHUCK-BRITSON



SITUATION PLAN

SHOWING SUBDRAIN LOCATIONS



TYPICAL SECTION OF SUBDRAIN OUTLET

REMOVABLE RODENT GUARD DETAILS

REVETMENT STONE (EMBEDDED) OUTLET DETAILS

SUBDRAIN OUTLET ELEVATIONS	
LOCATION	ELEVATION
SOUTH ABUTMENT	77.88
NORTH ABUTMENT	77.40

NOTE:
SECTION A-A IS SHOWN ON SOUTH ABUTMENT BACKFILL DETAILS SHEET V.9.

SUBDRAIN NOTES:

THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

THE SUBDRAINS SHALL BE 4" IN DIAMETER AND SHALL BE IN ACCORDANCE WITH ARTICLE 4143.01, B, OF THE STANDARD SPECIFICATIONS.

THE SUBDRAIN OUTLET SHALL CONSIST OF A LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED ON THIS SHEET. THE LENGTH OF THE OUTLET PIPE SHALL BE DETERMINED BY THE REVETMENT AND ITS PLACEMENT LOCATION. THE CONTRACTOR IS TO INSURE THE OUTLET PIPE IS ADEQUATELY STRONG ENOUGH AND WILL NOT BE DAMAGED WHEN REVETMENT IS PLACED. A CHECK WILL BE MADE AT THE SUBDRAIN OUTLET TO INSURE THAT THE SUBDRAIN IS NOT DAMAGED AND IS DRAINING PROPERLY DURING THE BACKFILL PROCESS. IF A METAL OUTLET PIPE IS USED, IT SHALL BE 6 INCHES IN DIAMETER AND COUPLED TO THE 4 INCH DIAMETER SUBDRAIN IN ONE OF THE TWO FOLLOWING WAYS.

1. USE AN INSIDE FIT REDUCER COUPLER (COUPLER MUST BE INSERTED A MINIMUM OF 1'-0 INTO THE METAL OUTLET PIPE).
2. INSERT 1'-0 OF THE 4"Φ SUBDRAIN INTO THE 6"Φ METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.

THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF BRIDGE BERMS. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

SHUCK-BRITSON

DESIGN FOR 0° SKEW

120'-10 TRUSS SPAN 10'-0 TRAIL
PRE-ENGINEERED STEEL TRUSS
RECREATIONAL TRAIL BRIDGE

SUBDRAIN DETAILS

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

CITY OF WEST DES MOINES

ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALL, ABUTMENT PAVING NOTCH, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT WING WALL.

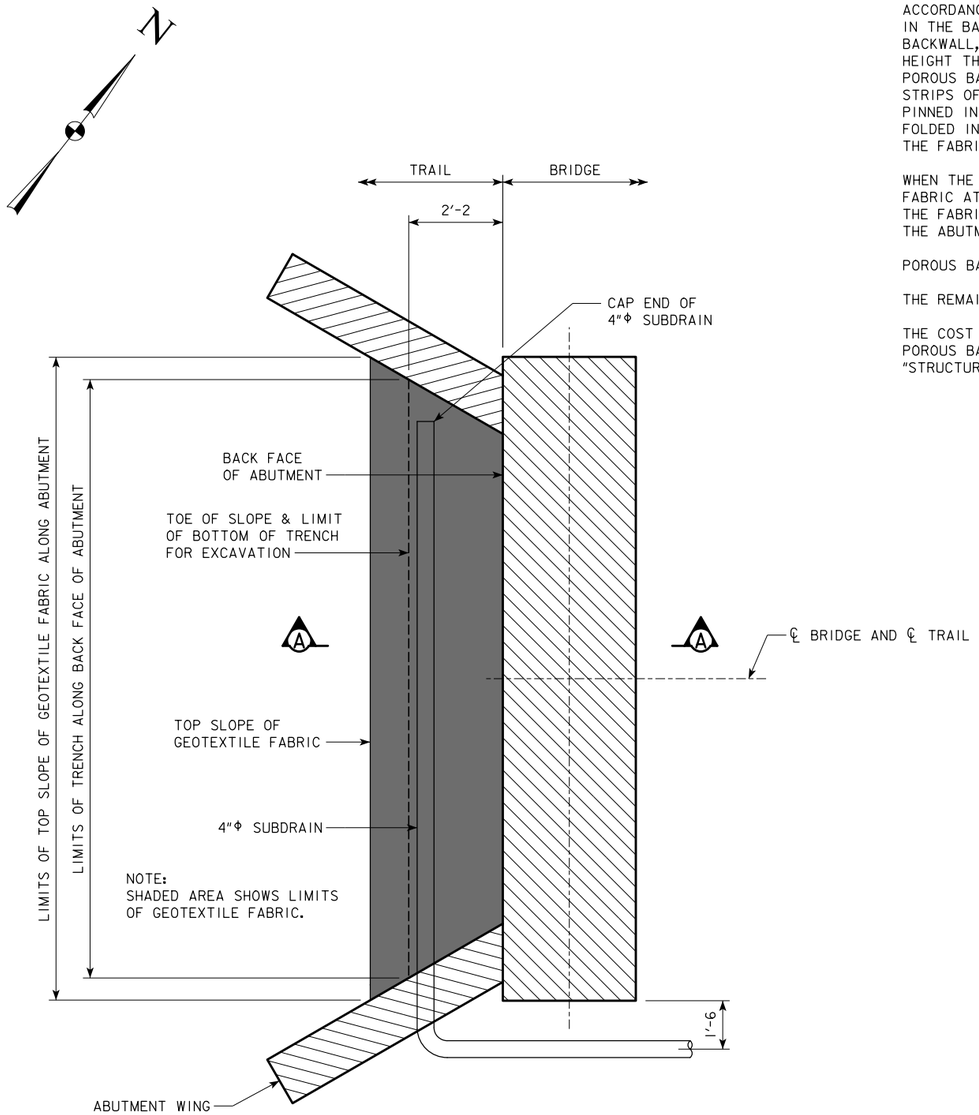
POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH COMPACTED GRANULAR BACKFILL.

THE COST OF FURNISHING AND PLACING SUBDRAIN, GEOTEXTILE FABRIC, GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS INCIDENTAL TO THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)" AND WILL NOT BE MEASURED FOR PAYMENT.

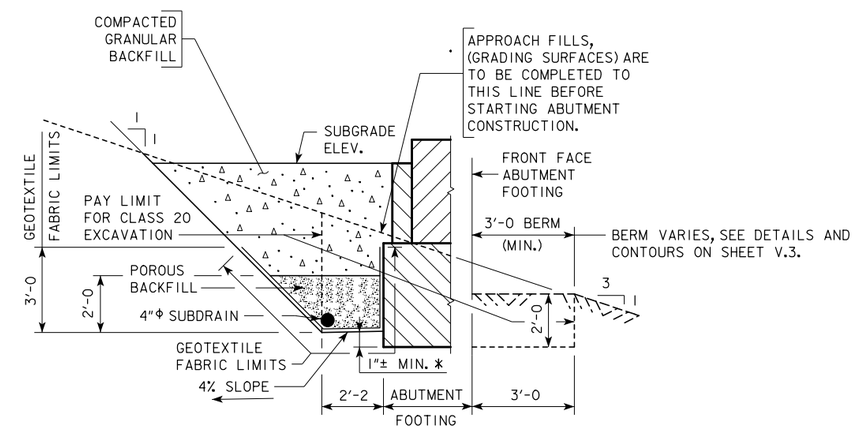
NOTES:
SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM WEST END OF 4"Φ SUBDRAIN.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



ABUTMENT PLAN

(SOUTH ABUT. SHOWN, NORTH ABUT. SIMILAR)



SECTION A-A

BACKFILL DETAILS

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

NOTE:
SEE SUBDRAIN DETAILS SHEET V.8 FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

SHUCK-BRITSON

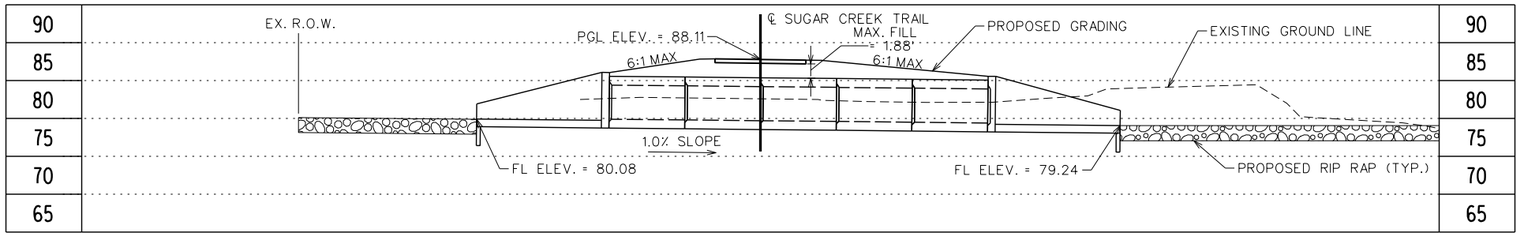
DESIGN FOR 0° SKEW

120'-10 TRUSS SPAN 10'-0 TRAIL
PRE-ENGINEERED STEEL TRUSS
RECREATIONAL TRAIL BRIDGE

ABUTMENT BACKFILL DETAILS

STA. 264+03.14 DALLAS COUNTY JUNE, 2020

CITY OF WEST DES MOINES



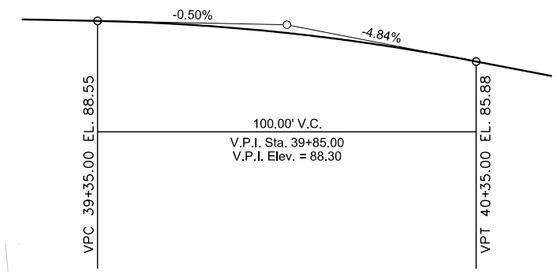
LONGITUDINAL SECTION ALONG ℄ TRAIL

BENCHMARK

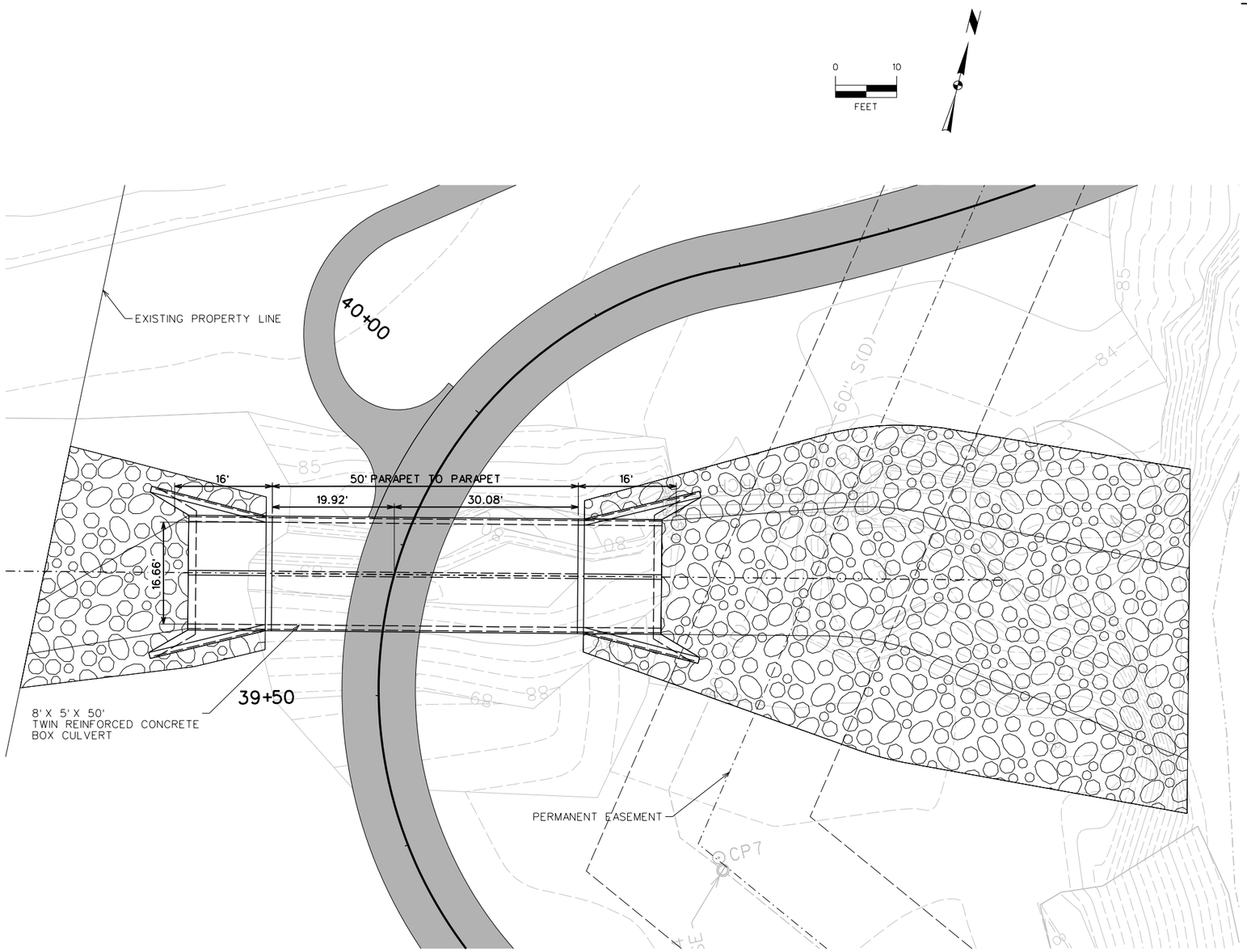
CITY OF WEST DES MOINES VERTICAL DATUM
IARTN DERIVED - US SURVEY FEET

CONVERSION FROM CITY OF WEST DES MOINES DATUM TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) IS (+)774.01

BM1 N=562593.00 E=1546901.00 Z=81.38
CITY BENCHMARK #85 - MONUMENT ON NORTH SIDE OF BOONEVILLE ROAD, EAST OF CREEK.



PROPOSED PROFILE GRADE



SITUATION PLAN

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED

TYPICAL TRAIL SECTION

UTILITIES CONTACTS

SEE SHEET A.2 FOR UTILITY CONTACT INFORMATION

LOCATION

SUGAR CREEK GREENWAY TRAIL PHASE 1 CULVERT
T-78N R-26W
SECTION 22
BOONE TOWNSHIP
DALLAS COUNTY
LATITUDE 41° 32' 49.09" N
LONGITUDE 93° 50' 36.71" W

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet V.10

SUGAR CREEK GREENWAY TRAIL PHASE 1

CULVERT SITUATION PLAN

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet V.10

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IOWA DOT
Highway Division

TWIN REINFORCED CONCRETE BOX CULVERT STANDARDS

GENERAL NOTES:

1. THE RCB CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF VARYING HEIGHTS.
2. VERTICAL EARTH PRESSURE, EV=0.120 kcf.
   HORIZONTAL EARTH PRESSURE, EHmax = 0.060 kcf MAX, EHmin = 0.030 kcf.
3. THE RCB CULVERT SECTIONS ARE DESIGN FOR CLASS I EXPOSURE CONDITIONS EXCEPT: CLASS 2 EXPOSURE CONDITION IS UTILIZED FOR THE SLAB DESIGN IN 0' FILL INSTANCES.
4. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.
5. THE CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR EDGE OR END OF REINFORCING BAR TO BE 2" UNLESS OTHERWISE NOTED.
6. EXCEPT FOR DOWEL BARS 5r1 IN SLAB, LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS.
7. FLOOR OF BARREL IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.
8. THE PERMISSIBLE CONSTRUCTION JOINT AT THE TOP OF THE WALLS MAY BE LOWERED AT THE CONTRACTOR'S OPTION WITH ENGINEER'S APPROVAL.
9. THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60 REINFORCEMENT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE DESIGN STRESSES ARE BASED ON GRADE 60 REINFORCEMENT.
10. THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

BAR SIZE NUMBER	4	5	6	7	8	9
MINIMUM SPLICE LENGTH	17"	21"	25"	31"	41"	51"

    THIS SPLICE, IF USED, WILL BE AT THE CONTRACTOR'S EXPENSE.
11. REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:
    EDGE CLEARANCES: 2" EXCEPT
      TOP OF FLOOR $2\frac{1}{4}$" TO NEAR TRANSVERSE REINFORCING BAR
      BOTTOM OF FLOOR $3\frac{1}{2}$" TO NEAR TRANSVERSE REINFORCING BAR
    END CLEARANCES:
      VERTICAL TOP 2"
      VERTICAL BOTTOM 3" OR $3\frac{1}{2}$" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
      TRANSVERSE 2"
12. ALL CONSTRUCTION JOINTS SHALL BE FORMED WITH A BEVELED KEYWAY EXCEPT AT BELL JOINTS.
13. ALL BEVELED KEYWAYS SHALL BE CENTERED.
14. KEYWAY SIZE SHALL BE 2x4 EXCEPT AS FOLLOWS:
    KEYWAY BETWEEN THE FLOOR AND WALL SHALL BE 2x6 WHEN THE WALL IS GREATER THAN 10 INCHES WIDE.
15. KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.
16. IF 0' OF FILL IS SPECIFIED, DETAILS FOR PAVING NOTCH AND REFERENCE TO EPOXY COATING OF SLAB REINFORCING STEEL, IF APPLICABLE, SHALL BE INCLUDED IN THE FINAL PLANS.
17. ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED OR SHOWN.
18. SEE CURRENT STANDARD SPECIFICATIONS REGARDING CONCRETE FORM REMOVAL.
19. THESE CULVERT STANDARDS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 IS $\frac{5}{8}$ INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	4	5	6	7	8	9
BAR DESIGNATION	13	16	19	22	25	29

20. IN THE EVENT THE SLAB THICKNESS AT THE BARREL END SECTION EXCEEDS 18 INCHES, THE CULVERT PARAPET SHALL EXTEND A MINIMUM OF 6 INCHES ABOVE THE TOP OF THE CULVERT SLAB. REFER TO THE CULVERT DESIGN MANUAL FOR INSTRUCTIONS. THESE DETAILS ARE TO BE INCLUDED IN THE DESIGN PLANS TO ADDRESS THESE SITUATIONS.

INDEX FOR TWIN CULVERT STANDARDS:

TWRCB G1-12 INDEX & GENERAL NOTES
TWRCB G2-12 TYPICAL CULVERT BARREL DETAILS
TWRCB 8-4-12 CULVERT BARREL DETAILS, 8 x 4 BARREL SECTIONS
TWRCB 8-5-12 CULVERT BARREL DETAILS, 8 x 5 BARREL SECTIONS
TWRCB 8-6-12 CULVERT BARREL DETAILS, 8 x 6 BARREL SECTIONS
TWRCB 8-7-12 CULVERT BARREL DETAILS, 8 x 7 BARREL SECTIONS
TWRCB 8-8-12 CULVERT BARREL DETAILS, 8 x 8 BARREL SECTIONS
TWRCB 8-9-12 CULVERT BARREL DETAILS, 8 x 9 BARREL SECTIONS
TWRCB 8-10-12 CULVERT BARREL DETAILS, 8 x 10 BARREL SECTIONS
TWRCB 10-4-12 CULVERT BARREL DETAILS, 10 x 4 BARREL SECTIONS
TWRCB 10-5-12 CULVERT BARREL DETAILS, 10 x 5 BARREL SECTIONS
TWRCB 10-6-12 CULVERT BARREL DETAILS, 10 x 6 BARREL SECTIONS
TWRCB 10-7-12 CULVERT BARREL DETAILS, 10 x 7 BARREL SECTIONS
TWRCB 10-8-12 CULVERT BARREL DETAILS, 10 x 8 BARREL SECTIONS
TWRCB 10-9-12 CULVERT BARREL DETAILS, 10 x 9 BARREL SECTIONS
TWRCB 10-10-12 CULVERT BARREL DETAILS, 10 x 10 BARREL SECTIONS
TWRCB 10-11-12 CULVERT BARREL DETAILS, 10 x 11 BARREL SECTIONS
TWRCB 10-12-12 CULVERT BARREL DETAILS, 10 x 12 BARREL SECTIONS
TWRCB 12-4-12 CULVERT BARREL DETAILS, 12 x 4 BARREL SECTIONS
TWRCB 12-5-12 CULVERT BARREL DETAILS, 12 x 5 BARREL SECTIONS
TWRCB 12-6-12 CULVERT BARREL DETAILS, 12 x 6 BARREL SECTIONS
TWRCB 12-7-12 CULVERT BARREL DETAILS, 12 x 7 BARREL SECTIONS
TWRCB 12-8-12 CULVERT BARREL DETAILS, 12 x 8 BARREL SECTIONS
TWRCB 12-9-12 CULVERT BARREL DETAILS, 12 x 9 BARREL SECTIONS
TWRCB 12-10-12 CULVERT BARREL DETAILS, 12 x 10 BARREL SECTIONS
TWRCB 12-11-12 CULVERT BARREL DETAILS, 12 x 11 BARREL SECTIONS
TWRCB 12-12-12 CULVERT BARREL DETAILS, 12 x 12 BARREL SECTIONS
TWH 0-1-12 FLARED WING HEADWALLS, 0° SKEW, DIMENSION PLAN & TABLE
TWH 0-2-12 FLARED WING HEADWALLS, 0° SKEW, APRON & CURTAIN WALL DETAILS
TWH 0-3-12 FLARED WING HEADWALLS, 0° SKEW, WINGWALL & PARAPET DETAILS
TWH 0-4-12 FLARED WING HEADWALLS, 0° SKEW, QUANTITIES TABLE
TWH 0-5-12 FLARED WING HEADWALLS, 0° SKEW, QUANTITIES TABLE
TWH 15-1-12 FLARED WING HEADWALLS, 15° SKEW, DIMENSION PLAN
TWH 15-2-12 FLARED WING HEADWALLS, 15° SKEW, DIMENSION TABLE
TWH 15-3-12 FLARED WING HEADWALLS, 15° SKEW, APRON DETAILS
TWH 15-4-12 FLARED WING HEADWALLS, 15° SKEW, PARAPET & CURTAIN WALL DETAILS
TWH 15-5-12 FLARED WING HEADWALLS, 15° SKEW, WINGWALL DETAILS
TWH 15-6-12 FLARED WING HEADWALLS, 15° SKEW, QUANTITIES TABLE
TWH 15-7-12 FLARED WING HEADWALLS, 15° SKEW, QUANTITIES TABLE
TWH 15-8-12 FLARED WING HEADWALLS, 15° SKEW, QUANTITIES TABLE
TWH 15-9-12 FLARED WING HEADWALLS, 15° SKEW, QUANTITIES TABLE
TWH 30-1-12 FLARED WING HEADWALLS, 30° SKEW, DIMENSION PLAN
TWH 30-2-12 FLARED WING HEADWALLS, 30° SKEW, DIMENSION TABLE
TWH 30-3-12 FLARED WING HEADWALLS, 30° SKEW, APRON DETAILS
TWH 30-4-12 FLARED WING HEADWALLS, 30° SKEW, PARAPET & CURTAIN WALL DETAILS
TWH 30-5-12 FLARED WING HEADWALLS, 30° SKEW, WINGWALL DETAILS
TWH 30-6-12 FLARED WING HEADWALLS, 30° SKEW, QUANTITIES TABLE
TWH 30-7-12 FLARED WING HEADWALLS, 30° SKEW, QUANTITIES TABLE
TWH 30-8-12 FLARED WING HEADWALLS, 30° SKEW, QUANTITIES TABLE
TWH 30-9-12 FLARED WING HEADWALLS, 30° SKEW, QUANTITIES TABLE
TWH 45-1-12 FLARED WING HEADWALLS, 45° SKEW, DIMENSION PLAN
TWH 45-2-12 FLARED WING HEADWALLS, 45° SKEW, DIMENSION TABLE
TWH 45-3-12 FLARED WING HEADWALLS, 45° SKEW, APRON DETAILS
TWH 45-4-12 FLARED WING HEADWALLS, 45° SKEW, APRON DETAILS
TWH 45-5-12 FLARED WING HEADWALLS, 45° SKEW, PARAPET & CURTAIN WALL DETAILS
TWH 45-6-12 FLARED WING HEADWALLS, 45° SKEW, WINGWALL DETAILS
TWH 45-7-12 FLARED WING HEADWALLS, 45° SKEW, QUANTITIES TABLE
TWH 45-8-12 FLARED WING HEADWALLS, 45° SKEW, QUANTITIES TABLE
TWH 45-9-12 FLARED WING HEADWALLS, 45° SKEW, QUANTITIES TABLE
TWH 45-10-12 FLARED WING HEADWALLS, 45° SKEW, QUANTITIES TABLE
TWCBJ 1-12 CULVERT BELL JOINTS, 8' SPANS
TWCBJ 2-12 CULVERT BELL JOINTS, 10' & 12' SPANS
TWCBJ 3-12 CULVERT BELL JOINTS, ALL SPANS

SPECIFICATIONS:

DESIGN:
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010.

CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT SERIES, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010:
REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI.

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet V.11

SUGAR CREEK GREENWAY TRAIL PHASE 1
WEST DES MOINES, IOWA
CULVERT DETAIL SHEET

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet V.11

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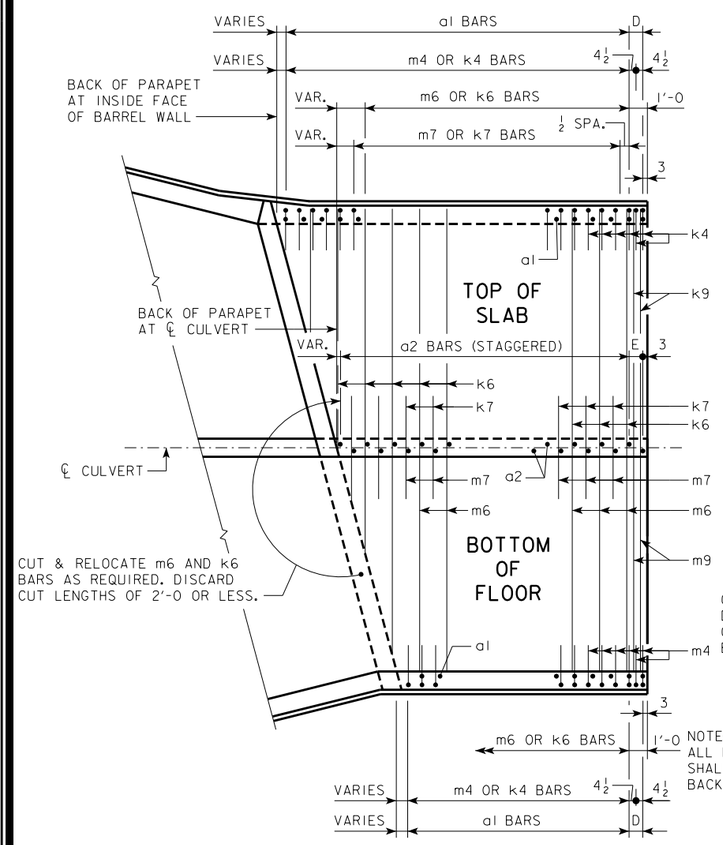
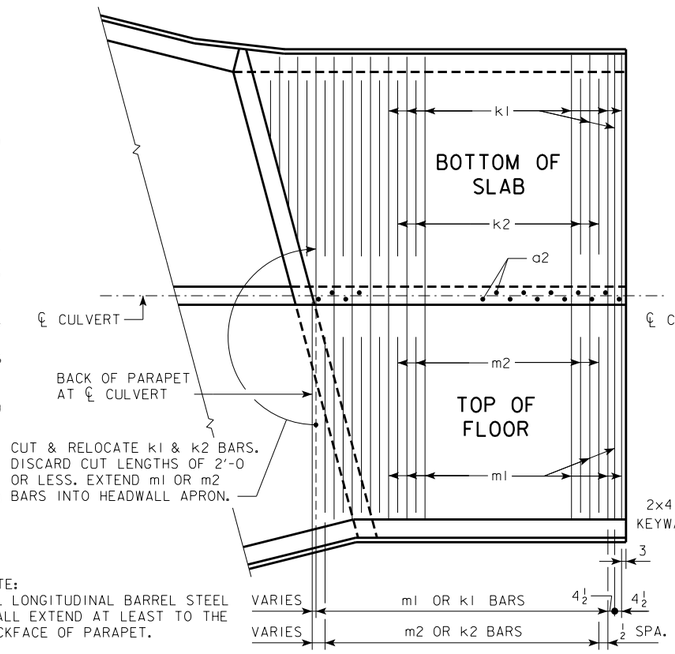


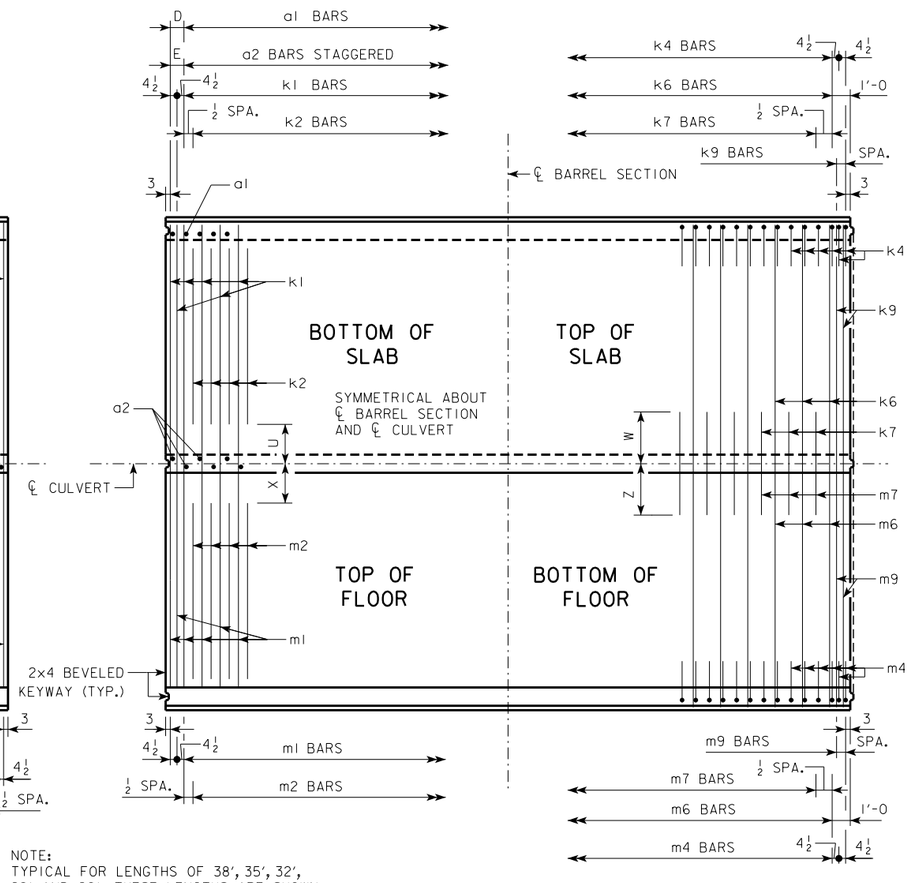
NOTE:
ALL LONGITUDINAL BARREL STEEL SHALL EXTEND AT LEAST TO THE BACKFACE OF PARAPET.



END SECTION PLAN VIEWS

(KEYWAYS NOT SHOWN)

NOTE:
END SECTION DETAILS SHOWN ARE FOR A 15° SKEW BARREL. USE FOR SKEWS OF 30° & 45° BY INCREASING THE NUMBER OF TRANSVERSE REINFORCING BARS REQUIRED TO BE CUT AND RELOCATED.

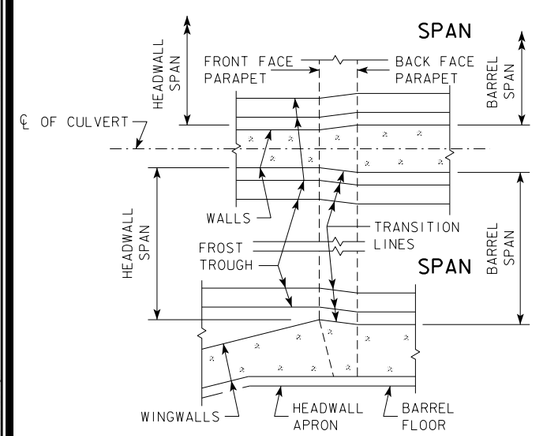


NOTE:
TYPICAL FOR LENGTHS OF 38', 35', 32', 29', AND 26'. THESE LENGTHS ARE SHOWN AS TYPICAL BECAUSE ALL TRANSVERSE AND VERTICAL REINFORCING STEEL SPACING REPEATS IN 3'-0 INTERVALS.

STANDARD SECTION PLAN VIEW

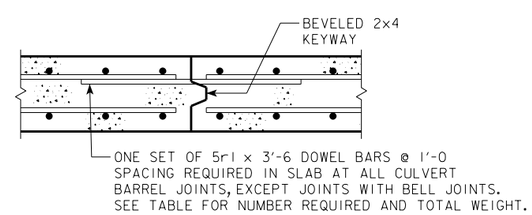
(KEYWAY IS TO BE OMITTED WHEN BELL JOINTS ARE USED)

NOTE:
DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH DIMENSIONS AND QUANTITIES FOR BARREL SECTION SHEETS.



TRANSITION WALL DETAILS

5r1 BARS - ONE CONST. JT.		
SPAN	NO.	WEIGHT (LB)
8'-0	18	66
10'-0	22	80
12'-0	26	95



TOP SLAB CONSTRUCTION JOINT DETAIL

TYPICAL CULVERT BARREL DETAILS

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet V.12

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CULVERT DETAIL SHEET

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863
Sheet V.12

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VARIABLE DIMENSIONS AND QUANTITIES FOR TWIN 8 x 5 BARREL SECTIONS

DIMENSIONS											
FILL	S	H	A	B	C	D	E	U	W	X	Z
0	8	5	13	10.5	9	9	9	0'-0	5'-3	1'-9	5'-3
1	8	5	11	10	9	9	9	0'-8	5'-3	2'-2	4'-8
2	8	5	8	10	9	9	9	1'-2	4'-10	2'-1	3'-11
3	8	5	8	10	9	9	9	1'-4	4'-2	2'-2	3'-6
4	8	5	8	10	9	9	9	1'-8	3'-8	2'-1	3'-3
5-7	8	5	8	10	9	9	9	1'-5	3'-3	2'-2	3'-2
8-10	8	5	8	10	9	9	9	1'-11	2'-11	2'-4	2'-11
11-13	8	5	8.5	10.5	9	9	9	1'-10	2'-11	1'-8	3'-3
14-16	8	5	9.5	11.5	9	9	9	1'-10	3'-0	1'-8	3'-0
17-19	8	5	10	12.5	9	9	9	1'-8	2'-11	1'-8	3'-3
20-22	8	5	12	13.5	9	9	9	1'-4	3'-0	1'-5	3'-1
23-25	8	5	13	15	9	9	9	1'-3	3'-1	1'-3	3'-2

	BAR LIST														
	a1			a2			b1			b2			e1		
FILL	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.
0	4	9	6'-10	6	9	6'-10	4	6	20	4	6	11	4	12	14
1	4	9	6'-8	6	9	6'-8	4	6	20	4	6	11	4	12	14
2	4	9	6'-5	6	9	6'-5	4	6	20	4	6	11	4	12	14
3	4	9	6'-5	6	9	6'-5	4	6	20	4	6	11	4	12	14
4	4	12	6'-5	6	9	6'-5	4	6	20	4	6	11	4	12	14
5-7	4	12	6'-5	6	9	6'-5	4	6	20	4	6	11	4	12	14
8-10	4	12	6'-5	6	9	6'-5	4	6	20	4	6	11	4	12	14
11-13	4	9	6'-6	6	9	6'-6	4	6	20	4	6	11	4	12	14
14-16	4	9	6'-8	6	9	6'-8	4	6	20	4	6	11	4	12	14
17-19	4	12	6'-9	6	9	6'-9	4	6	20	4	6	11	4	12	14
20-22	4	12	7'-0	6	9	7'-0	4	6	20	4	6	11	4	12	14
23-25	4	12	7'-3	6	9	7'-3	4	6	20	4	6	11	4	12	14

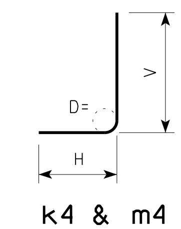
	BAR LIST														
	e2			f1			f2			k1			k2		
FILL	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	L	SIZE	SP.	L
0	4	18	14	4	12	18	4	18	14	4	9	17'-11	4	9	8'-11
1	4	18	14	4	12	18	4	18	14	6	18	17'-11	5	18	8'-3
2	4	18	14	4	12	18	4	18	14	5	12	17'-11	4	12	7'-0
3	4	18	14	4	12	18	4	18	14	6	18	17'-11	5	18	6'-10
4	4	18	14	4	12	18	4	18	14	6	18	17'-11	5	18	6'-0
5-7	4	18	14	4	12	18	4	18	14	5	18	17'-11	5	18	6'-10
8-10	4	18	14	4	12	18	4	18	14	6	18	17'-11	5	18	5'-10
11-13	4	18	14	4	12	18	4	18	14	5	12	17'-11	4	12	6'-1
14-16	4	18	14	4	12	18	4	18	14	5	12	17'-11	4	12	6'-4
17-19	4	18	14	4	12	18	4	18	14	4	9	17'-11	4	9	6'-8
20-22	4	18	14	4	12	18	4	18	14	4	9	17'-11	4	9	7'-7
23-25	4	18	14	4	12	18	4	18	14	6	18	17'-11	6	18	7'-8

	BAR LIST														
	k4					k6			k7			k9			
FILL	SIZE	SP.	L	H	V	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	L	
0	5	12	8'-8	5'-5	3'-3	4	12	17'-11	4	12	10'-6	4	4.5	17'-11	
1	5	12	8'-6	5'-5	3'-1	5	18	17'-11	5	18	10'-6	5	4.5	17'-11	
2	4	6	5'-8	2'-10	2'-10	5	18	17'-11	6	18	9'-8	6	4.5	17'-11	
3	4	6	5'-4	2'-6	2'-10	5	18	17'-11	6	18	8'-4	6	4.5	17'-11	
4	4	6	5'-4	2'-6	2'-10	5	18	17'-11	6	18	7'-4	6	4.5	17'-11	
5-7	4	6	5'-3	2'-5	2'-10	4	12	17'-11	5	12	6'-6	5	4.5	17'-11	
8-10	4	6	5'-2	2'-4	2'-10	5	12	17'-11	5	12	5'-10	5	4.5	17'-11	
11-13	4	6	5'-0	2'-2	2'-10	4	9	17'-11	5	9	5'-10	5	4.5	17'-11	
14-16	4	6	5'-1	2'-2	2'-11	5	12	17'-11	6	12	6'-0	6	4.5	17'-11	
17-19	6	12	5'-6	2'-2	3'-4	5	12	17'-11	6	12	5'-10	6	4.5	17'-11	
20-22	6	12	5'-7	2'-1	3'-6	5	12	17'-11	6	12	6'-0	6	4.5	17'-11	
23-25	4	6	5'-5	2'-2	3'-3	5	12	17'-11	6	12	6'-2	6	4.5	17'-11	

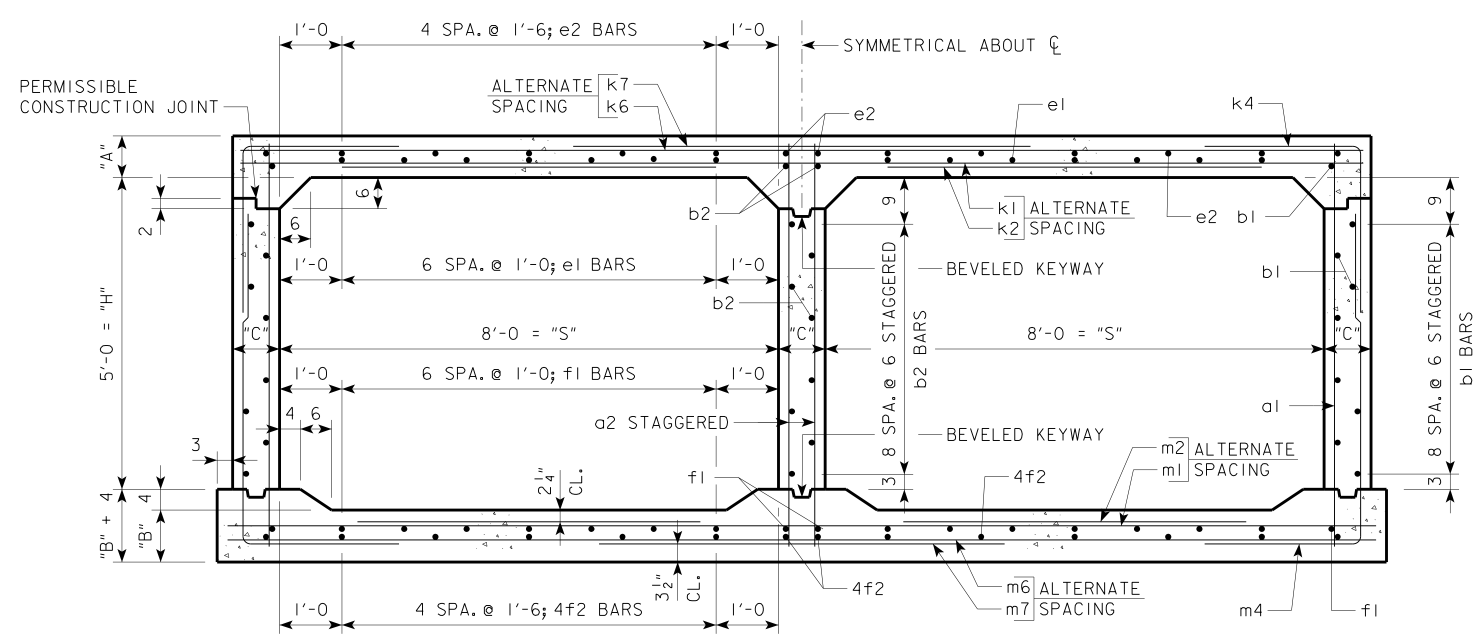
	BAR LIST																			QUANTITIES				
	m1			m2			m4					m6			m7			m9			CONCRETE (CY/FT)			STEEL
FILL	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	L	H	V	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	L	SLAB	FLOOR	WALLS	TOTAL	(LB/FT)
0	6	18	18'-5	5	18	6'-2	6	12	10'-10	5'-5	5'-5	5	18	18'-5	5	18	10'-6	5	4.5	18'-5	0.789	0.667	0.382	1.838	243.00
1	5	12	18'-5	4	12	5'-5	6	12	10'-6	5'-3	5'-3	4	18	18'-5	6	18	9'-4	6	4.5	18'-5	0.676	0.638	0.382	1.696	238.84
2	5	12	18'-5	4	12	5'-7	4	6	8'-2	2'-11	5'-3	5	18	18'-5	6	18	7'-10	6	4.5	18'-5	0.507	0.638	0.382	1.527	226.24
3	5	12	18'-5	4	12	5'-6	4	6	7'-9	2'-6	5'-3	5	18	18'-5	6	18	7'-0	6	4.5	18'-5	0.507	0.638	0.382	1.527	222.55
4	6	18	18'-5	5	18	5'-6	4	6	7'-8	2'-5	5'-3	4	18	18'-5	6	18	6'-6	6	4.5	18'-5	0.507	0.638	0.382	1.527	213.21
5-7	6	18	18'-5	5	18	5'-4	4	6	7'-8	2'-5	5'-3	5	18	18'-5	6	18	6'-4	6	4.5	18'-5	0.507	0.638	0.382	1.527	209.95
8-10	5	12	18'-5	4	12	5'-0	4	6	7'-7	2'-4	5'-3	5	12	18'-5	5	12	5'-10	5	4.5	18'-5	0.507	0.638	0.382	1.527	224.18
11-13	4	9	18'-5	4	9	6'-4	4	6	7'-7	2'-3	5'-4	5	18	18'-5	8	18	6'-6	8	4.5	18'-5	0.536	0.667	0.382	1.585	228.63
14-16	5	12	18'-5	5	12	6'-9	4	6	7'-7	2'-2	5'-5	5	12	18'-5	6	12	6'-0	6	4.5	18'-5	0.592	0.725	0.382	1.699	241.89
17-19	4	9	18'-5	4	9	7'-1	6	12	7'-7	2'-1	5'-6	5	18	18'-5	8	18	6'-6	8	4.5	18'-5	0.620	0.782	0.382	1.784	240.66
20-22	5	12	18'-5	5	12	7'-5	6	12	7'-8	2'-1	5'-7	5	12	18'-5	6	12	6'-2	6	4.5	18'-5	0.733	0.840	0.382	1.955	251.71
23-25	6	18	18'-5	6	18	7'-9	4	6	7'-10	2'-2	5'-8	5	12	18'-5	6	12	6'-4	6	4.5	18'-5	0.789	0.927	0.382	2.098	251.97

BENT BAR DETAIL

BARS	D
4	3
5	$3\frac{3}{4}$
6	$4\frac{1}{2}$



NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.



TWIN 8 x 5 BARREL SECTION

NOTES:

1. DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH SHEET TWRCB G2-12.
2. DIMENSIONS "A", "B", "C", "D", "E", AND "SP." LISTED IN THE BAR LIST ARE IN INCHES.

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet V.13

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CULVERT DETAIL SHEET

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
515-964-2020 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 1190863

Sheet V.13

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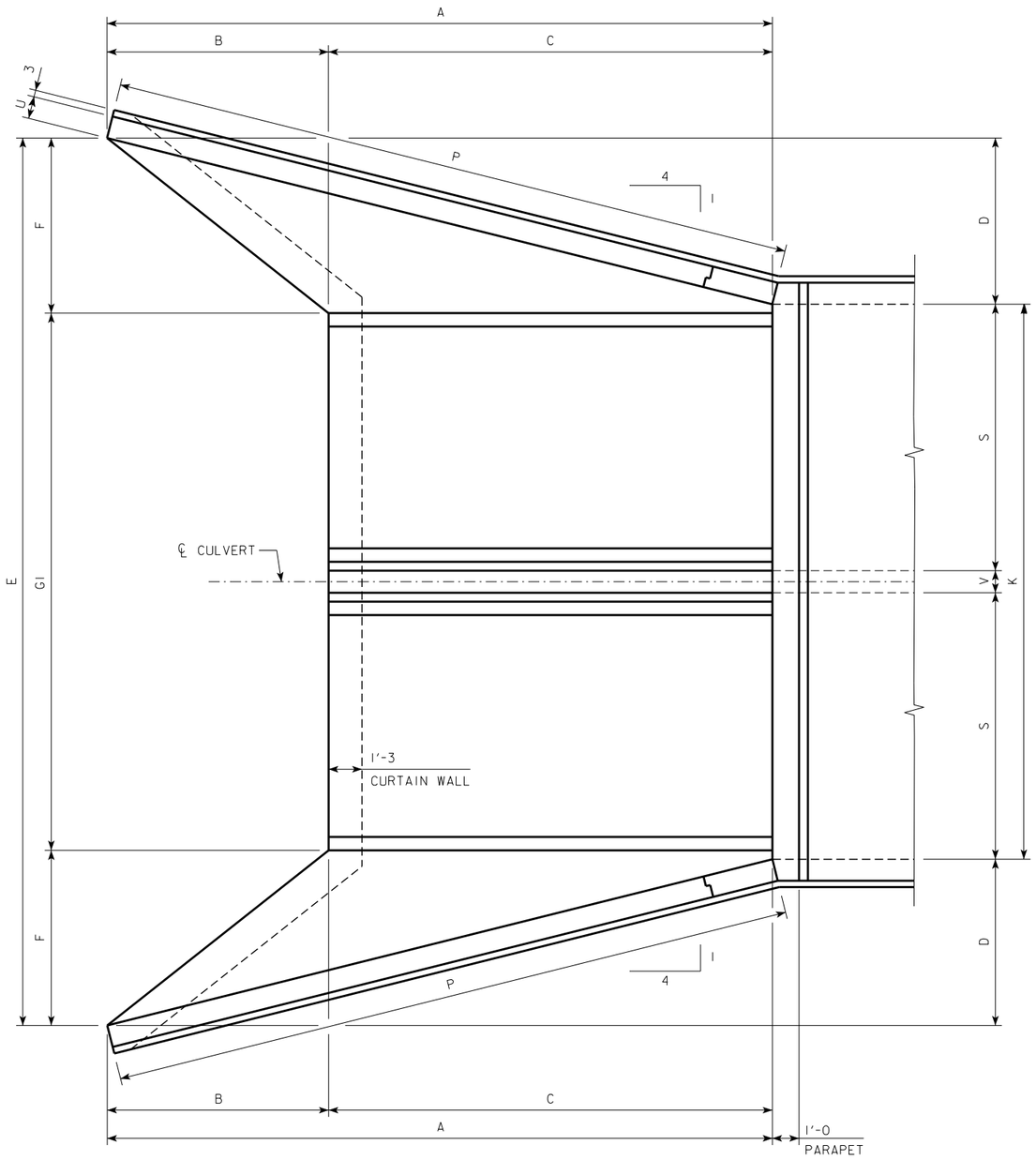

PLAN VIEW

DIMENSION TABLE

S X H	12' X 12'	12' X 11'	12' X 10'	12' X 9'	12' X 8'	12' X 7'	12' X 6'	12' X 5'	12' X 4'	10' X 12'	10' X 11'	10' X 10'	10' X 9'	S X H
A	37'-0	34'-0	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	37'-0	34'-0	31'-0	28'-0	A
B	12'-4	11'-4	10'-4	9'-4	8'-4	7'-4	6'-4	5'-4	4'-4	12'-4	11'-4	10'-4	9'-4	B
C	24'-8	22'-8	20'-8	18'-8	16'-8	14'-8	12'-8	10'-8	8'-8	24'-8	22'-8	20'-8	18'-8	C
D	9'-3	8'-6	7'-9	7'-0	6'-3	5'-6	4'-9	4'-0	3'-3	9'-3	8'-6	7'-9	7'-0	D
E	43'-6	41'-11	40'-4	38'-10	37'-4	35'-9	34'-3	32'-9	31'-3	39'-6	37'-11	36'-4	34'-10	E
F	9'-7	8'-10	8'-1	7'-4	6'-7	5'-10	5'-1	4'-4	3'-7	9'-7	8'-10	8'-1	7'-4	F
G1	24'-4	24'-3	24'-2	24'-2	24'-2	24'-1	24'-1	24'-1	24'-1	20'-4	20'-3	20'-2	20'-2	G1
G2	25'-6 3/4	25'-5 5/8	25'-4 5/8	25'-4 5/8	25'-4 1/2	25'-3 1/2	25'-3 3/8	25'-3 1/4	25'-3 1/8	21'-6 3/4	21'-5 5/8	21'-4 5/8	21'-4 5/8	G2
G3	15'-7 3/8	14'-4 3/8	13'-1 3/8	11'-10 3/8	10'-7 3/8	9'-4 1/2	8'-1 1/2	6'-10 1/2	5'-7 1/2	15'-7 3/8	14'-4 3/8	13'-1 3/8	11'-10 3/8	G3
G4	16'-5 7/8	15'-0 1/2	13'-7	12'-4	11'-1	9'-7 5/8	8'-4 3/4	7'-1 7/8	5'-11	16'-5 7/8	15'-0 1/2	13'-7	12'-4	G4
G5	0'-3 1/8	0'-5 3/8	0'-7 3/4	0'-7 5/8	0'-7 5/8	0'-9 7/8	0'-9 3/4	0'-9 3/4	0'-9 5/8	0'-3 1/8	0'-5 3/8	0'-7 3/4	0'-7 5/8	G5
K	25'-0	24'-11	24'-10	24'-10	24'-10	24'-9	24'-9	24'-9	24'-9	21'-0	20'-11	20'-10	20'-10	K
P	38'-1 5/8	35'-0 1/2	31'-11 1/2	28'-10 3/8	25'-9 1/4	22'-8 1/8	19'-7	16'-5 7/8	13'-4 3/4	38'-1 5/8	35'-0 1/2	31'-11 1/2	28'-10 3/8	P
R1	40'-1	36'-10	33'-7	30'-4	27'-1	23'-10	20'-7	17'-4	14'-1	40'-1	36'-10	33'-7	30'-4	R1
R2	27'-0 1/8	24'-9 1/4	22'-6 1/2	20'-3 3/4	18'-0 7/8	15'-10 1/8	13'-7 3/8	11'-4 3/4	9'-2	27'-0 1/8	24'-9 1/4	22'-6 1/2	20'-3 3/4	R2
T	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-1	1'-1	1'-1	1'-1	T
U	1'-0	0'-11	0'-10	0'-10	0'-10	0'-9	0'-9	0'-9	0'-9	1'-0	0'-11	0'-10	0'-10	U
V	1'-0	0'-11	0'-10	0'-10	0'-10	0'-9	0'-9	0'-9	0'-9	1'-0	0'-11	0'-10	0'-10	V
W	5'-0	4'-9	4'-6	4'-3	4'-0	3'-9	3'-6	3'-6	3'-6	5'-0	4'-9	4'-6	4'-3	W

S X H	10' X 8'	10' X 7'	10' X 6'	10' X 5'	10' X 4'	8' X 10'	8' X 9'	8' X 8'	8' X 7'	8' X 6'	8' X 5'	8' X 4'	S X H
A	25'-0	22'-0	19'-0	16'-0	13'-0	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	A
B	8'-4	7'-4	6'-4	5'-4	4'-4	10'-4	9'-4	8'-4	7'-4	6'-4	5'-4	4'-4	B
C	16'-8	14'-8	12'-8	10'-8	8'-8	20'-8	18'-8	16'-8	14'-8	12'-8	10'-8	8'-8	C
D	6'-3	5'-6	4'-9	4'-0	3'-3	7'-9	7'-0	6'-3	5'-6	4'-9	4'-0	3'-3	D
E	33'-4	31'-9	30'-3	28'-9	27'-3	32'-4	30'-10	29'-4	27'-9	26'-3	24'-9	23'-3	E
F	6'-7	5'-10	5'-1	4'-4	3'-7	8'-1	7'-4	6'-7	5'-10	5'-1	4'-4	3'-7	F
G1	20'-2	20'-1	20'-1	20'-1	20'-1	16'-2	16'-2	16'-2	16'-1	16'-1	16'-1	16'-1	G1
G2	21'-4 1/2	21'-3 1/2	21'-3 3/8	21'-3 1/4	21'-3 1/8	17'-4 5/8	17'-4 5/8	17'-4 1/2	17'-3 1/2	17'-3 3/8	17'-3 1/4	17'-3 1/8	G2
G3	10'-7 3/8	9'-4 1/2	8'-1 1/2	6'-10 1/2	5'-7 1/2	13'-1 3/8	11'-10 3/8	10'-7 3/8	9'-4 1/2	8'-1 1/2	6'-10 1/2	5'-7 1/2	G3
G4	11'-1	9'-7 5/8	8'-4 3/4	7'-1 7/8	5'-11	13'-7	12'-4	11'-1	9'-7 5/8	8'-4 3/4	7'-1 7/8	5'-11	G4
G5	0'-7 5/8	0'-9 7/8	0'-9 3/4	0'-9 3/4	0'-9 5/8	0'-7 3/4	0'-7 5/8	0'-7 5/8	0'-9 7/8	0'-9 3/4	0'-9 3/4	0'-9 5/8	G5
K	20'-10	20'-9	20'-9	20'-9	20'-9	16'-10	16'-10	16'-10	16'-9	16'-9	16'-9	16'-9	K
P	25'-9 1/4	22'-8 1/8	19'-7	16'-5 7/8	13'-4 3/4	31'-11 1/2	28'-10 3/8	25'-9 1/4	22'-8 1/8	19'-7	16'-5 7/8	13'-4 3/4	P
R1	27'-1	23'-10	20'-7	17'-4	14'-1	33'-7	30'-4	27'-1	23'-10	20'-7	17'-4	14'-1	R1
R2	18'-0 7/8	15'-10 1/8	13'-7 3/8	11'-4 3/4	9'-2	22'-6 1/2	20'-3 3/4	18'-0 7/8	15'-10 1/8	13'-7 3/8	11'-4 3/4	9'-2	R2
T	1'-1	1'-1	1'-1	1'-1	1'-1	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	T
U	0'-10	0'-9	0'-9	0'-9	0'-9	0'-10	0'-10	0'-10	0'-9	0'-9	0'-9	0'-9	U
V	0'-10	0'-9	0'-9	0'-9	0'-9	0'-10	0'-10	0'-10	0'-9	0'-9	0'-9	0'-9	V
W	4'-0	3'-9	3'-6	3'-6	3'-6	4'-6	4'-3	4'-0	3'-9	3'-6	3'-6	3'-6	W

NOTES:

1. SEE SHEET TWRCB G1-12 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.
2. SEE SHEETS TWH 0-2-12 & TWH 0-3-12 FOR LOCATION OF CERTAIN DIMENSIONS TABULATED

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet V.14

SUGAR CREEK GREENWAY TRAIL PHASE 1

CULVERT DETAIL SHEET

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
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Project No: 1190863
Sheet V.14

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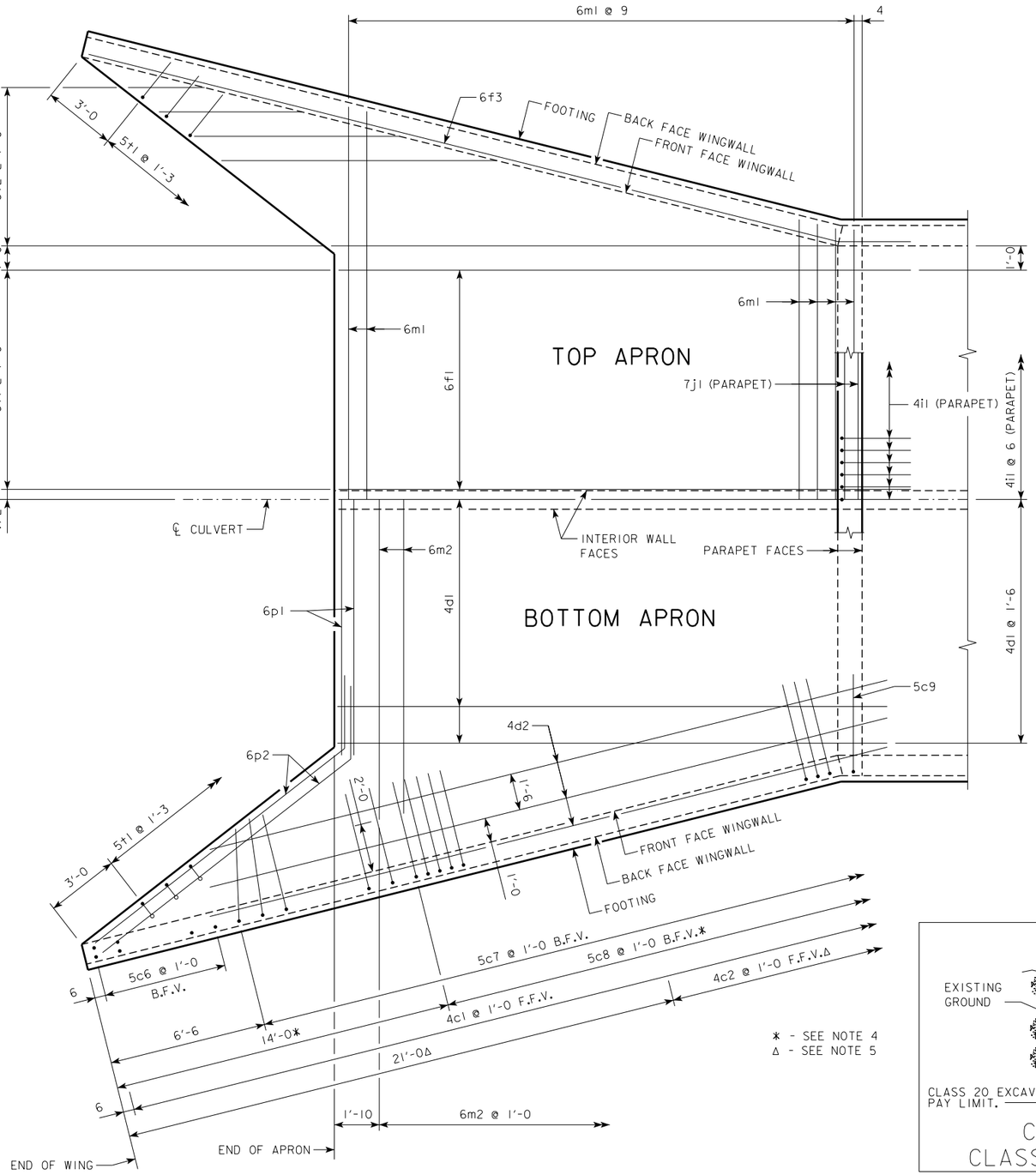
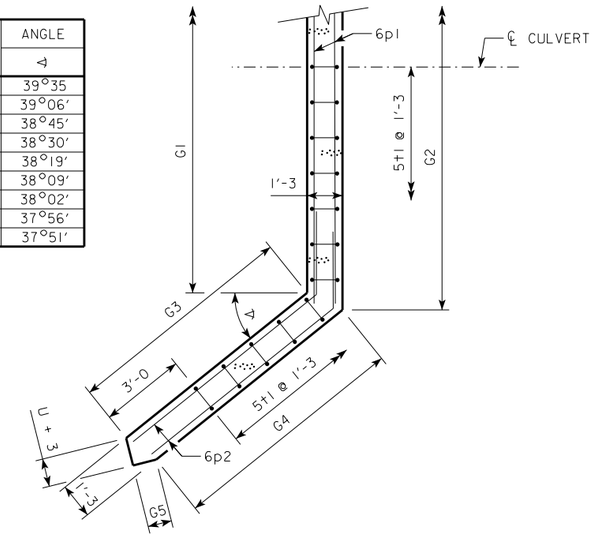


PLAN VIEW - TOP & BOTTOM OF APRON REINFORCING BARS

CULVERT HEIGHT (H)	ANGLE ∢
4'	39°35'
5'	39°06'
6'	38°45'
7'	38°30'
8'	38°19'
9'	38°09'
10'	38°02'
11'	37°56'
12'	37°51'



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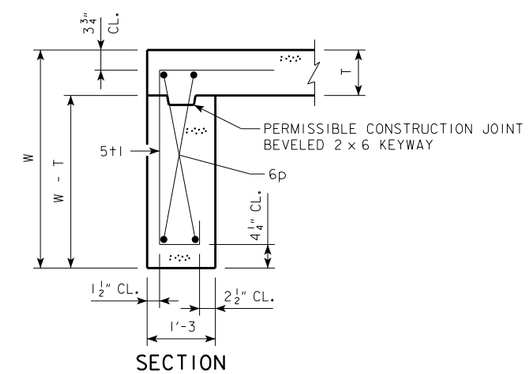
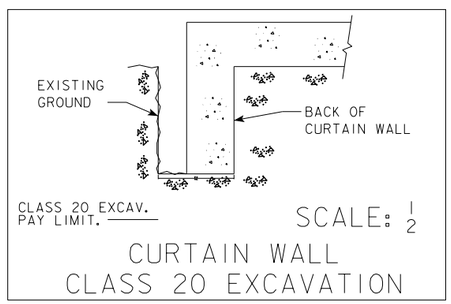


SECTION

CURTAIN WALL DETAILS



CURTAIN WALL
CLASS 20 EXCAVATION

NOTES:

1. BAR SPACINGS AND POSITIONS SHOWN ARE SIMILAR FOR ALL SIZES OF HEADWALLS IN THIS STANDARD.
2. WINGWALL BARS CONSISTENTLY REFERENCED FROM END OF WING FOR ALL HEADWALLS.
3. TOP TRANSVERSE FLOOR BARS ARE REFERENCED APPROXIMATELY 4" FROM THE BACK OF THE PARAPET FOR ALL HEADWALLS.
4. THERE ARE NO 5c8 BARS IN THE 4' & 5' HEIGHT HEADWALLS.
5. 4c2 BARS USED ONLY IN THE 9', 10', 11' & 12' HEIGHT HEADWALLS.
6. FOR DIMENSION TABLE SEE SHEET TWH 0-1-12.
7. FOR REINFORCING IN CURTAIN WALL SEE CURTAIN WALL DETAILS THIS SHEET.

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22

Project No: 1190863 | Sheet V.15

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CULVERT DETAIL SHEET

SNYDER & ASSOCIATES, INC.
2727 S.W. SNYDER BLVD.
ANKENY, IOWA 50023
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Project No: 1190863
Sheet V.15

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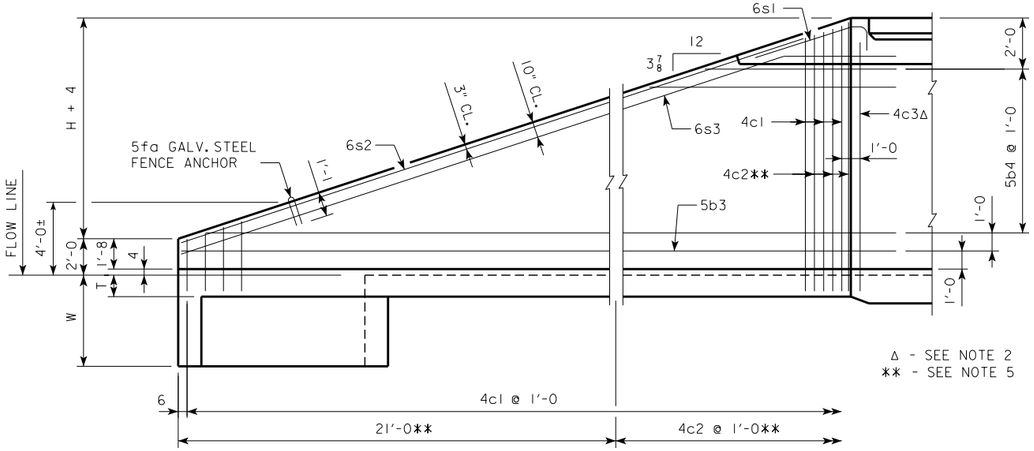
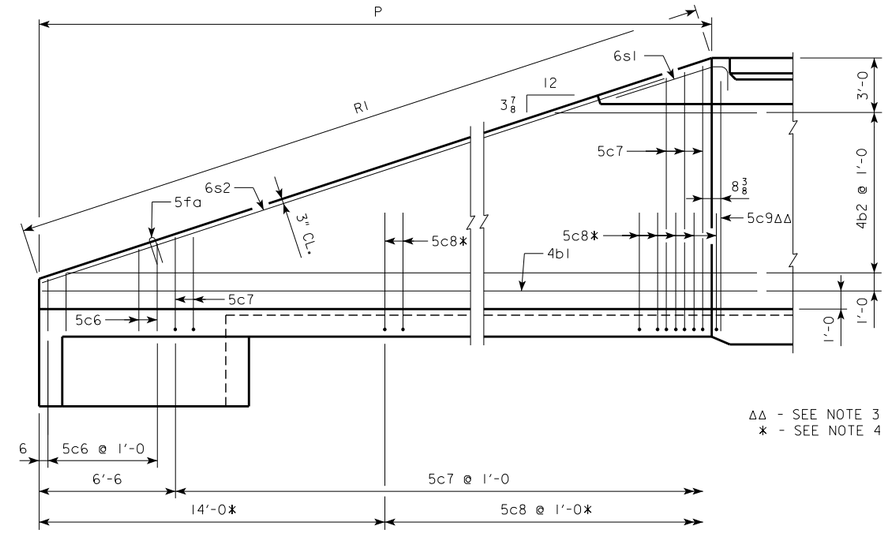
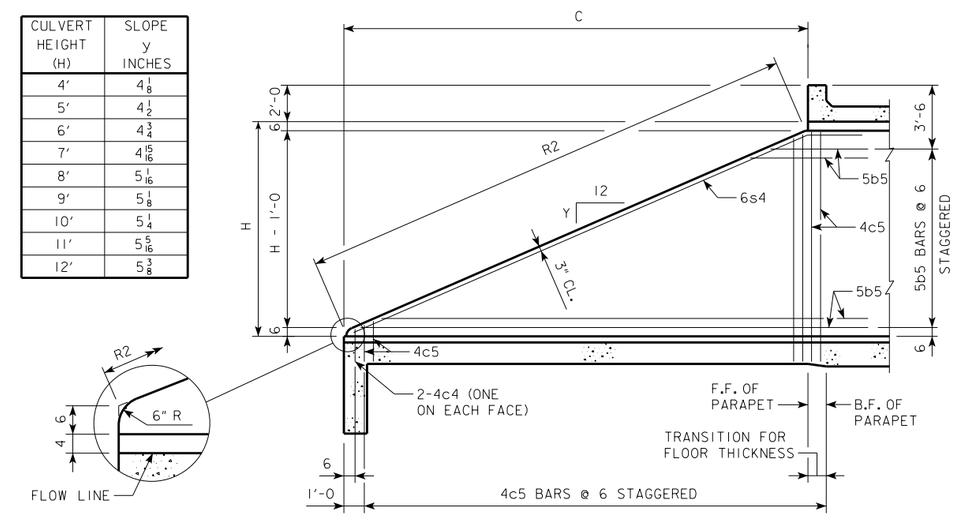


TYPICAL VIEW - FRONT FACE REINFORCING

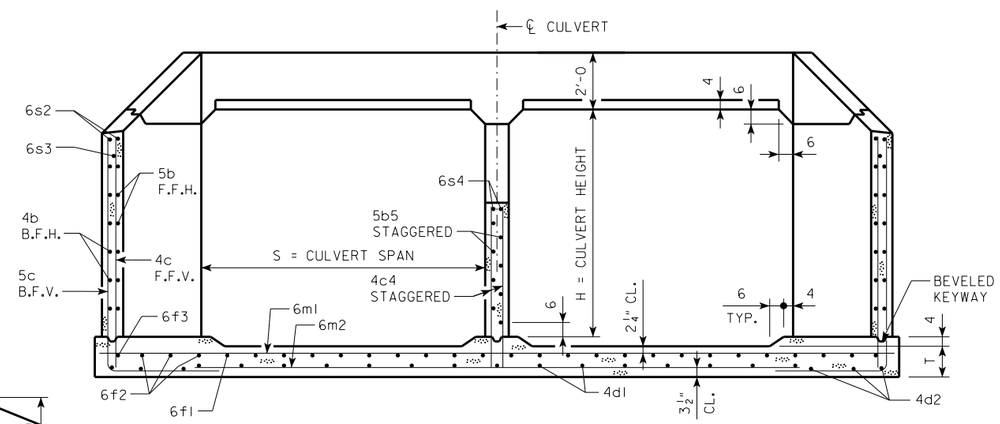


TYPICAL VIEW - BACK FACE REINFORCING

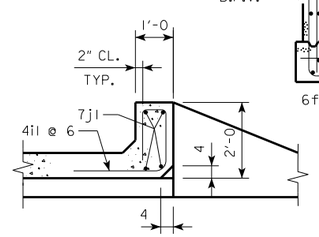
CULVERT HEIGHT (H)	SLOPE y INCHES
4'	4 1/8
5'	4 1/2
6'	4 3/4
7'	4 15/16
8'	5 1/16
9'	5 1/8
10'	5 1/4
11'	5 5/16
12'	5 3/8



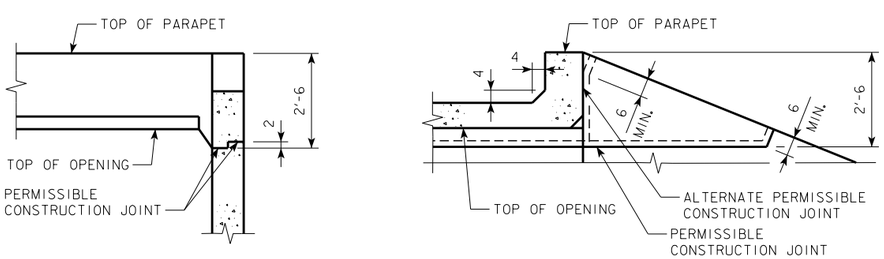
TYPICAL VIEW - INTERIOR WALL



TYPICAL SECTION - NEAR CENTER OF APRON



SECTION THRU PARAPET



TOP OF WINGWALL DETAILS

NOTES:

1. BAR SPACING AND POSITIONS SHOWN ARE SIMILAR FOR ALL SIZES OF HEADWALL IN THIS STANDARD.
2. TWO 4c3 BARS FOR 4', 5', 11' & 12' HEIGHT HEADWALLS. ONE 4c3 BAR FOR 6' THRU 10' HEIGHT HEADWALLS.
3. TWO 5c9 BARS FOR 4', 5', 11' & 12' HEIGHT HEADWALLS. ONE 5c9 BAR FOR 6' THRU 10' HEIGHT HEADWALLS.
4. NOT APPLICABLE FOR 4' & 5' HEIGHT HEADWALLS.
5. NOT APPLICABLE FOR 4' THRU 8' HEIGHT HEADWALLS.
6. FOR DIMENSION TABLE SEE SHEET TWH 0-1-12.

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: AS SHOWN
Technician: MLB | Date: 06/26/20 | T-R-S: 78N-26W-22
Project No: 1190863 | Sheet V.16

SUGAR CREEK GREENWAY TRAIL PHASE 1

CULVERT DETAIL SHEET

WEST DES MOINES, IOWA

SNYDER & ASSOCIATES, INC.
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Project No: 1190863
Sheet V.16

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BILL OF REINFORCING FOR ONE HEADWALL 0° SKEW CULVERT SPAN × CULVERT HEIGHT

BAR	LOCATION	10'×9' NO.	10'×9' LENGTH	10'×9' WT.	10'×8' NO.	10'×8' LENGTH	10'×8' WT.	10'×7' NO.	10'×7' LENGTH	10'×7' WT.
5fa	FENCE ANCHOR (GALV.)	2	2'-10	6	2	2'-10	6	2	2'-10	6
4b1	WINGWALL, B.F.H.	2	31'-7	42	2	28'-6	38	2	25'-5	34
4b2	WINGWALL, B.F.H.	14 VAR.	2 EACH 11'-7 TO 30'-2	195	12 VAR.	2 EACH 11'-7 TO 27'-1	155	10 VAR.	2 EACH 11'-7 TO 24'-0	119
5b3	WINGWALL, F.F.H.	2	31'-8	66	2	28'-7	60	2	25'-5	53
5b4	WINGWALL, F.F.H.	16 VAR.	2 EACH 8'-7 TO 30'-3	324	14 VAR.	2 EACH 8'-7 TO 27'-2	261	12 VAR.	2 EACH 8'-7 TO 24'-0	204
5b5	INTERIOR WALL, BOTH F.H.	15 VAR.	4'-11 TO 21'-3	205	13 VAR.	5'-0 TO 19'-3	164	11 VAR.	5'-1 TO 17'-3	128
4c1	WINGWALL, F.F.V.	58 VAR.	2 EACH 2'-9 TO 11'-10	283	52 VAR.	2 EACH 2'-9 TO 10'-10	236	46 VAR.	2 EACH 2'-9 TO 9'-11	195
4c2	WINGWALL, F.F.V.	18 VAR.	2 EACH 9'-5 TO 12'-0	129	---	---	---	---	---	---
4c3	WINGWALL, F.F.V.	2	10'-8	14	2	9'-8	13	2	8'-8	12
4c4	INTERIOR WALL, BOTH F.V.	2	1'-8	2	2	1'-8	2	2	1'-8	2
4c5	INTERIOR WALL, BOTH F.V.	38 VAR.	1'-10 TO 9'-10	148	34 VAR.	1'-10 TO 8'-10	121	30 VAR.	1'-10 TO 7'-9	96
5c6	WINGWALL, B.F.V.	12 VAR.	2 EACH 2'-9 TO 4'-5	45	12 VAR.	2 EACH 2'-9 TO 4'-5	45	12 VAR.	2 EACH 2'-9 TO 4'-5	45
5c7	WINGWALL, B.F.V.	46 VAR.	2 EACH 8'-9 TO 15'-10	590	40 VAR.	2 EACH 8'-9 TO 14'-10	492	34 VAR.	2 EACH 8'-9 TO 13'-11	402
5c8	WINGWALL, B.F.V.	32	10'-6	350	26	10'-6	285	20	10'-6	219
5c9	WINGWALL, B.F.V.	2	14'-8	31	2	13'-8	29	2	12'-8	26
4d1	APRON, LONGIT., BOTT.	13	21'-6	187	13	19'-6	169	13	17'-6	152
4d2	APRON, LONGIT., BOTT.	6	26'-7	107	6	23'-6	94	6	20'-6	82
6f1	APRON, LONGIT., TOP	20	21'-6	646	20	19'-6	586	20	17'-6	526
6f2	APRON, LONGIT., TOP	12 VAR.	2 EACH 5'-3 TO 18'-10	217	10 VAR.	2 EACH 5'-11 TO 16'-10	171	10 VAR.	2 EACH 3'-11 TO 14'-10	141
6f3	APRON, LONGIT., TOP	2	31'-8	95	2	28'-7	86	2	25'-5	76
4i1	PARAPET, VERTICAL	41	6'-1	167	41	6'-1	167	41	6'-1	167
7ji	PARAPET, HORIZONTAL	4	22'-2	181	4	22'-2	181	4	21'-11	179
6m1	APRON, TRANS., TOP	26 VAR.	22'-4 TO 31'-9	1056	23 VAR.	22'-4 TO 30'-7	914	21 VAR.	22'-1 TO 29'-7	815
6m2	APRON, TRANS., BOTT.	18 VAR.	16'-7 TO 25'-1	563	16 VAR.	16'-7 TO 24'-1	489	14 VAR.	16'-6 TO 23'-0	415
6p1	CURTAIN, HORIZONTAL	4	21'-1	127	4	21'-1	127	4	21'-0	126
6p2	CURTAIN, HORIZONTAL	8	14'-10	178	8	13'-7	163	8	12'-4	148
6s1	WING SLOPE, BOTH F.	4	7'-8	46	4	7'-8	46	4	7'-8	46
6s2	WING SLOPE, BOTH F.	4	27'-9	167	4	24'-6	147	4	21'-3	128
6s3	WING SLOPE, F.F.	2	33'-0	99	2	29'-9	89	2	26'-6	80
6s4	INTERIOR WALL, BOTH F.	2	23'-1	69	2	20'-11	63	2	18'-8	56
5t1	CURTAIN, VERTICAL	33	7'-3	250	31	7'-0	226	29	6'-9	204
ESTIMATED QUANTITIES ONE HEADWALL	REINF. STEEL	6585 LB			5625 LB			4882 LB		
	CONCRETE PARAPET △	2.3	50.6 CY		2.3	42.8 CY		2.2	34.7 CY	
	CONCRETE WINGWALLS	14.0			11.4			8.1		
	CONCRETE FOOTING *	34.3			29.1			24.4		

BAR	10'×6' NO.	10'×6' LENGTH	10'×6' WT.	10'×5' NO.	10'×5' LENGTH	10'×5' WT.	10'×4' NO.	10'×4' LENGTH	10'×4' WT.
5fa	2	2'-10	6	2	2'-10	6	2	2'-10	6
4b1	2	22'-4	30	2	19'-3	26	2	16'-2	22
4b2	8 VAR.	2 EACH 11'-7 TO 20'-11	87	6 VAR.	2 EACH 11'-7 TO 17'-10	59	4 VAR.	2 EACH 11'-7 TO 14'-9	35
5b3	2	22'-4	47	2	19'-3	40	2	16'-2	34
5b4	10 VAR.	2 EACH 8'-7 TO 20'-11	154	8 VAR.	2 EACH 8'-7 TO 17'-10	110	6 VAR.	2 EACH 8'-7 TO 14'-9	73
5b5	9 VAR.	5'-1 TO 15'-3	95	7 VAR.	5'-3 TO 13'-3	68	5 VAR.	5'-5 TO 11'-2	43
4c1	40 VAR.	2 EACH 2'-9 TO 8'-11	156	32 VAR.	2 EACH 2'-9 TO 7'-8	111	26 VAR.	2 EACH 2'-9 TO 6'-8	82
4c2	---	---	---	---	---	---	---	---	---
4c3	2	7'-8	10	4	6'-8	18	4	5'-8	15
4c4	2	1'-8	2	2	1'-8	2	2	1'-7	2
4c5	26 VAR.	1'-10 TO 6'-9	75	22 VAR.	1'-10 TO 5'-9	56	18 VAR.	1'-10 TO 4'-9	40
5c6	12 VAR.	2 EACH 2'-9 TO 4'-5	45	12 VAR.	2 EACH 2'-9 TO 4'-5	45	12 VAR.	2 EACH 2'-9 TO 4'-5	45
5c7	28 VAR.	2 EACH 8'-9 TO 12'-11	316	20 VAR.	2 EACH 8'-9 TO 11'-8	213	14 VAR.	2 EACH 8'-9 TO 10'-8	142
5c8	14	10'-6	153	---	---	---	---	---	---
5c9	2	11'-8	24	4	10'-8	45	4	9'-8	40
4d1	13	15'-6	135	13	13'-6	117	13	11'-6	100
4d2	6	17'-5	70	6	14'-5	58	6	11'-6	46
6f1	20	15'-6	466	20	13'-6	406	20	11'-6	345
6f2	8 VAR.	2 EACH 4'-7 TO 12'-10	105	6 VAR.	2 EACH 5'-4 TO 10'-10	73	4 VAR.	2 EACH 6'-1 TO 8'-10	45
6f3	2	22'-4	67	2	19'-3	58	2	16'-2	49
4i1	41	6'-1	167	41	6'-1	167	41	6'-1	167
7ji	4	21'-11	179	4	21'-11	179	4	21'-11	179
6m1	18 VAR.	22'-1 TO 28'-6	684	15 VAR.	22'-1 TO 27'-4	557	13 VAR.	22'-1 TO 26'-7	475
6m2	12 VAR.	16'-6 TO 22'-0	347	10 VAR.	16'-6 TO 21'-0	282	8 VAR.	16'-6 TO 20'-0	219
6p1	4	21'-0	126	4	21'-0	126	4	21'-0	126
6p2	8	11'-1	133	8	9'-10	118	8	8'-7	103
6s1	4	7'-8	46	4	7'-8	46	4	7'-8	46
6s2	4	18'-0	108	4	14'-9	89	4	11'-6	69
6s3	2	23'-3	70	2	20'-0	60	2	16'-9	50
6s4	2	16'-5	49	2	14'-2	43	2	11'-11	36
5t1	27	6'-6	183	25	6'-6	169	23	6'-6	156
REINF. STEEL	4135 LB			3347 LB			2790 LB		
CONCRETE PARAPET △	2.2	29.9 CY		2.2	25.0 CY		2.2	20.4 CY	
CONCRETE WINGWALLS	6.2			4.5			3.1		
CONCRETE FOOTING *	21.5			18.3			15.1		

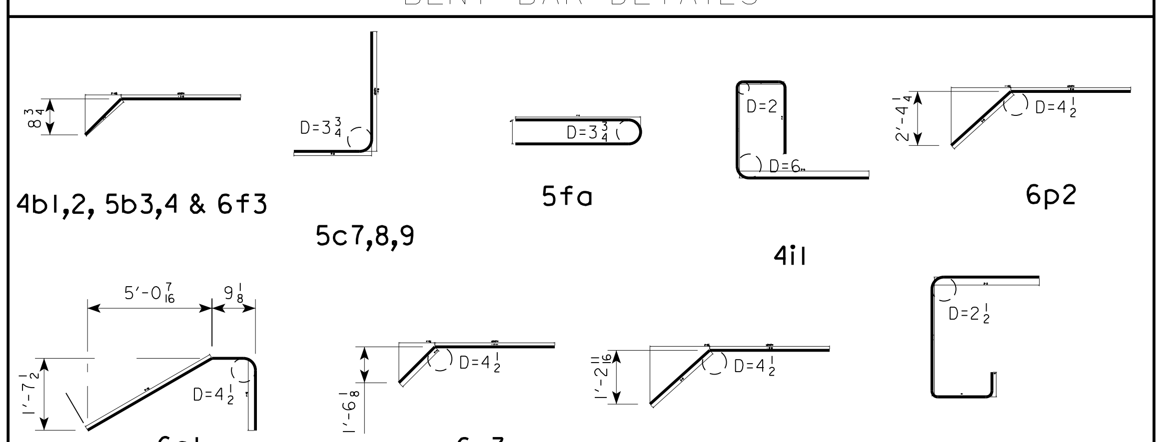
BAR	8'×10' NO.	8'×10' LENGTH	8'×10' WT.	8'×9' NO.	8'×9' LENGTH	8'×9' WT.	8'×8' NO.	8'×8' LENGTH	8'×8' WT.	8'×7' NO.	8'×7' LENGTH	8'×7' WT.
5fa	2	2'-10	6	2	2'-10	6	2	2'-10	6	2	2'-10	6
4b1	2	34'-8	46	2	31'-7	42	2	28'-6	38	2	25'-5	34
4b2	16 VAR.	2 EACH 11'-7 TO 33'-3	240	14 VAR.	2 EACH 11'-7 TO 30'-2	195	12 VAR.	2 EACH 11'-7 TO 27'-1	155	10 VAR.	2 EACH 11'-7 TO 24'-0	119
5b3	2	34'-9	72	2	31'-8	66	2	28'-7	60	2	25'-5	53
5b4	18 VAR.	2 EACH 8'-7 TO 33'-4	393	16 VAR.	2 EACH 8'-7 TO 30'-3	324	14 VAR.	2 EACH 8'-7 TO 27'-2	261	12 VAR.	2 EACH 8'-7 TO 24'-0	204
5b5	17 VAR.	4'-11 TO 23'-3	250	15 VAR.	4'-11 TO 21'-3	205	13 VAR.	5'-0 TO 19'-3	164	11 VAR.	5'-1 TO 17'-3	128
4c1	64 VAR.	2 EACH 2'-8 TO 12'-9	330	58 VAR.	2 EACH 2'-8 TO 11'-9	279	52 VAR.	2 EACH 2'-8 TO 10'-9	233	46 VAR.	2 EACH 2'-8 TO 9'-10	192
4c2	24 VAR.	2 EACH 9'-4 TO 12'-11	178	18 VAR.	2 EACH 9'-4 TO 11'-11	128	---	---	---	---	---	---
4c3	2	11'-7	15	2	10'-7	14	2	9'-7	13	2	8'-7	11
4c4	2	1'-7	2	2	1'-7	2	2	1'-7	2	2	1'-7	2
4c5	42 VAR.	1'-10 TO 10'-9	177	38 VAR.	1'-9 TO 9'-9	146	34 VAR.	1'-9 TO 8'-9	119	30 VAR.	1'-9 TO 7'-8	94
5c6	12 VAR.	2 EACH 2'-8 TO 4'-4	44	12 VAR.	2 EACH 2'-8 TO 4'-4	44	12 VAR.	2 EACH 2'-8 TO 4'-4	44	12 VAR.	2 EACH 2'-8 TO 4'-4	44
5c7	52 VAR.	2 EACH 8'-8 TO 16'-9	689	46 VAR.	2 EACH 8'-8 TO 15'-9	586	40 VAR.	2 EACH 8'-8 TO 14'-9	488	34 VAR.	2 EACH 8'-8 TO 13'-10	399
5c8	38	10'-6	416	32	10'-6	350	26	10'-6	285	20	10'-6	219
5c9	2	15'-7	33	2	14'-7	30	2	13'-7	28	2	12'-7	26
4d1	11	23'-6	173	11	21'-6	158	11	19'-6	143	11	17'-6	129
4d2	6	29'-8	119	6	26'-7	107	6	23'-6	94	6	20'-6	82
6f1	16	23'-6	565	16	21'-6	517	16	19'-6	469	16	17'-6	421
6f2	14 VAR.	2 EACH 4'-6 TO 20'-10	266	12 VAR.	2 EACH 5'-3 TO 18'-10	217	10 VAR.	2 EACH 5'-11 TO 16'-10	171	10 VAR.	2 EACH 3'-11 TO 14'-10	141
6f3	2	34'-9	104	2	31'-8	95	2	28'-7	86	2	25'-5	76
4i1	33	6'-1	134	33	6'-1	134	33	6'-1	134	33	6'-1	134
7ji	4	18'-2	149	4	18'-2	149	4	18'-2	149	4	17'-11	146
6m1	29 VAR.	18'-4 TO 28'-10	1027	26 VAR.	18'-4 TO 27'-9	900	23 VAR.	18'-4 TO 26'-7	776	21 VAR.	18'-1 TO 25'-7	689
6m2	20 VAR.	12'-7 TO 22'-1	521	18 VAR.	12'-7 TO 21'-1	455	16 VAR.	12'-7 TO 20'-1	393	14 VAR.	12'-6 TO 19'-0	331
6p1	4	17'-1	103	4	17'-1	103	4	17'-1	103	4	17'-0	102
6p2	8	16'-1	193	8	14'-10	178	8	13'-7	163	8	12'-4	148
6s1	4	7'-8	46	4	7'-8	46	4	7'-8	46	4	7'-8	46
6s2	4	31'-0	186	4	27'-9	167	4	24'-6	147	4	21'-3	128
6s3	2	36'-3	109	2	33'-0	99	2	29'-9	89	2	26'-6	80
6s4	2	25'-4	76	2	23'-1	69	2	20'-11	63	2	18'-8	56
5t1	31	7'-6	242	29	7'-3	219	27	7'-0	197	25	6'-9	176
REINF. STEEL	6904 LB			6030 LB			5119 LB			4416 LB		
CONCRETE PARAPET △	2.0	53.7 CY		2.0	45.1 CY		2.0	37.9 CY		1.9	30.5 CY	
CONCRETE WINGWALLS	16.9			14.0			11.4			8.1		
CONCRETE FOOTING *	34.8			29.1			24.5			20.5		

BAR	8'×6' NO.	8'×6' LENGTH	8'×6' WT.	8'×5' NO.	8'×5' LENGTH	8'×5' WT.	8'×4' NO.	8'×4' LENGTH	8'×4' WT.	BAR
5fa	2	2'-10	6	2	2'-10	6	2	2'-10	6	5fa
4b1	2	22'-4	30	2	19'-3	26	2	16'-2	22	4b1
4b2	8 VAR.	2 EACH 11'-7 TO 20'-11	87	6 VAR.	2 EACH 11'-7 TO 17'-10	59	4 VAR.	2 EACH 11'-7 TO 14'-9	35	4b2
5b3	2	22'-4	47	2	19'-3	40	2	16'-2	34	5b3
5b4	10 VAR.	2 EACH 8'-7 TO 20'-11	154	8 VAR.	2 EACH 8'-7 TO 17'-10	110	6 VAR.	2 EACH 8'-7 TO 14'-9	73	5b4
5b5	9 VAR.	5'-1 TO 15'-3	95	7 VAR.	5'-3 TO 13'-3	68	5 VAR.	5'-5 TO 11'-2	43	5b5
4c1	40 VAR.	2 EACH 2'-8 TO 8'-10	154	32 VAR.	2 EACH 2'-8 TO 7'-7	110	26 VAR.	2 EACH 2'-8 TO 6'-7	80	4c1
4c2	---	---	---	---	---	---	---	---	---	4c2
4c3	2	7'-7	10	4	6'-7	18	4	5'-7	15	4c3
4c4	2	1'-7	2	2	1'-7	2	2	1'-6	2	4c4
4c5	26 VAR.	1'-9 TO 6'-8	73	22 VAR.	1'-9 TO 5'-8	54	18 VAR.	1'-9 TO 4'-8	39	4c5
5c6	12 VAR.	2 EACH 2'-8 TO 4'-4	44	12 VAR.	2 EACH 2'-8 TO 4'-4	44	12 VAR.	2 EACH 2'-8 TO 4'-4	44	5c6
5c7	28 VAR.	2 EACH 8'-8 TO 12'-10	314	20 VAR.	2 EACH 8'-8 TO 11'-7	211	14 VAR.	2 EACH 8'-8 TO 10'-7	141	5c7
5c8	14	10'-6	153	---	---	---	---	---	---	5c8
5c9	2	11'-7	24	4	10'-7	44	4	9'-7	40	5c9
4d1	11	15'-6	114	11	13'-6	99	11	11'-6	85	4d1
4d2	6	17'-5	70	6	14'-5	58	6	11'-6	46	4d2
6f1	16	15'-6	372	16	13'-6	324	16	11'-6	276	6f1
6f2	8 VAR.	2 EACH 4'-7 TO 12'-10	105	6 VAR.	2 EACH 5'-4 TO 10'-10	73	4 VAR.	2 EACH 6'-1 TO 8'-10	45	6f2
6f3	2	22'-4	67	2	19'-3	58	2	16'-2	49	6f3
4i1	33	6'-1	134	33	6'-1	134	33	6'-1	134	4i1
7ji	4	17'-11	146	4	17'-11	146	4	17'-11	146	7ji
6m1	18 VAR.	18'-1 TO 24'-6	576	15 VAR.	18'-1 TO 23'-4	467	13 VAR.	18'-1 TO 22'-7	397	6m1
6m2	12 VAR.	12'-6 TO 18'-0	275	10 VAR.	12'-6 TO 17'-0	222	8 VAR.	12'-6 TO 16'-0	171	6m2
6p1	4	17'-0	102	4	17'-0	102	4	17'-0	102	6p1
6p2	8	11'-1	133	8	9'-10	118	8	8'-7	103	6p2
6s1	4	7'-8	46	4	7'-8	46	4	7'-8	46	6s1
6s2	4	18'-0	108	4	14'-9	89	4	11'-6	69	6s2
6s3	2	23'-3	70	2	20'-0	60	2	16'-9	50	6s3
6s4	2	16'-5	49	2	14'-2	43	2	11'-11	36	6s4
5t1	23	6'-6	156	21	6'-6	142	19	6'-6	129	5t1
REINF. STEEL	3716 LB			2973 LB			2458 LB			
CONCRETE PARAPET △	1.9	26.1 CY		1.9	21.6 CY		1.9	17.6 CY		
CONCRETE WINGWALLS	6.2			4.5			3.1			
CONCRETE FOOTING *	18.0			15.2			12.6			

△ INCLUDES TOP OF WINGWALL QUANTITIES.
* ASSUMES APRON AND FLOOR ARE EQUAL THICKNESS, ADJUST CONCRETE QUANTITIES FOR TRANSITION WHERE APRON AND FLOOR THICKNESS ARE NOT EQUAL.

NOTE:
WEIGHT OF BARS OVER 40'-0 LONG INCLUDES AN ALLOWANCE OF 2'-3 FOR LAP. LENGTHS SHOWN FOR BARS OVER 40'-0 LONG DO NOT INCLUDE LAP.

BENT BAR DETAILS



NOTE:
ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

HEADWALL NOTES:

1. SEE DRAWING TWRCB GI-12 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.
2. THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.
3. THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.
4. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.
5. CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. CLEARANCE TO THE BOTTOM ENDS OF VERTICAL BARS SHALL BE 3 INCHES.
6. CONCRETE QUANTITIES ARE ESTIMATED FROM BACK OF PARAPET.
7. HORIZONTAL TAILS OF BARS "b" & "s" ESTIMATED TO EXTEND 2'-0 BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "d", "6f1", AND "6f3" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0 BEYOND BACK OF PARAPET.
8. THE "LENGTH" COLUMN REFLECTS TOTAL NUMBER OF FEET NECESSARY TO MEET THESE REQUIREMENTS.

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Project No: 1190863 | Sheet V.17

SUGAR CREEK GREENWAY TRAIL PHASE 1
CULVERT DETAIL SHEET
WEST DES MOINES, IOWA

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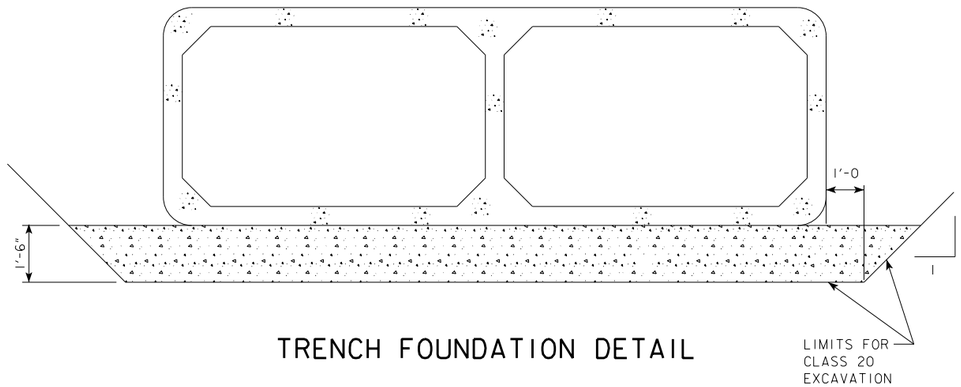
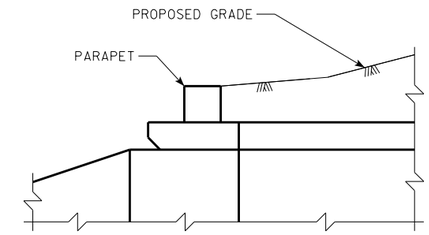
Project No: 1190863
Sheet V.17



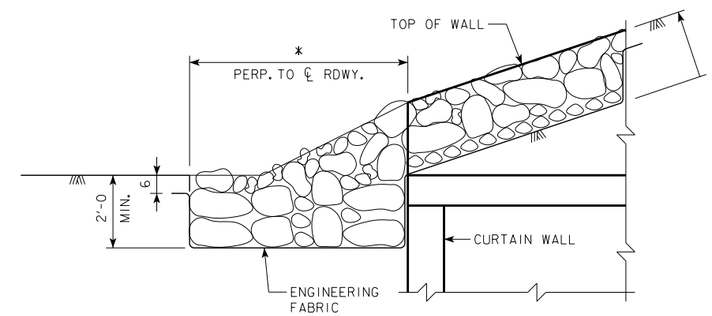
TRENCH FOUNDATION DETAIL

TRENCH FOUNDATION SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL.

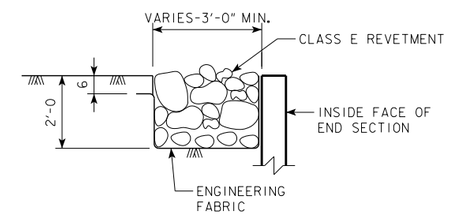


SECTION C-C

* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



SECTION B-B



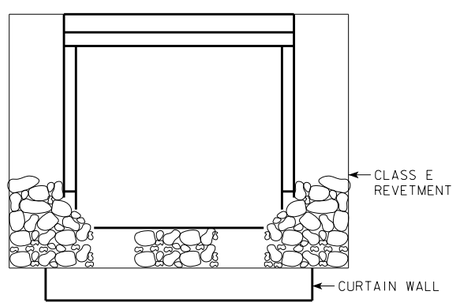
SECTION A-A

TYPICAL DETAILS

CONSTRUCTION NOTES:

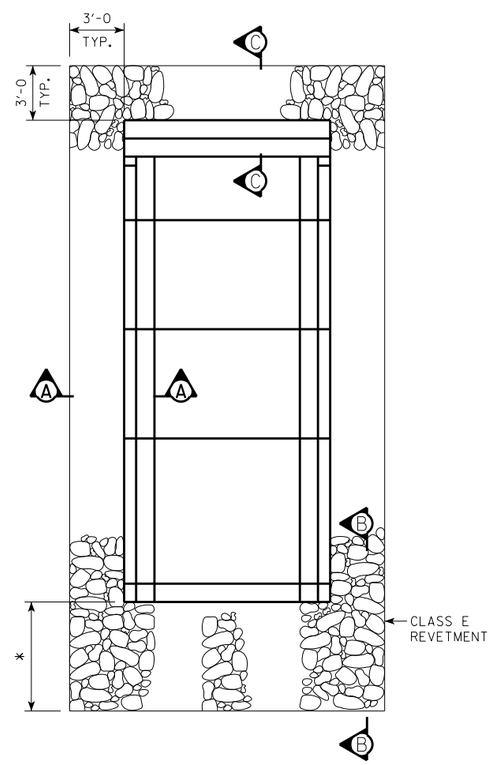
CLASS E REVETMENT SHOULD BE USED AND PLACED ACCORDING TO ARTICLE 2507.03 OF THE STANDARD SPECIFICATIONS.

THE ENGINEERING FABRIC SHALL MEET THE MATERIAL REQUIREMENTS IN ACCORDANCE WITH ARTICLE 4196.01, B, 3 OF THE STANDARD SPECIFICATIONS.



ELEVATION VIEW

NON-SKEW END SECTIONS



PLAN VIEW

* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.

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Project No: 1190863 | Sheet V.18

SUGAR CREEK GREENWAY TRAIL PHASE 1

CULVERT DETAIL SHEET

WEST DES MOINES, IOWA

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Sheet V.18

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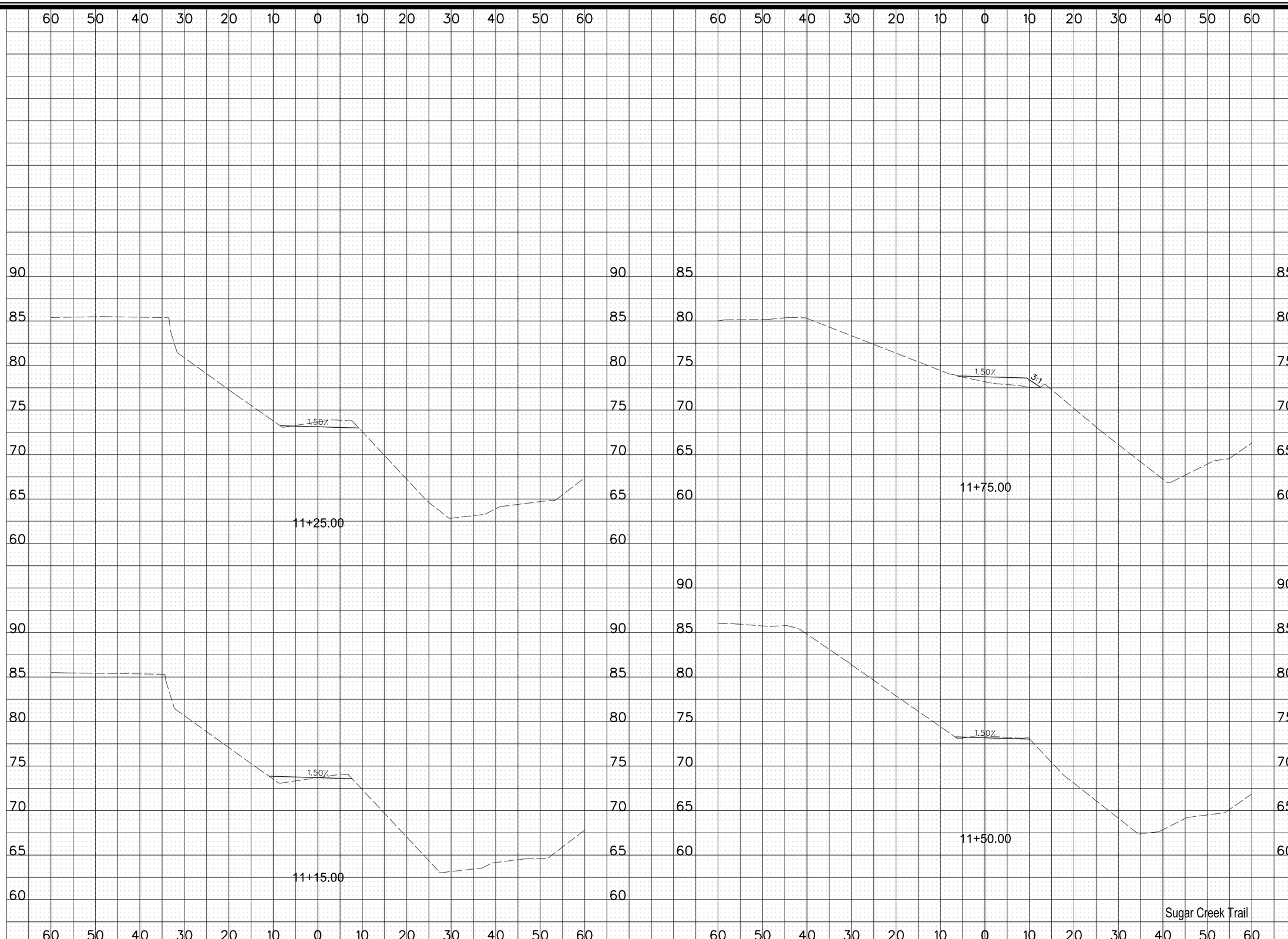

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Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 04/08/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Sheet W.1

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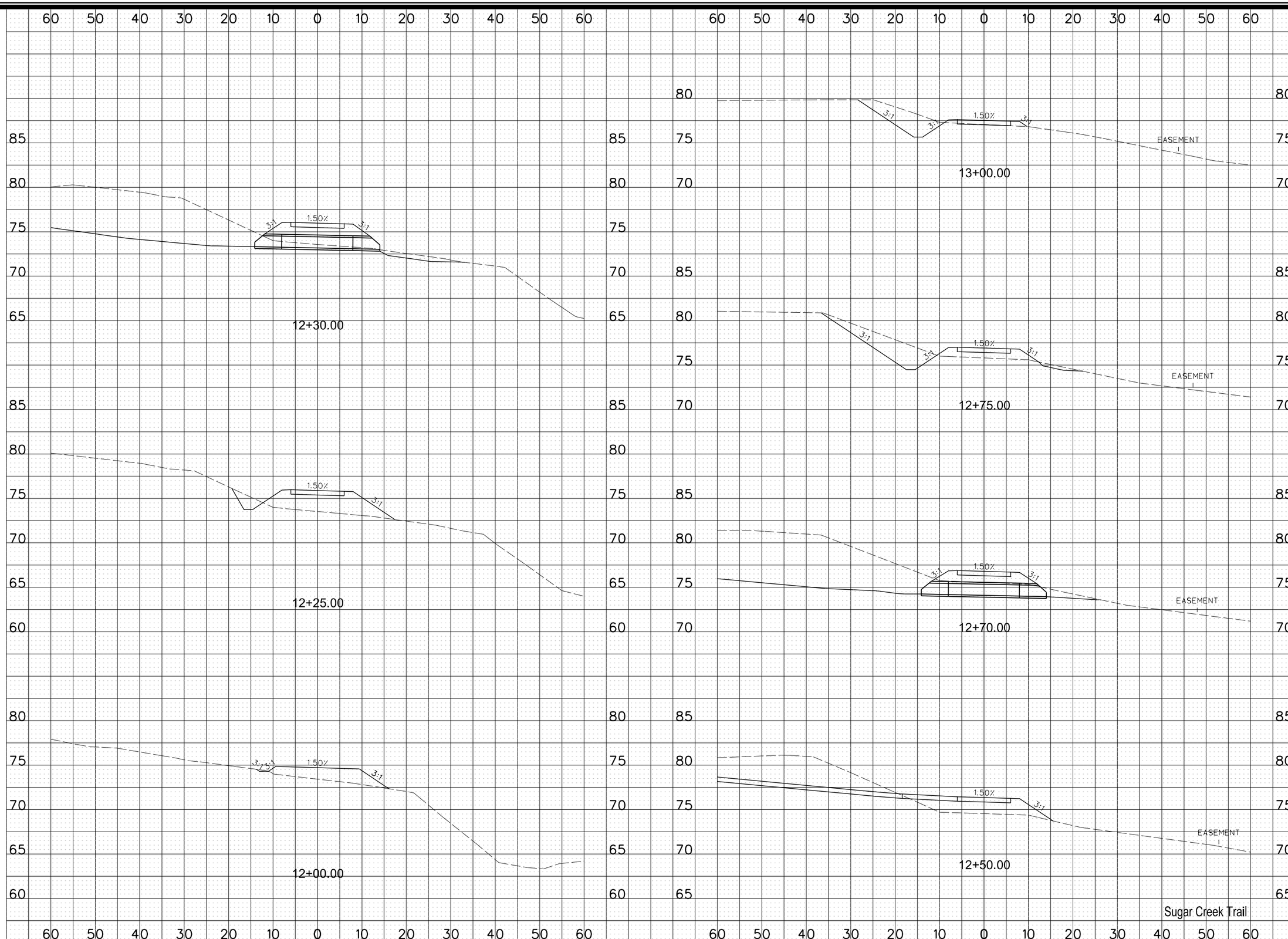

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Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
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Project No: 1190863

Sheet W.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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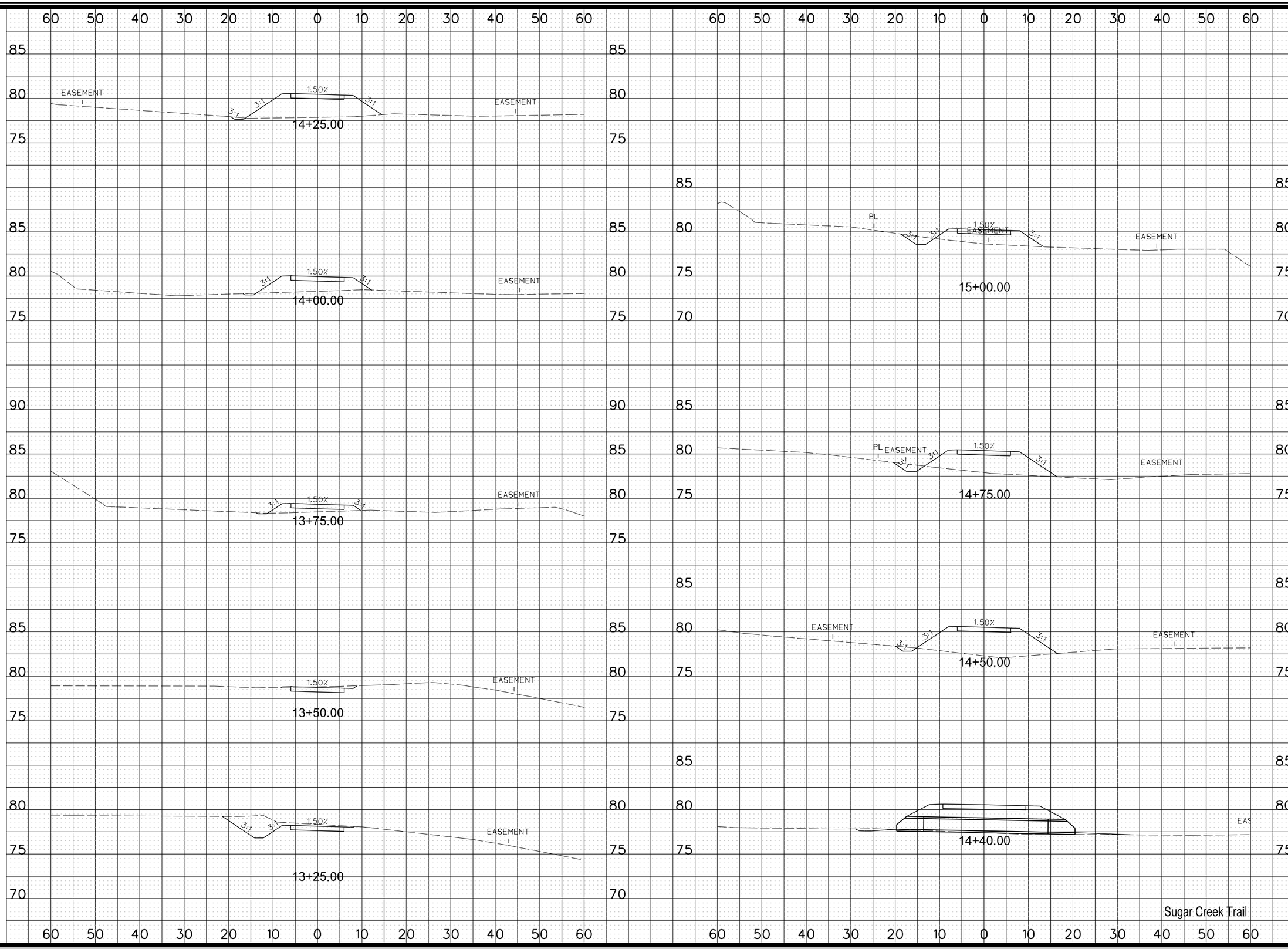
Sheet W.2



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Sheet W.3

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Sheet W.3

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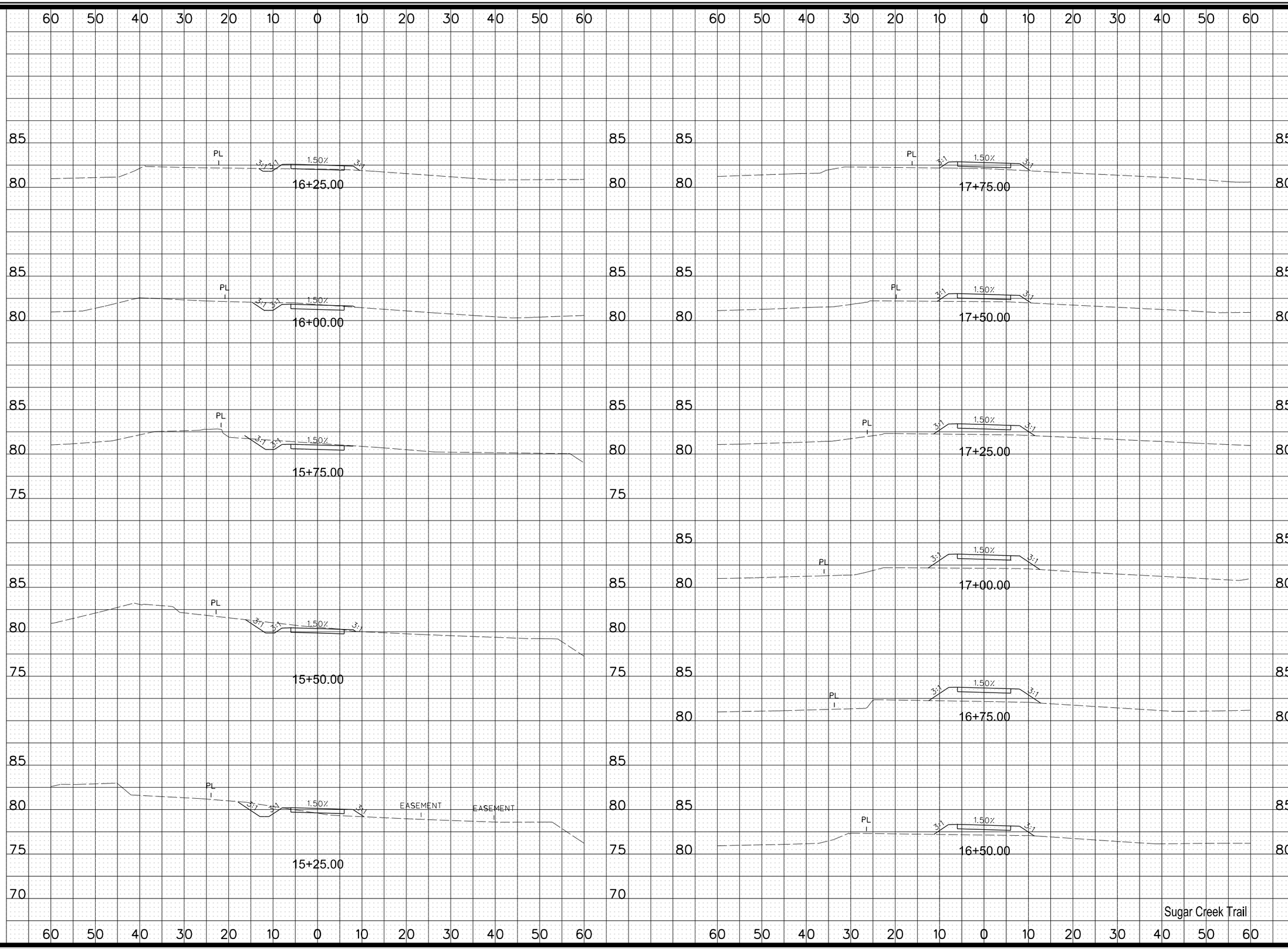

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Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

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Sheet W.4

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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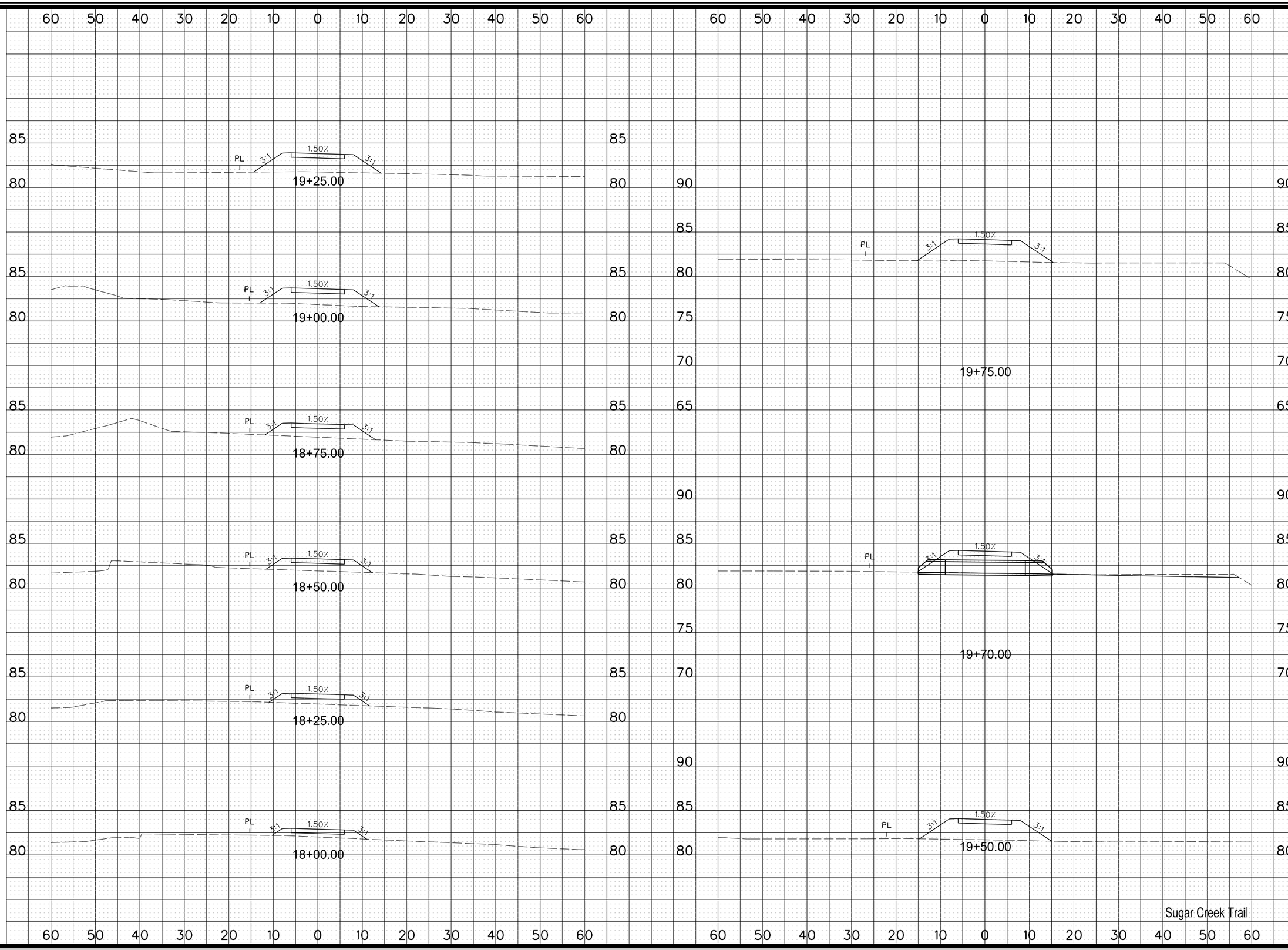
Sheet W.4



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Sheet W.5

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Sheet W.5

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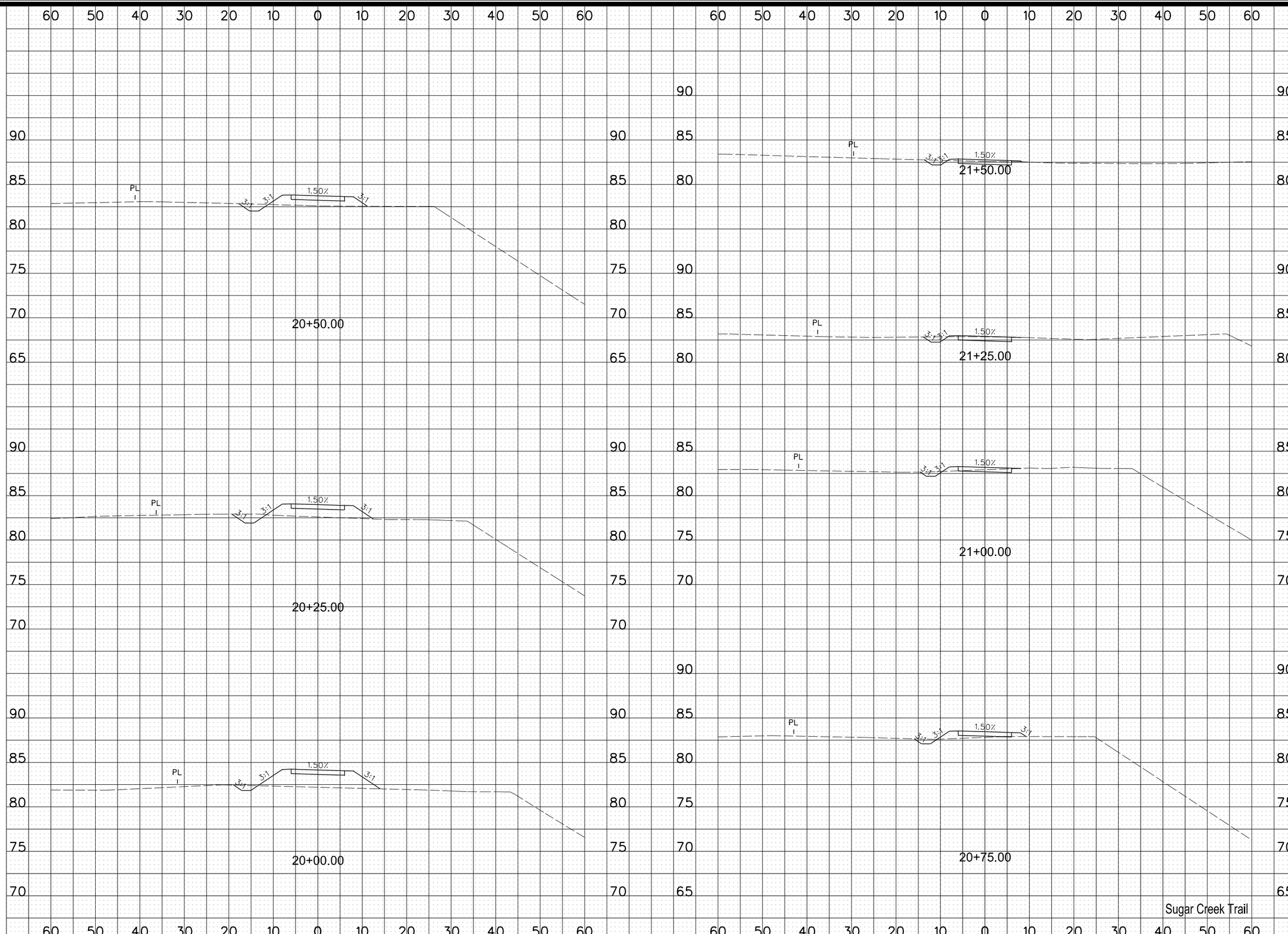

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Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

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Sheet W.6

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Sheet W.6

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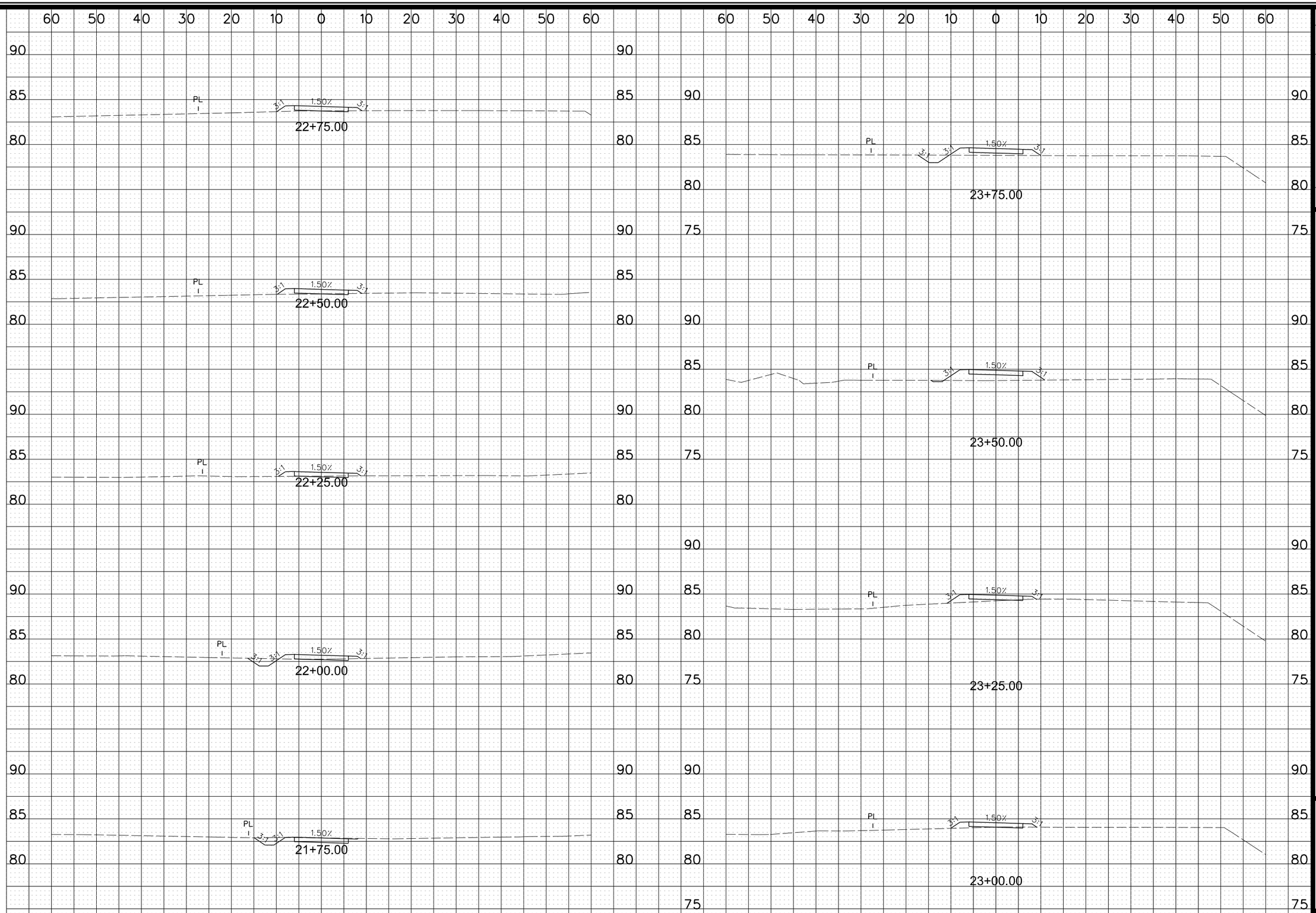

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Sheet W.7

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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Sheet W.7

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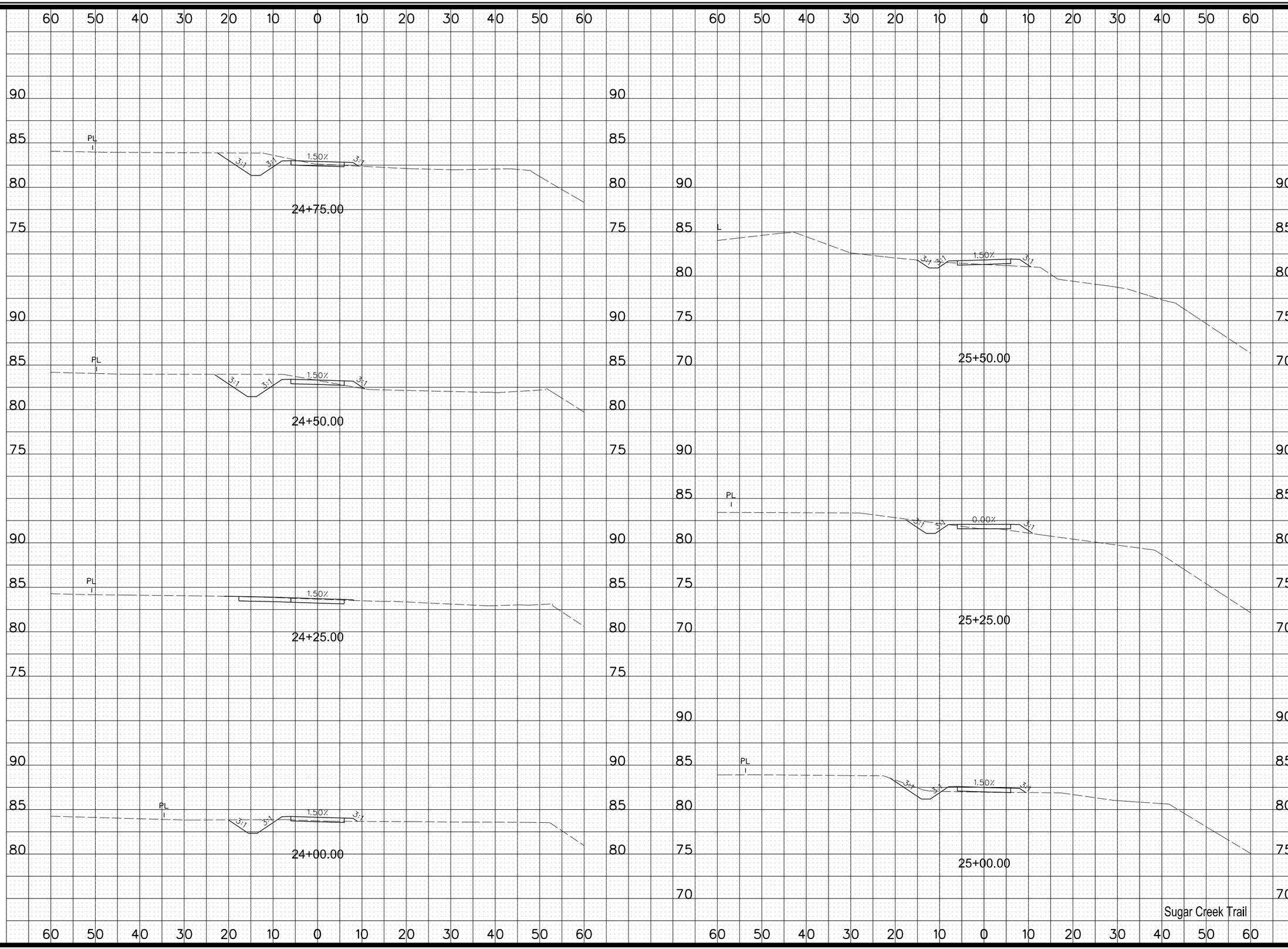

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Sheet W.8

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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Sheet W.8

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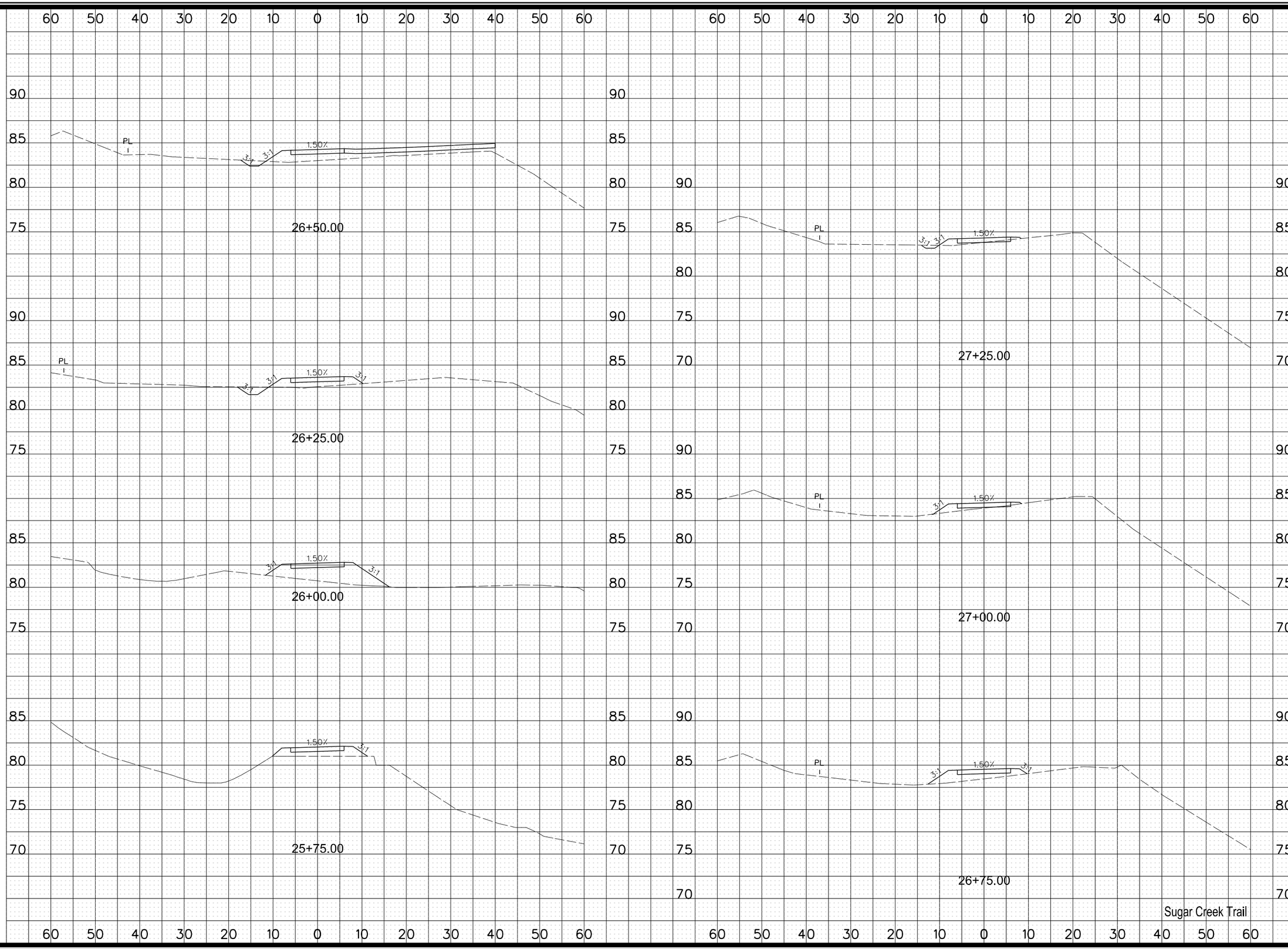

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Project No: 1190863

Sheet W.9

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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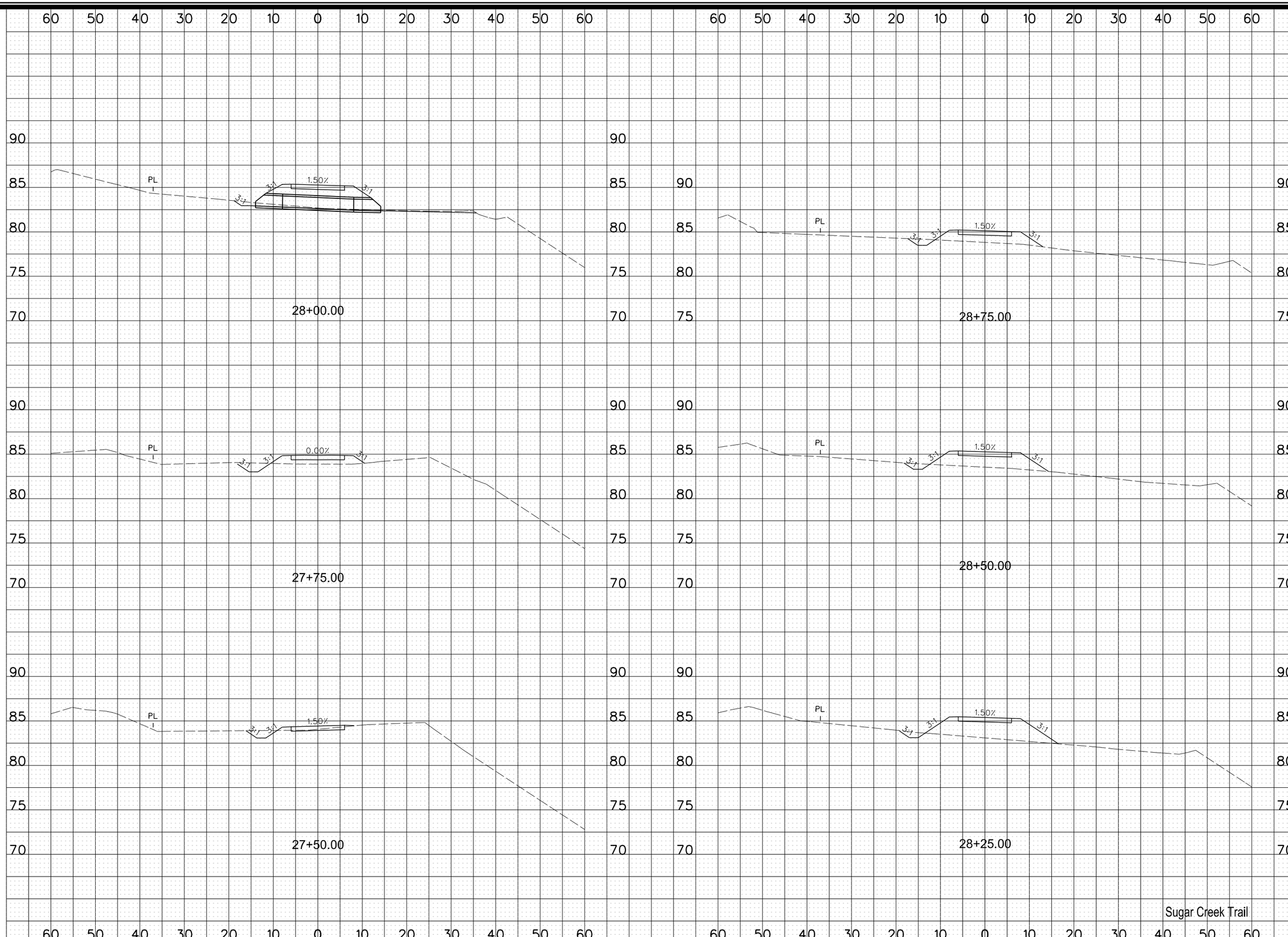

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Project No: 1190863

Sheet W.10

SUGAR CREEK GREENWAY TRAIL PHASE 1

CROSS SECTIONS

WEST DES MOINES, IOWA

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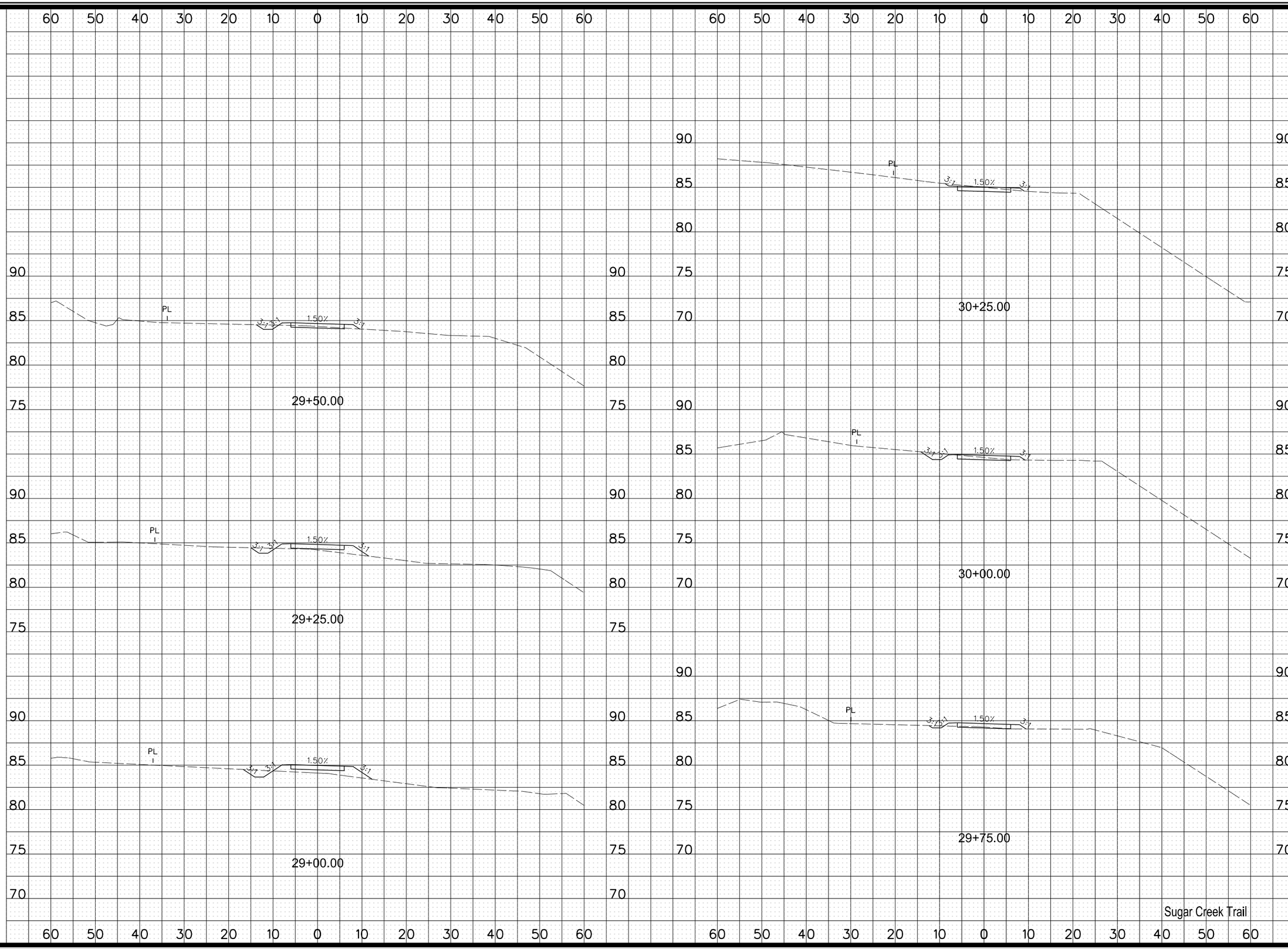

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Project No: 1190863

Sheet W.11

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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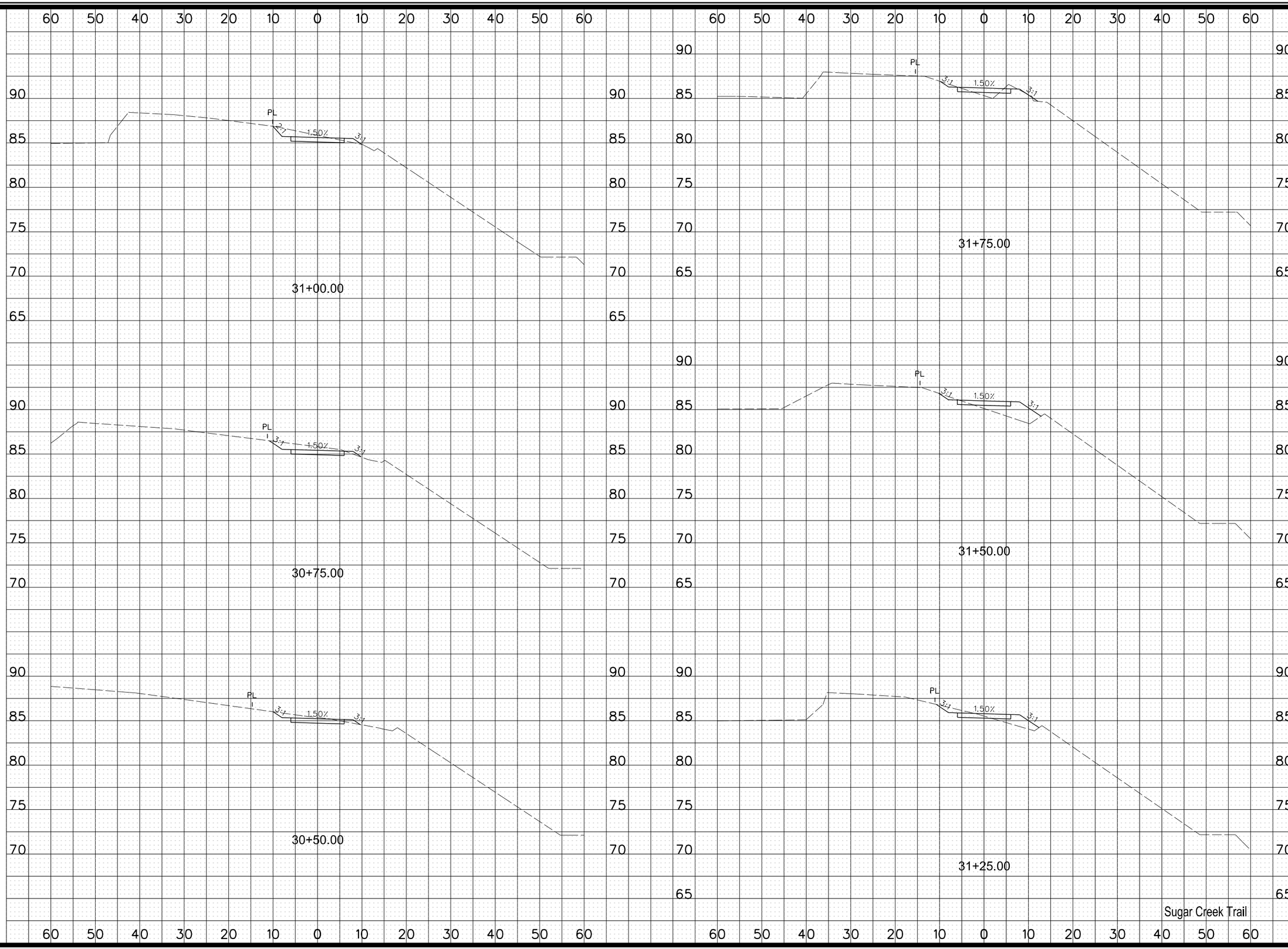

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Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.12

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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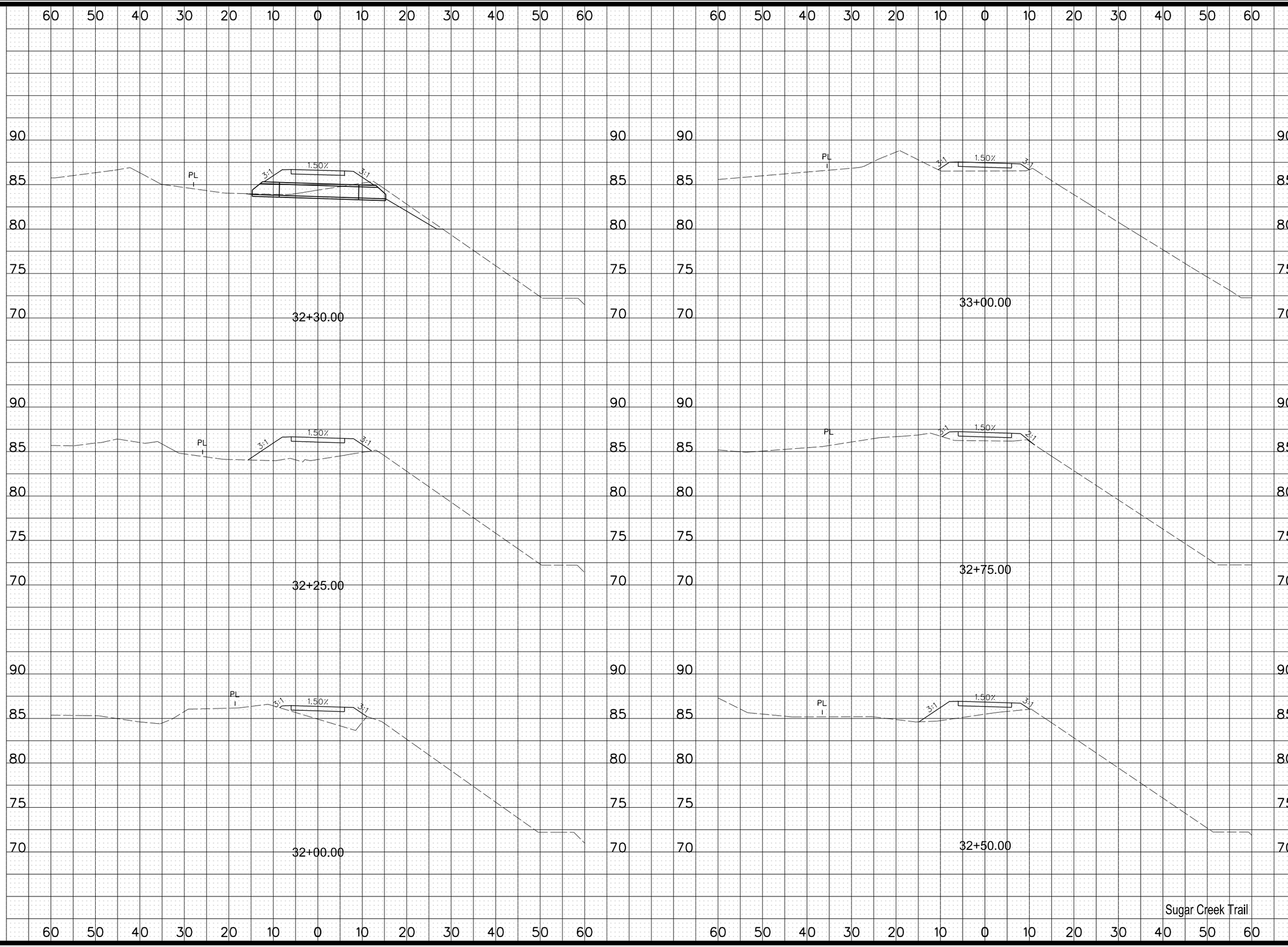

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Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.13

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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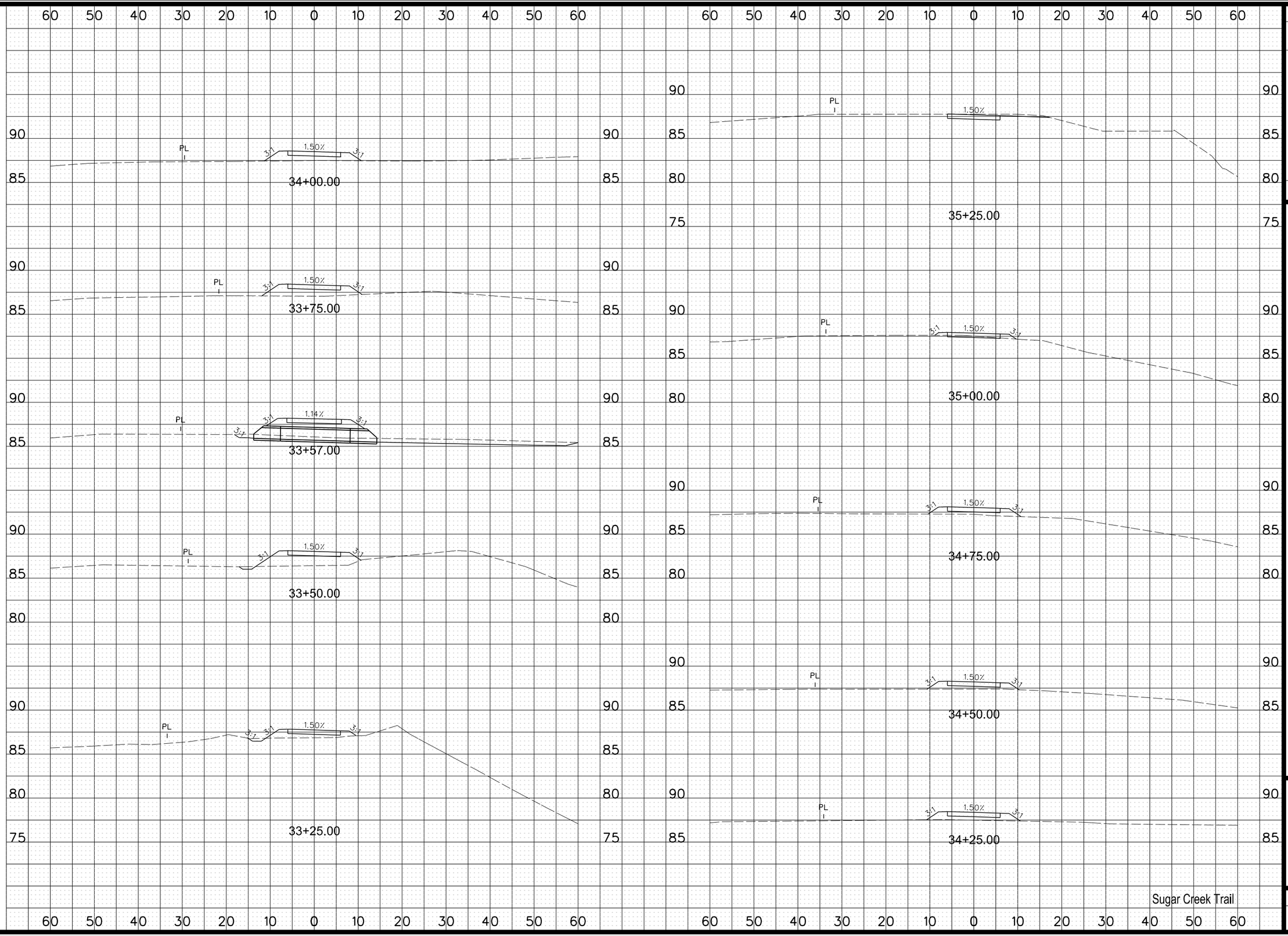

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Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.14

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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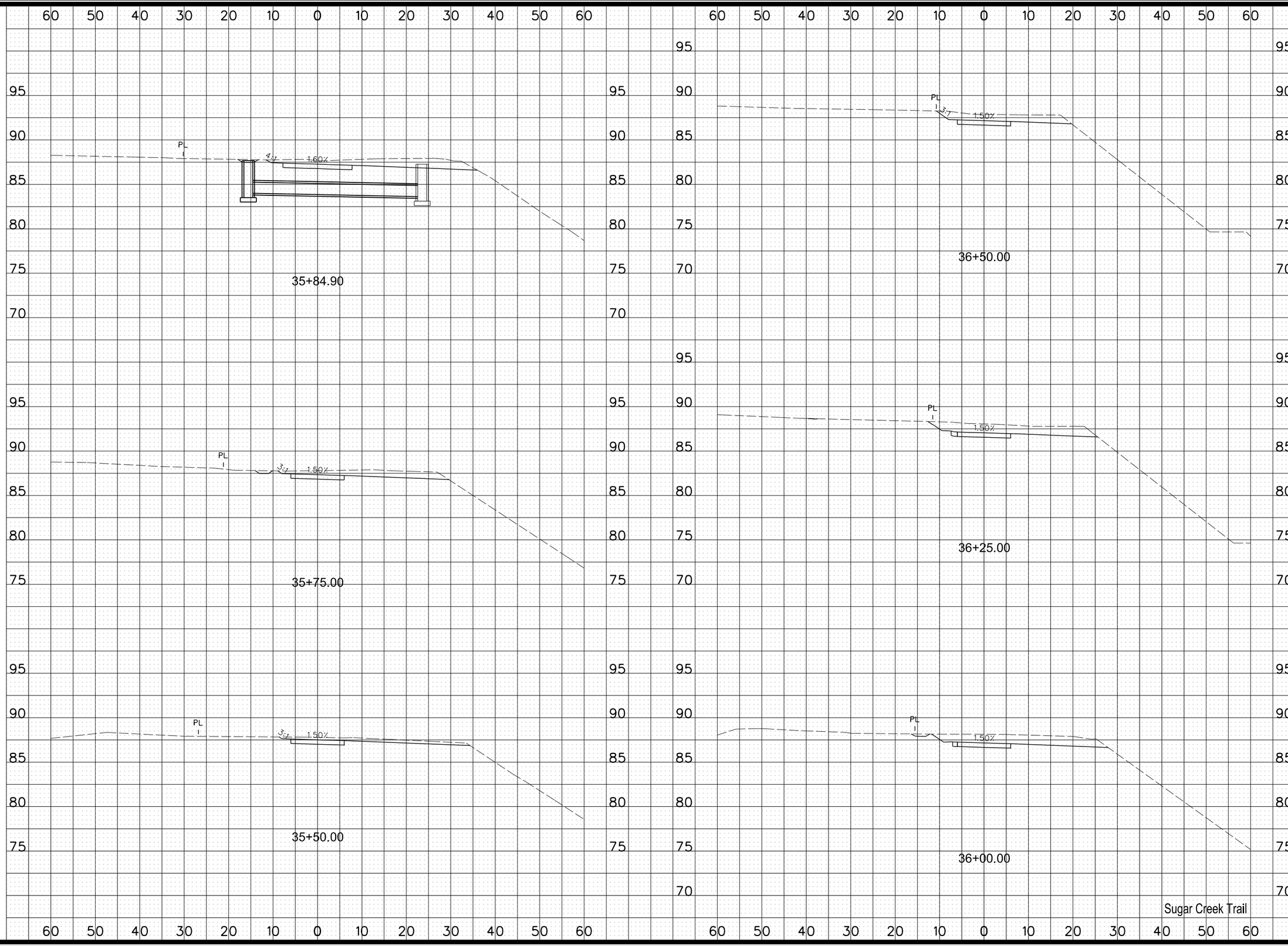

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Engineer: | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.15

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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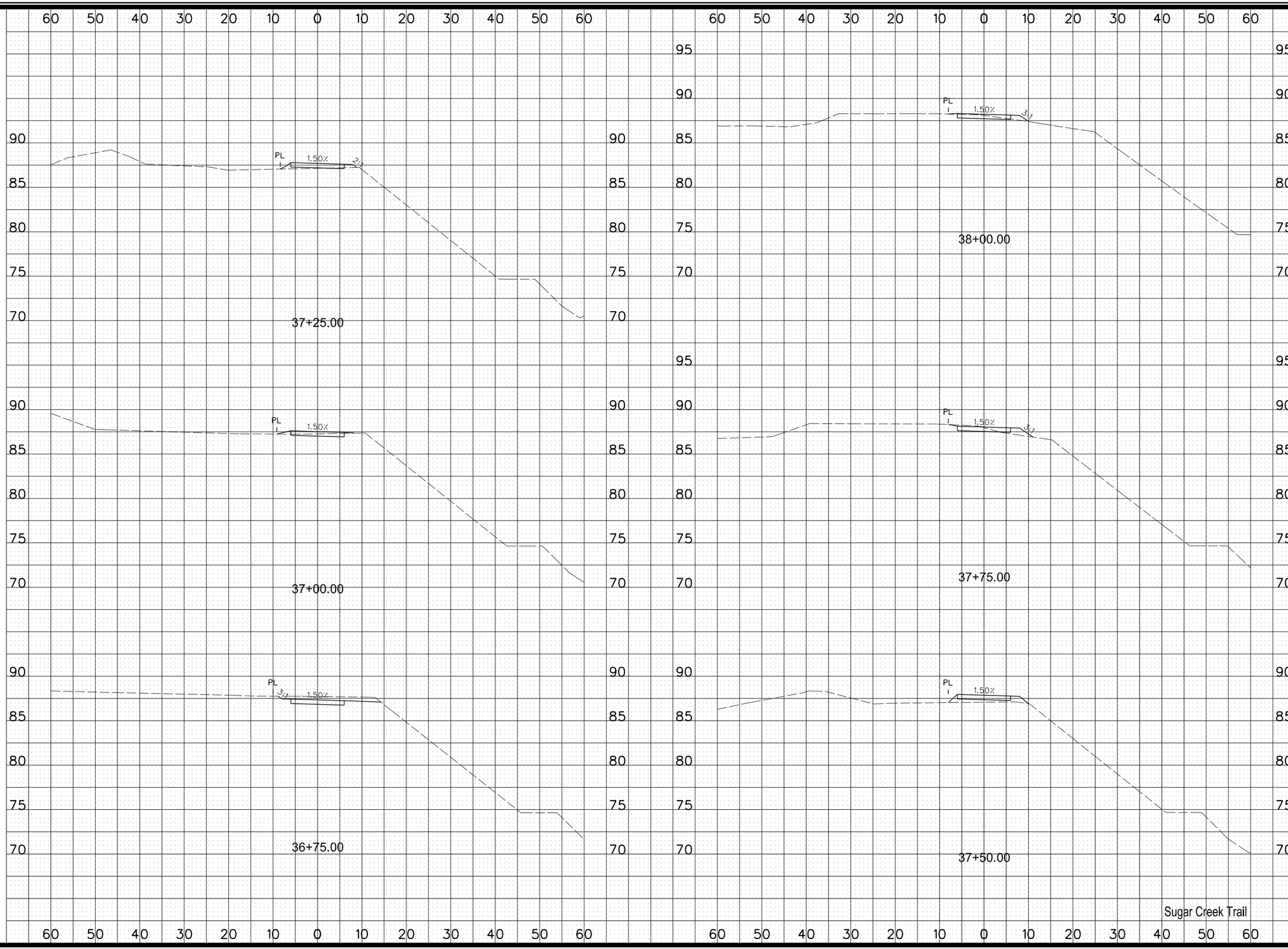

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Engineer: | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.16

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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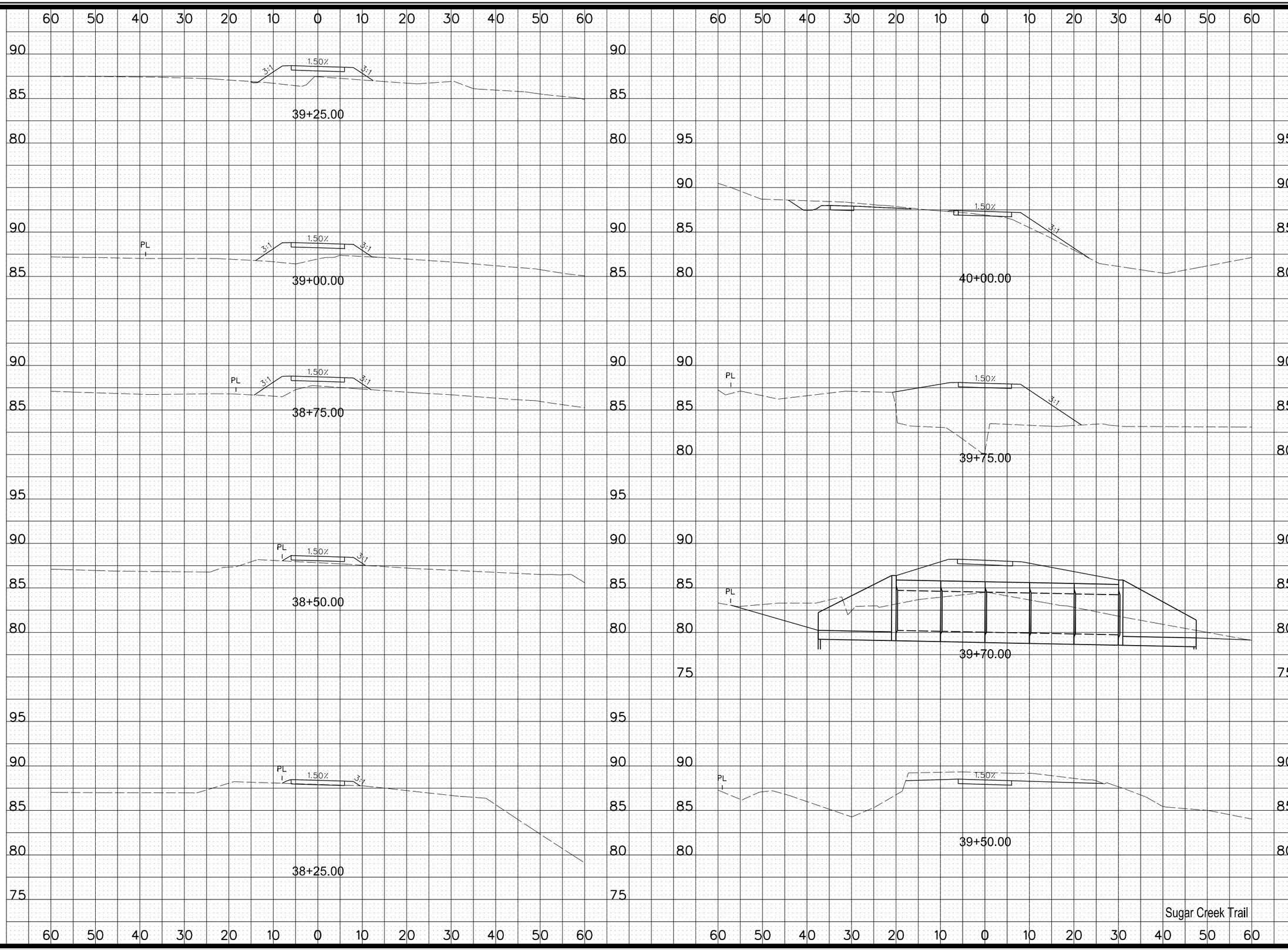

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Engineer: | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.17

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

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Project No: 1190863

Sheet W.17

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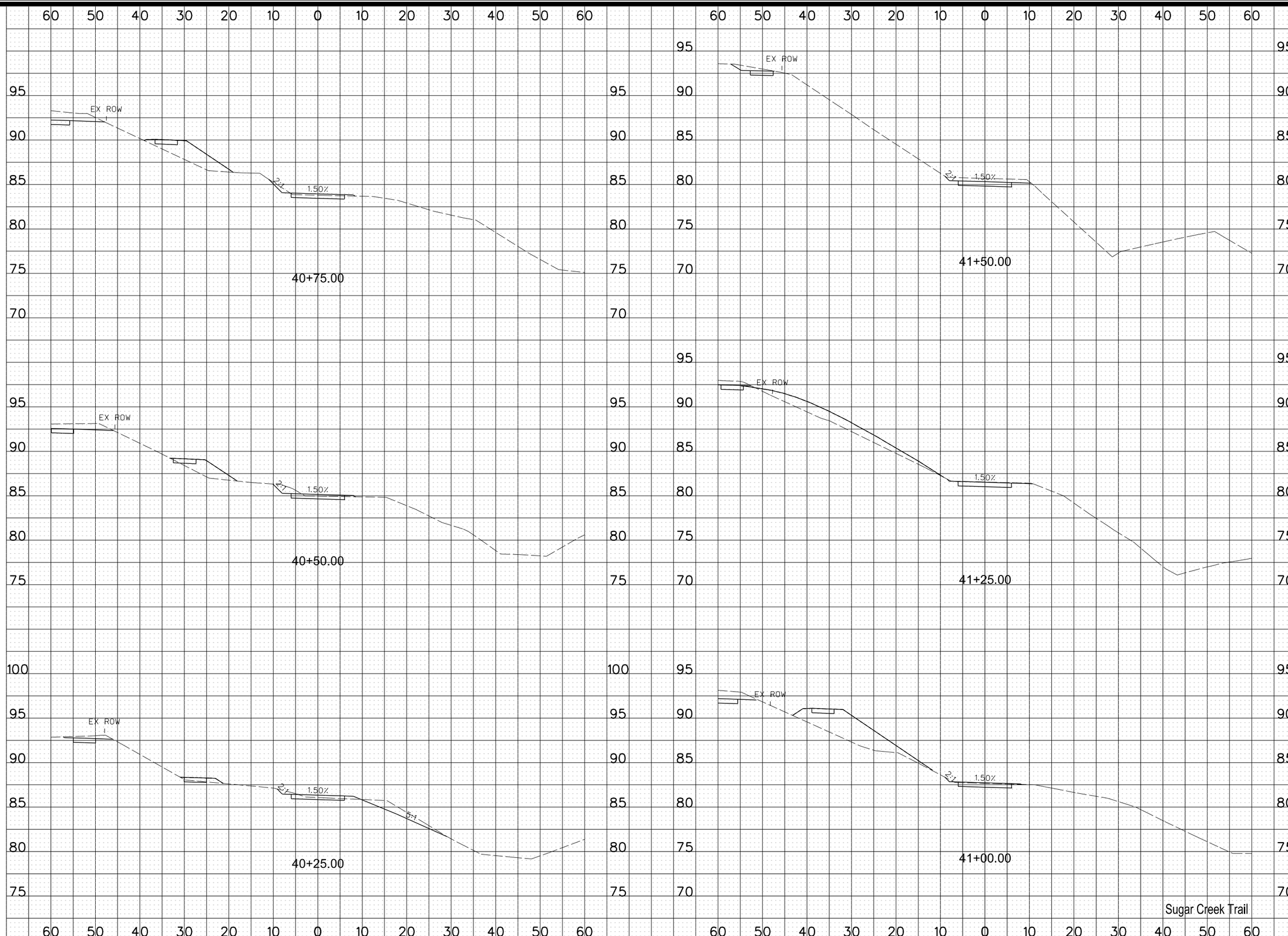

MARK	REVISION	DATE	BY

Engineer: | Checked By: TNJ | Scale: 1" = 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.18

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet W.18

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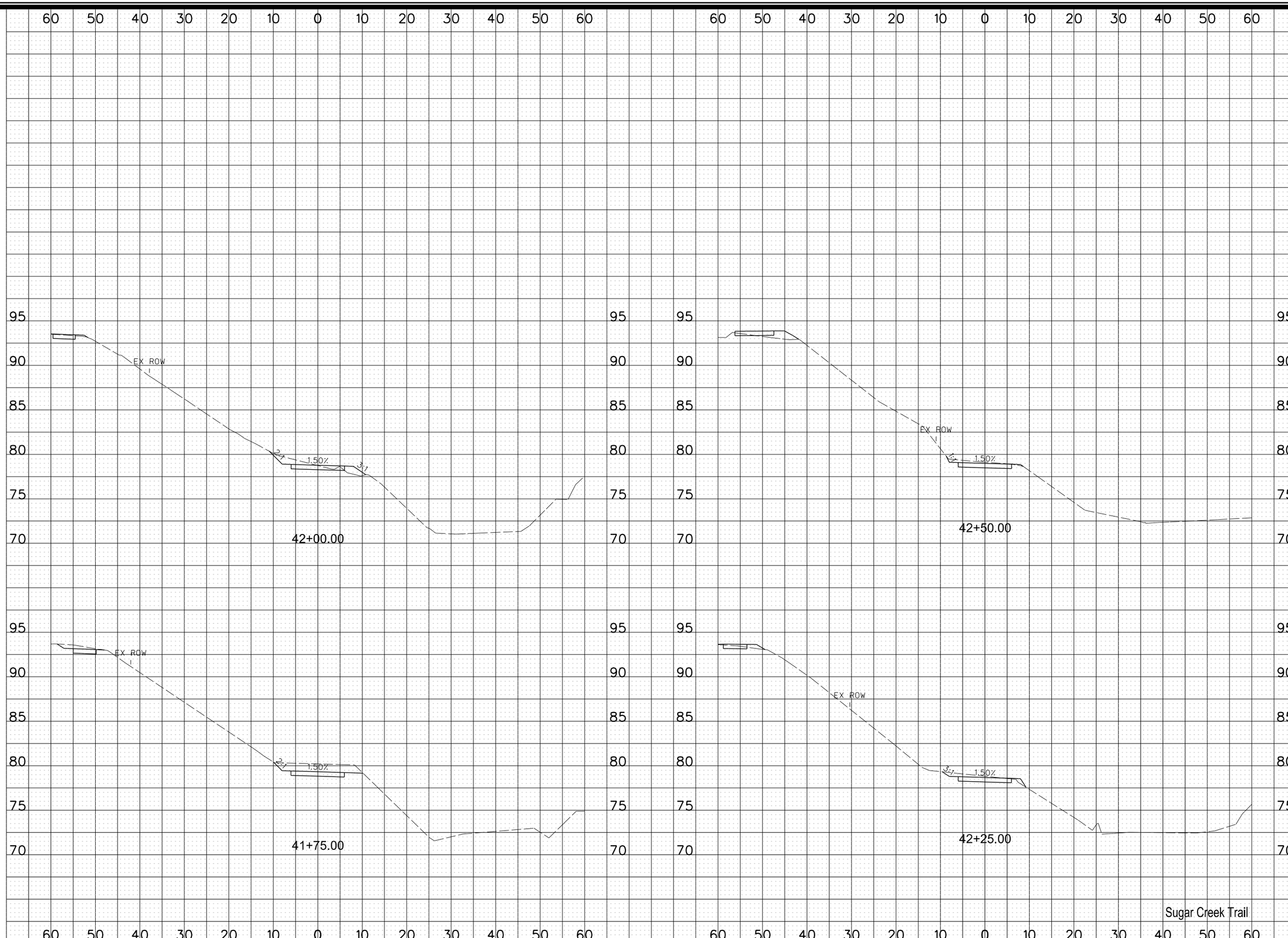

MARK	REVISION	DATE	BY

Engineer: Checked By: TNJ Scale: 1"= 10'
Technician: MLB Date: 02/17/20 Field Bk: Pg:

Project No: 1190863 Sheet W.19

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863
Sheet W.19

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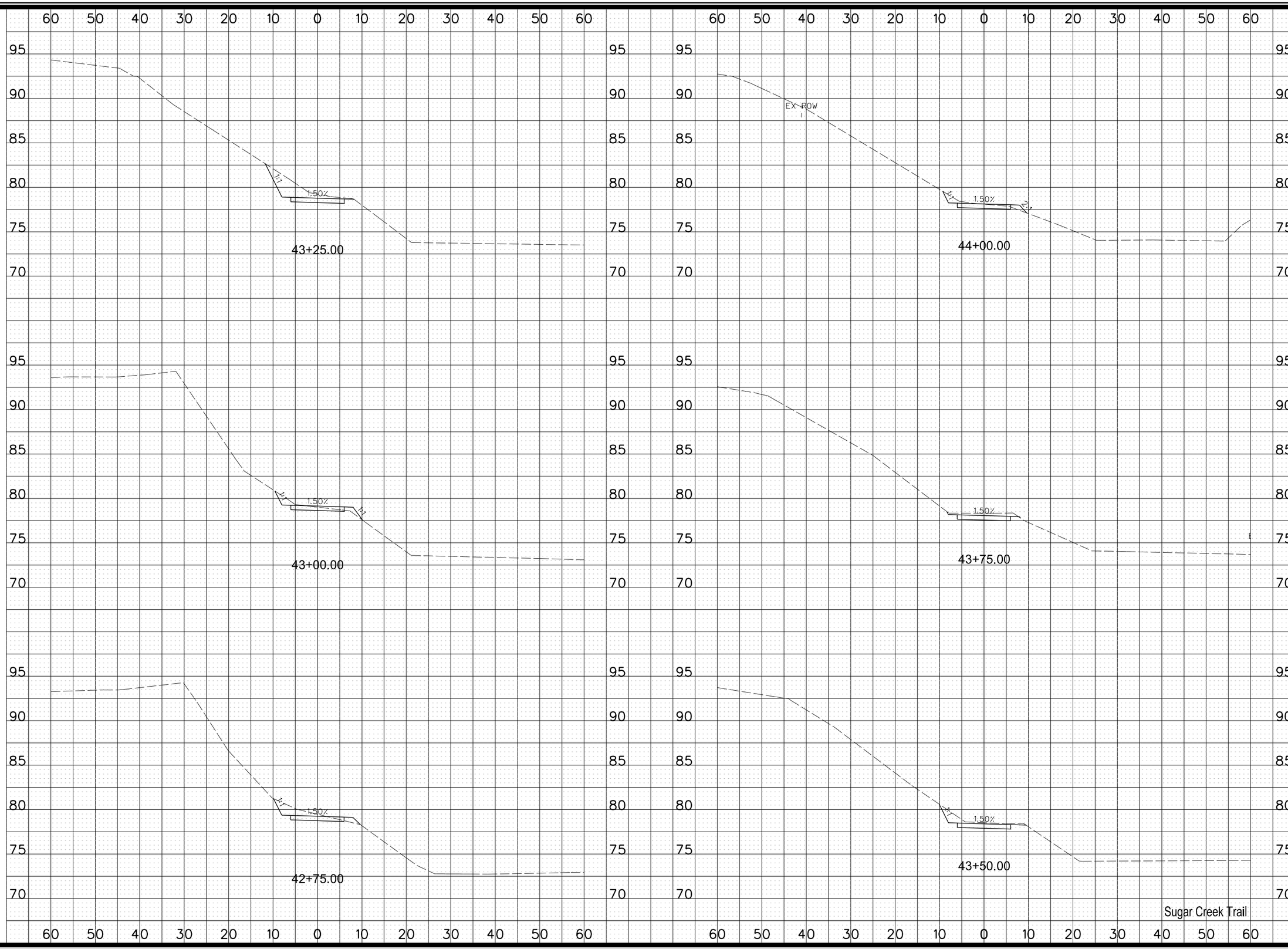

MARK	REVISION	DATE	BY

Engineer: | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.20

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet W.20

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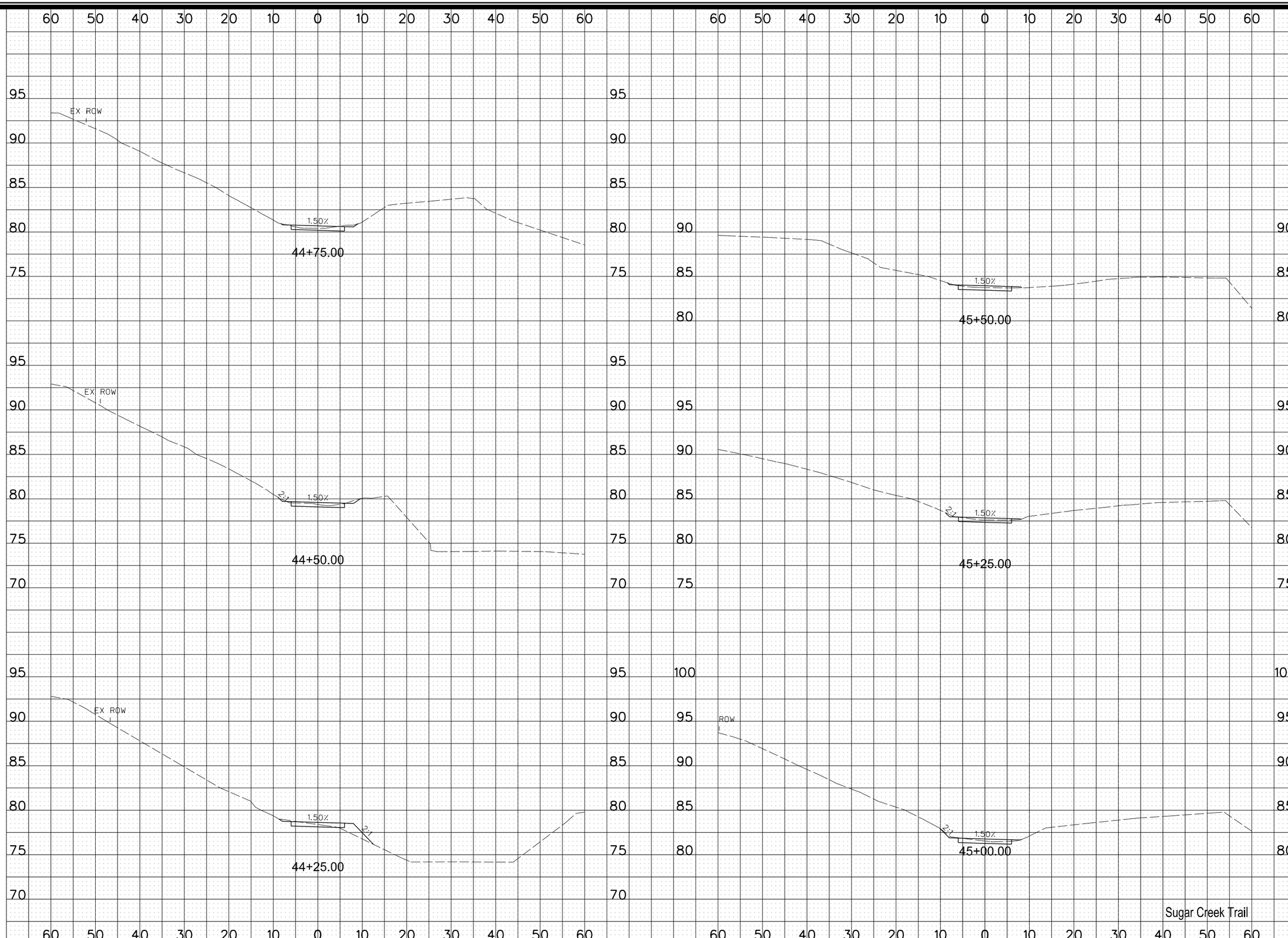

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Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.21

SUGAR CREEK GREENWAY TRAIL PHASE 1

CROSS SECTIONS

WEST DES MOINES, IOWA

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Project No: 1190863

Sheet W.21

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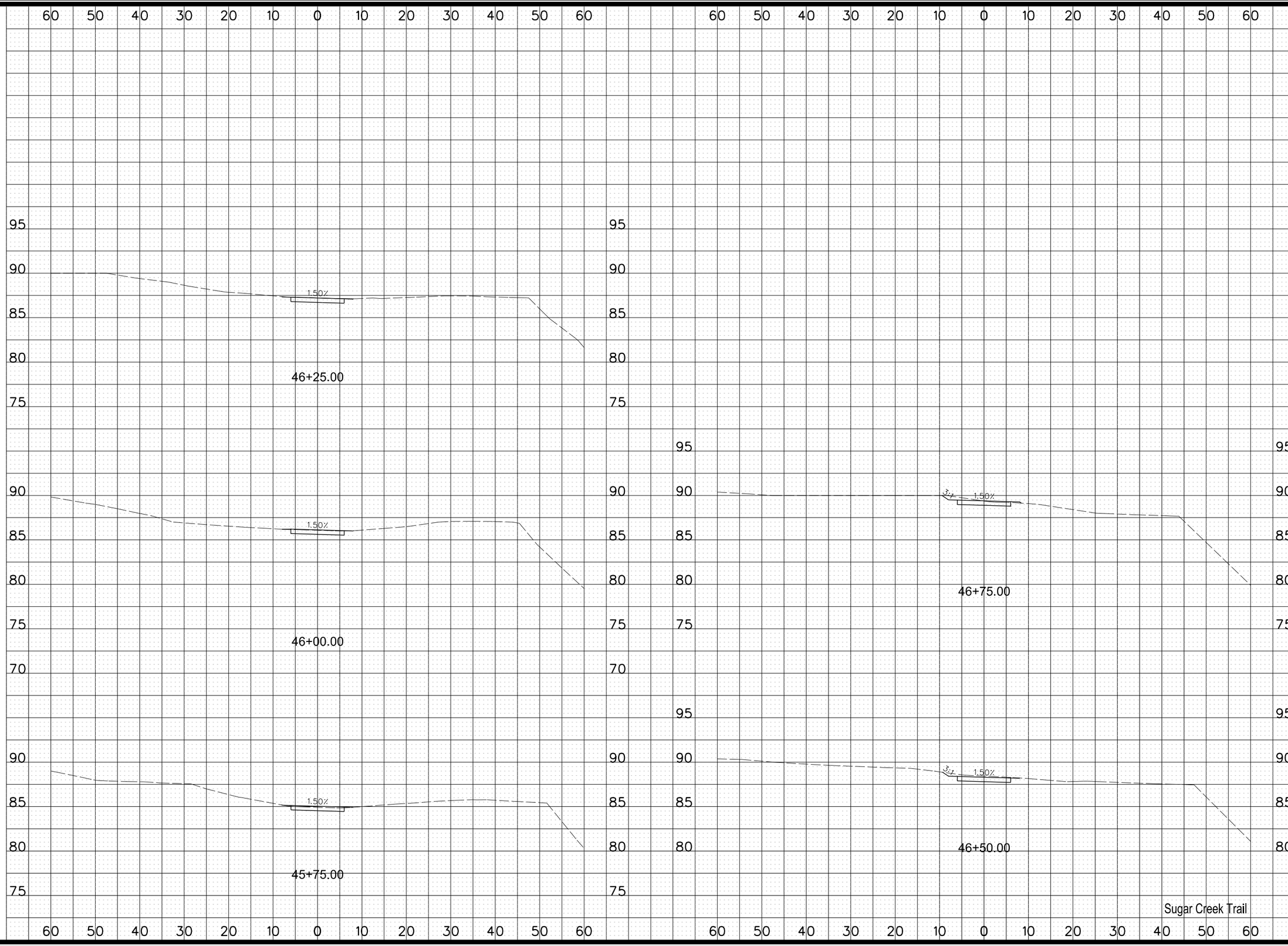

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet W.22

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet W.22

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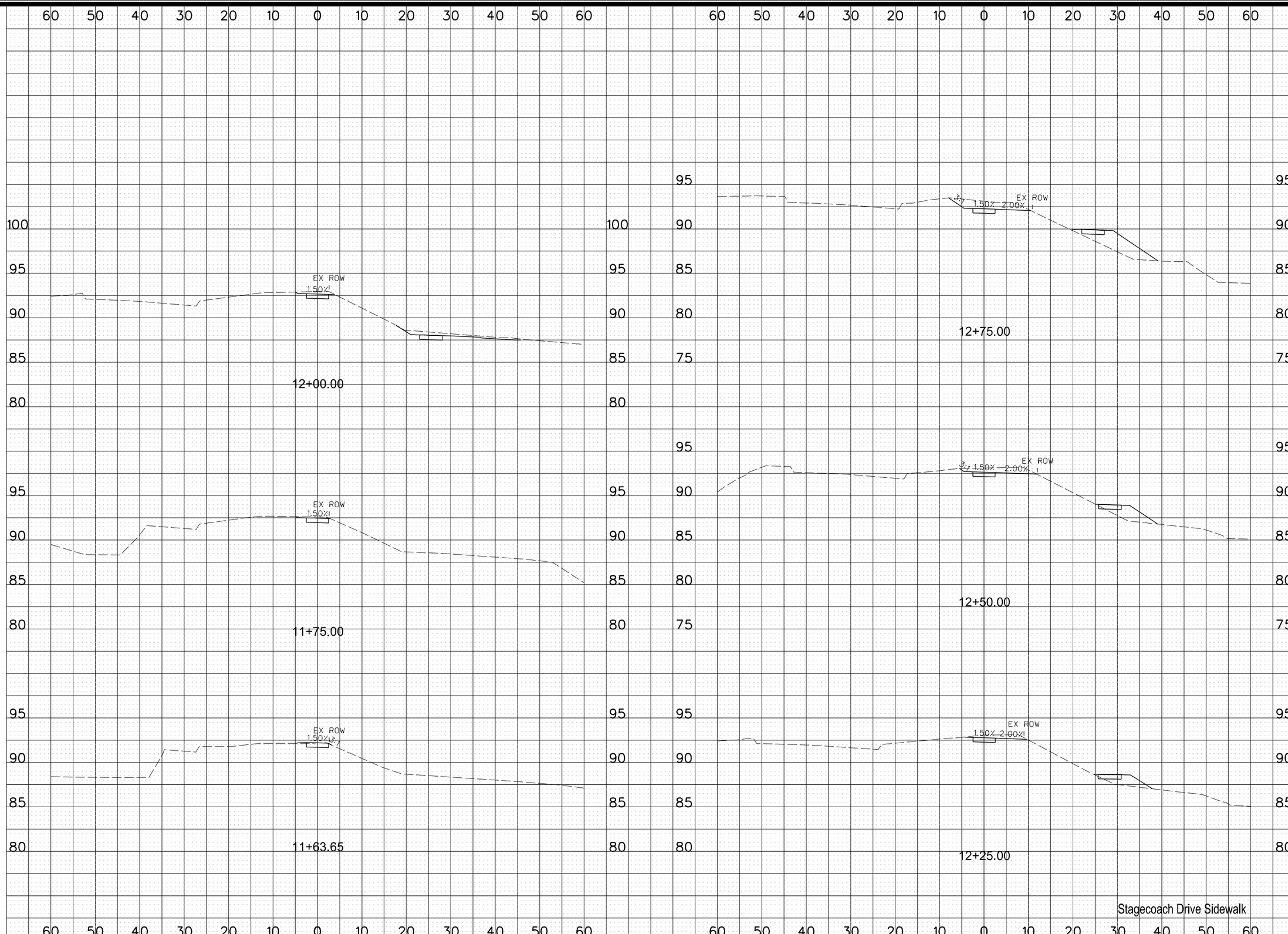

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 04/08/20 | Field Bk: | Pg:

Project No: 1190863

Sheet X.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

CROSS SECTIONS

WEST DES MOINES, IOWA

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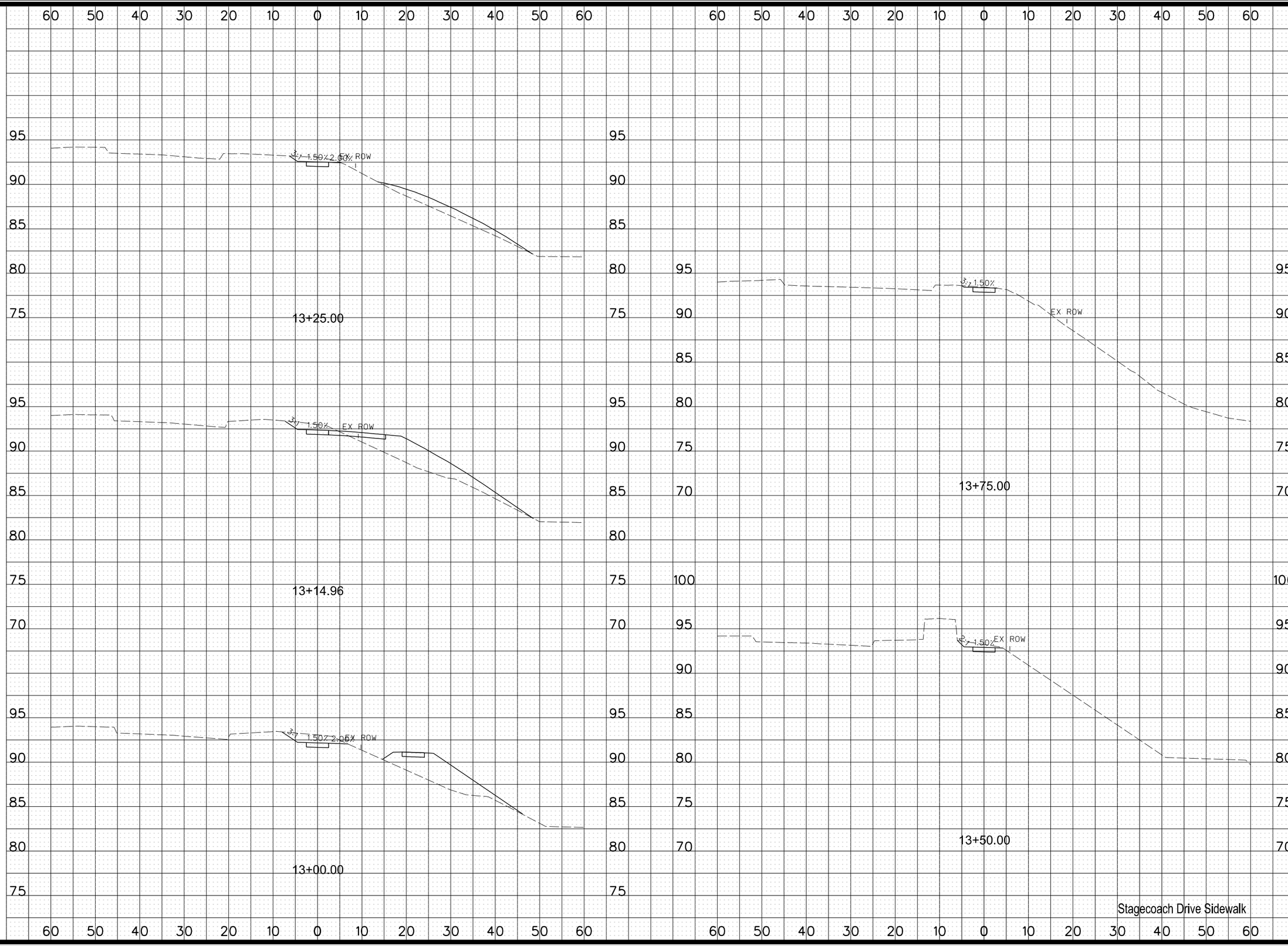
Project No: 1190863

Sheet X.1



MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet X.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

CROSS SECTIONS

WEST DES MOINES, IOWA

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Project No: 1190863

Sheet X.2

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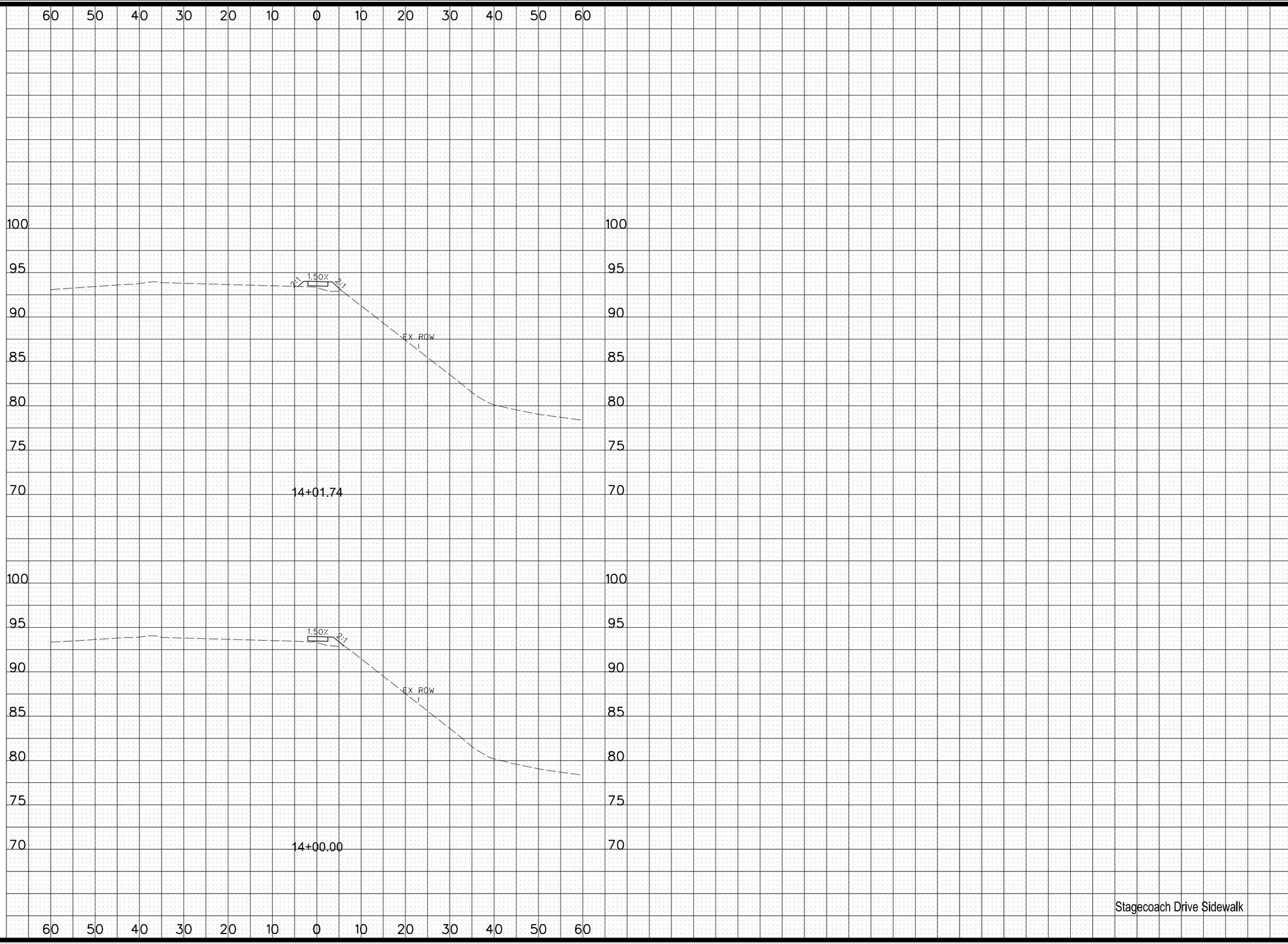

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet X.3

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Sheet X.3

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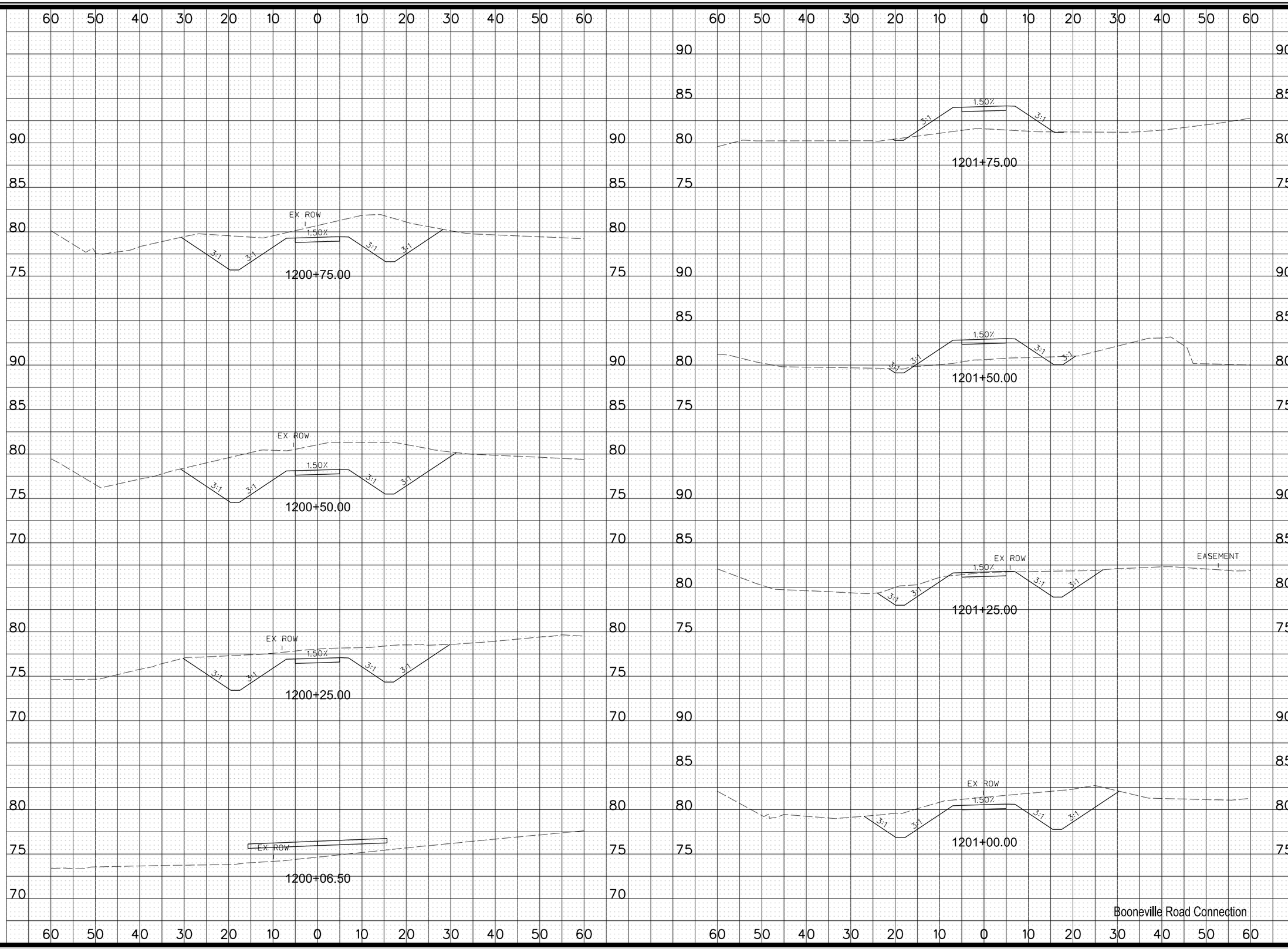

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 04/08/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.1

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet Y.1

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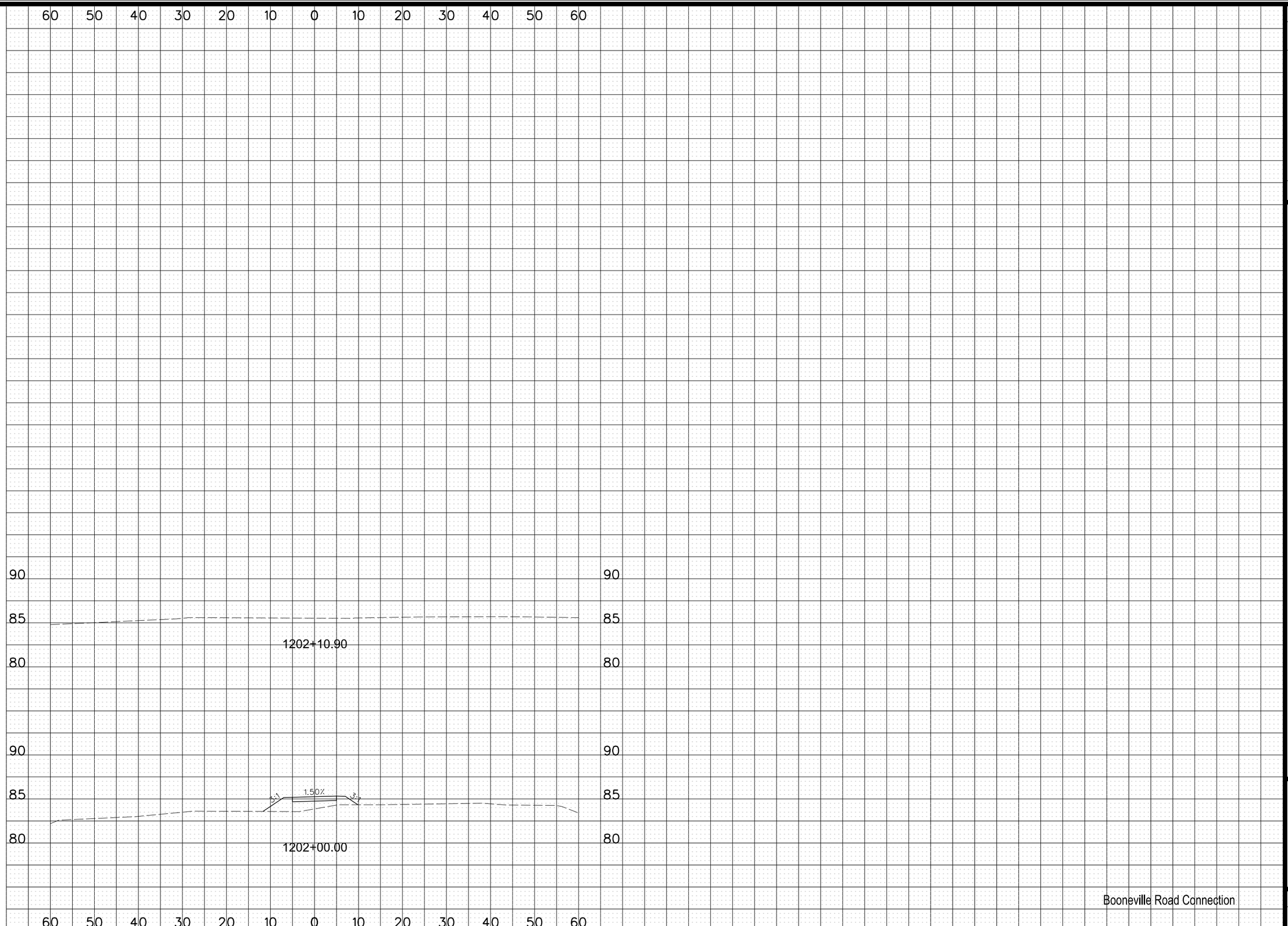

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.2

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet Y.2

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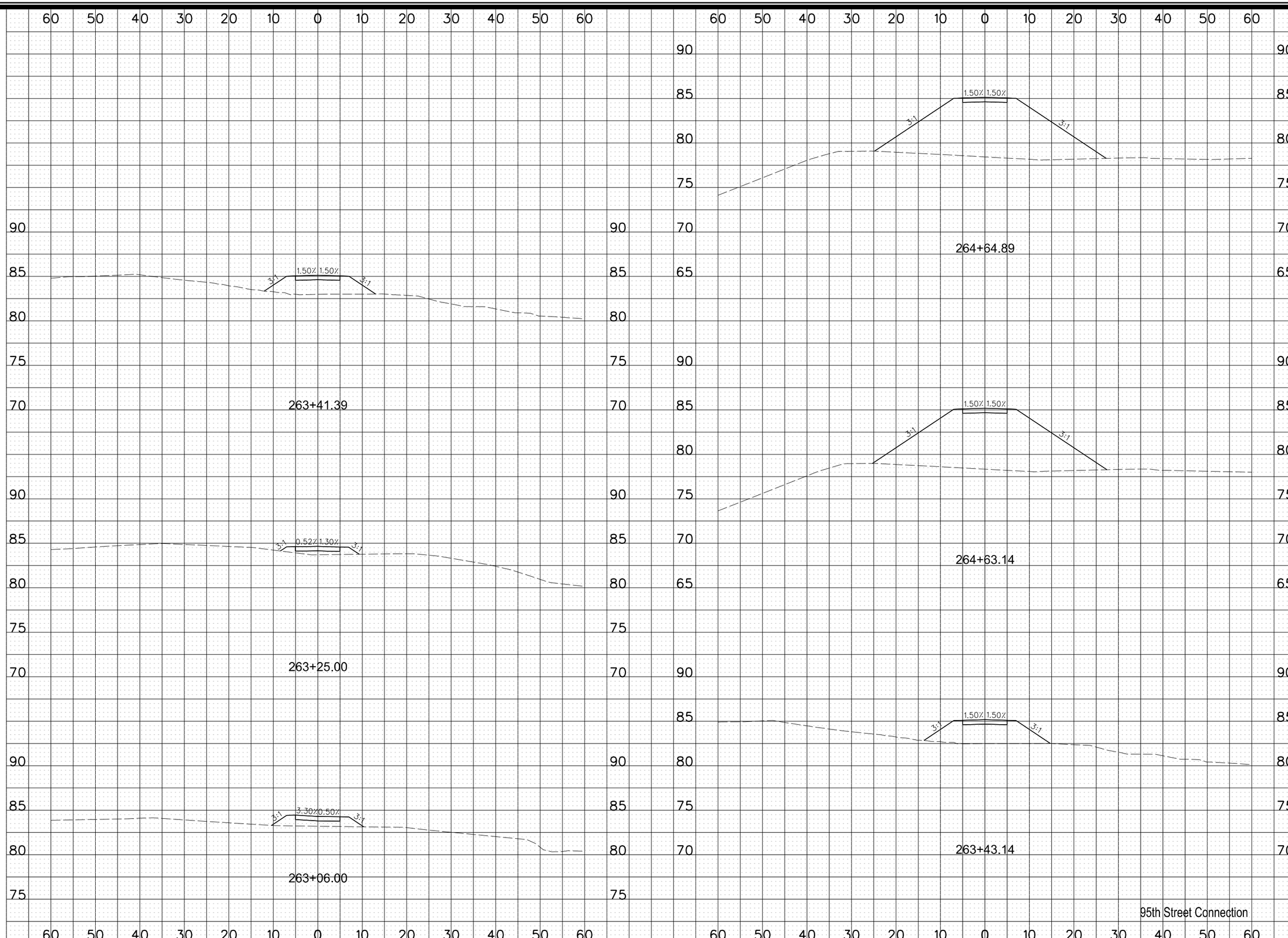

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 04/08/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.3

SUGAR CREEK GREENWAY TRAIL PHASE 1

CROSS SECTIONS

WEST DES MOINES, IOWA

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Project No: 1190863

Sheet Y.3

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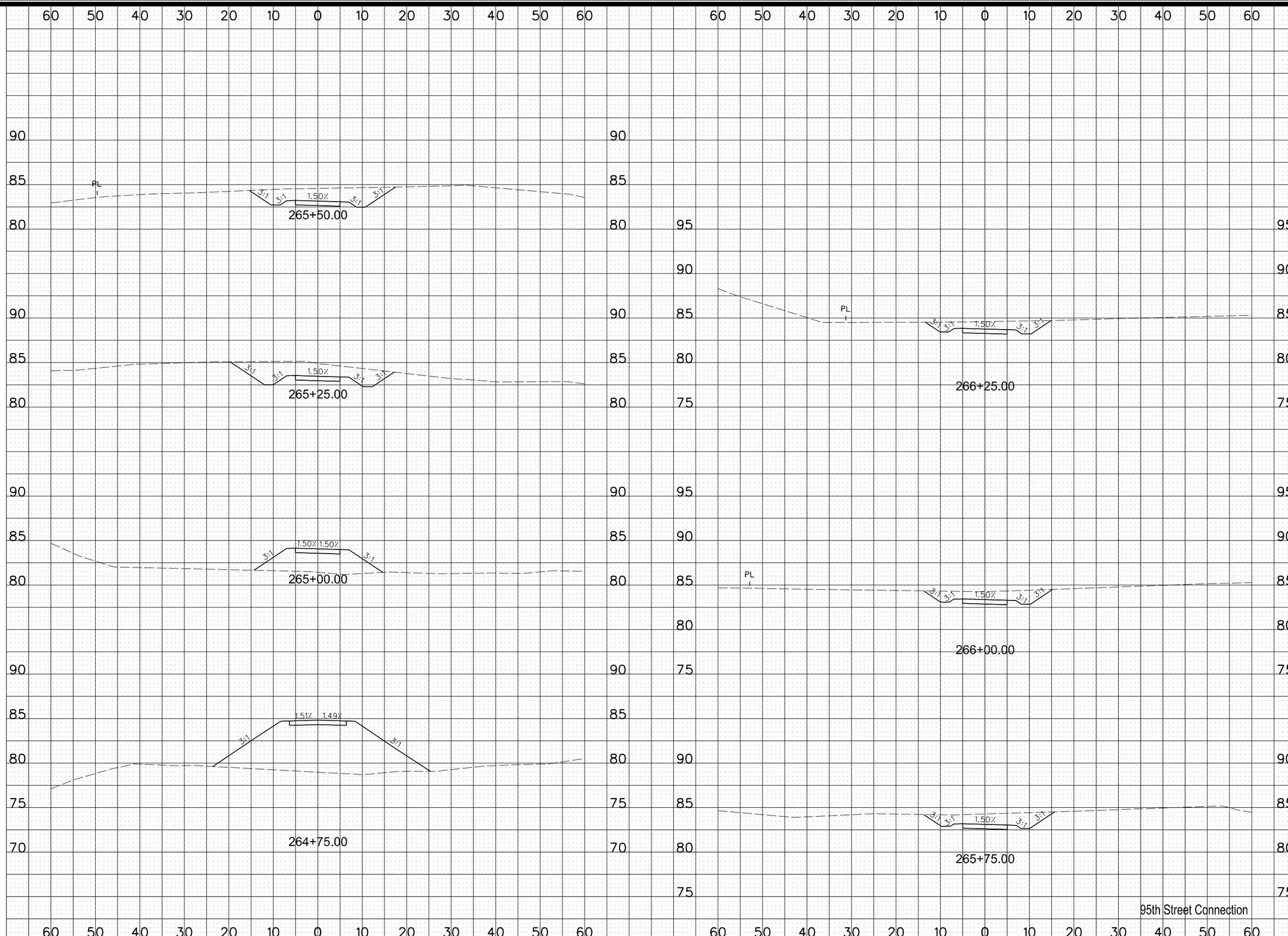

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.4

SUGAR CREEK GREENWAY TRAIL PHASE 1

CROSS SECTIONS

WEST DES MOINES, IOWA

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Project No: 1190863

Sheet Y.4

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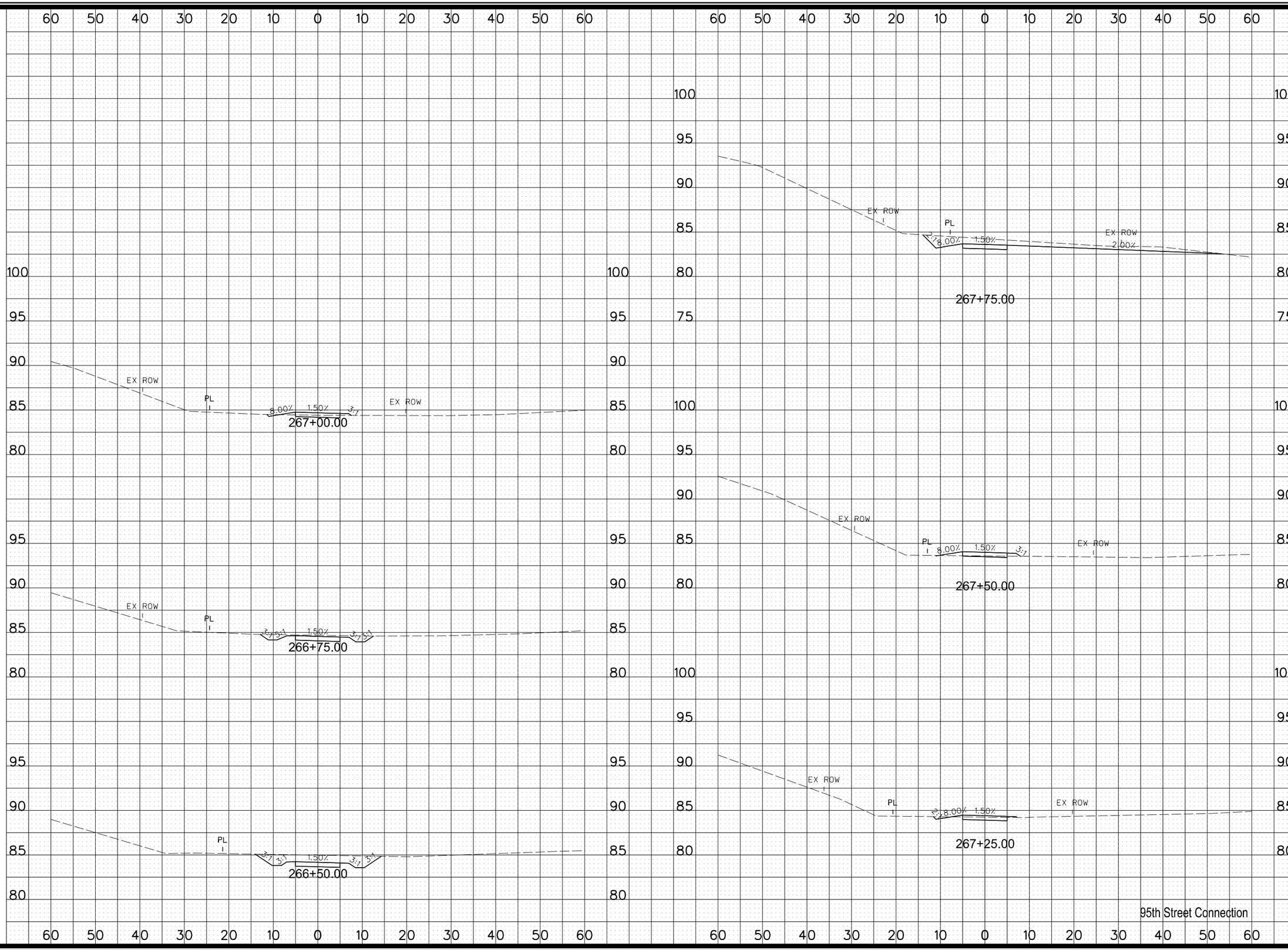

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.5

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet Y.5

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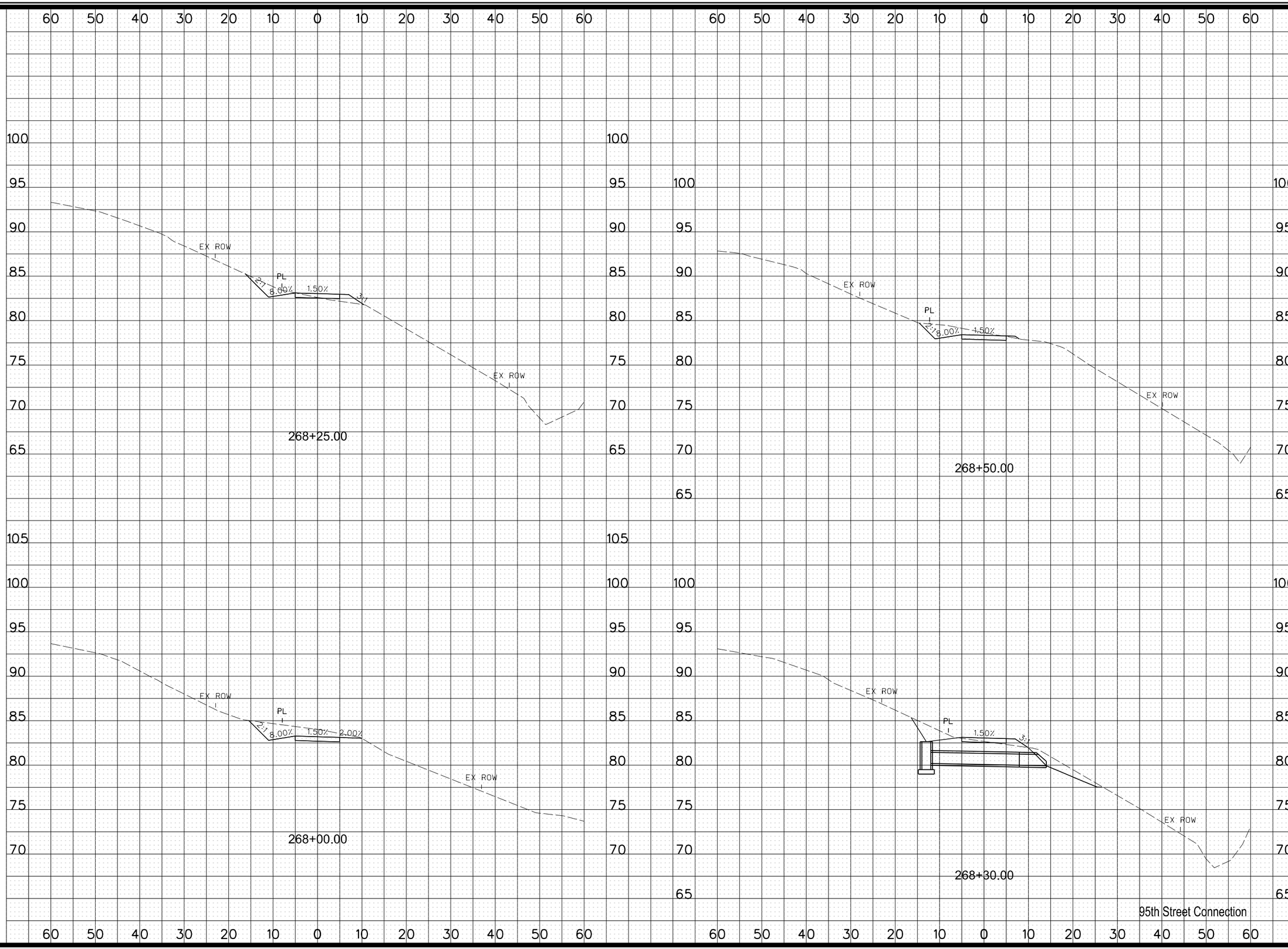

MARK	REVISION	DATE	BY

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Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.6

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

SNYDER & ASSOCIATES, INC.
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Project No: 1190863

Sheet Y.6

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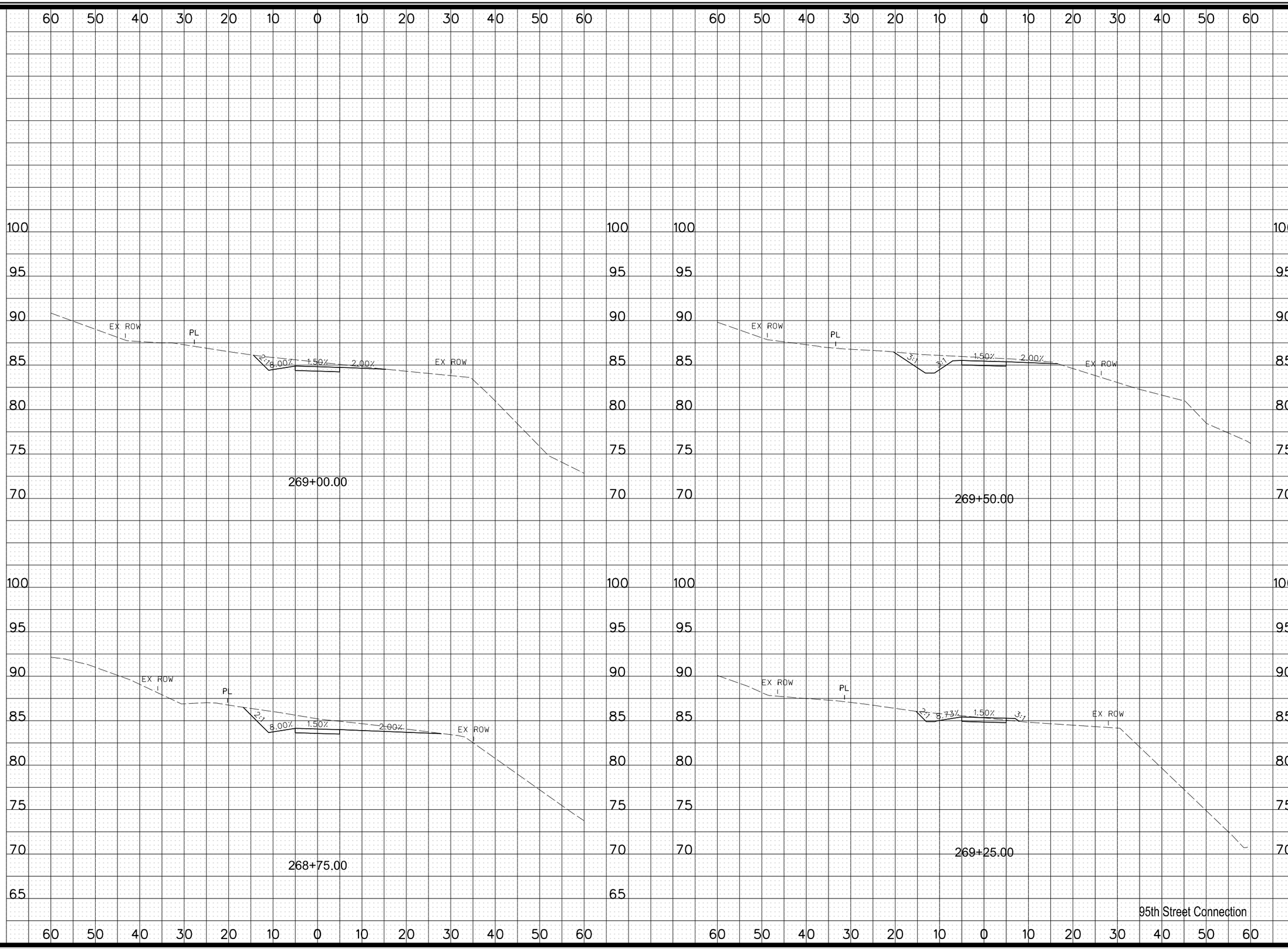

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: Pg:

Project No: 1190863

Sheet Y.7

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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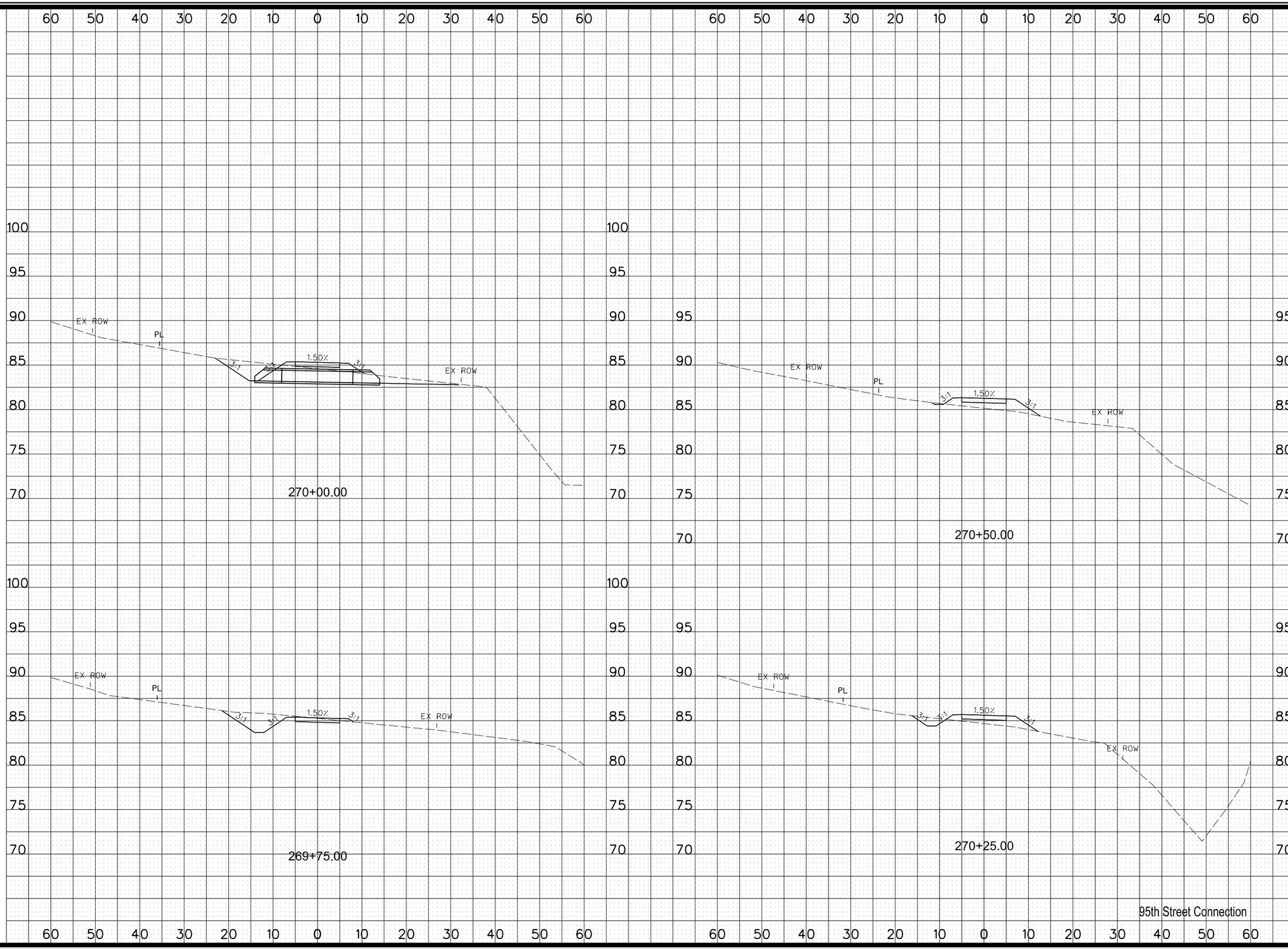
Project No: 1190863

Sheet Y.7



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Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.8

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet Y.8

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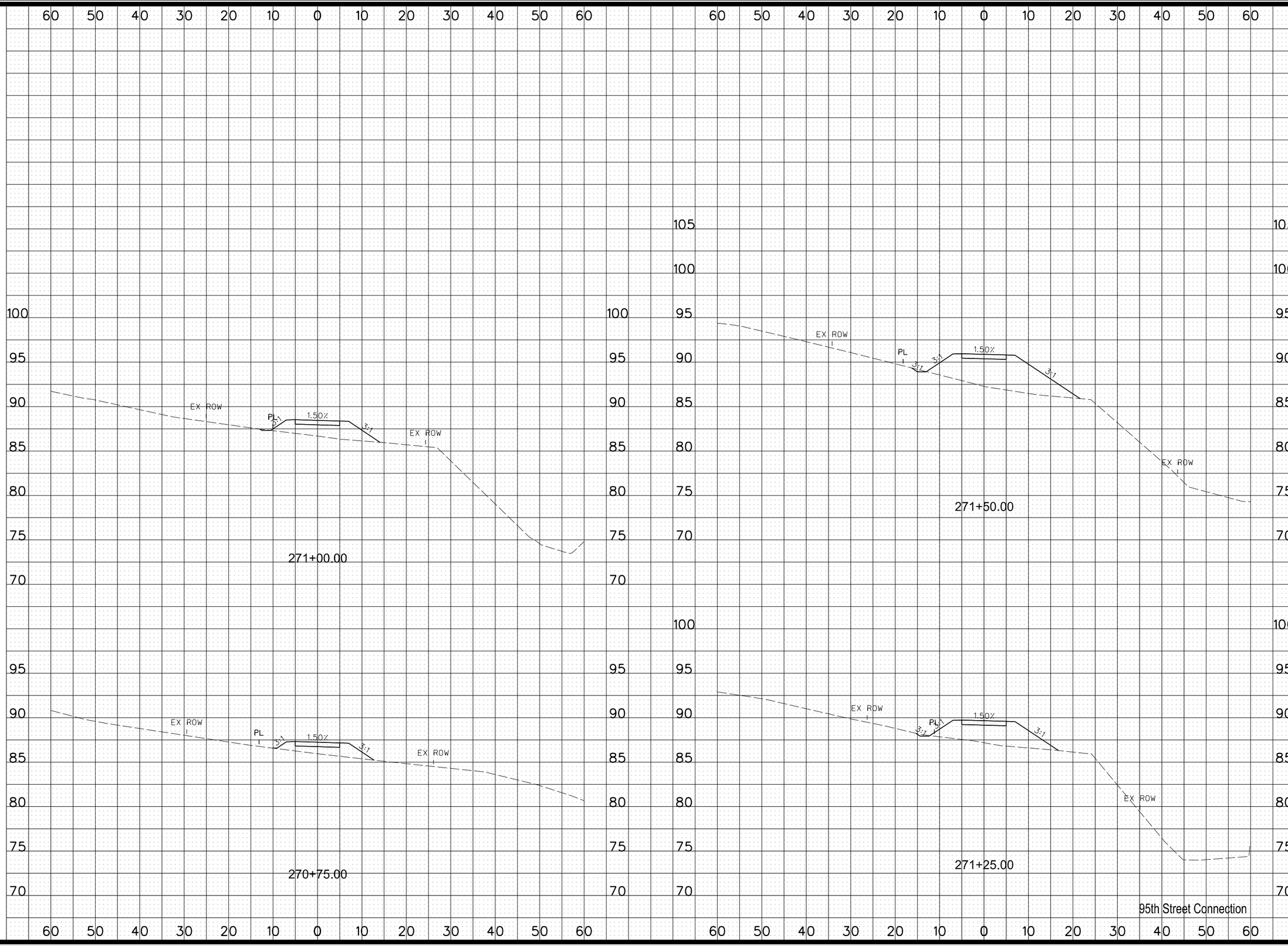

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.9

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet Y.9

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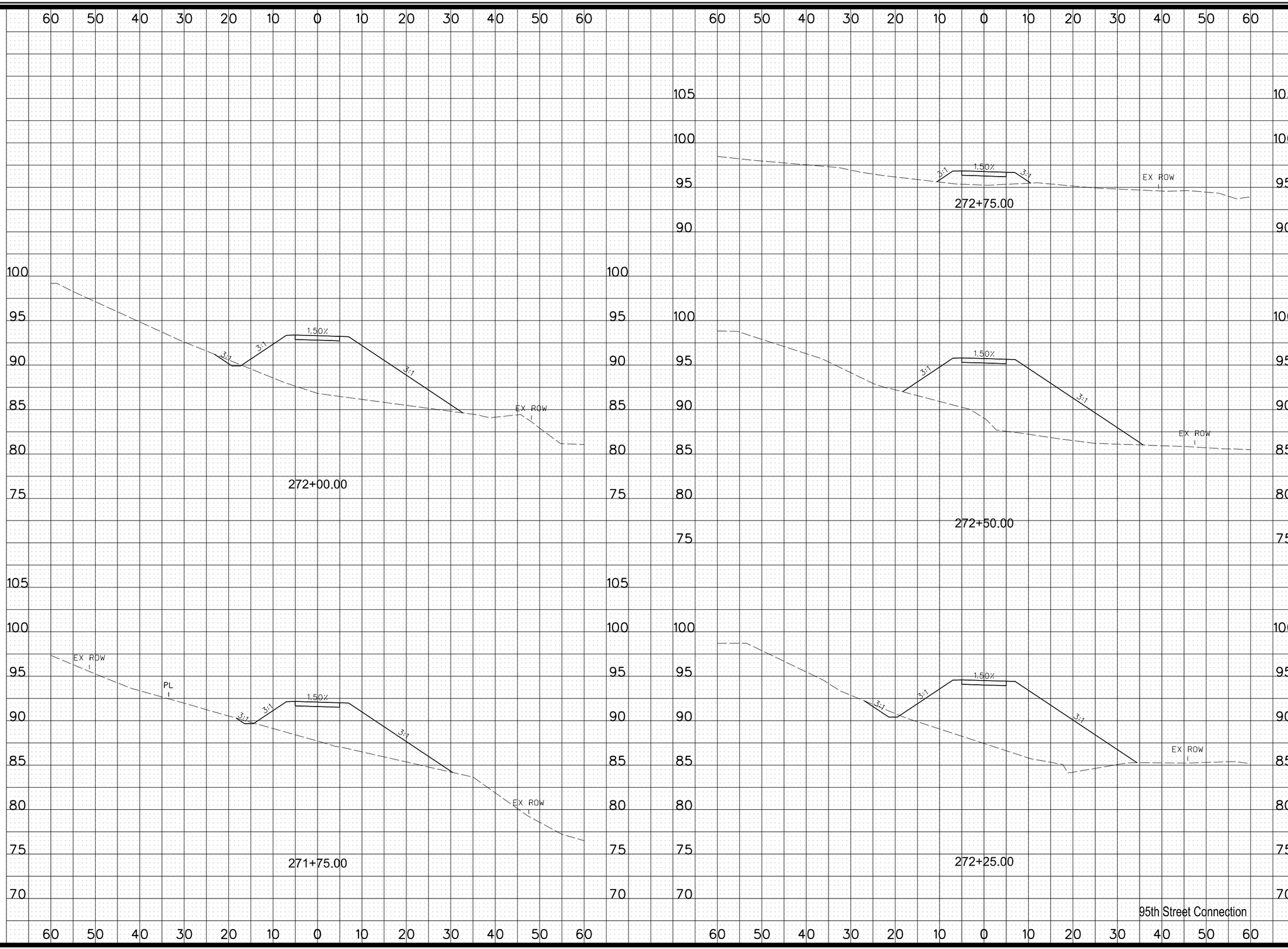

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.10

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet Y.10

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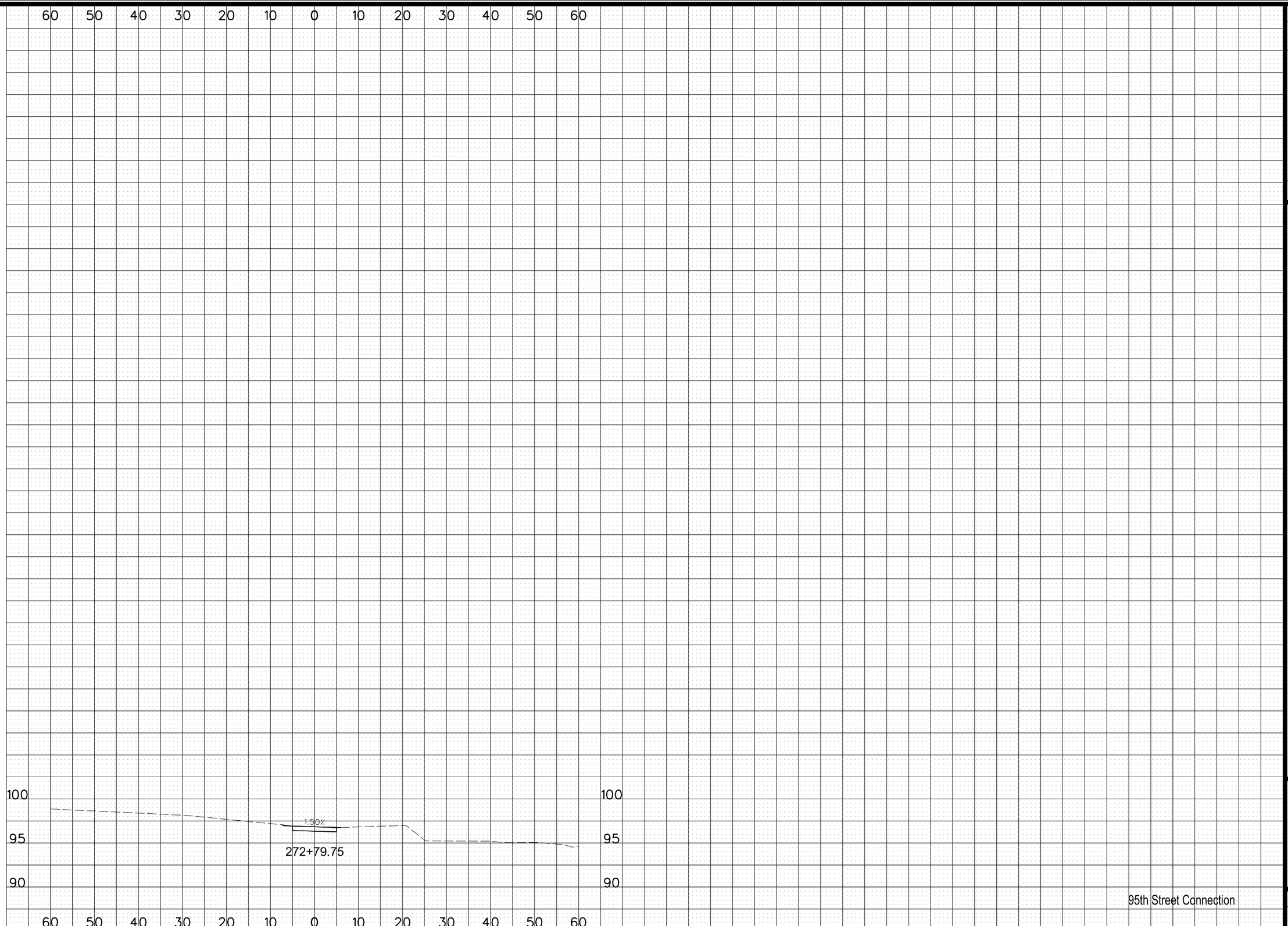

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.11

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

SNYDER & ASSOCIATES, INC.
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Project No: 1190863

Sheet Y.11

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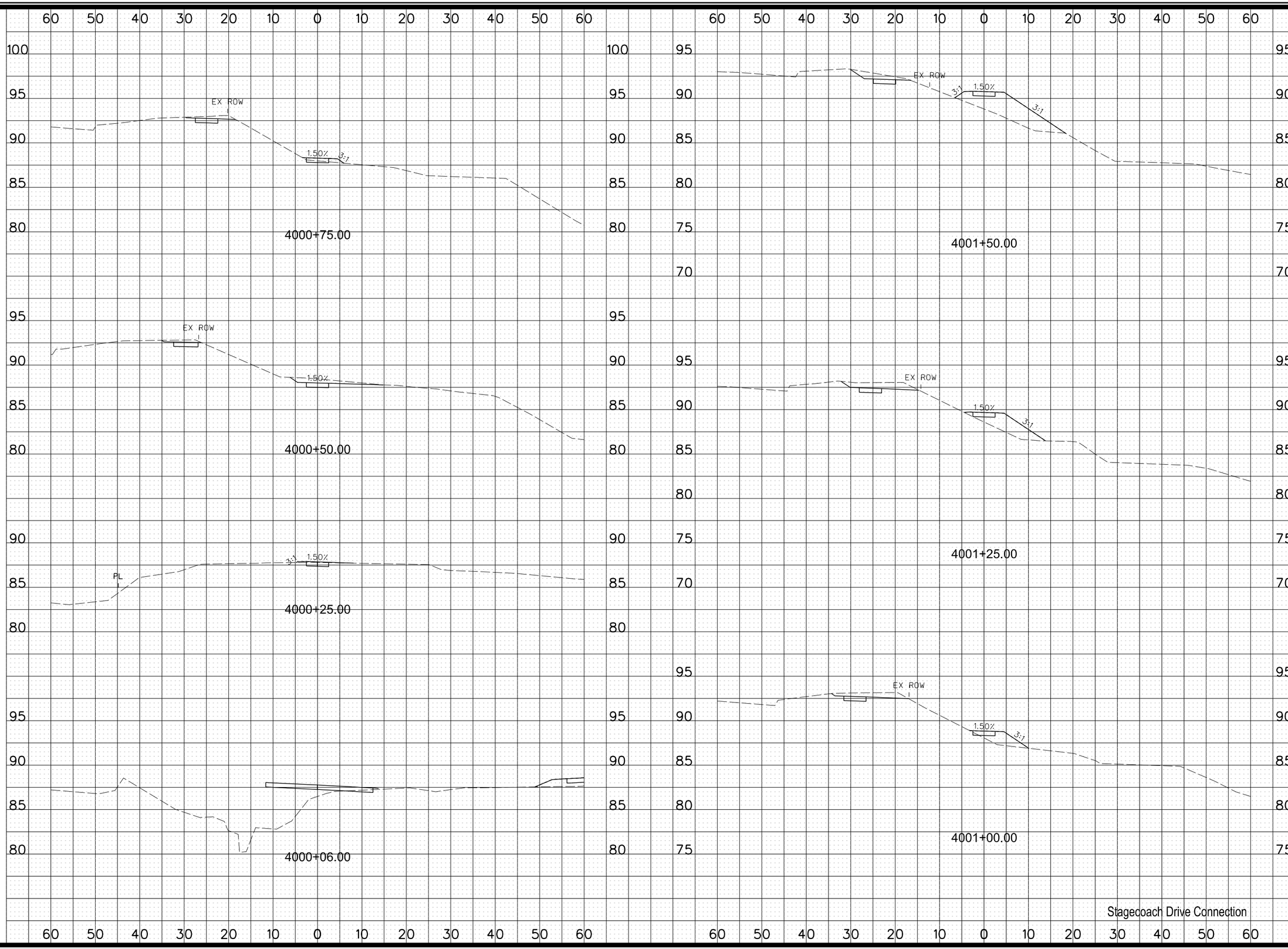

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 04/08/20 | Field Bk: | Pg:

Project No: 1190863 | Sheet Y.12

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863
Sheet Y.12

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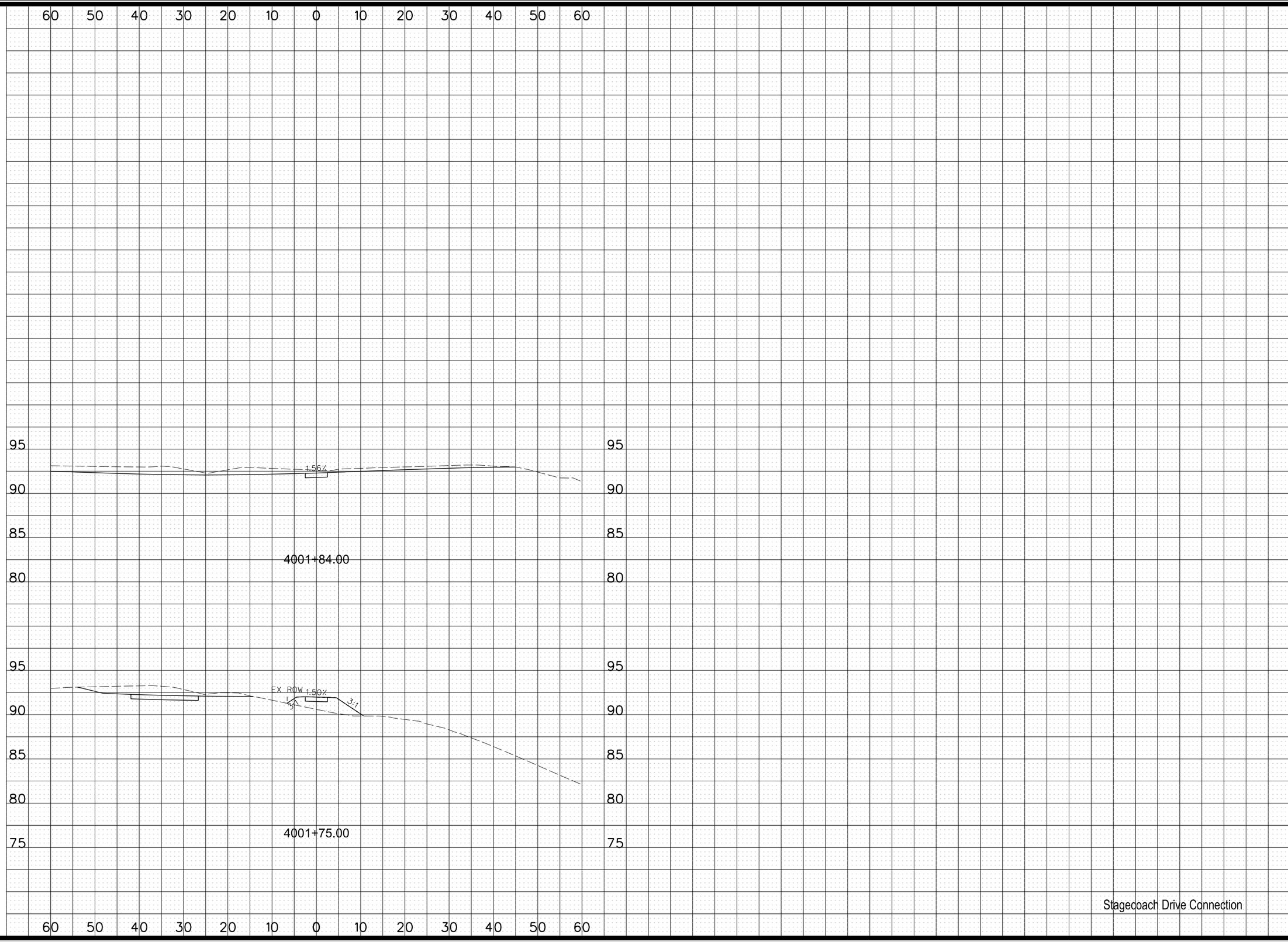

MARK	REVISION	DATE	BY

Engineer: RP | Checked By: TNJ | Scale: 1"= 10'
Technician: MLB | Date: 02/17/20 | Field Bk: | Pg:

Project No: 1190863

Sheet Y.13

SUGAR CREEK GREENWAY TRAIL PHASE 1

WEST DES MOINES, IOWA

CROSS SECTIONS

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Project No: 1190863

Sheet Y.13

Y:\pen\Gate.tbl
V:\BWheel\Region\CP.pltcfg
Default
1:20
6/17/2020
2:43:32 PM
MBEREADS
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