CULVERT #1 LOAD RATING PACKAGE

COLORADO DEPARTMENT OF TRANSPORTATION

LOAD & RESISTANCE FACTOR RATING SUMMARY

Structure #: Winsome C1 (TBD)

Rated using:

- Asphalt thickness: 10 in. and / or Fill thickness: 66 in.
- ☑ Colorado Legal Loads (CO) or ☐ Interstate Legal Loads (Interstate)
- ☑ Multi-lane for Legal & Permit Vehicles or ☐ Single lane for Legal & Permit Vehicles

Highway #:	Alamar Way
Batch I.D.:	
Structure Type:	CBC
Parallel Structure #:	N/A

Structural Member	3 Cell CBC							

Rating Factor

Inventory	2.753							
Operating	3.568							

Tons

Type 3 truck (Interstate 24T / CO 27T)	3.129							
Type 3S2 truck (Interstate 38T / CO 42.5T)	3.104							
Type 3-2 truck (Interstate 39T / CO 42.5T)	3.129							

Type 3 Type 3S2 Type 3-2

Tons

Type SU4 truck (27T)	3.548							
Type SU5 truck (31T)	3.448							
Type SU6 truck (Interstate 34.75T / CO 33T)	3.595							
Type SU7 truck (Interstate 38.75T / CO 35T)	3.762							
NRL (40T)	3.445							

SU4 SU5 SU6 SU7

Tons

EV2 (28.75T)	2.828							
EV3 (43T)	3.048							

EV2 EV3

Tons

Permit Truck (96T)	3.723							
Modified Tandem (50T)	3.723							

Comments:

- Load Posting Required: NO
- CBC rated using AASHTOWARE BrR 7.5.1.3001
-Rating controlled by flexure.
-Rating based on 8/26/2024 Revised Plans and Rebar Shop Drawings.
-7 x 12 triple cell CBC with 5.5 max fill
-Rating by Kimley-Horn

PE Seal

Rated by: (Print name and sign)

Katlyn Cunningham

Digitally signed by Katlyn Cunningham
DN: C=US, E=Katlyn.Cunningham@Kimley-Horn.com, O=Kimley-Horn, OU=Structures, CN=Katlyn Cunningham
Date: 2025.01.23 16:02:25-07'00'

Date: 01/23/2025

Checked by: (Print name and sign)

Date: 01/23/2025

APPENDIX B: RATING OR RE-RATING QA/QC CHECKLIST

(to be filled by Rater with concurrence from Checker who will also initial and sign on check Item 14)

☑ 1. Structure Number Winsome C1 (TBD) - New Culvert not yet numbered
Verify plans available: ☑ Yes ☐ No
If no plans: ☐ Rating based on Physical inspection
☐ Rating based on non-destructive test loading

☑ 2. Verify overlay thickness and/or fill depth

☑ 3. Verify, if applicable, previously calculated loads and pertinent information

☑ 4. Verify LLDF's (live load distribution factors)
Include ☐ Hand calc. ☑ BrR calc. ☐ CANDE calc. or ☐ Other software calc.

☑ 5. The "Description" area of the Bridge ID window in BrR shall have the following information: Provide reason(s) for rating/re-rating, company name, rater initials, checker initials and date.

☑ 6. Verify that "Traffic" area of the Bridge ID window in BrR is filled

☑ 7. Verify that "Global Reference Point" area of the Bridge ID window in BrR is filled

☑ 8. System analysis or ☐ Line analysis used in BrR
If Line analysis used, explain here: _____

_____

☑ 9. Completed steps required per Fig. 1-9 of CDOT Bridge Rating Manual

☑ 10. Completed steps required per Section 1.13 of CDOT Bridge Rating Manual

☑ 11. Reported the rating results per Section 1.14 of CDOT Bridge Rating Manual, including posting requirements (per Section 1.15) and color code requirements (per Section 1.16)

☑ 12. Completed Rating Summary Sheet (RSS) per section 1.14 of CDOT Bridge Rating Manual

☑ 13. Verify that the load rating results are initialed and dated by both the rater and checker

☑ 14. Initial and date this checklist
Rater initials and date KRC 01/14/2025
Checker initials and date ANB 01/23/2025

☑ 15. Send rating package in electronic format to CDOT Bridge contact / Rating Unit

Rating Results Summary Report

Name: Culvert #1(TBD) Bridge ID: Winsome C1(TBD) NBI: Culvert 1(TBD)

Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Component	Location (ft)	Location (%)	Limit State	Impact	Lane
Colorado HL-93	Axle Load	LRFR	Inventory	99.09	2.753	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93	Axle Load	LRFR	Operating	128.46	3.568	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Axle Load	LRFR	Inventory	99.09	2.753	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Axle Load	LRFR	Operating	128.46	3.568	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Tandem	LRFR	Inventory	86.14	2.393	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Tandem	LRFR	Operating	111.67	3.102	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HS20-44	Axle Load	LRFR	Inventory	99.09	2.753	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HS20-44	Axle Load	LRFR	Operating	128.46	3.568	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado EV2	Axle Load	LRFR	Legal	81.31	2.828	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado EV3	Axle Load	LRFR	Legal	131.04	3.048	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado NRL	Axle Load	LRFR	Legal	137.81	3.445	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU4	Axle Load	LRFR	Legal	95.79	3.548	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU5	Axle Load	LRFR	Legal	106.89	3.448	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU6 NONI...	Axle Load	LRFR	Legal	118.62	3.595	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU7 NONI...	Axle Load	LRFR	Legal	131.66	3.762	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado Type 3	Axle Load	LRFR	Legal	84.48	3.129	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado Type 3-2	Axle Load	LRFR	Legal	133.00	3.129	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado Type 3S2	Axle Load	LRFR	Legal	131.16	3.104	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado Modified T...	Axle Load	LRFR	Permit	186.17	3.723	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado Permit 96T	Axle Load	LRFR	Permit	357.47	3.723	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested

KRC 1/23/2025

ANB 01/23/2025

AASHTO Culvert LRFR Engine Version 7.5.0.3001

Analysis preference setting: None

Analysis time: 1/23/2025 3:41:05 PM Analyzed by: BrR

Print time: 1/23/2025 3:44:51 PM

WINSOME FILING NO. 3
CULVERT CONSTRUCTION DOCUMENTS
A PORTION OF SECTIONS 13 AND 24, TOWNSHIP 11 SOUTH, RANGE 65 SOUTH, AND A PORTION OF THE WEST HALF SECTON 19, TOWNSHIP 11 SOUTH, RANGE 64 WEST OF THE 6TH P.M COUNTY OF EL PASO, STATE OF COLORADO

CONTACTS:

DEVELOPER:
WINSOME, LLC
1864 WOODMOOR DRIVE, SUITE 100
MONUMENT, CO 80132
TEL: (719) 476-0800
CONTACT: JOE DESJARDIN

PLANNER/LANDSCAPE ARCHITECT:
NES, INC
619 N CASCADE AVENUE, SUITE 200
COLORADO SPRINGS, CO 80903
TEL: (719) 471-0073
EMAIL: ABARLOW@NESCOLORADO.COM
CONTACT: ANDREA BARLOW

ENGINEER:
KIMLEY-HORN AND ASSOCIATES, INC.
2 NORTH NEVADA, SUITE 300
COLORADO SPRINGS, CO 80903
(719) 453-0180
EMAIL:
KEVIN.KOFFORD@KIMLEY-HORN.COM
CONTACT: KEVIN KOFFORD

SURVEY:
EDWARD JAMES SURVEYING, INC.
926 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
TEL: (719) 576-1216
CONTACT: JONATHAN TESSIN

EL PASO COUNTY PLANNING DEPARTMENT
2880 INTERNATIONAL CIRCLE, SUITE 110
COLORADO SPRINGS, CO 80910

PLANNING REVIEWER:
RYAN HOWSER
TEL: (719) 520-6313
EMAIL: RYANHOWSER@ELPASOCO.COM

ENGINEERING REVIEWER:
GILBERT LAFORCE
TEL: (719) 520-7945
EMAIL:
GILBERTLAFORCE@ELPASOCO.COM

EPC DPW STORMWATER TEAM:
CHRISTINA FURCHAK
(719) 433-4863
EMAIL:
CHRISTINAFURCHAK@ELPASOCO.COM

EPC PCD INSPECTIONS SUPERVISOR:
TEM: BRAD WALTERS
(719) 520-6819
EMAIL:BRADWALTERS@ELPASOCO.COM

FALCON FIRE DEPARTMENT:
AREA: FAL D2
FIRE CHIEF T. HARWIG
7030 OLD MERIDIAN ROAD
PAYTON, CO 80831
TEL: (719) 495-4050
EMAIL:
FALCONFIRE@FALCONFIREPD.ORG

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT:
WATER QUALITY CONTROL DIVISION
4300 CHERRY CREEK DRIVE SOUTH
DENVER, CO 80246
TEL: (303) 692-3500

LEGAL DESCRIPTION

TRACT OF LAND BEING A PORTION OF THE SOUTHEAST QUARTER OF SECTION 13, AND A PORTION OF SECTION 24, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 24, SAID POINT BEING THE POINT OF BEGINNING; THENCE N00°14'25"E ON THE WEST LINE OF THE NORTHWEST QUARTER OF SAID SECTION 24, SAID LINE ALSO BEING ON THE WEST BOUNDARY OF PARCEL 4, AS RECORDED UNDER RECEPTION NUMBER 218900072, A DISTANCE OF 2,636.99 FEET TO THE NORTHWEST CORNER OF SAID SECTION 24; THENCE N89°21'38"E ON THE NORTH LINE OF THE NORTHWEST QUARTER OF SAID SECTION 24, A DISTANCE OF 2,633.02 FEET TO THE NORTH QUARTER CORNER OF SAID SECTION 24; THENCE N00°10'29"E ON THE WEST LINE OF THE SOUTH HALF OF THE SOUTH EAST QUARTER OF SECTION 13, TOWNSHIP 11 SOUTH, RANGE 65 WEST, A DISTANCE OF 1,321.95 FEET TO THE NORTHWEST CORNER OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SAID SECTION 13; THENCE N89°20'26"E ON THE NORTH LINE OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SAID SECTION 13, A DISTANCE OF 1,873.37 FEET; THENCE S00°34'43"W, A DISTANCE OF 2,706.21 FEET; THENCE S89°15'17"E, A DISTANCE OF 155.82 FEET; THENCE S00°17'06"W, A DISTANCE OF 239.06 FEET; THENCE N89°42'54"W, A DISTANCE OF 609.60 FEET TO A POINT ON CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT, WHOSE CENTER BEARS N85°44'53"W, HAVING A DELTA OF 05°13'06", A RADIUS OF 1,710.00 FEET, A DISTANCE OF 155.74 FEET TO A POINT ON CURVE; THENCE S89°02'00"W, A DISTANCE OF 60.00 FEET; S89°29'13"W, A DISTANCE OF 722.44 FEET; THENCE S15°45'23"W, A DISTANCE OF 1,195.74 FEET; THENCE N82°21'05"W, A DISTANCE OF 229.91 FEET; THENCE N89°29'30"W, A DISTANCE OF 757.49 FEET; THENCE S20°46'13"W, A DISTANCE OF 758.90 FEET TO A POINT ON CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT, WHOSE CENTER BEARS N22°56'03"E, HAVING A DELTA OF 03°42'28", A RADIUS OF 1,470.00 FEET, A DISTANCE OF 95.13 FEET TO A POINT ON CURVE; THENCE S19°13'35"W, A DISTANCE OF 60.00 FEET; THENCE S18°06'10"W, A DISTANCE OF 383.72 FEET TO A POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE RIGHT, HAVING A DELTA OF 02°06'44", A RADIUS OF 1,790.00 FEET, A DISTANCE OF 65.99 FEET TO A POINT ON CURVE; THENCE N69°47'06"W, A DISTANCE OF 306.30 FEET; THENCE N89°45'39"W, A DISTANCE OF 128.26 FEET; THENCE S29°41'56"W, A DISTANCE OF 768.98 FEET; THENCE N89°41'23"W, A DISTANCE OF 820.25 FEET TO A POINT ON THE WEST LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 24; THENCE N00°14'17"E ON THE WEST LINE OF SOUTHWEST QUARTER OF SAID SECTION 24 A DISTANCE OF 1,684.27 FEET TO THE POINT OF BEGINNING.

CONTAINING A CALCULATED AREA OF 15,222,954 SQUARE FEET OR 349.471 ACRES.

BENCHMARK

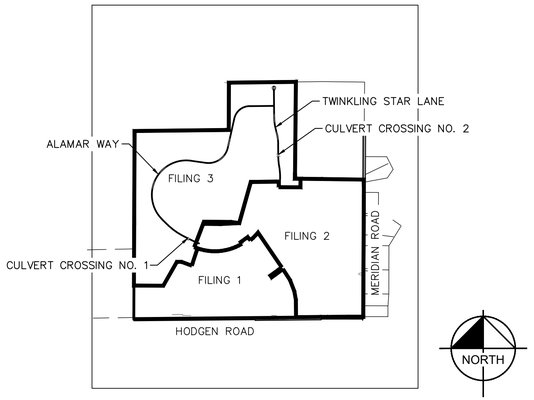
A 2.5" ALUMINUM CAP BEING A 30 FOOT WITNESS CORNER NORTH OF THE SOUTHWEST CORNER OF SECTION 24, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN.

BASIS OF BEARING

THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 24, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF THE 6 PRINCIPAL MERIDIAN MONUMENTED ON THE SOUTHERLY END BY A 2-1/2" ALUMINUM CAP STAMPED "LS 28658" AND AT THE NORTHERLY END BY A 3-1/2" ALUMINUM CAP STAMPED "LS 12103" BEING ASSUMED TO BEAR N00°14'25"E A DISTANCE OF 2636.99 FEET AS SHOWN IN LAND SURVEY PLAT RECORDED UNDER RECEPTION 218900072 RECORDS OF EL PASO COUNTY, COLORADO.

Know what's below. Call before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES



VICINITY MAP
1"=2,000'

FLOODPLAIN NOTE

FEDERAL EMERGENCY MANAGEMENT AGENCY, FLOOD INSURANCE RATE MAP, MAP NUMBER 08041C0350G, EFFECTIVE DECEMBER 7, 2018 INDICATES THE AREA IN THE VICINITY OF THIS PARCEL OF LAND TO BE IN ZONE X (AREA DETERMINED TO BE OUT OF THE 500 YEAR FLOODPLAIN). A CONDITIONAL LETTER OF MAP REVISION HAS BEEN PROCESSED AND APPROVED FOR THIS REACH OF WEST KIOWA CREEK.

LEGEND

- LOT BOUNDARY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EFFECTIVE 100 YEAR FLOODPLAIN
- PROPOSED 100 YEAR FLOODPLAIN PER CLOMR
- DELINEATED WETLAND
- UTILITY EASEMENT
- R.O.W. LINE
- EDGE OF PAVEMENT

SEQUENCE NOTES:

THIS PLANS TO BE CONSTRUCTED WITH THE FOLLOWING:

- GRADING TO BE INCLUDED BY PCD NO. EGP215 (WINSOME FILING NO. 3 EARLY GRADING PERMIT)
- ROADWAY CONSTRUCTION TO INCLUDED BY PCD NO. VR222 (WINSOME FILING NO. 3 FINAL PLAT)

SHEET INDEX:

SHEET NO.	SHEET TITLE
1	COVER SHEET
2	HORIZONTAL CONTROL
3	SITE PLAN
4	SITE PLAN
5	CULVERT 1-PLAN & PROFILE
6	CULVERT 2-PLAN & PROFILE
7	ALAMAR WAY PROFILE
8	TWINKLING STAR LANE PROFILE
9	CULVERT DETAILS
10	CULVERT DETAILS
11	GUARDRAIL DETAILS
12	GUARDRAIL DETAILS

OWNER'S STATEMENT

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH THE REQUIREMENTS OF THE GRADING AND EROSION CONTROL PLAN AND ALL OF THE SPECIFIED IN THESE DETAILED PLANS AND SPECIFICATIONS.

OWNER SIGNATURE DATE

JOE DESJARDIN, DIRECTOR OF ENTITLEMENTS
WINSOME, LLC
1864 WOODMOOR DRIVE, SUITE 100
MONUMENT, CO 80132

ENGINEER'S STATEMENT

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DETAILED ROADWAY, DRAINAGE, GRADING AND EROSION CONTROL PLANS AND SPECIFICATIONS, AND SAID PLANS AND SPECIFICATIONS ARE IN CONFORMITY WITH APPLICABLE MASTER DRAINAGE PLANS AND MASTER TRANSPORTATION PLANS. SAID PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR ROADWAY AND DRAINAGE FACILITIES ARE DESIGNED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS.

COLORADO LICENSED KEVIN REX KOFFORD 57234 PROFESSIONAL ENGINEER

8/31/2022
KEVIN KOFFORD, PE (CO #57234) – KIMLEY-HORN AND ASSOCIATES, INC. DATE

EL PASO COUNTY

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT. FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL VOLUMES 1 AND 2, AND ENGINEERING CRITERIA MANUAL, AS AMENDED.

IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTOR'S DISCRETION.

JOSHUA PALMER, PE INTERIM COUNTY ENGINEER/ECM ADMINISTRATOR DATE

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
COVER SHEET

COLORADO LICENSED KEVIN REX KOFFORD 57234 8/31/2022 PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
1

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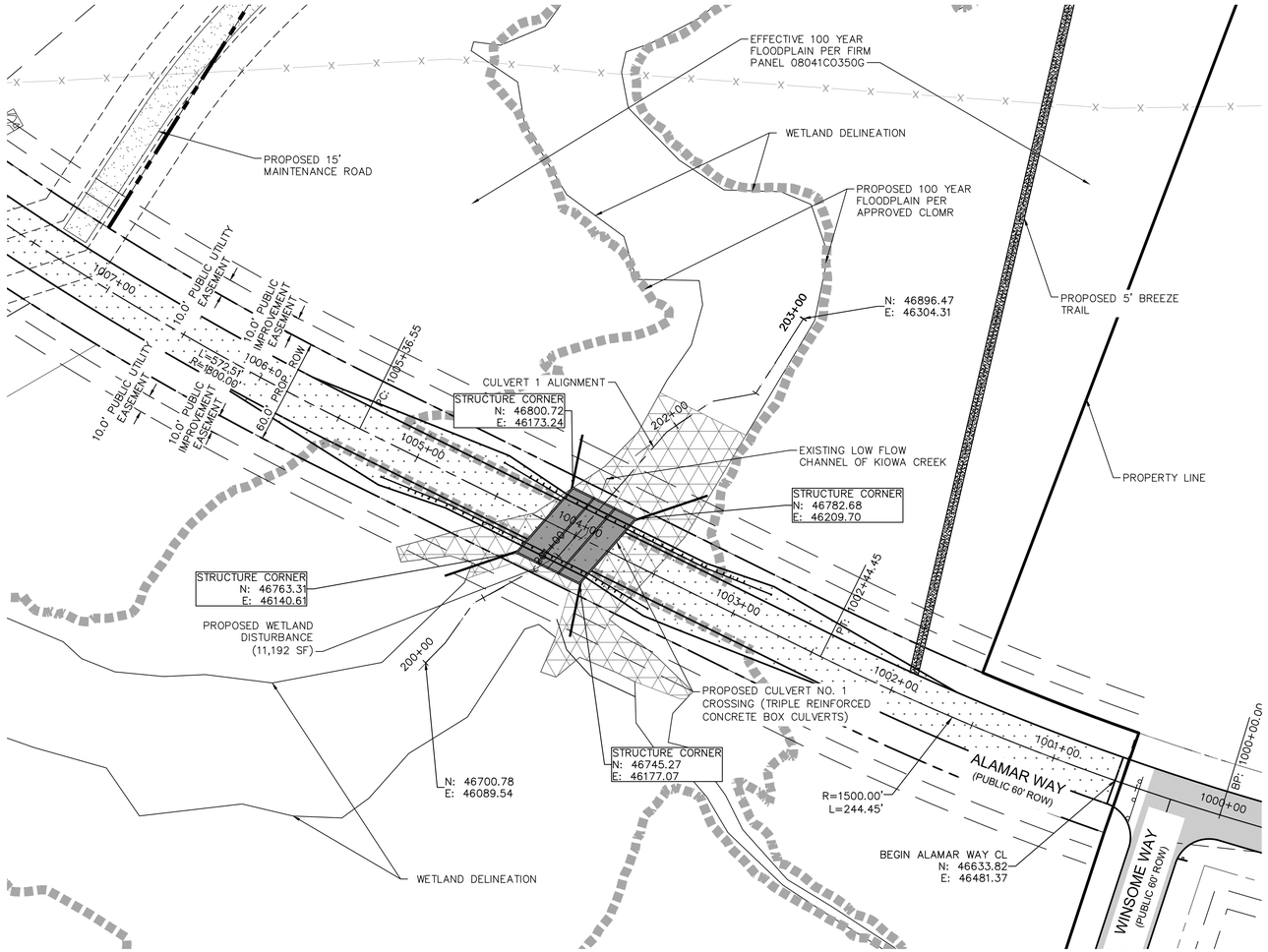
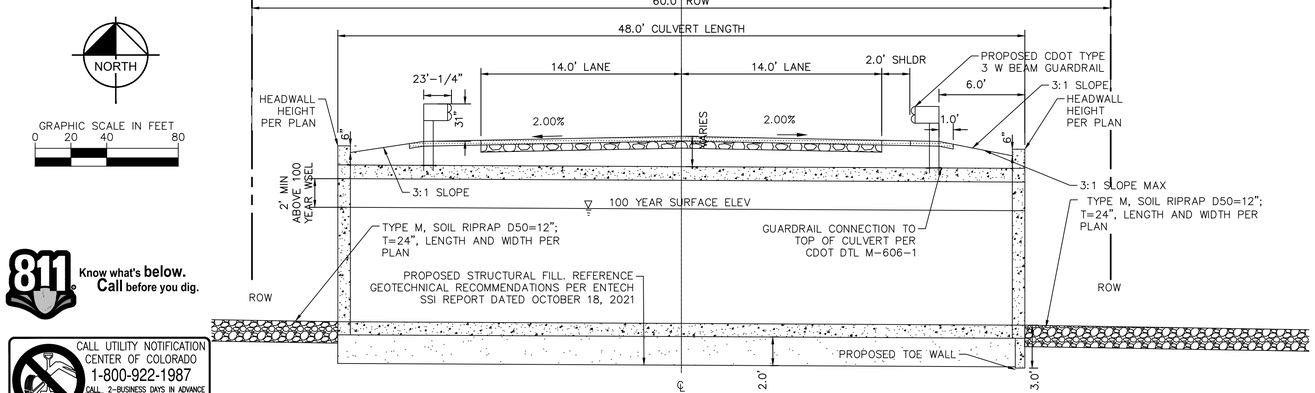


CULVERT CROSSING NO. 1
SCALE:1"=40'

CULVERT CROSSING NO. 2
SCALE: 1"=40'



RURAL LOCAL ROADWAY – TYPICAL CULVERT CROSSING
SCALE: 1" =5'

NORTH
GRAPHIC SCALE IN FEET
0 20 40 80

811 Know what's below. Call before you dig.

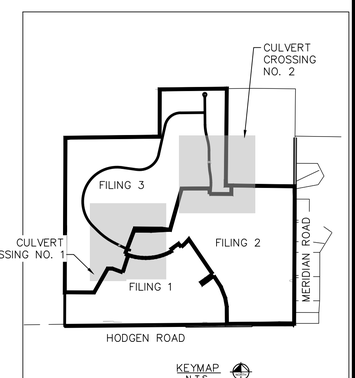
CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NOTES

1. ROADWAY LAYOUT IS FOR REFERENCE ONLY. REFERENCE WINSOME FILING NO. 3 CONSTRUCTION DOCUMENTS FOR ROADWAY PLAN AND PROFILES
2. GUARDRAIL WILL BE INSTALLED WITH INSTALLATION OF THE REINFORCED CONCRETE BOX CULVERTS AND THIS PLAN. REFERENCE SHEETS 3 – 4. FOR GUARDRAIL DETAILS

LEGEND

	PROPERTY LINE
5430	EXISTING MAJOR CONTOUR
5431	EXISTING MINOR CONTOUR
5430	PROPOSED MAJOR CONTOUR
5431	PROPOSED MINOR CONTOUR
	WETLAND DELINEATION BOUNDARY
	PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR
	EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G
	WETLAND DISTURBANCE AREA



PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION–INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY–HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453–0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
HORIZONTAL CONTROL

COLORADO LICENSED KEVIN REX KOFFORD 57234 10/31/2023 PROFESSIONAL ENGINEER

PROJECT NO. 196106001

SHEET 2

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LEGEND

- PROPERTY LINE
- 5430 EXISTING MAJOR CONTOUR
- 5431 EXISTING MINOR CONTOUR
- 5430 PROPOSED MAJOR CONTOUR
- 5431 PROPOSED MINOR CONTOUR
- WETLAND DELINEATION BOUNDARY
- PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR
- EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G
- PROPOSED 100 YR WATER SURFACE ELEVATION (WSEL)
- PROPOSED RIPRAP

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR

END END ANCHORAGE
STA:1005+12.90
OFF:19.00'LT

BREAKPOINT
STA:1005+12.89
OFF:24.92'LT

100 YEAR WSEL: 7325.49

BEGIN END ANCHORAGE
STA:1004+72.92
OFF:16.00'LT

WETLAND DELINEATION

TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7326.49' TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10.
(516 SY)

PROPOSED TYPE 3 W-BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

1006+00

60.0' ROW

7330

PC: 1005+36.55

1005+00

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

END END ANCHORAGE
STA:1004+53.52
OFF:19.00'RT

BREAKPOINT
STA:1004+53.50
OFF:24.92'RT

BEGIN END ANCHORAGE
STA:1004+13.88
OFF:16.00'RT

100 YEAR WSEL: 7321.50

70'X ~100'
TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7322.50' TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10.
(644 SY)

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

WETLAND DELINEATION

200+00

DIRECTION OF FLOW

EXISTING LOW FLOW CHANNEL OF KIOWA CREEK

75.2° SKEW

78.0'

CULVERT 1 ALIGNMENT

LOW FLOW CHANNEL IN RIPRAP PAD, SEE DETAIL ON SHEET 10

48.0'

100.0'

1004+00

202+00

DIRECTION OF FLOW

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR

END END ANCHORAGE
STA:1003+84.71
OFF:16.00'LT

BREAKPOINT
STA:1003+45.07
OFF:24.92'LT

BEGIN END ANCHORAGE
STA:1003+45.04
OFF:19.00'LT

GRADE IN SWALE AROUND THE WINGWALL TO PROVIDE POSITIVE DRAINAGE

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

ALAMAR WAY
(PUBLIC 60' ROW)

1003+00

PROPOSED TYPE 3 W- BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

END END ANCHORAGE
STA:1003+25.42
OFF:16.00'RT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

BREAKPOINT
STA:1002+85.67
OFF:24.92'RT

BEGIN END ANCHORAGE
STA:1002+85.64
OFF:19.00'RT

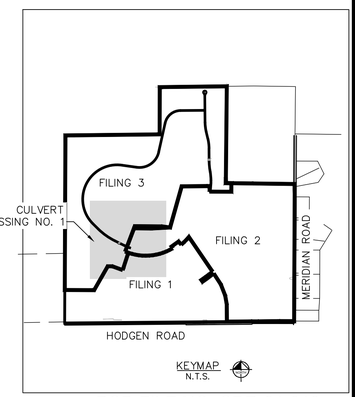
EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

PT: 1002+44.45

60.0' ROW

203+00

CULVERT CROSSING NO. 1
SCALE:1"=20'



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

811 Know what's below. Call before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
CULVERT 1-SITE PLAN

COLORADO LICENSED
KEVIN REX KOFFORD
57234
9/29/2023
PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
3

k:\cos_civil\196106001_winsome filing no. 3\CADD\plansheets\Culvert CDs\196106001_SP-Exhibit.dwg Kofford, Kevin 10/5/2023 1:24 PM

LEGEND

- PROPERTY LINE
- EXISTING MAJOR CONTOUR (5430)
- EXISTING MINOR CONTOUR (5431)
- PROPOSED MAJOR CONTOUR (5430)
- PROPOSED MINOR CONTOUR (5431)
- WETLAND DELINEATION BOUNDARY
- PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR
- EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G
- PROPOSED 100 YR WATER SURFACE ELEVATION (WSEL)
- PROPOSED RIPRAP

POND 4

END END ANCHORAGE
STA: 2009+74.43
OFF: 19.00'LT

BREAKPOINT
STA: 2009+74.41
OFF: 24.92'LT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

100 YEAR WSEL=7287.56

BEGIN END ANCHORAGE
STA: 2009+34.78
OFF: 16.00'LT

TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7288.56' TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10. (461 SY)

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR MODEL

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

END END ANCHORAGE
STA: 2009+49.43
OFF: 19.00'RT

BREAKPOINT
STA: 2009+49.41
OFF: 24.92'RT

BEGIN END ANCHORAGE
STA: 2009+09.96
OFF: 16.00'RT

PROPOSED TYPE 3 W- BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

LOW FLOW CHANNEL IN RIPRAP PAD, SEE DETAIL ON SHEET 10

70' X ~88'
TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7284.24 TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10
(925 SY)

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

100 YEAR WSEL=7283.24

CULVERT 2 ALIGNMENT

4:1 SLOPE WITH EMBANKMENT/SCOUR PROTECTION SOIL PROTECTION TYPE M, RIPRAP D50=12"; T=24". REFERENCE RIPRAP DETAIL ON SHEET 10. REFERENCE DRAINAGE REPORT FOR CALCULATIONS
(479 SY)

DIRECTION OF FLOW

WETLAND DELINEATION

EXISTING LOW FLOW CHANNEL OF KIOWA CREEK

END END ANCHORAGE
STA: 2008+50.81
OFF: 16.00'LT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

BREAKPOINT
STA: 2008+11.77
OFF: 24.92'LT

BEGIN END ANCHORAGE
STA: 2008+11.67
OFF: 19.00'LT

P.T.: 2008+37.90

PROPOSED TYPE 3 W- BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

END END ANCHORAGE
STA: 2008+25.58
OFF: 16.00'RT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

BREAKPOINT
STA: 2007+85.46
OFF: 25.03'RT

BEGIN END ANCHORAGE
STA: 2007+85.61
OFF: 19.00'RT

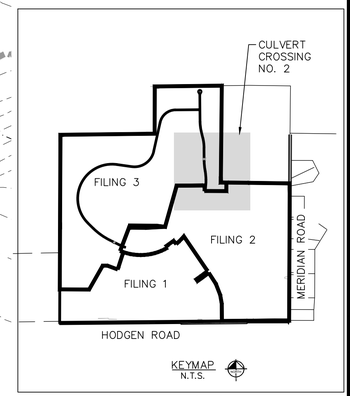
60.0' ROW

TWINKLING STAR LANE
(PUBLIC 60' ROW)

R=1420.00'
L=243.11'

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR MODEL



NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

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1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

CULVERT CROSSING NO. 2
SCALE: 1"=20'

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
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DESIGNED BY: KRK
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CHECKED BY: KRK
DATE: 9/3/2021

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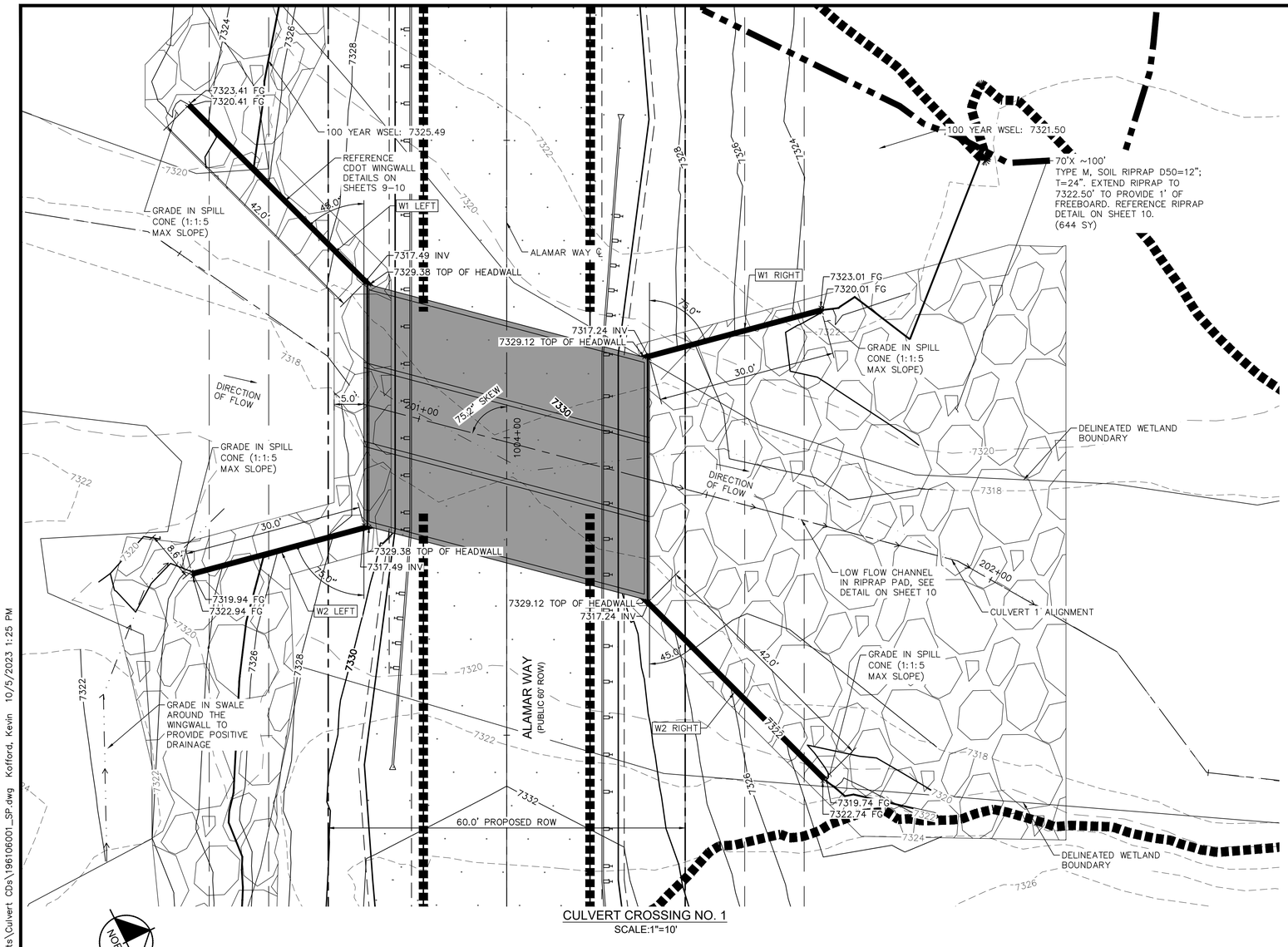
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
CULVERT 2-SITE PLAN

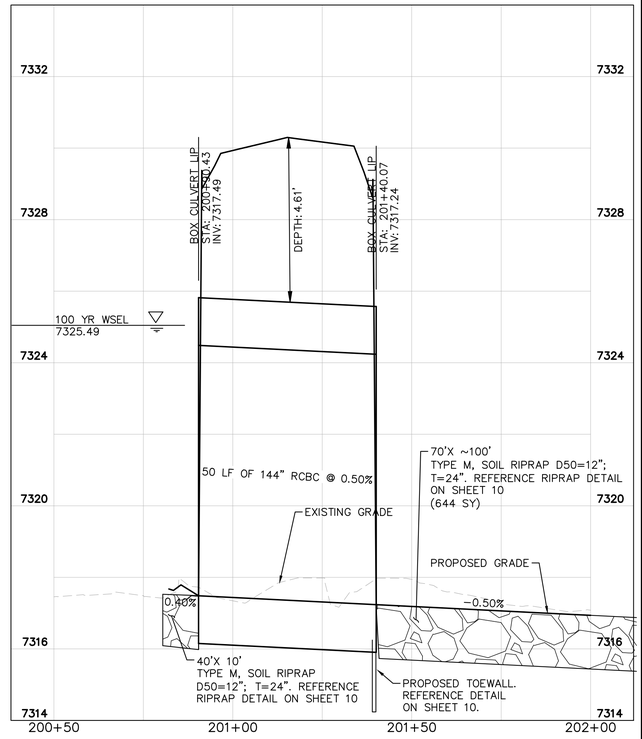
COLORADO LICENSED
KEVIN REX KOFFORD
57234
9/27/2023
PROFESSIONAL ENGINEER

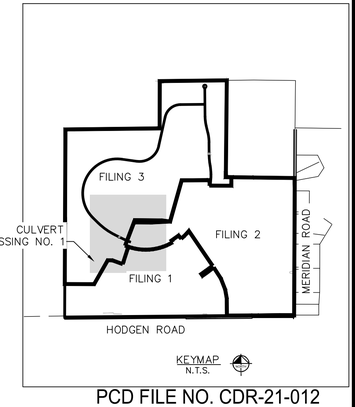
PROJECT NO.
196106001

SHEET
4

k:\cos_civil\196106001_winsome filing no. 3\CADD\plansheets\Culvert CDs\196106001_SP-Exhibit.dwg Kofford, Kevin 10/5/2023 1:24 PM







NORTH

GRAPHIC SCALE IN FEET
0 10 20 40
HORIZONTAL
0 1 2 4
VERTICAL

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WINGWALL DIMENSION SUMMARY

LOCATION	h (FT)*	k (FT)	LENGTH (FT)	m**	Θ (DEG)
W1 RIGHT	12'–0 1/2"	3	30	10'– 7 1/2"	75
W2 RIGHT	12'–0 1/2"	3	42	10'– 7 1/2"	45
W1 LEFT	12'–0 1/2"	3	42	10'– 7 1/2"	45
W2 LEFT	12'–0 1/2"	3	30	10'– 7 1/2"	75

*HEIGHT IS FROM BOTTOM OF SLAB TO TOP OF MODIFIED HEADWALL PER DETAIL ON SHEET 10
**M IS DIFFERENT VALUE THAN STANDARD EQUATION DUE TO MODIFIED HEADWALL HEIGHT

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION–INVERT REVISIONS	KRK	9/29/23	KRK
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1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

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DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

CULVERT 1-PLAN & PROFILE

COLORADO LICENSED KEVIN W. KOFFORD 57234 PROFESSIONAL ENGINEER 10/31/2023

PROJECT NO. 196106001

SHEET 5

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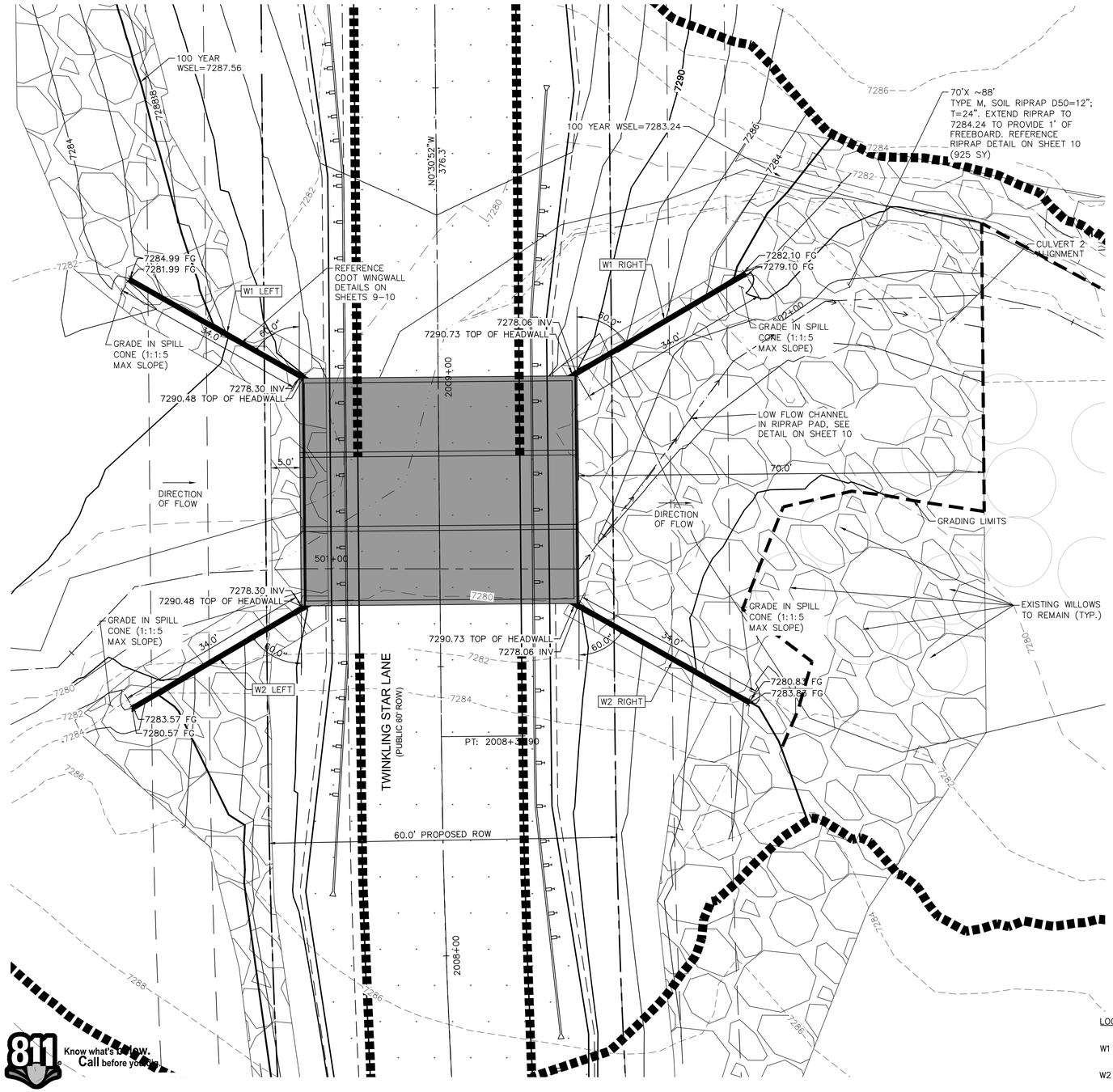
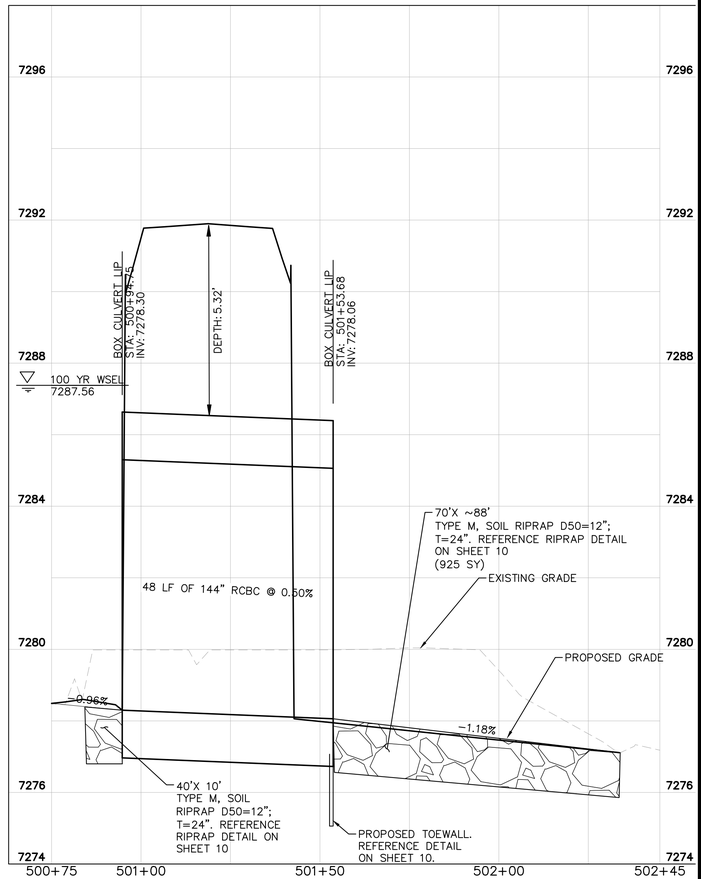


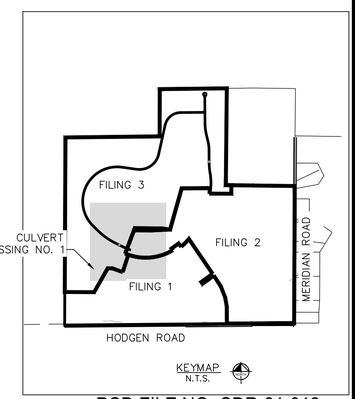
CULVERT CROSSING NO. 2
SCALE: 1"=40'



WINGWALL DIMENSION SUMMARY

LOCATION	h (FT)*	k (FT)	LENGTH (FT)	m**	Θ (DEG)
W1 RIGHT	12'-0 1/2"	3	34	10'- 7 ½ "	60
W2 RIGHT	12'-0 1/2"	3	34	10'- 7 ½ "	60
W1 LEFT	12'-0 1/2"	3	34	10'- 7 ½ "	60
W2 LEFT	12'-0 1/2"	3	34	10'- 7 ½ "	60

*HEIGHT IS FROM BOTTOM OF SLAB TO TOP OF MODIFIED HEADWALL PER DETAIL ON SHEET 10
**M IS DIFFERENT VALUE THAN STANDARD EQUATION DUE TO MODIFIED HEADWALL HEIGHT



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NORTH

NO.	REVISION	BY	DATE	APPR.
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1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

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2 North Nevada Avenue Suite 300
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DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

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EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

CULVERT 2-PLAN & PROFILE

COLORADO LICENSED KEVIN REX KOFFORD 57234 10/31/2023 PROFESSIONAL ENGINEER

PROJECT NO. 196106001

SHEET 6

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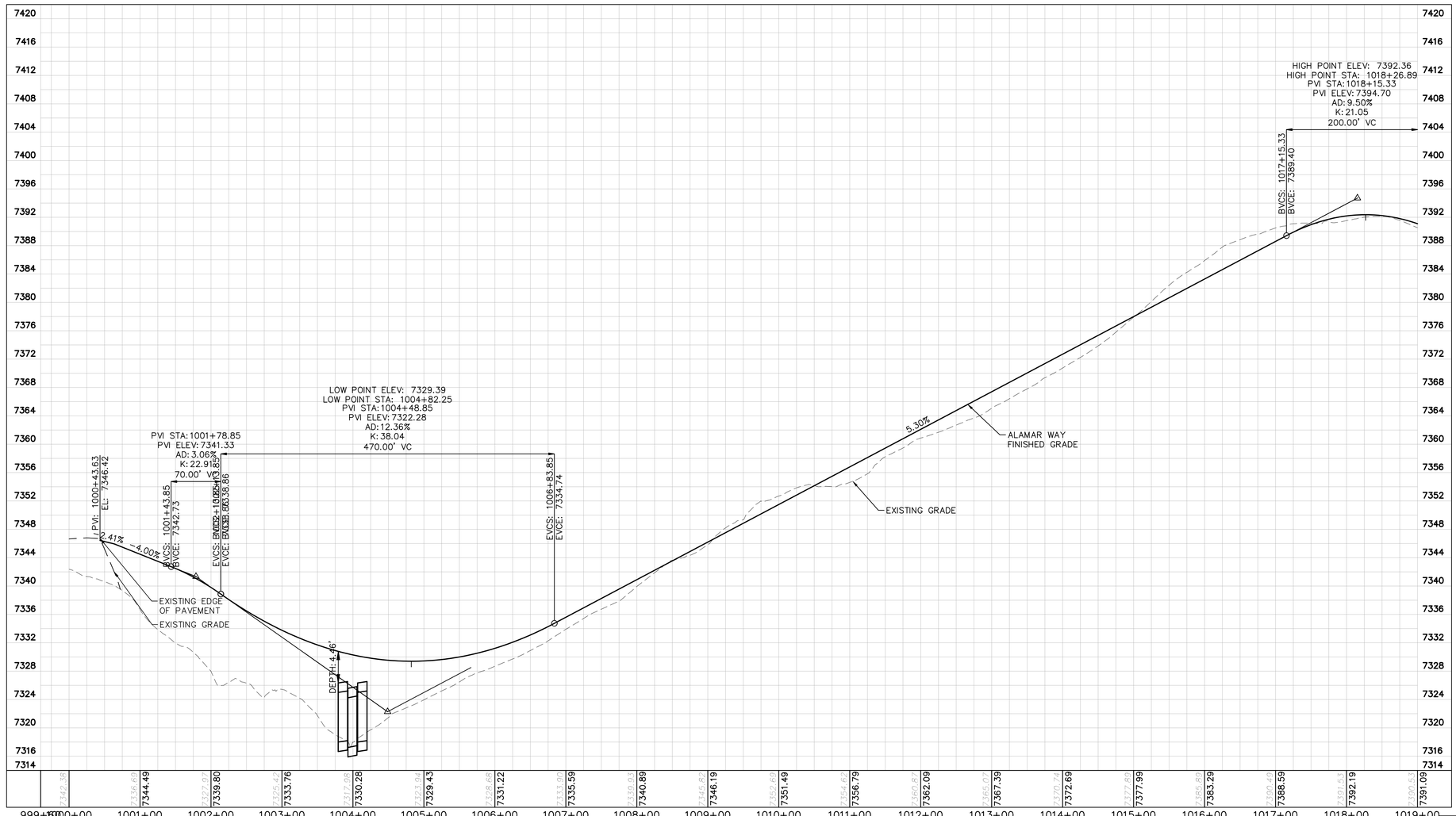

CULVERT CROSSING NO. 1- PROFILE
SCALE:1"=80'

NOTE: THIS PROFILE IS FOR REFERENCE ONLY. REFERENCE WINSOME FILING NO. 3 (SF229) FOR FULL ROADWAY PLAN AND PROFILES.

GRAPHIC SCALE IN FEET
0 40 80 160
HORIZONTAL

0 4 8 16
VERTICAL

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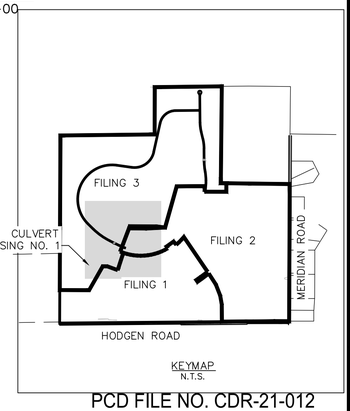

KEYMAP
N.T.S.

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
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2 North Nevada Avenue Suite 300
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DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
ALAMAR WAY PROFILE

COLORADO LICENSED
JEFFREY REX KOFFORD
57234
9/31/2023
PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
7

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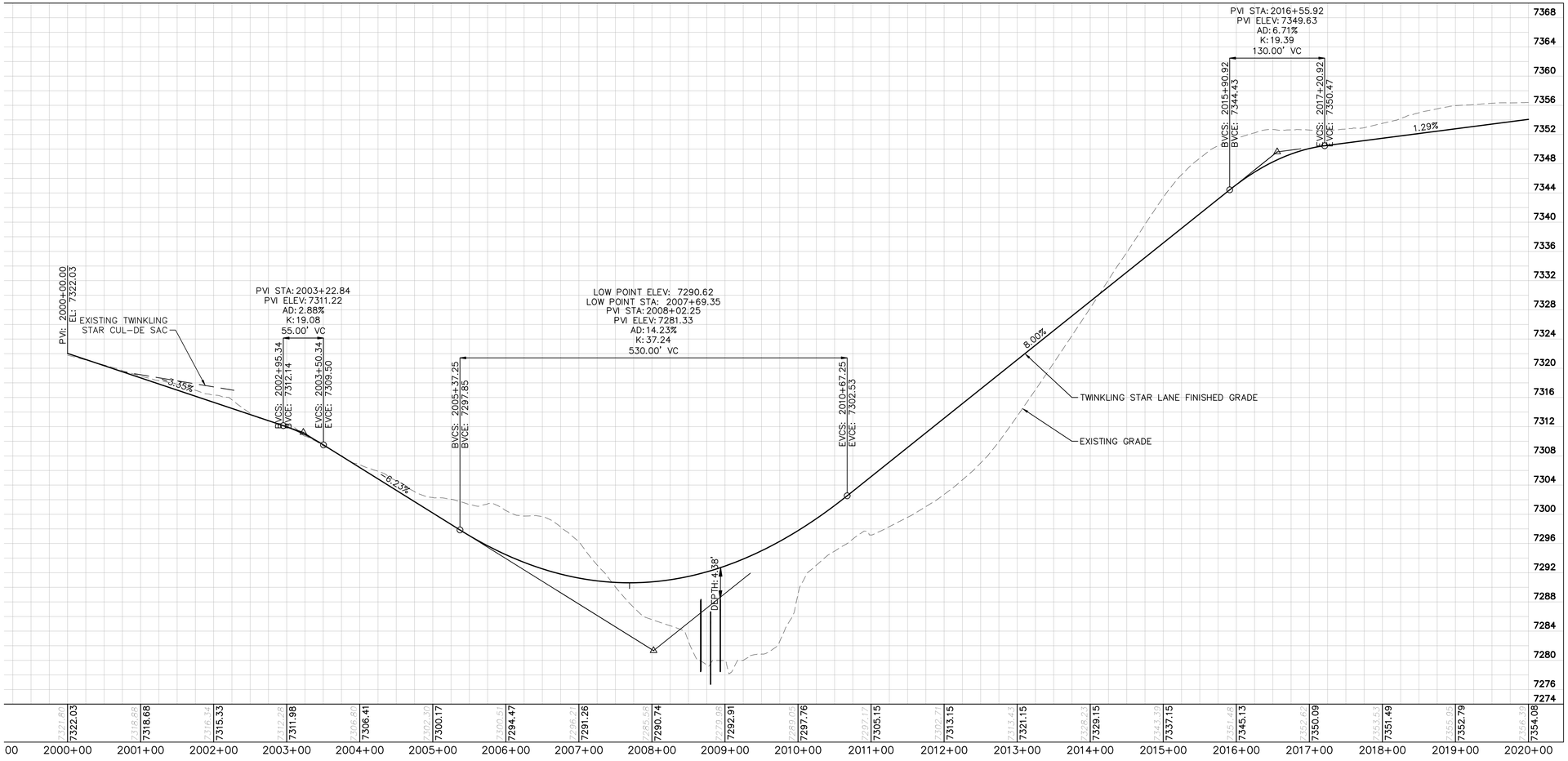

CULVERT CROSSING NO. 2-FILE
SCALE: 1"=80'

GRAPHIC SCALE IN FEET
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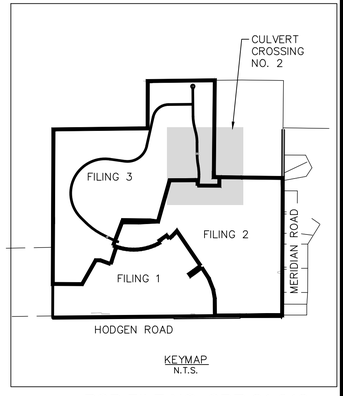
HORIZONTAL

0 4 8 16
VERTICAL

NOTE: THIS PROFILE IS FOR REFERENCE ONLY. REFERENCE WINSOME FILING NO. 3 (SF229) FOR FULL ROADWAY PLAN AND PROFILES.



KEYMAP
N.T.S.

PCD FILE NO. CDR-21-012

Know what's below. Call before you dig.

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CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

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DESIGNED BY: KRK
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DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
TWINKLING STAR LANE PROFILE

COLORADO LICENSED
KEVIN REX KOFFORD
57234
8/31/2022
PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
8

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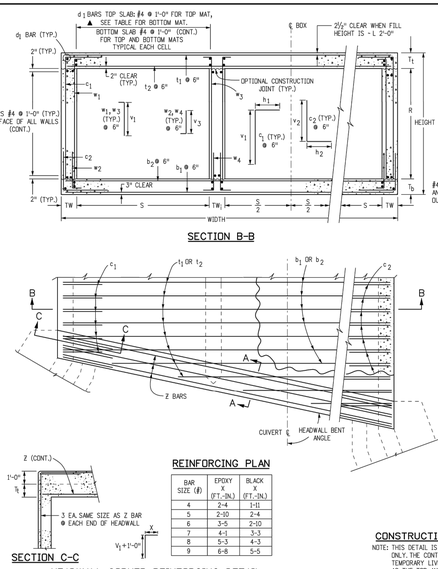
REFERENCE MODIFIED HEADWALL DETAIL ON SHEET 10



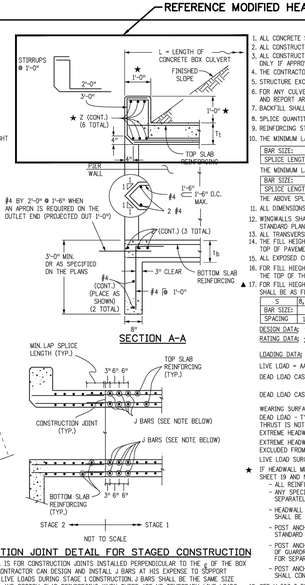
SECTION B-B

SECTION C-C

HEADWALL CORNER REINFORCING DETAIL

REINFORCING PLAN

BAR SIZE (#)	EPOXY X (FT-IN)	BLACK X (FT-IN)
4	2-4	1-11
5	2-10	2-4
6	3-5	2-10
7	4-1	3-3
8	5-3	4-3
9	6-8	5-5



SECTION A-A

CONSTRUCTION JOINT DETAIL FOR STAGED CONSTRUCTION

NOTE: THIS DETAIL IS FOR CONSTRUCTION JOINTS INSTALLED PERPENDICULAR TO THE ℄ OF THE BOX ONLY. THE CONTRACTOR CAN DESIGN AND INSTALL J BARS AT HIS EXPENSE TO SUPPORT TEMPORARY LIVE LOADS DURING STAGE 1 CONSTRUCTION. J BARS SHALL BE THE SAME SIZE AS THE TOP AND BOTTOM SLAB REINFORCING WHEN THERE ARE NO TEMPORARY LIVE LOADS TO SUPPORT.

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS D (BOX CULVERT).
2. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS PLACED.
3. ALL CONSTRUCTION JOINTS NOT SHOWN ON THE PLANS SHALL BE CONSTRUCTED ONLY IF APPROVED BY THE ENGINEER.
4. THE CONTRACTOR SHALL MAINTAIN THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.
5. STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH STANDARD PLAN M-206-1.
6. FOR ANY CULVERT SPAN 20 FT. OR GREATER, A FOUNDATION INVESTIGATION AND REPORT ARE REQUIRED.
7. BACKFILL SHALL NOT BEGIN UNTIL TOP SLAB HAS REACHED DESIGN STRENGTH, f_c.
8. SPLICE QUANTITIES FOR LONGITUDINAL AND TRANSVERSE BARS ARE NOT INCLUDED.
9. REINFORCING STEEL SHALL BE GRADE 60.
10. THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS SHALL BE:

BAR SIZE:	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH:	1'-3"	1'-7"	2'-0"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS SHALL BE:

BAR SIZE:	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH:	1'-1"	1'-4"	1'-7"	1'-10"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS ARE FOR CLASS B SPLICES.

11. ALL DIMENSIONS ARE PERPENDICULAR TO THE CENTERLINE OF THE BOX.
12. WINGWALLS SHALL BE TIED TO CONCRETE BOX CULVERT IN ACCORDANCE WITH STANDARD PLAN M-601-01.
13. ALL TRANSVERSE REINFORCING SHALL BE NORMAL TO THE CENTERLINE OF THE BOX.
14. THE FILL HEIGHT IS THE DISTANCE MEASURED FROM THE TOP OF THE TOP SLAB TO THE TOP OF PAVEMENT.
15. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED ¾ IN.
16. FOR FILL HEIGHTS LESS THAN 2 FT, A WATERPROOFING MEMBRANE SHALL BE PROVIDED FOR THE TOP OF THE TOP SLAB AND 18" DOWN ALONG THE TOPS OF THE EXTERIOR WALLS.
17. FOR FILL HEIGHTS LESS THAN 2 FT. THE d_1 BARS FOR THE BOTTOM MAT OF THE TOP SLAB SHALL BE AS FOLLOWS:

S	8, 9, 10	11, 12, 13	14, 15, 16	17, 18, 19, 20
BAR SIZE:	#5	#6	#7	
SPACING	1'-0"	1'-0"	1'-0"	

DESIGN DATA: 7TH EDITION, 2014, OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
RATING DATA: 2ND EDITION, 2011, OF THE AASHTO MANUAL FOR BRIDGE EVALUATION

LOADING DATA:
f_y= 60,000 psi,
f'_c= 4,500 psi,
LIVE LOAD = AASHTO LRFD, HL-93 TRUCK, HL-93 TANDEM, COLORADO PERMIT TRUCK AND NRL
DEAD LOAD CASE 1: VERTICAL EARTH LOAD = 120 LBS./CU.FT.
HORIZONTAL EARTH LOAD = 30 LBS./CU.FT.
DEAD LOAD CASE 2: VERTICAL EARTH LOAD = 120 LBS./CU. FT.
HORIZONTAL EARTH LOAD = 60 LBS./CU.FT.
WEARING SURFACE = 12 IN. THICK CONCRETE PAVEMENT.
DEAD LOAD = TYPE 7 BARRIER.
THRUST IS NOT CONSIDERED IN THIS STANDARD, I.E. THRUST = 0.
EXTREME HEADWATER TO DEPTH RATIO IS IN ACCORDANCE WITH THE CDOT DRAINAGE MANUAL.
EXTREME HEADWATER TO DEPTH RATIO WAS INCLUDED IN THE CULVERT DESIGNS BUT EXCLUDED FROM THE RATINGS AS PER THE AASHTO MANUAL FOR BRIDGE EVALUATION.
LIVE LOAD SURCHARGE ON EXTERIOR WALLS = 2 FT. OF EARTH

★ IF HEADWALL MOUNT GUARDRAIL IS USED (SEE STANDARD PLAN M-606-1, SHEET 19 AND NOTES BELOW):
- ALL REINFORCING STEEL SHALL BE ACCORDING TO THIS BOX CULVERT PLAN.
- ANY SPECIAL DESIGN FOR STIRRUPS WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
- HEADWALL DIMENSION AND CONCRETE QUANTITY SHALL BE ACCORDING TO STANDARD PLAN M-606-1, SHEET 19.
- POST ANCHORS SHALL BE PROVIDED ACCORDING TO STANDARD PLAN M-606-1, SHEET 19.
- POST ANCHORS AND CONCRETE FOR HEADWALL MOUNT OF GUARDRAIL WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
- POST ANCHORS WHEN REQUIRED AND ENCASED IN HEADWALL CONCRETE, SHALL CONFORM TO ASTM A 36 OR AASHTO M 169 STEEL.

18. SEE M-603-3 FOR PRECAST CONCRETE BOX CULVERT DETAILS.

Computer File Information		Sheet Revisions	
Creation Date: 07/04/12	Initials: DDG	Date:	Comments
Last Modification Date: 04/05/19	Initials: JBE	08/27/13	LRFD Design
Full Path: www.codot.gov/business/designsupport		08/01/15	Analysis Program Updates
Drawing File Name: 601030102.dgn		04/05/19	Clarified Max shown in Tbl. Load Combination Max. only, not for Pre-Cast CBC. Changed title and added Gen. Note 18.
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English			

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TRIPLE CONCRETE BOX CULVERT (CAST-IN-PLACE)	STANDARD PLAN NO.
Issued By: Project Development Branch July 4, 2012	M-601-3
	Sheet No. 1 of 2

TRIPLE CONCRETE BOX CULVERT DIMENSIONS, QUANTITIES & RATING FACTORS (EXCLUDING HEADWALL & TOEWALL QUANTITIES)

BOX SIZE				BAR SIZES				DIMENSIONS								QUANTITIES			RATING FACTORS			
S (FT)	R (FT)	WT. (FT-IN)	WIDTH (FT-IN)	d1 BARS TOP SLAB AND BOTTOM SLAB (FT-IN)	d2 BARS (FT-IN)	d3 BARS (FT-IN)	d4 BARS (FT-IN)	n*	T1 (FT-IN)	T2 (FT-IN)	T3 (FT-IN)	T4 (FT-IN)	T5 (FT-IN)	T6 (FT-IN)	T7 (FT-IN)	CONCRETE CY/LF	REBAR STL LBS/LF	WATERPROOFING SY/LF	HL-93 INVENTORY	HL-93 OPERATING	COLORADO PERMIT	NRL VEHICLE
6		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528	3.370	1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
8		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634	3.370	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
10		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
12		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845	4.722	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
6		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528	3.370	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
8		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
10		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
12		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845	4.722	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	

HEADWALL AND TOEWALL QUANTITIES

HEADWALL BENT ANGLE	90° TO 75°			74° TO 60°			59° TO 45°		
CLEAR SPAN (S)	Z	STIRRUPS	REBAR QUANT.	Z	STIRRUPS	REBAR QUANT.	Z	STIRRUPS	REBAR QUANT.
	#	#	LBS/LF	#	#	LBS/LF	#	#	LBS/LF
8	4	4	19.2	5	4	23.5	7	4	34.4
10	5	4	23.9	6	4	28.7	9	4.*	54.0
12	6	4	28.7	6	4	28.2	9	5.*	59.2
14	6	4	27.9	7	4	33.5	★	★	★
16	6	4	27.5	8	5	44.1	★	★	★
18	7	4	33.0	9	5	51.8	★	★	★
20	7	4	32.8	★	★	★	★	★	★

CONCRETE QUANTITY = 0.086 CY/LF

NOTES

■ 1. SIX INCH SPACING AT EACH END OF THE SPAN FOR A DISTANCE OF 1/4 OF THE SPAN LENGTH; 12 INCH SPACING ELSEWHERE.

2. QUANTITIES ARE GIVEN FOR ONE HEADWALL AND ONE TOEWALL AND ARE BASED ON PER LINEAR FOOT OF HEADWALL. STEEL QUANTITIES INCLUDE ALL REINFORCING. QUANTITIES SHALL BE PAID FOR AS SHOWN ON THE PLANS.

★ 3. SKEWED HEADWALLS ARE NOT RECOMMENDED FOR THESE SPANS. A SPECIAL DESIGN IS REQUIRED.

4. FOR HEADWALL AND TOEWALL DETAILS SEE M-601-3, SHEET 1 OF 2.

5. WHEN THE FILL HEIGHTS ARE LESS THAN OR EQUAL TO 2 FT, ALL REINFORCING BARS IN THE HEADWALL, ALL REINFORCING BARS DESIGNATED BY AN ASTERISK (*), AND THE d_2 BARS IN THE TOP MAT OF THE TOP SLAB SHALL BE EPOXY COATED.

6. REINFORCING QUANTITIES INCLUDE BOTH EPOXY-COATED AND UNCOATED BARS.

7. WHEN A (RISE) R OF LESS THAN 6 FT IS REQUIRED, USE THE BAR SIZES AND THE SLAB AND WALL THICKNESSES FOR THE 6 FT RISE OF AVAILABLE IN THE TABLES.

▲ 8. FOR SIZE AND SPACING OF THE BOTTOM MAT BARS IN THE TOP SLAB SEE TABLE ON M-601-3, SHEET 1 OF 2. ALL OTHER d_1 BARS ARE #4's AT 1'-0" SPACING. THE NUMBER OF BARS REQUIRED IS LISTED ON THIS SHEET AND INCLUDES BOTH #4 BARS AND THOSE FROM THE TABLE.

◆ 9. LIVE LOAD IS NEGLECTED AS PER AASHTO LRFD SECTION 3.6.1.2.6. FOR THESE STRUCTURES REFER TO THE CDOT RATING MANUAL.

10. FOR ALL NEW CULVERT DESIGNS, A RATING IS REQUIRED. THE RATING SUMMARY SHEET SHOULD BE PRINTED FROM THE CDOT EXTERNAL WEBSITE AND SUBMITTED TO THE BRIDGE RATING UNIT OR INCLUDED AS PART OF A LARGER DESIGN PACKAGE. FOR ADDITIONAL INFORMATION, SEE THE CDOT RATING MANUAL.

Computer File Information		Sheet Revisions	
Creation Date: 07/04/12	Initials: DDG	Date:	Comments
Last Modification Date: 04/05/19	Initials: JBE	08/27/13	LRFD Design
Full Path: www.codot.gov/business/designsupport		08/01/15	Analysis Program Updates
Drawing File Name: 601030202.dgn		04/05/19	Clarified Max shown in Tbl. Load Combination Max. only, not for Pre-Cast CBC. Changed title and added Gen. Note 18.
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English			

Colorado Department of Transportation
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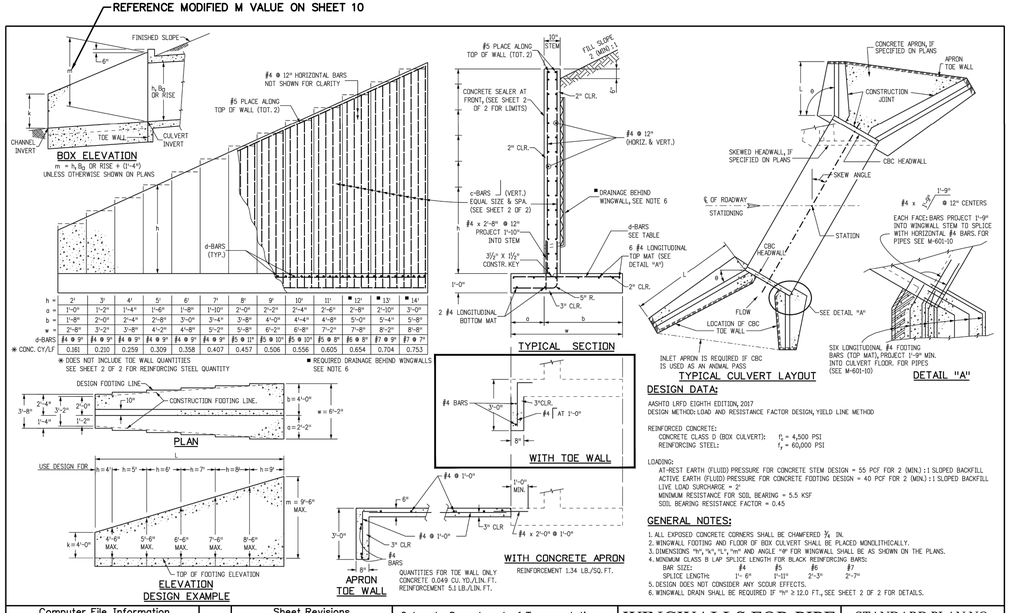
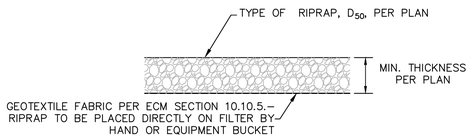
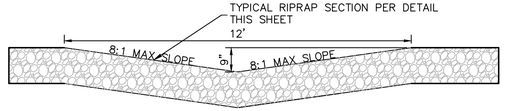
TRIPLE CONCRETE BOX CULVERT (CAST-IN-PLACE)	STANDARD PLAN NO.
Issued By: Project Development Branch July 4, 2012	M-601-3
	Sheet No. 2 of 2

REFERENCE MODIFIED M VALUE ON SHEET 10



#5 PLACE ALONG TOP OF WALL (TOT. 2)
CONCRETE SEALER AT FRONT, (SEE SHEET 2 OF 2 FOR LIMITS)
2" CLR.
#4 @ 12" (HORIZ. & VERT.)
c-BARS (VERT.





RIPRAP LOW FLOW CHANNEL

1. D50 = MEAN PARTICLE SIZE (INTERMEDIATE DIMENSION) BY WEIGHT.
2. RIP RAP SHALL BE PER PLAN AND SHALL BE MIXED WITH 30% SOIL TO 70% RIP RAP.
3. RIP RAP SECTION THICKNESS SHALL BE 2.0 TIMES THE SPECIFIED MEAN PARTICLE SIZE (I.E. D50 X 2.0 MINIMUM) PER ECM SECTION 10.10.3.
4. ALL RIP RAP SHALL BE UNDERLAIN WITH GEOTEXTILE FILTER FABRIC FOR STABILIZATION.
5. RIP RAP SHALL WRAP AROUND AND EXTEND 2' MIN. BEHIND FLUME AND FLARED END SECTIONS.

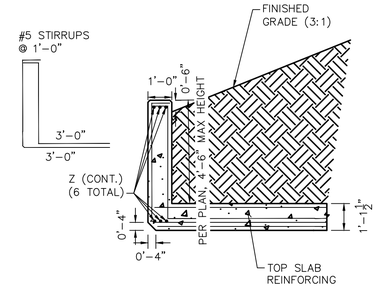
TYPICAL RIPRAP SECTION DETAIL

Table 9.5 Recommended wingwall flare angles (θ_a or θ_b)

Skew Angle, θ°	θ_a°	θ_b°
90	60	60
80	50	70
70	45	80
60	40	90
50	30	90
40	20	100
30	15	105
< 30	Consult the Region Hydraulic Engineer	

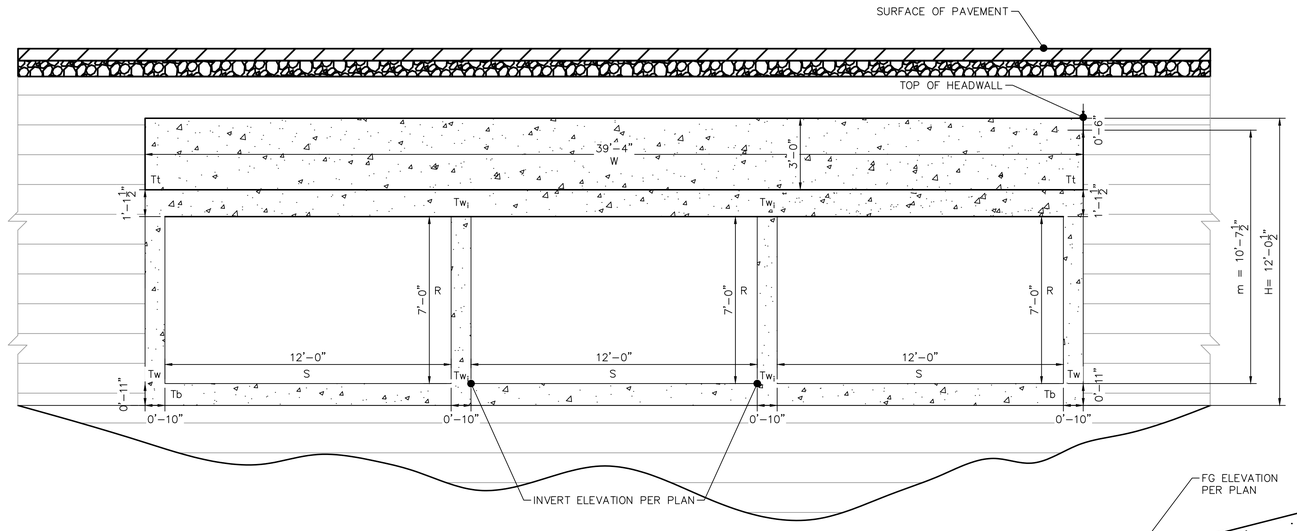
NO SKEW–CULVERT 2

75° SKEW–CULVERT 1



MODIFIED CULVERT HEADWALL SECTION DETAIL (A-A) FROM M-601-3

SCALE: 1"=3'



TRIPLE CONCRETE BOX CULVERT SECTION DETAIL

SCALE: 1"=3'

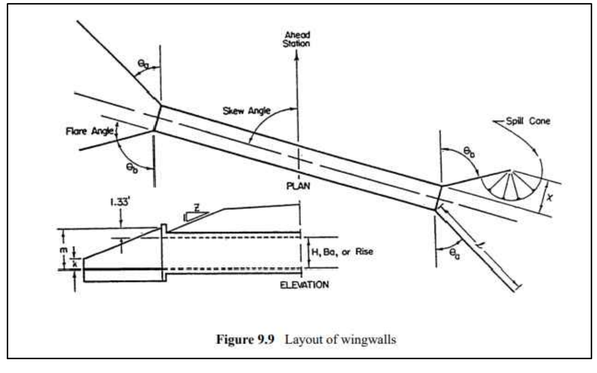
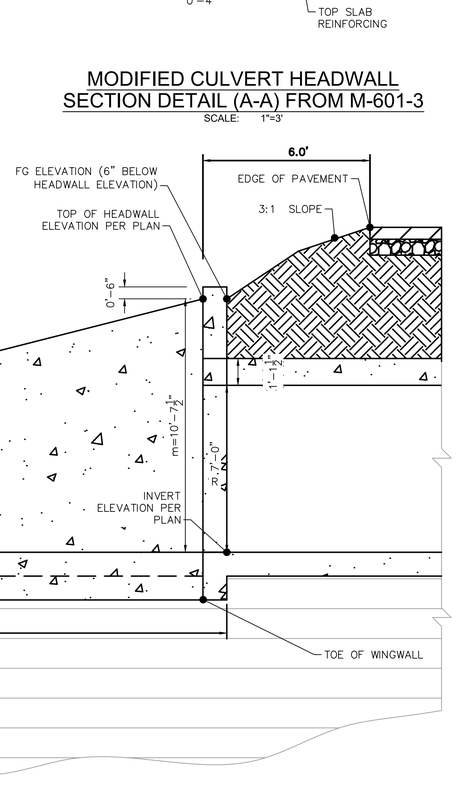


Figure 9.9 Layout of wingwalls

WINGWALL SPILL CONE CDOT DRAINAGE MANUAL FIGURE 9.9



WINGWALL (BOX CULVERT) SECTION DETAIL

SCALE: 1"=3'

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION–INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
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2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453–0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

CULVERT DETAILS

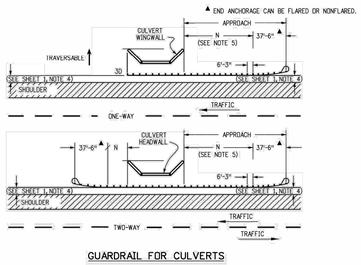
PROJECT NO. 196106001

SHEET 10

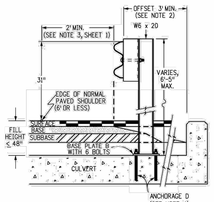
PCD FILE NO. CDR-21-012

k:\cos_civil\196106001_winsome filing no. 3\CADD\plansheets\Culvert CDs\196106001_DT.dwg Kofford, Kevin 10/5/2023 1:26 PM

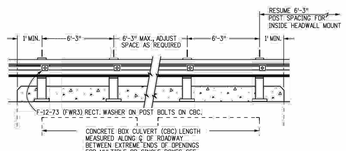
GUARDRAIL APPLICATION DETAILS



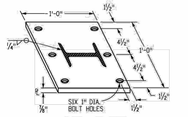
GUARDRAIL FOR CULVERTS



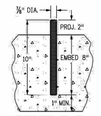
INSIDE MOUNT ON CBC



RAIL PLACEMENT FOR INSIDE MOUNT



BASE PLATE B
(FOR INSIDE MOUNT)



ANCHORAGE D
(FOR INSIDE MOUNT)

NOTES

1. LOCATION AND LENGTH OF MEDIAN GUARDRAIL APPROACHES TO CULVERTS WITH FULL HEADWALL AND WINGWALLS SHALL BE AS SHOWN FOR BRIDGES ON SHEET 15. THE GUARDRAIL TYPE 3 SHALL CONTINUE ACROSS THE CULVERT AS SHOWN ON THIS SHEET.
2. RIGHT SHOULDER BOX CULVERT TREATMENT IS SHOWN ON THIS SHEET FOR CULVERTS 20 FT. OR LESS IN LENGTH.
3. CONSTRUCTION AND PAYMENT FOR FILL HEIGHTS SHALL BE INCLUDED IN THE COST OF THE GUARDRAIL TYPE 3.
4. ANCHORAGE D: SIX BOLTS FOR BASE PLATE "B" WITH INSIDE MOUNT. THE BOLTS SHALL BE 7/8 IN. DIA X 10 IN. HIGH STRENGTH RODS THREADED FULL LENGTH AND ALL GALVANIZED. RODS SHALL BE CAST-IN-PLACE FOR NEW STRUCTURES. FOR EXISTING STRUCTURES, THE RODS SHALL BE INSTALLED IN 1-1/4 IN. DIA HOLES WITH NON-SHRINK GROUT OR EPOXY CONFORMING TO ASTM C 881. IF THE THICKNESS OF A CULVERT'S TOP PANEL REQUIRES BOLTS TO BE LESS THAN 10 IN. HIGH, THE BOLTS SHALL BE APPROVED BY THE ENGINEER.
5. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW, THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL ON, AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.
6. ALL POSTS, BASE PLATES, AND ANCHOR BOLTS SHALL BE FABRICATED FROM ASTM A 36 STEEL. THE ABOVE MATERIAL, W-BEAM, AND ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION INACCORDANCE WITH SECTION 509. CONCRETE, REINFORCING STEEL, AND STRUCTURAL STEEL ELEMENTS SHALL BE IN ACCORDANCE WITH SECTIONS 601, 602, AND 509, RESPECTIVELY.
7. POST ANCHORS, ENCASED IN CONCRETE, SHALL BE ASTM A 36 STEEL, AND NEED NOT BE GALVANIZED.
8. PRIOR TO INSTALLATION OF GUARDRAIL ON CULVERTS, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105 SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.

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MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES
Issued by the Project Development Branch: July 31, 2019

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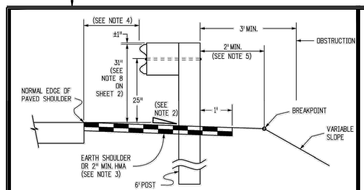
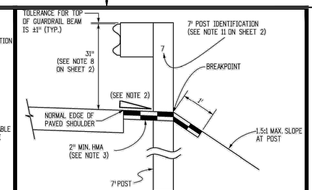
Project Sheet Number:

TYPICAL APPLICATION WITH EXCEPTION OF THE CULVERT CROSS SECTION

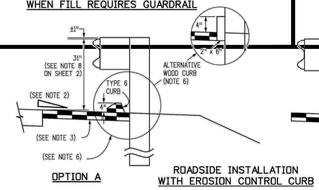


NORMAL ROADSIDE INSTALLATION WHEN FILL REQUIRES GUARDRAIL

APPLICATION OVER THE CULVERT. REFERENCE TYPICAL SECTION ON SHEET 2

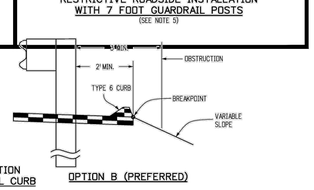


RESTRICTIVE ROADSIDE INSTALLATION WITH 7 FOOT GUARDRAIL POSTS (SEE NOTE 5)

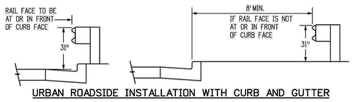


OPTION A

ROADSIDE INSTALLATION WITH EROSION CONTROL CURB



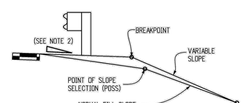
OPTION B (PREFERRED)



URBAN ROADSIDE INSTALLATION WITH CURB AND GUTTER

LOCATION	SPACING
ALL LOCATIONS EXCEPT BRIDGE RAIL LOCATIONS	6'-3"
BRIDGE OR STRUCTURE APPROACH	SEE SHEETS 11 & 19

NORMAL CENTER-TO-CENTER POST SPACING



EMBANKMENT WITH GUARDRAIL

(NOTE: THE CATCHPOINT REMAINS THE SAME AS THAT FOR "NORMAL" FILL SLOPE. FOR THE WIDER "2" DISTANCES, THE VARIABLE SLOPE MAY "CATCH" AT THE POSS.)

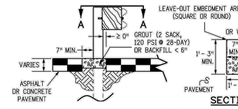
GENERAL NOTES (CONTINUE ON SHEET 2)

1. ALL GUARDRAILS SHOWN ARE MASH 2016 TL-3 COMPLIANT.
2. RATE OF SLOPE DEPENDS ON GUARDRAIL LOCATION:
   A. FOR GUARDRAIL FACE 2 FT. OR LESS FROM THE NORMAL EDGE OF PAVED SHOULDER, CONTINUE THE RATE OF SLOPE OF THE NORMAL PAVED SHOULDER TO THE BREAKPOINT.
   B. FOR GUARDRAIL FACE MORE THAN 2 FT. FROM THE NORMAL EDGE OF THE PAVED SHOULDER, THE SLOPE SHALL BE 10:1 OR FLATTER.
3. WHEN SPECIFIED ON THE PLANS, EXTEND A 2 IN. MINIMUM THICKNESS PAVED SURFACE TO 1 FT. BEHIND THE GUARDRAIL POSTS OR TO THE EROSION CONTROL CURB AS SHOWN ON PLANS. ASPHALT CUTTING & PATCHING OR OTHER APPROVED METHOD SHALL BE USED TO MINIMIZE DAMAGE TO ALL PAVED SURFACES UNDER GUARDRAIL INSTALLATIONS. ALL REPAIRS TO THE PAVED AREA WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK. A MINIMUM 3 IN. THICK FIBER REINFORCED CONCRETE PAVEMENT MAY ALSO BE USED FOR PAVING BENEATH THE GUARDRAIL. INSTALL THE POST IN A ½ IN. OVERSIZED FORMED HOLE FOR GUARDRAIL RUNS AND TERMINALS AS DIRECTED. PAYMENT FOR THIS PAVED SURFACE WILL BE MADE UNDER A PAVEMENT OR CONCRETE PAY ITEM WITH QUANTITIES SHOWN ON THE PLANS.
4. THE MINIMUM GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE SHALL BE:
   0 FT. FOR SHOULDERS 8 FT. OR WIDER
   2 FT. FOR SHOULDERS 6 FT. OR LESS

   THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE;
   0 FT. MINIMUM FOR SHOULDERS 6 FT. OR WIDER
   2 FT. DESIRABLE FOR 4 FT. SHOULDERS

   THE ABOVE 2 FT. GUARDRAIL TO SHOULDER OFFSET IS DESIRABLE BUT NOT REQUIRED FOR:
   A. FOR AN EXISTING HIGHWAY WITH A DESIGN SPEED LESS THAN 50 MPH, THE MINIMUM OFFSET IS 4 FT. FROM THE TRAVELED WAY.
   B. FOR A ONE-WAY ONE-LANE RAMP, AND WHERE ONE OR MORE OF THE FOLLOWING ARE TRUE:
      (1) THE NON-OFFSET GUARDRAIL BEGINS AT LEAST 100 FT. BEYOND RAMP NOSE.
      (2) THE NON-OFFSET GUARDRAIL IS NOT LOCATED ON THE RAMP EXIT OR ENTRANCE CURVE CONNECTION TO THE MAJOR HIGHWAY.
      (3) THE RAMP SHOULDERS ARE 4 FT. OR WIDER.

   USE OF GREATER THAN MINIMUM OFFSET DIMENSIONS IS ENCOURAGED TO MEET THE DESIRABLE GOAL OF PLACING THE GUARDRAIL AS FAR AS POSSIBLE FROM THE TRAVEL WAY, EVEN FOR SHORT DISTANCES, WHILE PROVIDING A SMOOTH CHANGE IN GUARDRAIL ALIGNMENT.
5. IF 2 FT. CANNOT BE PROVIDED BETWEEN THE BACK OF THE GUARDRAIL POST AND THE BREAKPOINT, USE 7 FT. GUARDRAIL POSTS. REFER TO THE "RESTRICTIVE ROADSIDE INSTALLATION" DETAIL.
6. WHEN SPECIFIED ON THE PLANS, INSTALL 4 IN. HIGH TYPE 6 CURB WITH ITS FACE AT OR BEHIND THE RAIL FACE. AS AN ALTERNATIVE WHEN SPECIFIED ON THE PLANS, INSTALL A 2 IN. x 6 IN. TREATED (AASHTO M 133) WOOD CURB. FASTEN WITH A 4 IN. LAG BOLT AND WASHER AT EACH WOOD POST, OR WITH A 1/4 IN. DIA. BOLT WITH WASHER AND NUT AT EACH STEEL POST. IF THE 2 IN. x 6 IN. WOOD CURB IS SPECIFIED, IT WILL BE INCLUDED IN THE COST OF THE GUARDRAIL. IF APPROVED BY THE ENGINEER, A 2 IN. x 4 IN. TREATED WOOD CURB MAY BE SUBSTITUTED FOR THE 2 IN. x 6 IN. CURB AND SET ON TOP OF PAVEMENT SURFACE AND ATTACHED AS DESCRIBED ABOVE. NO SPLICING SHALL BE ALLOWED IN WOOD CURBS. ADJACENT BOARDS SHALL BE BUTTED TOGETHER AND BOLTED AT A POST LOCATION. JOINTS SHALL BE LOCATED AT THE POSTS.



SECTION A-A

LEAVE-OUT AREA FOR GUARDRAIL POSTS LOCATED IN PAVEMENT

NOTE: LEAVE-OUT AREAS SHALL BE PROVIDED FOR ALL GUARDRAIL POSTS LOCATED IN PAVEMENT TO ALLOW THE POSTS TO ROTATE IN THEIR EMBEDMENT SUCH THAT VEHICLE IMPACT LOADS ARE DISTRIBUTED THROUGH THE POST INTO THE EMBEDMENT MATERIAL PRIOR TO THE POSTS BREAKING PREMATURELY.

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MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES
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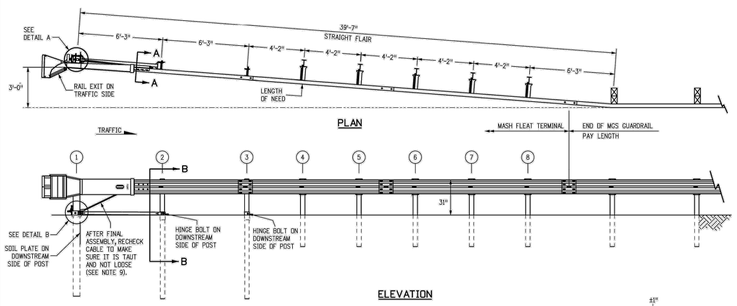
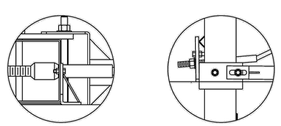
OFFSET NOTES

1. POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF POSTS.
2. THE GUARDRAIL BETWEEN POST (1) THRU (8) IS ON A STRAIGHT LINE FLARE.

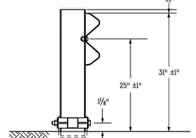




DETAIL A
IMPACT HEAD CONNETION

DETAIL B
POST #1 CONNECTION

SECTION A-A
ANCHOR BRACKET



SECTION B-B
POST #2

MFLEAT TERMINAL
(MASH CERTIFIED)

NOTES

1. THE END ANCHORAGE (FLARED) SHALL BE THE MFLEAT TERMINAL, AS MANUFACTURED BY ROAD SYSTEMS INC. (TELEPHONE #: 432-263-2435). ONE END ANCHORAGE (FLARED) SHALL INCLUDE ALL POST, RAIL, AND ALL HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (FLARED) SHALL BE INSTALLED CONFORMING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LIST TO THE ENGINEER PRIOR TO INSTALLATION OF THE DEVICE.
2. RETROREFLECTOR TABS SHALL NOT BE USED ON END ANCHORAGE POSTS.
3. DELINEATION SHALL BE APPLIED TO THE END PIECE, AND SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
4. AESTHETIC TREATMENT OPTIONS MAY BE AVAILABLE WITH PRIOR APPROVAL OF THE PROJECT ENGINEER. CONTACT THE MANUFACTURER FOR APPROVED AESTHETIC TREATMENT OPTIONS.
5. ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS AND BEARING PLATES SHALL BE GALVANIZED.
6. THE LOWER SECTIONS OF THE POSTS 1, 2, AND 3 SHALL NOT PROTRUDE MORE THAN 4 INCHES ABOVE THE GROUND (MEASURED ALONG A 5 FOOT CORD). SITE GRADING MAY BE NECESSARY TO MEET THIS REQUIREMENT.
7. THE LOWER SECTIONS OF THE HINGED POSTS SHOULD NOT BE DRIVEN WITH THE UPPER POST ATTACHED. IF THE POST IS PLACED IN A DRILLED HOLE, THE BACKFILL MATERIAL MUST BE SATISFACTORILY COMPACTED TO PREVENT SETTLEMENT.
8. WHEN COMPETENT ROCK IS ENCOUNTERED, A 12 INCH DIA. POST HOLE, DRILLED 20 INCHES DEEP INTO THE ROCK SURFACE SHALL BE USED IF APPROVED BY THE ENGINEER FOR POSTS 1 AND/OR 2. GRANULAR MATERIAL SHALL BE PLACED IN THE BOTTOM OF THE HOLE, APPROXIMATELY 2.5 INCHES DEEP TO PROVIDE DRAINAGE. THE FIRST AND/OR SECOND POST SHALL BE FIELD CUT TO LENGTH, PLACED IN THE HOLE AND BACKFILLED WITH SUITABLE BACKFILL. THE SOIL PLATE MAY BE TRIMMED IF REQUIRED.
9. THE BREAKAWAY CABLE ASSEMBLY SHALL BE TAUT, A LOCKING DEVICE (VICE GRIPS OR CHANNEL LOCK PLIERS) SHOULD BE USED TO PREVENT THE CABLE FROM TWISTING WHEN TIGHTENING NUTS.

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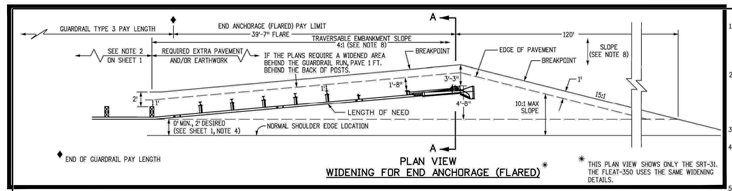
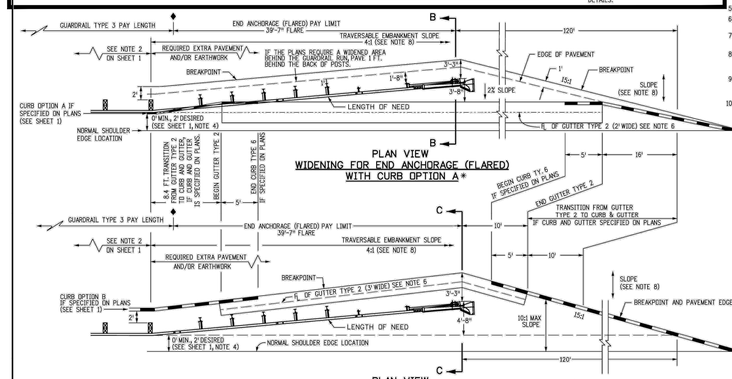
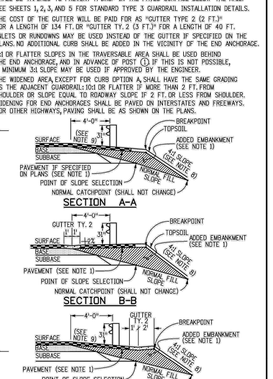


* THIS PLAN VIEW SHOWS ONLY THE SRT-31. THE FLEAT-350 USES THE SAME WIDENING DETAILS.



NOTES

1. PAYMENT FOR THE ADDED EMBANKMENT (APPROXIMATELY 45 CU. YDS.) FOR THE FLARE SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 203 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 203
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (FLARED) WHEN THE CONTRACT PLANS DO NOT INCLUDE PAY ITEM 203. THE ADDED EMBANKMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SUBSECTION 203.07, AASHTO 1 99.
2. WHEN THE WIDENED AREA IS PAVED, PAYMENT FOR THE PAVEMENT (APPROX. 70 SQ. YDS.) SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 403 OR 412 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 403 OR 412
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (FLARED) WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 403 OR 412 (SEE SHEET 1, NOTE 2 FOR PAVEMENT TYPES)
3. CONCRETE PAVED AREAS SHALL HAVE THEIR TAPERED ENDS SQUARED OFF AS DIRECTED BY THE ENGINEER.
4. WHEN OVERLAY PAVING, THE FINISHED SURFACE AT EACH POST SHALL NOT BE ABOVE THE TOP BREAKAWAY HOLE OR STRUT ASSEMBLY. THE WIDENED AREA AT THE FLARED END ANCHORAGE SHOULD NOT BE OVERLAYED UNLESS PAVEMENT CONDITIONS WARRANT IT BEING OVERLAYED. ANY OVERLAY PAVEMENT ABUTTING THE FLARED END ANCHORAGE SHALL BE TAPERED TO PREVENT A DROP IN THE PAVED SURFACE BELOW THE RAIL.
5. SEE SHEETS 1, 2, 3, AND 5 FOR STANDARD TYPE 3 GUARDRAIL INSTALLATION DETAILS.
6. THE COST OF THE GUTTER WILL BE PAID FOR AS "GUTTER TYPE 2 (2 FT.)" FOR A LENGTH OF 134 FT. OR "GUTTER TY. 2 (3 FT.)" FOR A LENGTH OF 40 FT.
7. INLETS OR RUNDOWNS MAY BE USED INSTEAD OF THE GUTTER IF SPECIFIED ON THE PLANS. NO ADDITIONAL CURB SHALL BE ADDED IN THE VICINITY OF THE END ANCHORAGE.
8. 4:1 OR FLATTER SLOPES IN THE TRAVERSABLE AREA SHALL BE USED BEHIND THE END ANCHORAGE, AND IN ADVANCE OF POST (1) IF THIS IS NOT POSSIBLE, A MINIMUM 3:1 SLOPE MAY BE USED IF APPROVED BY THE ENGINEER.
9. THE WIDENED AREA, EXCEPT FOR CURB OPTION A, SHALL HAVE THE SAME GRADING AS THE ADJACENT GUARDRAIL: 10:1 OR FLATTER IF WIDE THAN 2 FT. FROM SHOULDER OR SLOPE EQUAL TO ROADWAY SLOPE IF 2 FT. OR LESS FROM SHOULDER.
10. WIDENING FOR END ANCHORAGES SHALL BE PAVED ON INTERSTATES AND FREEWAYS. FOR OTHER HIGHWAYS, PAVING SHALL BE AS SHOWN ON THE PLANS.



Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(REV)	03/05/20	Replaced the old end anchorage drawings with the new MFLEAT and anchorage drawings.
Last Modification Date: 03/05/20	(REV)		
Detailer Initials: LTA	(REV)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(REV)		

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

MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO. M-606-1
Standard Sheet No. 7 of 19
Project Sheet Number:

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
GUARDRAIL DETAILS

COLORADO LICENSED
REX KRAMER
57234
7/31/20
PROFESSIONAL ENGINEER

PROJECT NO. 196106001
SHEET 11

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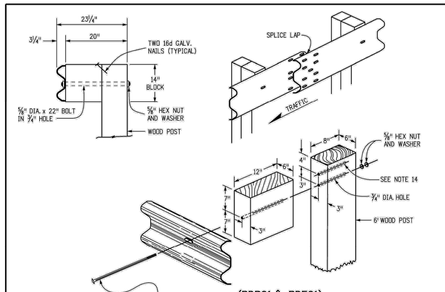
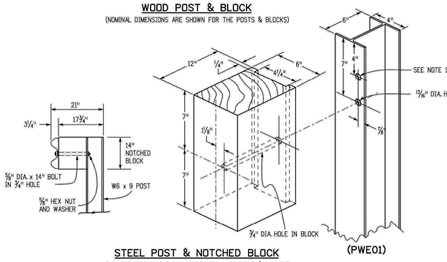
STANDARD GUARDRAIL DETAILS



WOOD POST & BLOCK

(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

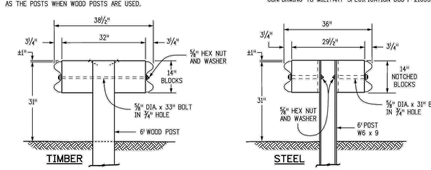


STEEL POST & NOTCHED BLOCK

(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

GENERAL NOTES (CONTINUED FROM SHEET 1)

7. SEE SHEETS 7 AND 9 FOR CURB TREATMENTS AT GUARDRAIL TERMINALS.
8. IF THIS DIMENSION WILL BE LESS THAN 28 INCHES, RESET GUARDRAIL HEIGHT TO 28 INCHES OR ABOVE.
9. ALL W-BEAM SPLICES, AND SPLICES OF TERMINAL CONNECTORS TO W-BEAM SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED IN THE PLANS OR BY THE MANUFACTURER.
10. MATERIAL TYPE AND SHAPE OF POSTS AND BLOCKS SHALL BE THE SAME THROUGHOUT THE PROJECT EXCEPT WHEN SPECIFIC POSTS AND BLOCKS ARE SPECIFIED, i.e. AT END ANCHORAGES AND BOX CULVERTS.
11. WHEN SPECIFIED IN THE CONTRACT, 7 FT. POSTS SHALL BE INSTALLED INSTEAD OF THE STANDARD 6 FT. POSTS. THE 7 FT. POSTS SHALL BE MARKED WITH THE NUMBER 7 TO ENSURE PERMANENT INDENTIFICATION. STEEL POSTS SHALL BE STAMPED PRIOR TO GALVANIZING. THE NUMBER 7 SHALL BE A MINIMUM 2 IN. TALL AND LOCATED AS SHOWN ON THE ELEVATION VIEW ON SHEET 1.
12. THE STANDARD 3 IN. X 1⅝ IN. X ⅜ IN. RECTANGULAR WASHER USED UNDER POST BOLT HEADS IN THE PAST MAY REMAIN IN EXISTING INSTALLATIONS BUT SHALL NOT BE USED IN NEW CONSTRUCTION, REPAIRS, OR RESETTING OF RAIL, EXCEPT WHEN SPECIFICALLY IDENTIFIED ON THE STANDARD PLAN.
13. STANDARD GALVANIZED ROUND STEEL WASHERS SHALL BE USED UNDER ALL NUTS IN CONTACT WITH WOOD POSTS.
14. AN ADDITIONAL HOLE SHALL BE PROVIDED IN THE POSTS TO FACILITATE FUTURE RAISING OF THE RAIL ELEMENTS AND BLOCKS FOR OVERLAYS. POSTS PROVIDED MAY ALSO HAVE ADDITIONAL HOLES (UP TO 4 PER FLANGE) FOR MEDIAN GUARDRAIL APPLICATION.
15. RETROREFLECTOR TABS SHALL BE INSTALLED AT 25 FT. INTERVALS (SEE SHEETS 6 AND 8 FOR EXCEPTIONS). RETROREFLECTOR TABS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK. THE TABS SHALL BE INSTALLED ON SPLICE BOLTS, NOT ON POST BOLTS AND SHALL BE MOUNTED SO THE BOLT SLOT FACES AWAY FROM TRAFFIC, AND THE RETROREFLECTOR SURFACE FACES THE APPROACHING TRAFFIC FOR ONE-WAY ROADS. FOR TWO-WAY ROADS, BOTH SIDES OF THE TABS SHALL BE RETROREFLECTIVE, SO THAT DELINEATION IS PROVIDED FOR BOTH DIRECTIONS OF TRAVEL. THE RETROREFLECTIVE SHEETING COLOR SHALL MATCH THE COLOR OF THE ADJACENT TRAVEL WAY EDGE LINE. SEE THE RETROREFLECTOR TAB DETAIL ON SHEET 3.
16. AT THE TIME OF INSTALLATION, WOOD POSTS OR BLOCKS WITH SEASONING CHECKS GREATER THAN ¼ IN. SHALL NOT BE USED WHEN THE CHECK EXTENDS THE FULL LENGTH OF THE PIECE.
17. WOOD BLOCKS SHALL BE CUT FROM THE SAME CROSS-SECTION, SPECIES, AND GRADE, AND SHALL RECEIVE THE SAME PRESERVATIVE TREATMENT AS THE POSTS WHEN WOOD POSTS ARE USED.
18. REFERENCES SUCH AS @@POD01", @@POE01", AND @@PWE01" IN THIS STANDARD PLAN SPECIFY HARDWARE DETAILS FROM @@A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" PREPARED BY THE AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.
19. RAIL BLOCKS MANUFACTURED FROM SYNTHETIC MATERIAL WILL BE ACCEPTED AS ALTERNATIVES TO WOOD BLOCKS FOR USE WITH STEEL POSTS PROVIDED THAT THE BLOCKS HAVE RECEIVED FHWA APPROVAL.
20. WOOD POSTS SHALL BE MADE OF TIMBER WITH AN EXTREME FIBER STRESS IN BENDING OF 1200 PSI STRESS GRADING AND POST DIMENSIONS SHALL CONFORM WITH THE RULES OF THE WEST COAST INSPECTION BUREAU, OR THE SOUTHERN PINE BUREAU, OR THE WESTERN WOOD PRODUCTS ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NOMINAL DIMENSIONS INDICATED. ONLY ONE TYPE OF SURFACE FINISH SHALL BE USED FOR POSTS AND BLOCKS IN ANY ONE CONTINUOUS LENGTH OF GUARDRAIL.
21. GLULAM POSTS AND BLOCKS WILL BE ACCEPTED AS ALTERNATIVES PROVIDED THAT THE SUPPLIED MATERIALS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.
22. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO AASHTO M 133 EXCEPT THAT BLOCKS NEED NOT BE INCISED. PRESERVATION ASSAY RETENTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER. THE CONTRACTOR SHALL CERTIFY THAT THE SPECIES AND GRADE MEET THE REQUIREMENTS OF THE CONTRACT.
23. W-BEAM AND THRIE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED USING AASHTO M 270 (ASTM A 709) GRADE 36 STEEL, UNLESS CORROSION RESISTANT STEEL IS REQUIRED, IN WHICH CASE THE POST SHALL BE MANUFACTURED FROM AASHTO M 270 (ASTM A 709) GRADE 50W STEEL. THE DIMENSIONS OF THE CROSS-SECTION SHALL CONFORM TO A W6 X 9 SECTION AS DEFINED IN AASHTO M 160 (ASTM A 6). W6 X 8.5 WIDE FLANGE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.
24. AFTER THE SECTION IS CUT AND ALL HOLES ARE DRILLED OR PUNCHED THE COMPONENT SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) UNLESS CORROSION-RESISTANT STEEL IS USED. WHEN CORROSION-RESISTANT STEEL IS USED THE PORTION OF THE POST TO BE EMBEDDED IN SOIL SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) AND THE PORTION ABOVE THE SOIL SHALL NOT BE ZINC-COATED, PAINTED OR OTHERWISE TREATED.
25. FIELD MODIFICATION TO RAIL ELEMENTS IS ALLOWED PER MANUFACTURER'S RECOMMENDATIONS, OR WITH THE APPROVAL OF THE STANDARDS AND SPECIFICATIONS UNIT. POSTS SHALL NOT BE MODIFIED. COMPONENTS ON WHICH THE SPELTER COATING HAS BEEN DAMAGED SHALL BE EITHER REGALVANIZED OR RECOATED IN CONFORMANCE WITH AASHTO M 36, OR PAINTED WITH ONE FULL BRUSH COAT OF ZINC RICH PAINT CONFORMING TO MILITARY SPECIFICATION DOD-P-21035A.



DOUBLE BLOCK AND GUARDRAIL TYPE 3 (DOUBLE) FOR MEDIAN BARRIER

Computer File Information		Sheet Revisions	
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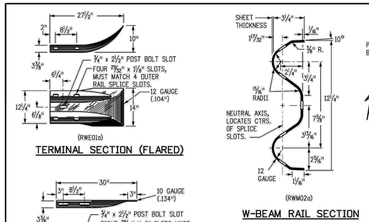
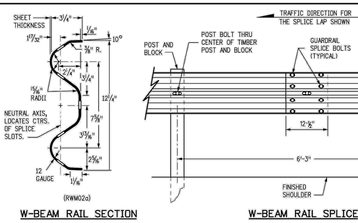
Designer Initials: JBK	BOX		
Last Modification Date: 03/05/20	BOX		
Detailer Initials: LTA	BOX		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	BOX		

Colorado Department of Transportation	MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES	STANDARD PLAN NO.
2829 West Howard Place, CDOT HQ, 3rd Floor, Denver, CO 80204, Phones: 303-757-9021 FAX: 303-757-9868		M-606-1
Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 2 of 19
		Project Sheet Number:



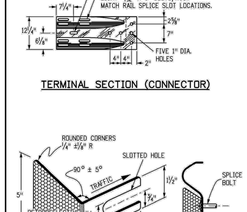
TERMINAL SECTION (FLARED)



W-BEAM RAIL SECTION

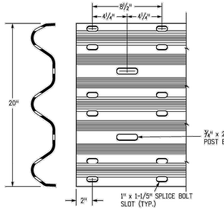
W-BEAM RAIL SPLICE

PART	MATERIAL SPEC.	GALVANIZING SPEC.	CORROSION-RESISTANT SPEC.
W-BEAM RAIL & TERMINAL SECTIONS	AASHTO M 180, CLASS A OR B	AASHTO M 180, TYPE 1 OR 2	AASHTO M 180, TYPE 4
BASE PLATE	ASTM A 36	AASHTO M 111	N.A.
NUTS, BOLTS & STUDS FOR GENERAL USE	ASTM A 307		AASHTO M 232, CLASS C
HIGH STRENGTH BOLTS & NUTS	ASTM A 325		OR
HIGH STRENGTH STUDS & NUTS	ASTM A 449		OR
ROUND STEEL WASHERS	ASTM F 436		ASTM B 695 CLASS 50 TYPE 1
RECTANGULAR WASHERS	AASHTO M 180		
OTHER FITTINGS	ASTM A 36	AASHTO M 111	



TERMINAL SECTION (CONNECTOR)

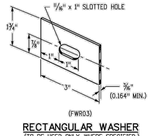
THRIE BEAM TERMINAL SECTION (CONNECTOR)



THRIE BEAM DETAIL

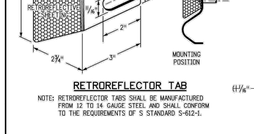
THE TABULATION OF GUARDRAIL WILL SPECIFY THE TYPE OF CORROSION PROTECTION: GALVANIZED OR CORROSION - RESISTANT STEEL.

STEEL POSTS SHALL HAVE THE SAME CORROSION PROTECTION AS SPECIFIED FOR THE METAL BEAM RAIL, PUNCHING, DRILLING, CUTTING, OR WELDING OF POSTS WILL NOT BE PERMITTED AFTER GALVANIZING.



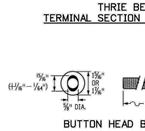
RECTANGULAR WASHER

(TO BE USED ONLY WHERE SPECIFIED.)

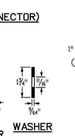


RETROREFLECTOR TAB

NOTE: RETROREFLECTOR TABS SHALL BE MANUFACTURED FROM 12 TO 14 GAUGE STEEL AND SHALL CONFORM TO THE REQUIREMENTS OF S STANDARD S-612-1.



BUTTON HEAD BOLT WITH OVAL SHOULDER



WASHER

HEX NUT

DIAMETER & TYPE (INCHES)	12" BLOCKS L = LENGTH (INCHES)	THREAD LENGTH (INCHES)	INTENDED USE	AASHTO-AGC-ARTBA STANDARD NUMBER	NO. BOLTS, NUTS & WASHERS
⅝	11¼	FULL (1 13/16)	ALL RAIL SPLICES	FBB01	8 PER SPLICE*
BUTTONHEAD OVAL SHLDR.	22	MIN. 2½	SINGLE BLOCK & POST (TIMBER)	FBB04	1 PER POST
	33	MIN. 2	DOUBLE BLOCK & POST (TIMBER)	FBB05	1 PER POST
	14	MIN. 2	FASTEN NOTCHED BLOCK TO STEEL POST	FBB03	1 PER BLOCK
WASHERS NOT USED AT RAIL SPLICES					

Computer File Information		Sheet Revisions	
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Designer Initials: JBK	BOX		
Last Modification Date: 03/05/20	BOX		
Detailer Initials: LTA	BOX		
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Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 3 of 19
		Project Sheet Number:

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1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
GUARDRAIL DETAILS

COLORADO LICENSED
KEVIN REX KOFFORD
57234
7/31/2023
PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
12

PCD FILE NO. CDR-21-012

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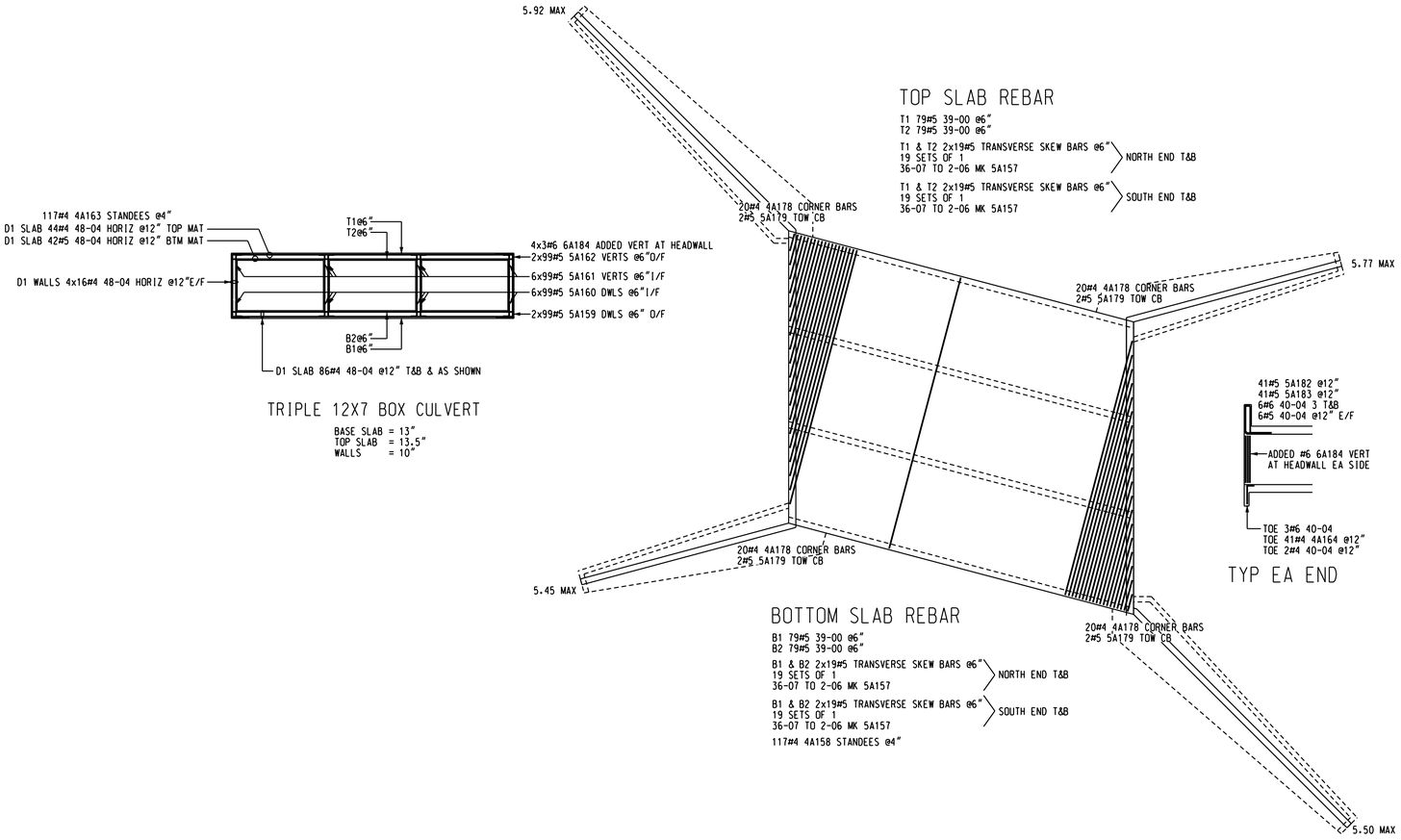
FOR WINGWALLS SEE DRAWING 1A



TRIPLE 12X7 BOX CULVERT

BASE SLAB = 13"
TOP SLAB = 13.5"
WALLS = 10"

TYP EA END

TOP SLAB REBAR

T1 79#5 39-00 @6"
T2 79#5 39-00 @6"

T1 & T2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — NORTH END T&B

T1 & T2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — SOUTH END T&B

BOTTOM SLAB REBAR

B1 79#5 39-00 @6"
B2 79#5 39-00 @6"

B1 & B2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — NORTH END T&B

B1 & B2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — SOUTH END T&B

117#4 4A158 STANDEES @4"

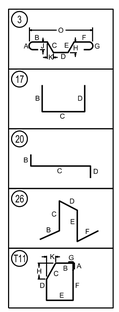
Kimley»Horn

- ☐ NO EXCEPTIONS TAKEN
- ☐ CORRECTIONS NOTED
- ☐ REJECTED
- ☐ VERIFY & MAKE CORRECTIONS
- ☐ RESUBMIT
- ☐ FOR INFORMATION ONLY

Our limited review is only for conformance with the design concept of the project and general compliance with the information given in our Plans and Specifications. Contractor is responsible for: dimensions to be confirmed and correlated at the job site, information that pertains to the fabrication processes or to techniques of construction, quantities, safety, coordination with other work, and for conformance to the requirements of the plans and specifications. Review does not authorize changes to contract unless stated specifically in separate letter or change order.

Reviewed By: KEVIN.KOFFORD Date: 8/6/24

ALL EPOXY REBAR



QTY	SIZE	EP	BAR MARK	V	BND TYP	CD	BENDING DIMENSIONS A	B	C	D	E	F/R	G	H	J	K	O
12	6		6A184		17			3-05	10-10								
198	5		5A159		17			2-04	2-04								
594	5		5A160		17			0-10	2-02								
594	5		5A161		17			0-10	7-11								
198	5		5A162		17			2-06	7-11								
8	5		5A179		3			2-03	2-03					1-012		1-112	
41	5		5A182		T11		0-08	3-06	0-053	3-00				0-04		0-04	
41	5		5A183		20			0-08	3-09	3-00							
117	4		4A158		26			1-00	0-06	0-06	0-06	1-00					
117	4		4A163		26			1-00	0-07	0-06	0-07	1-00					
41	4		4A164		17			1-00	2-07								
80	4		4A178		3			2-03	2-03					1-012		1-112	
Total for size 6: 257																	
Total for size 5: 11076																	
Total for size 4: 899																	

ALL REBAR TO BE ASTM A615 GRADE 60: UNO

REBAR PLACEMENT DRAWINGS ARE NOT TO BE CONSIDERED "STAND ALONE" DOCUMENTS, AND MUST BE USED IN CONJUNCTION WITH THE ARCHITECTURAL & ENGINEERING CONTRACT DRAWINGS, INCLUDING ALL CURRENT REVISIONS TO SAID PLAN. BARTON SUPPLY IS NOT RESPONSIBLE FOR FAILURE OF THE CONTRACTOR TO INTEGRATE ALL PLANS APPLICABLE TO THE PROJECT.

REVISIONS

Date	Remarks
6/18/2024	FOR CONSTRUCTION DRAWING

Concrete Forms & Steel Supplies
14800 E. MONCRIEFF PL
AURORA, CO 80011
Phone: 303-576-2248
Fax: 303-576-2276

BARTON REBAR STEEL SUPPLY
Since 1972, The Materials You Need, The People You Trust.

DRAWING CONTENTS

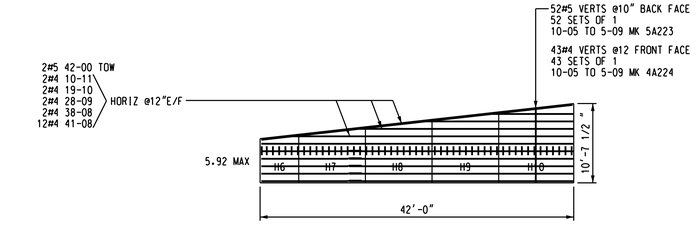
Project: WINSOME FILING 3
ALAMAR WAY BOX CULVERT *
Location: COLORADO SPRINGS, COLORADO
Customer: VISTA CONCRETE

Contract No. V5005V

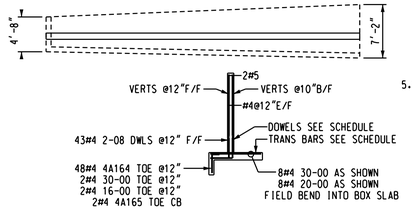
Drawn by: SJG

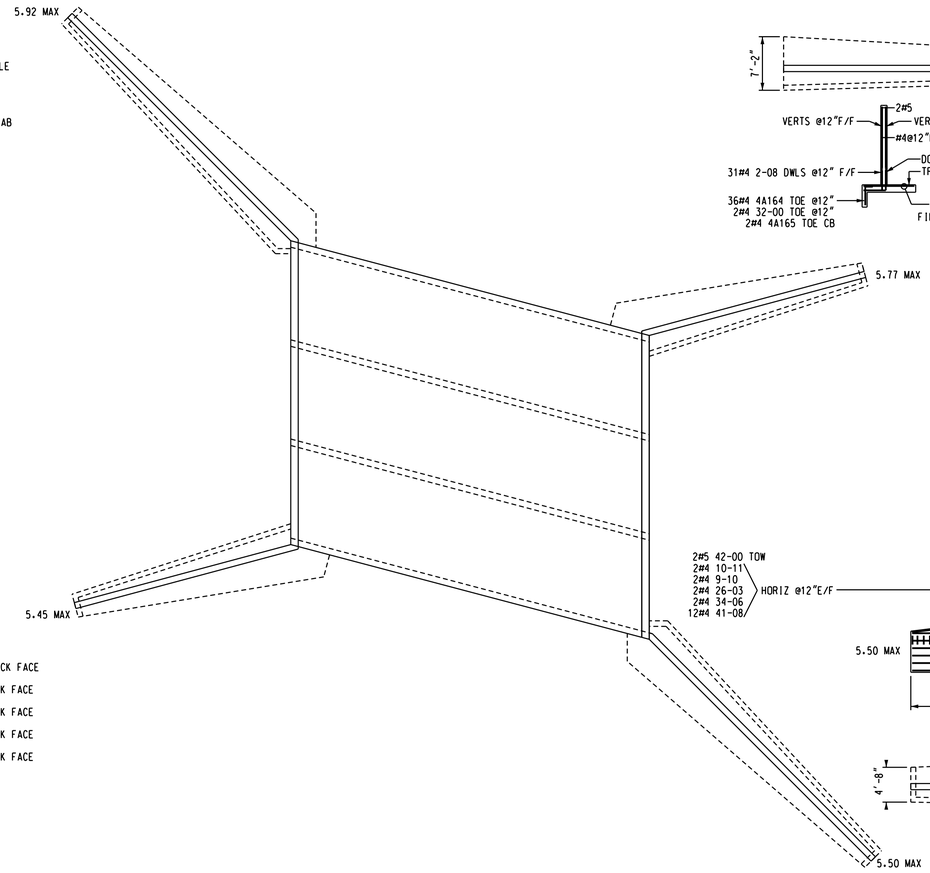
Date: 5/28/2024

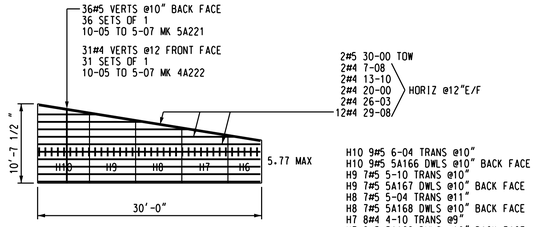
Dwg. No. 1



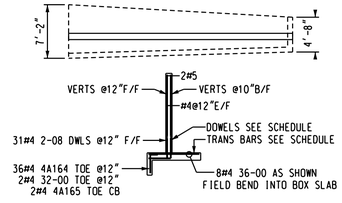
H10 12#5 6-04 TRANS @10"
H10 12#5 5A166 DWLS @10" BACK FACE
H9 11#5 5-10 TRANS @10"
H9 11#5 5A167 DWLS @10" BACK FACE
H8 10#5 5-04 TRANS @11"
H8 11#5 5A168 DWLS @10" BACK FACE
H7 13#4 4-10 TRANS @9"
H7 11#5 5A169 DWLS @10" BACK FACE
H6 7#4 4-04 TRANS @9"
H6 7#5 5A170 DWLS @10" BACK FACE

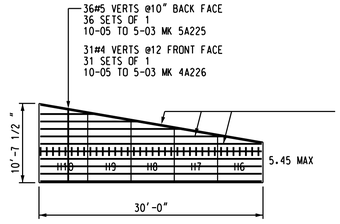




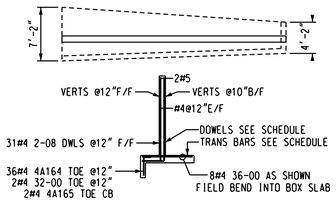


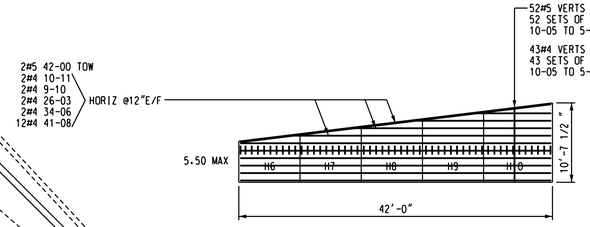
H10 9#5 6-04 TRANS @10"
H10 9#5 5A166 DWLS @10" BACK FACE
H9 7#5 5-10 TRANS @10"
H9 7#5 5A167 DWLS @10" BACK FACE
H8 7#5 5-04 TRANS @11"
H8 7#5 5A168 DWLS @10" BACK FACE
H7 8#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE
H6 6#4 4-04 TRANS @9"
H6 5#5 5A170 DWLS @10" BACK FACE





H10 8#5 6-04 TRANS @10"
H10 8#5 5A166 DWLS @10" BACK FACE
H9 7#5 5-10 TRANS @10"
H9 7#5 5A167 DWLS @10" BACK FACE
H8 7#5 5-04 TRANS @11"
H8 7#5 5A168 DWLS @10" BACK FACE
H7 8#4 4-10 TRANS @9"
H7 7#5 5A169 DWLS @10" BACK FACE
H6 9#4 4-04 TRANS @9"
H6 7#5 5A170 DWLS @10" BACK FACE





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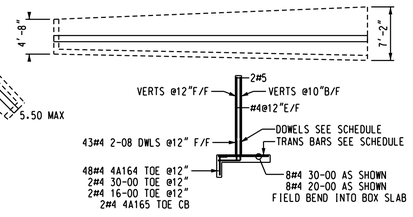
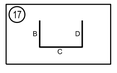
H10 11#5 5A166 DWLS @10" BACK FACE
H9 10#5 5-10 TRANS @10"
H9 10#5 5A167 DWLS @10" BACK FACE
H8 10#5 5-04 TRANS @11"
H8 10#5 5A168 DWLS @10" BACK FACE
H7 11#4 4-10 TRANS @9"
H7 10#5 5A169 DWLS @10" BACK FACE
H6 10#4 4-04 TRANS @9"
H6 10#5 5A170 DWLS @10" BACK FACE



ALL EPOXY REBAR

QTY	SIZE	EP	BAR MARK	V	BND TYP	CD	BENDING DIMENSIONS A	B	C	D	E	F/R	G	H	J	K	O
40	5		5A166		17			2-09	2-09								
35	5		5A167		17			2-07	2-09								
35	5		5A168		17			2-05	2-09								
36	5		5A169		17			2-03	2-09								
29	5		5A170		17			2-01	2-09								
168	4		4A164		17			1-00	2-07								
8	4		4A165		17			2-07	2-00								
Total for size 5: 947																	
Total for size 4: 427																	



REBAR PLACEMENT DRAWINGS ARE NOT TO BE CONSIDERED "STAND ALONE" DOCUMENTS, AND MUST BE USED IN CONJUNCTION WITH THE ARCHITECTURAL & ENGINEERING CONTRACT DRAWINGS, INCLUDING ALL CURRENT REVISIONS TO SAID PLAN. BARTON SUPPLY IS NOT RESPONSIBLE FOR FAILURE OF THE CONTRACTOR TO INTEGRATE ALL PLANS APPLICABLE TO THE PROJECT.

ALL REBAR TO BE ASTM A615 GRADE 60: UNO

REVISIONS

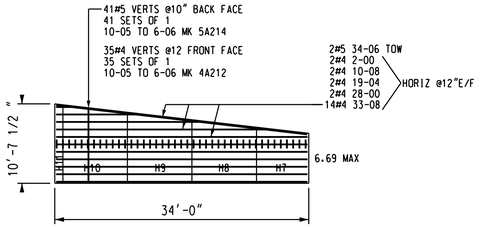
Date	Remarks
6/18/2024	FOR CONSTRUCTION DRAWING
7/25/2024	REVISED WINGWALL END HEIGHTS

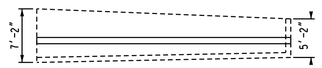
Concrete Forms & Steel Supplies
14800 E. MONCRIEFF PL
AURORA, CO 80011
Phone: 303-576-2248
Fax: 303-576-2276

BARTON REBAR STEEL SUPPLY
Since 1972, The Materials You Need, The People You Trust.

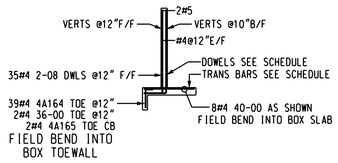
DRAWING CONTENTS
Project: WINSOME FILING 3
Location: COLORADO SPRINGS, COLORADO
Customer: VISTA CONCRETE
ALAMAR WAY BOX CULVERT *

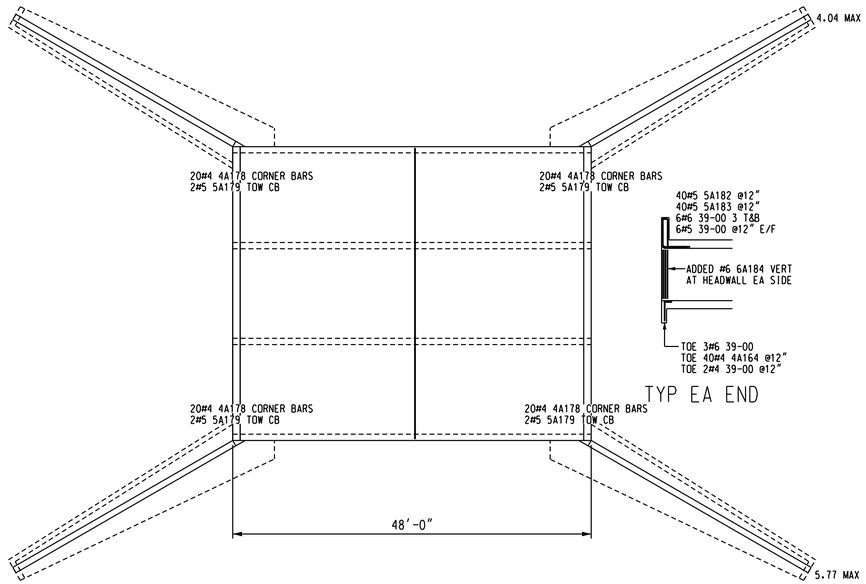
Contract No. V5005V
Drawn by: SJG
Date: 5/28/2024
Dwg. No. **1A**

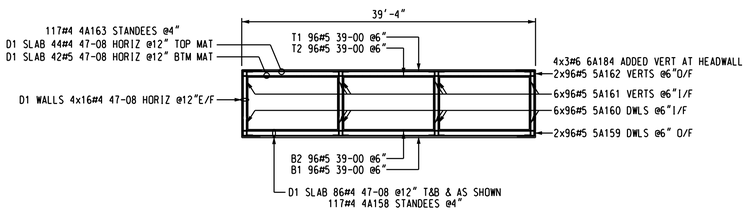




H11 2#5 6-10 TRANS @8"
H11 2#5 5A211 DWLS @10" BACK FACE
H10 10#5 6-04 TRANS @10"
H10 10#5 5A166 DWLS @10" BACK FACE
H9 10#5 5-10 TRANS @10"
H9 10#5 5A167 DWLS @10" BACK FACE
H8 10#5 5-04 TRANS @11"
H8 11#5 5A168 DWLS @10" BACK FACE
H7 10#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE

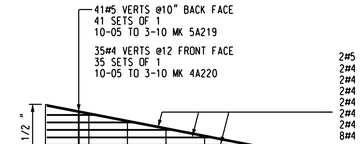


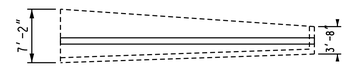




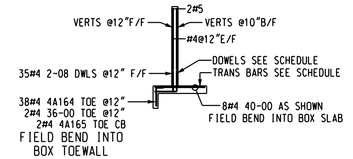
TRIPLE 12X7 BOX CULVERT

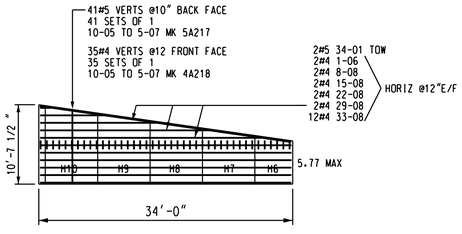
BASE SLAB = 13"
TOP SLAB = 13.5"
WALLS = 10"

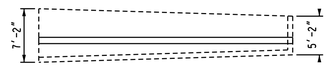




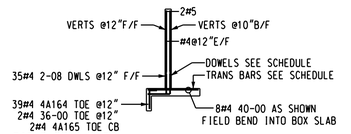
H10 7#5 6-04 TRANS @10"
H10 7#5 5A166 DWLS @10" BACK FACE
H9 6#5 5-10 TRANS @10"
H9 6#5 5A167 DWLS @10" BACK FACE
H8 7#5 5-04 TRANS @11"
H8 7#5 5A168 DWLS @10" BACK FACE
H7 6#4 4-10 TRANS @9"
H7 6#5 5A169 DWLS @10" BACK FACE
H6 6#4 4-04 TRANS @9"
H6 6#5 5A170 DWLS @10" BACK FACE
H5 7#4 3-10 TRANS @9"
H5 6#5 5A171 DWLS @10" BACK FACE
H4 6#4 3-04 TRANS @9"
H4 3#5 5A172 DWLS @10" BACK FACE

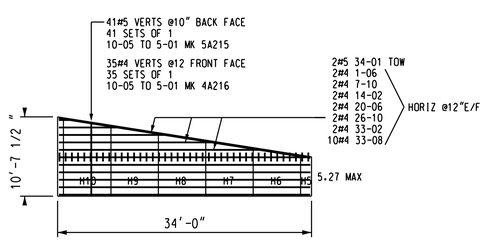


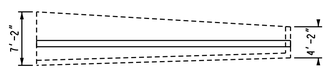




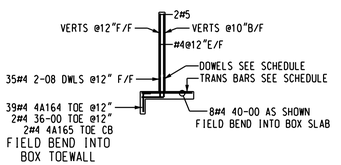
H11 1#5 6-10 TRANS @8"
H11 1#5 5A211 DWLS @10" BACK FACE
H10 9#5 6-04 TRANS @10"
H10 9#5 5A166 DWLS @10" BACK FACE
H9 8#5 5-10 TRANS @10"
H9 8#5 5A167 DWLS @10" BACK FACE
H8 9#5 5-04 TRANS @11"
H8 9#5 5A168 DWLS @10" BACK FACE
H7 9#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE
H6 7#4 4-04 TRANS @9"
H6 6#5 5A170 DWLS @10" BACK FACE





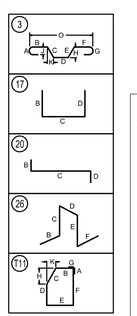


H11 1#5 6-10 TRANS @8"
H11 1#5 5A211 DWLS @10" BACK FACE
H10 8#5 6-04 TRANS @10"
H10 8#5 5A166 DWLS @10" BACK FACE
H9 7#5 5-10 TRANS @10"
H9 7#5 5A167 DWLS @10" BACK FACE
H8 8#5 5-04 TRANS @11"
H8 8#5 5A168 DWLS @10" BACK FACE
H7 9#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE
H6 9#4 4-04 TRANS @9"
H6 7#5 5A170 DWLS @10" BACK FACE
H5 2#4 3-10 TRANS @9"
H5 2#5 5A171 DWLS @10" BACK FACE



ALL EPOXY REBAR

QTY	SIZE	EP	BAR MARK	V	BND TYP	CD*	BENDING DIMENSIONS A	B	C	D	E	F/R	G	H	J	K	O
12	6		6A184		17		3-05	10-10									
192	5		5A159		17		2-04	2-04									
576	5		5A160		17		0-10	2-02									
576	5		5A161		17		0-10	7-11									
192	5		5A162		17		2-06	7-11									
34	5		5A166		17		2-09	2-09									
31	5		5A167		17		2-07	2-09									
35	5		5A168		17		2-05	2-09									
30	5		5A169		17		2-03	2-09									
19	5		5A170		17		2-01	2-09									
8	5		5A171		17		1-11	2-09									
3	5		5A172		17		1-09	2-09									
8	5		5A179		3		2-03	2-03						1-012		1-112	
40	5		5A182		T11	0-08	3-06	0-053	3-00					0-04		0-04	
40	5		5A183		20		0-08	3-09	3-00								
4	5		5A211		17		2-11	2-09									
117	4		4A158		26		1-00	0-06	0-06	0-06	1-00						
117	4		4A163		26		1-00	0-07	0-06	0-07	1-00						
195	4		4A164		17		1-00	2-07									
8	4		4A165		17		2-07	2-00									
80	4		4A178		3		2-03	2-03						1-012		1-112	
Total for size		6:	257														
Total for size		5:	11630														
Total for size		4:	1292														



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ALL REBAR TO BE ASTM A615 GRADE 60; UNO

REVISIONS

Date	Remarks
6/18/2024	FOR CONSTRUCTION DRAWING
7/25/2024	REVISED WINGWALL END HEIGHTS

Concrete Forms & Steel Supplies
14800 E. MONCRIEFF PL
AURORA, CO 80011
Phone: 303-576-2248
Fax: 303-576-2276

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Since 1973, The Materials You Need, The People You Trust.

DRAWING CONTENTS
Project: WINSOME FILING 3
Location: COLORADO SPRINGS, COLORADO
Customer: VISTA CONCRETE
TWINKLING START LANE BOX CULVERT
*

Contract No. V5005V
Drawn by: SJG
Date: 5/28/2024
Dwg. No. 2

COLORADO DEPARTMENT OF TRANSPORTAT

CULVERT #2 LOAD RATING PACKAGE

LOAD & RESISTANCE FACTOR RATING SUMMARY

Structure #: Winsome C2 (TBD)

Rated using:
- Asphalt thickness: 10 in. and / or Fill thickness: 72 in.
- ☑ Colorado Legal Loads (CO) or ☐ Interstate Legal Loads (Interstate)
- ☑ Multi-lane for Legal & Permit Vehicles or ☐ Single lane for Legal & Permit Vehicles

Highway #:	Twinkling Star Ln
Batch I.D.:	
Structure Type:	CBC
Parallel Structure #:	N/A

Structural Member	3 Cell CBC							

Rating Factor

Inventory	2.753							
Operating	3.568							

Tons

Type 3 truck (Interstate 24T / CO 27T)	3.129							
Type 3S2 truck (Interstate 38T / CO 42.5T)	3.104							
Type 3-2 truck (Interstate 39T / CO 42.5T)	3.129							

Type 3 Type 3S2 Type 3-2

Tons

Type SU4 truck (27T)	3.548							
Type SU5 truck (31T)	3.448							
Type SU6 truck (Interstate 34.75T / CO 33T)	3.595							
Type SU7 truck (Interstate 38.75T / CO 35T)	3.762							
NRL (40T)	3.445							

SU4 SU5 SU6 SU7

Tons

EV2 (28.75T)	2.828							
EV3 (43T)	3.048							

EV2 EV3

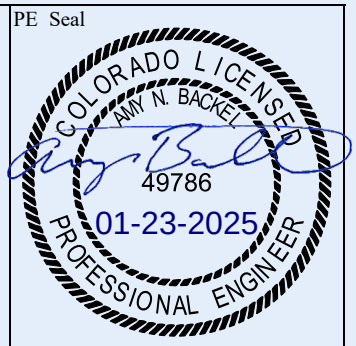
Tons

Permit Truck (96T)	3.723							
Modified Tandem (50T)	3.723							

Comments:

-Load Posting Required: NO
-CBC Rated Using AASHTOWARE BrR 7.5.1.3001
-Rating Controlled by flexure.
Rating based on 8/6/2024 Revised Plans and Rebar Shop Drawings
-7X12 Triple Cell CBC 6.0' max fill
-Rating by Kimley-Horn

PE Seal



Rated by: (Print name and sign)
Katlyn Cunningham
Digitally signed by Katlyn Cunningham
DN: C=US, E=Katlyn.Cunningham@Kimley-Horn.com, O=Kimley-Horn, OU=Structures, CN=Katlyn Cunningham
Date: 2025.01.23 16:02:25-07'00'

Date: 01/23/2025

Checked by: (Print name and sign)

Date: 01/23/2025

APPENDIX B: RATING OR RE-RATING QA/QC CHECKLIST

(to be filled by Rater with concurrence from Checker who will also initial and sign on check Item 14)

☑ 1. Structure Number Winsome C2 (TBD) - New Culvert not yet numbered
Verify plans available: ☑ Yes ☐ No
If no plans: ☐ Rating based on Physical inspection
☐ Rating based on non-destructive test loading

☑ 2. Verify overlay thickness and/or fill depth

☑ 3. Verify, if applicable, previously calculated loads and pertinent information

☑ 4. Verify LLDF's (live load distribution factors)
Include ☐ Hand calc. ☑ BrR calc. ☐ CANDE calc. or ☐ Other software calc.

☑ 5. The "Description" area of the Bridge ID window in BrR shall have the following information: Provide reason(s) for rating/re-rating, company name, rater initials, checker initials and date.

☑ 6. Verify that "Traffic" area of the Bridge ID window in BrR is filled

☑ 7. Verify that "Global Reference Point" area of the Bridge ID window in BrR is filled

☑ 8. System analysis or ☐ Line analysis used in BrR
If Line analysis used, explain here: _____

_____

☑ 9. Completed steps required per Fig. 1-9 of CDOT Bridge Rating Manual

☑ 10. Completed steps required per Section 1.13 of CDOT Bridge Rating Manual

☑ 11. Reported the rating results per Section 1.14 of CDOT Bridge Rating Manual, including posting requirements (per Section 1.15) and color code requirements (per Section 1.16)

☑ 12. Completed Rating Summary Sheet (RSS) per section 1.14 of CDOT Bridge Rating Manual

☑ 13. Verify that the load rating results are initialed and dated by both the rater and checker

☑ 14. Initial and date this checklist
Rater initials and date KRC 01/14/2025
Checker initials and date ANB 01/23/2025

☑ 15. Send rating package in electronic format to CDOT Bridge contact / Rating Unit

Rating Results Summary Report

Name: Culvert #2 (TBD) Bridge ID: Winsome C2 (TBD) NBI: Culvert 2 (TBD)

Live Load	Live Load Type	Rating Method	Rating Level	Load Rating (Ton)	Rating Factor	Component	Location (ft)	Location (%)	Limit State	Impact	Lane
Colorado HL-93	Axle Load	LRFR	Inventory	99.09	2.753	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93	Axle Load	LRFR	Operating	128.46	3.568	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Axle Load	LRFR	Inventory	99.09	2.753	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Axle Load	LRFR	Operating	128.46	3.568	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Tandem	LRFR	Inventory	86.14	2.393	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HL-93 Tan...	Tandem	LRFR	Operating	111.67	3.102	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HS20-44	Axle Load	LRFR	Inventory	99.09	2.753	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado HS20-44	Axle Load	LRFR	Operating	128.46	3.568	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado EV2	Axle Load	LRFR	Legal	81.31	2.828	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado EV3	Axle Load	LRFR	Legal	131.04	3.048	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado NRL	Axle Load	LRFR	Legal	137.81	3.445	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU4	Axle Load	LRFR	Legal	95.79	3.548	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU5	Axle Load	LRFR	Legal	106.89	3.448	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU6 NONI...	Axle Load	LRFR	Legal	118.62	3.595	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado SU7 NONI...	Axle Load	LRFR	Legal	131.66	3.762	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado Type 3	Axle Load	LRFR	Legal	84.48	3.129	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado Type 3-2	Axle Load	LRFR	Legal	133.00	3.129	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado Type 3S2	Axle Load	LRFR	Legal	131.16	3.104	Top Slab 1	4.80	40.000	Flexure	As Requested	As Requested
Colorado Modified T...	Axle Load	LRFR	Permit	186.17	3.723	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested
Colorado Permit 96T	Axle Load	LRFR	Permit	357.47	3.723	Bottom Slab 3	0.78	6.500	Shear	As Requested	As Requested

KRC 1/23/2025

ANB 01/23/2025

WINSOME FILING NO. 3
CULVERT CONSTRUCTION DOCUMENTS
A PORTION OF SECTIONS 13 AND 24, TOWNSHIP 11 SOUTH, RANGE 65 SOUTH, AND A PORTION OF THE WEST HALF SECTON 19, TOWNSHIP 11 SOUTH, RANGE 64 WEST OF THE 6TH P.M COUNTY OF EL PASO, STATE OF COLORADO

CONTACTS:

DEVELOPER:
WINSOME, LLC
1864 WOODMOOR DRIVE, SUITE 100
MONUMENT, CO 80132
TEL: (719) 476-0800
CONTACT: JOE DESJARDIN

PLANNER/LANDSCAPE ARCHITECT:
NES, INC
619 N CASCADE AVENUE, SUITE 200
COLORADO SPRINGS, CO 80903
TEL: (719) 471-0073
EMAIL: ABARLOW@NESCOLORADO.COM
CONTACT: ANDREA BARLOW

ENGINEER:
KIMLEY-HORN AND ASSOCIATES, INC.
2 NORTH NEVADA, SUITE 300
COLORADO SPRINGS, CO 80903
(719) 453-0180
EMAIL:
KEVIN.KOFFORD@KIMLEY-HORN.COM
CONTACT: KEVIN KOFFORD

SURVEY:
EDWARD JAMES SURVEYING, INC.
926 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
TEL: (719) 576-1216
CONTACT: JONATHAN TESSIN

EL PASO COUNTY PLANNING DEPARTMENT
2880 INTERNATIONAL CIRCLE, SUITE 110
COLORADO SPRINGS, CO 80910

PLANNING REVIEWER:
RYAN HOWSER
TEL: (719) 520-6313
EMAIL: RYANHOWSER@ELPASOCO.COM

ENGINEERING REVIEWER:
GILBERT LAFORCE
TEL: (719) 520-7945
EMAIL:
GILBERTLAFORCE@ELPASOCO.COM

EPC DPW STORMWATER TEAM:
CHRISTINA FURCHAK
(719) 433-4863
EMAIL:
CHRISTINAFURCHAK@ELPASOCO.COM

EPC PCD INSPECTIONS SUPERVISOR:
TEM: BRAD WALTERS
(719) 520-6819
EMAIL:BRADWALTERS@ELPASOCO.COM

FALCON FIRE DEPARTMENT:
AREA: FAL D2
FIRE CHIEF T. HARWIG
7030 OLD MERIDIAN ROAD
PAYTON, CO 80831
TEL: (719) 495-4050
EMAIL:
FALCONFIRE@FALCONFIREPD.ORG

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT:
WATER QUALITY CONTROL DIVISION
4300 CHERRY CREEK DRIVE SOUTH
DENVER, CO 80246
TEL: (303) 692-3500

LEGAL DESCRIPTION

TRACT OF LAND BEING A PORTION OF THE SOUTHEAST QUARTER OF SECTION 13, AND A PORTION OF SECTION 24, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 24, SAID POINT BEING THE POINT OF BEGINNING; THENCE N00°14'25"E ON THE WEST LINE OF THE NORTHWEST QUARTER OF SAID SECTION 24, SAID LINE ALSO BEING ON THE WEST BOUNDARY OF PARCEL 4, AS RECORDED UNDER RECEPTION NUMBER 218900072, A DISTANCE OF 2,636.99 FEET TO THE NORTHWEST CORNER OF SAID SECTION 24; THENCE N89°21'38"E ON THE NORTH LINE OF THE NORTHWEST QUARTER OF SAID SECTION 24, A DISTANCE OF 2,633.02 FEET TO THE NORTH QUARTER CORNER OF SAID SECTION 24; THENCE N00°10'29"E ON THE WEST LINE OF THE SOUTH HALF OF THE SOUTH EAST QUARTER OF SECTION 13, TOWNSHIP 11 SOUTH, RANGE 65 WEST, A DISTANCE OF 1,321.95 FEET TO THE NORTHWEST CORNER OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SAID SECTION 13; THENCE N89°20'26"E ON THE NORTH LINE OF THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SAID SECTION 13, A DISTANCE OF 1,873.37 FEET; THENCE S00°34'43"W, A DISTANCE OF 2,706.21 FEET; THENCE S89°15'17"E, A DISTANCE OF 155.82 FEET; THENCE S00°17'06"W, A DISTANCE OF 239.06 FEET; THENCE N89°42'54"W, A DISTANCE OF 609.60 FEET TO A POINT ON CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT, WHOSE CENTER BEARS N85°44'53"W, HAVING A DELTA OF 05°13'06", A RADIUS OF 1,710.00 FEET, A DISTANCE OF 155.74 FEET TO A POINT ON CURVE; THENCE S89°02'00"W, A DISTANCE OF 60.00 FEET; S89°29'13"W, A DISTANCE OF 722.44 FEET; THENCE S15°45'23"W, A DISTANCE OF 1,195.74 FEET; THENCE N82°21'05"W, A DISTANCE OF 229.91 FEET; THENCE N89°29'30"W, A DISTANCE OF 757.49 FEET; THENCE S20°46'13"W, A DISTANCE OF 758.90 FEET TO A POINT ON CURVE; THENCE ON THE ARC OF A CURVE TO THE LEFT, WHOSE CENTER BEARS N22°56'03"E, HAVING A DELTA OF 03°42'28", A RADIUS OF 1,470.00 FEET, A DISTANCE OF 95.13 FEET TO A POINT ON CURVE; THENCE S19°13'35"W, A DISTANCE OF 60.00 FEET; THENCE S18°06'10"W, A DISTANCE OF 383.72 FEET TO A POINT OF CURVE; THENCE ON THE ARC OF A CURVE TO THE RIGHT, HAVING A DELTA OF 02°06'44", A RADIUS OF 1,790.00 FEET, A DISTANCE OF 65.99 FEET TO A POINT ON CURVE; THENCE N69°47'06"W, A DISTANCE OF 306.30 FEET; THENCE N89°45'39"W, A DISTANCE OF 128.26 FEET; THENCE S29°41'56"W, A DISTANCE OF 768.98 FEET; THENCE N89°41'23"W, A DISTANCE OF 820.25 FEET TO A POINT ON THE WEST LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 24; THENCE N00°14'17"E ON THE WEST LINE OF SOUTHWEST QUARTER OF SAID SECTION 24 A DISTANCE OF 1,684.27 FEET TO THE POINT OF BEGINNING.

CONTAINING A CALCULATED AREA OF 15,222,954 SQUARE FEET OR 349.471 ACRES.

BENCHMARK

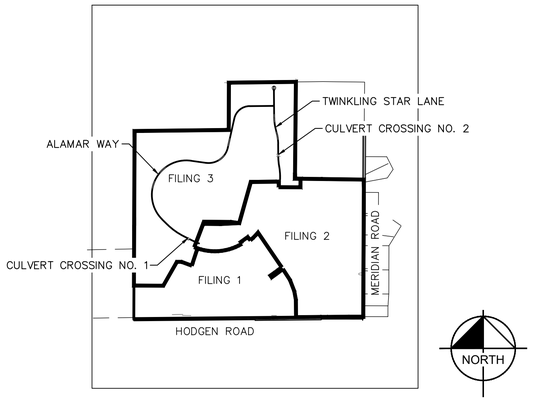
A 2.5" ALUMINUM CAP BEING A 30 FOOT WITNESS CORNER NORTH OF THE SOUTHWEST CORNER OF SECTION 24, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF THE 6TH PRINCIPAL MERIDIAN.

BASIS OF BEARING

THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 24, TOWNSHIP 11 SOUTH, RANGE 65 WEST OF THE 6 PRINCIPAL MERIDIAN MONUMENTED ON THE SOUTHERLY END BY A 2-1/2" ALUMINUM CAP STAMPED "LS 28658" AND AT THE NORTHERLY END BY A 3-1/2" ALUMINUM CAP STAMPED "LS 12103" BEING ASSUMED TO BEAR N00°14'25"E A DISTANCE OF 2636.99 FEET AS SHOWN IN LAND SURVEY PLAT RECORDED UNDER RECEPTION 218900072 RECORDS OF EL PASO COUNTY, COLORADO.

Know what's below. Call before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES



VICINITY MAP
1"=2,000'

FLOODPLAIN NOTE

FEDERAL EMERGENCY MANAGEMENT AGENCY, FLOOD INSURANCE RATE MAP, MAP NUMBER 08041C0350G, EFFECTIVE DECEMBER 7, 2018 INDICATES THE AREA IN THE VICINITY OF THIS PARCEL OF LAND TO BE IN ZONE X (AREA DETERMINED TO BE OUT OF THE 500 YEAR FLOODPLAIN). A CONDITIONAL LETTER OF MAP REVISION HAS BEEN PROCESSED AND APPROVED FOR THIS REACH OF WEST KIOWA CREEK.

LEGEND

- LOT BOUNDARY LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EFFECTIVE 100 YEAR FLOODPLAIN
- PROPOSED 100 YEAR FLOODPLAIN PER CLOMR
- DELINEATED WETLAND
- UTILITY EASEMENT
- R.O.W. LINE
- EDGE OF PAVEMENT

SEQUENCE NOTES:

THIS PLANS TO BE CONSTRUCTED WITH THE FOLLOWING:

- GRADING TO BE INCLUDED BY PCD NO. EGP215 (WINSOME FILING NO. 3 EARLY GRADING PERMIT)
- ROADWAY CONSTRUCTION TO INCLUDED BY PCD NO. VR222 (WINSOME FILING NO. 3 FINAL PLAT)

SHEET INDEX:

SHEET NO.	SHEET TITLE
1	COVER SHEET
2	HORIZONTAL CONTROL
3	SITE PLAN
4	SITE PLAN
5	CULVERT 1-PLAN & PROFILE
6	CULVERT 2-PLAN & PROFILE
7	ALAMAR WAY PROFILE
8	TWINKLING STAR LANE PROFILE
9	CULVERT DETAILS
10	CULVERT DETAILS
11	GUARDRAIL DETAILS
12	GUARDRAIL DETAILS

OWNER'S STATEMENT

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH THE REQUIREMENTS OF THE GRADING AND EROSION CONTROL PLAN AND ALL OF THE SPECIFIED IN THESE DETAILED PLANS AND SPECIFICATIONS.

OWNER SIGNATURE DATE

JOE DESJARDIN, DIRECTOR OF ENTITLEMENTS
WINSOME, LLC
1864 WOODMOOR DRIVE, SUITE 100
MONUMENT, CO 80132

ENGINEER'S STATEMENT

THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DETAILED ROADWAY, DRAINAGE, GRADING AND EROSION CONTROL PLANS AND SPECIFICATIONS, AND SAID PLANS AND SPECIFICATIONS ARE IN CONFORMITY WITH APPLICABLE MASTER DRAINAGE PLANS AND MASTER TRANSPORTATION PLANS. SAID PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR ROADWAY AND DRAINAGE FACILITIES ARE DESIGNED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS.

COLORADO LICENSED KEVIN REX KOFFORD 57234 PROFESSIONAL ENGINEER

8/31/2022
KEVIN KOFFORD, PE (CO #57234) – KIMLEY-HORN AND ASSOCIATES, INC. DATE

EL PASO COUNTY

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT. FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL VOLUMES 1 AND 2, AND ENGINEERING CRITERIA MANUAL, AS AMENDED.

IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTOR'S DISCRETION.

JOSHUA PALMER, PE INTERIM COUNTY ENGINEER/ECM ADMINISTRATOR DATE

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
COVER SHEET

COLORADO LICENSED KEVIN REX KOFFORD 57234 8/31/2022 PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
1

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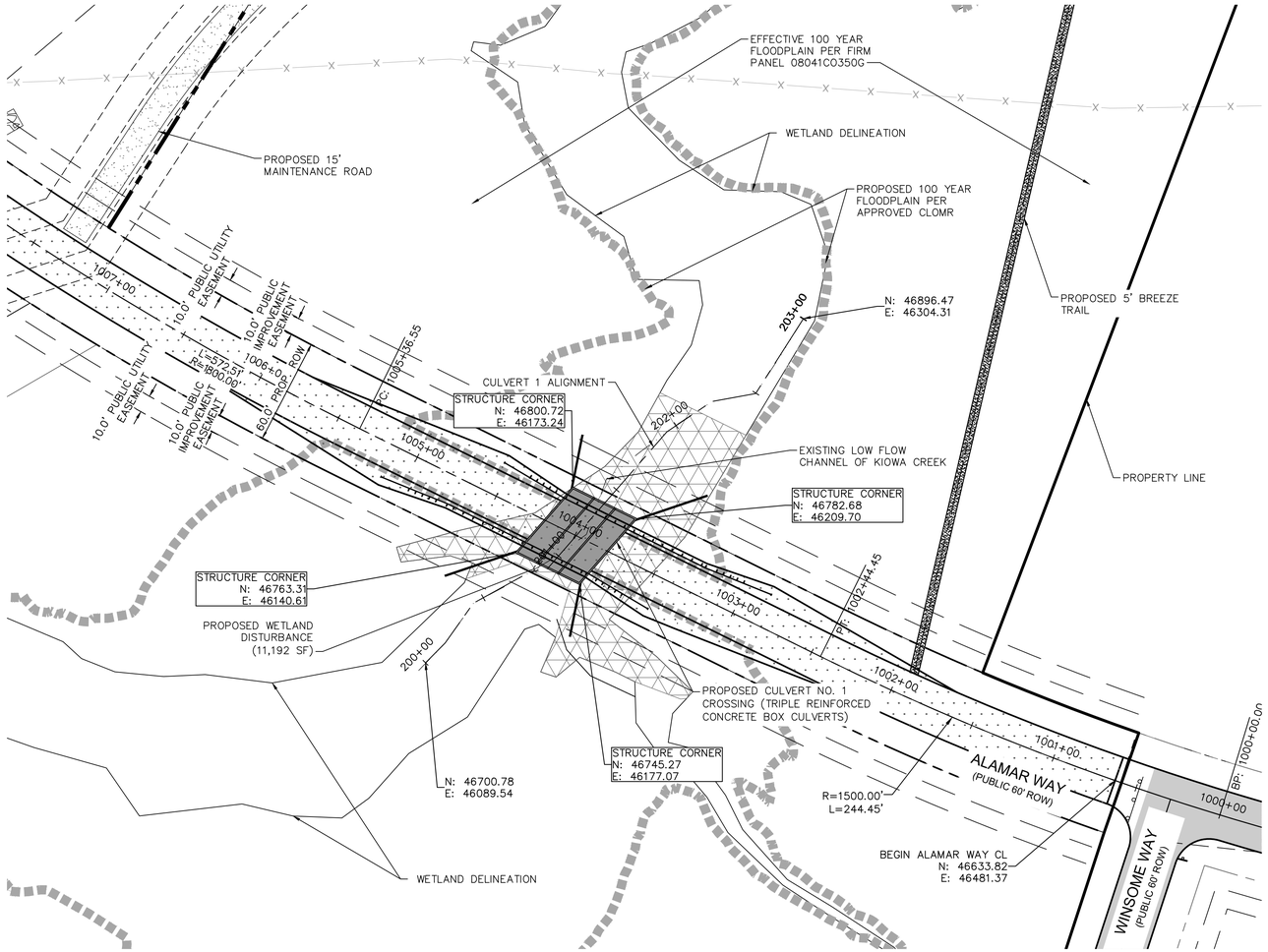
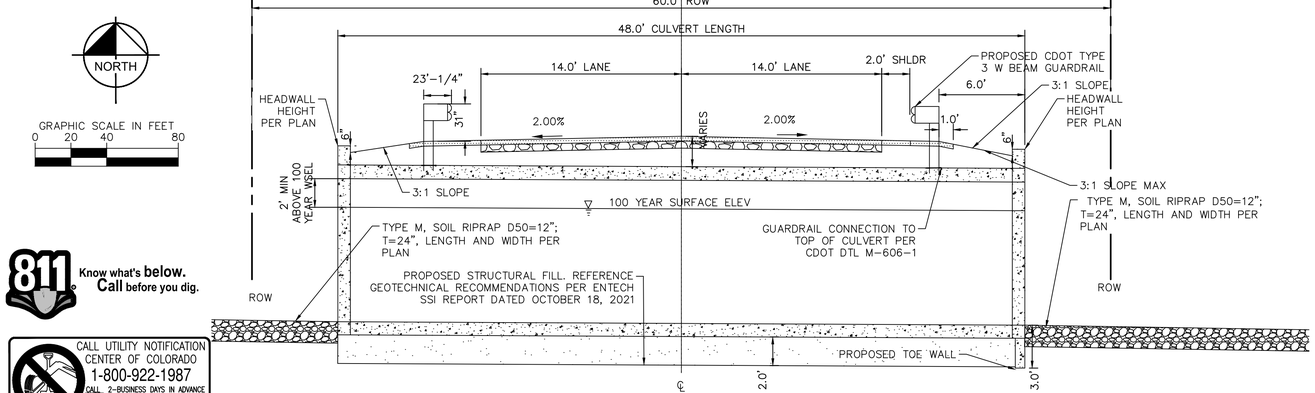


CULVERT CROSSING NO. 1
SCALE:1"=40'

CULVERT CROSSING NO. 2
SCALE: 1"=40'



RURAL LOCAL ROADWAY – TYPICAL CULVERT CROSSING
SCALE: 1" =5'

NORTH
GRAPHIC SCALE IN FEET
0 20 40 80

811 Know what's below. Call before you dig.

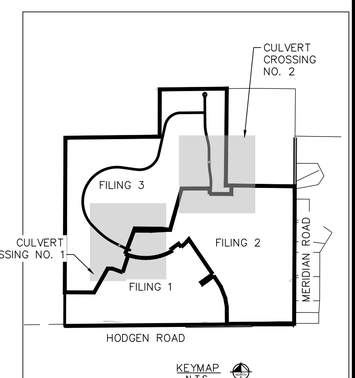
CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NOTES

1. ROADWAY LAYOUT IS FOR REFERENCE ONLY. REFERENCE WINSOME FILING NO. 3 CONSTRUCTION DOCUMENTS FOR ROADWAY PLAN AND PROFILES
2. GUARDRAIL WILL BE INSTALLED WITH INSTALLATION OF THE REINFORCED CONCRETE BOX CULVERTS AND THIS PLAN. REFERENCE SHEETS 3 – 4. FOR GUARDRAIL DETAILS

LEGEND

	PROPERTY LINE
5430	EXISTING MAJOR CONTOUR
5431	EXISTING MINOR CONTOUR
5430	PROPOSED MAJOR CONTOUR
5431	PROPOSED MINOR CONTOUR
	WETLAND DELINEATION BOUNDARY
	PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR
	EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G
	WETLAND DISTURBANCE AREA



PCD FILE NO. CDR-21-012

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2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY–HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453–0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
HORIZONTAL CONTROL

COLORADO LICENSED KEVIN REX KOFFORD 57234 10/31/2023 PROFESSIONAL ENGINEER

PROJECT NO. 196106001

SHEET 2

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LEGEND

- PROPERTY LINE
- 5430 EXISTING MAJOR CONTOUR
- 5431 EXISTING MINOR CONTOUR
- 5430 PROPOSED MAJOR CONTOUR
- 5431 PROPOSED MINOR CONTOUR
- WETLAND DELINEATION BOUNDARY
- PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR
- EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G
- PROPOSED 100 YR WATER SURFACE ELEVATION (WSEL)
- PROPOSED RIPRAP

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR

END END ANCHORAGE
STA:1005+12.90
OFF:19.00'LT

BREAKPOINT
STA:1005+12.89
OFF:24.92'LT

100 YEAR WSEL: 7325.49

BEGIN END ANCHORAGE
STA:1004+72.92
OFF:16.00'LT

WETLAND DELINEATION

TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7326.49' TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10.
(516 SY)

PROPOSED TYPE 3 W-BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

1006+00

60.0' ROW

7330

PC: 1005+36.55

1005+00

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

END END ANCHORAGE
STA:1004+53.52
OFF:19.00'RT

BREAKPOINT
STA:1004+53.50
OFF:24.92'RT

BEGIN END ANCHORAGE
STA:1004+13.88
OFF:16.00'RT

100 YEAR WSEL: 7321.50

70'X ~100'
TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7322.50' TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10.
(644 SY)

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

WETLAND DELINEATION

200+00

DIRECTION OF FLOW

EXISTING LOW FLOW CHANNEL OF KIOWA CREEK

75.2° SKEW

78.0'

CULVERT 1 ALIGNMENT

LOW FLOW CHANNEL IN RIPRAP PAD, SEE DETAIL ON SHEET 10

48.0'

100.0'

1004+00

202+00

DIRECTION OF FLOW

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR

END END ANCHORAGE
STA:1003+84.71
OFF:16.00'LT

BREAKPOINT
STA:1003+45.07
OFF:24.92'LT

BEGIN END ANCHORAGE
STA:1003+45.04
OFF:19.00'LT

GRADE IN SWALE AROUND THE WINGWALL TO PROVIDE POSITIVE DRAINAGE

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

ALAMAR WAY
(PUBLIC 60' ROW)

1003+00

PROPOSED TYPE 3 W- BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

END END ANCHORAGE
STA:1003+25.42
OFF:16.00'RT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

BREAKPOINT
STA:1002+85.67
OFF:24.92'RT

BEGIN END ANCHORAGE
STA:1002+85.64
OFF:19.00'RT

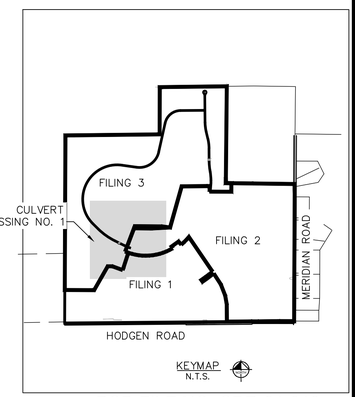
EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

PT: 1002+44.45

60.0' ROW

203+00

CULVERT CROSSING NO. 1
SCALE:1"=20'



KEYMAP
N.T.S.

NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

811 Know what's below. Call before you dig.

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PCD FILE NO. CDR-21-012

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2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
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Kimley»Horn
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2 North Nevada Avenue Suite 300
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DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
CULVERT 1-SITE PLAN

COLORADO LICENSED
KEVIN REX KOFFORD
57234
9/29/2023
PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
3

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LEGEND

- PROPERTY LINE
- EXISTING MAJOR CONTOUR (5430)
- EXISTING MINOR CONTOUR (5431)
- PROPOSED MAJOR CONTOUR (5430)
- PROPOSED MINOR CONTOUR (5431)
- WETLAND DELINEATION BOUNDARY
- PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR
- EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G
- PROPOSED 100 YR WATER SURFACE ELEVATION (WSEL)
- PROPOSED RIPRAP

POND 4

END END ANCHORAGE
STA: 2009+74.43
OFF: 19.00'LT

BREAKPOINT
STA: 2009+74.41
OFF: 24.92'LT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

100 YEAR WSEL=7287.56

BEGIN END ANCHORAGE
STA: 2009+34.78
OFF: 16.00'LT

TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7288.56' TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10. (461 SY)

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR MODEL

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

END END ANCHORAGE
STA: 2009+49.43
OFF: 19.00'RT

BREAKPOINT
STA: 2009+49.41
OFF: 24.92'RT

BEGIN END ANCHORAGE
STA: 2009+09.96
OFF: 16.00'RT

PROPOSED TYPE 3 W- BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

LOW FLOW CHANNEL IN RIPRAP PAD, SEE DETAIL ON SHEET 10

70' X ~88'
TYPE M, SOIL RIPRAP D50=12"; T=24". EXTEND RIPRAP TO 7284.24 TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10
(925 SY)

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

100 YEAR WSEL=7283.24

CULVERT 2 ALIGNMENT

4:1 SLOPE WITH EMBANKMENT/SCOUR PROTECTION SOIL PROTECTION TYPE M, RIPRAP D50=12"; T=24". REFERENCE RIPRAP DETAIL ON SHEET 10. REFERENCE DRAINAGE REPORT FOR CALCULATIONS
(479 SY)

DIRECTION OF FLOW

WETLAND DELINEATION

EXISTING LOW FLOW CHANNEL OF KIOWA CREEK

END END ANCHORAGE
STA: 2008+50.81
OFF: 16.00'LT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

BREAKPOINT
STA: 2008+11.77
OFF: 24.92'LT

BEGIN END ANCHORAGE
STA: 2008+11.67
OFF: 19.00'LT

P.T.: 2008+37.90

PROPOSED TYPE 3 W- BEAM (31 INCHES) PER CDOT STANDARD DETAIL M-606-1

END END ANCHORAGE
STA: 2008+25.58
OFF: 16.00'RT

PROPOSED MFLEAT END ANCHORAGE PER STANDARD DETAIL M-606-1

BREAKPOINT
STA: 2007+85.46
OFF: 25.03'RT

BEGIN END ANCHORAGE
STA: 2007+85.61
OFF: 19.00'RT

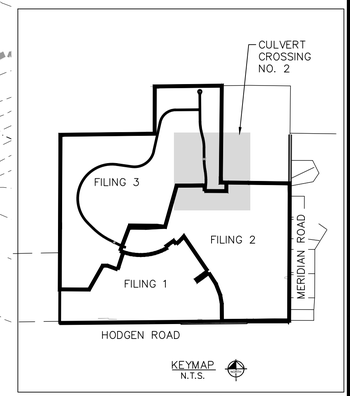
60.0' ROW

TWINKLING STAR LANE
(PUBLIC 60' ROW)

R=1420.00'
L=243.11'

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

PROPOSED 100 YEAR FLOODPLAIN PER APPROVED CLOMR MODEL



NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

811 Know what's below. Call before you dig.

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

CULVERT CROSSING NO. 2
SCALE: 1"=20'

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn

2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

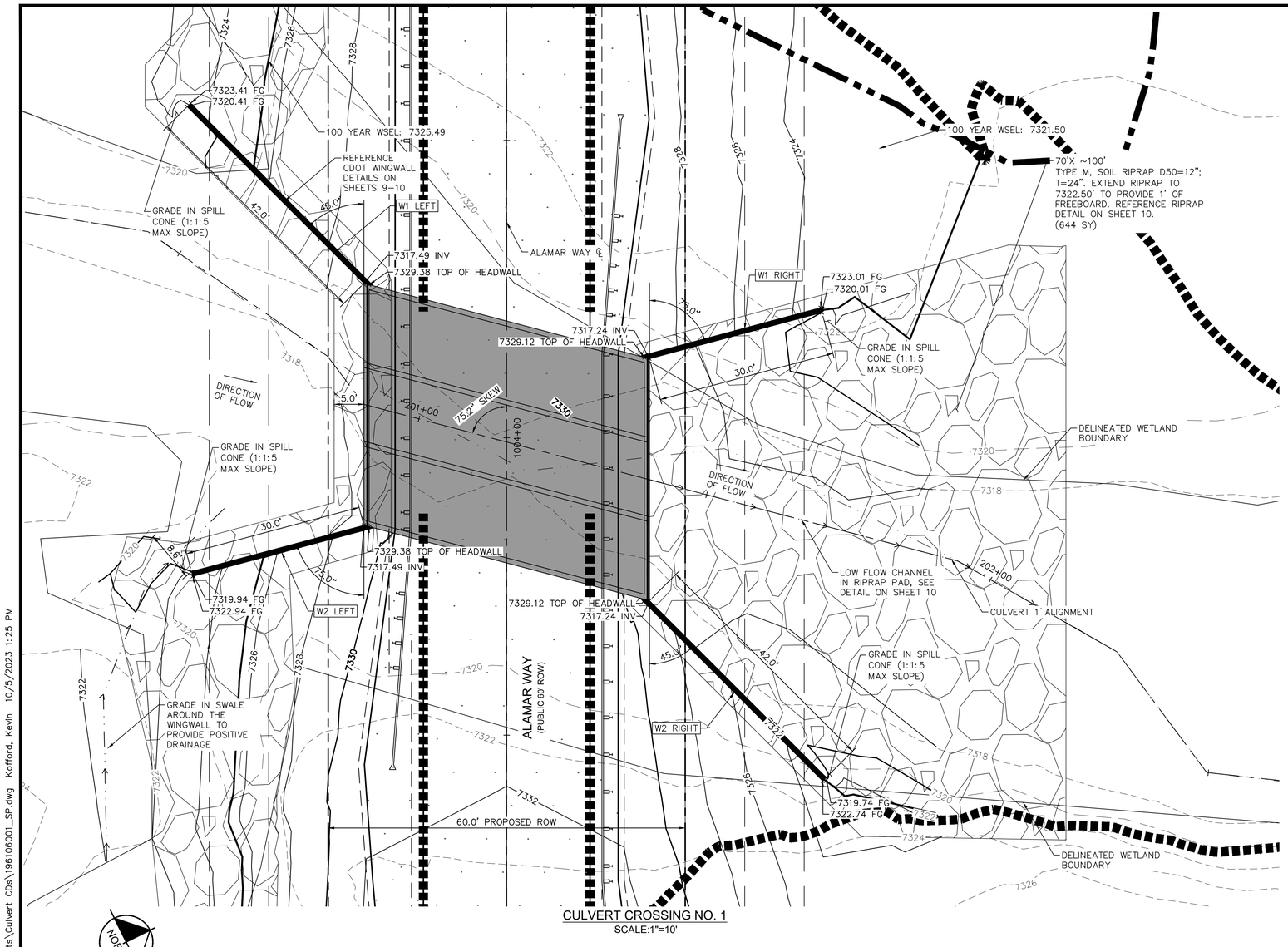
WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
CULVERT 2-SITE PLAN

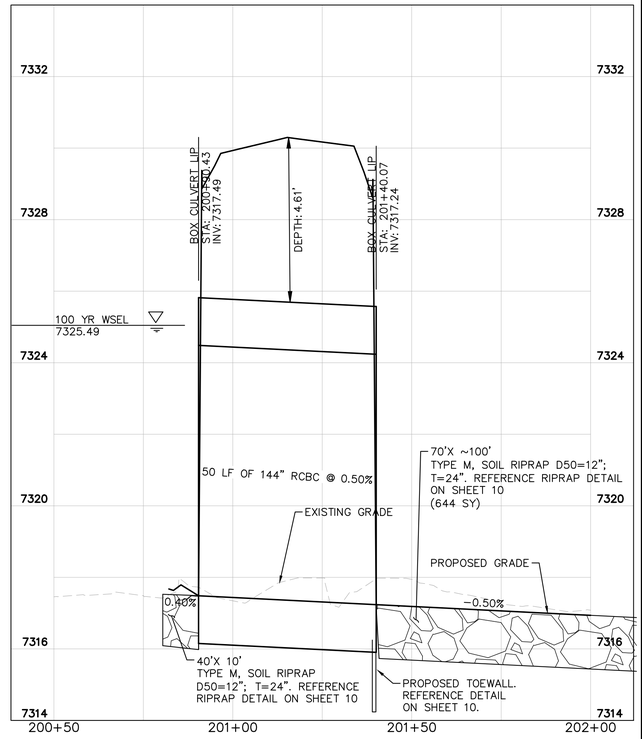
COLORADO LICENSED
KEVIN REX KOFFORD
57234
9/27/2023
PROFESSIONAL ENGINEER

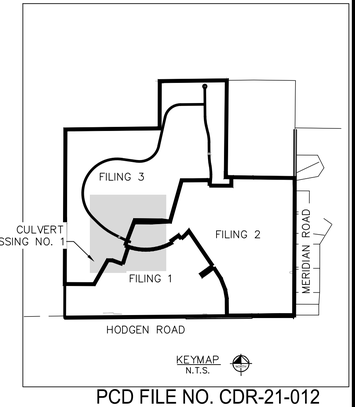
PROJECT NO.
196106001

SHEET
4

k:\cos_civil\196106001_winsome filing no. 3\CADD\plansheets\Culvert CDs\196106001_SP-Exhibit.dwg Kofford, Kevin 10/5/2023 1:24 PM







NORTH

GRAPHIC SCALE IN FEET
0 10 20 40
HORIZONTAL
0 1 2 4
VERTICAL

811 Know what's below. Call before you dig.

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WINGWALL DIMENSION SUMMARY

LOCATION	h (FT)*	k (FT)	LENGTH (FT)	m**	Θ (DEG)
W1 RIGHT	12'–0 1/2"	3	30	10'– 7 1/2"	75
W2 RIGHT	12'–0 1/2"	3	42	10'– 7 1/2"	45
W1 LEFT	12'–0 1/2"	3	42	10'– 7 1/2"	45
W2 LEFT	12'–0 1/2"	3	30	10'– 7 1/2"	75

*HEIGHT IS FROM BOTTOM OF SLAB TO TOP OF MODIFIED HEADWALL PER DETAIL ON SHEET 10
**M IS DIFFERENT VALUE THAN STANDARD EQUATION DUE TO MODIFIED HEADWALL HEIGHT

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION–INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
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2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453–0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

CULVERT 1-PLAN & PROFILE

COLORADO LICENSED KEVIN W. KOFFORD 57234 PROFESSIONAL ENGINEER 10/31/2023

PROJECT NO. 196106001

SHEET 5

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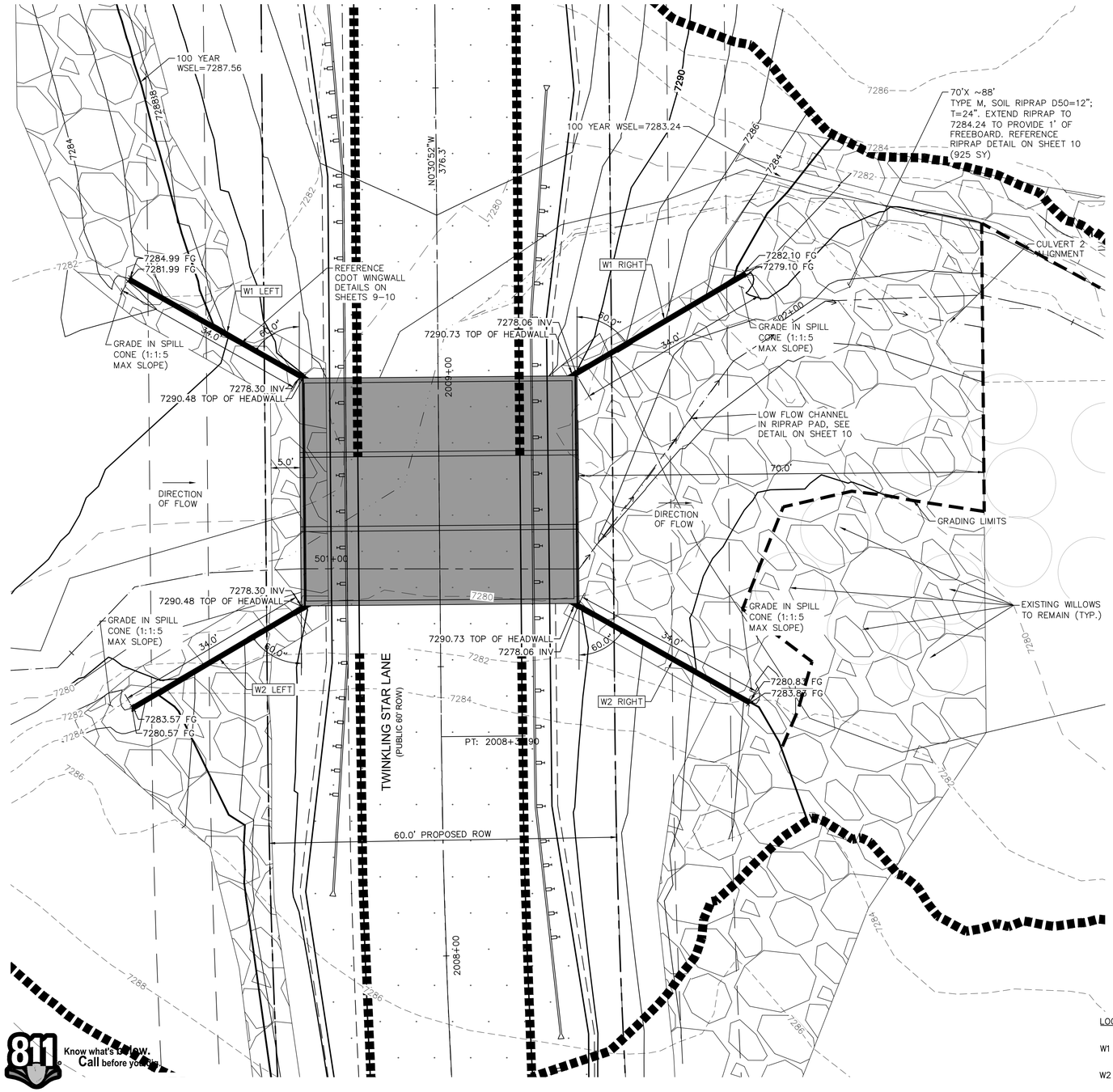
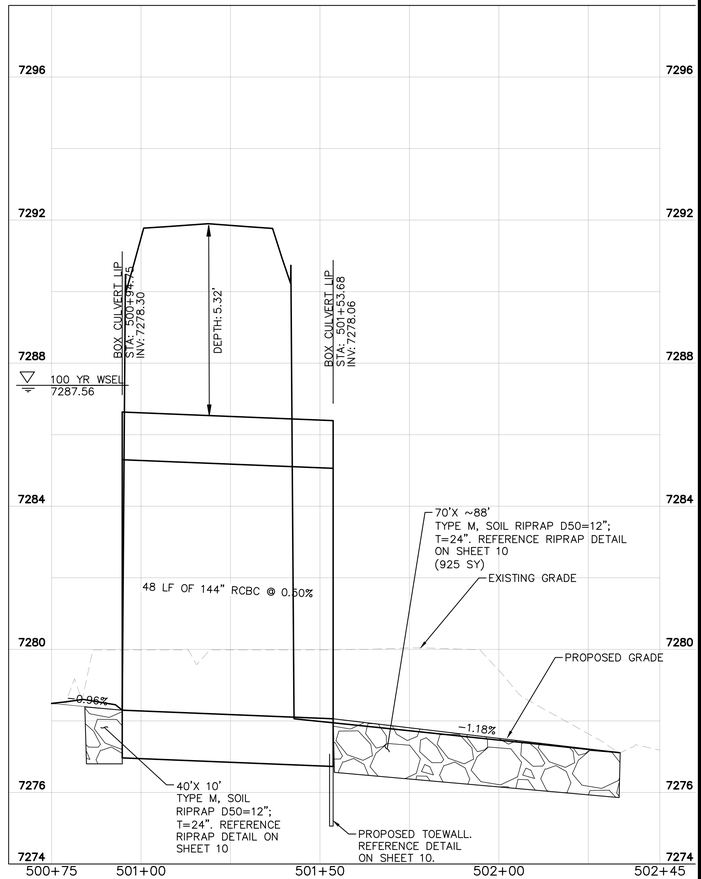


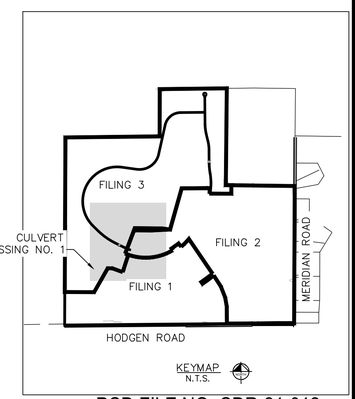
CULVERT CROSSING NO. 2
SCALE: 1"=40'



WINGWALL DIMENSION SUMMARY

LOCATION	h (FT)*	k (FT)	LENGTH (FT)	m**	Θ (DEG)
W1 RIGHT	12'-0 1/2"	3	34	10'- 7 ½ "	60
W2 RIGHT	12'-0 1/2"	3	34	10'- 7 ½ "	60
W1 LEFT	12'-0 1/2"	3	34	10'- 7 ½ "	60
W2 LEFT	12'-0 1/2"	3	34	10'- 7 ½ "	60

*HEIGHT IS FROM BOTTOM OF SLAB TO TOP OF MODIFIED HEADWALL PER DETAIL ON SHEET 10
**M IS DIFFERENT VALUE THAN STANDARD EQUATION DUE TO MODIFIED HEADWALL HEIGHT



PCD FILE NO. CDR-21-012

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1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE, BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

NORTH

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
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2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

CULVERT 2-PLAN & PROFILE

COLORADO LICENSED KEVIN REX KOFFORD 57234 10/31/2023 PROFESSIONAL ENGINEER

PROJECT NO. 196106001

SHEET 6

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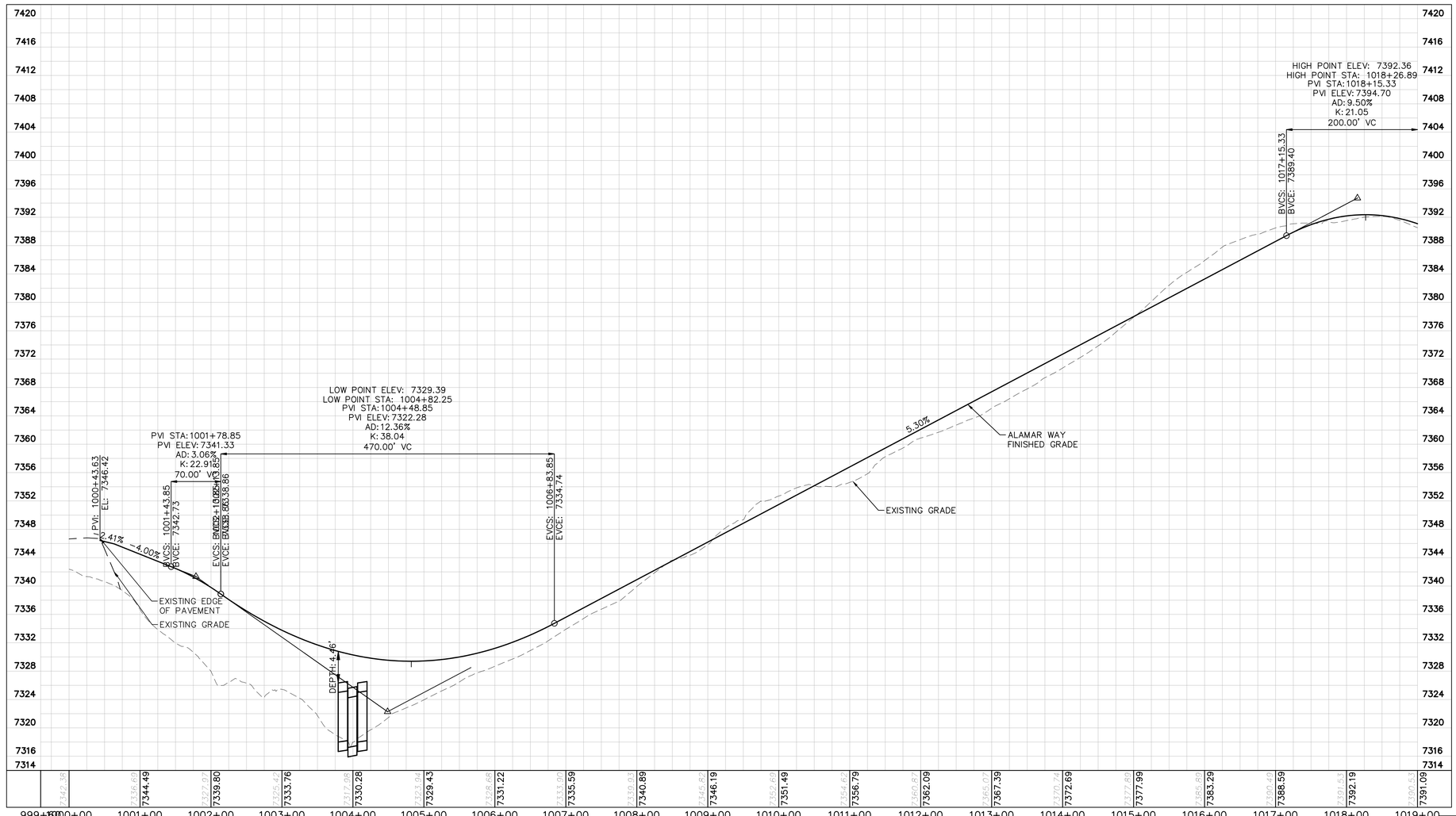

CULVERT CROSSING NO. 1- PROFILE
SCALE:1"=80'

NOTE: THIS PROFILE IS FOR REFERENCE ONLY. REFERENCE WINSOME FILING NO. 3 (SF229) FOR FULL ROADWAY PLAN AND PROFILES.

GRAPHIC SCALE IN FEET
0 40 80 160
HORIZONTAL

0 4 8 16
VERTICAL

811 Know what's below. Call before you dig.

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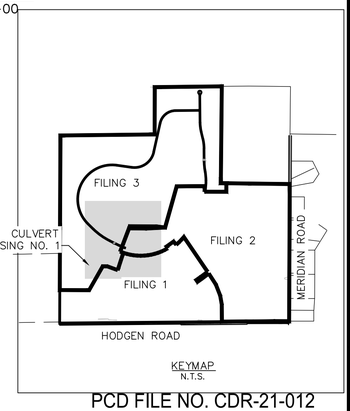
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES



KEYMAP
N.T.S.

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
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1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

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DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
ALAMAR WAY PROFILE

COLORADO LICENSED
JEFFREY REX KOFFORD
57234
9/31/2023
PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
7

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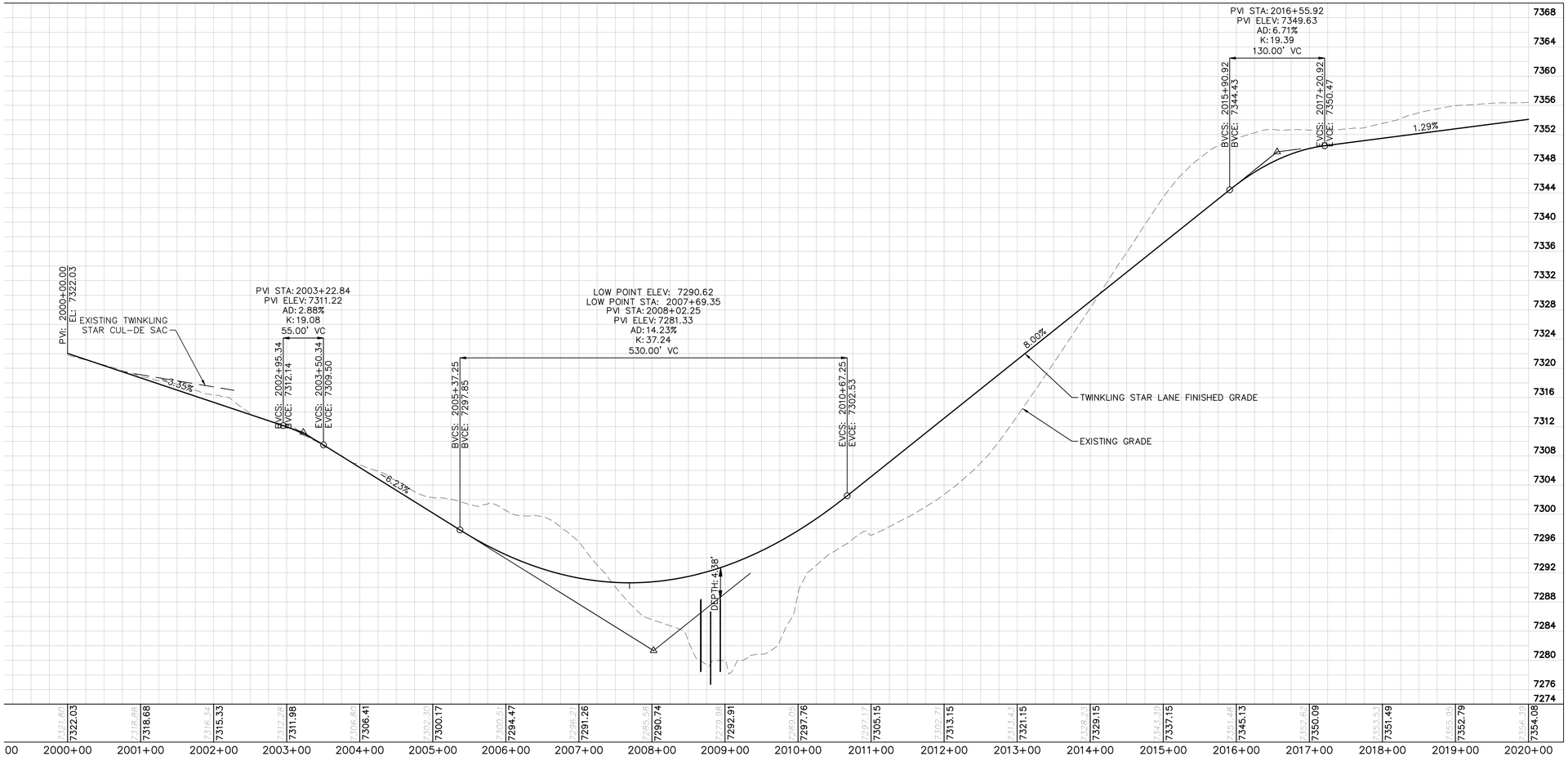

CULVERT CROSSING NO. 2-FILE
SCALE: 1"=80'

GRAPHIC SCALE IN FEET
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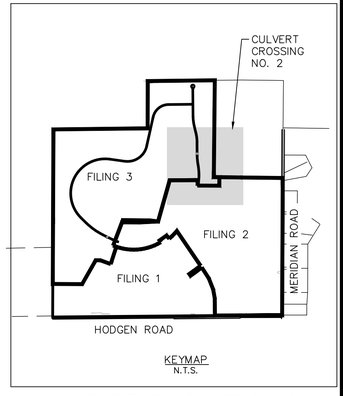
HORIZONTAL

0 4 8 16
VERTICAL

NOTE: THIS PROFILE IS FOR REFERENCE ONLY. REFERENCE WINSOME FILING NO. 3 (SF229) FOR FULL ROADWAY PLAN AND PROFILES.



KEYMAP
N.T.S.

PCD FILE NO. CDR-21-012

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CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

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DESIGNED BY: KRK
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CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
TWINKLING STAR LANE PROFILE

COLORADO LICENSED
KEVIN REX KOFFORD
57234
8/31/2022
PROFESSIONAL ENGINEER

PROJECT NO.
196106001

SHEET
8

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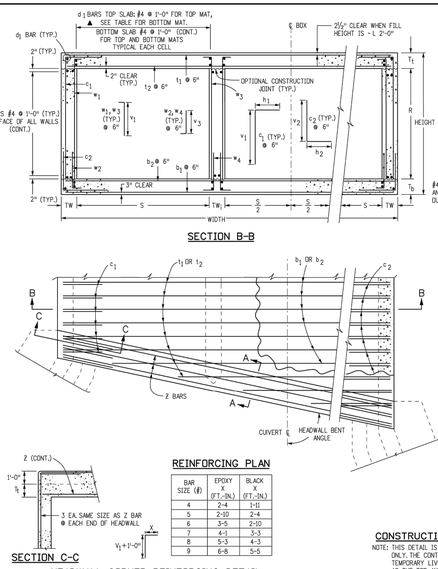
REFERENCE MODIFIED HEADWALL DETAIL ON SHEET 10



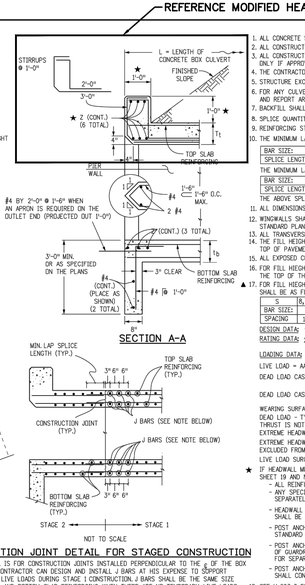
SECTION B-B

SECTION C-C

HEADWALL CORNER REINFORCING DETAIL

REINFORCING PLAN

BAR SIZE (#)	EPOXY X (FT-IN)	BLACK X (FT-IN)
4	2-4	1-11
5	2-10	2-4
6	3-5	2-10
7	4-1	3-3
8	5-3	4-3
9	6-8	5-5



SECTION A-A

CONSTRUCTION JOINT DETAIL FOR STAGED CONSTRUCTION

NOTE: THIS DETAIL IS FOR CONSTRUCTION JOINTS INSTALLED PERPENDICULAR TO THE ℄ OF THE BOX ONLY. THE CONTRACTOR CAN DESIGN AND INSTALL J BARS AT HIS EXPENSE TO SUPPORT TEMPORARY LIVE LOADS DURING STAGE 1 CONSTRUCTION. J BARS SHALL BE THE SAME SIZE AS THE TOP AND BOTTOM SLAB REINFORCING WHEN THERE ARE NO TEMPORARY LIVE LOADS TO SUPPORT.

GENERAL NOTES

1. ALL CONCRETE SHALL BE CLASS D (BOX CULVERT).
2. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS PLACED.
3. ALL CONSTRUCTION JOINTS NOT SHOWN ON THE PLANS SHALL BE CONSTRUCTED ONLY IF APPROVED BY THE ENGINEER.
4. THE CONTRACTOR SHALL MAINTAIN THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.
5. STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH STANDARD PLAN M-206-1.
6. FOR ANY CULVERT SPAN 20 FT. OR GREATER, A FOUNDATION INVESTIGATION AND REPORT ARE REQUIRED.
7. BACKFILL SHALL NOT BEGIN UNTIL TOP SLAB HAS REACHED DESIGN STRENGTH, f_c.
8. SPLICE QUANTITIES FOR LONGITUDINAL AND TRANSVERSE BARS ARE NOT INCLUDED.
9. REINFORCING STEEL SHALL BE GRADE 60.
10. THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS SHALL BE:

BAR SIZE:	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH:	1'-3"	1'-7"	2'-0"	2'-10"	3'-8"	4'-8"	5'-11"	7'-3"

THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS SHALL BE:

BAR SIZE:	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH:	1'-1"	1'-4"	1'-7"	1'-10"	2'-6"	3'-1"	3'-11"	4'-10"

THE ABOVE SPLICE LENGTHS ARE FOR CLASS B SPLICES.

11. ALL DIMENSIONS ARE PERPENDICULAR TO THE CENTERLINE OF THE BOX.
12. WINGWALLS SHALL BE TIED TO CONCRETE BOX CULVERT IN ACCORDANCE WITH STANDARD PLAN M-601-01.
13. ALL TRANSVERSE REINFORCING SHALL BE NORMAL TO THE CENTERLINE OF THE BOX.
14. THE FILL HEIGHT IS THE DISTANCE MEASURED FROM THE TOP OF THE TOP SLAB TO THE TOP OF PAVEMENT.
15. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED ¾ IN.
16. FOR FILL HEIGHTS LESS THAN 2 FT, A WATERPROOFING MEMBRANE SHALL BE PROVIDED FOR THE TOP OF THE TOP SLAB AND 18" DOWN ALONG THE TOPS OF THE EXTERIOR WALLS.
17. FOR FILL HEIGHTS LESS THAN 2 FT. THE d_1 BARS FOR THE BOTTOM MAT OF THE TOP SLAB SHALL BE AS FOLLOWS:

S	8, 9, 10	11, 12, 13	14, 15, 16	17, 18, 19, 20
BAR SIZE:	#5	#6	#7	
SPACING	1'-0"	1'-0"	1'-0"	

DESIGN DATA: 7TH EDITION, 2014, OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
RATING DATA: 2ND EDITION, 2011, OF THE AASHTO MANUAL FOR BRIDGE EVALUATION

LOADING DATA:
f_y= 60,000 psi,
f'_c= 4,500 psi,
LIVE LOAD = AASHTO LRFD, HL-93 TRUCK, HL-93 TANDEM, COLORADO PERMIT TRUCK AND NRL
DEAD LOAD CASE 1: VERTICAL EARTH LOAD = 120 LBS./CU.FT.
HORIZONTAL EARTH LOAD = 30 LBS./CU.FT.
DEAD LOAD CASE 2: VERTICAL EARTH LOAD = 120 LBS./CU. FT.
HORIZONTAL EARTH LOAD = 60 LBS./CU.FT.
WEARING SURFACE = 12 IN. THICK CONCRETE PAVEMENT.
DEAD LOAD = TYPE 7 BARRIER.
THRUST IS NOT CONSIDERED IN THIS STANDARD, I.E. THRUST = 0.
EXTREME HEADWATER TO DEPTH RATIO IS IN ACCORDANCE WITH THE CDOT DRAINAGE MANUAL.
EXTREME HEADWATER TO DEPTH RATIO WAS INCLUDED IN THE CULVERT DESIGNS BUT EXCLUDED FROM THE RATINGS AS PER THE AASHTO MANUAL FOR BRIDGE EVALUATION.
LIVE LOAD SURCHARGE ON EXTERIOR WALLS = 2 FT. OF EARTH

★ IF HEADWALL MOUNT GUARDRAIL IS USED (SEE STANDARD PLAN M-606-1, SHEET 19 AND NOTES BELOW):
- ALL REINFORCING STEEL SHALL BE ACCORDING TO THIS BOX CULVERT PLAN.
- ANY SPECIAL DESIGN FOR STIRRUPS WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
- HEADWALL DIMENSION AND CONCRETE QUANTITY SHALL BE ACCORDING TO STANDARD PLAN M-606-1, SHEET 19.
- POST ANCHORS SHALL BE PROVIDED ACCORDING TO STANDARD PLAN M-606-1, SHEET 19.
- POST ANCHORS AND CONCRETE FOR HEADWALL MOUNT OF GUARDRAIL WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
- POST ANCHORS WHEN REQUIRED AND ENCASED IN HEADWALL CONCRETE, SHALL CONFORM TO ASTM A 36 OR AASHTO M 169 STEEL.

18. SEE M-603-3 FOR PRECAST CONCRETE BOX CULVERT DETAILS.

Computer File Information		Sheet Revisions	
Creation Date: 07/04/12	Initials: DDG	Date:	Comments
Last Modification Date: 04/05/19	Initials: JBE	08/27/13	LRFD Design
Full Path: www.codot.gov/business/designsupport		08/01/15	Analysis Program Updates
Drawing File Name: 601030102.dgn		04/05/19	Clarified Max shown in Tbl. Load Combination Max. only, not for Pre-Cast CBC. Changed title and added Gen. Note 18.
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English			

Colorado Department of Transportation
Division of Project Support DDG/Bridge
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phones: 303-757-9021 FAX: 303-757-9868

TRIPLE CONCRETE BOX CULVERT (CAST-IN-PLACE)	STANDARD PLAN NO.
Issued By: Project Development Branch July 4, 2012	M-601-3
	Sheet No. 1 of 2

TRIPLE CONCRETE BOX CULVERT DIMENSIONS, QUANTITIES & RATING FACTORS (EXCLUDING HEADWALL & TOEWALL QUANTITIES)

BOX SIZE				BAR SIZES				DIMENSIONS								QUANTITIES			RATING FACTORS			
S (FT)	R (FT)	WT. (FT-IN)	WIDTH (FT-IN)	d1 BARS TOP SLAB AND BOTTOM SLAB (FT-IN)	d2 BARS (FT-IN)	d3 BARS (FT-IN)	d4 BARS (FT-IN)	n*	T1 (FT-IN)	T2 (FT-IN)	T3 (FT-IN)	T4 (FT-IN)	T5 (FT-IN)	T6 (FT-IN)	T7 (FT-IN)	CONCRETE CY/LF	REBAR STL LBS/LF	WATERPROOFING SY/LF	HL-93 INVENTORY	HL-93 OPERATING	COLORADO PERMIT	NRL VEHICLE
6		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528	3.370	1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
8		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634	3.370	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
10		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
12		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845	4.722	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	5	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
6		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528	3.370	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	6'-10"	2'-4"	1'-0"	2'-4"	2.638	528		1.71	1.07	1.69	
8		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	8'-8"	2'-4"	1'-0"	2'-4"	3.168	634		1.71	1.07	1.69	
10		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	10'-6"	2'-4"	1'-0"	2'-4"	3.698	739		1.71	1.07	1.69	
12		1'-0"	2'-4"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845	4.722	1.71	1.07	1.69	
		1'-0"	2'-10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	3'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	4'-6"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	
		1'-0"	5'-0"	#5 @ 10"	#5 @ 10"	#5 @ 10"	#5 @ 10"	6	1'-0"	1'-0"	2'-4"	12'-4"	2'-4"	1'-0"	2'-4"	4.228	845		1.71	1.07	1.69	

HEADWALL AND TOEWALL QUANTITIES

HEADWALL BENT ANGLE	90° TO 75°			74° TO 60°			59° TO 45°		
CLEAR SPAN (S)	Z	STIRRUPS	REBAR QUANT.	Z	STIRRUPS	REBAR QUANT.	Z	STIRRUPS	REBAR QUANT.
	#	#	LBS/LF	#	#	LBS/LF	#	#	LBS/LF
8	4	4	19.2	5	4	23.5	7	4	34.4
10	5	4	23.9	6	4	28.7	9	4.*	54.0
12	6	4	28.7	6	4	28.2	9	5.*	59.2
14	6	4	27.9	7	4	33.5	★	★	★
16	6	4	27.5	8	5	44.1	★	★	★
18	7	4	33.0	9	5	51.8	★	★	★
20	7	4	32.8	★	★	★	★	★	★

CONCRETE QUANTITY = 0.086 CY/LF

NOTES

■ 1. SIX INCH SPACING AT EACH END OF THE SPAN FOR A DISTANCE OF 1/4 OF THE SPAN LENGTH; 12 INCH SPACING ELSEWHERE.

2. QUANTITIES ARE GIVEN FOR ONE HEADWALL AND ONE TOEWALL AND ARE BASED ON PER LINEAR FOOT OF HEADWALL. STEEL QUANTITIES INCLUDE ALL REINFORCING. QUANTITIES SHALL BE PAID FOR AS SHOWN ON THE PLANS.

★ 3. SKEWED HEADWALLS ARE NOT RECOMMENDED FOR THESE SPANS. A SPECIAL DESIGN IS REQUIRED.

4. FOR HEADWALL AND TOEWALL DETAILS SEE M-601-3, SHEET 1 OF 2.

5. WHEN THE FILL HEIGHTS ARE LESS THAN OR EQUAL TO 2 FT, ALL REINFORCING BARS IN THE HEADWALL, ALL REINFORCING BARS DESIGNATED BY AN ASTERISK (*), AND THE d_2 BARS IN THE TOP MAT OF THE TOP SLAB SHALL BE EPOXY COATED.

6. REINFORCING QUANTITIES INCLUDE BOTH EPOXY-COATED AND UNCOATED BARS.

7. WHEN A (RISE) R OF LESS THAN 6 FT IS REQUIRED, USE THE BAR SIZES AND THE SLAB AND WALL THICKNESSES FOR THE 6 FT RISE OF AVAILABLE IN THE TABLES.

▲ 8. FOR SIZE AND SPACING OF THE BOTTOM MAT BARS IN THE TOP SLAB SEE TABLE ON M-601-3, SHEET 1 OF 2. ALL OTHER d_1 BARS ARE #4's AT 1'-0" SPACING. THE NUMBER OF BARS REQUIRED IS LISTED ON THIS SHEET AND INCLUDES BOTH #4 BARS AND THOSE FROM THE TABLE.

◆ 9. LIVE LOAD IS NEGLECTED AS PER AASHTO LRFD SECTION 3.6.1.2.6. FOR THESE STRUCTURES REFER TO THE CDOT RATING MANUAL.

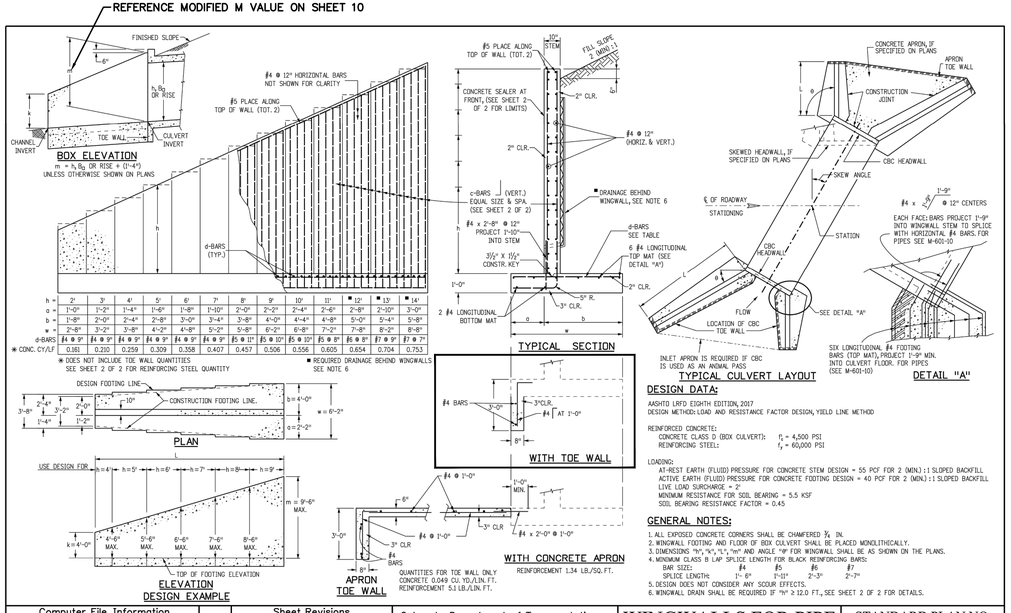
10. FOR ALL NEW CULVERT DESIGNS, A RATING IS REQUIRED. THE RATING SUMMARY SHEET SHOULD BE PRINTED FROM THE CDOT EXTERNAL WEBSITE AND SUBMITTED TO THE BRIDGE RATING UNIT OR INCLUDED AS PART OF A LARGER DESIGN PACKAGE. FOR ADDITIONAL INFORMATION, SEE THE CDOT RATING MANUAL.

Computer File Information		Sheet Revisions	
Creation Date: 07/04/12	Initials: DDG	Date:	Comments
Last Modification Date: 04/05/19	Initials: JBE	08/27/13	LRFD Design
Full Path: www.codot.gov/business/designsupport		08/01/15	Analysis Program Updates
Drawing File Name: 601030202.dgn		04/05/19	Clarified Max shown in Tbl. Load Combination Max. only, not for Pre-Cast CBC. Changed title and added Gen. Note 18.
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English			

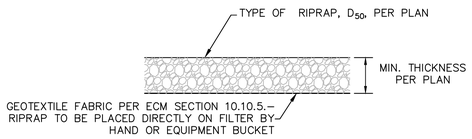
Colorado Department of Transportation
Division of Project Support DDG/Bridge
2829 West Howard Place
CDOT HQ, 3rd Floor
Denver, CO 80204
Phones: 303-757-9021 FAX: 303-757-9868

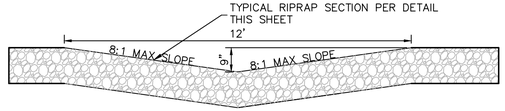
TRIPLE CONCRETE BOX CULVERT (CAST-IN-PLACE)	STANDARD PLAN NO.
Issued By: Project Development Branch July 4, 2012	M-601-3
	Sheet No. 2 of 2

REFERENCE MODIFIED M VALUE ON SHEET 10



#5 PLACE ALONG TOP OF WALL (TOT. 2)
CONCRETE SEALER AT FRONT, (SEE SHEET 2 OF 2 FOR LIMITS)
2" CLR.
#4 @ 12" (HORIZ. & VERT.)
c-BARS (VERT.





RIPRAP LOW FLOW CHANNEL

1. D50 = MEAN PARTICLE SIZE (INTERMEDIATE DIMENSION) BY WEIGHT.
2. RIP RAP SHALL BE PER PLAN AND SHALL BE MIXED WITH 30% SOIL TO 70% RIP RAP.
3. RIP RAP SECTION THICKNESS SHALL BE 2.0 TIMES THE SPECIFIED MEAN PARTICLE SIZE (I.E. D50 X 2.0 MINIMUM) PER ECM SECTION 10.10.3.
4. ALL RIP RAP SHALL BE UNDERLAIN WITH GEOTEXTILE FILTER FABRIC FOR STABILIZATION.
5. RIP RAP SHALL WRAP AROUND AND EXTEND 2' MIN. BEHIND FLUME AND FLARED END SECTIONS.

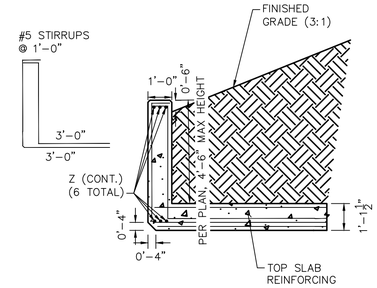
TYPICAL RIPRAP SECTION DETAIL

Table 9.5 Recommended wingwall flare angles (θ_a or θ_b)

Skew Angle, θ°	θ_a°	θ_b°
90	60	60
80	50	70
70	45	80
60	40	90
50	30	90
40	20	100
30	15	105
< 30	Consult the Region Hydraulic Engineer	

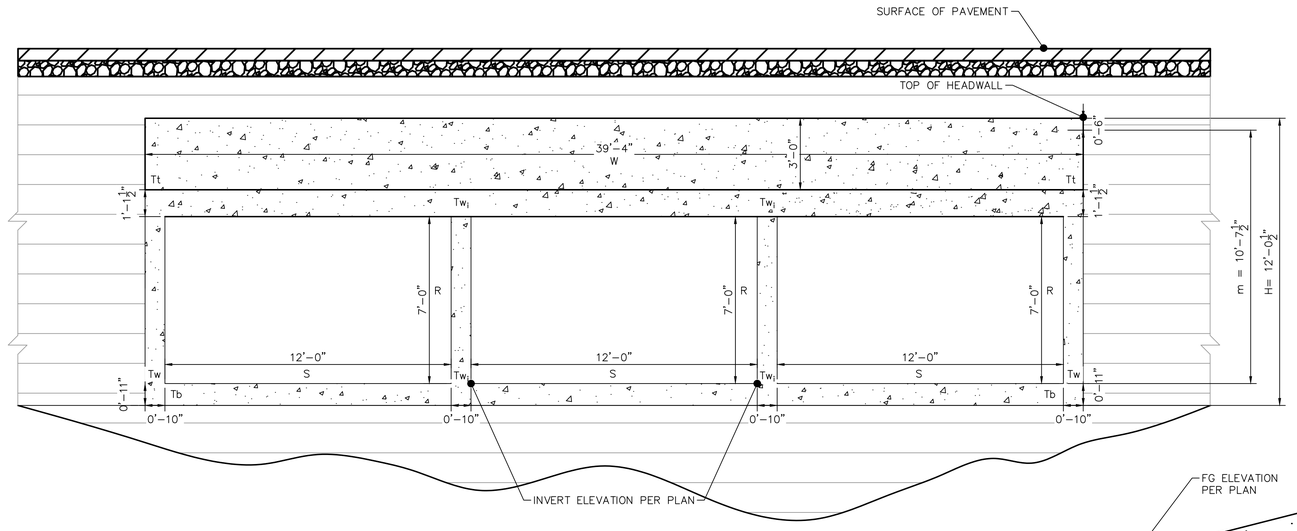
NO SKEW–CULVERT 2

75° SKEW–CULVERT 1



MODIFIED CULVERT HEADWALL SECTION DETAIL (A-A) FROM M-601-3

SCALE: 1"=3'



TRIPLE CONCRETE BOX CULVERT SECTION DETAIL

SCALE: 1"=3'

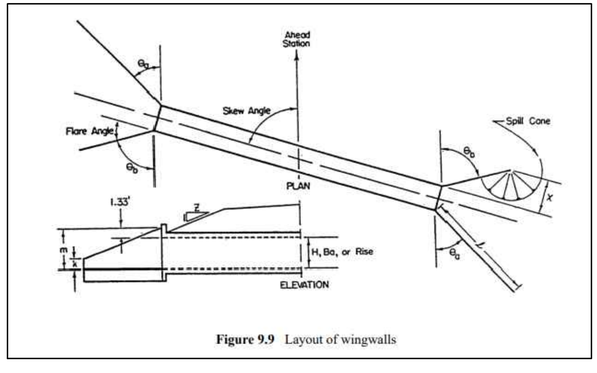
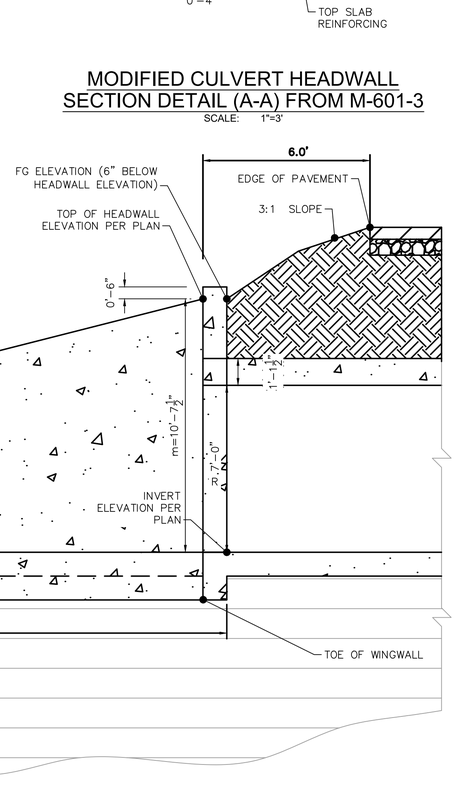


Figure 9.9 Layout of wingwalls

WINGWALL SPILL CONE CDOT DRAINAGE MANUAL FIGURE 9.9



WINGWALL (BOX CULVERT) SECTION DETAIL

SCALE: 1"=3'

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION–INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY–HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453–0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

CULVERT DETAILS

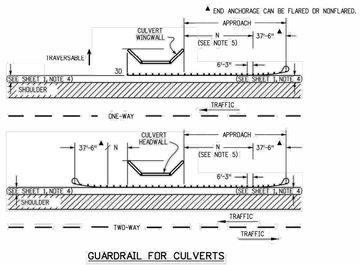
PROJECT NO. 196106001

SHEET 10

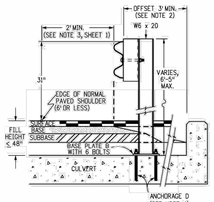
PCD FILE NO. CDR-21-012

k:\cos_civil\196106001_winsome filing no. 3\CADD\plansheets\Culvert CDs\196106001_DT.dwg Kofford, Kevin 10/5/2023 1:26 PM

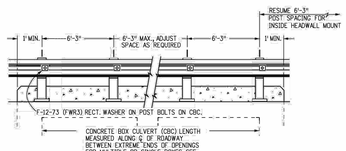
GUARDRAIL APPLICATION DETAILS



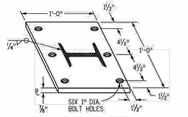
GUARDRAIL FOR CULVERTS



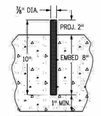
INSIDE MOUNT ON CBC



RAIL PLACEMENT FOR INSIDE MOUNT



BASE PLATE B
(FOR INSIDE MOUNT)



ANCHORAGE D
(FOR INSIDE MOUNT)

NOTES

1. LOCATION AND LENGTH OF MEDIAN GUARDRAIL APPROACHES TO CULVERTS WITH FULL HEADWALL AND WINGWALLS SHALL BE AS SHOWN FOR BRIDGES ON SHEET 15. THE GUARDRAIL TYPE 3 SHALL CONTINUE ACROSS THE CULVERT AS SHOWN ON THIS SHEET.
2. RIGHT SHOULDER BOX CULVERT TREATMENT IS SHOWN ON THIS SHEET FOR CULVERTS 20 FT. OR LESS IN LENGTH.
3. CONSTRUCTION AND PAYMENT FOR FILL HEIGHTS SHALL BE INCLUDED IN THE COST OF THE GUARDRAIL TYPE 3.
4. ANCHORAGE D: SIX BOLTS FOR BASE PLATE "B" WITH INSIDE MOUNT. THE BOLTS SHALL BE 7/8 IN. DIA X 10 IN. HIGH STRENGTH RODS THREADED FULL LENGTH AND ALL GALVANIZED. RODS SHALL BE CAST-IN-PLACE FOR NEW STRUCTURES. FOR EXISTING STRUCTURES, THE RODS SHALL BE INSTALLED IN 1-1/4 IN. DIA HOLES WITH NON-SHRINK GROUT OR EPOXY CONFORMING TO ASTM C 881. IF THE THICKNESS OF A CULVERT'S TOP PANEL REQUIRES BOLTS TO BE LESS THAN 10 IN. HIGH, THE BOLTS SHALL BE APPROVED BY THE ENGINEER.
5. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW, THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL ON, AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.
6. ALL POSTS, BASE PLATES, AND ANCHOR BOLTS SHALL BE FABRICATED FROM ASTM A 36 STEEL. THE ABOVE MATERIAL, W-BEAM, AND ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION INACCORDANCE WITH SECTION 509. CONCRETE, REINFORCING STEEL, AND STRUCTURAL STEEL ELEMENTS SHALL BE IN ACCORDANCE WITH SECTIONS 601, 602, AND 509, RESPECTIVELY.
7. POST ANCHORS, ENCASED IN CONCRETE, SHALL BE ASTM A 36 STEEL, AND NEED NOT BE GALVANIZED.
8. PRIOR TO INSTALLATION OF GUARDRAIL ON CULVERTS, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105 SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.

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MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO. M-606-1
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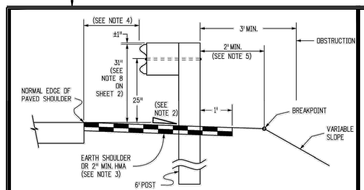
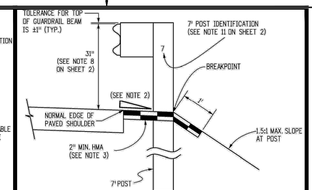
TYPICAL APPLICATION WITH EXCEPTION OF THE CULVERT CROSS SECTION

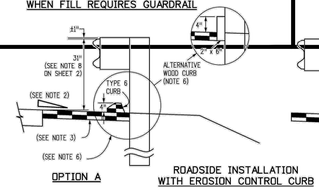


NORMAL ROADSIDE INSTALLATION WHEN FILL REQUIRES GUARDRAIL

APPLICATION OVER THE CULVERT. REFERENCE TYPICAL SECTION ON SHEET 2

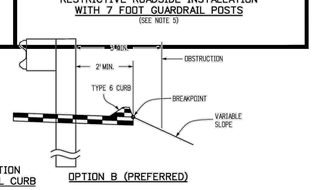


RESTRICTIVE ROADSIDE INSTALLATION WITH 7 FOOT GUARDRAIL POSTS (SEE NOTE 5)

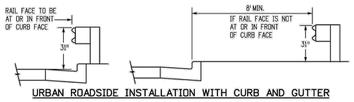


OPTION A

ROADSIDE INSTALLATION WITH EROSION CONTROL CURB



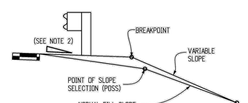
OPTION B (PREFERRED)



URBAN ROADSIDE INSTALLATION WITH CURB AND GUTTER

LOCATION	SPACING
ALL LOCATIONS EXCEPT BRIDGE RAIL LOCATIONS	6'-3"
BRIDGE OR STRUCTURE APPROACH	SEE SHEETS 11 & 19

NORMAL CENTER-TO-CENTER POST SPACING



EMBANKMENT WITH GUARDRAIL

(NOTE: THE CATCHPOINT REMAINS THE SAME AS THAT FOR "NORMAL" FILL SLOPE. FOR THE WIDER "2" DISTANCES, THE VARIABLE SLOPE MAY "CATCH" AT THE POSS.)

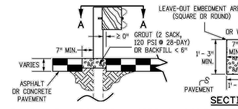
GENERAL NOTES (CONTINUE ON SHEET 2)

1. ALL GUARDRAILS SHOWN ARE MASH 2016 TL-3 COMPLIANT.
2. RATE OF SLOPE DEPENDS ON GUARDRAIL LOCATION:
   A. FOR GUARDRAIL FACE 2 FT. OR LESS FROM THE NORMAL EDGE OF PAVED SHOULDER, CONTINUE THE RATE OF SLOPE OF THE NORMAL PAVED SHOULDER TO THE BREAKPOINT.
   B. FOR GUARDRAIL FACE MORE THAN 2 FT. FROM THE NORMAL EDGE OF THE PAVED SHOULDER, THE SLOPE SHALL BE 10:1 OR FLATTER.
3. WHEN SPECIFIED ON THE PLANS, EXTEND A 2 IN. MINIMUM THICKNESS PAVED SURFACE TO 1 FT. BEHIND THE GUARDRAIL POSTS OR TO THE EROSION CONTROL CURB AS SHOWN ON PLANS. ASPHALT CUTTING & PATCHING OR OTHER APPROVED METHOD SHALL BE USED TO MINIMIZE DAMAGE TO ALL PAVED SURFACES UNDER GUARDRAIL INSTALLATIONS. ALL REPAIRS TO THE PAVED AREA WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK. A MINIMUM 3 IN. THICK FIBER REINFORCED CONCRETE PAVEMENT MAY ALSO BE USED FOR PAVING BENEATH THE GUARDRAIL. INSTALL THE POST IN A ½ IN. OVERSIZED FORMED HOLE FOR GUARDRAIL RUNS AND TERMINALS AS DIRECTED. PAYMENT FOR THIS PAVED SURFACE WILL BE MADE UNDER A PAVEMENT OR CONCRETE PAY ITEM WITH QUANTITIES SHOWN ON THE PLANS.
4. THE MINIMUM GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE SHALL BE:
   0 FT. FOR SHOULDERS 8 FT. OR WIDER
   2 FT. FOR SHOULDERS 6 FT. OR LESS

   THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE;
   0 FT. MINIMUM FOR SHOULDERS 6 FT. OR WIDER
   2 FT. DESIRABLE FOR 4 FT. SHOULDERS

   THE ABOVE 2 FT. GUARDRAIL TO SHOULDER OFFSET IS DESIRABLE BUT NOT REQUIRED FOR:
   A. FOR AN EXISTING HIGHWAY WITH A DESIGN SPEED LESS THAN 50 MPH, THE MINIMUM OFFSET IS 4 FT. FROM THE TRAVELED WAY.
   B. FOR A ONE-WAY ONE-LANE RAMP, AND WHERE ONE OR MORE OF THE FOLLOWING ARE TRUE:
      (1) THE NON-OFFSET GUARDRAIL BEGINS AT LEAST 100 FT. BEYOND RAMP NOSE.
      (2) THE NON-OFFSET GUARDRAIL IS NOT LOCATED ON THE RAMP EXIT OR ENTRANCE CURVE CONNECTION TO THE MAJOR HIGHWAY.
      (3) THE RAMP SHOULDERS ARE 4 FT. OR WIDER.

   USE OF GREATER THAN MINIMUM OFFSET DIMENSIONS IS ENCOURAGED TO MEET THE DESIRABLE GOAL OF PLACING THE GUARDRAIL AS FAR AS POSSIBLE FROM THE TRAVEL WAY, EVEN FOR SHORT DISTANCES, WHILE PROVIDING A SMOOTH CHANGE IN GUARDRAIL ALIGNMENT.
5. IF 2 FT. CANNOT BE PROVIDED BETWEEN THE BACK OF THE GUARDRAIL POST AND THE BREAKPOINT, USE 7 FT. GUARDRAIL POSTS. REFER TO THE "RESTRICTIVE ROADSIDE INSTALLATION" DETAIL.
6. WHEN SPECIFIED ON THE PLANS, INSTALL 4 IN. HIGH TYPE 6 CURB WITH ITS FACE AT OR BEHIND THE RAIL FACE. AS AN ALTERNATIVE WHEN SPECIFIED ON THE PLANS, INSTALL A 2 IN. x 6 IN. TREATED (AASHTO M 133) WOOD CURB. FASTEN WITH A 4 IN. LAG BOLT AND WASHER AT EACH WOOD POST, OR WITH A 1/4 IN. DIA. BOLT WITH WASHER AND NUT AT EACH STEEL POST. IF THE 2 IN. x 6 IN. WOOD CURB IS SPECIFIED, IT WILL BE INCLUDED IN THE COST OF THE GUARDRAIL. IF APPROVED BY THE ENGINEER, A 2 IN. x 4 IN. TREATED WOOD CURB MAY BE SUBSTITUTED FOR THE 2 IN. x 6 IN. CURB AND SET ON TOP OF PAVEMENT SURFACE AND ATTACHED AS DESCRIBED ABOVE. NO SPLICING SHALL BE ALLOWED IN WOOD CURBS. ADJACENT BOARDS SHALL BE BUTTED TOGETHER AND BOLTED AT A POST LOCATION. JOINTS SHALL BE LOCATED AT THE POSTS.



SECTION A-A

LEAVE-OUT AREA FOR GUARDRAIL POSTS LOCATED IN PAVEMENT

NOTE: LEAVE-OUT AREAS SHALL BE PROVIDED FOR ALL GUARDRAIL POSTS LOCATED IN PAVEMENT TO ALLOW THE POSTS TO ROTATE IN THEIR EMBEDMENT SUCH THAT VEHICLE IMPACT LOADS ARE DISTRIBUTED THROUGH THE POST INTO THE EMBEDMENT MATERIAL PRIOR TO THE POSTS BREAKING PREMATURELY.

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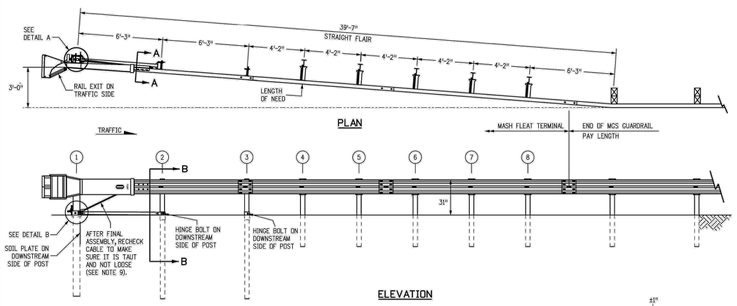
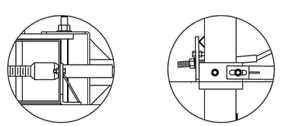
OFFSET NOTES

1. POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF POSTS.
2. THE GUARDRAIL BETWEEN POST (1) THRU (8) IS ON A STRAIGHT LINE FLARE.

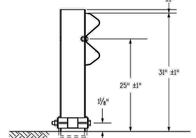




DETAIL A
IMPACT HEAD CONNETION

DETAIL B
POST #1 CONNECTION

SECTION A-A
ANCHOR BRACKET



SECTION B-B
POST #2

MFLEAT TERMINAL
(MASH CERTIFIED)

NOTES

1. THE END ANCHORAGE (FLARED) SHALL BE THE MFLEAT TERMINAL, AS MANUFACTURED BY ROAD SYSTEMS INC. (TELEPHONE #: 432-263-2435). ONE END ANCHORAGE (FLARED) SHALL INCLUDE ALL POST, RAIL, AND ALL HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (FLARED) SHALL BE INSTALLED CONFORMING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LIST TO THE ENGINEER PRIOR TO INSTALLATION OF THE DEVICE.
2. RETROREFLECTOR TABS SHALL NOT BE USED ON END ANCHORAGE POSTS.
3. DELINEATION SHALL BE APPLIED TO THE END PIECE, AND SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
4. AESTHETIC TREATMENT OPTIONS MAY BE AVAILABLE WITH PRIOR APPROVAL OF THE PROJECT ENGINEER. CONTACT THE MANUFACTURER FOR APPROVED AESTHETIC TREATMENT OPTIONS.
5. ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS AND BEARING PLATES SHALL BE GALVANIZED.
6. THE LOWER SECTIONS OF THE POSTS 1, 2, AND 3 SHALL NOT PROTRUDE MORE THAN 4 INCHES ABOVE THE GROUND (MEASURED ALONG A 5 FOOT CORD). SITE GRADING MAY BE NECESSARY TO MEET THIS REQUIREMENT.
7. THE LOWER SECTIONS OF THE HINGED POSTS SHOULD NOT BE DRIVEN WITH THE UPPER POST ATTACHED. IF THE POST IS PLACED IN A DRILLED HOLE, THE BACKFILL MATERIAL MUST BE SATISFACTORILY COMPACTED TO PREVENT SETTLEMENT.
8. WHEN COMPETENT ROCK IS ENCOUNTERED, A 12 INCH DIA. POST HOLE, DRILLED 20 INCHES DEEP INTO THE ROCK SURFACE SHALL BE USED IF APPROVED BY THE ENGINEER FOR POSTS 1 AND/OR 2. GRANULAR MATERIAL SHALL BE PLACED IN THE BOTTOM OF THE HOLE, APPROXIMATELY 2.5 INCHES DEEP TO PROVIDE DRAINAGE. THE FIRST AND/OR SECOND POST SHALL BE FIELD CUT TO LENGTH, PLACED IN THE HOLE AND BACKFILLED WITH SUITABLE BACKFILL. THE SOIL PLATE MAY BE TRIMMED IF REQUIRED.
9. THE BREAKAWAY CABLE ASSEMBLY SHALL BE TAUT, A LOCKING DEVICE (VICE GRIPS OR CHANNEL LOCK PLIERS) SHOULD BE USED TO PREVENT THE CABLE FROM TWISTING WHEN TIGHTENING NUTS.

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STANDARD PLAN NO. M-606-1
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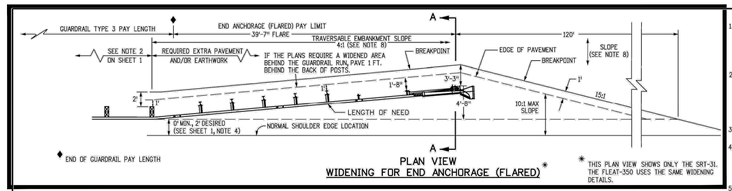
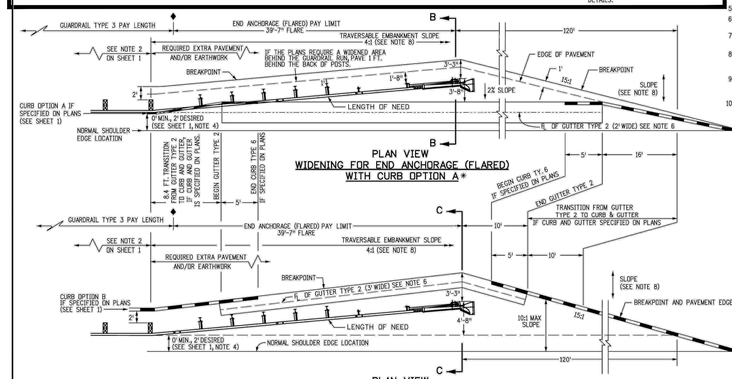
Project Sheet Number:

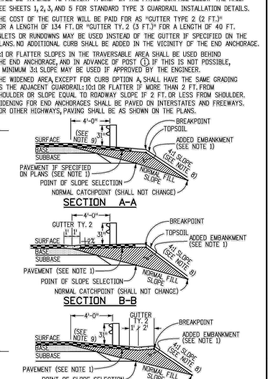


* THIS PLAN VIEW SHOWS ONLY THE SRT-31. THE FLEAT-350 USES THE SAME WIDENING DETAILS.



NOTES

1. PAYMENT FOR THE ADDED EMBANKMENT (APPROXIMATELY 45 CU. YDS.) FOR THE FLARE SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 203 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 203
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (FLARED) WHEN THE CONTRACT PLANS DO NOT INCLUDE PAY ITEM 203. THE ADDED EMBANKMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SUBSECTION 203.07, AASHTO 1 99.
2. WHEN THE WIDENED AREA IS PAVED, PAYMENT FOR THE PAVEMENT (APPROX. 70 SQ. YDS.) SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 403 OR 412 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 403 OR 412
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (FLARED) WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 403 OR 412 (SEE SHEET 1, NOTE 2 FOR PAVEMENT TYPES)
3. CONCRETE PAVED AREAS SHALL HAVE THEIR TAPERED ENDS SQUARED OFF AS DIRECTED BY THE ENGINEER.
4. WHEN OVERLAY PAVING, THE FINISHED SURFACE AT EACH POST SHALL NOT BE ABOVE THE TOP BREAKAWAY HOLE OR STRUT ASSEMBLY. THE WIDENED AREA AT THE FLARED END ANCHORAGE SHOULD NOT BE OVERLAYED UNLESS PAVEMENT CONDITIONS WARRANT IT BEING OVERLAYED. ANY OVERLAY PAVEMENT ABUTTING THE FLARED END ANCHORAGE SHALL BE TAPERED TO PREVENT A DROP IN THE PAVED SURFACE BELOW THE RAIL.
5. SEE SHEETS 1, 2, 3, AND 5 FOR STANDARD TYPE 3 GUARDRAIL INSTALLATION DETAILS.
6. THE COST OF THE GUTTER WILL BE PAID FOR AS "GUTTER TYPE 2 (2 FT.)" FOR A LENGTH OF 134 FT. OR "GUTTER TY. 2 (3 FT.)" FOR A LENGTH OF 40 FT.
7. INLETS OR RUNDOWNS MAY BE USED INSTEAD OF THE GUTTER IF SPECIFIED ON THE PLANS. NO ADDITIONAL CURB SHALL BE ADDED IN THE VICINITY OF THE END ANCHORAGE.
8. 4:1 OR FLATTER SLOPES IN THE TRAVERSABLE AREA SHALL BE USED BEHIND THE END ANCHORAGE, AND IN ADVANCE OF POST (1) IF THIS IS NOT POSSIBLE, A MINIMUM 3:1 SLOPE MAY BE USED IF APPROVED BY THE ENGINEER.
9. THE WIDENED AREA, EXCEPT FOR CURB OPTION A, SHALL HAVE THE SAME GRADING AS THE ADJACENT GUARDRAIL: 10:1 OR FLATTER IF WIDE THAN 2 FT. FROM SHOULDER OR SLOPE EQUAL TO ROADWAY SLOPE IF 2 FT. OR LESS FROM SHOULDER.
10. WIDENING FOR END ANCHORAGES SHALL BE PAVED ON INTERSTATES AND FREEWAYS. FOR OTHER HIGHWAYS, PAVING SHALL BE AS SHOWN ON THE PLANS.



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STANDARD PLAN NO. M-606-1
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Project Sheet Number:

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

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2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
GUARDRAIL DETAILS

COLORADO LICENSED
REX KRAMER
57234
7/31/20
PROFESSIONAL ENGINEER

PROJECT NO. 196106001
SHEET 11

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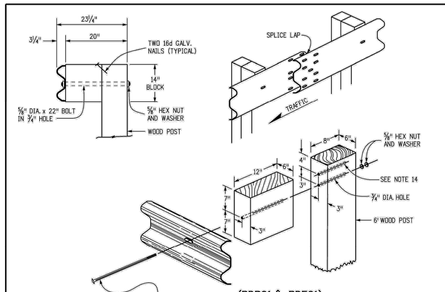
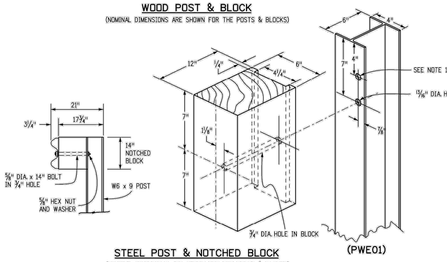
STANDARD GUARDRAIL DETAILS



WOOD POST & BLOCK

(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

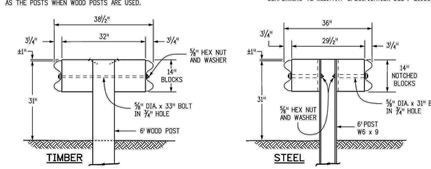


STEEL POST & NOTCHED BLOCK

(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

GENERAL NOTES (CONTINUED FROM SHEET 1)

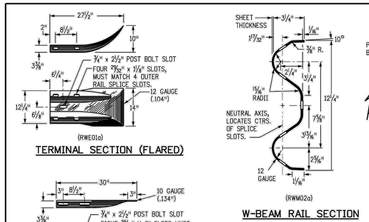
7. SEE SHEETS 7 AND 9 FOR CURB TREATMENTS AT GUARDRAIL TERMINALS.
8. IF THIS DIMENSION WILL BE LESS THAN 28 INCHES, RESET GUARDRAIL HEIGHT TO 28 INCHES OR ABOVE.
9. ALL W-BEAM SPLICES, AND SPLICES OF TERMINAL CONNECTORS TO W-BEAM SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED IN THE PLANS OR BY THE MANUFACTURER.
10. MATERIAL TYPE AND SHAPE OF POSTS AND BLOCKS SHALL BE THE SAME THROUGHOUT THE PROJECT EXCEPT WHEN SPECIFIC POSTS AND BLOCKS ARE SPECIFIED, i.e. AT END ANCHORAGES AND BOX CULVERTS.
11. WHEN SPECIFIED IN THE CONTRACT, 7 FT. POSTS SHALL BE INSTALLED INSTEAD OF THE STANDARD 6 FT. POSTS. THE 7 FT. POSTS SHALL BE MARKED WITH THE NUMBER 7 TO ENSURE PERMANENT INDENTIFICATION. STEEL POSTS SHALL BE STAMPED PRIOR TO GALVANIZING. THE NUMBER 7 SHALL BE A MINIMUM 2 IN. TALL AND LOCATED AS SHOWN ON THE ELEVATION VIEW ON SHEET 1.
12. THE STANDARD 3 IN. X 1⅝ IN. X ⅜ IN. RECTANGULAR WASHER USED UNDER POST BOLT HEADS IN THE PAST MAY REMAIN IN EXISTING INSTALLATIONS BUT SHALL NOT BE USED IN NEW CONSTRUCTION, REPAIRS, OR RESETTING OF RAIL, EXCEPT WHEN SPECIFICALLY IDENTIFIED ON THE STANDARD PLAN.
13. STANDARD GALVANIZED ROUND STEEL WASHERS SHALL BE USED UNDER ALL NUTS IN CONTACT WITH WOOD POSTS.
14. AN ADDITIONAL HOLE SHALL BE PROVIDED IN THE POSTS TO FACILITATE FUTURE RAISING OF THE RAIL ELEMENTS AND BLOCKS FOR OVERLAYS. POSTS PROVIDED MAY ALSO HAVE ADDITIONAL HOLES (UP TO 4 PER FLANGE) FOR MEDIAN GUARDRAIL APPLICATION.
15. RETROREFLECTOR TABS SHALL BE INSTALLED AT 25 FT. INTERVALS (SEE SHEETS 6 AND 8 FOR EXCEPTIONS). RETROREFLECTOR TABS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK. THE TABS SHALL BE INSTALLED ON SPLICE BOLTS, NOT ON POST BOLTS AND SHALL BE MOUNTED SO THE BOLT SLOT FACES AWAY FROM TRAFFIC, AND THE RETROREFLECTOR SURFACE FACES THE APPROACHING TRAFFIC FOR ONE-WAY ROADS. FOR TWO-WAY ROADS, BOTH SIDES OF THE TABS SHALL BE RETROREFLECTIVE, SO THAT DELINEATION IS PROVIDED FOR BOTH DIRECTIONS OF TRAVEL. THE RETROREFLECTIVE SHEETING COLOR SHALL MATCH THE COLOR OF THE ADJACENT TRAVEL WAY EDGE LINE. SEE THE RETROREFLECTOR TAB DETAIL ON SHEET 3.
16. AT THE TIME OF INSTALLATION, WOOD POSTS OR BLOCKS WITH SEASONING CHECKS GREATER THAN ¼ IN. SHALL NOT BE USED WHEN THE CHECK EXTENDS THE FULL LENGTH OF THE PIECE.
17. WOOD BLOCKS SHALL BE CUT FROM THE SAME CROSS-SECTION, SPECIES, AND GRADE, AND SHALL RECEIVE THE SAME PRESERVATIVE TREATMENT AS THE POSTS WHEN WOOD POSTS ARE USED.
18. REFERENCES SUCH AS @@POD01", @@POE01", AND @@PWE01" IN THIS STANDARD PLAN SPECIFY HARDWARE DETAILS FROM BBA GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" PREPARED BY THE AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.
19. RAIL BLOCKS MANUFACTURED FROM SYNTHETIC MATERIAL WILL BE ACCEPTED AS ALTERNATIVES TO WOOD BLOCKS FOR USE WITH STEEL POSTS PROVIDED THAT THE BLOCKS HAVE RECEIVED FHWA APPROVAL.
20. WOOD POSTS SHALL BE MADE OF TIMBER WITH AN EXTREME FIBER STRESS IN BENDING OF 1200 PSI STRESS GRADING AND POST DIMENSIONS SHALL CONFORM WITH THE RULES OF THE WEST COAST INSPECTION BUREAU, OR THE SOUTHERN PINE BUREAU, OR THE WESTERN WOOD PRODUCTS ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NOMINAL DIMENSIONS INDICATED. ONLY ONE TYPE OF SURFACE FINISH SHALL BE USED FOR POSTS AND BLOCKS IN ANY ONE CONTINUOUS LENGTH OF GUARDRAIL.
21. GLULAM POSTS AND BLOCKS WILL BE ACCEPTED AS ALTERNATIVES PROVIDED THAT THE SUPPLIED MATERIALS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.
22. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO AASHTO M 133 EXCEPT THAT BLOCKS NEED NOT BE INCISED. PRESERVATION ASSAY RETENTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER. THE CONTRACTOR SHALL CERTIFY THAT THE SPECIES AND GRADE MEET THE REQUIREMENTS OF THE CONTRACT.
23. W-BEAM AND THRIE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED USING AASHTO M 270 (ASTM A 709) GRADE 36 STEEL, UNLESS CORROSION RESISTANT STEEL IS REQUIRED, IN WHICH CASE THE POST SHALL BE MANUFACTURED FROM AASHTO M 270 (ASTM A 709) GRADE 50W STEEL. THE DIMENSIONS OF THE CROSS-SECTION SHALL CONFORM TO A W6 X 9 SECTION AS DEFINED IN AASHTO M 160 (ASTM A 6). W6 X 8.5 WIDE FLANGE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.
24. AFTER THE SECTION IS CUT AND ALL HOLES ARE DRILLED OR PUNCHED THE COMPONENT SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) UNLESS CORROSION-RESISTANT STEEL IS USED. WHEN CORROSION-RESISTANT STEEL IS USED THE PORTION OF THE POST TO BE EMBEDDED IN SOIL SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) AND THE PORTION ABOVE THE SOIL SHALL NOT BE ZINC-COATED, PAINTED OR OTHERWISE TREATED.
25. FIELD MODIFICATION TO RAIL ELEMENTS IS ALLOWED PER MANUFACTURER'S RECOMMENDATIONS, OR WITH THE APPROVAL OF THE STANDARDS AND SPECIFICATIONS UNIT. POSTS SHALL NOT BE MODIFIED. COMPONENTS ON WHICH THE SPELTER COATING HAS BEEN DAMAGED SHALL BE EITHER REGALVANIZED OR RECOATED IN CONFORMANCE WITH AASHTO M 36, OR PAINTED WITH ONE FULL BRUSH COAT OF ZINC RICH PAINT CONFORMING TO MILITARY SPECIFICATION DOD-P-21035A.



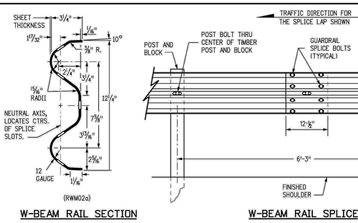
DOUBLE BLOCK AND GUARDRAIL TYPE 3 (DOUBLE) FOR MEDIAN BARRIER

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments:
Designer Initials: JBK	BOX		
Last Modification Date: 03/05/20	BOX		
Detailer Initials: LTA	BOX		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	BOX		

Colorado Department of Transportation	MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES	STANDARD PLAN NO.
2829 West Howard Place, CDOT HQ, 3rd Floor, Denver, CO 80204, Phones: 303-757-9021 FAX: 303-757-9868		M-606-1
Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 2 of 19
		Project Sheet Number:



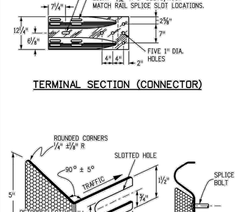
TERMINAL SECTION (FLARED)



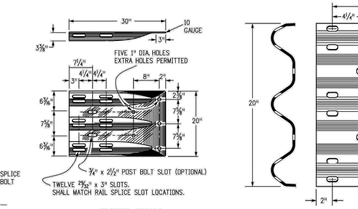
W-BEAM RAIL SECTION

W-BEAM RAIL SPLICE

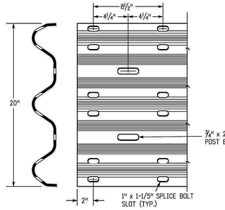
PART	MATERIAL SPEC.	GALVANIZING SPEC.	CORROSION-RESISTANT SPEC.
W-BEAM RAIL & TERMINAL SECTIONS	AASHTO M 180, CLASS A OR B	AASHTO M 180, TYPE 1 OR 2	AASHTO M 180, TYPE 4
BASE PLATE	ASTM A 36	AASHTO M 111	N.A.
NUTS, BOLTS & STUDS FOR GENERAL USE	ASTM A 307		AASHTO M 232, CLASS C
HIGH STRENGTH BOLTS & NUTS	ASTM A 325		OR
HIGH STRENGTH STUDS & NUTS	ASTM A 449		OR
ROUND STEEL WASHERS	ASTM F 436		ASTM B 695 CLASS 50 TYPE 1
RECTANGULAR WASHERS	AASHTO M 180		
OTHER FITTINGS	ASTM A 36	AASHTO M 111	



TERMINAL SECTION (CONNECTOR)



THRIE BEAM TERMINAL SECTION (CONNECTOR)



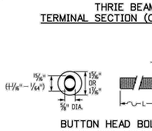
THRIE BEAM DETAIL

THE TABULATION OF GUARDRAIL WILL SPECIFY THE TYPE OF CORROSION PROTECTION: GALVANIZED OR CORROSION - RESISTANT STEEL.

STEEL POSTS SHALL HAVE THE SAME CORROSION PROTECTION AS SPECIFIED FOR THE METAL BEAM RAIL, PUNCHING, DRILLING, CUTTING, OR WELDING OF POSTS WILL NOT BE PERMITTED AFTER GALVANIZING.

RECTANGULAR WASHER

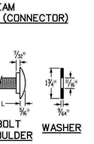
(TO BE USED ONLY WHERE SPECIFIED.)



RETROREFLECTOR TAB

NOTE: RETROREFLECTOR TABS SHALL BE MANUFACTURED FROM 12 TO 14 GAUGE STEEL AND SHALL CONFORM TO THE REQUIREMENTS OF S STANDARD S-612-1.

BUTTON HEAD BOLT WITH OVAL SHOULDER



WASHER

HEX NUT

DIAMETER & TYPE (INCHES)	12" BLOCKS L = LENGTH (INCHES)	THREAD LENGTH (INCHES)	INTENDED USE	AASHTO-AGC-ARTBA STANDARD NUMBER	NO. BOLTS, NUTS & WASHERS
⅝	11¼	FULL (1 13/16)	ALL RAIL SPLICES	FBB01	8 PER SPLICE*
BUTTONHEAD OVAL SHLDR.	22	MIN. 2½	SINGLE BLOCK & POST (TIMBER)	FBB04	1 PER POST
	33	MIN. 2	DOUBLE BLOCK & POST (TIMBER)	FBB05	1 PER POST
	14	MIN. 2	FASTEN NOTCHED BLOCK TO STEEL POST	FBB03	1 PER BLOCK
WASHERS NOT USED AT RAIL SPLICES					

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments:
Designer Initials: JBK	BOX		
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Colorado Department of Transportation	MIDWEST GUARDRAIL SYSTEM (MGS) TYPE 3 W-BEAM 31 INCHES	STANDARD PLAN NO.
2829 West Howard Place, CDOT HQ, 3rd Floor, Denver, CO 80204, Phones: 303-757-9021 FAX: 303-757-9868		M-606-1
Project Development Branch JBK	Issued by the Project Development Branch: July 31, 2019	Standard Sheet No. 3 of 19
		Project Sheet Number:

NO.	REVISION	BY	DATE	APPR.
4	INTERNAL REVISION-INVERT REVISIONS	KRK	9/29/23	KRK
3	COUNTY RESUBMITTAL #3	KRK	8/31/22	KRK
2	COUNTY RESUBMITTAL #2	KRK	4/6/22	KRK
1	COUNTY RESUBMITTAL #1	KRK	1/21/22	KRK

Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 300
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK
DRAWN BY: JRH
CHECKED BY: KRK
DATE: 9/3/2021

WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
GUARDRAIL DETAILS

COLORADO LICENSED
KEVIN REX KOFFORD
57234
7/31/2023
PROFESSIONAL ENGINEER

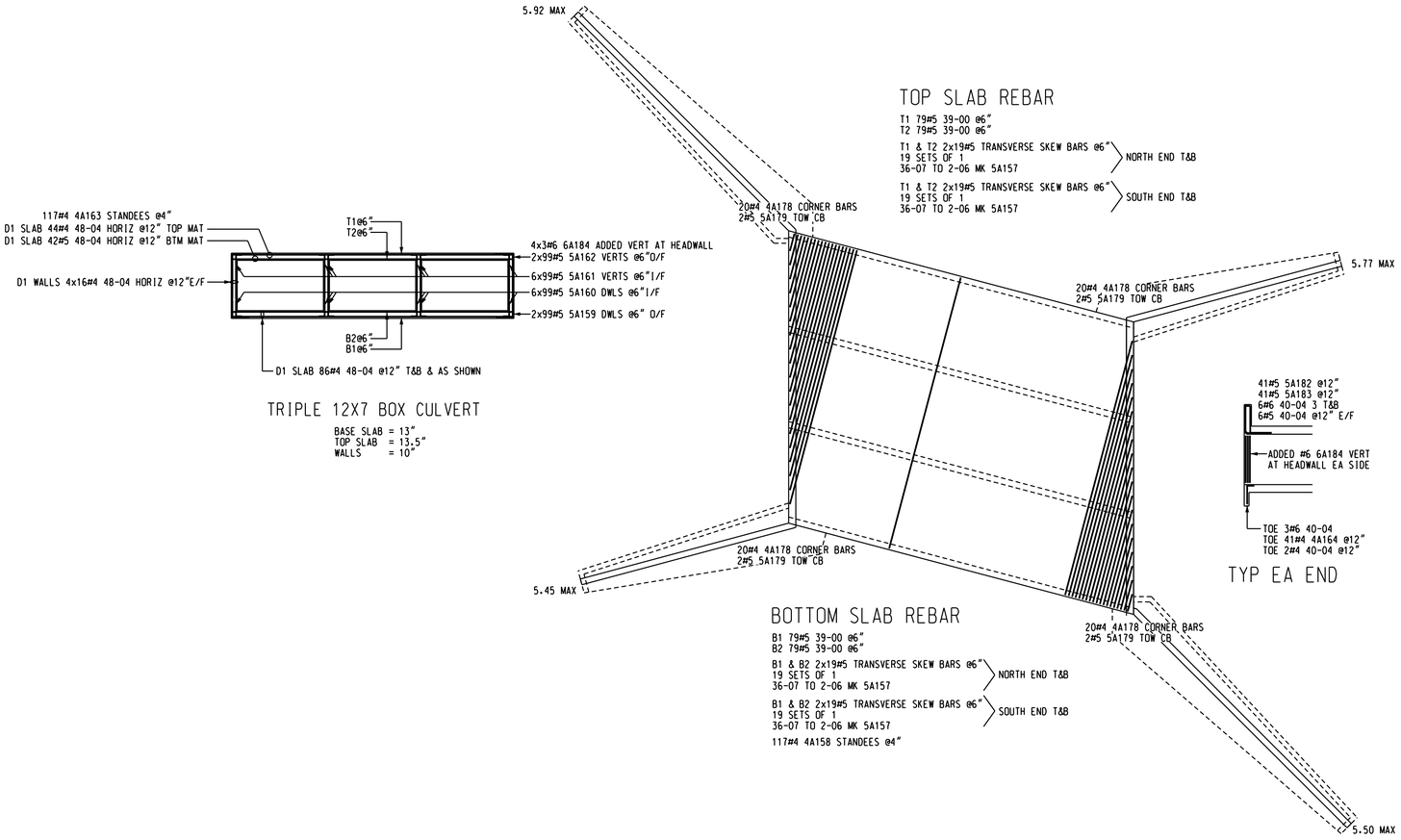
PROJECT NO.
196106001

SHEET
12

PCD FILE NO. CDR-21-012

k:\cos_civil\196106001_winsome filing no. 3\CADD\plonsheets\Culvert CDs\196106001_DT.dwg Kofford, Kevin 10/5/2023 1:27 PM

FOR WINGWALLS SEE DRAWING 1A



TRIPLE 12X7 BOX CULVERT

BASE SLAB = 13"
TOP SLAB = 13.5"
WALLS = 10"

TYP EA END

TOP SLAB REBAR

T1 79#5 39-00 @6"
T2 79#5 39-00 @6"

T1 & T2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — NORTH END T&B

T1 & T2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — SOUTH END T&B

BOTTOM SLAB REBAR

B1 79#5 39-00 @6"
B2 79#5 39-00 @6"

B1 & B2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — NORTH END T&B

B1 & B2 2x19#5 TRANSVERSE SKEW BARS @6" 19 SETS OF 1 36-07 TO 2-06 MK 5A157 — SOUTH END T&B

117#4 4A158 STANDEES @4"

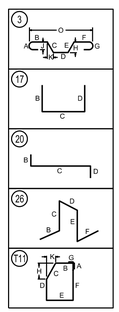
Kimley»Horn

- ☐ NO EXCEPTIONS TAKEN
- ☐ CORRECTIONS NOTED
- ☐ REJECTED
- ☐ VERIFY & MAKE CORRECTIONS
- ☐ RESUBMIT
- ☐ FOR INFORMATION ONLY

Our limited review is only for conformance with the design concept of the project and general compliance with the information given in our Plans and Specifications. Contractor is responsible for: dimensions to be confirmed and correlated at the job site, information that pertains to the fabrication processes or to techniques of construction, quantities, safety, coordination with other work, and for conformance to the requirements of the plans and specifications. Review does not authorize changes to contract unless stated specifically in separate letter or change order.

Reviewed By: KEVIN.KOFFORD Date: 8/6/24

ALL EPOXY REBAR



QTY	SIZE	EP	BAR MARK	V	BND TYP	CD	BENDING DIMENSIONS A	B	C	D	E	F/R	G	H	J	K	O
12	6		6A184		17			3-05	10-10								
198	5		5A159		17			2-04	2-04								
594	5		5A160		17			0-10	2-02								
594	5		5A161		17			0-10	7-11								
198	5		5A162		17			2-06	7-11								
8	5		5A179		3			2-03	2-03					1-012		1-112	
41	5		5A182		T11		0-08	3-06	0-053	3-00				0-04		0-04	
41	5		5A183		20			0-08	3-09	3-00							
117	4		4A158		26			1-00	0-06	0-06	0-06	1-00					
117	4		4A163		26			1-00	0-07	0-06	0-07	1-00					
41	4		4A164		17			1-00	2-07								
80	4		4A178		3			2-03	2-03					1-012		1-112	
Total for size 6: 257																	
Total for size 5: 11076																	
Total for size 4: 899																	

ALL REBAR TO BE ASTM A615 GRADE 60: UNO

REBAR PLACEMENT DRAWINGS ARE NOT TO BE CONSIDERED "STAND ALONE" DOCUMENTS, AND MUST BE USED IN CONJUNCTION WITH THE ARCHITECTURAL & ENGINEERING CONTRACT DRAWINGS, INCLUDING ALL CURRENT REVISIONS TO SAID PLAN. BARTON SUPPLY IS NOT RESPONSIBLE FOR FAILURE OF THE CONTRACTOR TO INTEGRATE ALL PLANS APPLICABLE TO THE PROJECT.

REVISIONS

Date	Remarks
6/18/2024	FOR CONSTRUCTION DRAWING

Concrete Forms & Steel Supplies
14800 E. MONCRIEFF PL
AURORA, CO 80011
Phone: 303-576-2248
Fax: 303-576-2276

BARTON REBAR STEEL SUPPLY
Since 1972, The Materials You Need, The People You Trust.

DRAWING CONTENTS

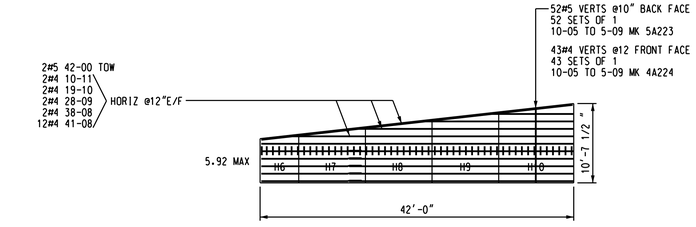
Project: WINSOME FILING 3
ALAMAR WAY BOX CULVERT *
Location: COLORADO SPRINGS, COLORADO
Customer: VISTA CONCRETE

Contract No. V5005V

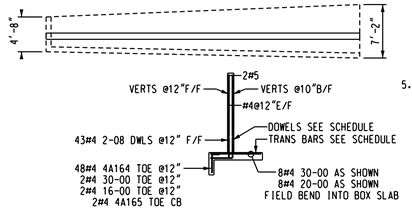
Drawn by: SJG

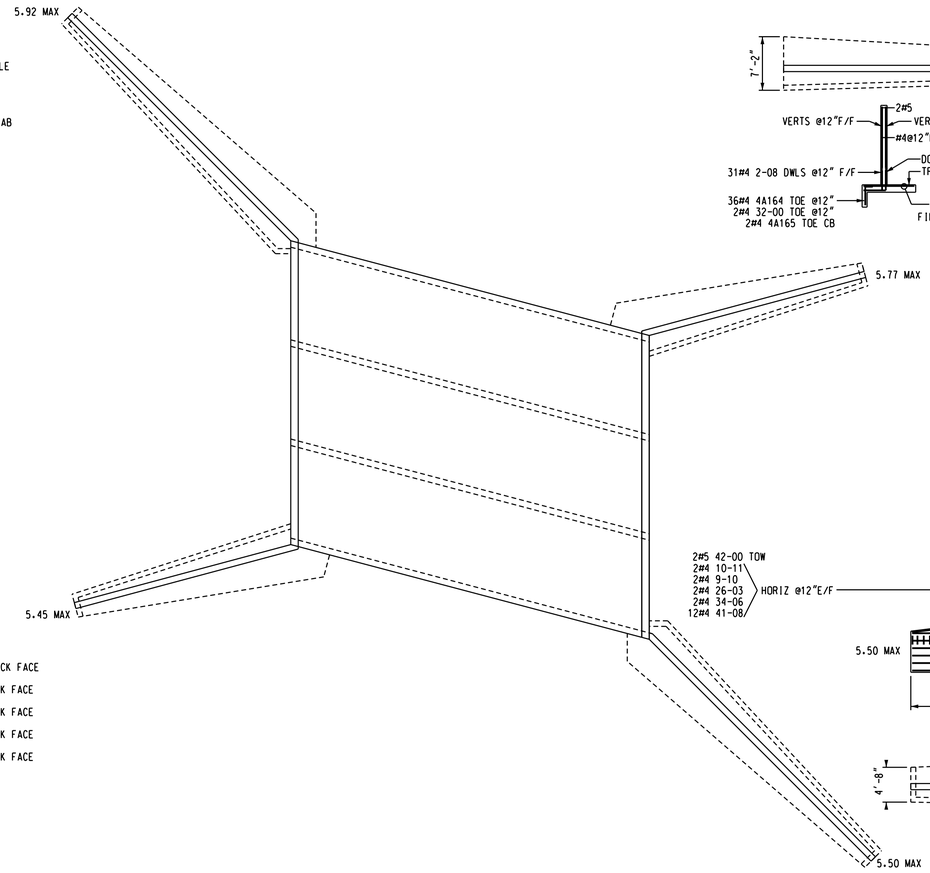
Date: 5/28/2024

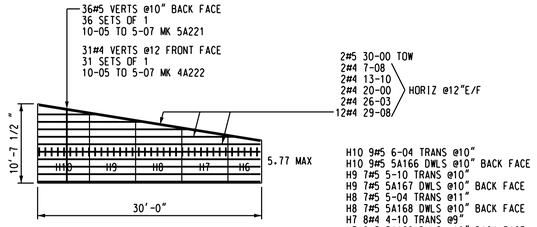
Dwg. No. 1



H10 12#5 6-04 TRANS @10"
H10 12#5 5A166 DWLS @10" BACK FACE
H9 11#5 5-10 TRANS @10"
H9 11#5 5A167 DWLS @10" BACK FACE
H8 10#5 5-04 TRANS @11"
H8 11#5 5A168 DWLS @10" BACK FACE
H7 13#4 4-10 TRANS @9"
H7 11#5 5A169 DWLS @10" BACK FACE
H6 7#4 4-04 TRANS @9"
H6 7#5 5A170 DWLS @10" BACK FACE







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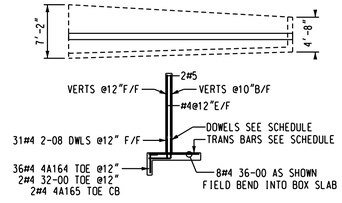
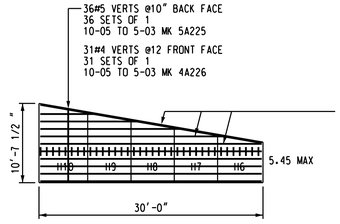
H8 7#5 5-04 TRANS @11"
H8 7#5 5A168 DWLS @10" BACK FACE
H7 8#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE
H6 6#4 4-04 TRANS @9"
H6 5#5 5A170 DWLS @10" BACK FACE





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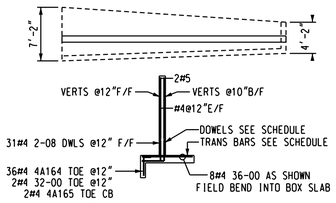

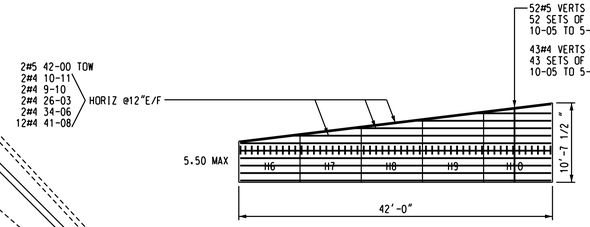

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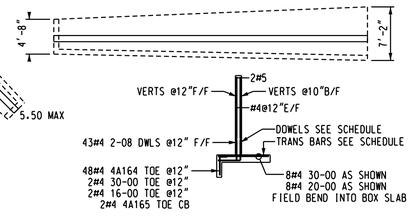
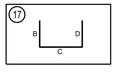


ALL EPOXY REBAR

QTY	SIZE	EP	BAR MARK	V	BND TYP	CD	BENDING DIMENSIONS A	B	C	D	E	F/R	G	H	J	K	O
40	5		5A166		17			2-09	2-09								
35	5		5A167		17			2-07	2-09								
35	5		5A168		17			2-05	2-09								
36	5		5A169		17			2-03	2-09								
29	5		5A170		17			2-01	2-09								
168	4		4A164		17			1-00	2-07								
8	4		4A165		17			2-07	2-00								
Total for size 5: 947																	
Total for size 4: 427																	



REBAR PLACEMENT DRAWINGS ARE NOT TO BE CONSIDERED "STAND ALONE" DOCUMENTS, AND MUST BE USED IN CONJUNCTION WITH THE ARCHITECTURAL & ENGINEERING CONTRACT DRAWINGS, INCLUDING ALL CURRENT REVISIONS TO SAID PLAN. BARTON SUPPLY IS NOT RESPONSIBLE FOR FAILURE OF THE CONTRACTOR TO INTEGRATE ALL PLANS APPLICABLE TO THE PROJECT.

ALL REBAR TO BE ASTM A615 GRADE 60: UNO

REVISIONS

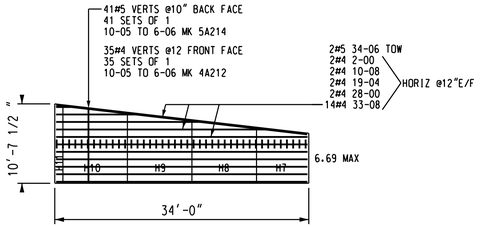
Date	Remarks
6/18/2024	FOR CONSTRUCTION DRAWING
7/25/2024	REVISED WINGWALL END HEIGHTS

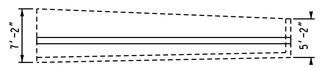
Concrete Forms & Steel Supplies
14800 E. MONCRIEFF PL
AURORA, CO 80011
Phone: 303-576-2248
Fax: 303-576-2276

BARTON REBAR STEEL SUPPLY
Since 1972, The Materials You Need, The People You Trust.

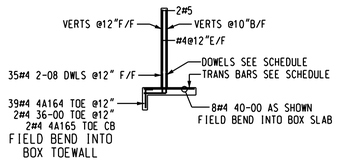
DRAWING CONTENTS
Project: WINSOME FILING 3
ALAMAR WAY BOX CULVERT *
Location: COLORADO SPRINGS, COLORADO
Customer: VISTA CONCRETE

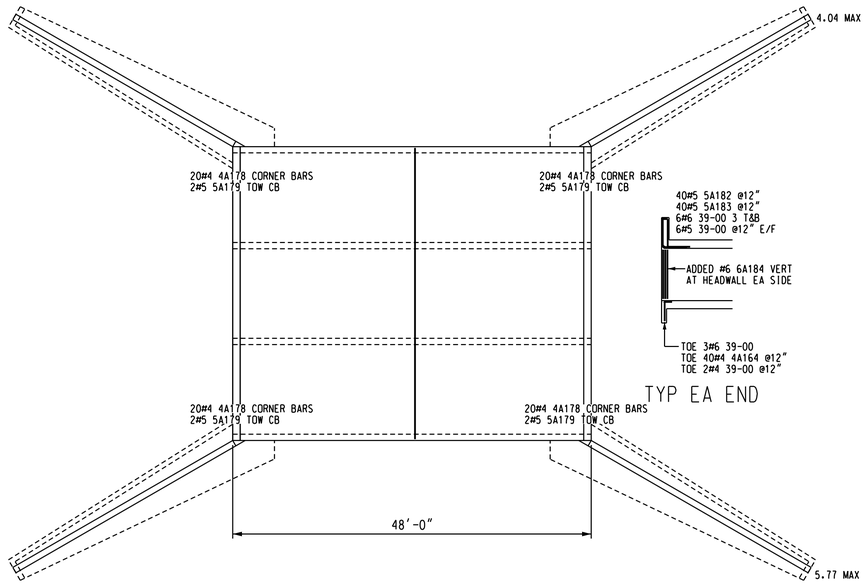
Contract No. V5005V
Drawn by: SJG
Date: 5/28/2024
Dwg. No. **1A**

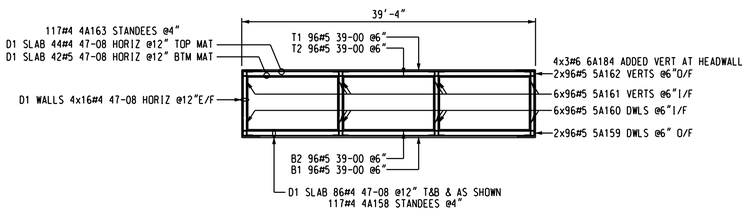




H11 2#5 6-10 TRANS @8"
H11 2#5 5A211 DWLS @10" BACK FACE
H10 10#5 6-04 TRANS @10"
H10 10#5 5A166 DWLS @10" BACK FACE
H9 10#5 5-10 TRANS @10"
H9 10#5 5A167 DWLS @10" BACK FACE
H8 10#5 5-04 TRANS @11"
H8 11#5 5A168 DWLS @10" BACK FACE
H7 10#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE

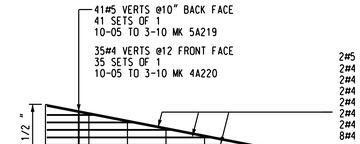


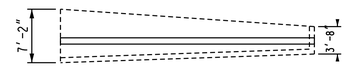




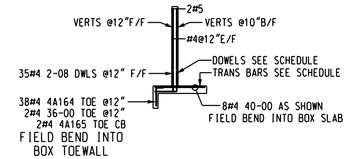
TRIPLE 12X7 BOX CULVERT

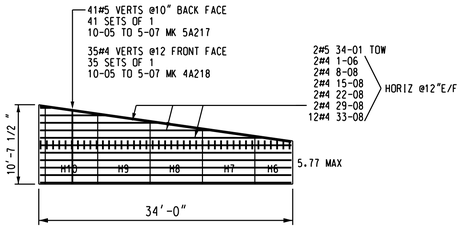
BASE SLAB = 13"
TOP SLAB = 13.5"
WALLS = 10"

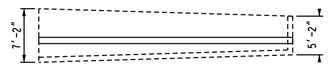




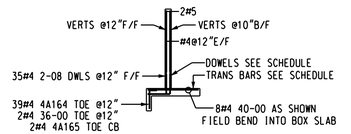
H10 7#5 6-04 TRANS @10"
H10 7#5 5A166 DWLS @10" BACK FACE
H9 6#5 5-10 TRANS @10"
H9 6#5 5A167 DWLS @10" BACK FACE
H8 7#5 5-04 TRANS @11"
H8 7#5 5A168 DWLS @10" BACK FACE
H7 6#4 4-10 TRANS @9"
H7 6#5 5A169 DWLS @10" BACK FACE
H6 6#4 4-04 TRANS @9"
H6 6#5 5A170 DWLS @10" BACK FACE
H5 7#4 3-10 TRANS @9"
H5 6#5 5A171 DWLS @10" BACK FACE
H4 6#4 3-04 TRANS @9"
H4 3#5 5A172 DWLS @10" BACK FACE

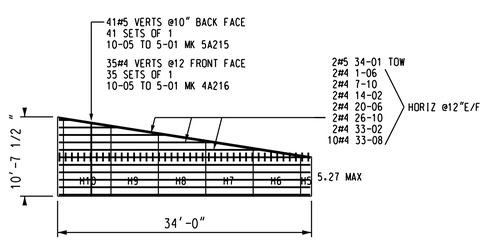


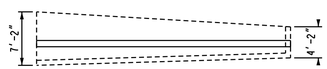




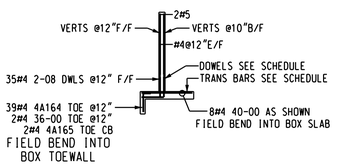
H11 1#5 6-10 TRANS @8"
H11 1#5 5A211 DWLS @10" BACK FACE
H10 9#5 6-04 TRANS @10"
H10 9#5 5A166 DWLS @10" BACK FACE
H9 8#5 5-10 TRANS @10"
H9 8#5 5A167 DWLS @10" BACK FACE
H8 9#5 5-04 TRANS @11"
H8 9#5 5A168 DWLS @10" BACK FACE
H7 9#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE
H6 7#4 4-04 TRANS @9"
H6 6#5 5A170 DWLS @10" BACK FACE





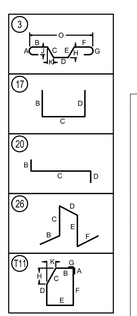


H11 1#5 6-10 TRANS @8"
H11 1#5 5A211 DWLS @10" BACK FACE
H10 8#5 6-04 TRANS @10"
H10 8#5 5A166 DWLS @10" BACK FACE
H9 7#5 5-10 TRANS @10"
H9 7#5 5A167 DWLS @10" BACK FACE
H8 8#5 5-04 TRANS @11"
H8 8#5 5A168 DWLS @10" BACK FACE
H7 9#4 4-10 TRANS @9"
H7 8#5 5A169 DWLS @10" BACK FACE
H6 9#4 4-04 TRANS @9"
H6 7#5 5A170 DWLS @10" BACK FACE
H5 2#4 3-10 TRANS @9"
H5 2#5 5A171 DWLS @10" BACK FACE



ALL EPOXY REBAR

QTY	SIZE	EP	BAR MARK	V	BND TYP	CD*	BENDING DIMENSIONS A	B	C	D	E	F/R	G	H	J	K	O
12	6		6A184		17		3-05	10-10									
192	5		5A159		17		2-04	2-04									
576	5		5A160		17		0-10	2-02									
576	5		5A161		17		0-10	7-11									
192	5		5A162		17		2-06	7-11									
34	5		5A166		17		2-09	2-09									
31	5		5A167		17		2-07	2-09									
35	5		5A168		17		2-05	2-09									
30	5		5A169		17		2-03	2-09									
19	5		5A170		17		2-01	2-09									
8	5		5A171		17		1-11	2-09									
3	5		5A172		17		1-09	2-09									
8	5		5A179		3		2-03	2-03						1-012		1-112	
40	5		5A182		T11	0-08	3-06	0-053	3-00					0-04		0-04	
40	5		5A183		20		0-08	3-09	3-00								
4	5		5A211		17		2-11	2-09									
117	4		4A158		26		1-00	0-06	0-06	0-06	1-00						
117	4		4A163		26		1-00	0-07	0-06	0-07	1-00						
195	4		4A164		17		1-00	2-07									
8	4		4A165		17		2-07	2-00									
80	4		4A178		3		2-03	2-03						1-012		1-112	
Total for size		6:	257														
Total for size		5:	11630														
Total for size		4:	1292														



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ALL REBAR TO BE ASTM A615 GRADE 60; UNO

REVISIONS

Date	Remarks
6/18/2024	FOR CONSTRUCTION DRAWING
7/25/2024	REVISED WINGWALL END HEIGHTS

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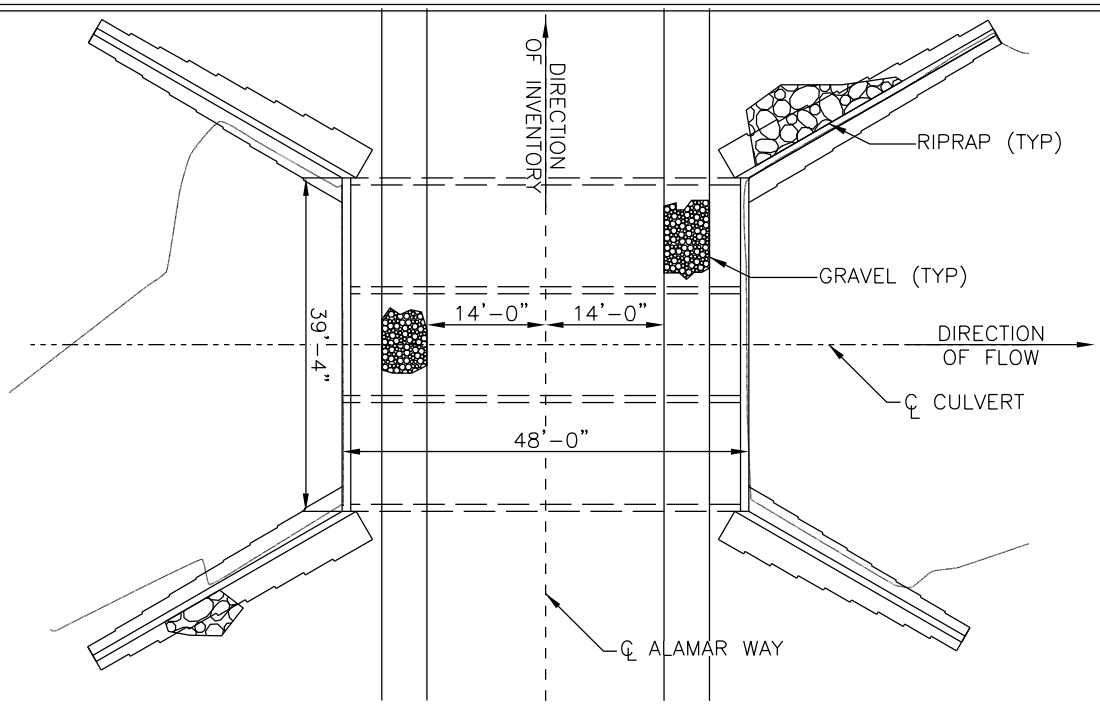
DRAWING CONTENTS
Project: WINSOME FILING 3
Location: COLORADO SPRINGS, COLORADO
Customer: VISTA CONCRETE
TWINKLING START LANE BOX CULVERT
*

Contract No. V5005V
Drawn by: SJG
Date: 5/28/2024
Dwg. No. 2

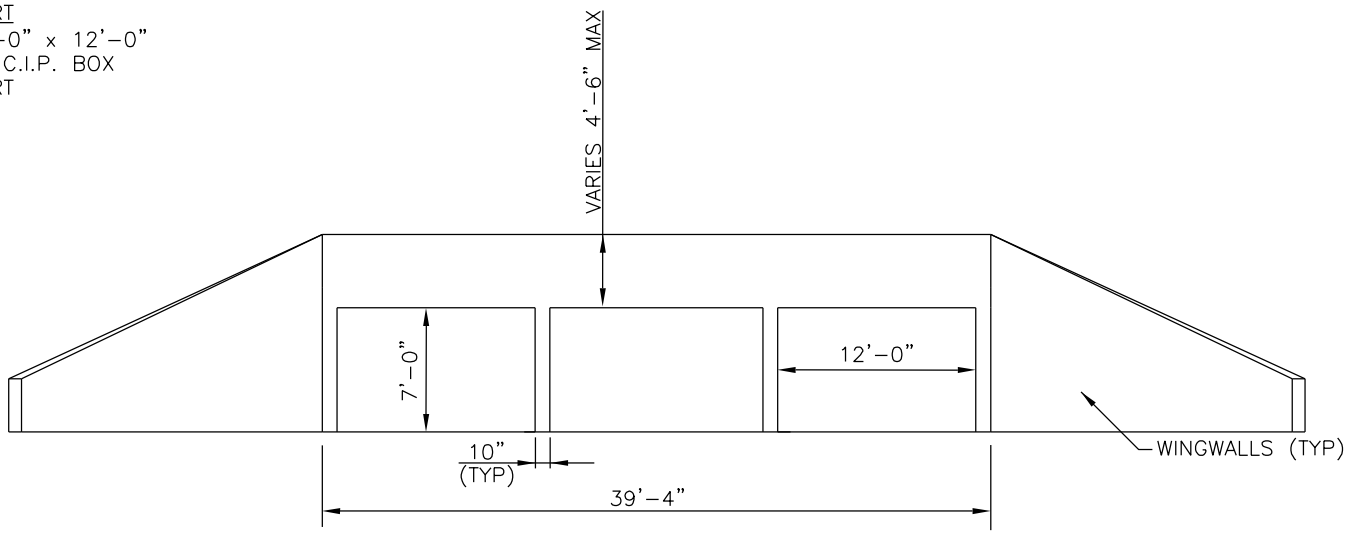
CULVERT #1 INSPECTION SKETCH

ELP–WINSOME–CULV1



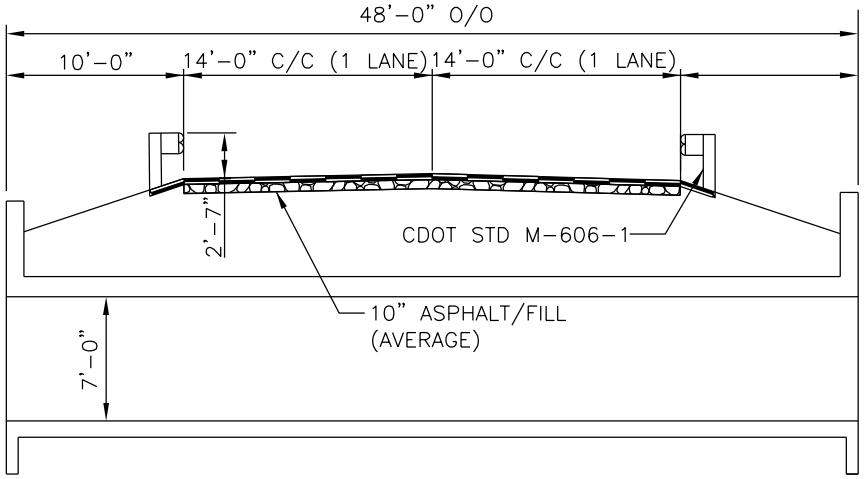
PLAN

CULVERT
(3) 7'–0" x 12'–0"
CONC. C.I.P. BOX
CULVERT



ELEVATION

LOOKING EAST

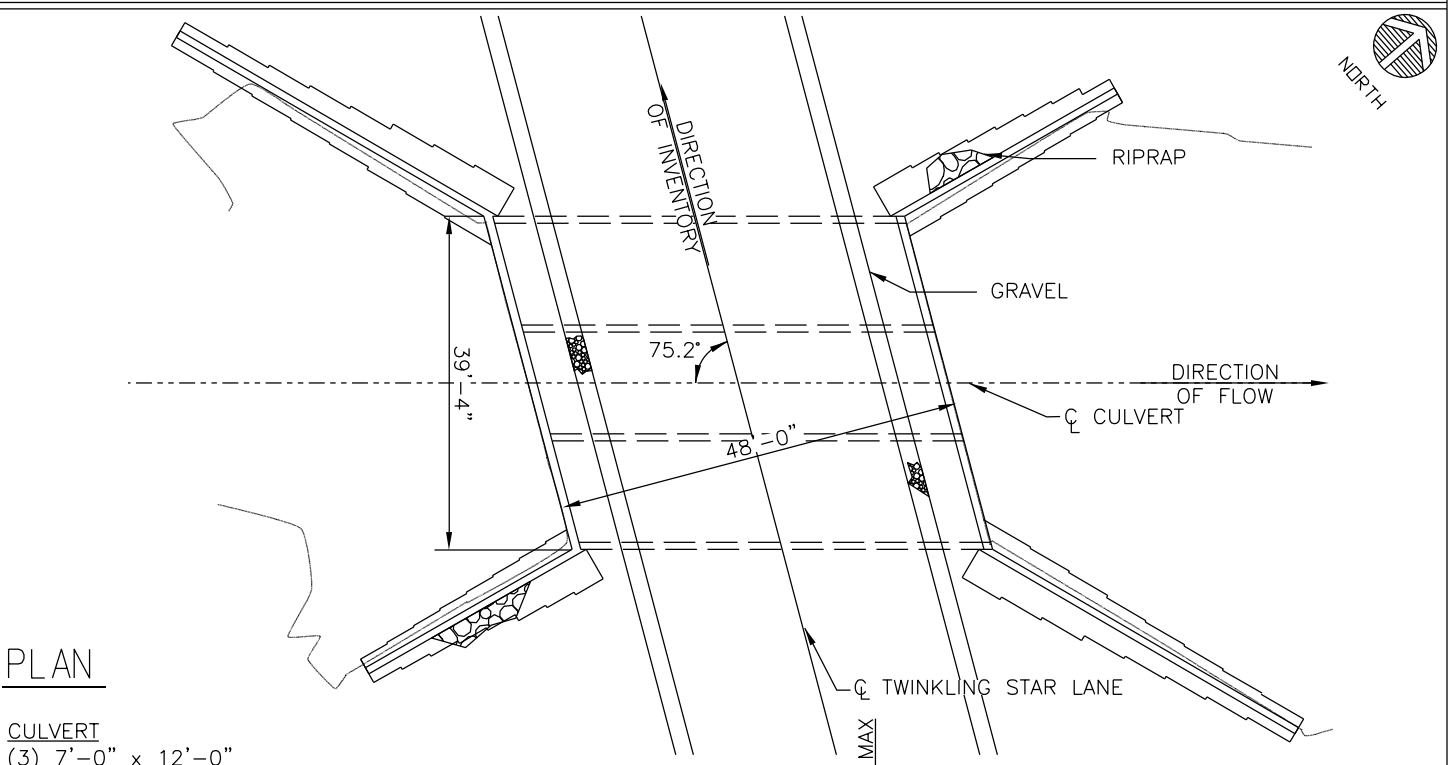


SECTION

LOOKING NORTH

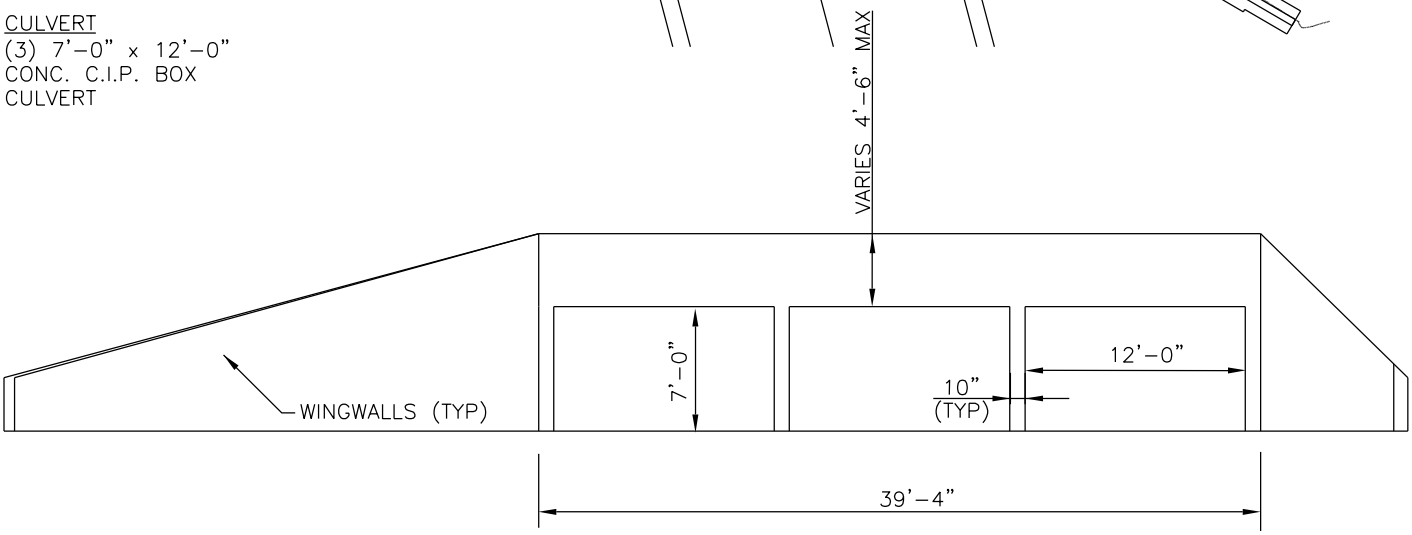
CULVERT #2 INSPECTION SKETCH

ELP-WINSOME-CULV2



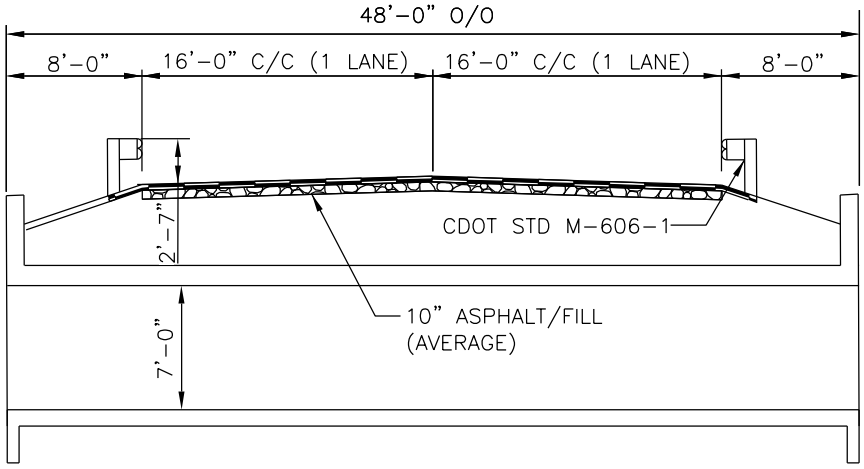
PLAN

CULVERT
(3) 7'-0" x 12'-0"
CONC. C.I.P. BOX
CULVERT



ELEVATION

LOOKING NORTH



SECTION

LOOKING NORTH