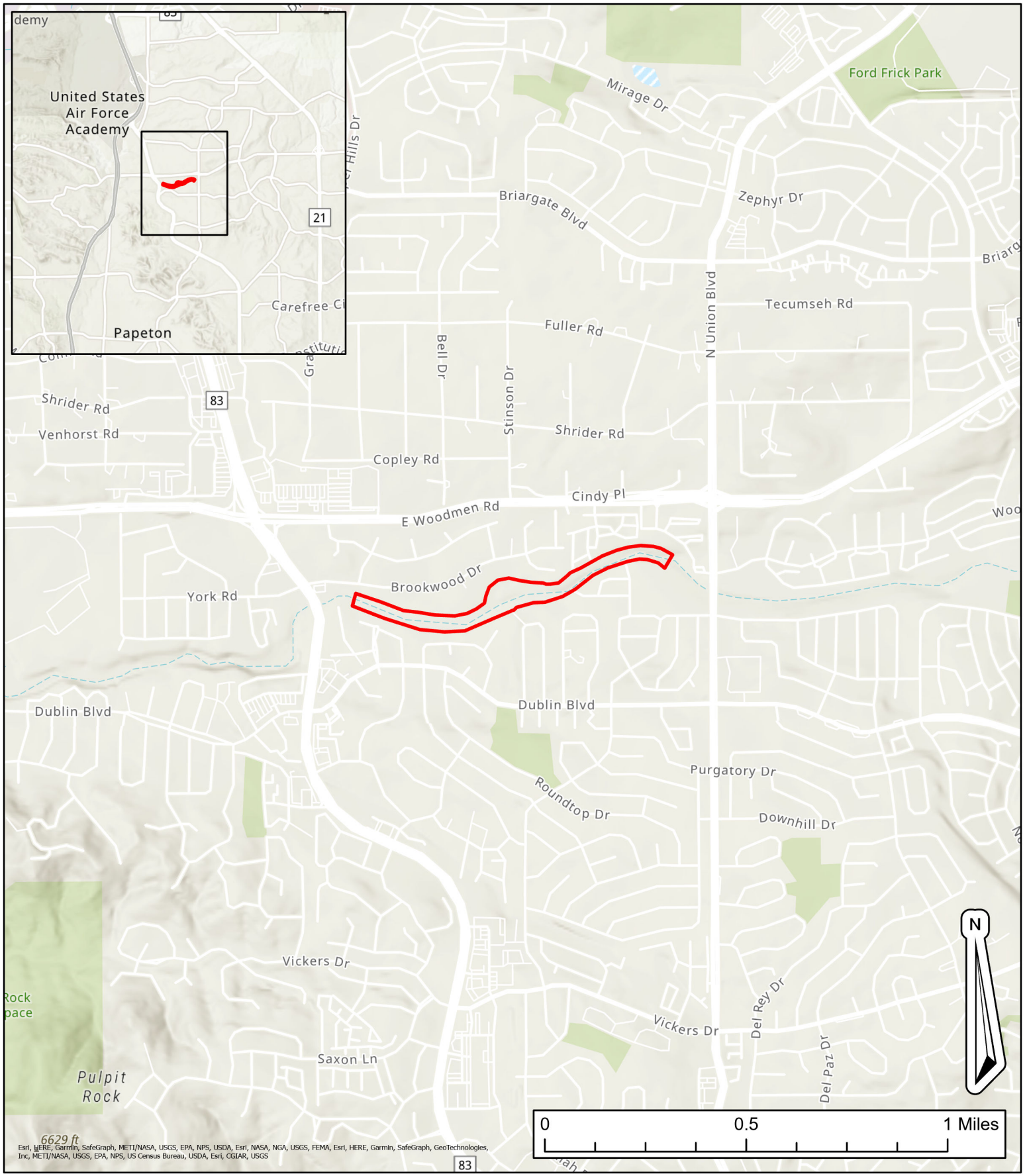


Cottonwood Creek

S9 T13S R66W
UTM NAD 83: Zone 13N;
518694 m E, 4308990 m N
38.929636°, -104.784324°
USGS Pikeview, CO Quadrangle

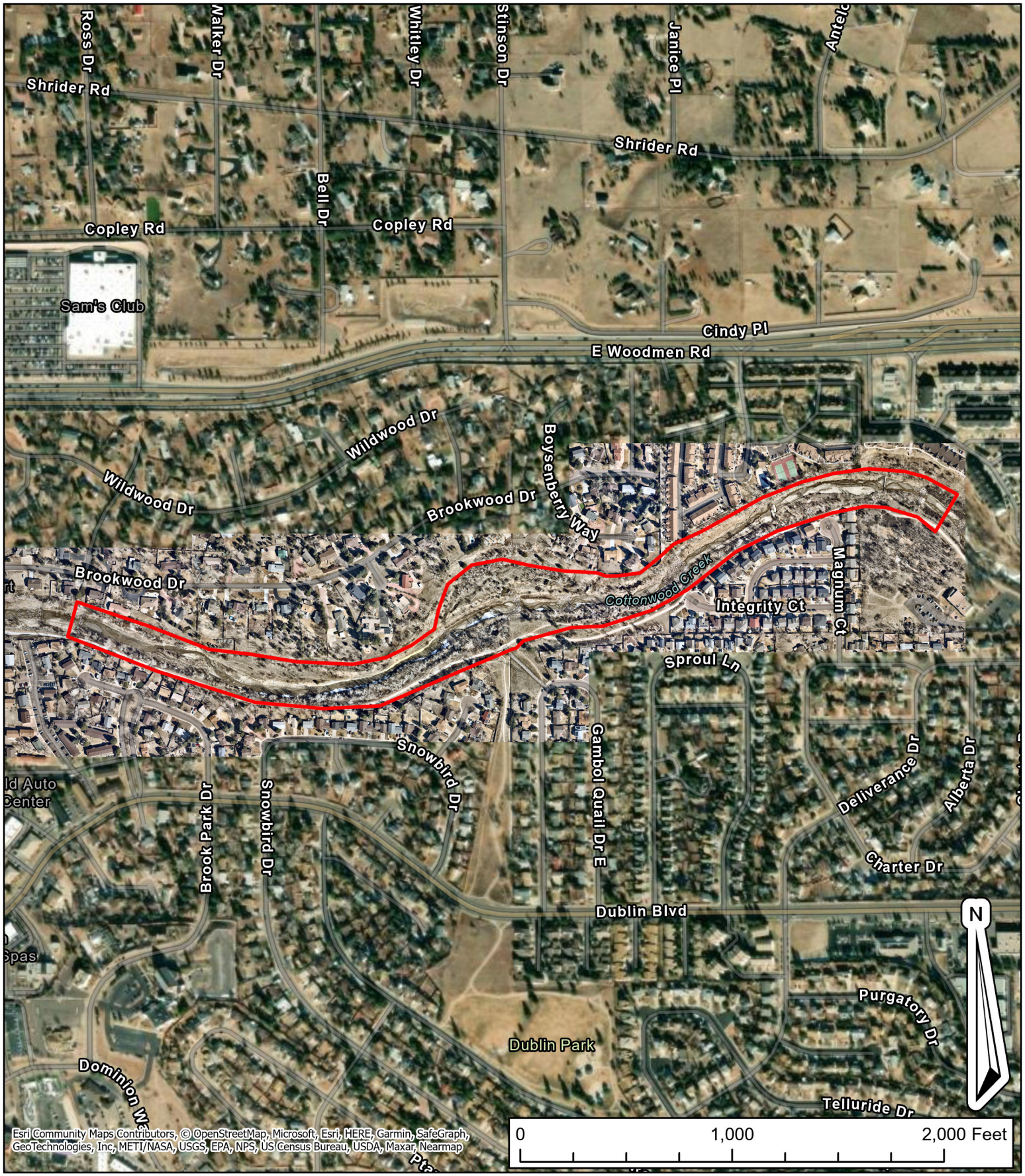
Study Area

1 inch = 0.3 miles

FIGURE 1
REGIONAL MAP

CORVUS

Colorado Springs, El Paso County
Date: 8/31/2023



Cottonwood Creek

Study Area

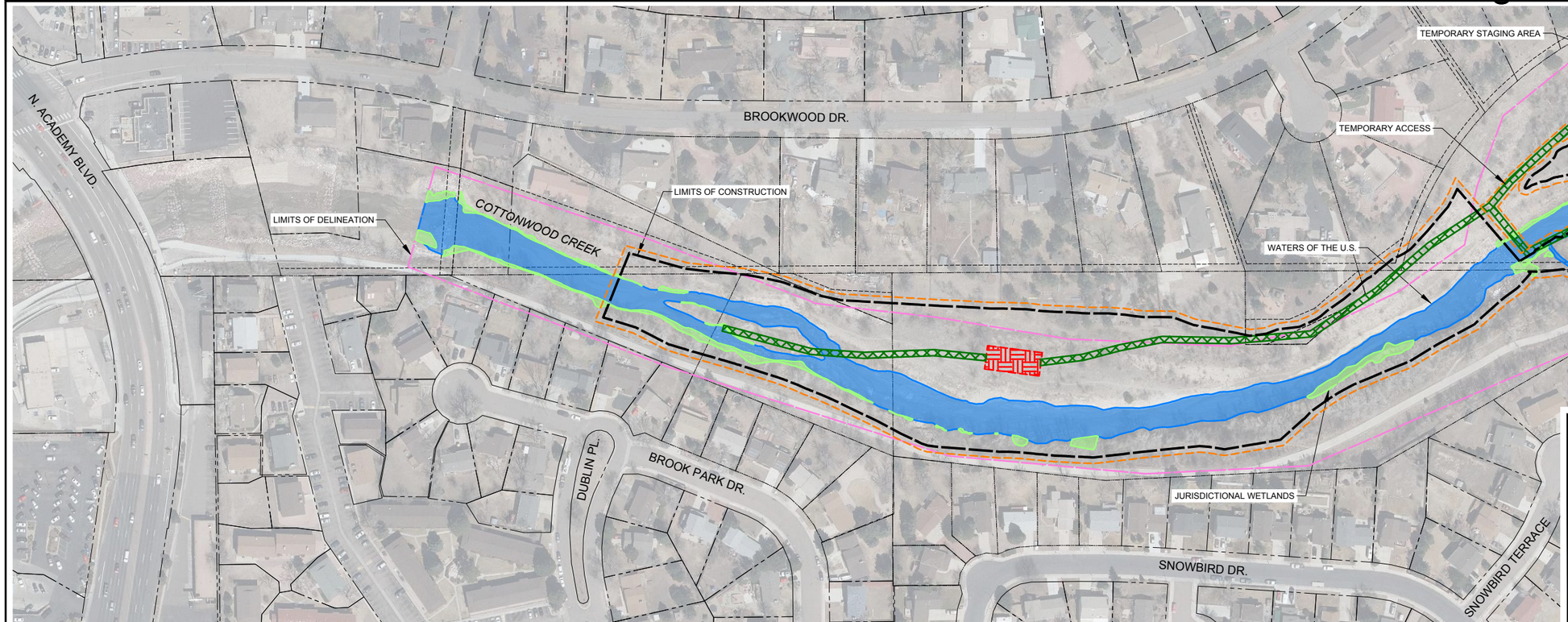
1 inch = 600 feet

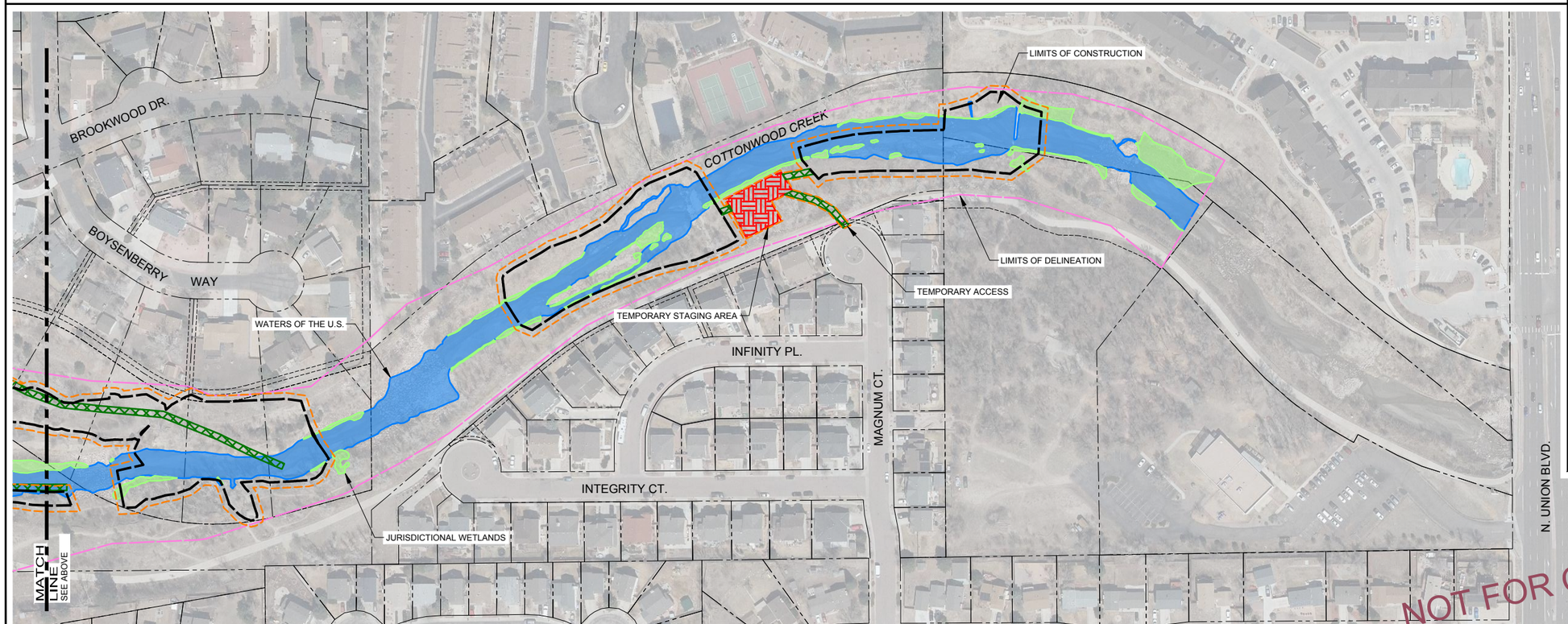
FIGURE 2
Project Overview

CORVUS

Colorado Springs, El Paso County
Map Date: 8/31/2023

Figure 5





N

0 50' 100' 200'
SCALE IN FEET

LEGEND:

- LIMITS OF DELINEATION
- WATERS OF THE UNITED STATES
- JURISDICTIONAL WETLANDS
- LIMITS OF DISTURBANCE
- LIMITS OF CONSTRUCTION
- TEMPORARY CONSTRUCTION ACCESS
- TEMPORARY CONSTRUCTION STAGING
- PARCELS

PERMANENT IMPACTS WITHIN LIMITS OF CONSTRUCTION	
WATERS	2.79 AC
WETLANDS	0.29 AC
TEMPORARY IMPACTS WITHIN LIMITS OF CONSTRUCTION	
WATERS	0.28 AC
WETLANDS	0.03 AC
CUT/FILL IMPACTS	
WATERS	CUT: 550 CY
	FILL: 18169 CY
WETLANDS	CUT: 231 CY
	FILL: 1154 CY

TEMPORARY IMPACTS OCCUR ON REGIONS THAT ARE ONLY USED FOR TRANSPORTATION BETWEEN CONSTRUCTION AREAS (ESTIMATED AS A 10' BUFFER).

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions | Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

WOTUS IMPACTS

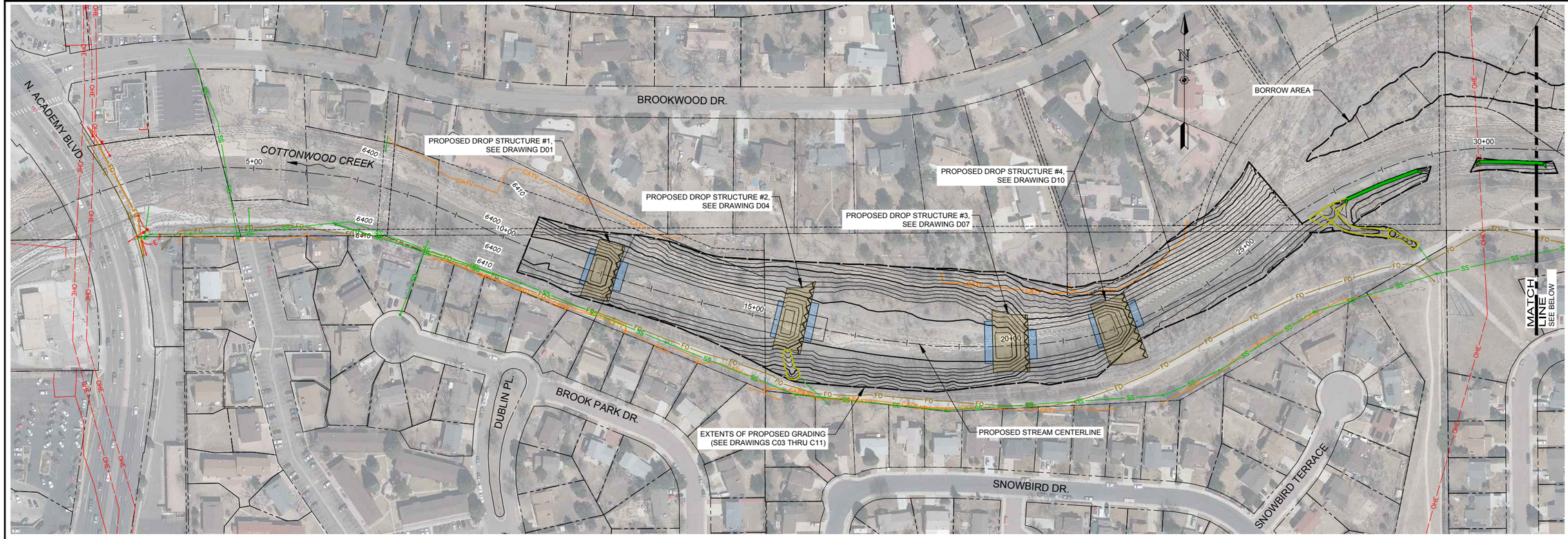
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

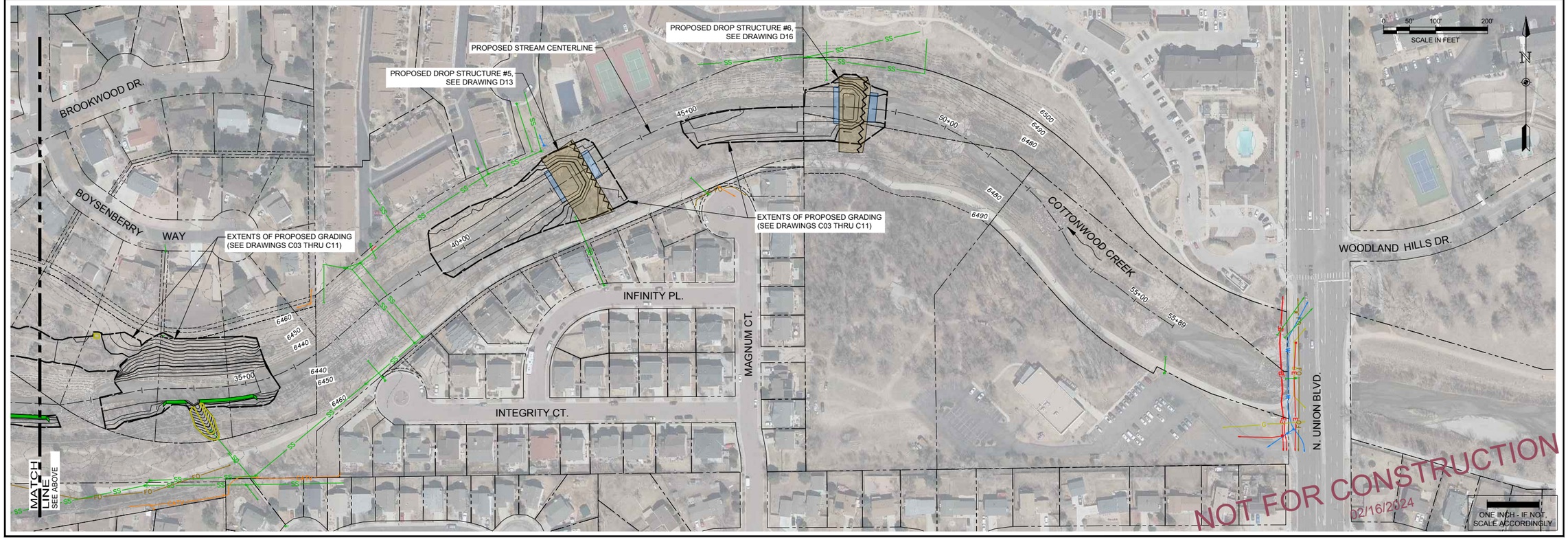
PROJECT NO. 36-4715.01

DRAWING NO. W01

SHEET 64 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 WOTUS IMPACTS.DWG Friday, February 16, 2024 1:48 PM By: RICKS, RONALD





Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PROJECT PLAN.DWG Friday, February 16, 2024 5:42 PM By: RICKS, RONALD

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

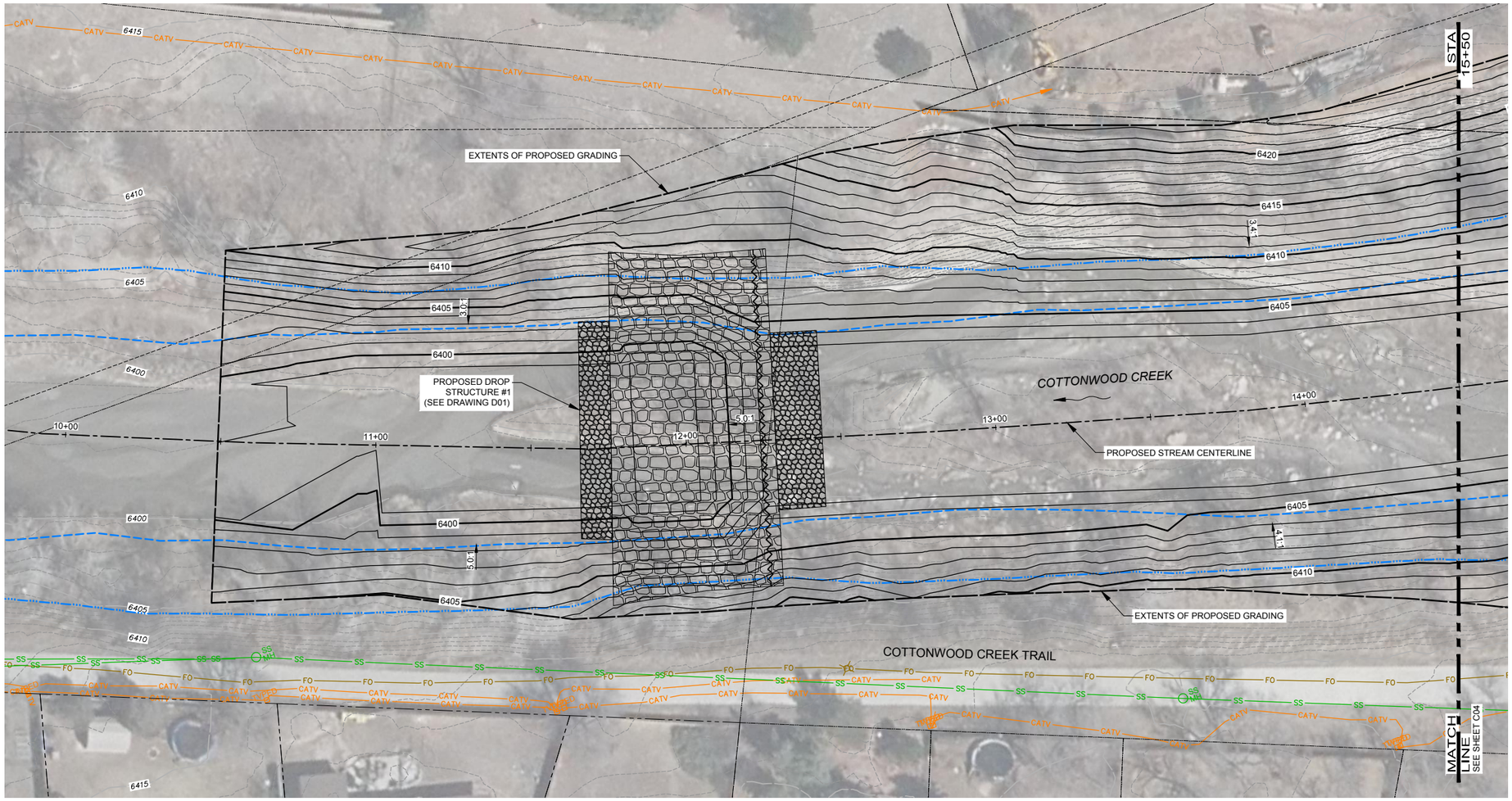
OVERALL SITE PLAN

Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

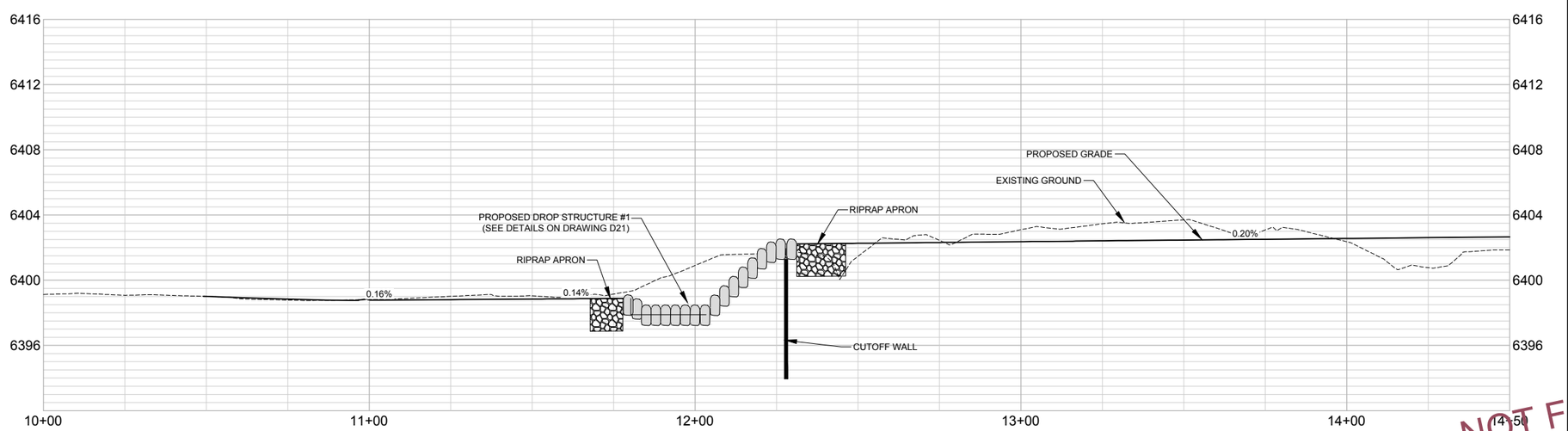
PROJECT NO. 36-4715.01

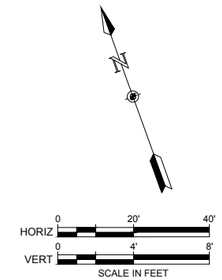
DRAWING NO. C02

SHEET 6 OF 64



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

PLAN AND PROFILE

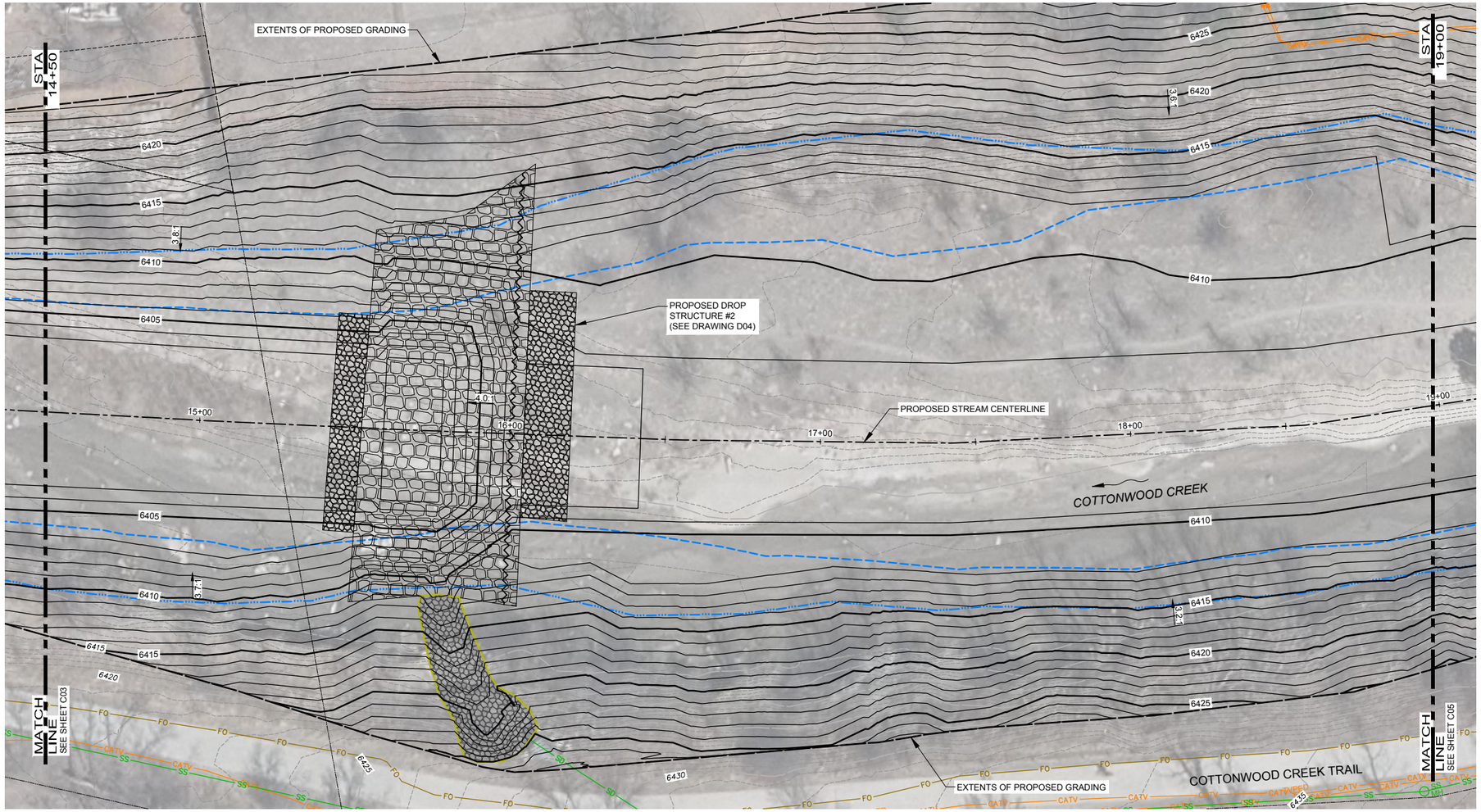
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

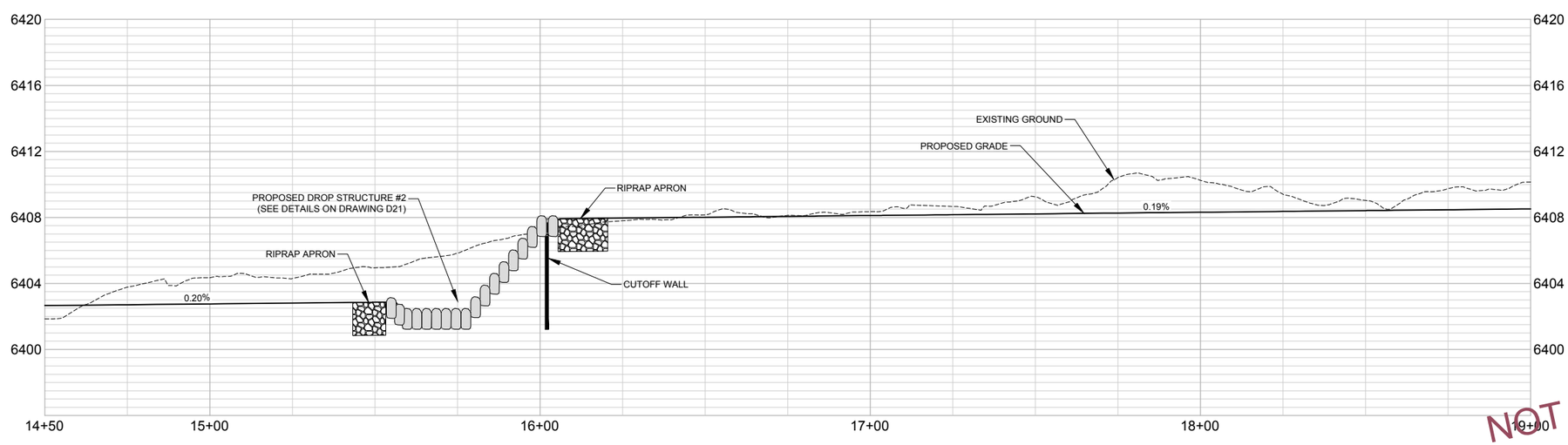
DRAWING NO. C03

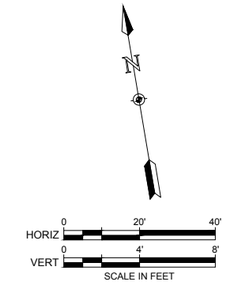
SHEET 7 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 1.DWG Friday, February 16, 2024 5:28 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

PLAN AND PROFILE

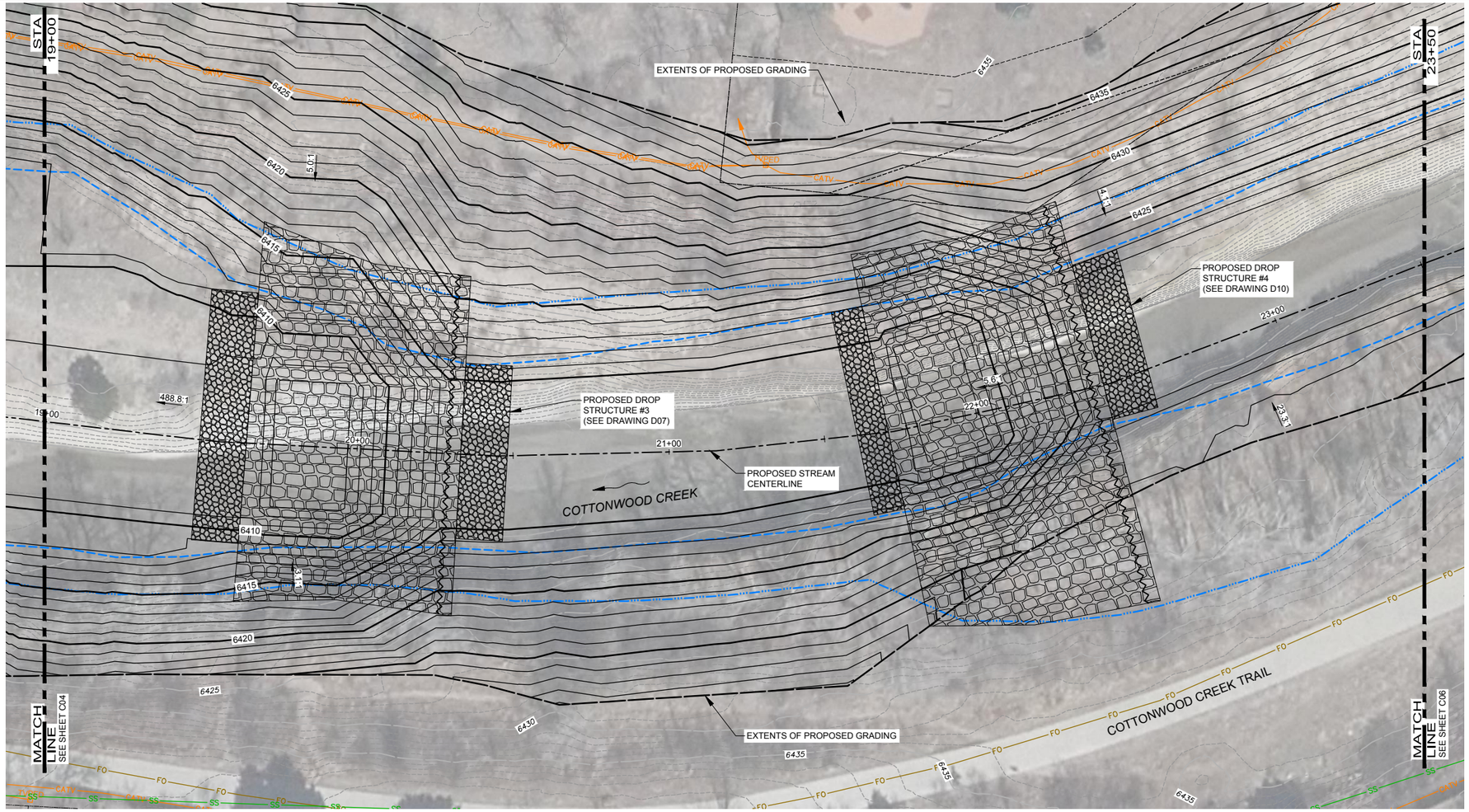
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

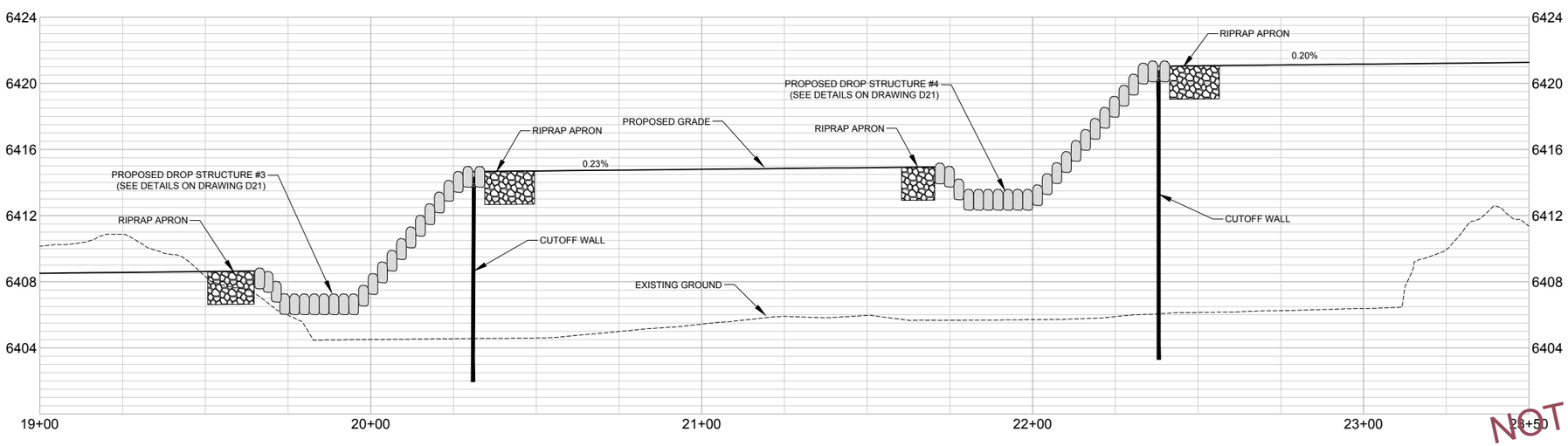
DRAWING NO. C04

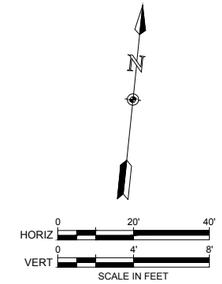
SHEET 8 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 1.DWG Friday, February 16, 2024 5:28 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

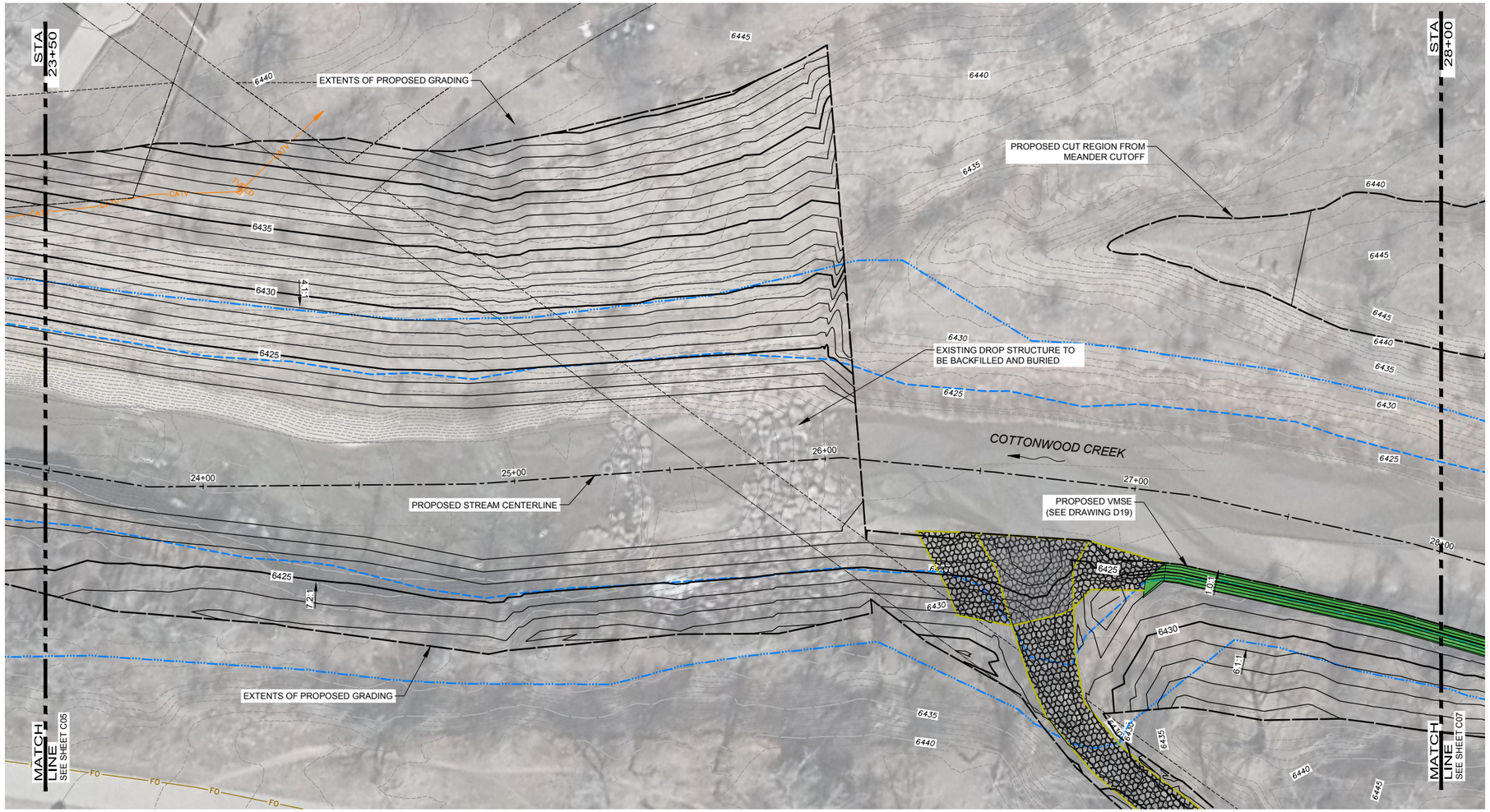
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION
PLAN AND PROFILE

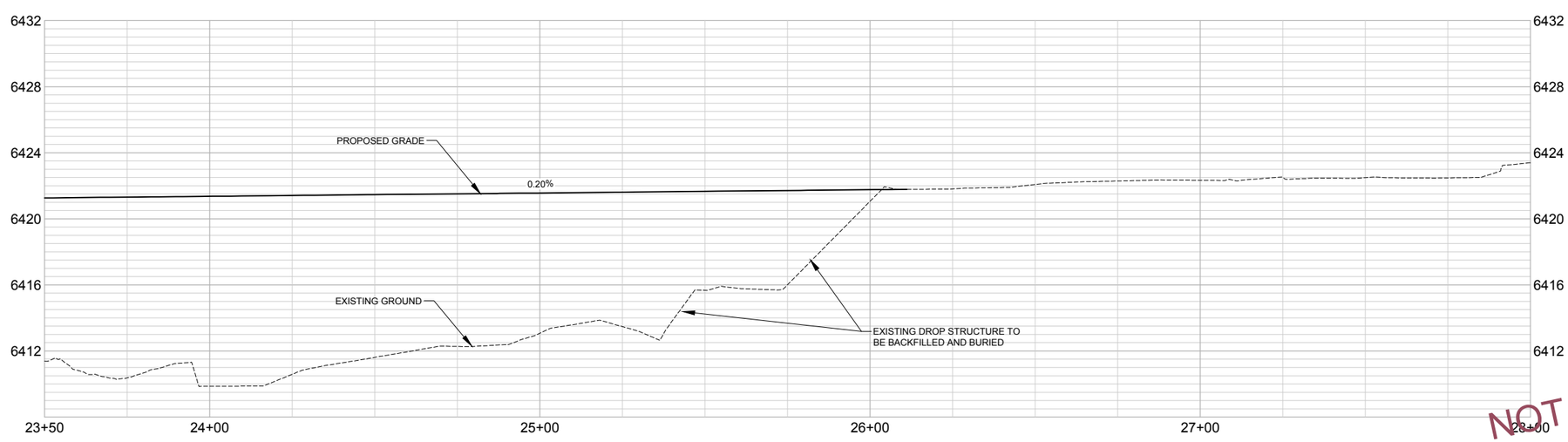
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

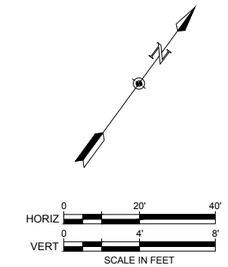
PROJECT NO. 36-4715.01
DRAWING NO. C05
SHEET 9 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 1.DWG Friday, February 16, 2024 5:28 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

XX

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

PLAN AND PROFILE

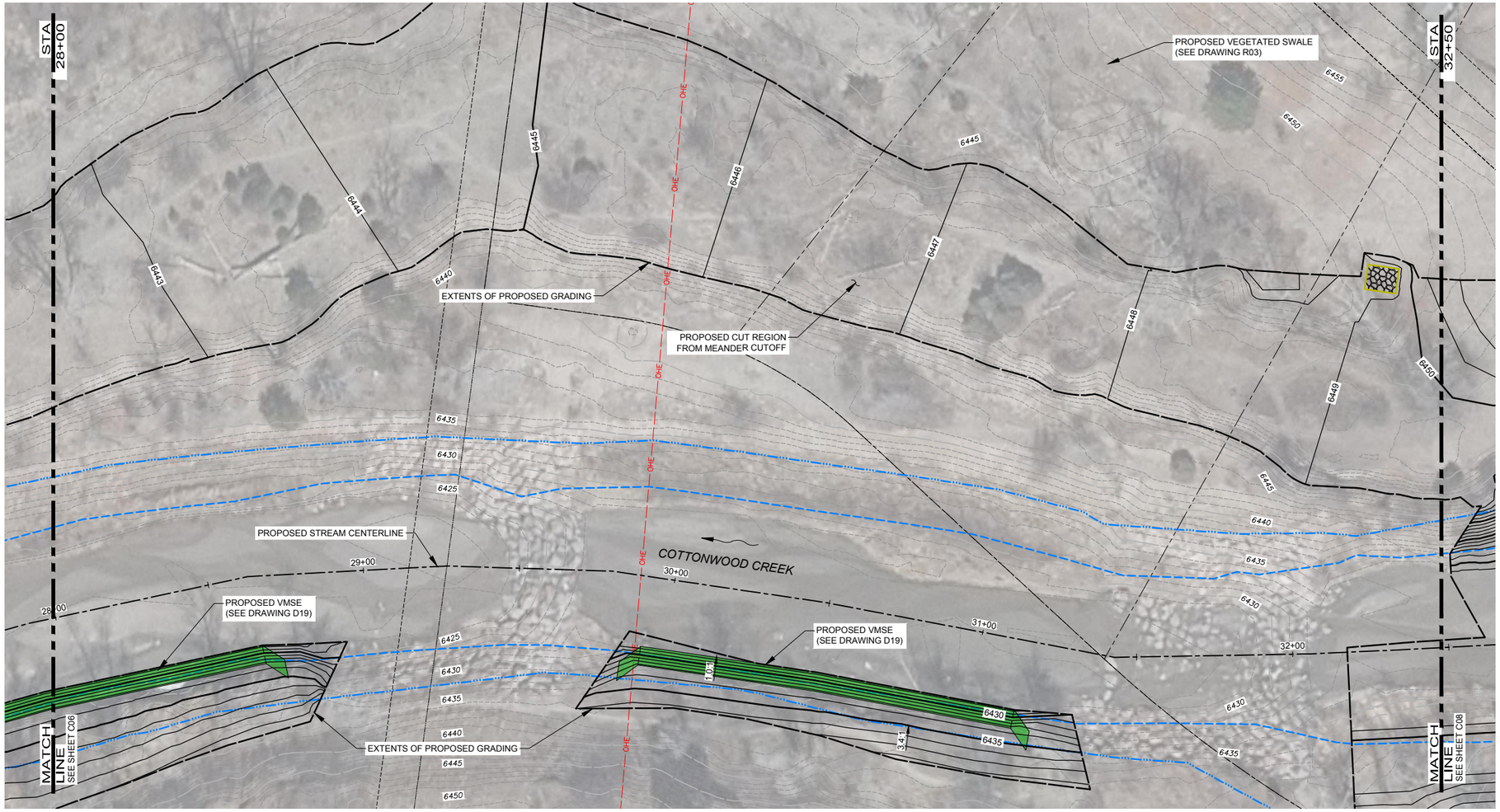
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

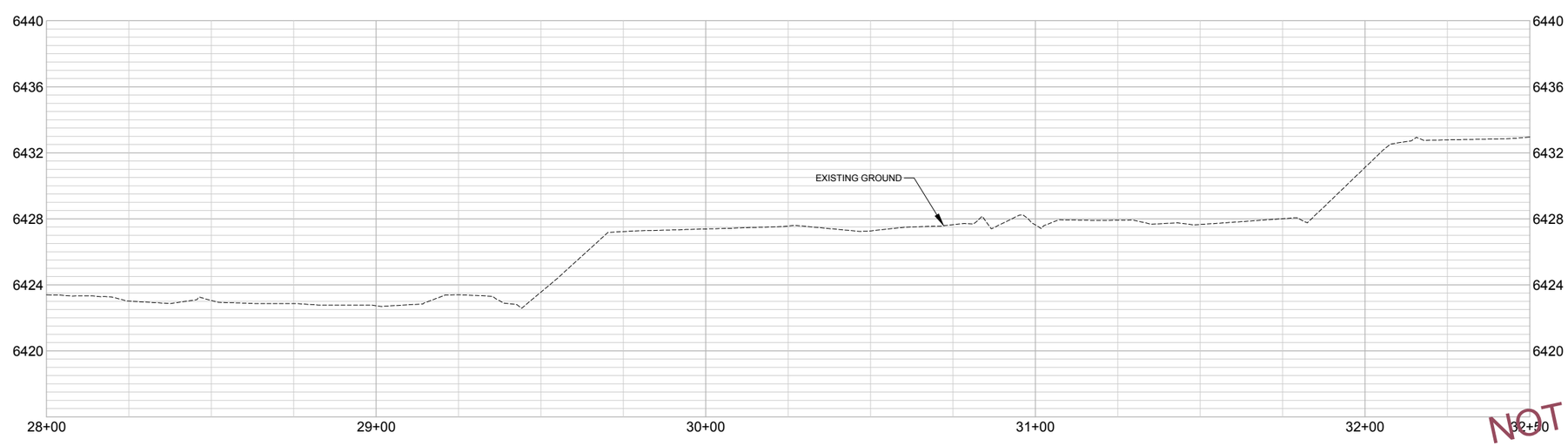
DRAWING NO. C06

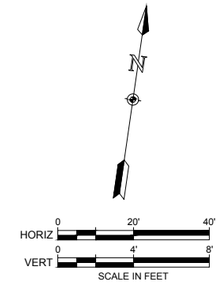
SHEET 10 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 1.DWG Friday, February 16, 2024 5:28 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

PLAN AND PROFILE

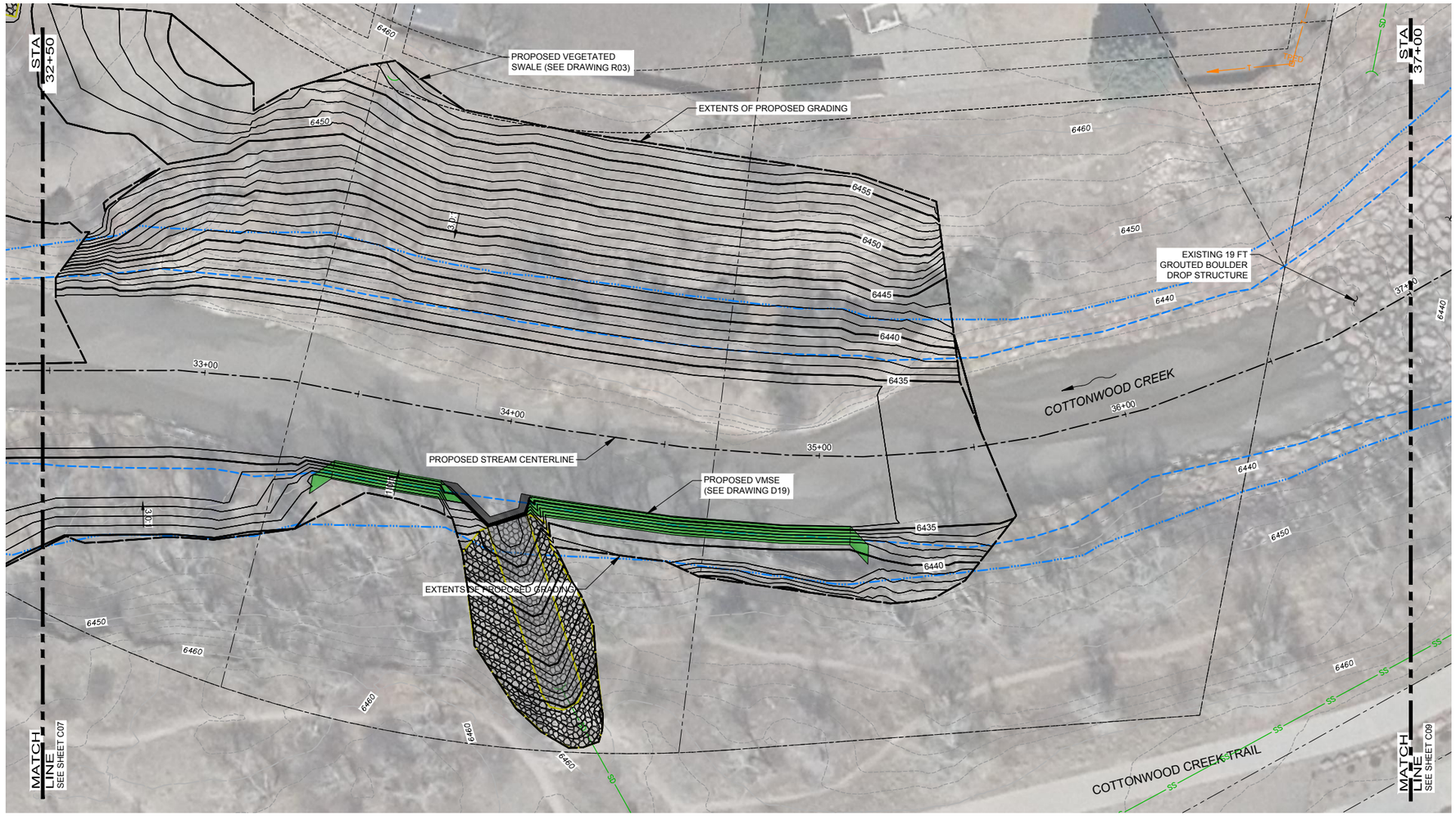
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

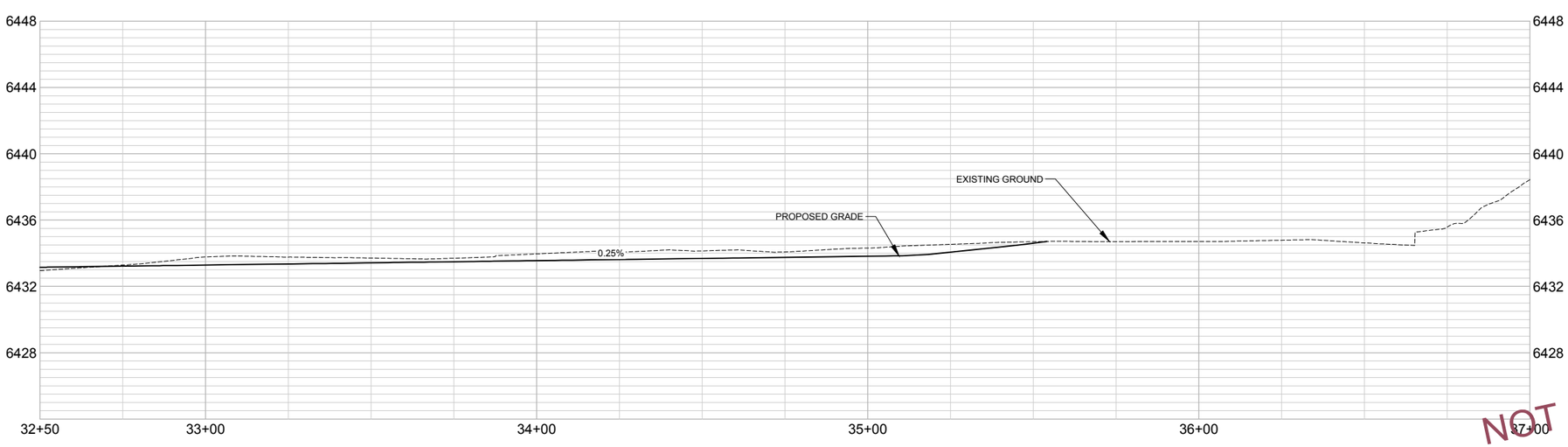
DRAWING NO. C07

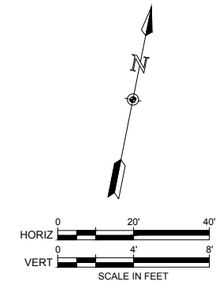
SHEET 11 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 1.DWG Friday, February 16, 2024 5:28 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

PLAN AND PROFILE

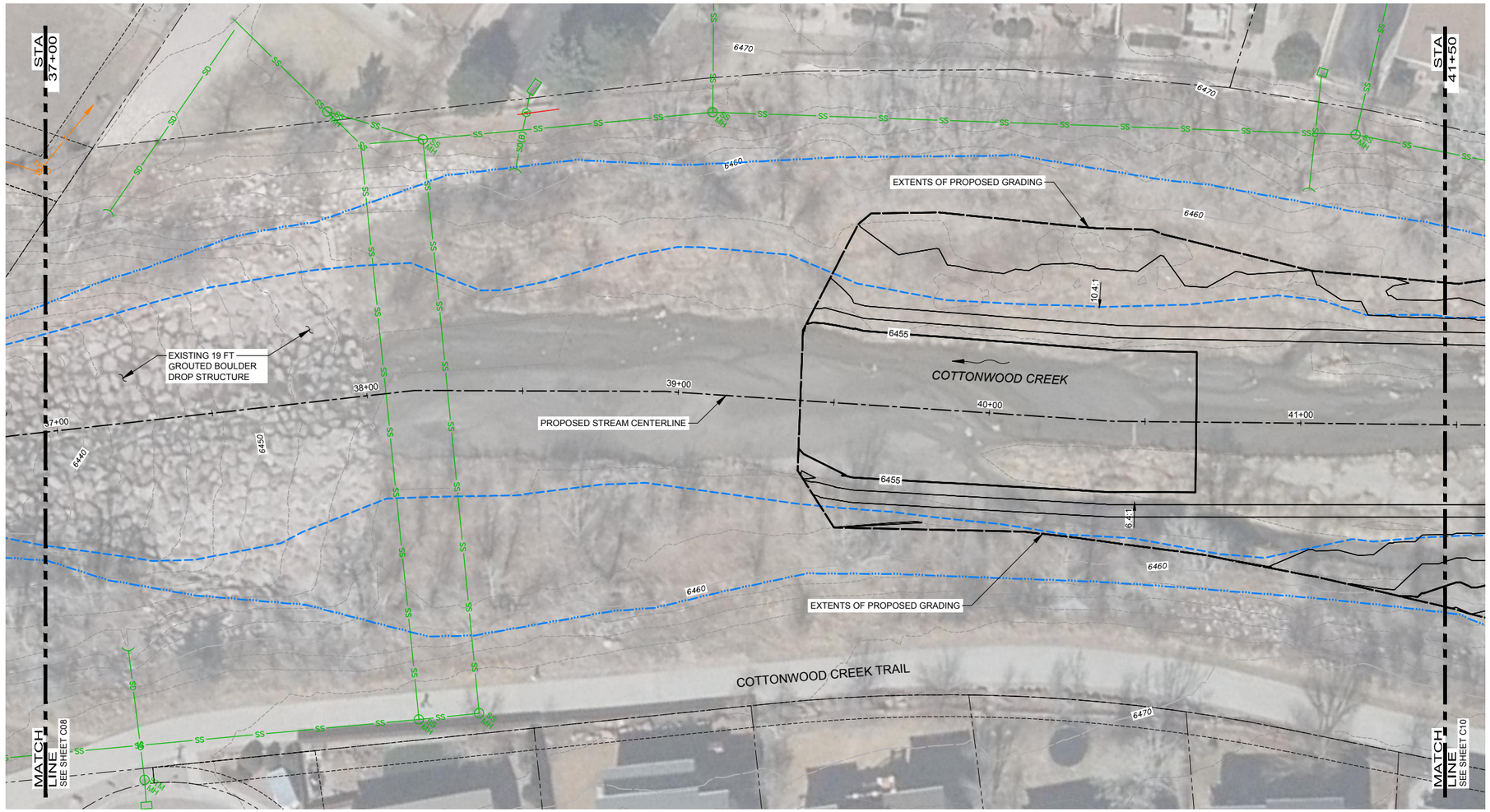
Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01

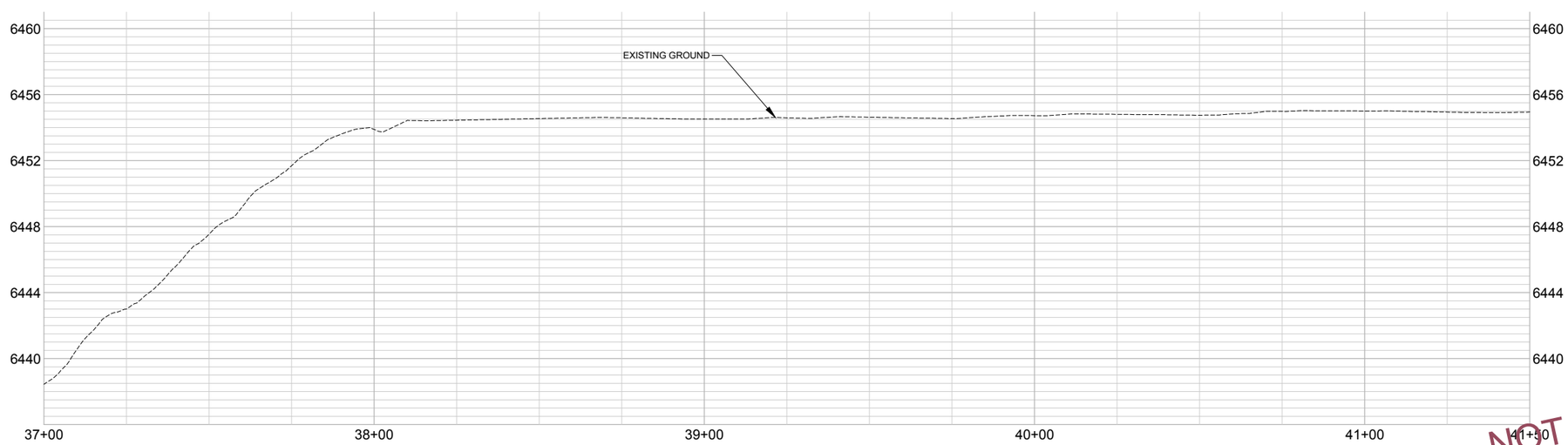
DRAWING NO. C08

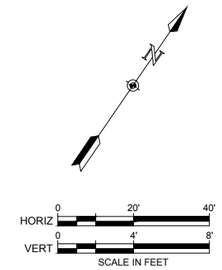
SHEET 12 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 2.DWG Friday, February 16, 2024 5:31 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

PLAN AND PROFILE

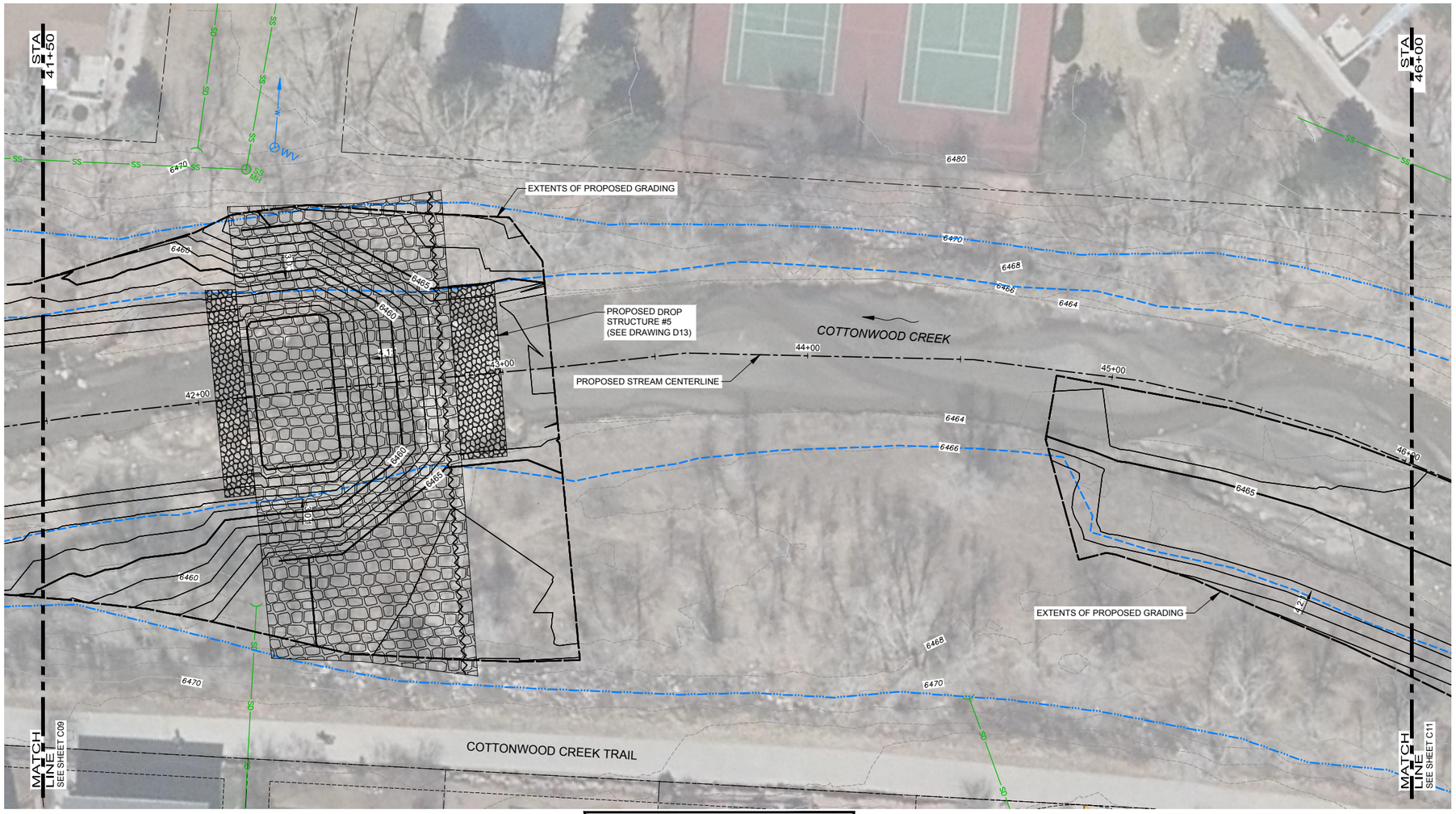
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

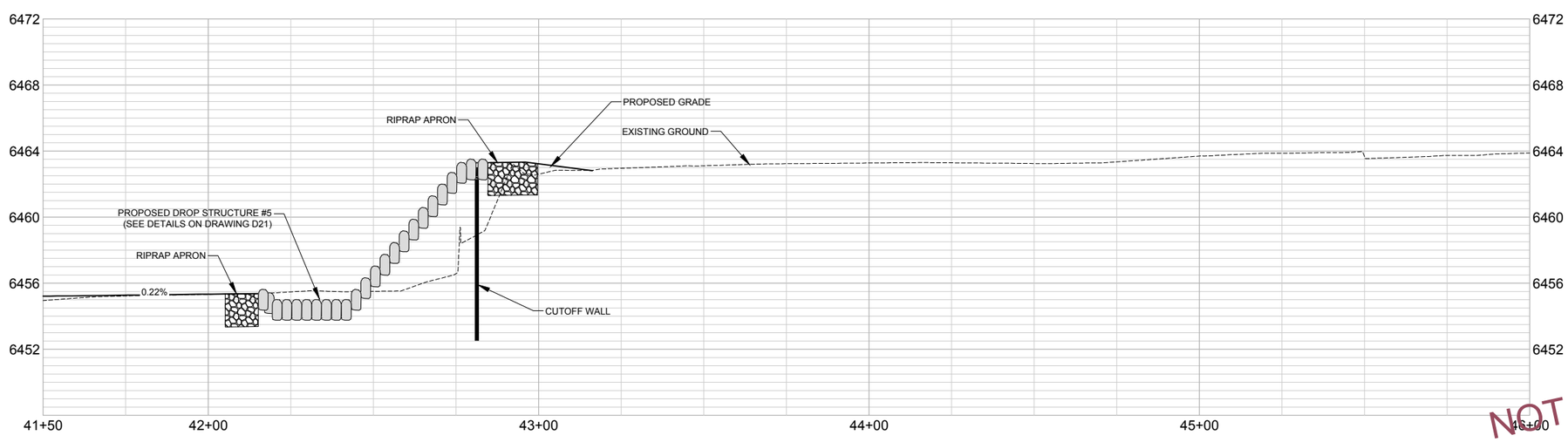
DRAWING NO. C09

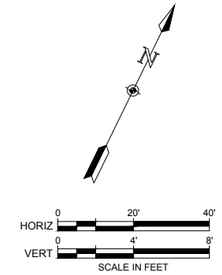
SHEET 13 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 2.DWG Friday, February 16, 2024 5:31 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

PLAN AND PROFILE

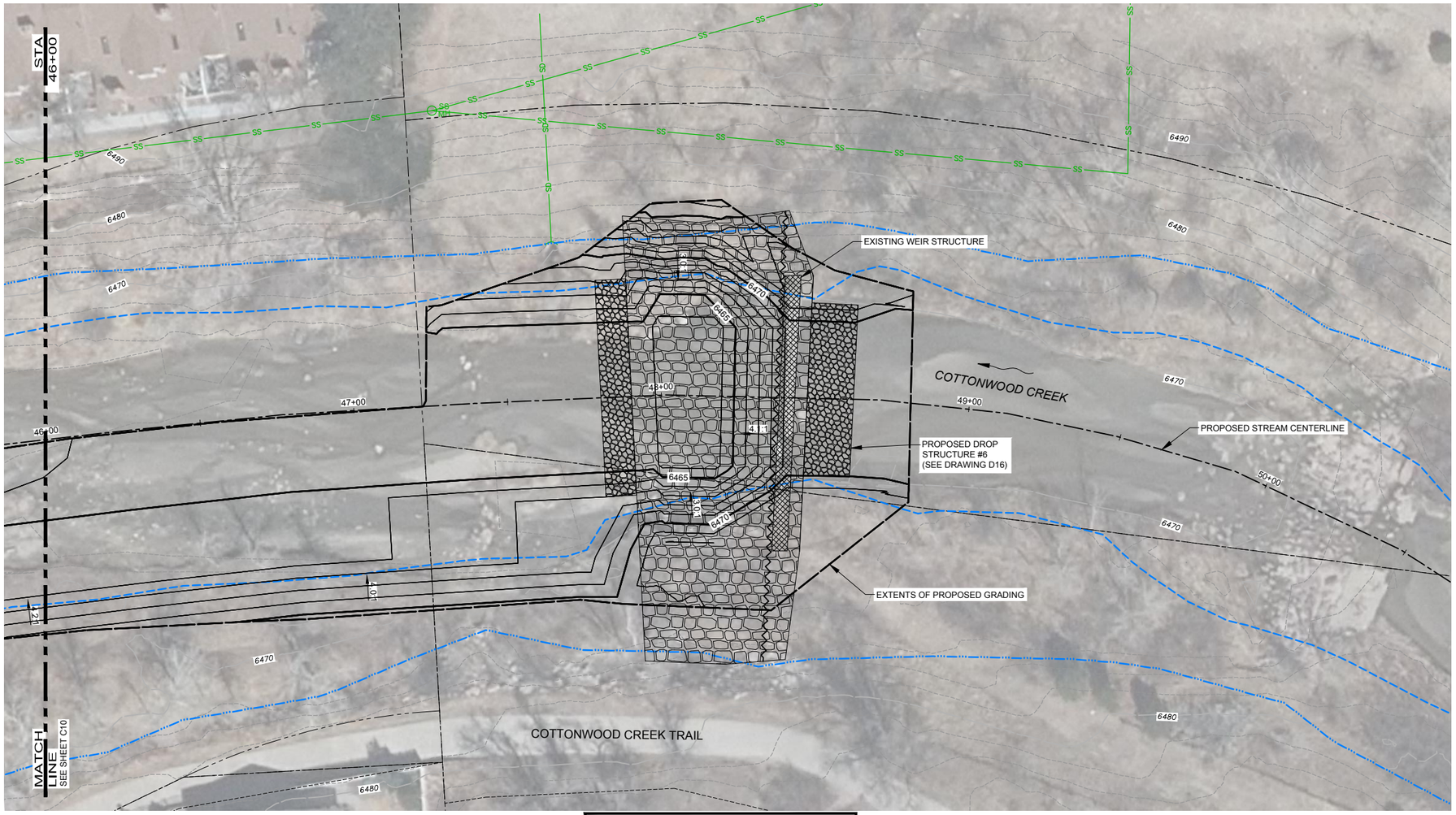
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

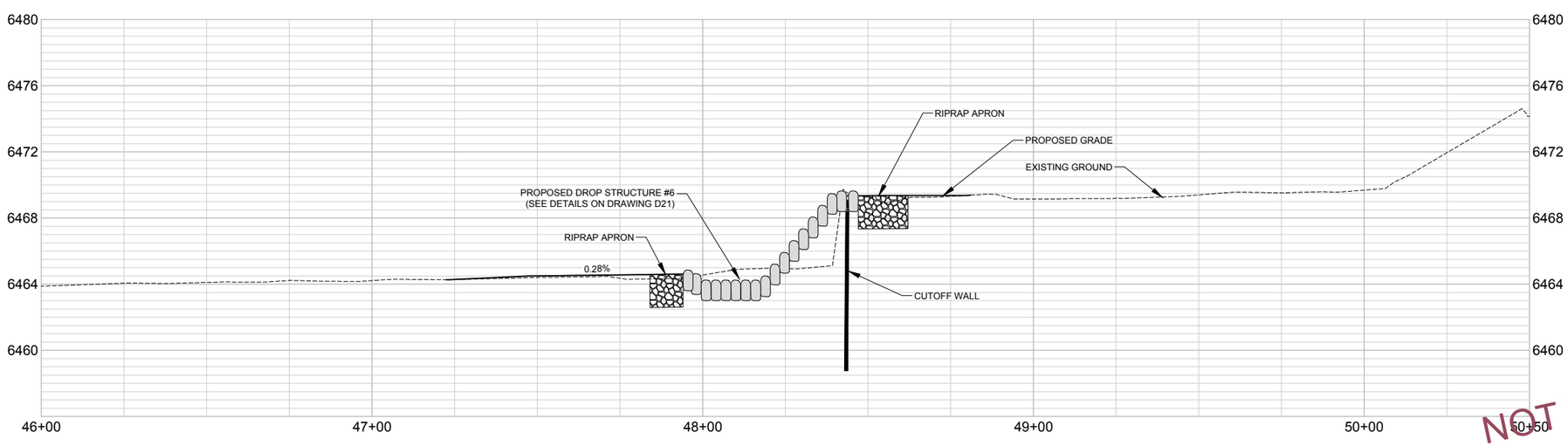
DRAWING NO. C10

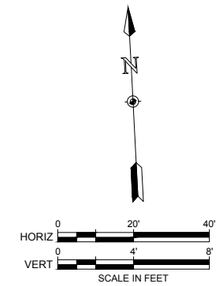
SHEET 14 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 2.DWG Friday, February 16, 2024 5:31 PM By: RICKS, RONALD



PLAN AND PROFILE





NOTES:

xx

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

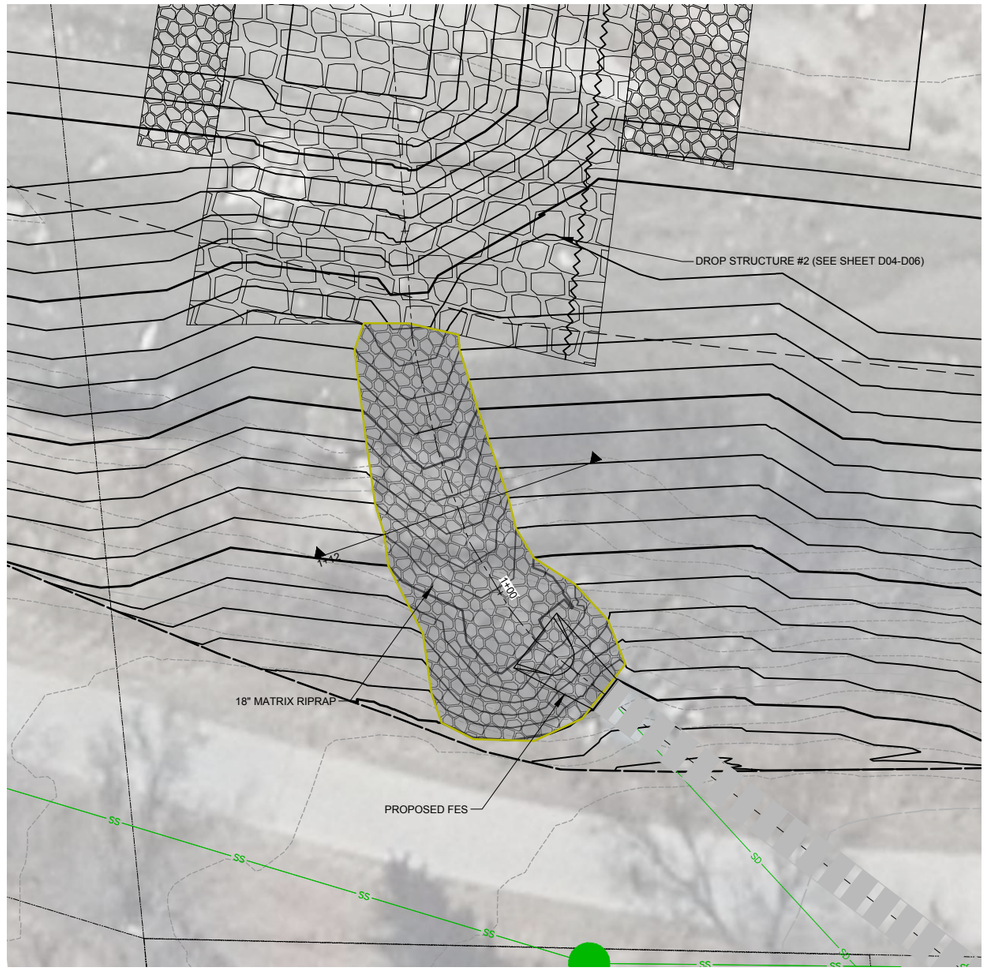
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

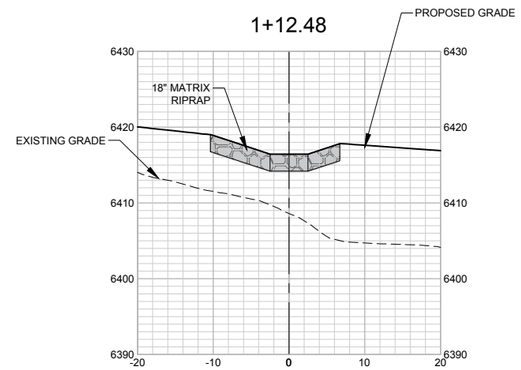
CONSTRUCTION
PLAN AND PROFILE

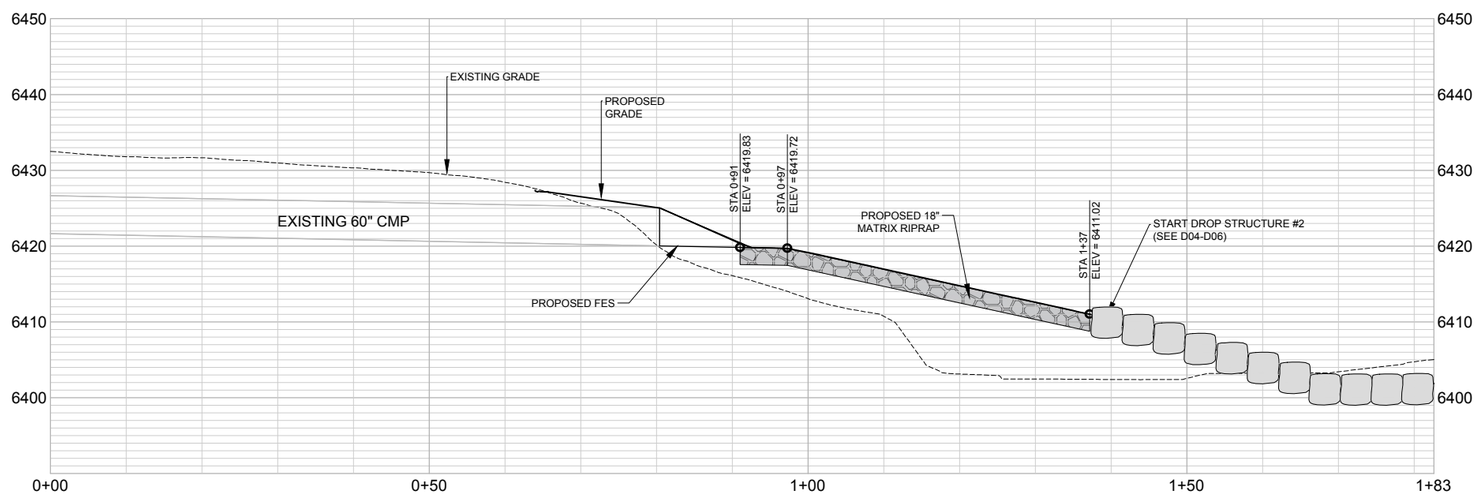
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

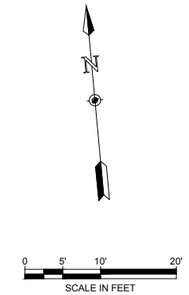
PROJECT NO. 36-4715.01
DRAWING NO. C11
SHEET 15 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 PLAN AND PROFILE 2.DWG Friday, February 16, 2024 5:31 PM By: RICKS, RONALD









NOTES:

XX

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

RUNDOWN DETAILS

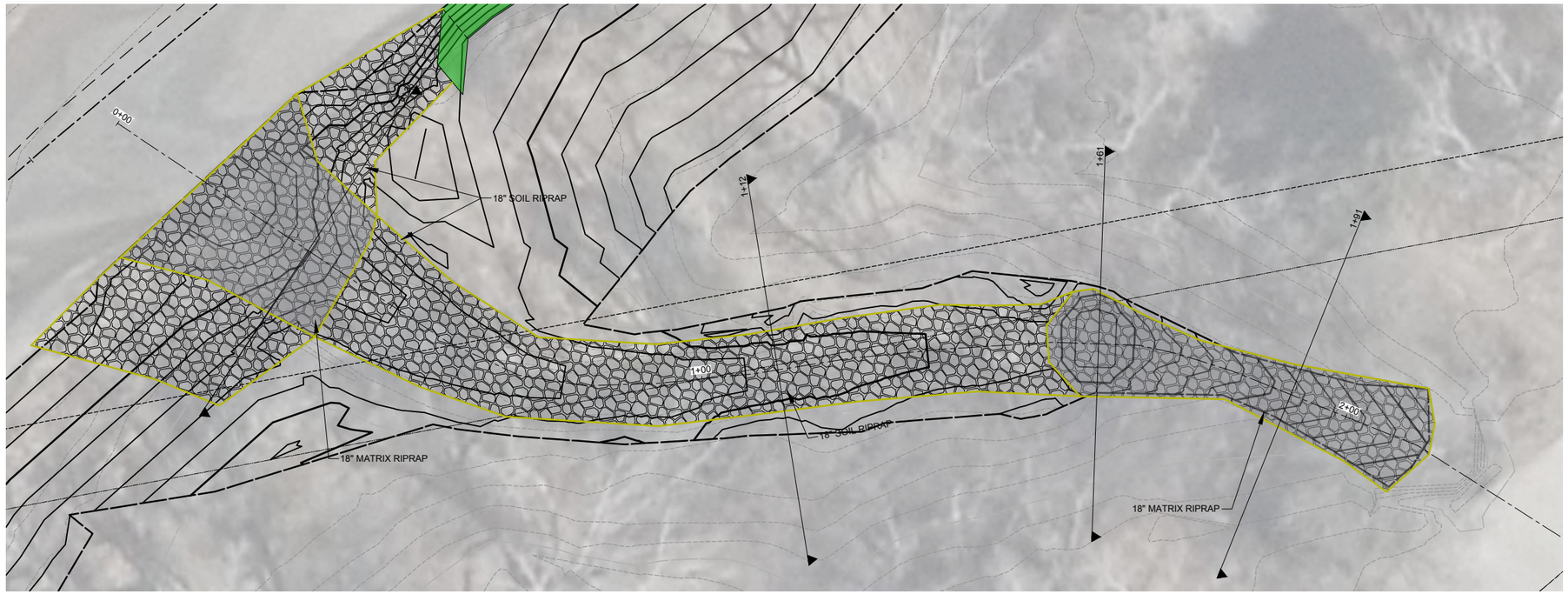
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

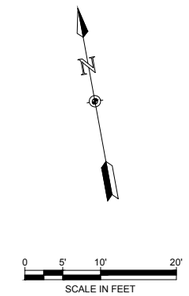
PROJECT NO. 36-4715.01

DRAWING NO. R01

SHEET 23 OF 64

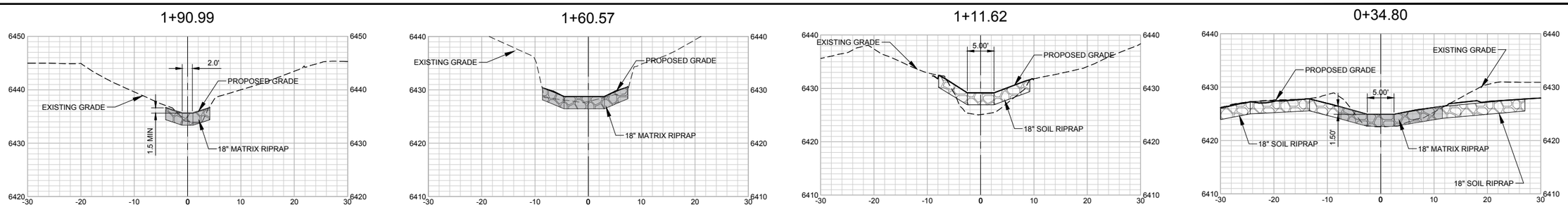
Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 RUNDOWN DESIGN.DWG Friday, February 16, 2024 1:04 PM By: RICKS, RONALD

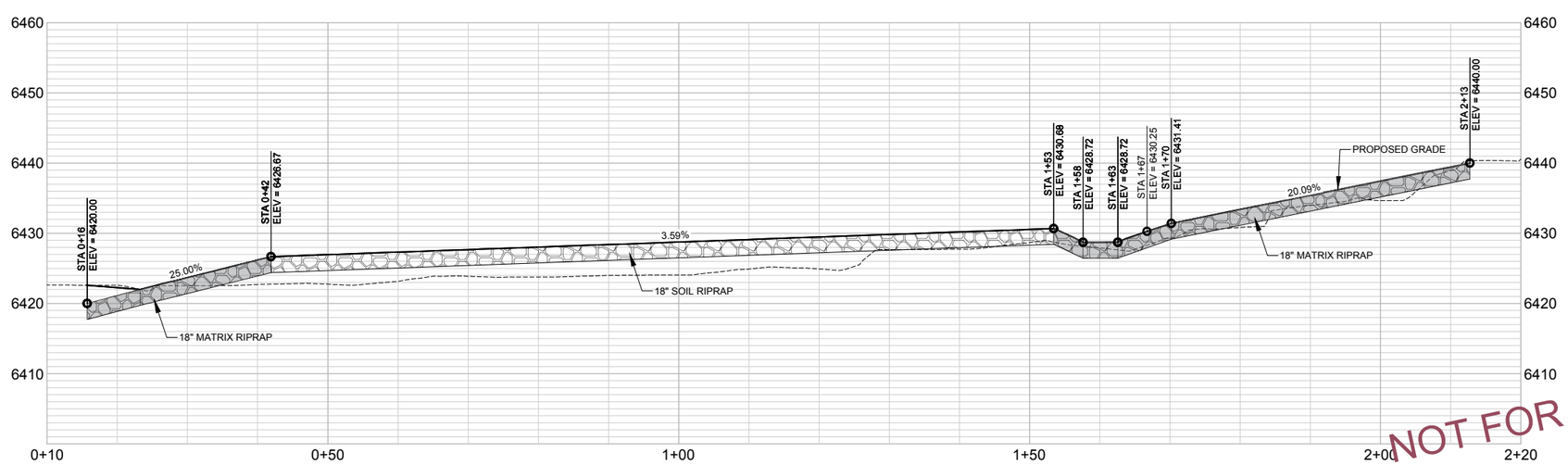




NOTES:

xx





NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

RUNDOWN DETAILS

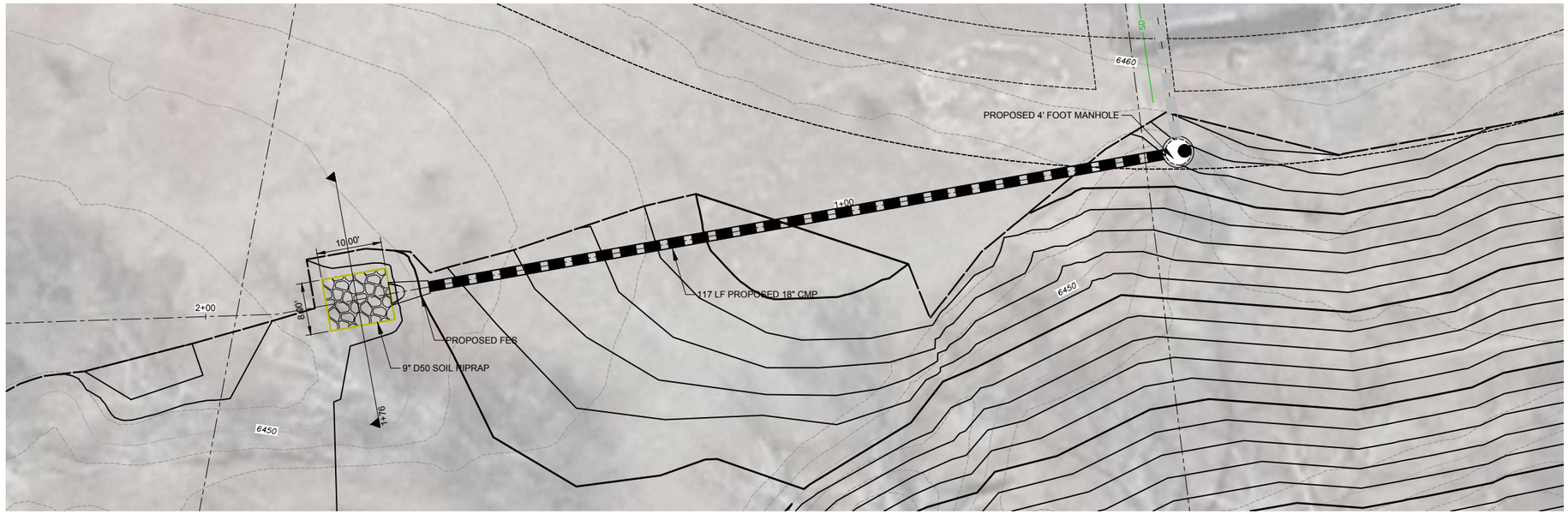
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

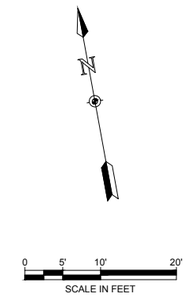
PROJECT NO. 36-4715.01

DRAWING NO. R02

SHEET 24 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 RUNDOWN DESIGN.DWG Friday, February 16, 2024 1:04 PM By: RICKS, RONALD

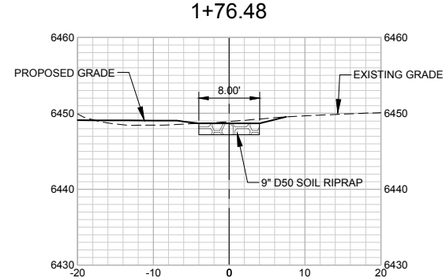


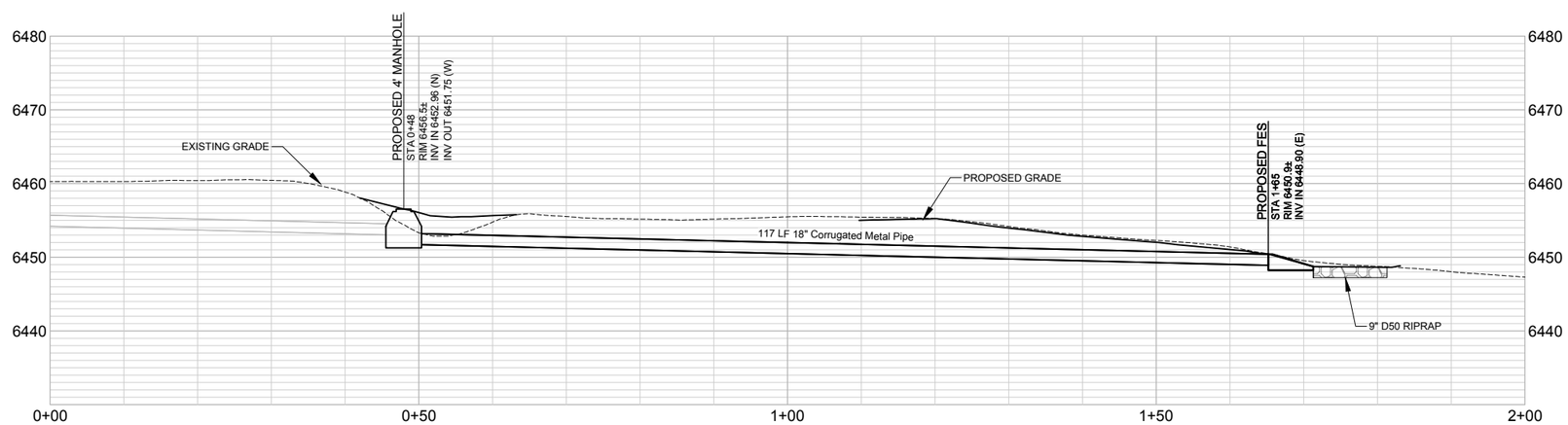


NOTES:

XX

1+76.48





NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

RUNDOWN DETAILS

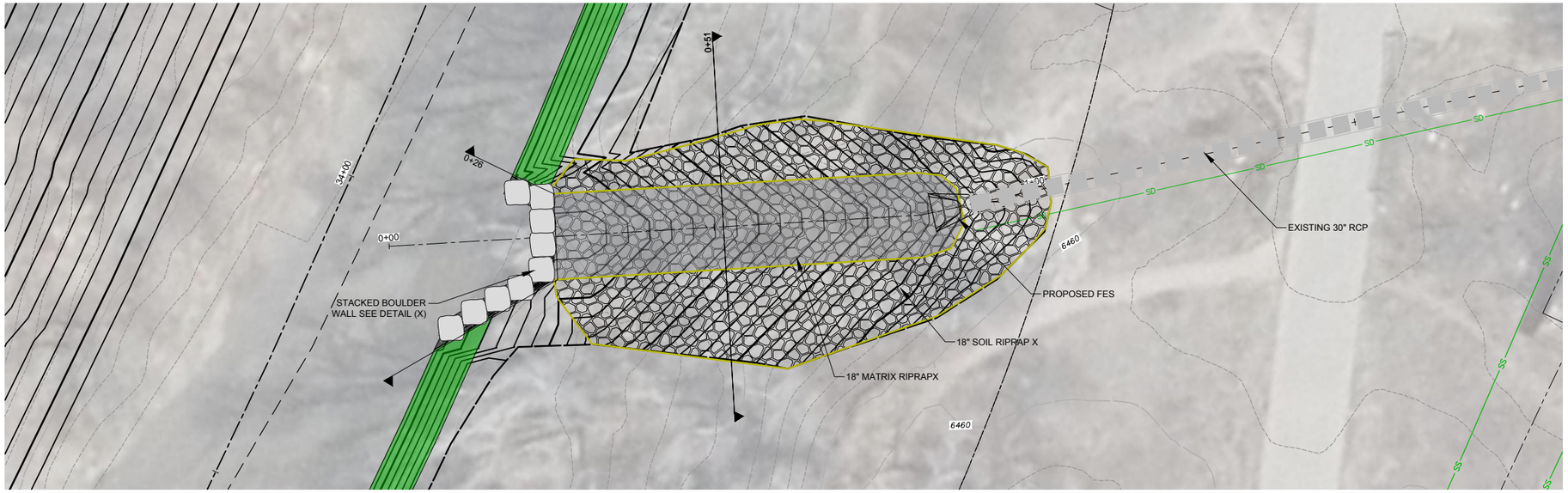
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

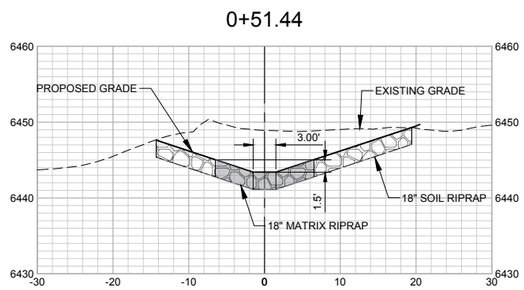
PROJECT NO. 36-4715.01

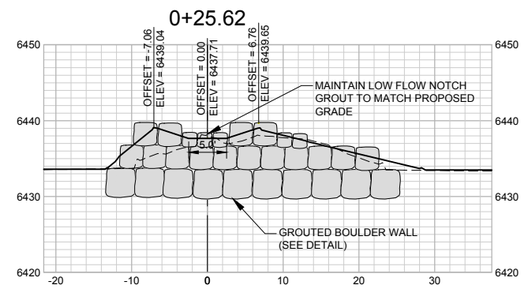
DRAWING NO. R03

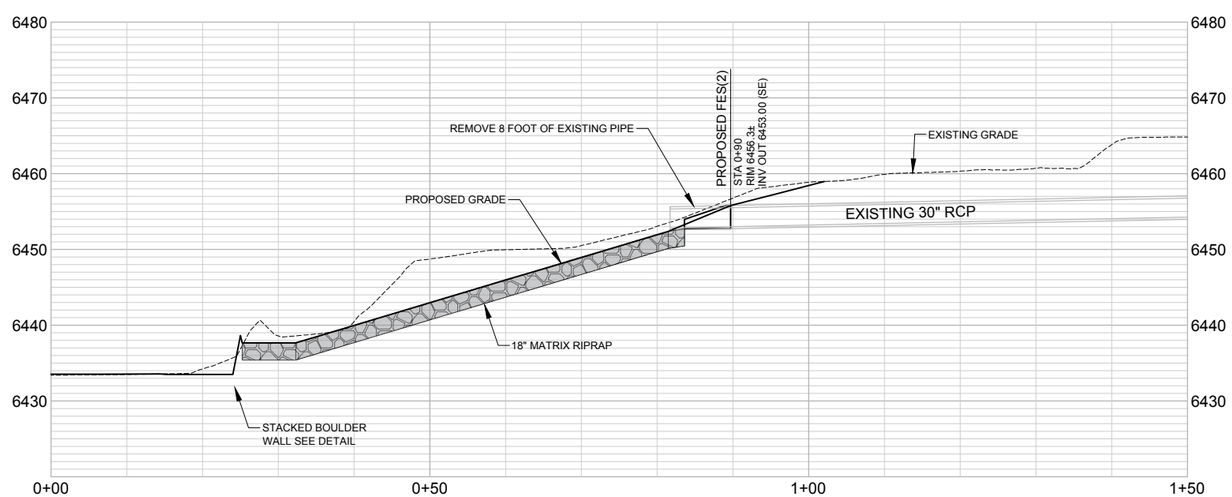
SHEET 25 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 RUNDOWN DESIGN.DWG Friday, February 16, 2024 1:04 PM By: RICKS, RONALD









NOTES:

XX

0 5' 10' 20'
SCALE IN FEET

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK
STABILIZATION
(ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

CONSTRUCTION
RUNDOWN DETAILS

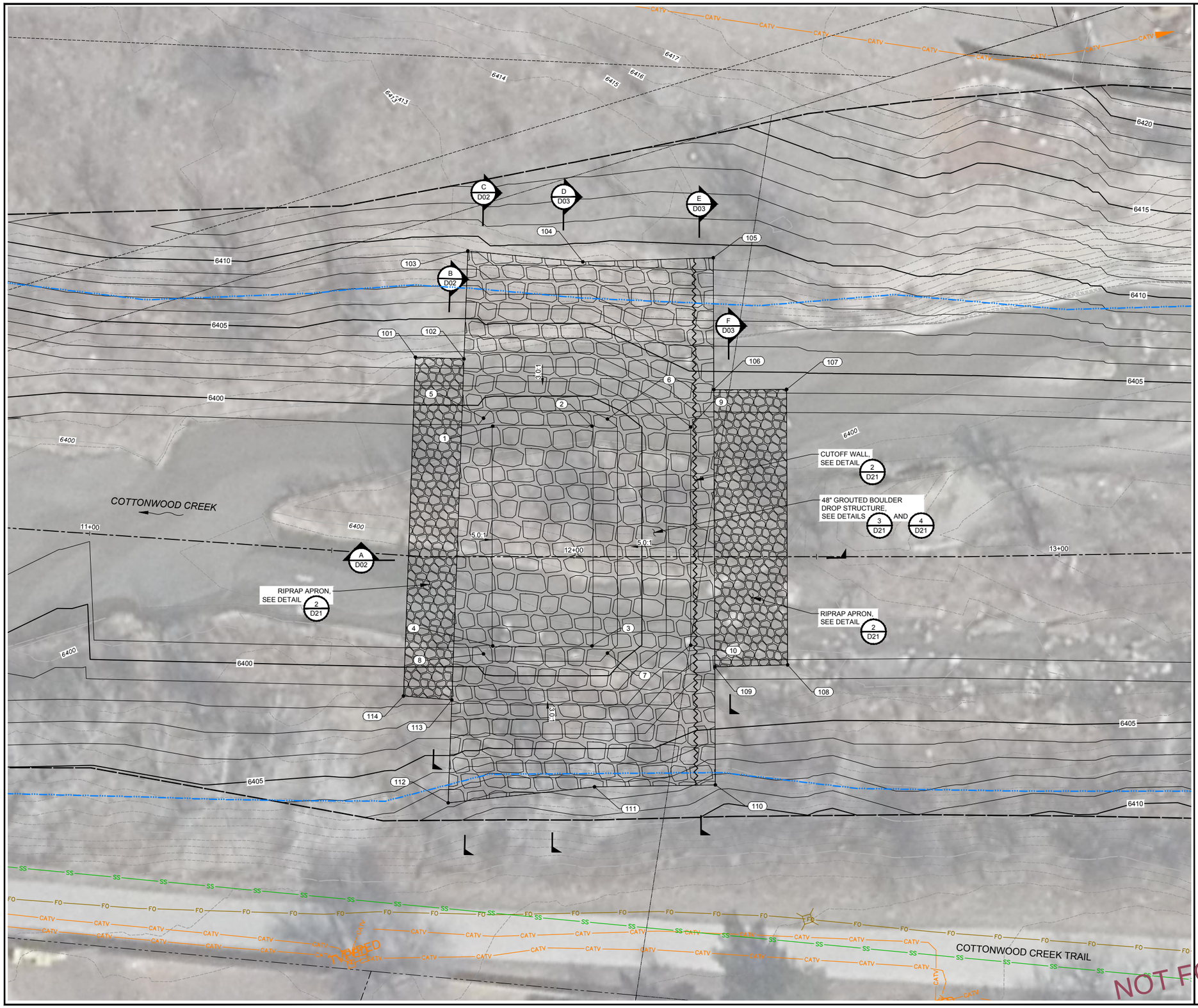
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

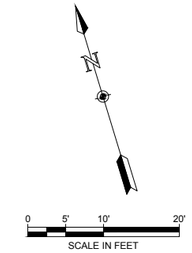
PROJECT NO.
36-4715.01

DRAWING NO.
R04

SHEET 26 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 RUNDOWN DESIGN.DWG Friday, February 16, 2024 1:04 PM By: RICKS, RONALD





NOTES:

xx

DROP STRUCTURE #1 ROCK EXTENT AND GRADING POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
1	1399935.54	3201923.88	6398.00
2	1399929.59	3201943.47	6398.00
3	1399886.22	3201930.29	6398.00
4	1399892.17	3201910.71	6398.00
5	1399937.67	3201922.54	6399.00
6	1399930.06	3201946.94	6399.00
7	1399883.89	3201932.92	6399.00
8	1399891.15	3201908.41	6399.00
9	1399923.52	3201962.88	6402.00
10	1399880.46	3201949.80	6402.00
101	1399953.77	3201912.77	6402.67
102	1399950.53	3201922.23	6402.57
103	1399971.59	3201929.45	6409.10
104	1399962.55	3201951.50	6409.15
105	1399955.55	3201977.46	6409.48
106	1399929.49	3201969.66	6404.15
107	1399925.19	3201984.03	6404.19
108	1399870.77	3201967.74	6403.27
109	1399874.74	3201953.27	6403.34
110	1399851.42	3201946.29	6408.65
111	1399858.27	3201922.34	6407.45
112	1399863.88	3201892.52	6407.77
113	1399883.96	3201899.40	6401.75
114	1399887.64	3201890.09	6401.51

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #1 PLAN

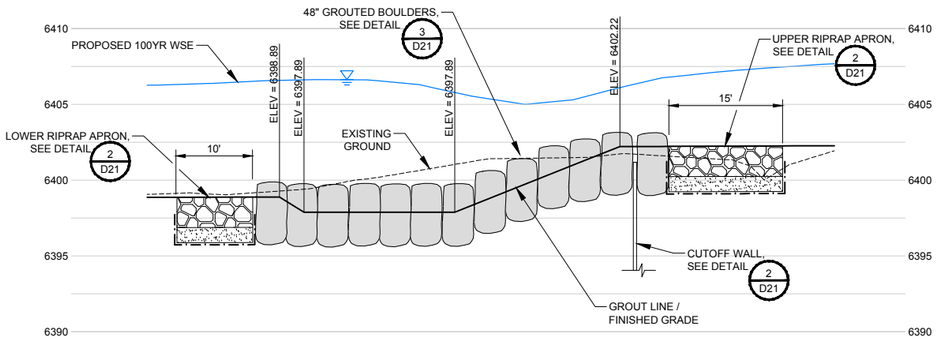
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D01

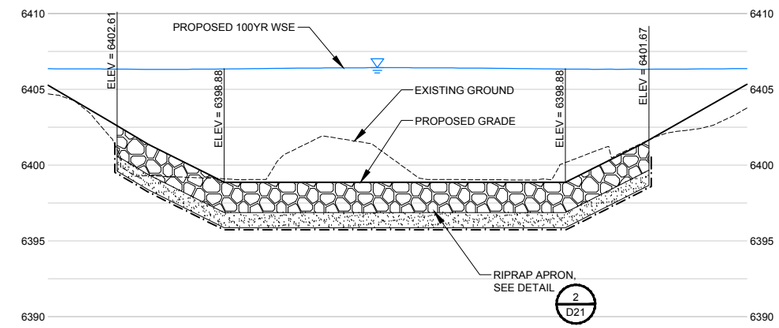
SHEET 27 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD



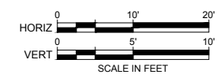
A D02 SECTION

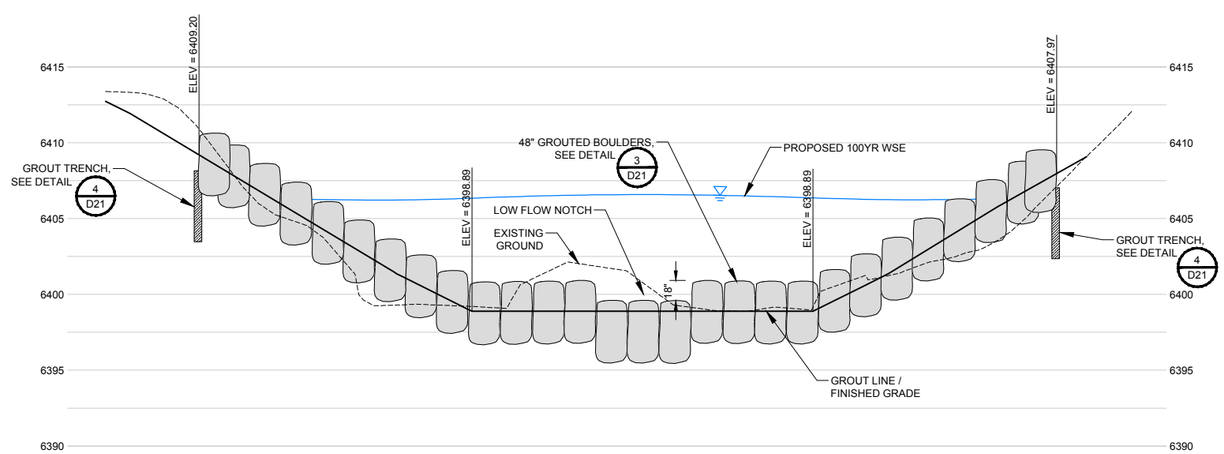
SCALE: AS SHOWN



B D02 SECTION

SCALE: AS SHOWN





C D02 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #1 SECTIONS 1 OF 2

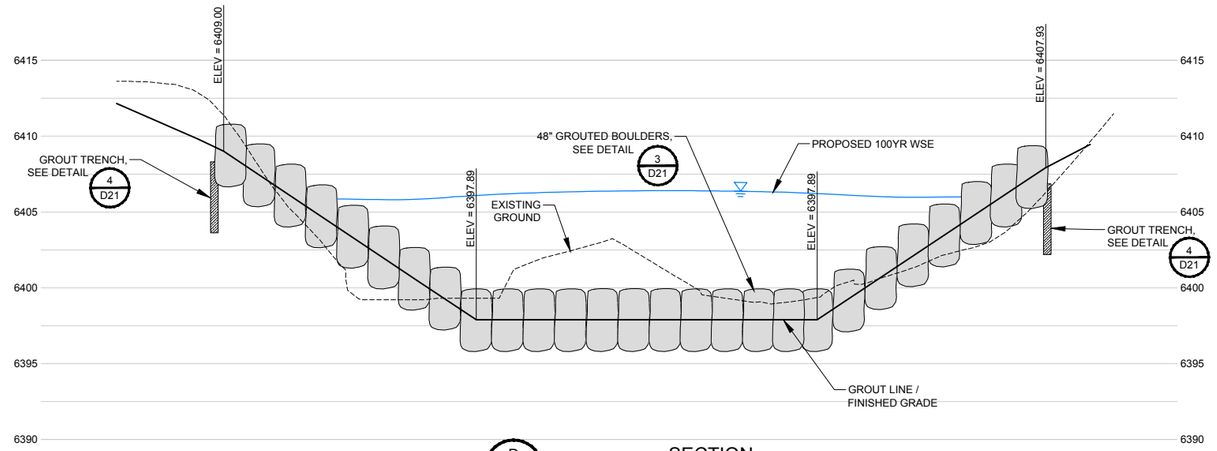
Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D02

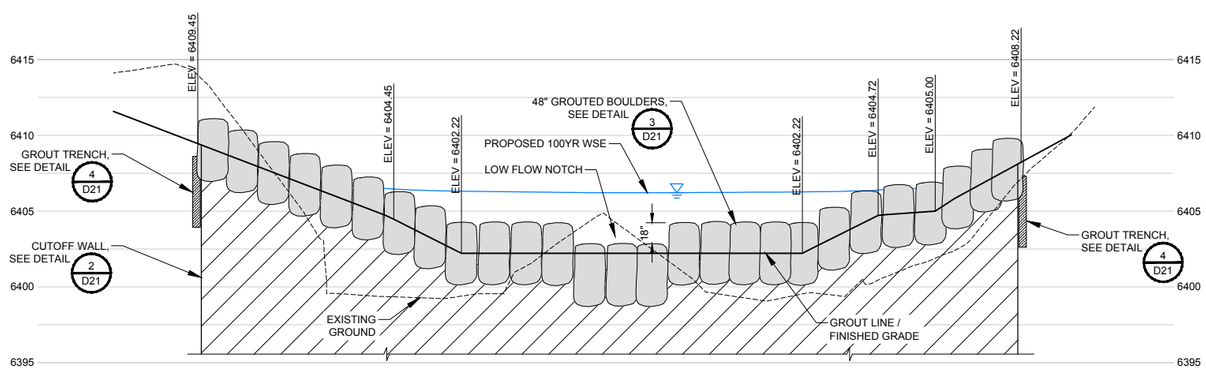
SHEET 28 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD



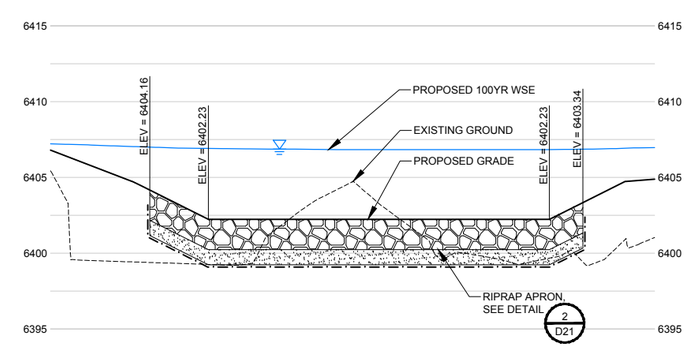
D / D03 SECTION

SCALE: AS SHOWN



E / D03 SECTION

SCALE: AS SHOWN



F / D03 SECTION

SCALE: AS SHOWN

HORIZ 0 10' 20'

VERT 0 5' 10'

SCALE IN FEET

NOT FOR CONSTRUCTION

02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #1 SECTIONS 2 OF 2

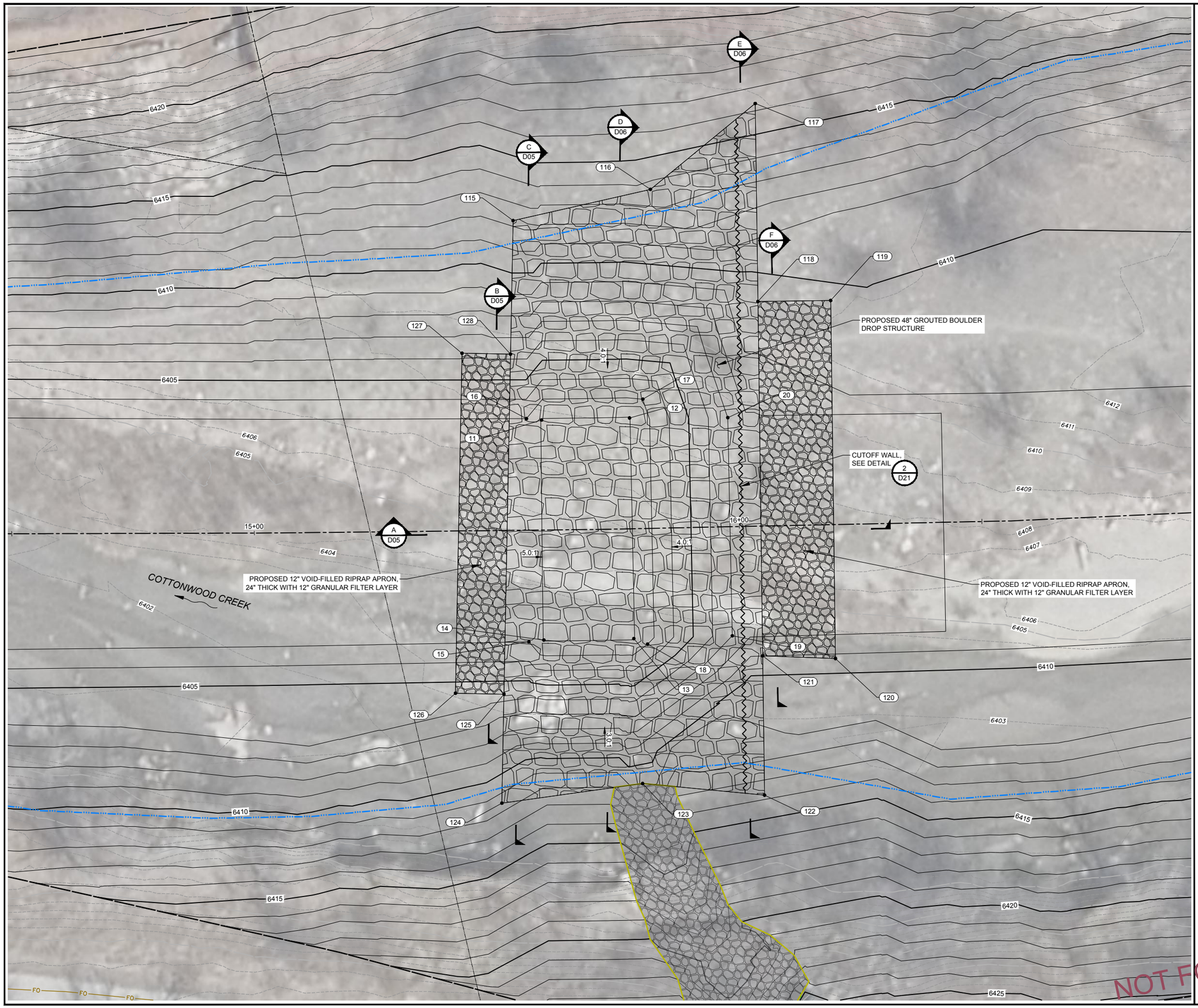
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

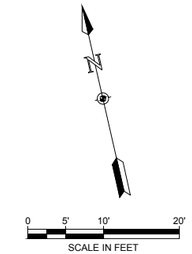
PROJECT NO. 36-4715.01

DRAWING NO. D03

SHEET 29 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD





NOTES:

XX

DROP STRUCTURE #2
ROCK EXTENT AND GRADING POINT TABLE

POINT #	NORTHING	EASTING	ELEVATION
11	1399836.60	3202284.54	6402.00
12	1399833.00	3202302.32	6402.00
13	1399788.44	3202293.12	6402.00
14	1399792.25	3202274.98	6402.00
15	1399792.58	3202271.88	6403.00
16	1399837.58	3202281.58	6403.00
17	1399836.17	3202305.87	6403.00
18	1399786.69	3202295.63	6403.00
19	1399784.50	3202313.04	6407.00
20	1399828.58	3202322.10	6407.00
115	1399878.01	3202287.94	6412.25
116	1399878.01	3202316.98	6413.73
117	1399890.50	3202341.96	6416.31
118	1399850.57	3202333.45	6409.68
119	1399847.44	3202348.12	6409.39
120	1399775.22	3202332.74	6409.23
121	1399779.09	3202318.23	6408.99
122	1399750.99	3202312.25	6413.77
123	1399758.90	3202288.27	6412.12
124	1399761.37	3202259.08	6411.54
125	1399783.19	3202264.48	6405.53
126	1399785.59	3202254.77	6405.36
127	1399853.67	3202271.61	6406.22
128	1399851.27	3202281.32	6406.23

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #2 PLAN

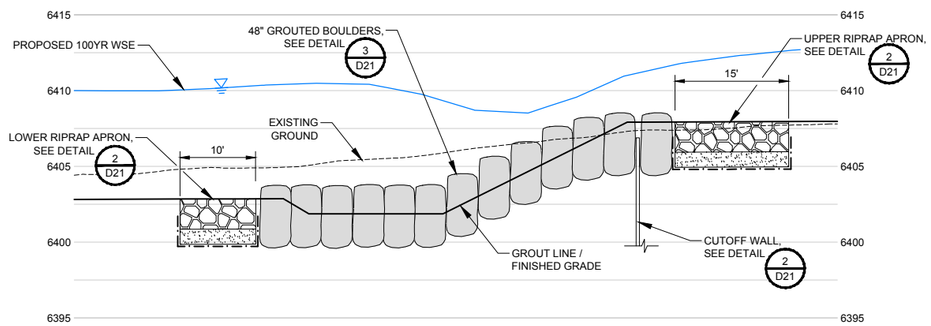
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D04

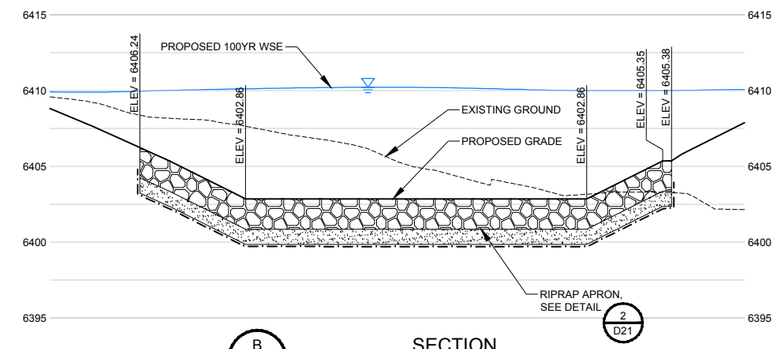
SHEET 30 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD



A D05 PROFILE

SCALE: AS SHOWN



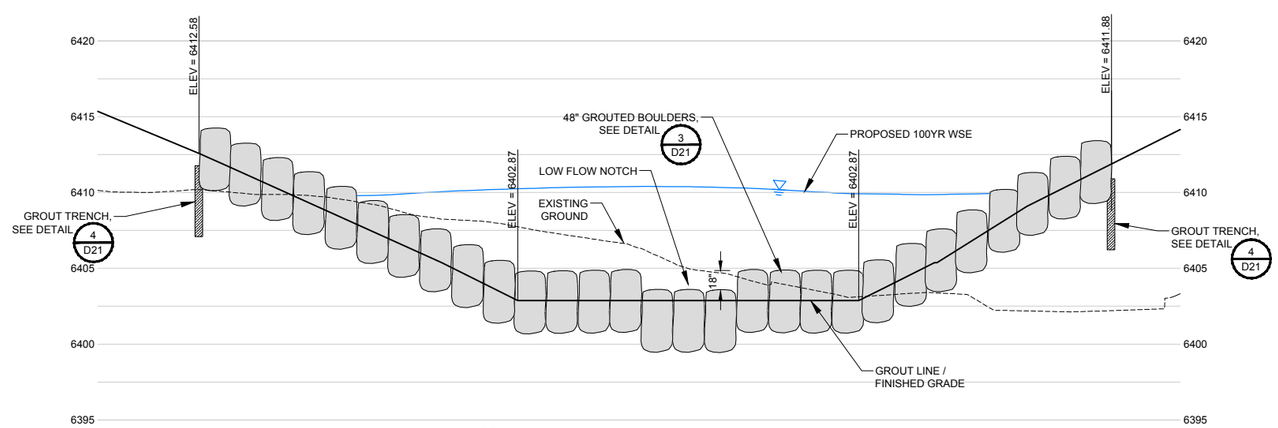
B D05 SECTION

SCALE: AS SHOWN

HORIZ 0 10' 20'

VERT 0 5' 10'

SCALE IN FEET



C D05 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION

02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #2 SECTIONS 1 OF 2

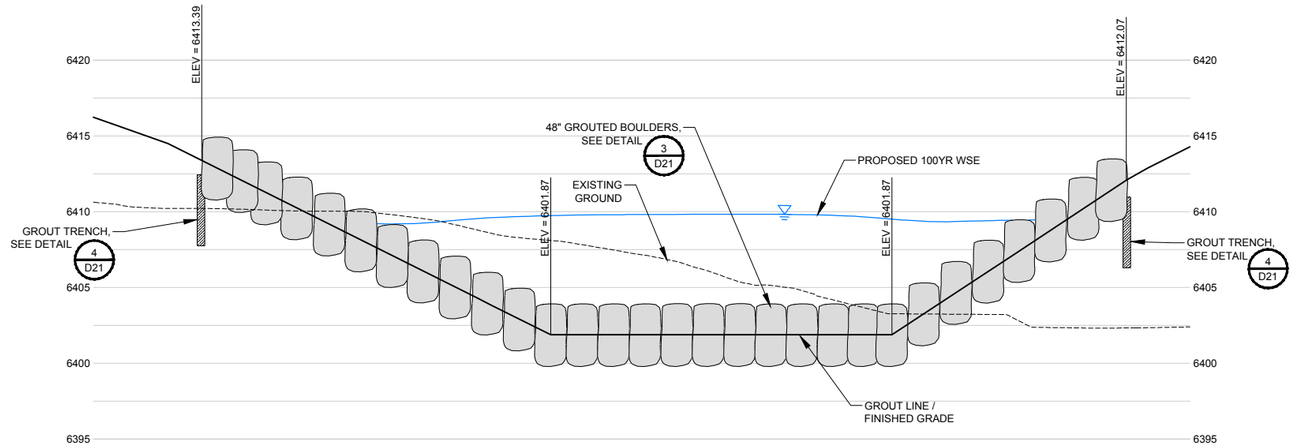
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D05

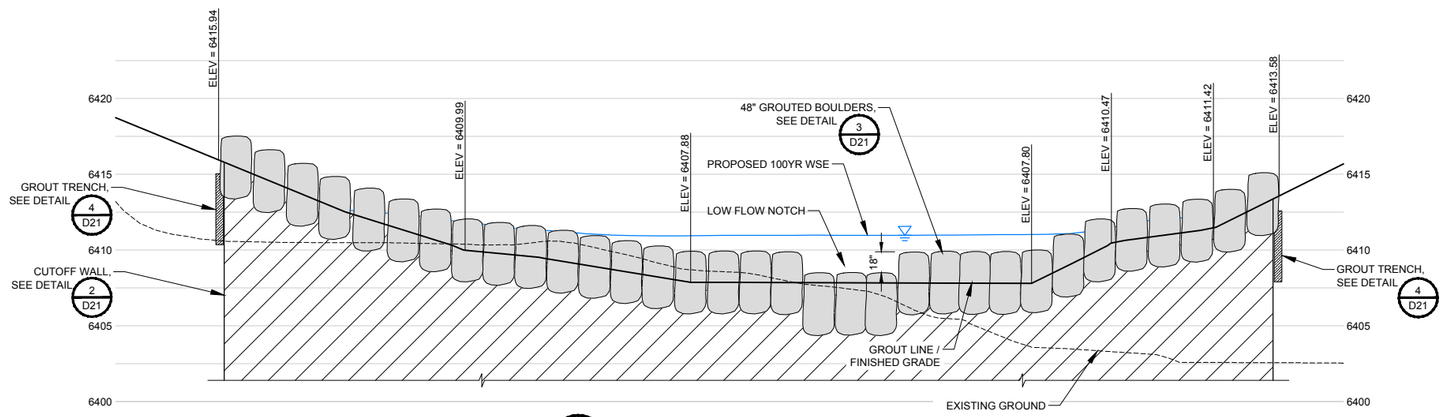
SHEET 31 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD



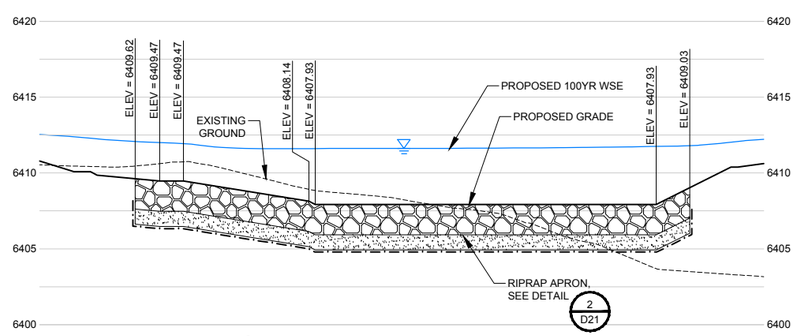
D D06 SECTION

SCALE: AS SHOWN



E D06 SECTION

SCALE: AS SHOWN



F D06 SECTION

SCALE: AS SHOWN

HORIZ 0 10' 20'
VERT 0 5' 10'
SCALE IN FEET

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions | Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #2 SECTIONS 2 OF 2

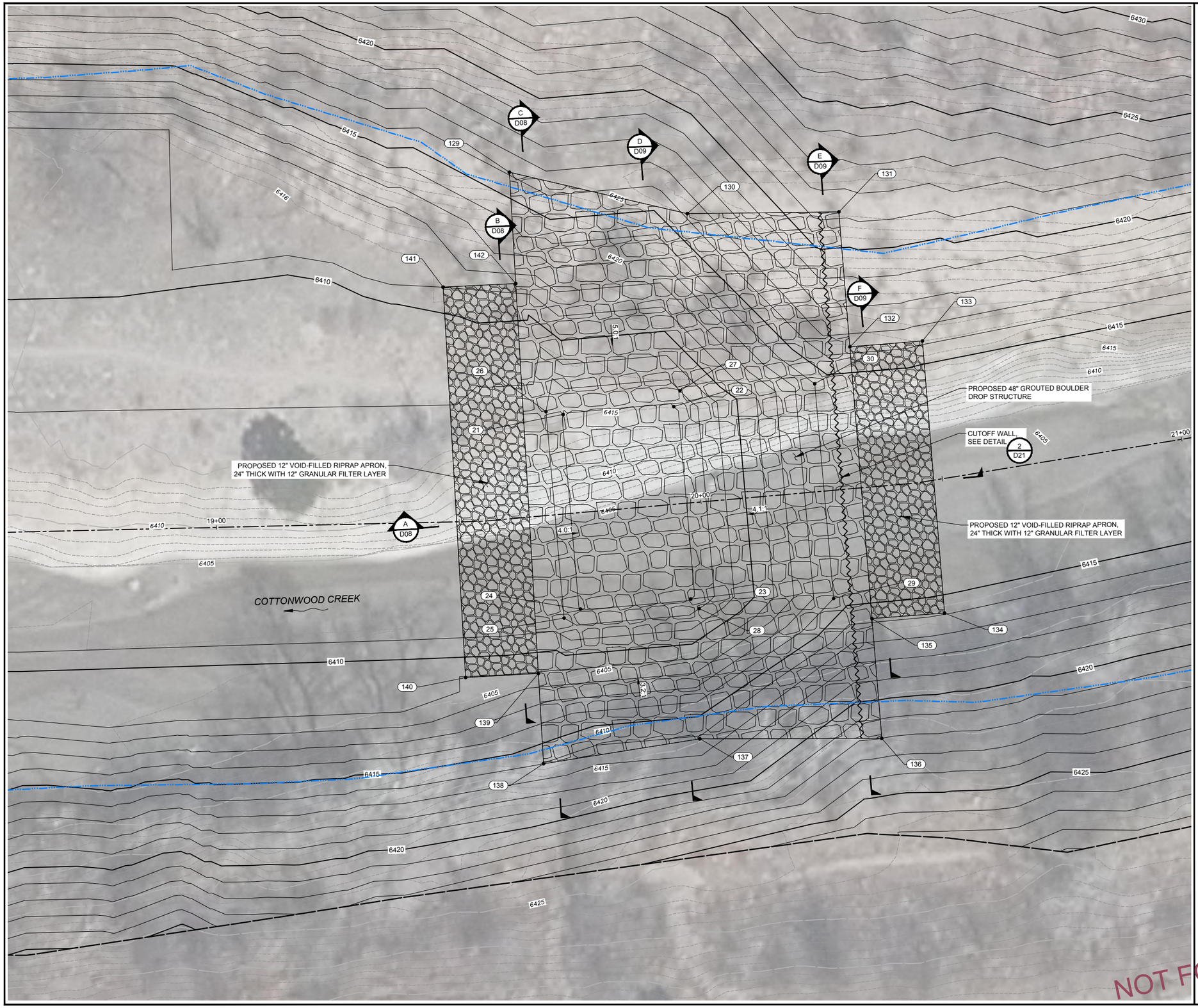
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

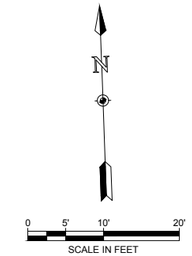
PROJECT NO. 36-4715.01

DRAWING NO. D06

SHEET 32 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD





NOTES:

XX

DROP STRUCTURE #3
ROCK EXTENT AND GRADING POINT TABLE

POINT #	NORTHING	EASTING	ELEVATION
21	1399786.50	3202688.39	6407.00
22	1399787.29	3202711.24	6407.00
23	1399747.53	3202713.28	6407.00
24	1399746.29	3202690.51	6407.00
25	1399744.56	3202687.05	6408.00
26	1399787.22	3202684.87	6408.00
27	1399790.51	3202712.63	6408.00
28	1399745.47	3202714.93	6408.00
29	1399746.56	3202742.71	6414.00
30	1399790.92	3202740.43	6414.00
129	1399836.78	3202679.14	6416.12
130	1399826.92	3202715.49	6416.19
131	1399826.13	3202746.72	6421.23
132	1399798.26	3202747.97	6416.33
133	1399798.92	3202762.95	6416.19
134	1399742.71	3202765.46	6415.94
135	1399742.12	3202750.47	6415.80
136	1399717.39	3202751.58	6422.01
137	1399718.67	3202714.10	6416.14
138	1399714.73	3202681.72	6416.02
139	1399733.34	3202681.32	6411.09
140	1399733.06	3202666.33	6411.02
141	1399813.63	3202664.63	6411.01
142	1399813.81	3202679.63	6411.50

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

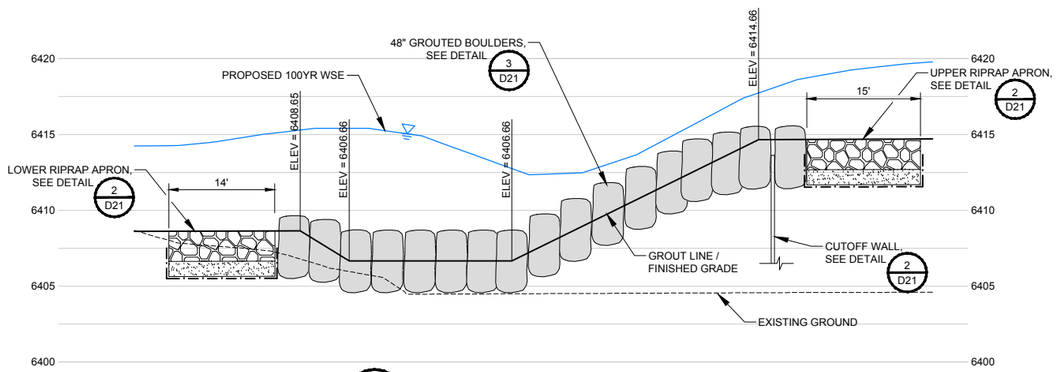
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

DROP STRUCTURE #3 PLAN

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

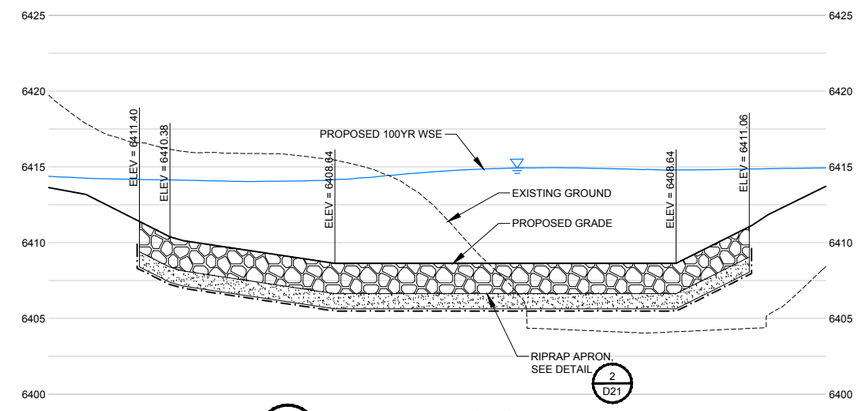
PROJECT NO. 36-4715.01
DRAWING NO. D07
SHEET 33 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD



A D08 SECTION

SCALE: AS SHOWN



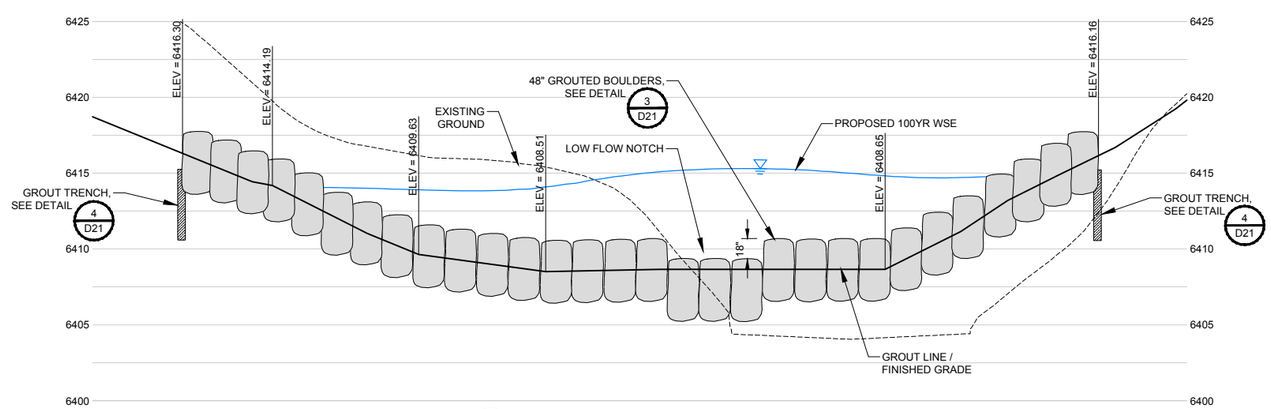
B D08 SECTION

SCALE: AS SHOWN

HORIZ 0 10' 20'

VERT 0 5' 10'

SCALE IN FEET



C D08 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION

02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES

3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #3 SECTIONS 1 OF 2

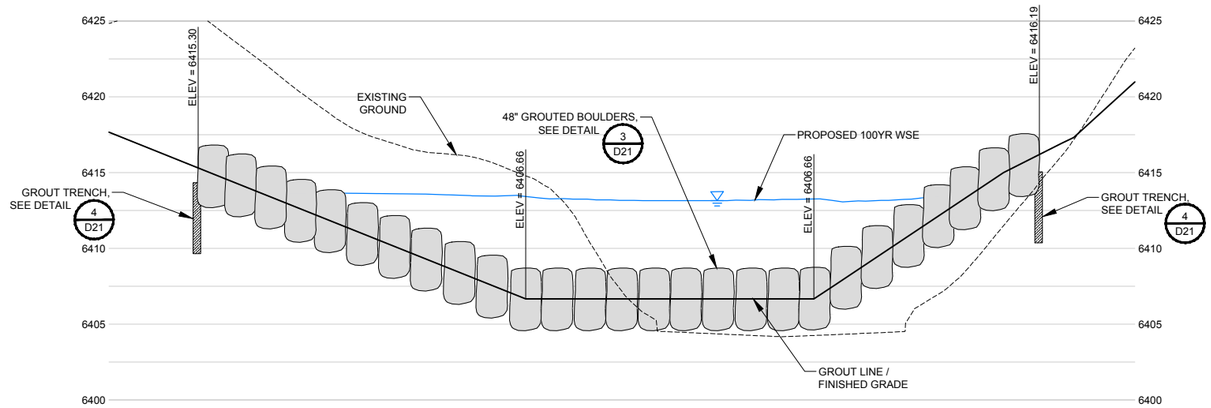
Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D08

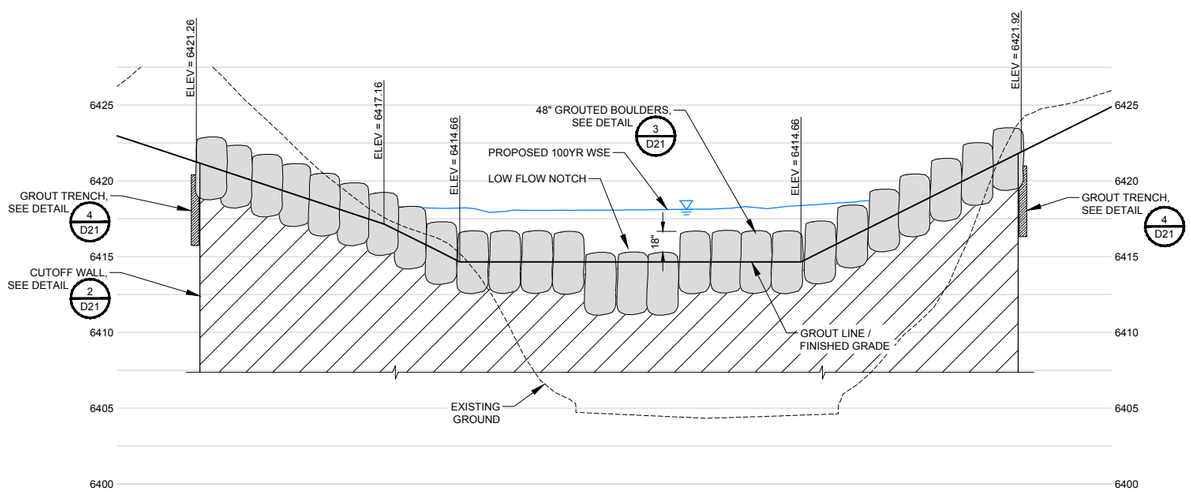
SHEET 34 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD



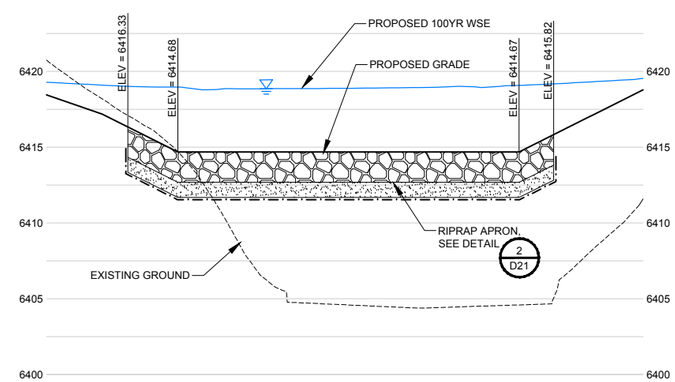
D / D09 SECTION

SCALE: AS SHOWN



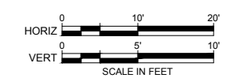
E / D09 SECTION

SCALE: AS SHOWN



F / D09 SECTION

SCALE: AS SHOWN



NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions | Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #3 SECTIONS 2 OF 2

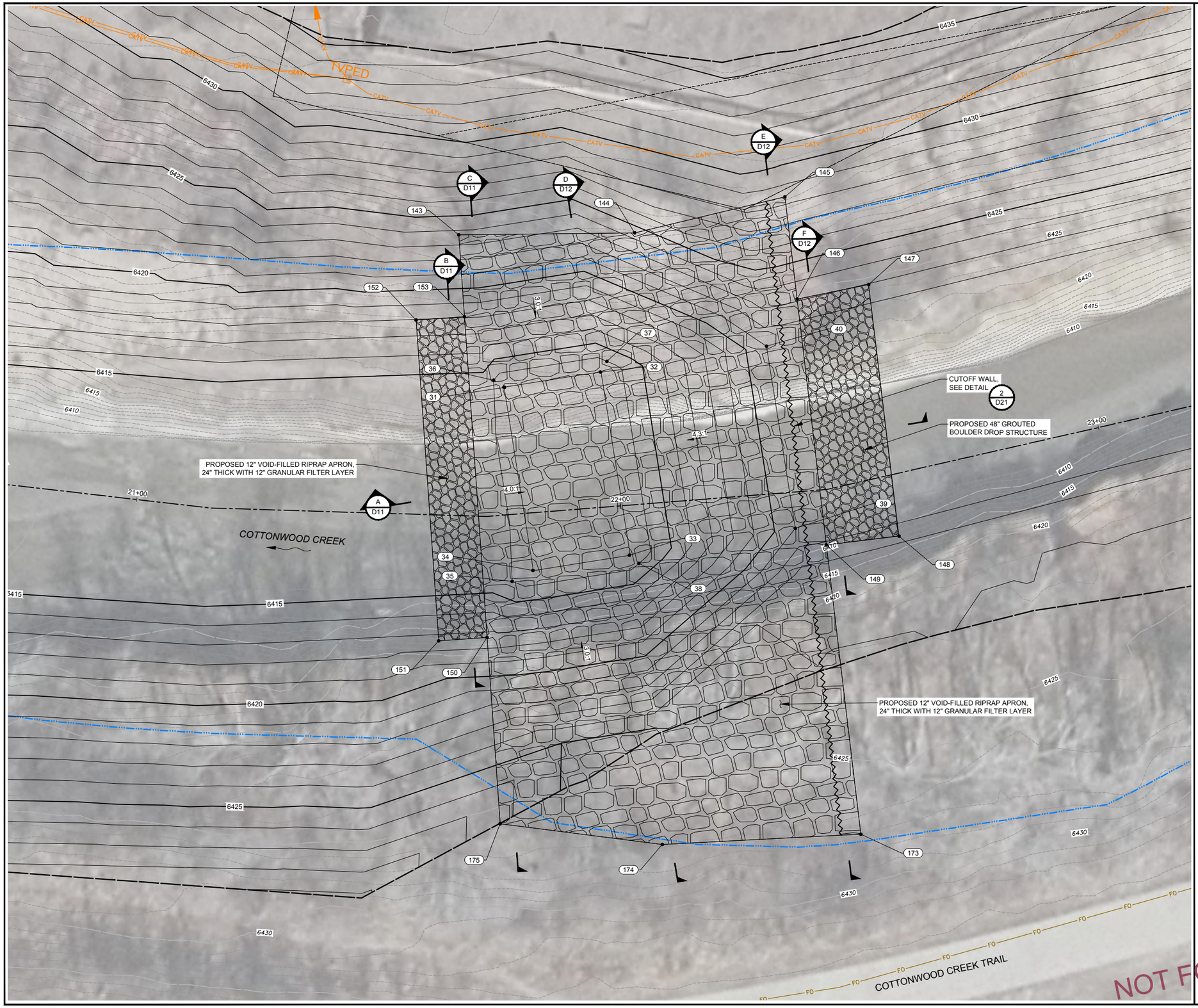
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

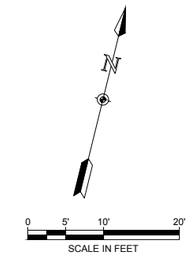
PROJECT NO. 36-4715.01

DRAWING NO. D09

SHEET 35 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 1.DWG Friday, February 16, 2024 4:23 PM By: RICKS, RONALD





NOTES:

xx

DROP STRUCTURE #4 ROCK EXTENT AND GRADING POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
31	1399817.27	3202883.69	6413.00
32	1399825.06	3202902.14	6413.00
33	1399789.86	3202916.98	6413.00
34	1399782.05	3202898.39	6413.00
35	1399778.82	3202894.77	6414.00
36	1399818.15	3202881.16	6414.00
37	1399827.51	3202902.90	6414.00
38	1399788.68	3202919.26	6414.00
39	1399803.39	3202948.85	6421.00
40	1399838.41	3202934.09	6421.00
143	1399845.53	3202867.03	6423.69
144	1399854.60	3202902.14	6424.46
145	1399869.20	3202930.44	6428.38
146	1399849.36	3202937.90	6423.11
147	1399855.78	3202951.51	6422.95
148	1399806.94	3202969.99	6422.65
149	1399801.60	3202955.88	6422.17
150	1399766.37	3202892.52	6417.28
151	1399763.30	3202883.00	6417.33
152	1399826.38	3202862.69	6417.95
153	1399829.44	3202872.21	6418.06
173	1399745.41	3202977.02	6426.93
174	1399733.58	3202937.79	6425.96
175	1399729.73	3202904.32	6425.43

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #4 PLAN

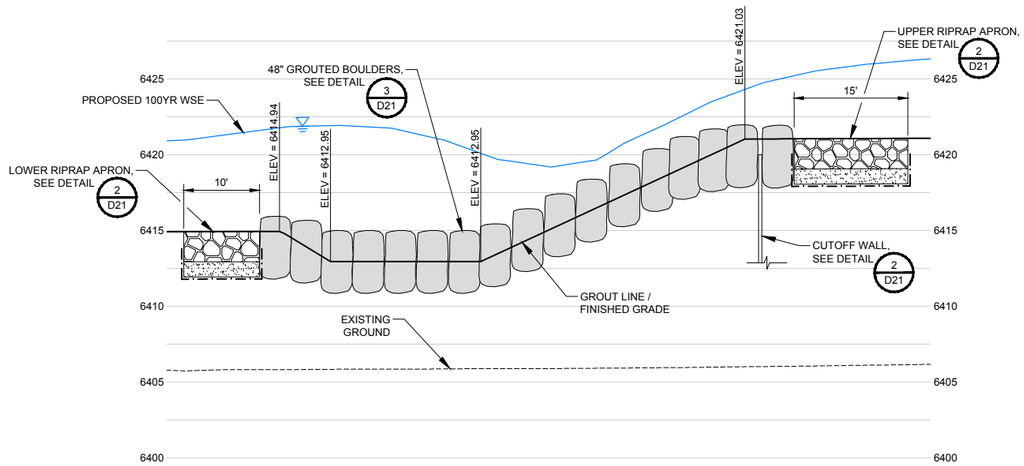
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D10

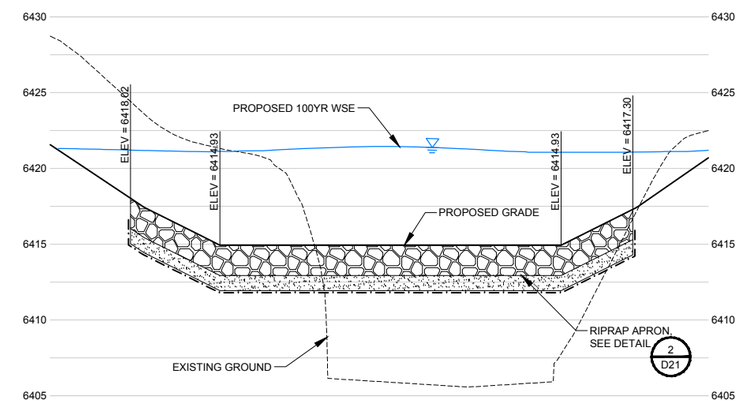
SHEET 36 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



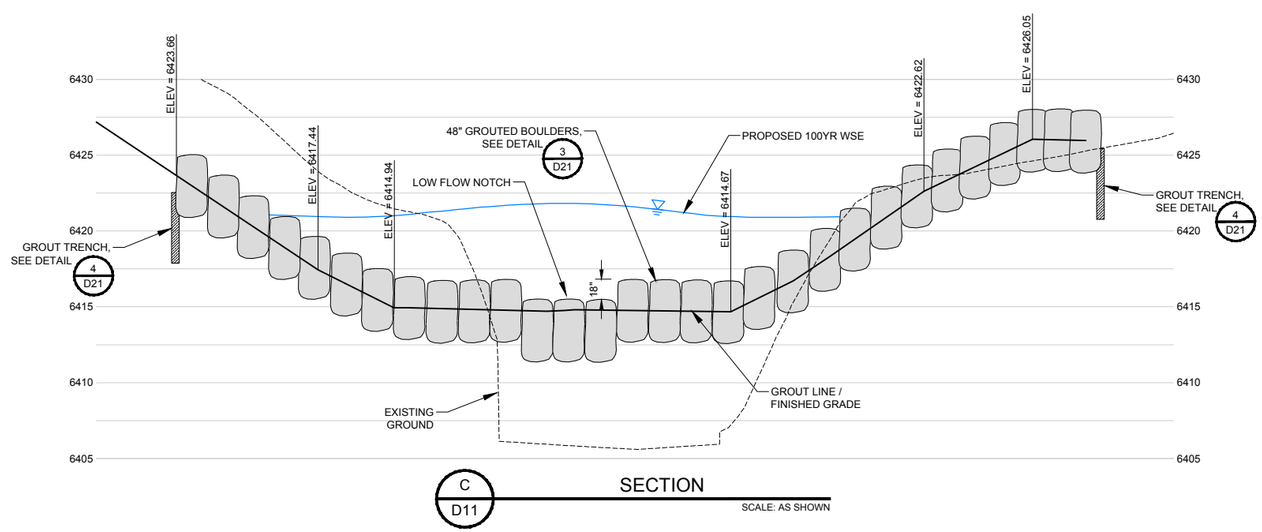
A D11 SECTION

SCALE: AS SHOWN



B D11 SECTION

SCALE: AS SHOWN



C D11 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

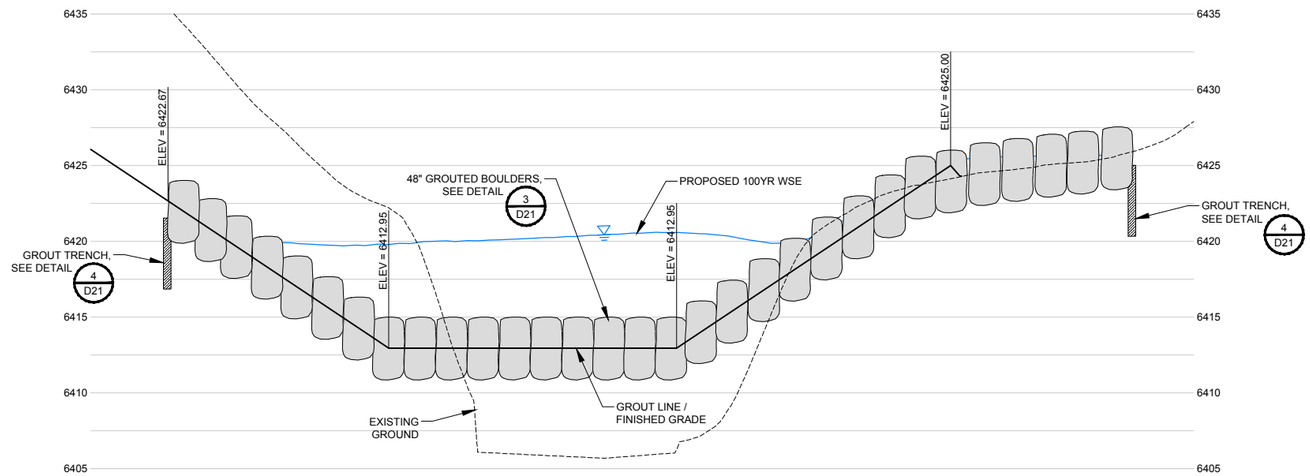
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #4 SECTIONS 1 OF 2

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

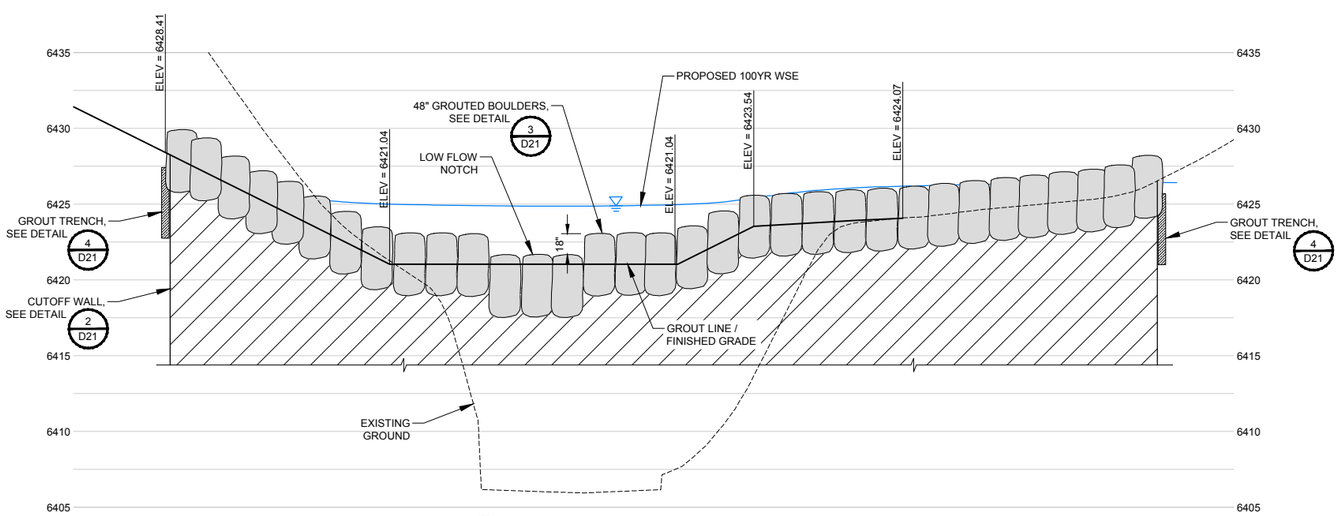
PROJECT NO. 36-4715.01

DRAWING NO. D11



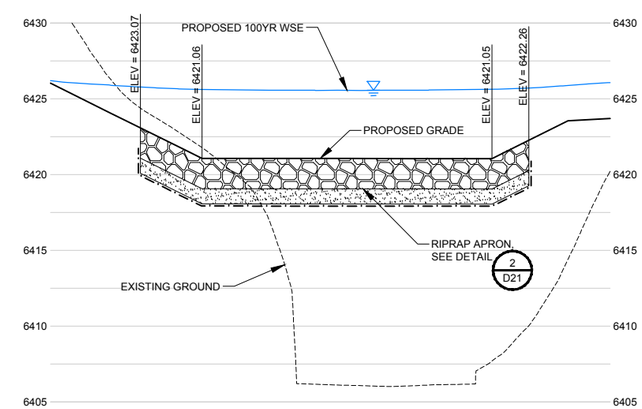
D / D12 SECTION

SCALE: AS SHOWN



E / D12 SECTION

SCALE: AS SHOWN



F / D12 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

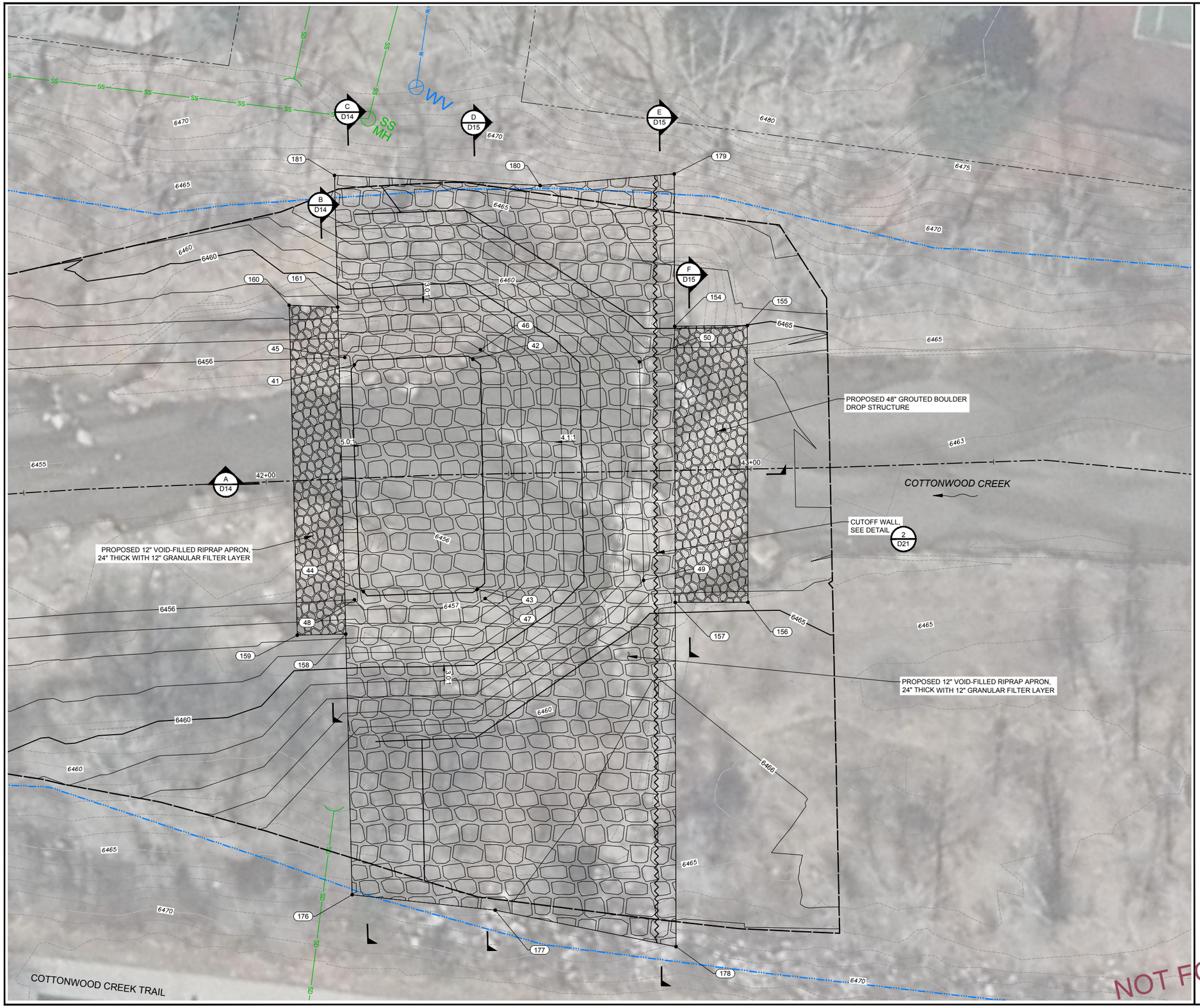
DROP STRUCTURE #4 SECTIONS 2 OF 2

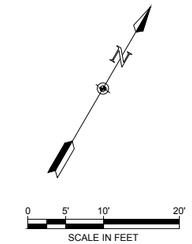
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D12

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD





NOTES:

xx

DROP STRUCTURE #5 ROCK EXTENT AND GRADING POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
41	1400581.81	3204707.02	6455.00
42	1400595.09	3204727.54	6455.00
43	1400554.59	3204752.18	6455.00
44	1400542.37	3204732.17	6455.00
45	1400582.12	3204704.54	6456.00
46	1400597.58	3204727.90	6456.00
47	1400553.77	3204754.56	6456.00
48	1400539.99	3204731.40	6456.00
49	1400573.46	3204780.87	6463.00
50	1400611.90	3204757.47	6463.00
154	1400621.90	3204760.05	6465.10
155	1400629.60	3204772.92	6464.98
156	1400580.38	3204801.75	6464.56
157	1400572.80	3204788.80	6464.47
158	1400532.98	3204733.41	6457.74
159	1400527.74	3204724.89	6457.68
160	1400585.64	3204689.22	6458.62
161	1400590.35	3204698.06	6458.56
176	1400487.22	3204761.60	6467.02
177	1400499.32	3204788.68	6466.68
178	1400511.59	3204824.66	6469.12
179	1400649.00	3204744.18	6470.14
180	1400633.00	3204721.47	6467.10
181	1400613.47	3204683.81	6465.35

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

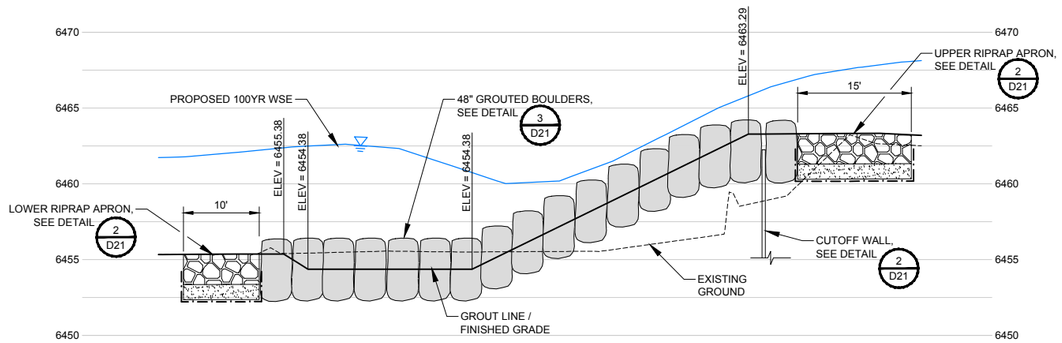
DROP STRUCTURE #5 PLAN

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

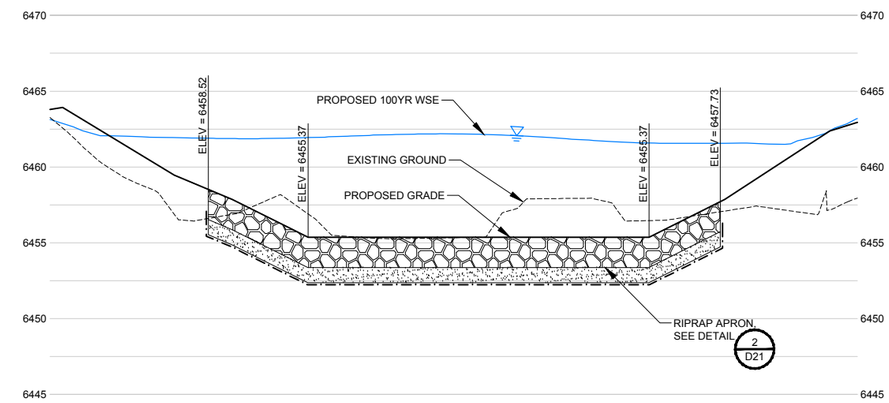
DRAWING NO. D13

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



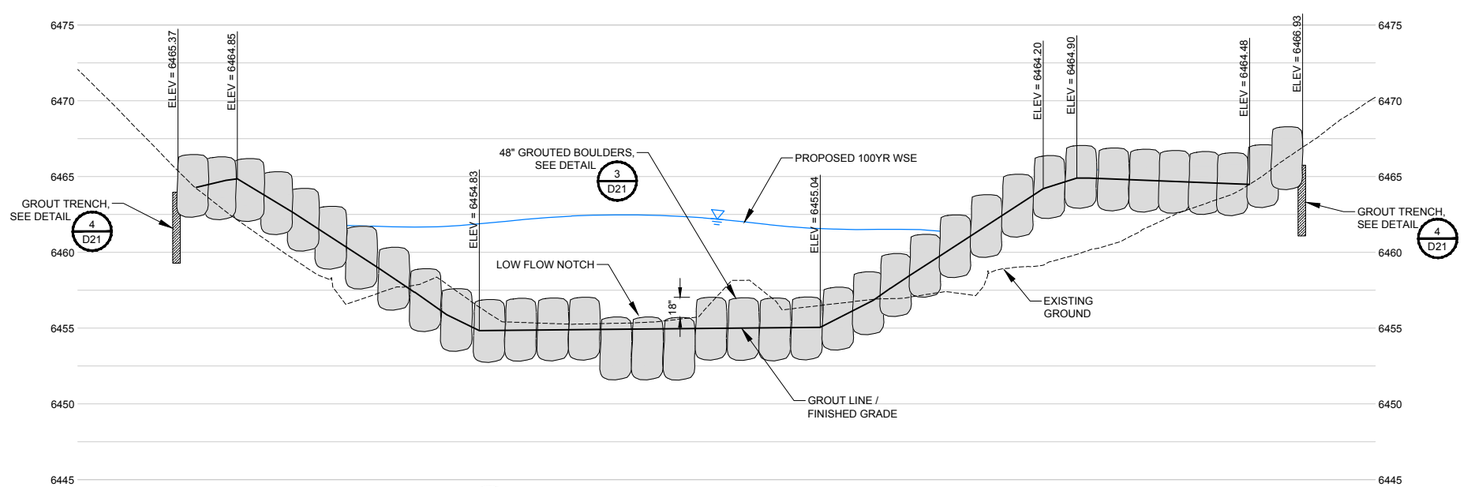
A D14 SECTION

SCALE: AS SHOWN



B D14 SECTION

SCALE: AS SHOWN



C D14 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #5
SECTIONS 1 OF 2

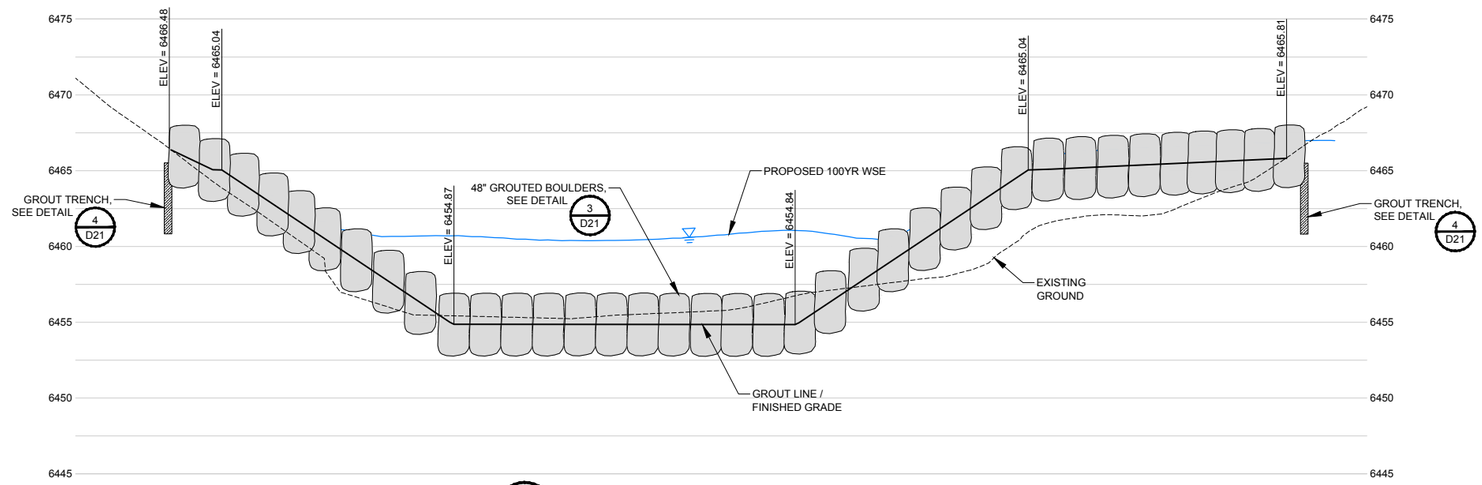
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D14

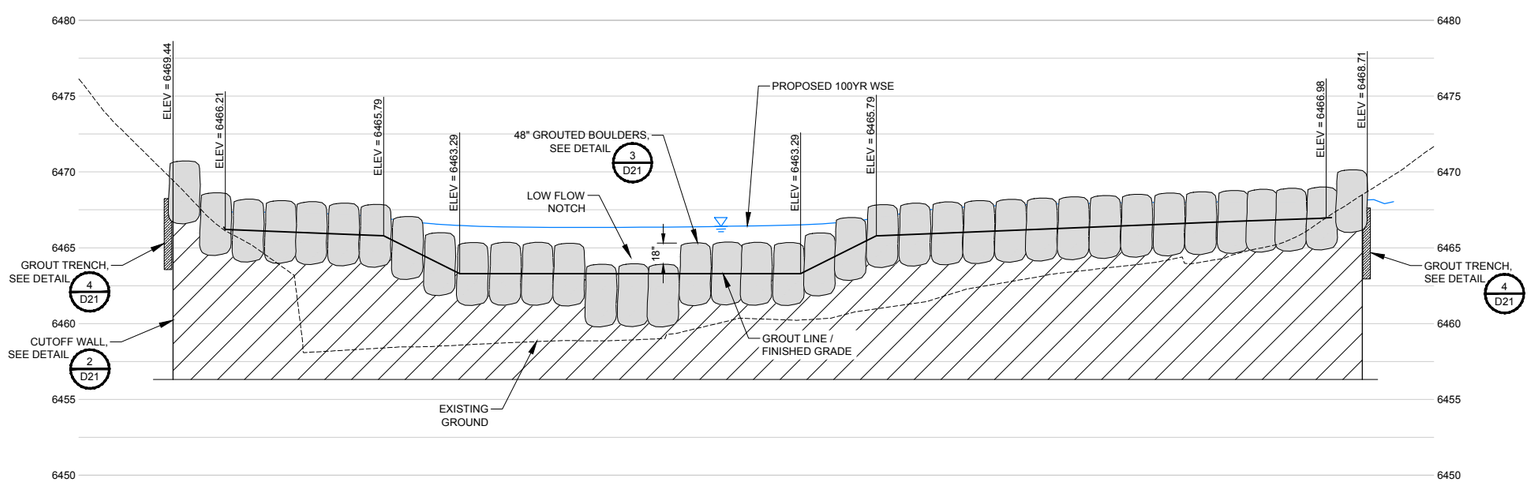
SHEET 40 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



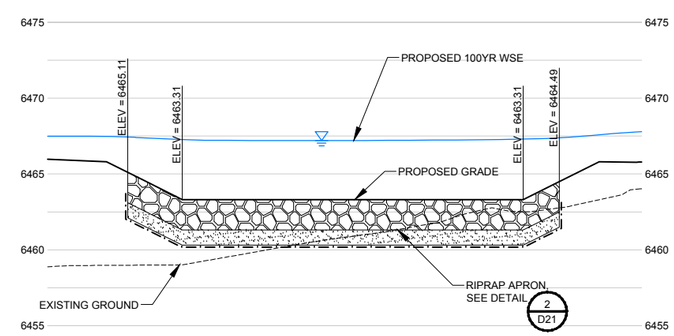
D / D15 SECTION

SCALE: AS SHOWN



E / D15 SECTION

SCALE: AS SHOWN



F / D15 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #5 SECTIONS 2 OF 2

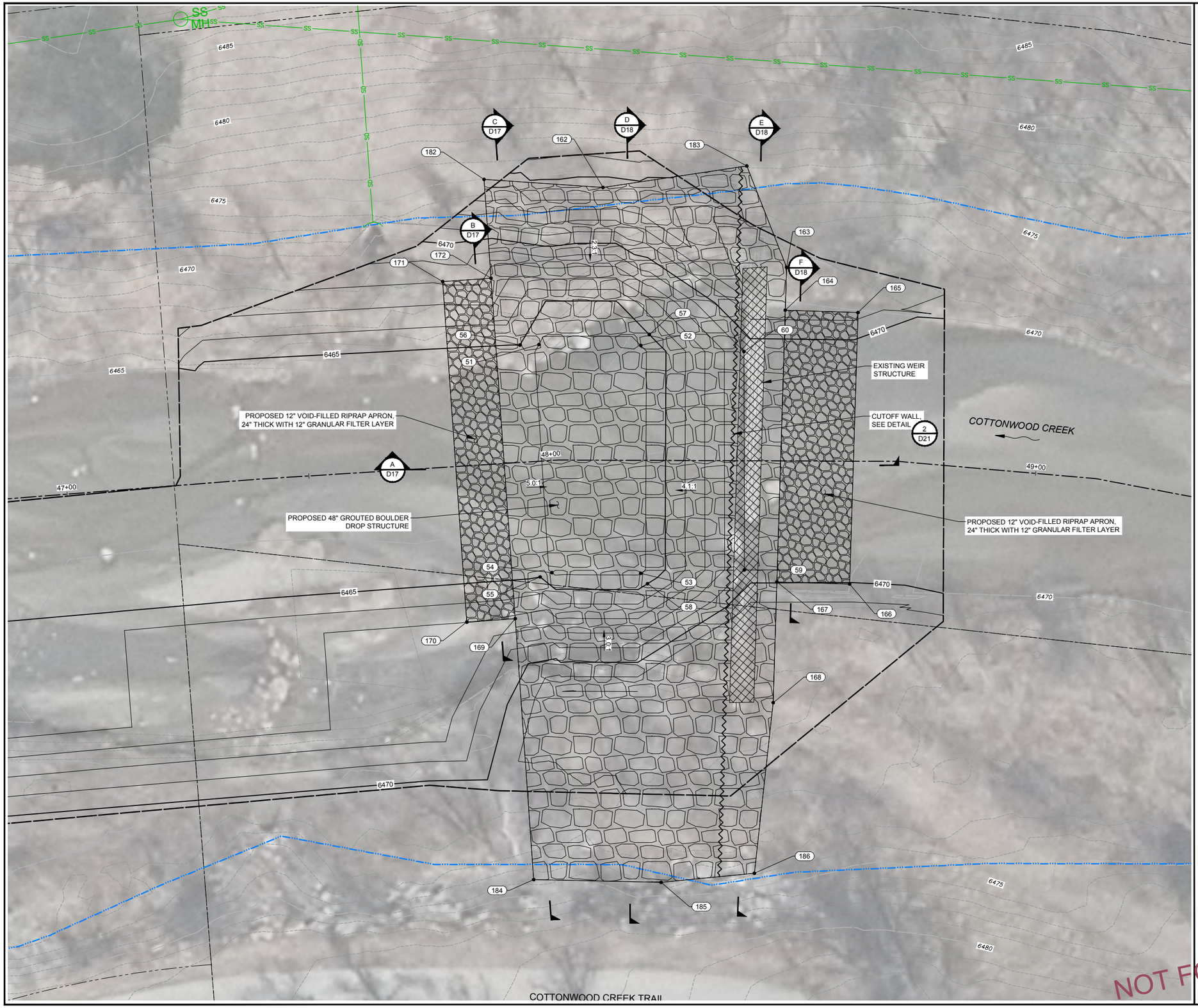
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

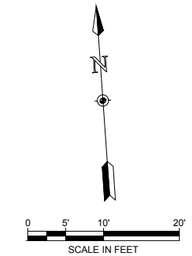
PROJECT NO. 36-4715.01

DRAWING NO. D15

SHEET 41 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD





NOTES:

XX

DROP STRUCTURE #6 ROCK EXTENT AND GRADING POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
51	1400736.03	3205265.50	6464.00
52	1400734.32	3205286.42	6464.00
53	1400687.48	3205283.09	6464.00
54	1400688.94	3205264.84	6464.00
55	1400688.22	3205262.34	6465.00
56	1400736.18	3205261.57	6465.00
57	1400736.46	3205288.34	6465.00
58	1400685.27	3205284.34	6465.00
59	1400686.68	3205304.44	6469.00
60	1400731.57	3205307.55	6469.00
162	1400767.38	3205280.95	6474.54
163	1400748.25	3205317.54	6471.85
164	1400739.47	3205316.65	6471.48
165	1400737.95	3205331.57	6471.34
166	1400682.23	3205325.89	6470.08
167	1400683.75	3205310.97	6469.95
168	1400658.98	3205308.45	6471.82
169	1400680.01	3205256.61	6467.21
170	1400680.01	3205246.61	6466.98
171	1400750.36	3205246.61	6468.13
172	1400750.36	3205256.61	6467.72
182	1400770.76	3205256.61	6475.01
183	1400769.70	3205310.83	6476.10
184	1400626.10	3205256.61	6473.64
185	1400623.67	3205282.76	6473.22
186	1400624.19	3205302.07	6473.89

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #6 PLAN

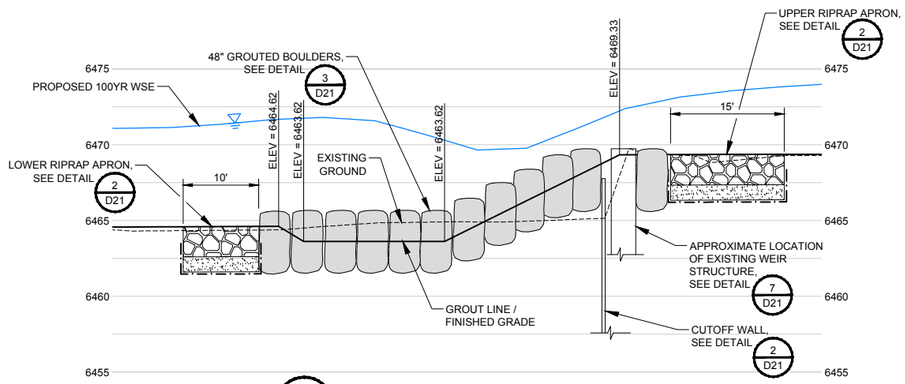
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D16

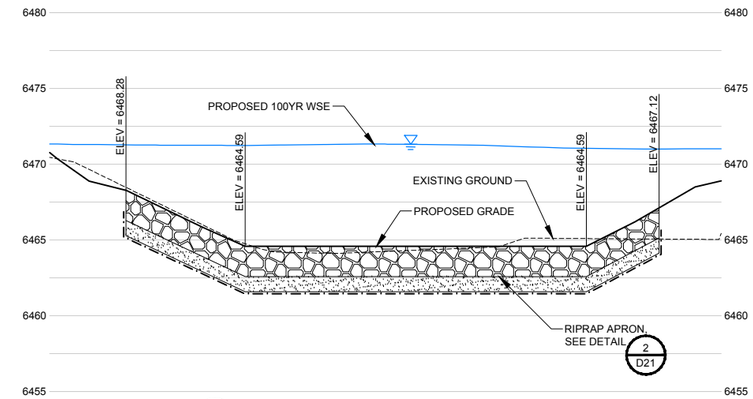
SHEET 42 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



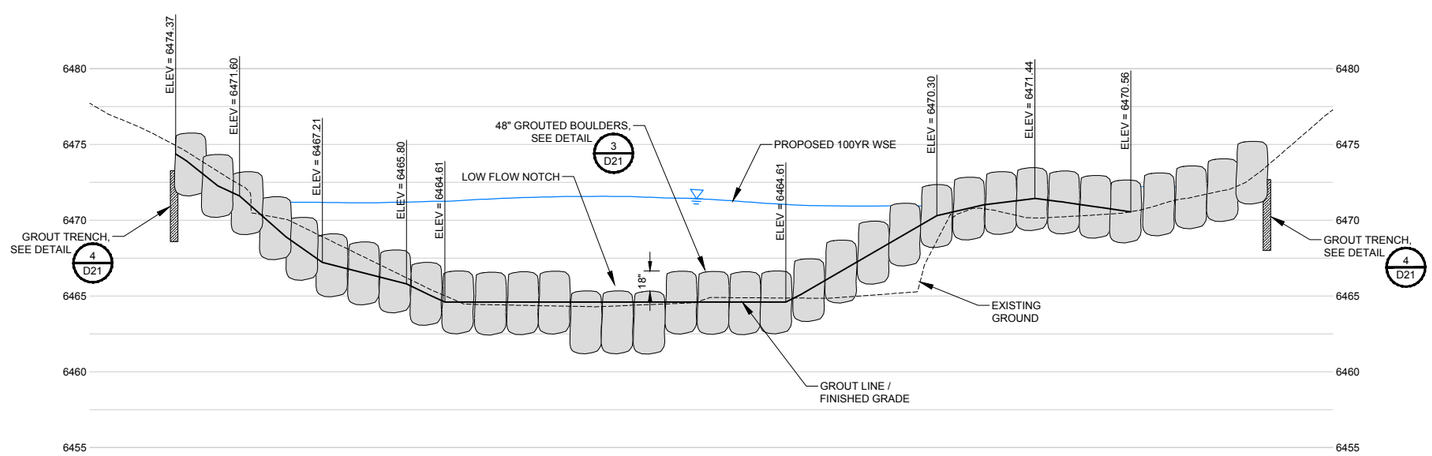
A D17 SECTION

SCALE: AS SHOWN



B D17 SECTION

SCALE: AS SHOWN



C D17 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #6 SECTIONS 1 OF 2

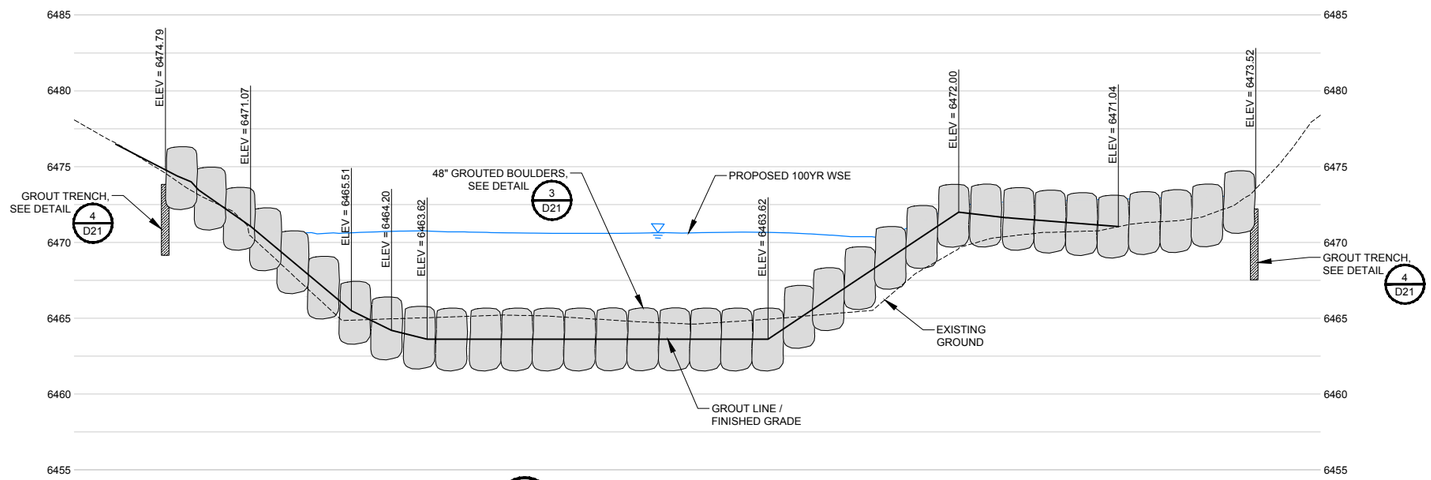
Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D17

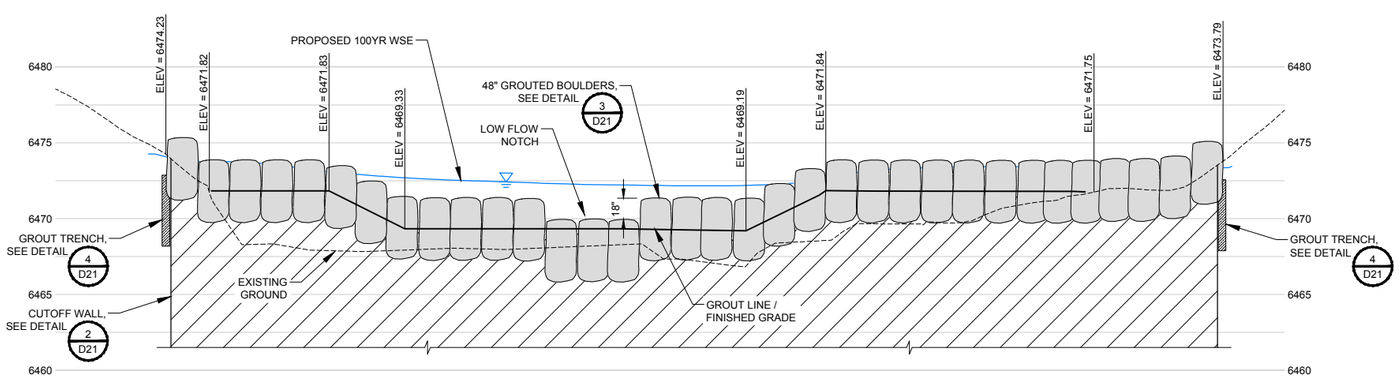
SHEET 43 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



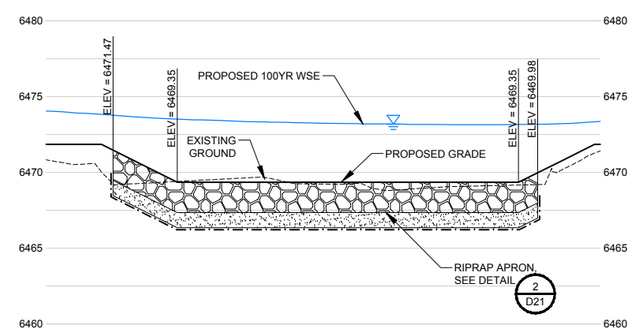
D / D18 SECTION

SCALE: AS SHOWN



E / D18 SECTION

SCALE: AS SHOWN



F / D18 SECTION

SCALE: AS SHOWN

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

DROP STRUCTURE #6 SECTIONS 2 OF 2

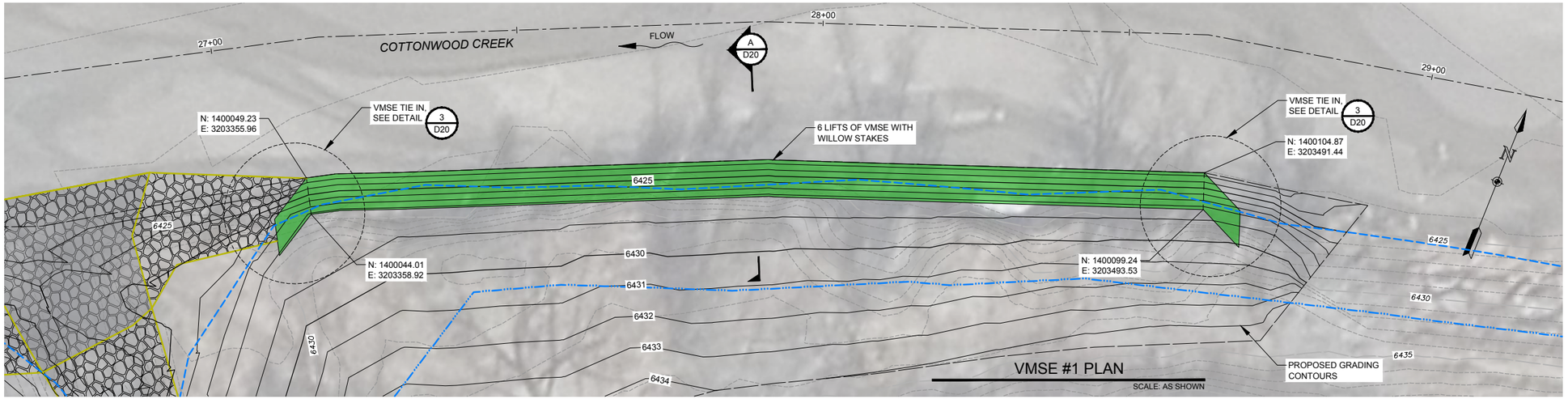
Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D18

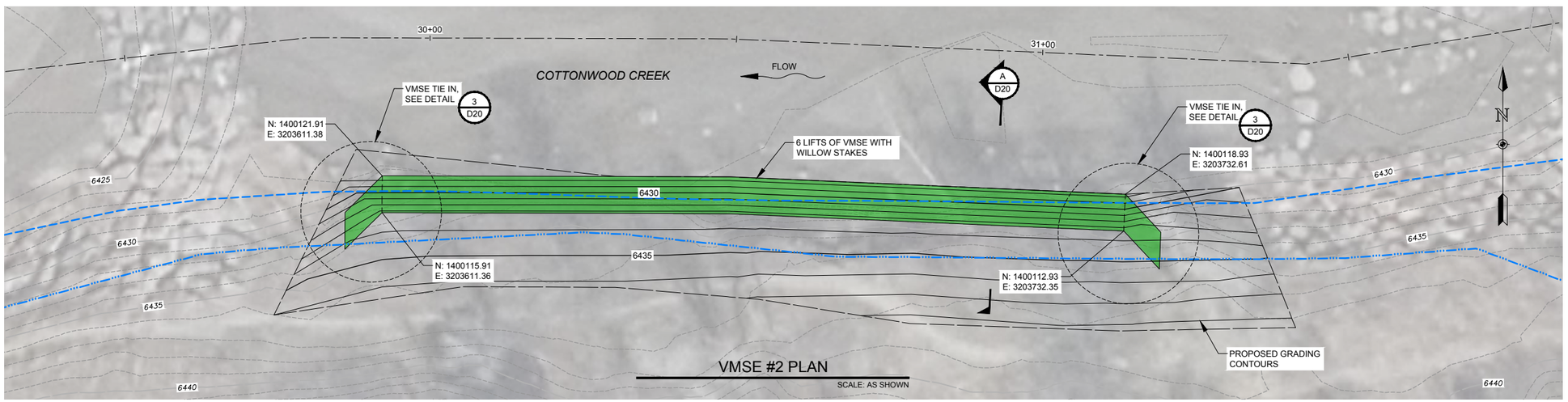
SHEET 44 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DROP STRUCTURE DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



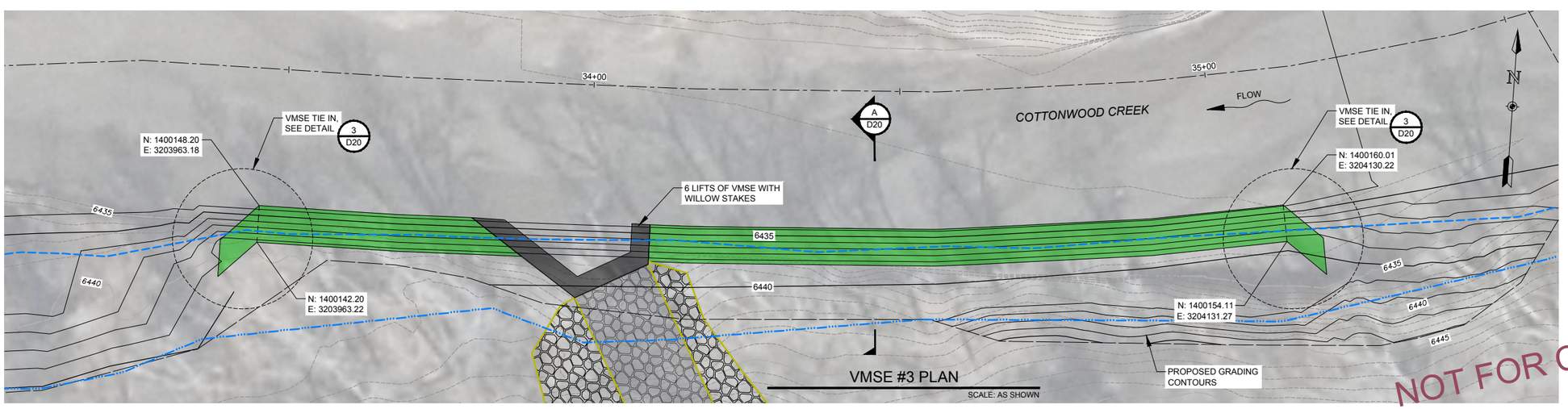
VMSE #1 PLAN

SCALE: AS SHOWN



VMSE #2 PLAN

SCALE: AS SHOWN



VMSE #3 PLAN

SCALE: AS SHOWN

0 5' 10' 20'
SCALE IN FEET

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

VMSE PLANS

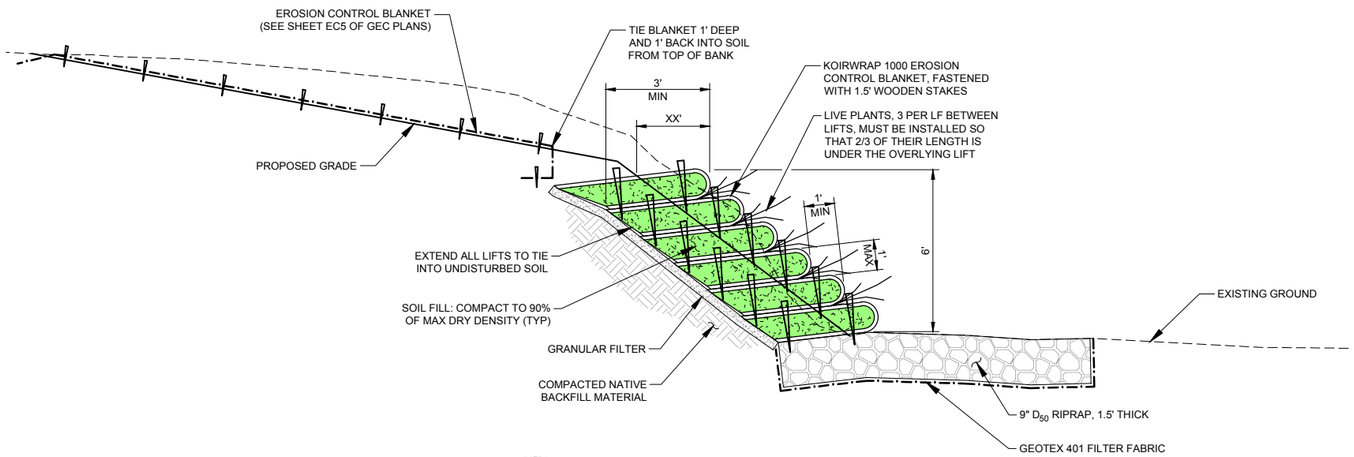
Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D19

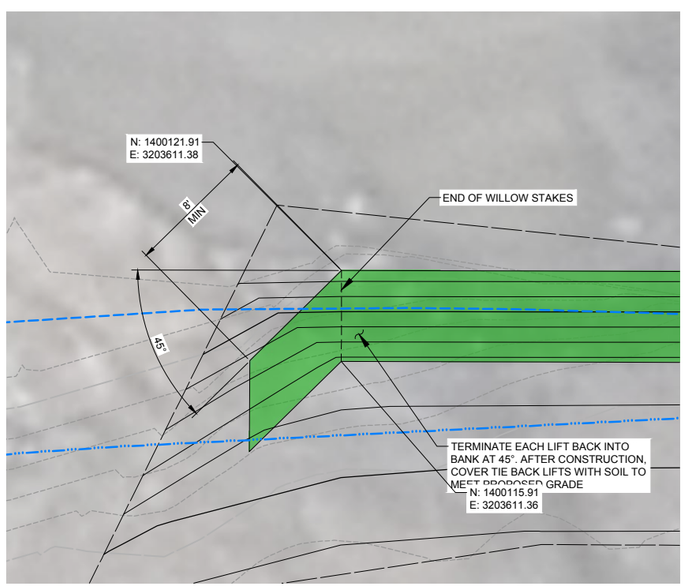
SHEET 45 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 1.DWG Friday, February 16, 2024 4:59 PM By: RICKS, RONALD



A / D20 TYPICAL SECTION

NOT TO SCALE



3 / D20 VMSE TIE IN DETAIL

NOT TO SCALE

VMSE TIE IN FIELD PHOTO

NOT TO SCALE

VMSE WILLOW STAKES
FIELD PHOTO

NOT TO SCALE

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT,
SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

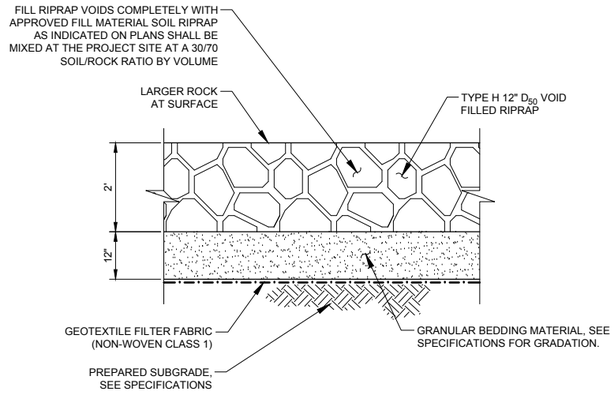
COTTONWOOD CREEK
STABILIZATION
(ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

CONSTRUCTION
VMSE DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO.
36-4715.01
DRAWING NO.
D20
SHEET 46 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 1.DWG Friday, February 16, 2024 4:59 PM By: RICKS, RONALD

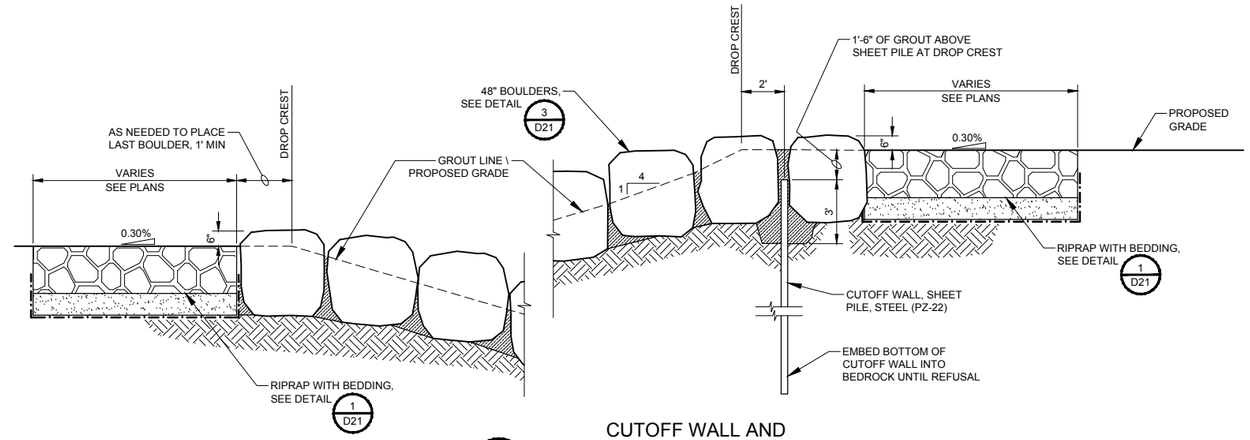


NOTES:

1. EXPOSED AND BURIED RIPRAP ARE APPLICABLE TO FLAT OR SLOPED AREAS. REFER TO THE GRADING PLAN FOR ACTUAL LOCATION AND LIMITS.
2. REFER TO SPECIFICATIONS FOR MATERIALS AND PLACEMENT REQUIREMENTS FOR RIPRAP AND GRANULAR BEDDING MATERIAL.
3. GENERAL PLACEMENT TECHNIQUES SHOULD RESULT IN LARGER ROCK AT THE SURFACE AND ROCK SECURELY INTERLOCKED AT THE DESIGN THICKNESS AND GRADE. COMPACTION AND LEVELING SHOULD RESULT IN MINIMAL VOIDS AND PROJECTIONS ABOVE GRADE. TYPICAL FOR BOTH BURIED AND EXPOSED RIPRAP.
4. ALL BURIED RIPRAP SHALL BE MIXED WITH SOIL PRIOR TO INSTALLATION. THE MIXTURE SHALL BE 70% RIPRAP AND 30% SOIL.

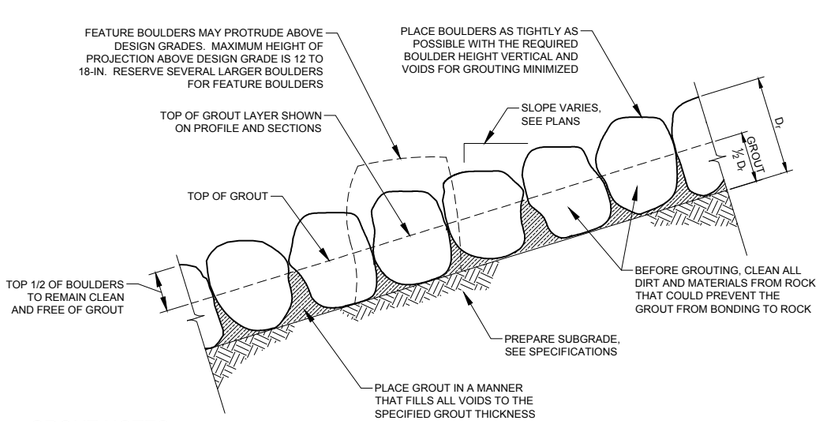
1 / D21 — TYPICAL RIPRAP PLACEMENT DETAIL

NOT TO SCALE



2 / D21 — CUTOFF WALL AND RIPRAP APRON DETAIL

NOT TO SCALE



GROUT NOTES

MATERIAL SPECIFICATIONS

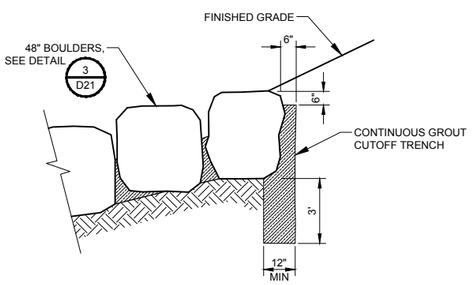
1. ALL GROUT SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH EQUAL TO 3200 PSI.
2. ONE CUBIC YARD OF GROUT SHALL HAVE A MINIMUM OF SIX (6) SACKS OF TYPE II PORTLAND CEMENT.
3. A MAXIMUM OF 25% TYPE F FLY ASH MAY BE SUBSTITUTED FOR THE PORTLAND CEMENT.
4. THE AGGREGATE SHALL BE COMPRISED OF ¾-INCH MAXIMUM GRAVEL, STRUCTURAL CONCRETE AGGREGATE.
5. THE GROUT SLUMP SHALL BE 4-INCHES TO 6-INCHES.
6. AIR ENTRAINMENT SHALL BE 5.5% - 7.5%.
7. TO CONTROL SHRINKAGE AND CRACKING, 1.5 POUNDS OF FIBERMESH, OR EQUIVALENT, SHALL BE USED PER CUBIC YARD OF GROUT.

PLACEMENT SPECIFICATIONS

1. GROUT SHALL BE DELIVERED BY MEANS OF A LOW PRESSURE (LESS THAN 10 PSI) CONCRETE PUMP USING A 3-INCH DIAMETER NOZZLE.
2. FULL DEPTH PENETRATION OF THE GROUT INTO THE BOULDER VOIDS SHALL BE ACHIEVED BY INJECTING GROUT STARTING WITH THE NOZZLE NEAR THE BOTTOM AND RAISING IT AS GROUT FILLS, WHILE VIBRATING GROUT INTO PLACE USING A PENCIL VIBRATOR.
3. AFTER GROUT PLACEMENT, EXPOSED BOULDER FACES SHALL BE CLEANED WITH A WET BROOM.
4. ALL GROUT BETWEEN BOULDERS SHALL BE TREATED WITH A BROOM FINISH.
5. ALL FINISHED GROUT SURFACES SHALL BE SPRAYED WITH A CLEAR LIQUID MEMBRANE CURING COMPOUND AS SPECIFIED IN ASTM C-309.
6. SPECIAL PROCEDURES SHALL BE REQUIRED FOR GROUT PLACEMENT WHEN THE AIR TEMPERATURES ARE LESS THAN 40°F OR GREATER THAN 90°F. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER OF THE PROCEDURES TO BE USED FOR PROTECTING THE GROUT.
7. CLEAN BOULDERS BY BRUSHING AND WASHING BEFORE GROUTING.

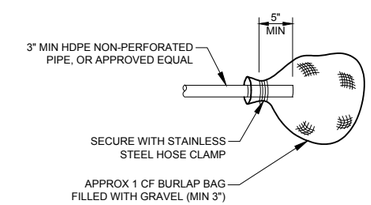
3 / D21 — GROUTED BOULDER PLACEMENT DETAIL

NOT TO SCALE



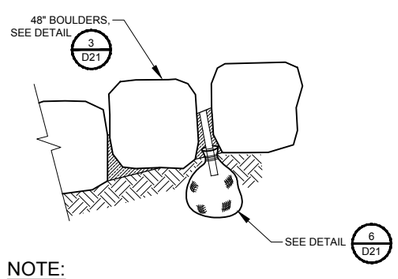
4 / D21 — TYPICAL GROUT TRENCH DETAIL

NOT TO SCALE



6 / D21 — WEEP PIPE BAG DETAIL

NOT TO SCALE

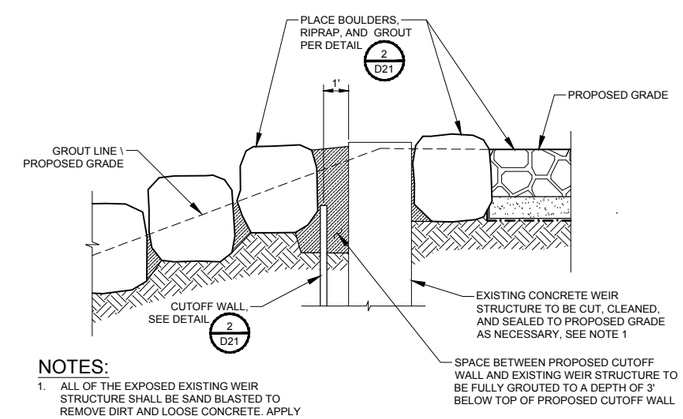


NOTE:

WEEP HOLES IN DROP STRUCTURES SHALL BE SPACED AT 10-FT INTERVALS IN ALL DIRECTIONS OR AS SHOWN ON THE PLANS.

5 / D21 — WEEP PIPE DETAIL

NOT TO SCALE



NOTES:

1. ALL OF THE EXPOSED EXISTING WEIR STRUCTURE SHALL BE SAND BLASTED TO REMOVE DIRT AND LOOSE CONCRETE. APPLY EPOXY PATCH CONCRETE SEALER, OR OTHER ENGINEER APPROVED PATCHING MATERIAL, AT REPAIR LOCATIONS.

7 / D21 — EXISTING WEIR STRUCTURE TIE IN DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

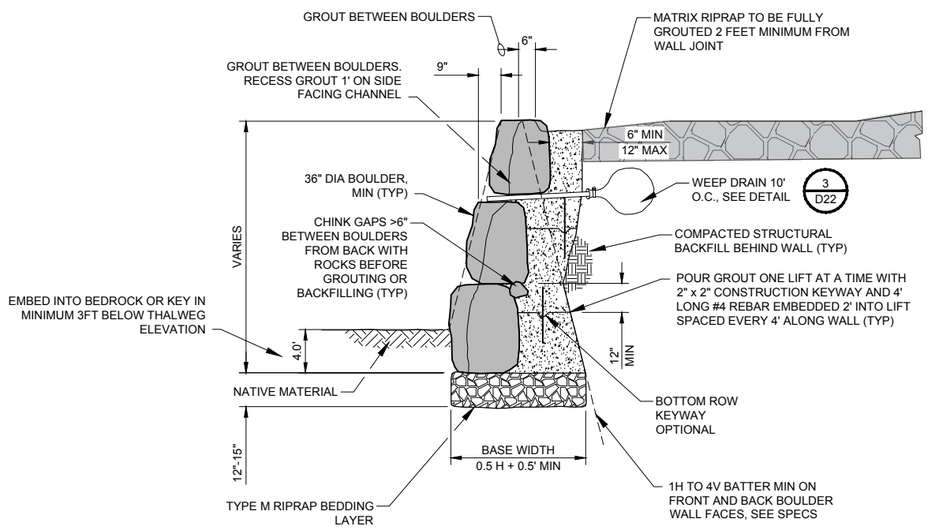
CONSTRUCTION
MISCELLANEOUS DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D21

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 1.DWG Friday, February 16, 2024 4:59 PM By: RICKS, RONALD

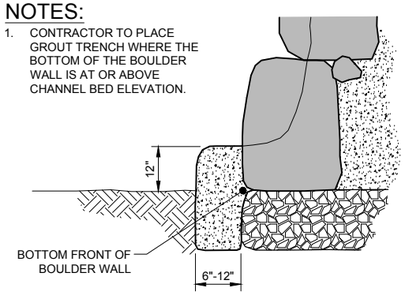


1 / D22 STACKED GROUTED BOULDER WALL 1 DETAIL

NOT TO SCALE

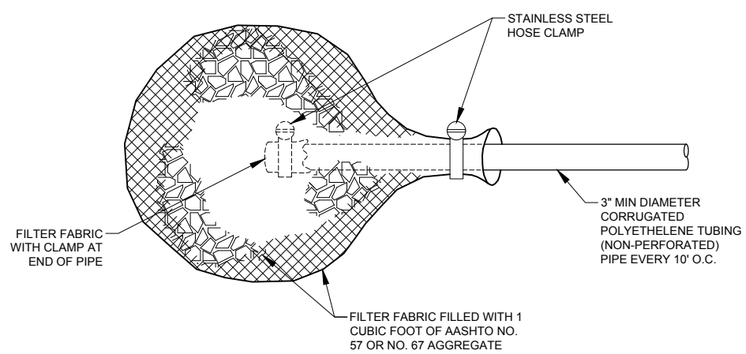
NOTES:

1. CONTRACTOR TO PLACE GROUT TRENCH WHERE THE BOTTOM OF THE BOULDER WALL IS AT OR ABOVE CHANNEL BED ELEVATION.



2 / D22 GROUT TRENCH DETAIL

NOT TO SCALE



3 / D22 WEEP DRAIN DETAIL

NOT TO SCALE

GENERAL NOTES:

1. IF SUITABLE BOULDERS CAN NOT BE OBTAINED INTERLOCKING CONCRETE BLOCKS CAN BE SUBSTITUTED. FOR CONCRETE BLOCK DETAIL SEE "PHASE 1 : BLACK CREEK" PLANSET SHEET D03

BOULDER NOTES:

ROCK FOR BOULDERS SHALL MEET THE FOLLOWING SPECIFICATIONS:

- DENSITY GREATER THAN 165 POUNDS PER CUBIC FOOT
- SPECIFIC GRAVITY GREATER THAN 2.6-BULK SATURATED SURFACE DRY (AASHTO T85)
- FREEZE THAW LOSS LESS THAN 10% (AASHTO T103 PROCEDURE A)
- LA ABRASION LOSS OF LESS THAN 35% (AASHTO T-96)
- CERTIFIED NO RHYOLITE ROCK
- CERTIFIED NO CALCITE INTRUSIONS

1. BOULDERS SHALL BE ROUGHLY BOX SHAPED. 48" INSTALLED BOULDERS SHALL BE BE A MINIMUM 4'-0" HIGH AND A MINIMUM 4'-0" IN WIDTH. 36" INSTALLED BOULDERS SHALL BE BE A MINIMUM 3'-0" HIGH AND A MINIMUM 3'-0" IN WIDTH. NEITHER BREADTH NOR THICKNESS OF A SINGLE BOULDER SHALL BE LESS THAN ⅔ OF ITS LENGTH.
2. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTION. HOWEVER, IN THE EVENT LARIMER COUNTY REPRESENTATIVE DETERMINES THE BOULDERS TO BE UNACCEPTABLE, LARIMER COUNTY REP SHALL PICK TWO RANDOM TRUCKLOADS TO BE DUMPED AND CHECKED FOR GRADATION. MECHANICAL EQUIPMENT AND LABOR NEEDED TO ASSIST IN CHECKING GRADATION SHALL BE PROVIDED BY CONTRACTOR AT NO ADDITIONAL COST TO LARIMER COUNTY. IF THE BOULDERS DO NOT MEET THE SPECIFIED GRADATION. IF THE BOULDERS DO MEET THE GRADATION SPECIFIED GRADATION, LARIMER COUNTY SHALL PAY FOR THE EQUIPMENT AND LABOR REQUIRED FOR CHECKING.
3. THE BOULDERS SHALL BE CAREFULLY PICKED AND ARRANGED SO THAT ADJACENT ROCK SURFACES MATCH WITHIN TWO (2) INCHES IN TOP ELEVATION AND TWO (2) INCHES ALONG VERTICAL EXPOSED FACES. BOULDERS SHALL BE PLACED SUCH THAT ADJACENT BOULDERS "TOUCH" EACH OTHER AND VOIDS DO NOT EXCEED SIX (6) INCHES OR A MAXIMUM VOID SPACE OF 25% OF TOTAL VOLUME WHICHEVER IS LESS. IT IS THE INTENT OF CONSTRUCTION TO MINIMIZE VOIDS AND GROUT PLACED BETWEEN BOULDERS.
4. BOULDERS SHALL BE PLACED IN EVENLY SPACED ROWS MIMICKING A "STAIR-STEP" PATTERN. THE TOP OF EACH BOULDER SHALL BE PLACED FLAT AND SHALL NOT MATCH THE SLOPE OF THE SUBGRADE.

GROUT NOTES:

SPECIFICATIONS

1. ALL GROUT SHALL BE CDOT TYPE B WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH EQUAL TO 4000 PSI.
2. ONE CUBIC YARD OF GROUT SHALL HAVE A MINIMUM OF SIX (6) SACKS OF TYPE II PORTLAND CEMENT.
3. THE WATER CEMENT RATIO SHALL NOT EXCEED 0.45.
4. THE AGGREGATE SHALL BE COMPRISED OF 3/4 INCH MAXIMUM GRAVEL, STRUCTURAL CONCRETE AGGREGATE.
5. THE GROUT SLUMP SHALL BE 4-INCHES TO 6-INCHES
6. AIR ENTRAINMENT SHALL BE 5% TO 8%.
7. TO CONTROL SHRINKAGE AND CRACKING, 1.5 POUNDS OF FIBERMESH, OR EQUIVALENT, SHALL BE USED PER CUBIC YARD OF GROUT.
8. A STIFFER MIX OR OTHER MEASURES CAN BE USED AS APPROVED BY THE UTILITIES REPRESENTATIVE FOR STEEPER SLOPES OR VERTICAL JOINTS.

PLACEMENT:

1. BOULDERS SHALL BE FREE OR DEBRIS AND DIRT PRIOR TO GROUT PLACEMENT.
2. ALL GROUT SHALL BE DELIVERED BY MEANS OF A LOW PRESSURE (LESS THAN 10 PSI) CONCRETE PUMP USING A 3-INCH NOZZLE.
3. GROUT SHALL BE DELIVERED IN A CONTROLLED MANNER. AN "S" ATTACHMENT MAY BE REQUIRED TO LIMIT EXIT VELOCITIES.
4. FULL DEPTH PENETRATION OF THE GROUT INTO THE BOULDER VOIDS SHALL BE ACHIEVED BY INJECTING GROUT STARTING WITH THE NOZZLE NEAR THE BOTTOM AND RAISING IT AS GROUT FILLS, WHILE VIBRATING GROUT INTO PLACE USING A PENCIL VIBRATOR.
5. AFTER GROUT PLACEMENT, EXPOSED BOULDER FACES SHALL BE CLEANED AND PRESSURE WASHED.
6. ALL GROUT BETWEEN BOULDERS SHALL BE TREATED WITH BROOM FINISH.
7. SPECIAL PROCEDURES SHALL BE REQUIRED FOR GROUT PLACEMENT WHEN THE AIR TEMPERATURES ARE LESS THAN 40°F OR GREATER THAN 90°F. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER OF THE PROCEDURES TO BE USED FOR PROTECTING THE GROUT.

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

CONSTRUCTION
MISCELLANEOUS DETAILS

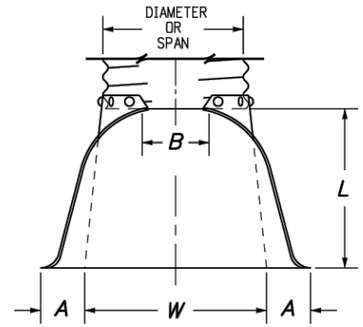
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01
DRAWING NO. D22
SHEET 48 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 1.DWG Friday, February 16, 2024 4:59 PM By: RICKS, RONALD

PIPE DIA.	THICKNESS	DIMENSIONS					
		A	B	H	L	W	T
		IN.					
12	0.064	6	6	6	21	24	34
18	0.064	8	10	6	31	36	46
21	0.064	9	12	6	36	42	52
24	0.064	10	13	6	41	48	58
30	0.079	12	16	8	51	60	70
36	0.079	14	19	9	60	72	94
42	0.109	16	22	11	69	84	106
48	0.109	18	27	12	78	90	112
54	0.109	18	30	12	84	102	124
60	0.109	18	33	12	87	114	136
66	0.109	18	36	12	87	120	142
72	0.109	18	39	12	87	126	148
78	0.109	18	42	12	87	132	154
84	0.109	18	45	12	87	138	160

FLEXIBLE ROUND PIPE



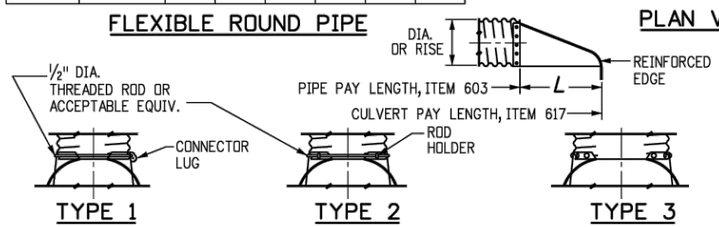
PLAN VIEW

PIPE ARCH SPAN x RISE	THICKNESS	DIMENSIONS					
		A	B	H	L	W	T
		(±1")	(MAX.)	(±1")	(±1.5")	(±2")	
		IN.					
21 x 15	0.064	7	10	6	23	36	46
24 x 18	0.064	8	12	6	28	42	52
28 x 20	0.064	9	14	6	32	48	58
35 x 24	0.079	10	16	6	39	60	70
42 x 29	0.079	12	18	8	46	75	85
49 x 33	0.109	13	21	9	53	85	103
57 x 38	0.109	18	26	12	63	90	108
64 x 43	0.109	18	30	12	70	102	120
71 x 47	0.109	18	33	12	77	114	132

FLEXIBLE PIPE ARCH

GENERAL NOTES

1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURERS' CONFIGURATIONS.
2. CONCRETE END SECTIONS SHALL BE FURNISHED WITH TONGUE OR GROOVE AS REQUIRED.
3. DESIGN LENGTH OF PIPE OR SIDE DRAIN IS BASED ON LENGTH OF END SECTION SHOWN IN TABLE. ANY ADDITIONAL PIPE REQUIRED TO PROVIDE THE DESIGN LENGTH SHALL BE FURNISHED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
4. THE INSIDE CONFIGURATION AND THE JOINT OF CONCRETE END SECTION AND PIPE SHALL MATCH.
5. END SECTIONS FOR CMP ARCH PIPE SHALL MATCH THE DIMENSIONS OF THE PIPE SHOWN ON THE PLANS.
6. GALVANIZED TOE PLATE AS SHOWN IS REQUIRED ON END SECTIONS FOR CORRUGATED STEEL PIPE AND SHALL BE THE SAME THICKNESS AS END SECTIONS. TOE PLATE SHALL BE FIELD-BOLTED TO END SECTION WITH 3/8 IN. GALVANIZED BOLTS, NUTS AND WASHERS.
7. GALVANIZED STEEL SHALL CONFORM TO AASHTO M 111, M 218 OR M 232.
8. CONCRETE PIPE JOINT FASTENERS, WHERE SHOWN ON PLANS, SHALL BE INSTALLED SO THAT A MINIMUM OF 15 LINEAR FEET OF THE OUTLET END OF THE PIPE ARE MECHANICALLY LOCKED TOGETHER. END SECTION LENGTHS WHEN USED, SHALL BE INCLUDED IN THE 15 LF REQUIREMENT.
9. CONNECTIONS OF METAL END SECTIONS TO PLASTIC PIPE SHALL BE APPROVED BY THE ENGINEER. PLASTIC END SECTIONS SHALL NOT BE USED.
10. THE END SECTION STYLE, EITHER REGULAR OR SAFETY, SHALL BE AS SHOWN ON THE PLANS.
11. AT THE OPTION OF THE CONTRACTOR AND APPROVAL OF THE CDOT PROJECT ENGINNER, REINFORCED CONCRETE END SECTIONS MAY BE MADE WITH SYNTHETIC FIBERS INSTEAD OF STEEL FOR PIPES 36 INCHES IN DIAMETER AND SMALLER, AND CONFORM TO AASHTO M 86 AND SUBSECTION 601.03.



TYPE 1

FOR 18 IN. THRU 24 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

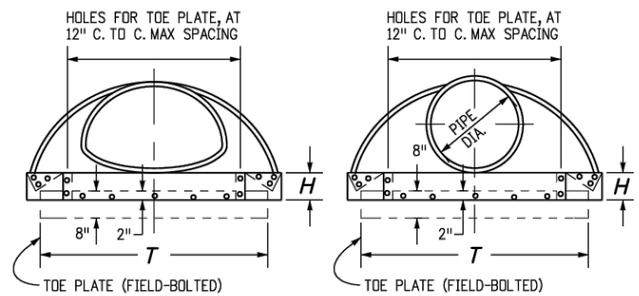
TYPE 2

FOR 30 IN. THRU 36 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

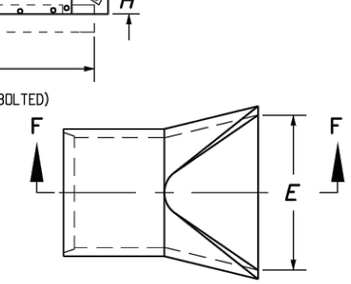
TYPE 3

FOR 42 IN. THRU 84 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS AND ALL SIZES WITH HELICAL CORRUGATIONS AND FOR ALL METAL PIPE ARCH CULVERTS. SHOP ATTACH A 24 IN. MIN. LENGTH OF ANNULAR PIPE WITH GALV. RIVETS OR BOLTS, SPOT WELDS, OR 2 IN. LONG SKIP WELDS ON 8 IN. CTRS. REPAIR BURNT GALVANIZING IN ACCORDANCE WITH SUBSECTION 707.09.

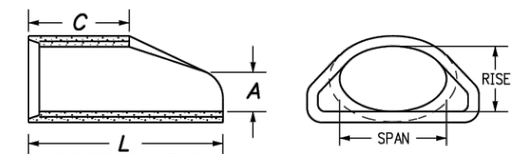
TYPICAL CONNECTIONS



ELEVATIONS



PLAN



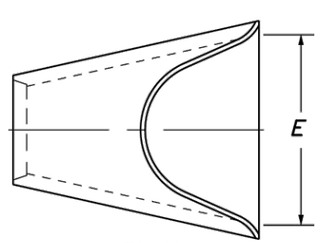
SECTION F-F

END VIEW

EQUIVALENT CIRCULAR DIA.	DIMENSIONS					
	NOMINAL SPAN x RISE		A	C	L	E
	IN.					
24	30	19	9	33	72	48
30	38	24	10	18	72	60
36	45	29	12	24	84	72
42	53	34	16	36	96	78
48	60	38	21	36	96	84
54	68	43	26	36	96	90
60	76	48	30	36	96	96

END SECTION FOR REINFORCED CONCRETE ELLIPTICAL PIPE

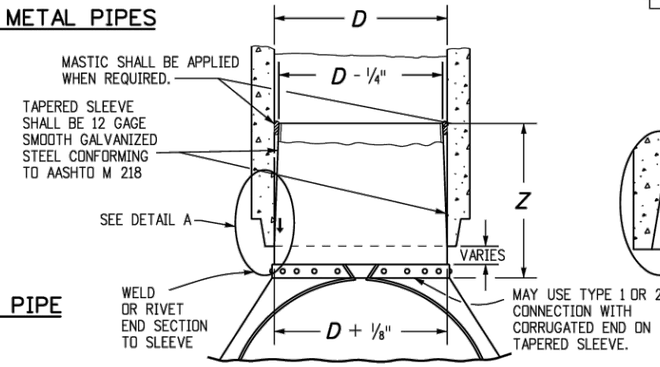
END SECTION AND CONNECTION DETAILS FOR ROUND AND ARCH METAL PIPES

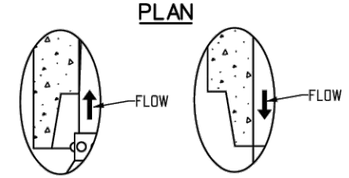


PLAN

PIPE I.D.	DIMENSIONS			
	A	C	L	E
	IN.			
18	10	48	78	36
24	10	48	78	48
30	14	36	96	60
36	18	36	96	72
42	24	36	96	78
48	28	24	96	84
54	30	36	96	90
60	36	36	96	96
72	34	20	96	108

REINFORCED CONCRETE CIRCULAR PIPE





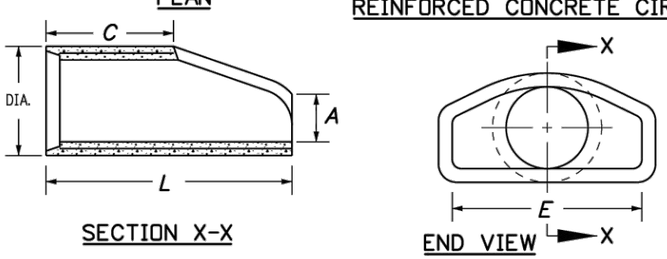
DETAIL A

D	Z (MIN.)
IN.	
18 - 24	12
30 AND 36	16
42 AND LARGER	24

NOTE: METAL END SECTION SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING.

STEEL END SECTION FOR CONCRETE CIRCULAR PIPE

(ALTERNATIVE FOR CONCRETE END SECTION)

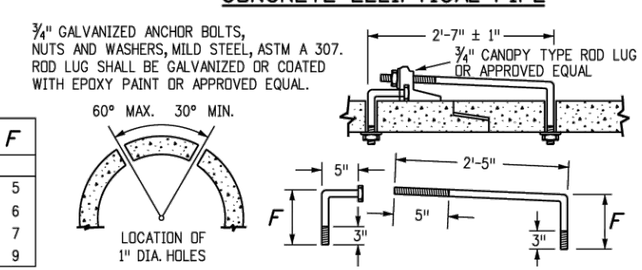


SECTION X-X

END VIEW

END SECTION FOR REINFORCED CONCRETE CIRCULAR PIPE

PIPE DIAMETER	F
IN.	
18 - 30	5
36 - 42	6
48 - 60	7
72 - 84	9



CONCRETE JOINT FASTENER (TWO PER JOINT)

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

Colorado Department of Transportation
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868
Project Development Branch JBK

CONCRETE AND METAL END SECTIONS

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-603-10
Standard Sheet No. 1 of 1
Project Sheet Number:

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Date
Revisions

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION
MISCELLANEOUS DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01
DRAWING NO. D23
SHEET 49 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

MATRIX RIPRAP

WHAT IS MATRIX RIPRAP?

MATRIX RIPRAP IS A COMBINATION OF ROCK RIPRAP AND CEMENT MORTAR THAT CREATES LARGE, HIGHLY INTERLOCKED, IRREGULARLY SHAPED CONGLOMERATES WITHIN A LAYER OF PLACED ROCK.

KEY PERFORMANCE TARGETS:

- REPRESENTATIVE ROCKS WILL HAVE A MINIMUM PULL OUT BOND OF 500 LBS AFTER 72 HOUR CURE TIME DUE TO CEMENT MORTAR ADHESIVE.
- MORTAR WILL PENETRATE ENTIRE THICKNESS OF ROCK LAYER WHERE APPLIED, WITH LIMITED POOLING ON TOP OF FILTER FABRIC. THIS IS VERIFIED VISUALLY BY PLACING MORTAR UNTIL REFUSAL BY THE ROCK AND MORTAR NO LONGER SINKS INTO VOIDS.
- MORTAR WILL FILL 35% TO 50% OF THE MATRIX VOID SPACE OVERALL. TOTAL MORTAR VOLUME SHOULD BE WITHIN THESE RANGES, PREFERABLY TOWARDS THE UPPER END; FOR TYPICAL MATRIX RIPRAP INSTALLATIONS:
  - d_{50} = 9" RIPRAP 2.0 TO 2.75 FT^3/YD^2
  - d_{50} = 12" RIPRAP 2.7 TO 4 FT^3/YD^2
  - d_{50} = 15" RIPRAP 3.4 TO 5.1 FT^3/YD^2

  (LAYER THICKNESS OF d_{50} x 2, ORDINARY TO LOOSE DUMPED ROCK PLACEMENT)

ROCK REQUIREMENTS:

- CLEAN AND FREE OF MUD
- SEE SPECIFICATIONS FOR RIPRAP GRADATION.
- OPEN VOID STRUCTURE; REJECT MATERIAL FINER THAN 4-IN.
- WASH IN STOCKPILE PRIOR TO PLACEMENT, WASH IN PLACE IMMEDIATELY BEFORE INSTALLING MORTAR (HEAVY PRESSURE WASH EACH TIME)
- ROCK LAYER THICKNESS AT LEAST TWICE THE NOMINAL d_{50}, AND AT LEAST AS THICK AS THE LARGEST INDIVIDUAL ROCK DIMENSION.

  9" RIPRAP ..... 18" THICK LAYER
  12" RIPRAP ..... 24" THICK LAYER
  15" RIPRAP ..... 30" THICK LAYER

CEMENT MORTAR REQUIREMENTS:

- THIS APPLICATION REQUIRES AN ADHESIVE BOND BETWEEN THE CEMENT MORTAR AND THE ROCKS, WHILE BEING ABLE TO PUMP THROUGH A HOSE AS SMALL AS 2".
- LAB TESTING SHALL INCLUDE ASTM C1437 FLOWABILITY TEST, TARGET OF 140% TO 150%.
- FIELD TESTING WILL BE BY SLUMP FLOW TESTING USING EITHER THE DIN 1048 (EUROPEAN TAPPING TABLE) OR ASTM C1611 SLUMP FLOW TEST
- DIN 1048 (EUROPEAN TAPPING TABLE) TEST TARGETS:
  DRY PLACEMENT: 13-IN TO 15-IN WITHOUT TAPPING
  20-IN TO 21-IN AFTER 15 TAPS
- ASTM C1611 TEST TARGETS:
  DRY PLACEMENT: 14 1/4-IN TO 15 3/4-IN;
  AIR ENTRAINMENT 5% - 7%
- ADHESICN: 500 LB ROCK PULLOUT ADHESION AT 72 HOURS.

CEMENT MORTAR MIX DESIGN RECOMMENDATIONS:

- CONSULT WITH LOCAL BATCH PLANT TO IDENTIFY POTENTIAL MIX DESIGNS EARLY IN THE CONSTRUCTION PROCESS.
- SUCCESSFUL MIX DESIGNS MAY FOLLOW MULTIPLE RECIPES; HOWEVER THE PREFERRED MIX WILL BE HIGH IN CEMENT CONTENT (740 LBS TO 760 LBS / CY), HAVE AN EVEN PROPORTION OF FINE AGGREGATE TO VERY FINE GRAVEL (#8 OR #9 INTERMEDIATE AGGREGATE) TOTALING APPROXIMATELY 2400 LBS / CY, AND WATER TO MAKE A VERY LOOSE AND FLOWABLE MATERIAL (420 LBS TO 450 LBS / CY)
- RECOMMENDED EXCLUSIONS:
  - COARSE AGGREGATE
  - FLY ASH
  - WATER REDUCING ADMIXTURES
- ALLOWABLE INCLUSIONS:
  - AIR ENTRAINING ADMIXTURE
  - DELAYED SET / RETARDING ADMIXTURE
  - ANTI-WASHOUT ADDITIVE FOR UNDERWATER PLACEMENT
- COMMON MIX DESIGNATIONS INCLUDE "MASONRY BLOCK FILL - 8 SACK MIX", MARTIN MARIETTA PA3418, OR A PRESCRIBED MIX MEETING THE ABOVE GUIDELINE.
- SIMILAR MIXES TO THE ABOVE RECOMMENDATION MAY BE USED IF THEY MEET THE SLUMP FLOW TEST, WORKABILITY TEST, AND PROVIDE AT LEAST 500LBS OF ROCK PULLOUT ADHESION WHEN CURED 72 HOURS.

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION
MISCELLANEOUS DETAILS

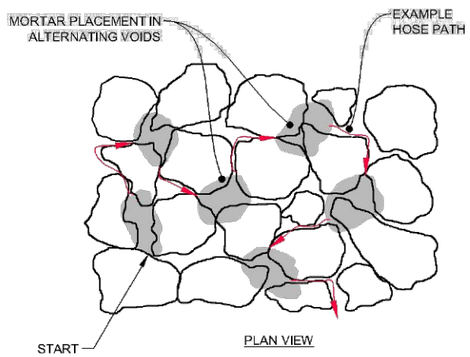
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01
DRAWING NO. D24
SHEET 50 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

TECHNIQUE 1 - MASONRY PUMP:

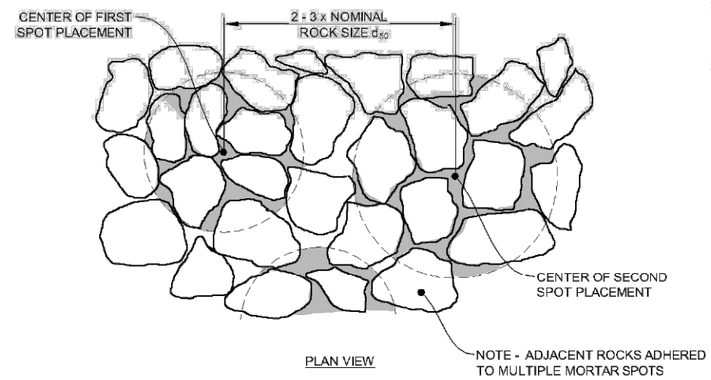
- IDEALLY SUITED FOR SMALLER SITES, 2" HOSE / MASONRY PUMP EQUIPMENT AND SMALLER ROCK SIZE, TYPICALLY 9" d_{50} - 12" d_{50}
- MORTAR HOSE IS GENERALLY LAID FLAT ON THE GROUND, AND MAY REQUIRE A HOSE HANDLER.
- NOZZLE IS PLACED AT THE TOP OF A RABBIT HOLE (SURFACE VOID), AND MORTAR IS PLACED UNTIL IT FILLS UP TO THE TOP OF THE ROCK.
- NOZZLE THEN TRACKS BETWEEN TWO SURFACE ROCKS TO AN ADJACENT RABBIT HOLE, LEAVING ONE HOLE IN BETWEEN EMPTY TO CREATE A CHECKERBOARD (ALTERNATING) PATTERN.
- MORTAR SHOULD ALMOST CONNECT BETWEEN PLACEMENT LOCATIONS AT MID-DEPTH IN THE ROCK LAYER.



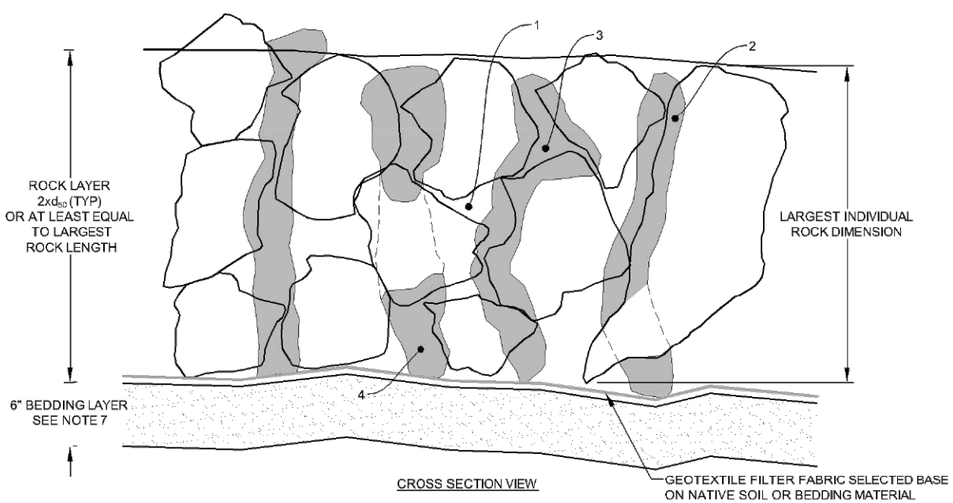
TECHNIQUE 1
MATRIX RIPRAP - MASONRY PUMP

TECHNIQUE 2 - CONCRETE PUMP PLACEMENT:

- BETTER SUITED FOR LARGER SITES WHICH REQUIRE A BOOM - STYLE CONCRETE PUMPER TRUCK TO REACH INSTALLATION LOCATION, WHICH WILL TYPICALLY HAVE A 2.5" (PREFERRED) OR 3" HOSE.
- TERMINAL END OF HOSE TO BE MANUALLY DIRECTED TO PLACEMENT LOCATION.
- THIS TECHNIQUE WILL REQUIRE OPERATING PUMP AT LOWER LIMIT OF PUMPING SPEED AND MAY REQUIRE THE FINAL SECTION OF RIGID PIPE TO BE NEARLY HORIZONTAL TO ACHIEVE A SLOW STEADY STREAM OF MORTAR. SPITTING OR SLUGGING OF MORTAR IS UNDESIRABLE AND CAUSES SURFACE SPLATTER AND LACK OF MORTAR PENETRATION.
- DUE TO LARGER HOSE SIZE, LARGER ROCK (12" d_{50} OR 15" d_{50}) IS EASIER TO PLACE MORTAR WITHIN DUE TO LARGER VOID SIZES.
- THIS METHOD MAY BE PARTIALLY AUTOMATED USING THE PUMPER TRUCK OR OTHER MEANS WITH APPROPRIATE FIELD VERIFICATION OF MORTAR PENETRATION.
- NOZZLE IS PLACED AT A LARGER VOID OPENING, AND MORTAR PLACED UNTIL IT FILLS TO THE TOP OF THE ROCK LAYER AND SPREADS TO IMMEDIATELY ADJACENT VOIDS. THIS WILL REQUIRE AN ESPECIALLY LOOSE MORTAR TO FLOW HORIZONTALLY BETWEEN VOIDS. THIS CREATES A LARGE CONGLOMERATE OF MULTIPLE ROCKS ABOUT AS WIDE AS THE ROCK LAYER IS THICK - i.e. 24" WIDE FOR 12" ROCK.
- NOZZLE SHOULD BE MOVED TO AN ADJACENT LARGE VOID ABOUT TWO OR THREE TIMES THE MEDIAN ROCK SIZE AWAY FROM THE FIRST VOID: 18" TO 24" FOR 9" ROCK 24" TO 36" FOR 12" ROCK OR 30" TO 45" FOR 15" ROCK.
- THERE MAY BE ROCKS IN BETWEEN CONGLOMERATES THAT DO NOT HAVE MORTAR - 1/4 TO 1/3 OF THE ROCKS WITHOUT MORTAR IS ACCEPTABLE WITH THIS TECHNIQUE.



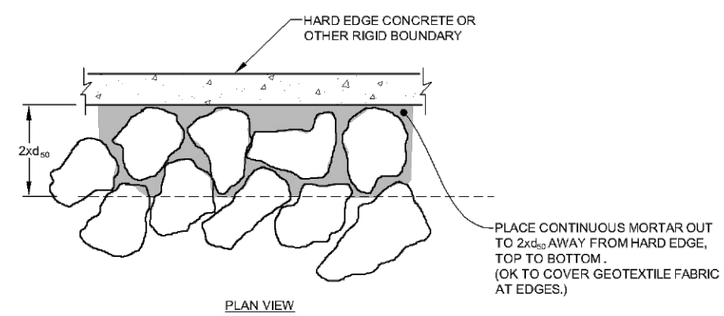
TECHNIQUE 2
MATRIX RIPRAP -CONCRETE PUMP PLACEMENT



MATRIX RIPRAP

INSTALLATION NOTES

1. ROCK SHOULD HAVE OPEN VOID SPACES THE SIZE OF A FIST TO ALLOW MORTAR TO PENETRATE.
2. CEMENT MORTAR SHOULD PENETRATE TO BOTTOM OF ROCK LAYER, FLOWING BY GRAVITY.
3. CONTACT POINTS OF ROCK SHOULD BE "GLUED" TOGETHER WITH A WIDE STREAM OF MORTAR.
4. MORTAR MAY CONTACT GEOTEXTILE FABRIC BUT SHOULD NOT SPREAD TO COVER MORE THAN 50% OF FABRIC TO ALLOW PORE PRESSURE OF SOIL TO DISPERSE.
5. NO FOOT OR MACHINE TRAFFIC OR ANY OTHER DISTURBANCE FOR 24 HOURS POST PLACEMENT.
6. FREEZING CONDITIONS DURING CURE TIME ARE ADVERSE TO THE PERFORMANCE OF MATRIX RIPRAP AND SHOULD BE AVOIDED OR MITIGATED ON A CASE BY CASE BASIS.
7. 6" GRANULAR BEDDING LAYER - NOT REQUIRED IF GEOTEXTILE OF SURVIVABILITY CLASS I IS SPECIFIED.



MATRIX RIPRAP - EDGE DETAIL

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

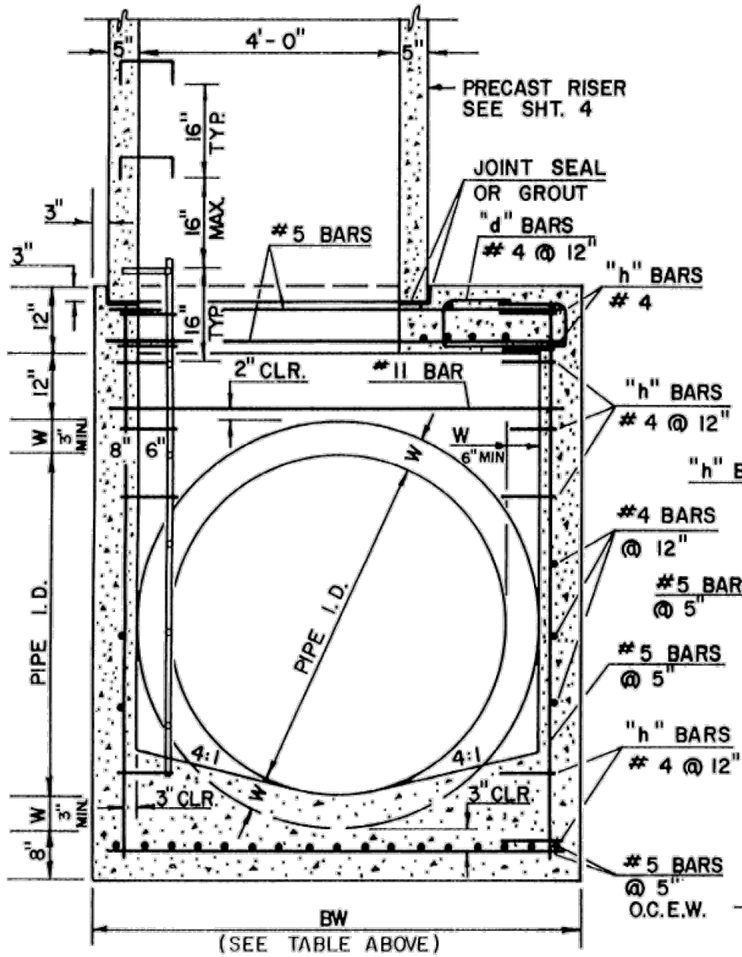
CONSTRUCTION
MISCELLANEOUS DETAILS

Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01
DRAWING NO. D25
SHEET 51 OF 64

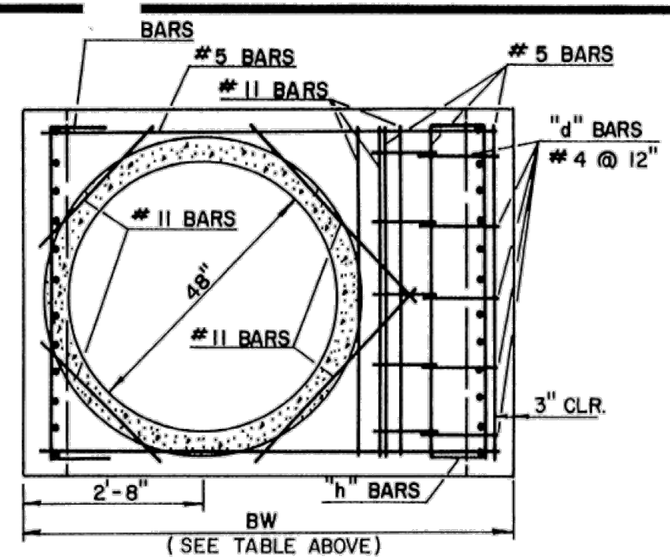
Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

PIPE I.D.	BW
48" AND SMALLER	6'-4"
54"	6'-10"
60" AND LARGER	O.D.+16"



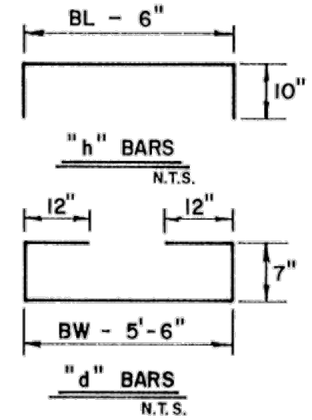
SECTION VIEW

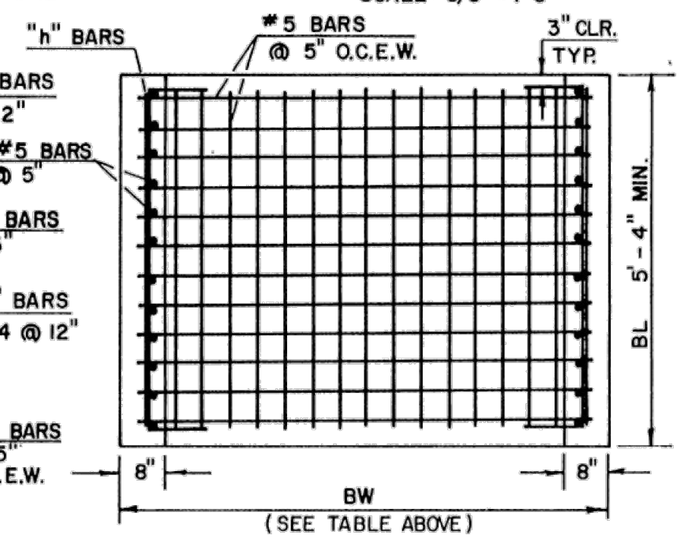
SCALE: 3/8" = 1'-0"



SLAB REINFORCING

SCALE: 3/8" = 1'-0"





BASE REINFORCING

SCALE: 3/8" = 1'-0"

NOTES

1. Type I manhole shall be used in all cases unless otherwise approved by the City Engineer
2. View and Details shown are typical for straight through design only. Design Engineer shall determine manhole base configuration and dimensions for particular pipe sizes and alignment.
3. Either ladder or steps shall be installed when manhole depth exceeds 30". Lowest step shall be a maximum of 16" above the floor.
4. Floor of the manhole shall be trowelled to a smooth, hard surface and shall slope towards the outlet (8:1 max., 1/2" per ft. min.). Floor shall be shaped and channelled; see sheet 2 for typical channel details.

TYPE I BASE MANHOLE

CITY OF COLORADO SPRINGS			
STORM SEWER MANHOLE-TYPE I			
APPROVED BY Gary R. Haynes CITY ENGINEER			
SCALE: AS SHOWN	DATE: JAN. 89	DRAWN: P.L.B.	SHEET: D-20A 1 OF 4

NOT FOR CONSTRUCTION 02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Date
Revisions

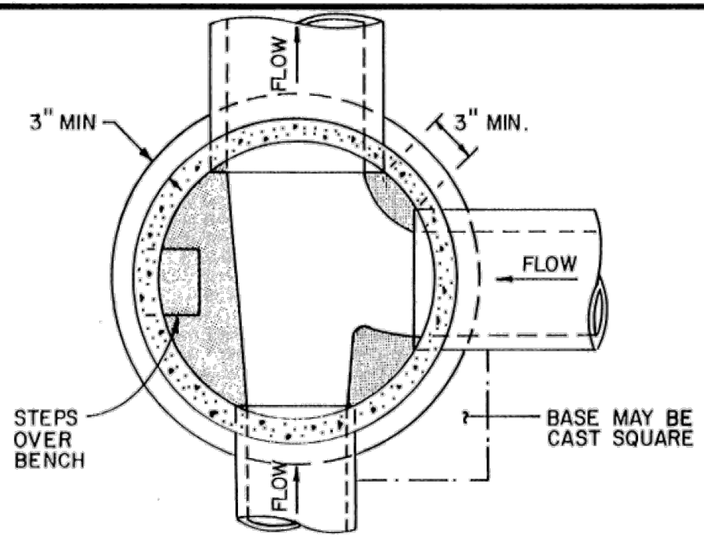
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION
MISCELLANEOUS DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

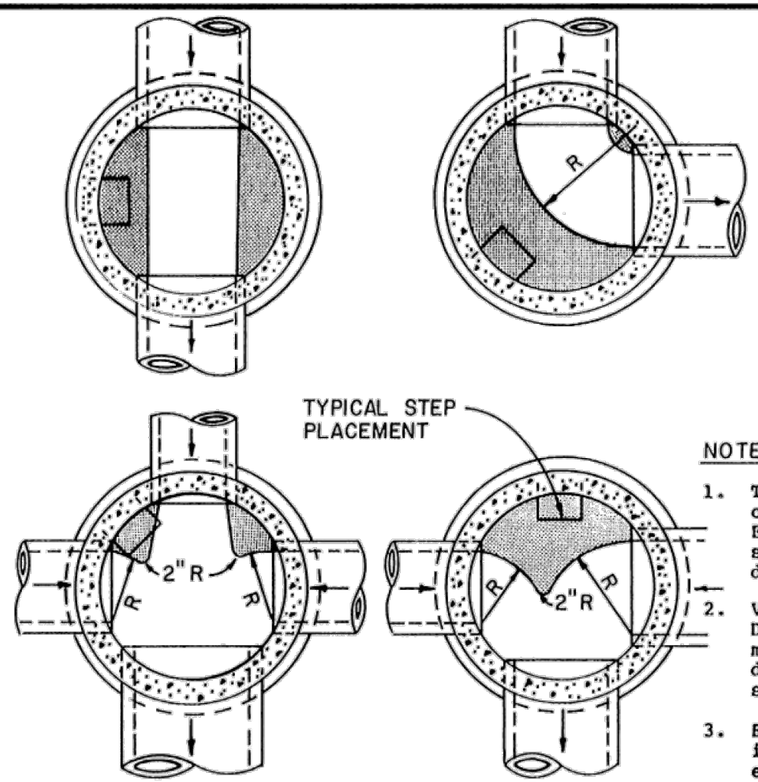
PROJECT NO. 36-4715.01
DRAWING NO. D26
SHEET 52 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



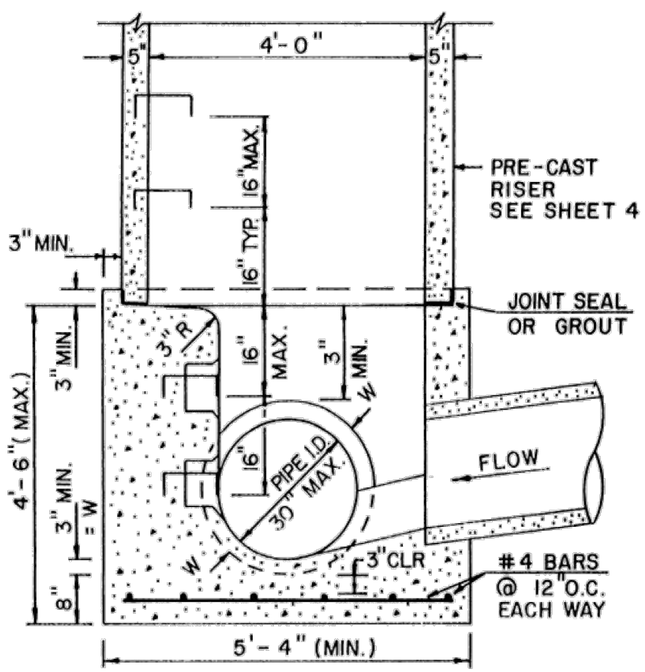
PLAN VIEW OF BASE

SCALE 3/8" = 1'-0"



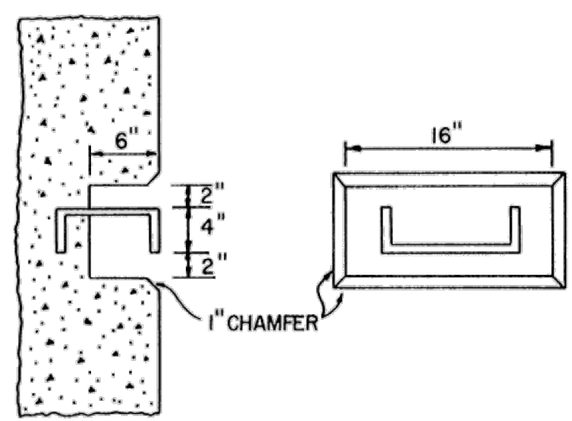
TYPICAL CHANNEL DETAILS

SCALE 1/4" = 1'-0"



SECTION VIEW

SCALE 3/8" = 1'-0"



TOE POCKETS DETAILS

SCALE 3/4" = 1'-0"

NOTES

1. Type II manholes shall be used only with approval of the City Engineer and only when the pipe sizes are 30" or less inside diameter.
2. View and Details are typical. Design Engineer shall determine manhole base configuration and dimensions for particular pipe sizes and alignment.
3. Either ladder or steps shall be installed when manhole depth exceeds 30". Steps in base shall be installed in "toe pockets" (see detail this sheet). Lowest step shall be a maximum of 16" above the floor.
4. Pipes shall be trimmed to final shape and set before manhole is poured.
5. Bench shall be sloped toward center of manhole base (4:1 max., 1/2" per ft. min.).
6. Floor of manhole shall be trowelled to a smooth, hard surface and shall slope towards the outlet (8:1 max., 1/2" per ft. min.). Floor shall be shaped and channelled; see details this sheet.

CITY OF COLORADO SPRINGS

STORM SEWER MANHOLE-TYPE II

APPROVED BY Gary R. Haynes CITY ENGINEER

SCALE:	DATE:	DRAWN:	SHEET: D-20 B
AS SHOWN	JAN. 89	P.L.B.	OF 4

NOT FOR CONSTRUCTION 02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions | Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

MISCELLANEOUS DETAILS

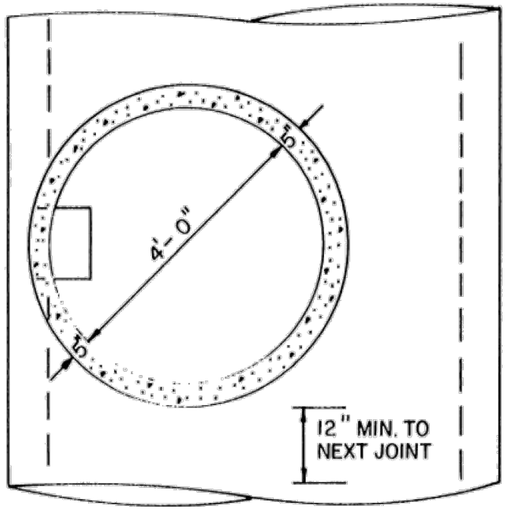
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

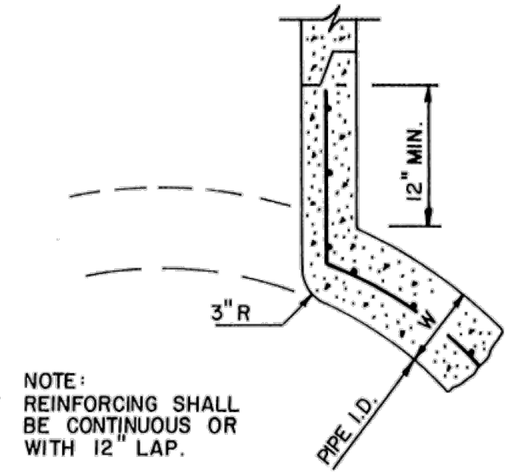
DRAWING NO. D27

SHEET 53 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



PLAN VIEW
SCALE 3/8" = 1'-0"

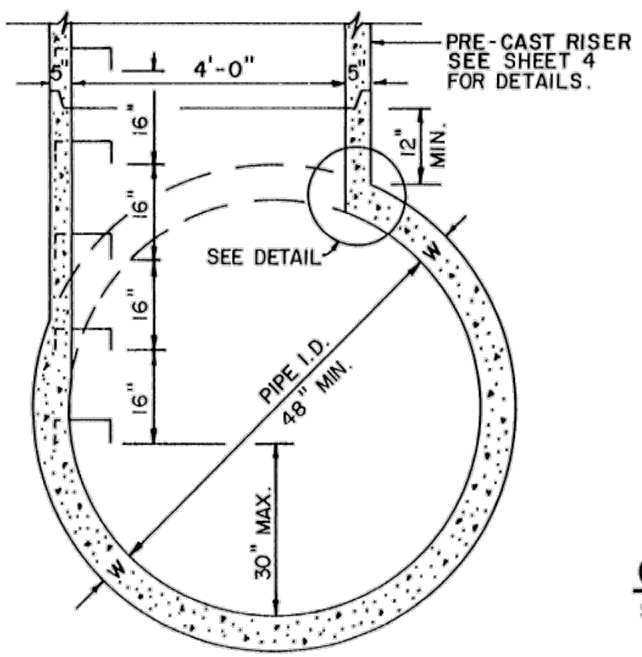


NOTE:
REINFORCING SHALL BE CONTINUOUS OR WITH 12" LAP.

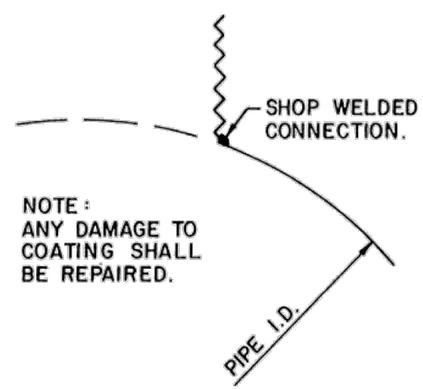
R.C.P. CONNECTION DETAIL
SCALE 3/4" = 1'-0"

NOTES:

1. Type III manholes shall be used only with approval by the City Engineer and only when all of the following conditions are met:
   a. Pipe is 48" or larger inside diameter
   b. No change in pipe size
   c. No change in pipe material
   d. No change in horizontal alignment
   e. Slope is flat and continuous
2. Type III manholes shall be fabricated by the manufacturer/supplier and delivered to the site as a single unit. Field fabrication shall not be permitted.
3. Either ladder or steps shall be installed. Lowest step shall be a maximum of 30" above the invert of the pipe.

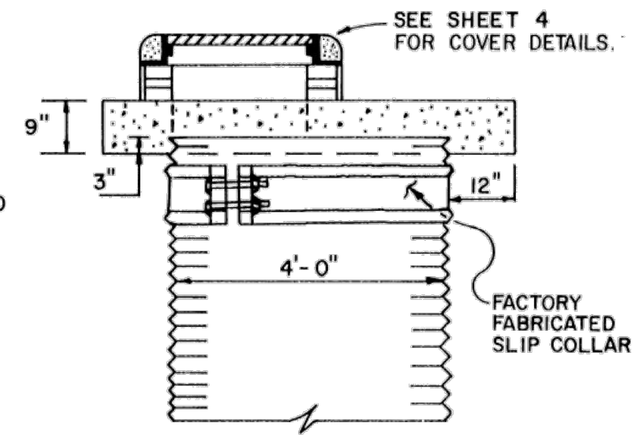


SECTION VIEW
SCALE 3/8" = 1'-0"



NOTE:
ANY DAMAGE TO COATING SHALL BE REPAIRED.

C.S.P. CONNECTION DETAIL
SCALE 3/4" = 1'-0"



SPECIAL LID FOR USE WITH C.S.P. RISER.
SCALE 3/8" = 1'-0"

CITY OF COLORADO SPRINGS

STORM SEWER MANHOLE-TYPE III

APPROVED BY Gary R. Haynes
CITY ENGINEER

SCALE:	DATE:	DRAWN:	SHEET: D-20C
AS SHOWN	JAN.89	PL.B	3 OF 4

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

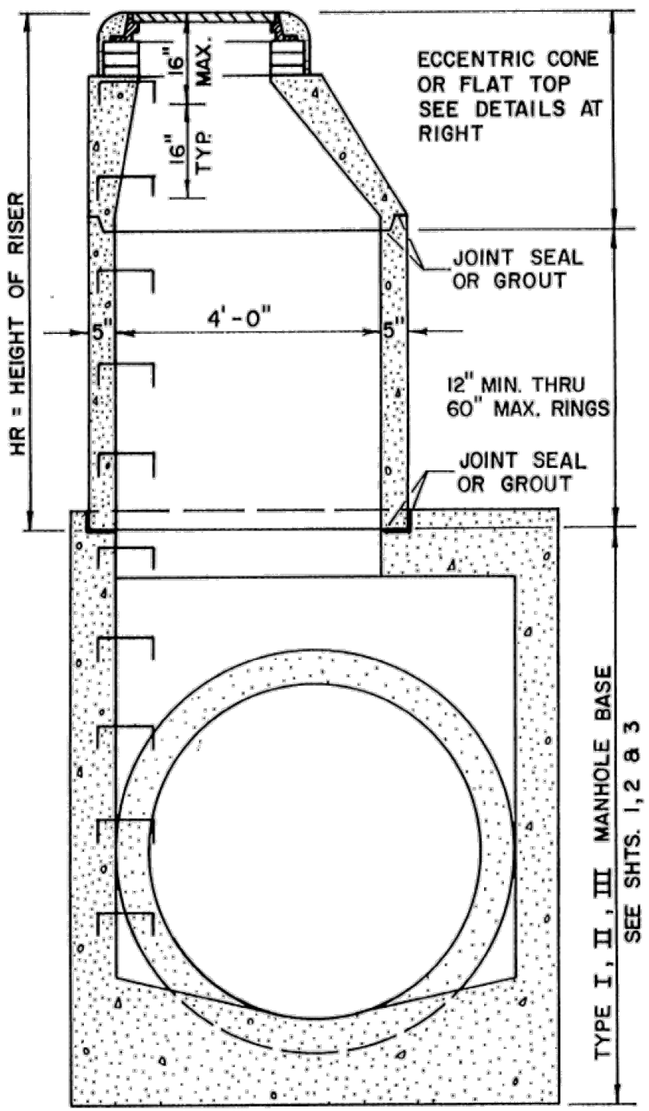
MISCELLANEOUS DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

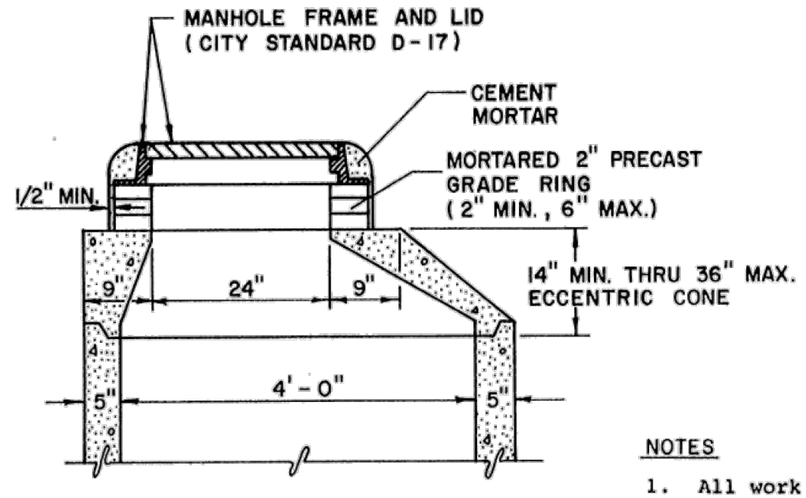
DRAWING NO. D28

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



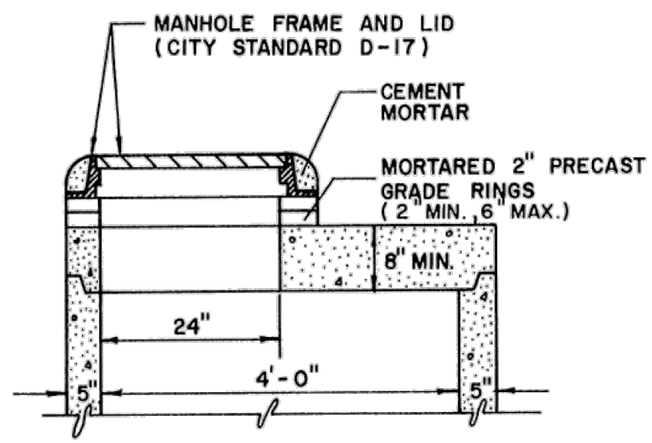
SECTION VIEW

SCALE: 3/8" = 1'-0"



ECCENTRIC CONE TOP

(FOR HR > 3' ±) SCALE: 1/2" = 1'-0"



ECCENTRIC FLAT TOP

(FOR HR < 3' ±) SCALE: 1/2" = 1'-0"

NOTES

1. All work shall be done in accordance with the standard and supplemental specifications applicable to the project.
2. Precast risers shall conform to ASTM C-478.
3. Steps shall be installed when manhole depth exceeds 30". Steps shall be cast iron or extruded aluminum, 1000 lb. capacity, 12" wide with non-skid grooves and drop front on safety noses, in accordance with approved OSHA requirements.

STORM SEWER MANHOLE PRECAST RISER

CITY OF COLORADO SPRINGS

STORM SEWER-COVER & RISER

APPROVED BY Gary R. Haynes CITY ENGINEER

SCALE:	DATE:	DRAWN:	SHEET: D-200
AS SHOWN	JAN. 89	PL.B	OF 4

NOT FOR CONSTRUCTION 02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions | Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

MISCELLANEOUS DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. D29

SHEET 55 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

STANDARD M-603-1

(SHEET 1 OF 2)
(JANUARY, 1982)

FEDERAL AID REGION NO.	STATE	PROJECT NO.	SHEET NO.
VIII	COLORADO		

REVISIONS *

TABLE I - 2 2/3" x 1/2" CORRUGATIONS
ROUND STEEL PIPE

12" MIN. COVER *

PIPE DIA. in	HEIGHT OF COVER LIMITS, H ft. WALL THICKNESS (Inches) 0.064	0.079	0.109	0.138	0.168
~~48~~	~~80~~	~~100~~	~~100~~	~~100~~	~~100~~ **
15	74	80	100	100	100 **
18	61	67	86	90	94
21	53	57	74	77	81
24	46	50	65	68	71
27	41	44	57	60	63
30	37	40	52	54	56
36	30	33	43	45	47
42	34	47	74	77	81
48	30	41	65	68	71
54		36	57	60	63
60			52	54	57
66				49	51
72				45	47
78					43
84					40

TABLE II - 3" x 1" CORRUGATIONS
ROUND STEEL PIPE

PIPE DIA. in	*MIN. COVER in	HEIGHT OF COVER LIMITS, H ft. WALL THICKNESS (Inches) 0.064	0.079	0.109	0.138	0.168
36	12	53	66	98	100	100 **
42	12	45	56	84	100	100 **
48	12	39	49	73	88	98
54	12	35	44	65	78	87
60	12	31	39	58	70	78
66	12	28	36	53	64	71
72	12	26	33	49	58	65
78	12	24	30	45	54	60
84	12	22	28	42	50	56
90	12	21	26	39	47	52
96	12		24	36	44	49
102	18		23	34	41	46
108	18			32	39	43
114	18			30	37	41
120	18			29	35	39

** COVER GREATER THAN 90 FT. SHALL BE USED ONLY AFTER THOROUGH INVESTIGATION OF FOUNDATION MATERIAL.

TABLE III - 125mm x 25mm CORRUGATIONS
ROUND STEEL PIPE

PIPE DIA. in.	*MIN. COVER in.	HEIGHT OF COVER LIMITS, H ft. WALL THICKNESS (Inches) 0.064	0.079	0.109	0.138	0.168
48	12	39	49	73	88	98
54	12	35	44	65	78	87
60	12	31	39	58	70	78
66	12	28	36	53	64	71
72	12	26	33	49	58	65
78	12	24	30	45	54	60
84	12	22	28	42	50	56
90	12	21	26	39	47	52
96	12		24	36	44	49
102	18		23	34	41	46
108	18			32	39	43
114	18			30	37	41
120	18			29	35	39

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS APPLICABLE TO THE PROJECT.

THE TABLES ON THESE SHEETS SHOW MINIMUM THICKNESS FOR STRUCTURAL REQUIREMENTS ONLY. THEY ARE INTENDED FOR USE ONLY WHERE CORROSIVE AND/OR ABRASIVE CONDITIONS ARE NEGLIGIBLE. HEAVIER METAL AND/OR PROTECTIVE COATINGS SHALL BE USED WHENE SITE INVESTIGATIONS INDICATE CORROSIVE AND/OR ABRASIVE CONDITIONS.

▼ PIPE-ARCH WITH EQUAL PERIMPHERY AND WITH SPAN AND RISE DIMENSIONS APPROXIMATELY EQUAL TO THOSE REQUIRED BY PLANS WILL BE PERMITTED.

ADEQUATE COVER SHALL BE PROVIDED DURING CONSTRUCTION TO PROTECT THE STRUCTURE FROM DAMAGE.

PIPE SHALL BE PLACED WITH LONGITUDINAL SEAMS AT THE SIDES OR QUARTER POINTS BUT NOT ALONG TOP OF VERTICAL AXIS.

~~STRUCTURAL PLATE PIPES OF EQUAL OR GREATER DIAMETER, CONFORMING TO SECTION 810 OF THE STANDARD SPECIFICATIONS, MAY BE SUBSTITUTED FOR THE PIPES ON THESE SHEETS AT NO ADDITIONAL COST TO THE PROJECT.~~

WHEN A CULVERT IS TO BE EXTENDED WITH PIPE OF A DIFFERENT MATERIAL, THE CONNECTION SHALL CONFORM TO THE DETAILS ON PLANS OR BE APPROVED.

EXTENSIONS FOR CMP ARCH CULVERT SHALL MATCH THE CORRUGATIONS AND THE SPAN AND RISE DIMENSIONS OF THE CULVERT TO BE EXTENDED.

THE MINIMUM COVER, EXCLUDING PAVEMENT, OVER CORRUGATED METAL PIPE CULVERT SHALL BE AS STAKED BY THE ENGINEER, BUT SHALL NOT BE LESS THAN SHOWN IN THE TABLES ON THESE SHEETS.

~~BACKFILL AND COMPACTION SHALL BE IN ACCORDANCE WITH SECTION 206.~~

TRENCH INSTALLATION:
INSTALLATION AND MAXIMUM FILL HEIGHTS SHALL CONFORM TO THE "M" STANDARD FOR "PIPE SEWER IN TRENCH".

* Top of Pipe to Top of Subgrade

ROUND PIPE — STEEL
PIPE-ARCH — STEEL

TABLE IV - 2 2/3" x 1/2" CORRUGATIONS
STEEL PIPE-ARCH (1)

12" MIN. COVER *

PIPE SIZE▼ in. SPAN x RISE	EQUIV. DIA. in	WALL THICKNESS in.	HEIGHT OF COVER LIMITS, H ft. CORNER BEARING PRESSURE 2 Tons Per Sq. Ft. CORNER RADII	
17 x 13	15	0.064	3"	11
21 x 15	18	0.064	3"	9
24 x 18	21	0.064	3"	8
28 x 20	24	0.064	3"	7
35 x 24	30	0.064	3"	5
42 x 29	36	0.064	3 1/2"	5
49 x 33	42	0.079	4"	5
57 x 38	48	0.109	5"	5
64 x 43	54	0.109	6"	6
71 x 47	60	0.138	7"	6
77 x 52	66	0.168	8"	6
83 x 57	72	0.168	9"	7

TABLE V - 3" x 1" & 125 mm x 25 mm CORRUGATIONS
STEEL PIPE-ARCH (2)

PIPE SIZE▼ in. SPAN x RISE	EQUIV. DIA. in	WALL THICKNESS in.	*MIN. COVER in.	HEIGHT OF COVER LIMITS, H ft. CORNER BEARING PRESSURE 2 Tons Per Sq. Ft. CORNER RADII	
40 x 31	36	0.064	12	5"	8
46 x 34	42	0.064	12	6"	8
53 x 41	48	0.064	12	7"	8
60 x 46	54	0.064	12	8"	8
66 x 51	60	0.064	12	9"	9
73 x 55	66	0.064	12	12"	10
81 x 59	72	0.064	12	14"	11
87 x 63	78	0.064	12	14"	10
95 x 67	84	0.079	12	16"	11
103 x 71	90	0.109	18	16"	10
112 x 75	96	0.109	18	18"	10
117 x 79	102	0.109	18	18"	10
128 x 83	108	0.138	24	18"	9
137 x 87	114	0.138	24	18"	8
142 x 91	120	0.168	24	18"	8

(1) PIPE-ARCH IS INTENDED FOR USE WHERE MINIMUM COVER REQUIREMENTS FOR ROUND PIPE CAN NOT BE MET.
WHEN COVER EXCEEDS 15 FT. - USE ROUND PIPE.

▼ SEE THIRD GENERAL NOTE.

Adopted from and in conformance with the State of Colorado Department of Highways with Revisions by the City of Colorado Springs Engineering Division

CITY OF COLORADO SPRINGS

METAL CULVERT PIPE

APPROVED BY Gary R. Hayes
CITY ENGINEER

SCALE:	DATE:	DRAWN:	SHEET
NO SCALE	JAN. 90	PLN.	D - 26

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Date
Revisions

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION
MISCELLANEOUS DETAILS

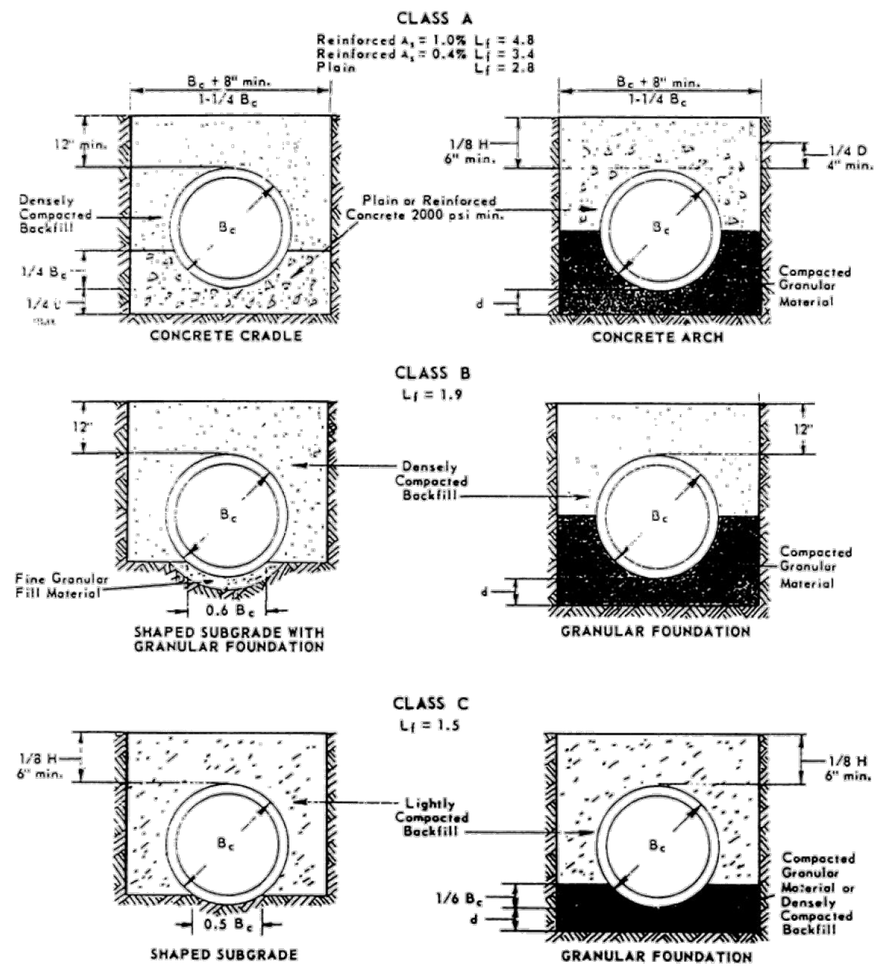
Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01
DRAWING NO. D30
SHEET 56 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

SOURCE: AMERICAN CONCRETE PIPE ASSOCIATION

TRENCH BEDDING CLASSIFICATION - ROUND PRECAST CONCRETE PIPE



Depth of Bedding Material Below Pipe

D	d (min.)
27" & smaller	3"
30" to 60"	4"
66" & larger	6"

Legend

B_c = outside diameter
H = backfill cover above top of pipe
D = inside diameter
d = depth of bedding material below pipe
A_s = area of transverse steel in the cradle or arch expressed as a percentage of area of concrete at invert or crown.

Notes:
For Class B and C beddings, subgrades should be excavated or over excavated, if necessary, so a uniform foundation free of protruding rocks may be provided.
Special care may be necessary with Class A or other unyielding foundations to cushion pipe from shock when blasting can be anticipated in the area.

CITY OF COLORADO SPRINGS

TRENCH BEDDING CLASSIFICATION

APPROVED BY Gary R. Haynes
CITY ENGINEER

SCALE:	DATE:	DRAWN:	SHEET
NO SCALE	JAN. 90	P.L.B.	D - 30

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions | Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

MISCELLANEOUS DETAILS

Project Mgr: DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

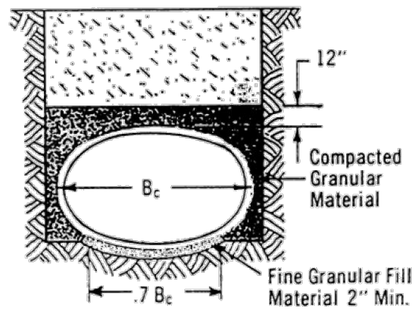
DRAWING NO. D31

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

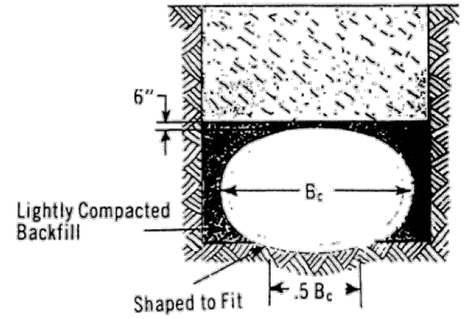
SOURCE: AMERICAN CONCRETE PIPE ASSOCIATION

TRENCH BEDDING CLASSIFICATION - PRECAST CONCRETE SECTIONS

HORIZONTAL ELLIPTICAL PIPE

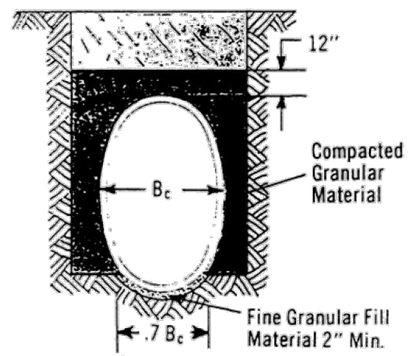


CLASS B
L_f=1.9

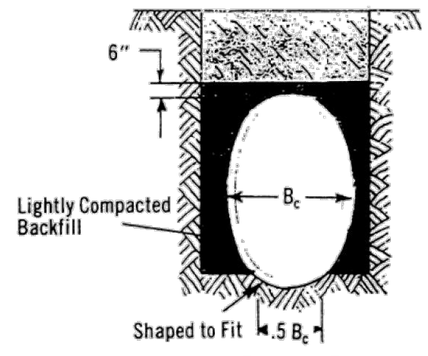


CLASS C
L_f=1.5

VERTICAL ELLIPTICAL PIPE

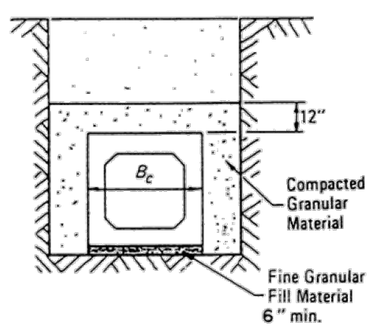


CLASS B
L_f=1.9

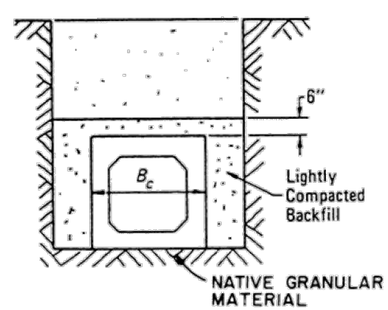


CLASS C
L_f=1.5

PRECAST BOX SECTION



CLASS B



CLASS C

CITY OF COLORADO SPRINGS			
TRENCH BEDDING CLASSIFICATION			
APPROVED BY Gary R. Hayes CITY ENGINEER			
SCALE: NO SCALE	DATE: JAN. 90	DRAWN: PL.B.	SHEET D-31

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

MISCELLANEOUS DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01

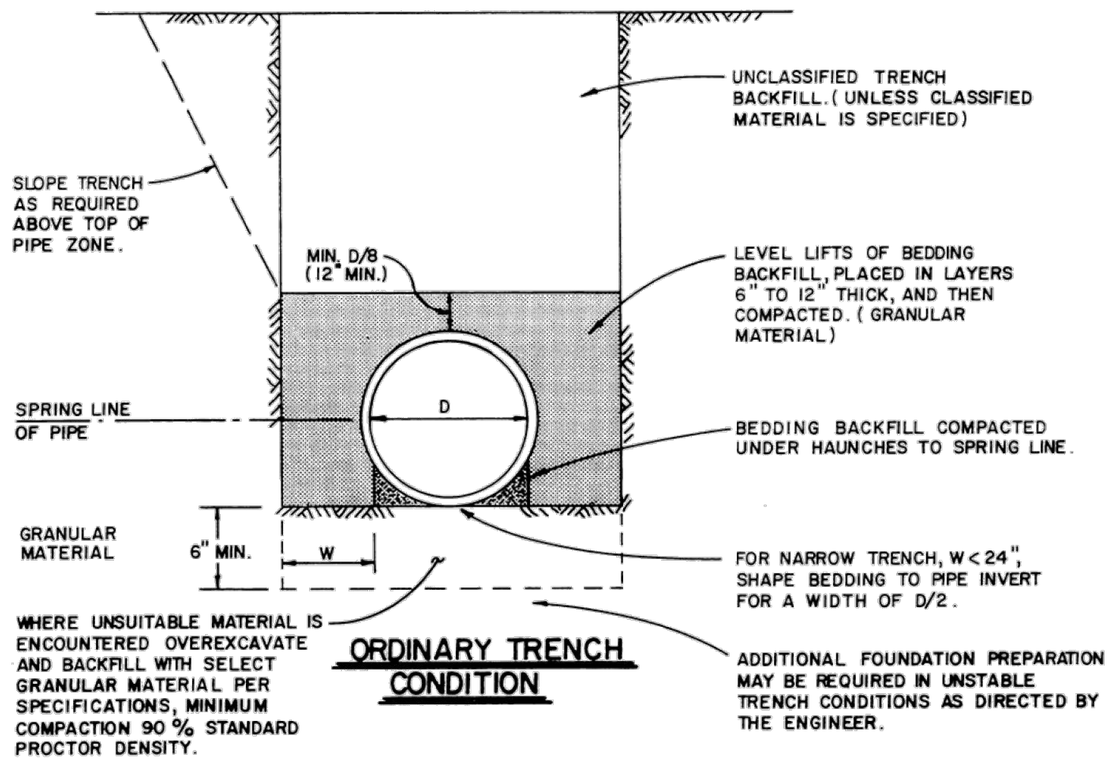
DRAWING NO. D32

SHEET 58 OF 64

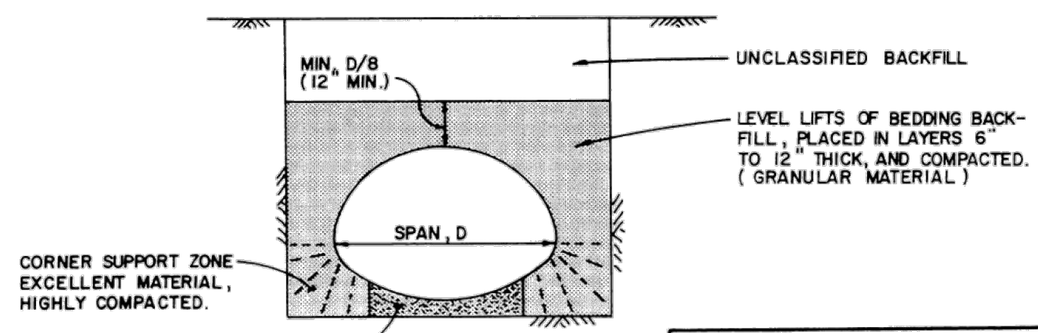
Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD

SOURCE: ASTM A-798 "INSTALLING FACTORY-MADE CORRUGATED STEEL SEWER PIPE.
ASTM D-2321 UNDERGROUND INSTALLATION OF FLEXIBLE THERMOPLASTIC SEWER PIPE.

TRENCH BEDDING FOR FLEXIBLE PIPE



ORDINARY TRENCH CONDITION



SHAPED BEDDING

(PIPE - ARCH)

CITY OF COLORADO SPRINGS			
TRENCH BEDDING FOR FLEXIBLE PIPE			
APPROVED BY Gary R. Haynes CITY ENGINEER			
SCALE: NO SCALE	DATE: JAN. 90	DRAWN: P.L.B.	SHEET D - 32

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

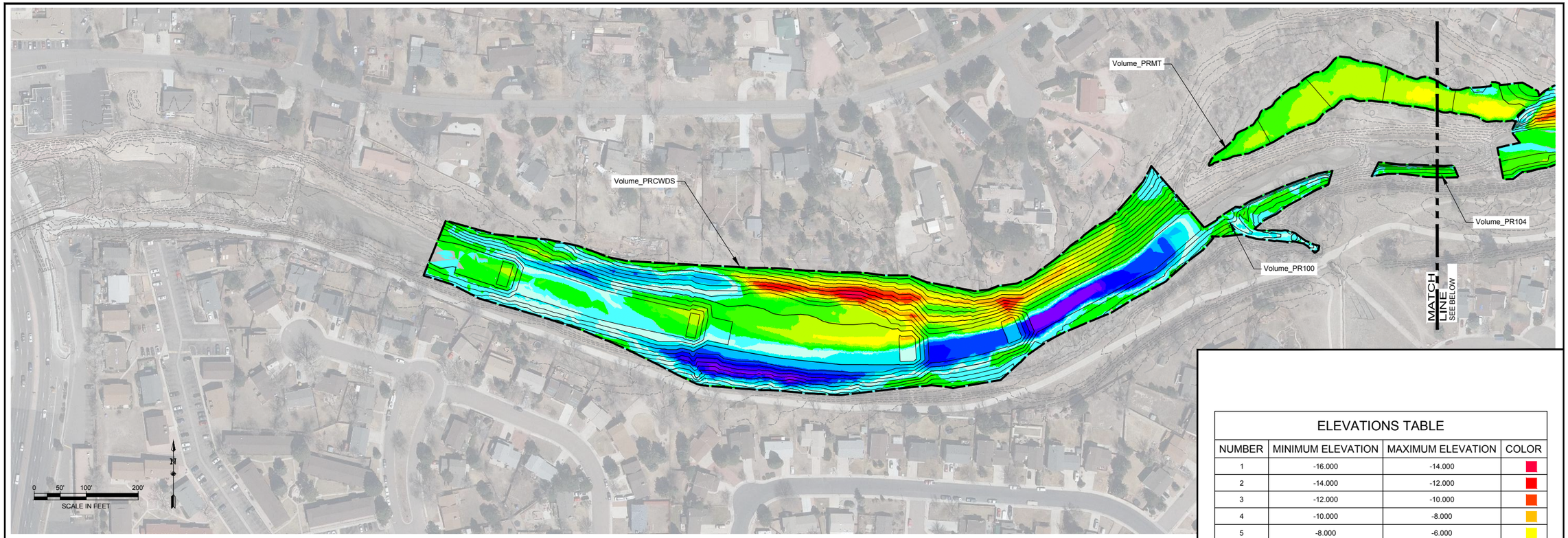
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

CONSTRUCTION
MISCELLANEOUS DETAILS

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01
DRAWING NO. D33
SHEET 59 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 DETAILS 2.DWG Friday, February 16, 2024 5:05 PM By: RICKS, RONALD



ELEVATIONS TABLE

NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOR
1	-16.000	-14.000	
2	-14.000	-12.000	
3	-12.000	-10.000	
4	-10.000	-8.000	
5	-8.000	-6.000	
6	-6.000	-4.000	
7	-4.000	-2.000	
8	-2.000	-0.050	
9	0.050	2.000	
10	2.000	4.000	
11	4.000	6.000	
12	6.000	8.000	
13	8.000	10.000	
14	10.000	12.000	
15	12.000	14.000	
16	14.000	16.000	

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
Volume_PRCWDS	**1.000**	1.050	272555.19 Sq. Ft.	18588.34 Cu. Yd.	25720.50 Cu. Yd.	7132.17 Cu. Yd.<Fill>
Volume_PRMT	**1.000**	1.050	39694.00 Sq. Ft.	5518.33 Cu. Yd.	17.94 Cu. Yd.	5500.39 Cu. Yd.<Cut>
Volume_PR104	**1.000**	1.050	3329.16 Sq. Ft.	105.58 Cu. Yd.	16.79 Cu. Yd.	88.79 Cu. Yd.<Cut>
Volume_PR114	**1.000**	1.050	43033.22 Sq. Ft.	466.51 Cu. Yd.	1669.84 Cu. Yd.	1203.33 Cu. Yd.<Fill>
Volume_PR100	**1.000**	1.050	9705.71 Sq. Ft.	249.71 Cu. Yd.	197.62 Cu. Yd.	52.09 Cu. Yd.<Cut>
Volume_PR106	**1.000**	1.050	40765.29 Sq. Ft.	3832.43 Cu. Yd.	447.86 Cu. Yd.	3384.56 Cu. Yd.<Cut>
Volume_PR119	**1.000**	1.050	31219.15 Sq. Ft.	617.92 Cu. Yd.	497.38 Cu. Yd.	120.53 Cu. Yd.<Cut>
Totals			440301.71 Sq. Ft.	29378.82 Cu. Yd.	28567.94 Cu. Yd.	810.88 Cu. Yd.<Cut>

NOT FOR CONSTRUCTION
02/16/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions | Date

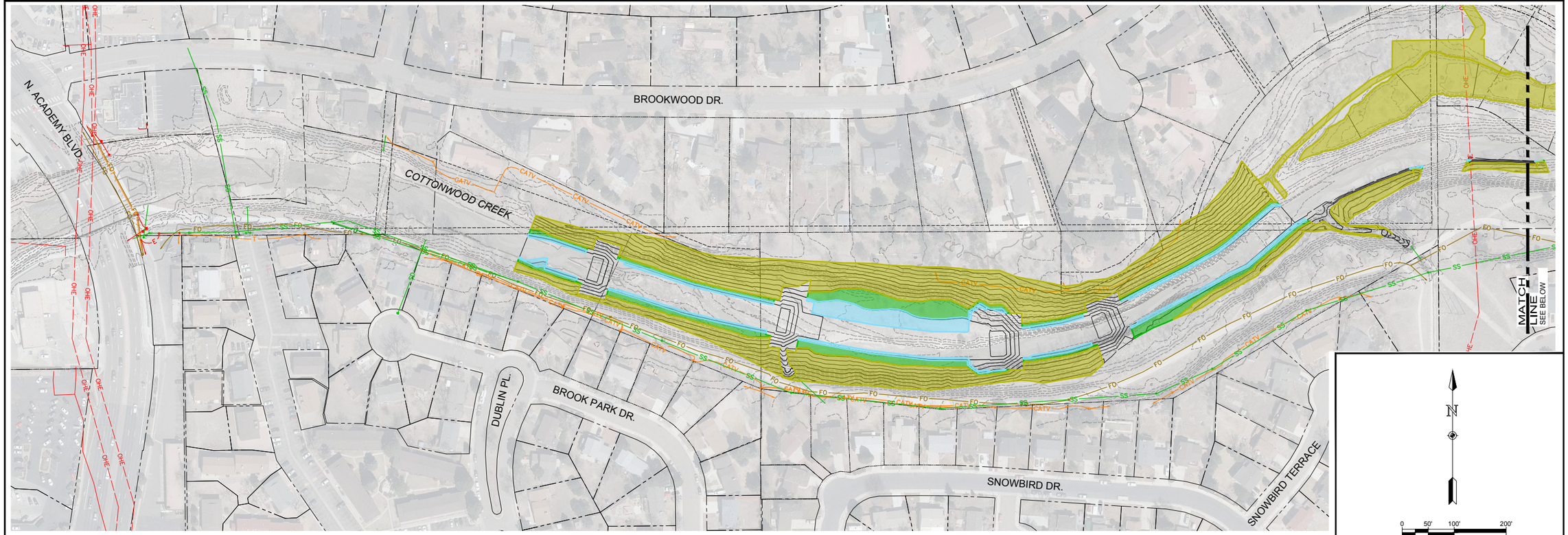
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

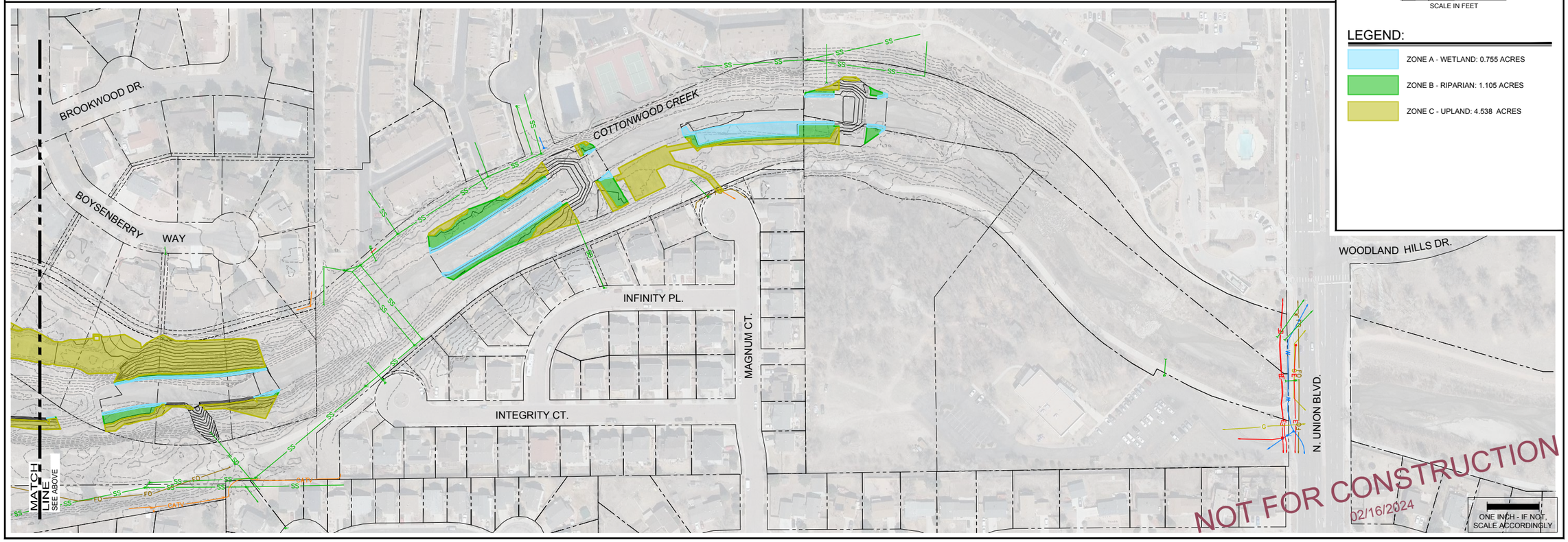
CUT AND FILL ELEVATION PLAN

Project Mgr. DLA
Designed By: ZLB
Drawn By: RBR
Approved By: DLA
Date: 02/16/2024

PROJECT NO. 36-4715.01
DRAWING NO. GD1
SHEET 60 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 GRADING MAP.DWG Friday, February 16, 2024 5:01 PM By: RICKS, RONALD





N

0 50' 100' 200'
SCALE IN FEET

LEGEND:

- ZONE A - WETLAND: 0.755 ACRES
- ZONE B - RIPARIAN: 1.105 ACRES
- ZONE C - UPLAND: 4.538 ACRES

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

CONSTRUCTION

REVEGETATION PLAN

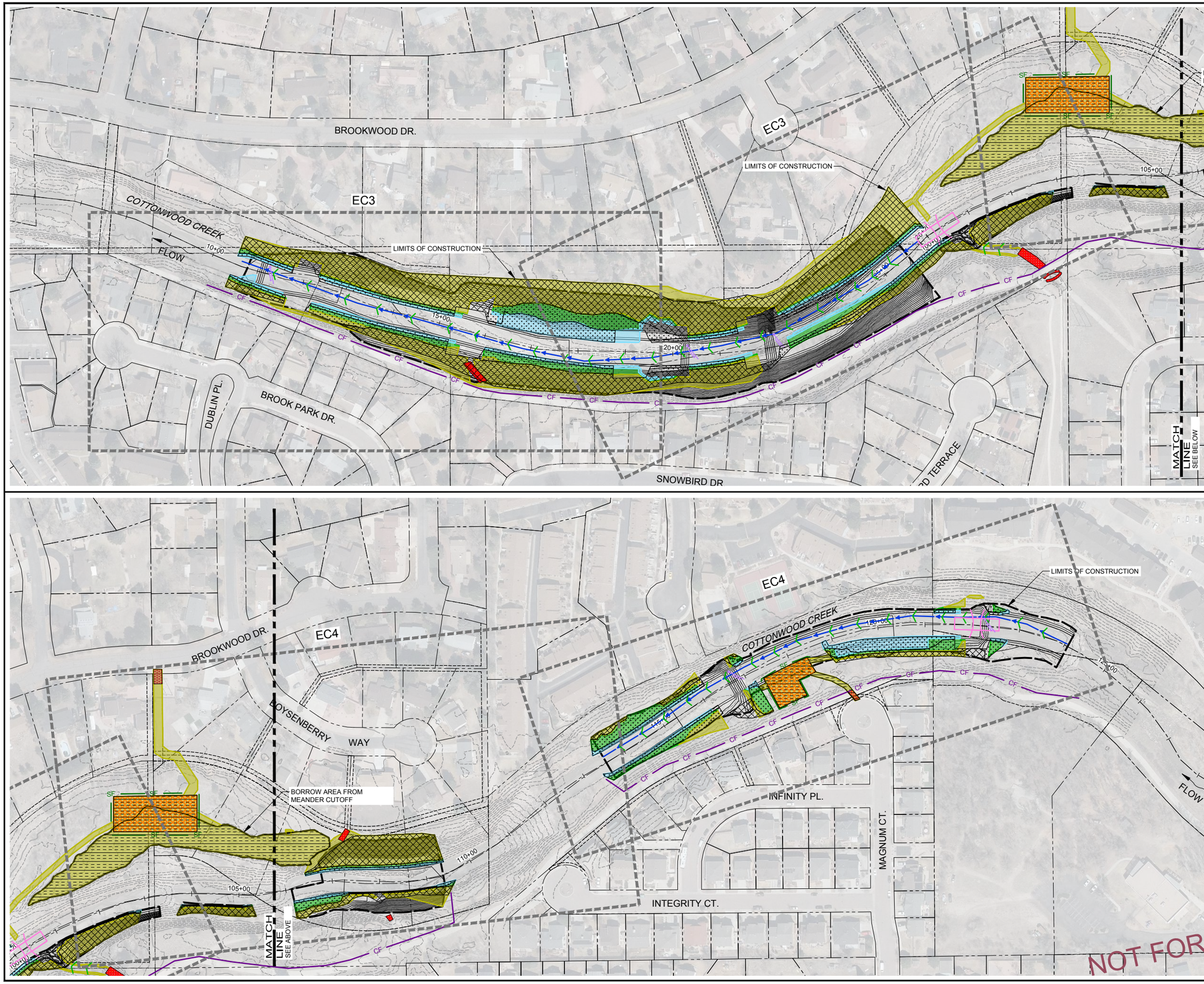
Project Mgr.	DLA
Designed By:	ZLB
Drawn By:	RBR
Approved By:	DLA
Date:	02/16/2024

PROJECT NO. 36-4715.01

DRAWING NO. P01

SHEET 61 OF 64

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 REVEGETATION PLAN.DWG Thursday, February 15, 2024 5:50 PM By: RICKS, RONALD



AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Revisions	Date

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

GRADING AND EROSION CONTROL
EROSION CONTROL PLAN OVERALL

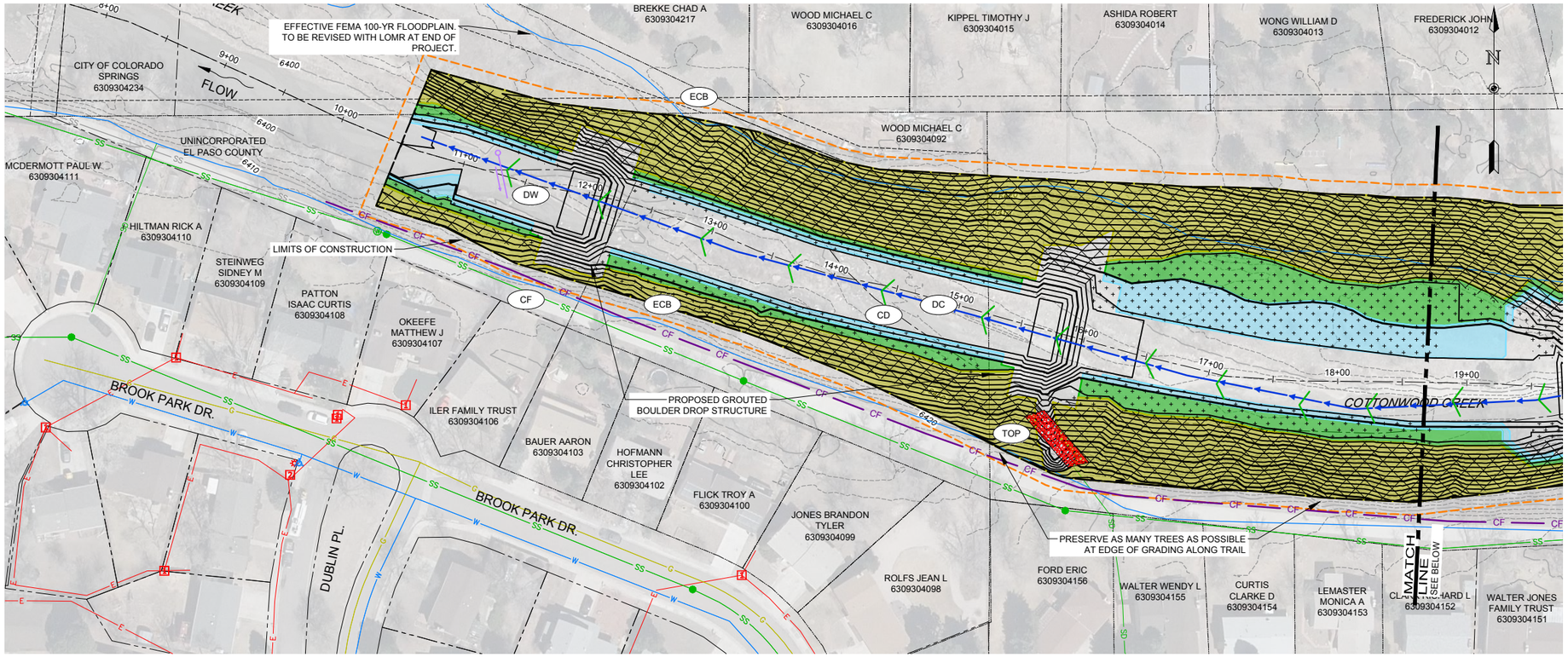
Project Mgr. DLA
Designed By: ZLB
Drawn By: ZLB
Approved By: MWG
Date: 02/12/2024

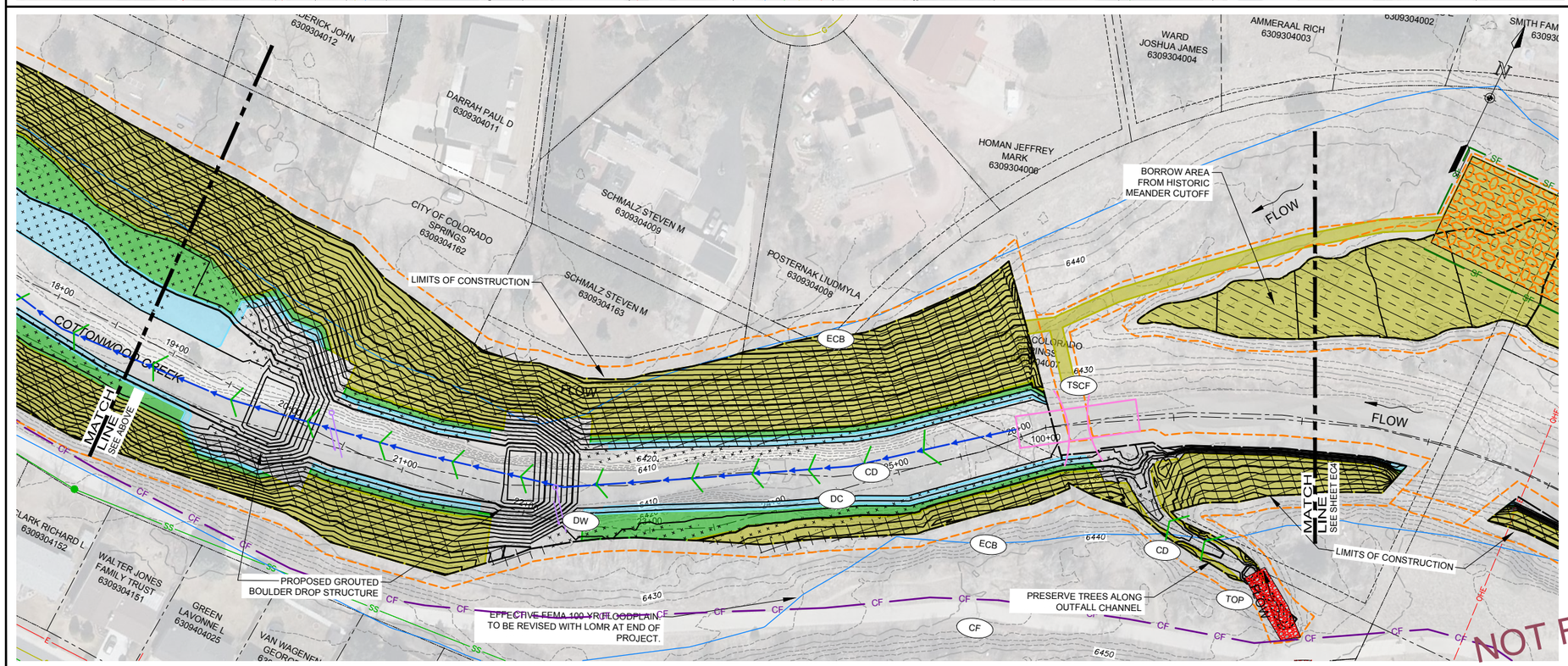
PROJECT NO. 36-4715.01

DRAWING NO. EC2

SHEET 4 OF 10

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 GEC EROSION CONTROL PLAN OVERALL.DWG Friday, February 09, 2024 3:40 PM By: ARMSTRONG, DYLAN





0 25' 50' 100'
SCALE IN FEET

LEGEND:

- WETLAND SEED MIX
- RIPARIAN SEED MIX
- UPLAND SEED MIX
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPERTY BOUNDARIES
- UTILITY EASEMENTS
- LIMITS OF CONSTRUCTION
- LIMITS OF DISTURBANCE
- TEMPORARY DIVERSION CHANNEL (DC)
- CHECK DAM (CD)
- TEMPORARY STREAM CROSSING WITH FORD (TSCF)
- DEWATERING OPERATIONS (DW)
- TEMPORARY OUTLET PROTECTION (TOP)
- CULVERT INLET PROTECTION (CIP)
- STABILIZED STAGING AREA (SSA)
- VEHICLE TRACKING CONTROL (VTC)
- SF — SILT FENCE (SF)
- CF — CONSTRUCTION FENCE (CF)
- STREAM EROSION CONTROL FABRIC (ECB)
- SLOPE EROSION CONTROL FABRIC (ECB)
- SEEDING AND MULCHING (SM)
- EFFECTIVE 100-YR FLOODPLAIN BOUNDARY

NOTES:

XX

NOT FOR CONSTRUCTION
02/12/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Date
Revisions

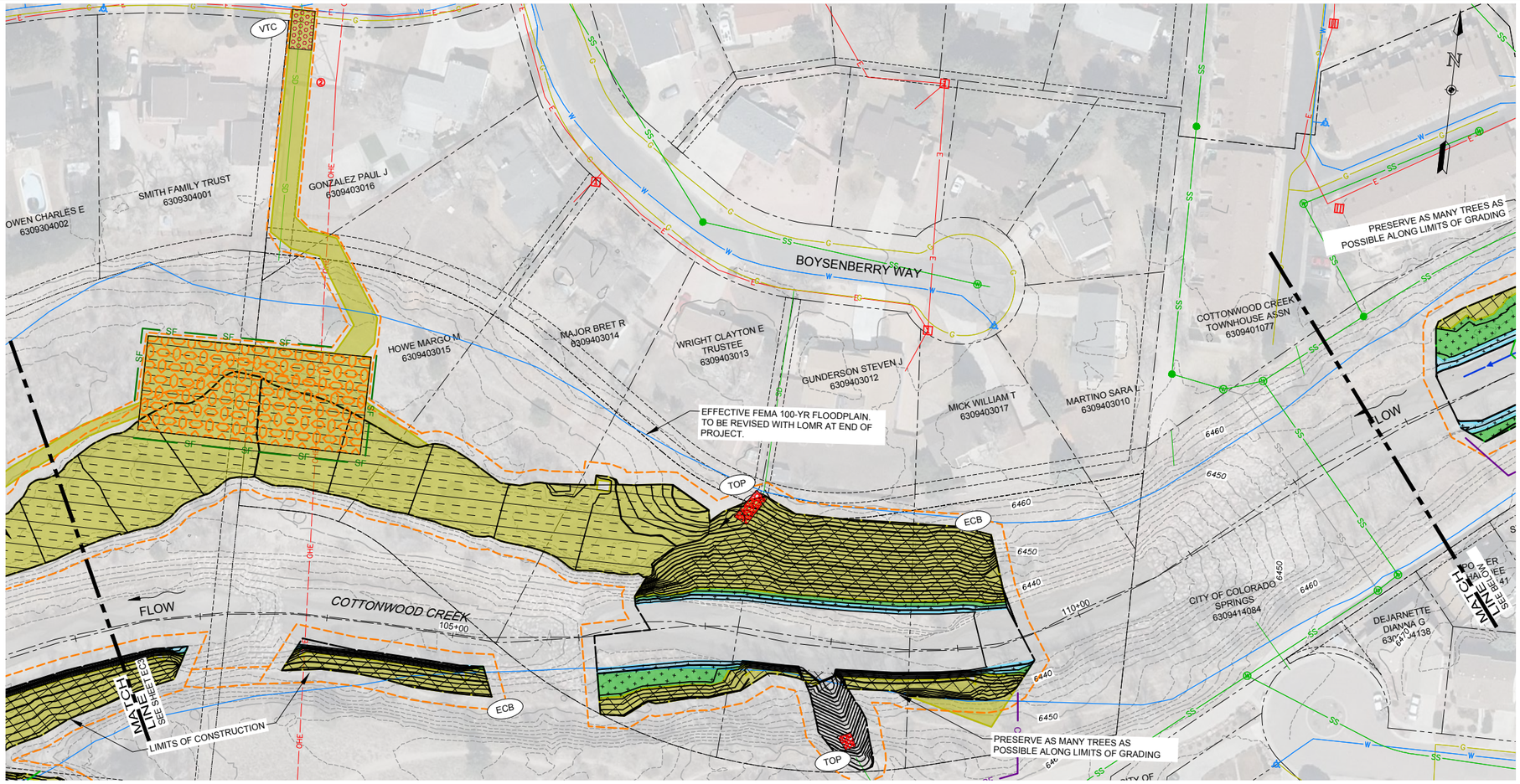
COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION)
COLORADO SPRINGS, COLORADO

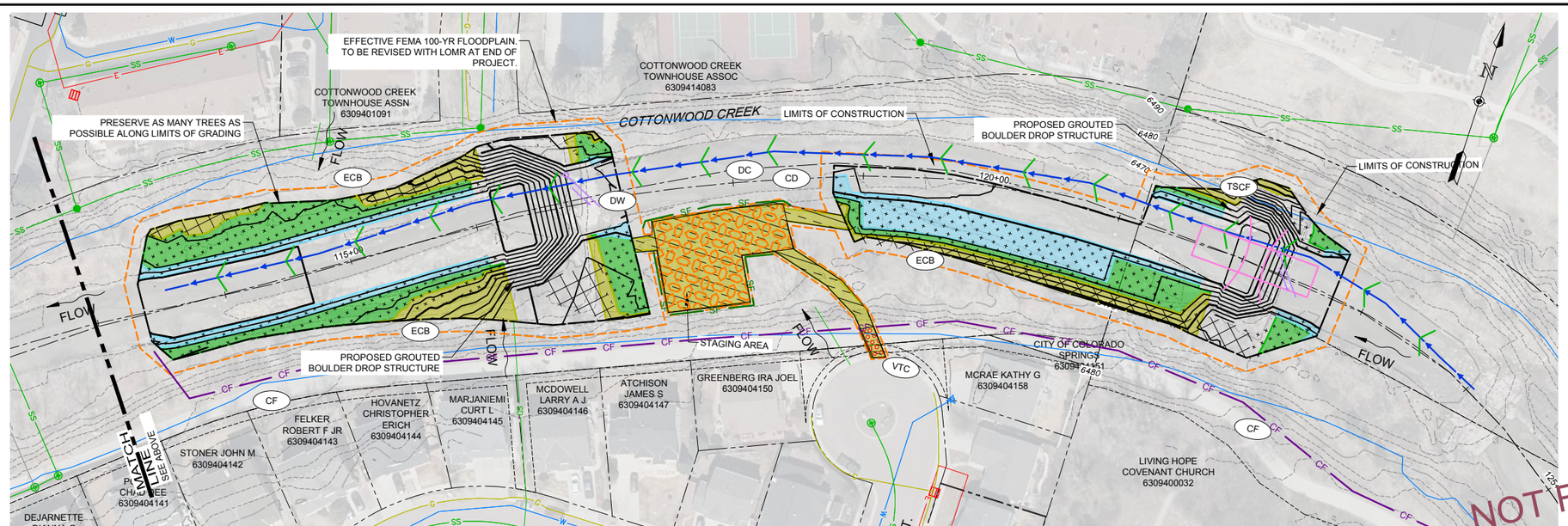
GRADING AND EROSION CONTROL
EROSION CONTROL PLAN - 1

Project Mgr. DLA
Designed By: ZLB
Drawn By: ZLB
Approved By: MWG
Date: 02/12/2024

PROJECT NO. 36-4715.01
DRAWING NO. EC3
SHEET 5 OF 10

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 GEC EROSION CONTROL PLAN.DWG Wednesday, February 14, 2024 3:16 PM By: ARMSTRONG, DYLAN





0 25' 50' 100'
SCALE IN FEET

LEGEND:

- WETLAND SEED MIX
- RIPARIAN SEED MIX
- UPLAND SEED MIX
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPERTY BOUNDARIES
- UTILITY EASEMENTS
- LIMITS OF CONSTRUCTION
- LIMITS OF DISTURBANCE
- TEMPORARY DIVERSION CHANNEL (DC)
- CHECK DAM (CD)
- TEMPORARY STREAM CROSSING WITH FORD (TSCF)
- DEWATERING OPERATIONS (DW)
- TEMPORARY OUTLET PROTECTION (TOP)
- CULVERT INLET PROTECTION (CIP)
- STABILIZED STAGING AREA (SSA)
- VEHICLE TRACKING CONTROL (VTC)
- SF — SILT FENCE (SF)
- CF — CONSTRUCTION FENCE (CF)
- STREAM EROSION CONTROL FABRIC (ECB)
- SLOPE EROSION CONTROL FABRIC (ECB)
- SEEDING AND MULCHING (SM)
- EFFECTIVE 100-YR FLOODPLAIN BOUNDARY

NOTES:

xx

NOT FOR CONSTRUCTION
02/12/2024

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

Date	Revisions

COTTONWOOD CREEK STABILIZATION (ACADEMY TO UNION) COLORADO SPRINGS, COLORADO

GRADING AND EROSION CONTROL

EROSION CONTROL PLAN - 2

Project Mgr. DLA
Designed By: ZLB
Drawn By: ZLB
Approved By: MWG
Date: 02/12/2024

PROJECT NO. 36-4715.01

DRAWING NO. EC4

SHEET 6 OF 10

Drawing Name: I:\36\36-471501_COTTONWOOD CREEK\MAINDWGS\SHEETS\36-4715.01 GEC EROSION CONTROL PLAN.DWG Wednesday, February 14, 2024 3:16 PM By: ARMSTRONG, DYLAN