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: JOSEPH 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:
NINA RUIZ
TEL: (719) 520–6313
EMAIL: NINARUIZ@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

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 2636.99 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 2633.02 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 1321.95 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 1873.37 FEET; THENCE S00°34'43"W A DISTANCE OF 2,706.21 FEET; THENCE S89°15'17"E A DISTANCE OF 769.17 FEET TO A POINT ON THE WEST LINE OF SECTION 19 TOWNSHIP 11 SOUTH, RANGE 64 WEST; THENCE S89°15'18"E A DISTANCE OF 1,158.32 FEET TO THE EAST LINE OF THE WEST HALF OF THE WEST HALF OF SAID SECTION 19 ; THENCE S00°17'06"W ON THE EAST LINE OF THE WEST HALF OF THE WEST HALF OF SAID SECTION 19, A DISTANCE OF 3,838.66 FEET TO A POINT 30.00 FEET NORTH OF THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 19; THENCE S89°55'06"W, ON A LINE 30.00 FEET NORTH OF AND PARALLEL WITH THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 19, ON SAID NORTHERLY RIGHT–OF–WAY LINE, A DISTANCE OF 30.00 FEET TO A POINT ON THE BOUNDARY LINE PARCEL NUMBER RW–36 AS SHOWN IN THE WARRANTY DEED AS RECORDED UNDER RECEPTION NUMBER 213096397; THENCE ON THE BOUNDARY OF SAID PARCEL THE FOLLOWING (3) THREE COURSES:

1. N00°17'06"E, 30.00 WEST OF AND PARALLEL WITH THE EAST LINE OF THE WEST HALF OF THE WEST HALF OF SAID SECTION 19, A DISTANCE OF 5.25 FEET
2. N89°47'54"W A DISTANCE OF 368.05 FEET
3. S89°14'50"W A DISTANCE OF 603.68 FEET TO A POINT BEING 30.00 FEET NORTH OF THE SOUTH LINE OF SOUTHWEST QUARTER OF SAID SECTION 19;

THENCE S89°55'06"W ON A LINE 30.00 FEET NORTH OF AND PARALLEL WITH THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 19, ON SAID NORTHERLY RIGHT–OF–WAY LINE A DISTANCE OF 173.03 FEET TO A POINT ON THE EAST LINE OF SAID SECTION 24; THENCE S89°30'15"W ON A LINE 30.00 NORTH OF AND PARALLEL WITH THE SOUTH LINE OF SAID SECTION 24, A DISTANCE OF 5238.44 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 A DISTANCE OF 2,606.92 FEET TO THE POINT OF BEGINNING.

CONTAINING A CALCULATED AREA OF 33,455,315 SQUARE FEET OR 768.028 ACRES. COLORADO.

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 6TH/ PRINCIPAL MERIDIAN BEING 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.

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 MUST BE CONSTRUCTED IN CONJUNCTION 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.

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.

JENNIFER IRVINE, PE COUNTY ENGINEER/ECM ADMINISTRATOR DATE

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
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

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO. 196106001

SHEET 1

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CULVERT CROSSING NO. 1

SCALE:1"=40'

GRAPHIC SCALE IN FEET 0 20 40 80

NORTH

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

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
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

PRELIMINARY
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Kimley-Horn and Associates, Inc.

PROJECT NO. 196106001

SHEET 2

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

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
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
SITE PLAN

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Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
196106001

SHEET
3

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POND 4

PROPOSED FLEAT 350 END ANCHORAGE PER STANDARD DETAIL M-606-1

END END ANCHORAGE
STA: 2009+89.47
OFF: 19.00'LT

BREAKPOINT
STA: 2009+89.15
OFF: 22.99'LT

BEGIN END ANCHORAGE
STA: 2009+51.97
OFF: 16.00'LT

100 YEAR
WSEL=7288.77

END END ANCHORAGE
STA: 2009+64.47
OFF: 19.00'RT

BREAKPOINT
STA: 2009+64.15
OFF: 22.99'RT

BEGIN END ANCHORAGE
STA: 2009+26.97
OFF: 16.00'RT

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

100'X ~106.5'
SOIL PROTECTION TYPE L, RIPRAP D50=9"; T=18".
EXTEND RIPRAP TO 7284.36 TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10
(1,473 SY)

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

SOIL PROTECTION TYPE L, RIPRAP D50=9"; T=18".
EXTEND RIPRAP TO 7289.771' TO PROVIDE 1' OF FREEBOARD. REFERENCE RIPRAP DETAIL ON SHEET 10.
(646 SY)

CULVERT 2 ALIGNMENT

100 YEAR
WSEL=7283.36

EMBANKMENT/SCOUR PROTECTION
SOIL PROTECTION TYPE M, RIPRAP D50=12"; T=24".
REFERENCE RIPRAP DETAIL ON SHEET 10. REFERENCE DRAINAGE REPORT FOR CALCULATIONS
(1,719 SY)

DIRECTION OF FLOW

DIRECTION OF FLOW

WETLAND DELINEATION

100 YEAR PER CLOMR MODEL

WETLAND DELINEATION

PT: 2008+37.90

END END ANCHORAGE
STA: 2008+33.83
OFF: 16.00'LT

END END ANCHORAGE
STA: 2008+08.45
OFF: 16.00'RT

100 YEAR WSEL PER CLOMR MODEL

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

BREAKPOINT
STA: 2007+97.15
OFF: 22.99'LT

BREAKPOINT
STA: 2007+70.68
OFF: 22.98'RT

BEGIN END ANCHORAGE
STA: 2007+96.78
OFF: 19.00'LT

BEGIN END ANCHORAGE
STA: 2007+70.41
OFF: 19.00'RT

60.0' ROW

PROPOSED FLEAT 350 END ANCHORAGE PER STANDARD DETAIL M-606-1

R=1420.00'
L=243.11'

TWINKLING STAR LANE
(PUBLIC 60' ROW)

EFFECTIVE 100 YEAR FLOODPLAIN PER FIRM PANEL 08041C0350G

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.
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
SITE PLAN

PRELIMINARY
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Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
196106001

SHEET
4

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based on the contour it appears the wingwall needs to be extended.
Update all wingwall lengths.

Unresolved. Fix contours or extend retaining wall. The space between the contour lines indicated near vertical finished ground.

CULVERT CROSSING NO. 1
SCALE:1"=10'

NORTH

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

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PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
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
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CHECKED BY: KRK
DATE: 9/3/2021

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

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PROJECT NO. 196106001

SHEET
5

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CULVERT CROSSING NO. 2
SCALE: 1"=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

NORTH

NO.	REVISION	BY	DATE	APPR.
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
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DATE: 9/3/2021

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

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PROJECT NO. 196106001

SHEET 6

PCD FILE NO. CDR-21-012

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CULVERT CROSSING NO. 1- PROFILE

SCALE:1"=80'

NOTE: THIS PROFILE IS FOR REFERENCE ONLY. REFERENCE WINSOME FILING NO. 3 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.

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

KEYMAP

PCD FILE NO. CDR-21-012

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

Kimley»Horn
2021 KIMLEY-HORN AND ASSOCIATES, INC.
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WINSOME FILING NO. 3
EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

ALAMAR WAY PROFILE

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Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO. 196106001

SHEET

7

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CULVERT CROSSING NO. 2-FILE

SCALE: 1"=80'

GRAPHIC SCALE IN FEET

0 40 80 160

HORIZONTAL

0 4 8 16

VERTICAL

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

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KEYMAP
NTS

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
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

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EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS

TWINKLING STAR LANE PROFILE

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Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
196106001

SHEET
8

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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:	#3	#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:	#3	#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-607-1.
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 $\frac{3}{4}$ 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_3 BARS FOR THE BOTTOM MAT OF THE TOP SLAB SHALL BE AS FOLLOWS:

S	6, 9, 10	14, 16, 18	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, 2013, 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	(REV)	08/27/13	LRFD Design
Full Path: www.codot.gov/business/designsupport	(REV)	08/01/15	Analysis Program Updates
Drawing File Name: 601030202.dgn	(REV)	04/05/19	Clarified files should be "set cell=0" for PDF CDR - only not for Pre-Cast CBC. Changed title and added Gen. Note 18.
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TRIPLE CONCRETE BOX CULVERT (CAST-IN-PLACE)

Issued By: Project Development Branch July 4, 2012

STANDARD PLAN NO.
M-601-3
Sheet No. 1 of 2

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

BOX SIZE S	BOX SIZE B	FILL HEIGHT ALLOWED HW/D	SLAB THICKNESS t_1	t_2	t_3	t_4	t_5	t_6	t_7	BAR SIZES d_1*	d_2	d_3	d_4	d_5	d_6	d_7	DIMENSIONS h*	h_1	h_2	h_3	h_4	QUANTITIES CONCRETE CY/LF	REBAR STL LBS/LF	WATERPROOFING SY/LF	RATING FACTORS HL-93 INVENTORY	HL-93 OPERATING	COLORADO PERMIT	NRL VEHICLE
8	10'-0"	2'-1"	5	10.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	958	3'-3	2'-4	6'-9	2'-4	1.11	236	3,370	1.7	1.0	1.80	1.69
	12'-0"	2'-1"	5	12.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	958	3'-3	2'-4	8'-9	2'-4	1.11	263		1.4	0.8	2.20	2.07
	14'-0"	2'-1"	5	14.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	958	3'-3	2'-4	10'-9	2'-4	1.11	290		1.1	0.6	2.70	2.53
	16'-0"	2'-1"	5	16.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	958	3'-3	2'-4	12'-9	2'-4	1.11	317		0.90	0.50	3.30	3.10
	18'-0"	2'-1"	5	18.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	958	3'-3	2'-4	14'-9	2'-4	1.11	344		0.75	0.42	3.90	3.67
	20'-0"	2'-1"	5	20.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	958	3'-3	2'-4	16'-9	2'-4	1.11	371		0.63	0.35	4.50	4.24
10	10'-0"	2'-1"	5	10.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,158	3'-3	2'-4	6'-9	2'-4	1.33	270		1.7	1.0	1.80	1.69
	12'-0"	2'-1"	5	12.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,158	3'-3	2'-4	8'-9	2'-4	1.33	301		1.4	0.8	2.20	2.07
	14'-0"	2'-1"	5	14.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,158	3'-3	2'-4	10'-9	2'-4	1.33	332		1.1	0.6	2.70	2.53
	16'-0"	2'-1"	5	16.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,158	3'-3	2'-4	12'-9	2'-4	1.33	363		0.90	0.50	3.30	3.10
	18'-0"	2'-1"	5	18.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,158	3'-3	2'-4	14'-9	2'-4	1.33	394		0.75	0.42	3.90	3.67
	20'-0"	2'-1"	5	20.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,158	3'-3	2'-4	16'-9	2'-4	1.33	425		0.63	0.35	4.50	4.24
12	10'-0"	2'-1"	5	10.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,358	3'-3	2'-4	6'-9	2'-4	1.50	303		1.7	1.0	1.80	1.69
	12'-0"	2'-1"	5	12.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,358	3'-3	2'-4	8'-9	2'-4	1.50	338		1.4	0.8	2.20	2.07
	14'-0"	2'-1"	5	14.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,358	3'-3	2'-4	10'-9	2'-4	1.50	373		1.1	0.6	2.70	2.53
	16'-0"	2'-1"	5	16.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,358	3'-3	2'-4	12'-9	2'-4	1.50	408		0.90	0.50	3.30	3.10
	18'-0"	2'-1"	5	18.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,358	3'-3	2'-4	14'-9	2'-4	1.50	443		0.75	0.42	3.90	3.67
	20'-0"	2'-1"	5	20.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,358	3'-3	2'-4	16'-9	2'-4	1.50	478		0.63	0.35	4.50	4.24
14	10'-0"	2'-1"	5	10.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,558	3'-3	2'-4	6'-9	2'-4	1.67	336	4,037	1.7	1.0	1.80	1.69
	12'-0"	2'-1"	5	12.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,558	3'-3	2'-4	8'-9	2'-4	1.67	374		1.4	0.8	2.20	2.07
	14'-0"	2'-1"	5	14.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,558	3'-3	2'-4	10'-9	2'-4	1.67	412		1.1	0.6	2.70	2.53
	16'-0"	2'-1"	5	16.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,558	3'-3	2'-4	12'-9	2'-4	1.67	451		0.90	0.50	3.30	3.10
	18'-0"	2'-1"	5	18.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,558	3'-3	2'-4	14'-9	2'-4	1.67	489		0.75	0.42	3.90	3.67
	20'-0"	2'-1"	5	20.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,558	3'-3	2'-4	16'-9	2'-4	1.67	528		0.63	0.35	4.50	4.24
16	10'-0"	2'-1"	5	10.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,758	3'-3	2'-4	6'-9	2'-4	1.83	369		1.7	1.0	1.80	1.69
	12'-0"	2'-1"	5	12.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,758	3'-3	2'-4	8'-9	2'-4	1.83	411		1.4	0.8	2.20	2.07
	14'-0"	2'-1"	5	14.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,758	3'-3	2'-4	10'-9	2'-4	1.83	454		1.1	0.6	2.70	2.53
	16'-0"	2'-1"	5	16.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,758	3'-3	2'-4	12'-9	2'-4	1.83	497		0.90	0.50	3.30	3.10
	18'-0"	2'-1"	5	18.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,758	3'-3	2'-4	14'-9	2'-4	1.83	540		0.75	0.42	3.90	3.67
	20'-0"	2'-1"	5	20.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,758	3'-3	2'-4	16'-9	2'-4	1.83	583		0.63	0.35	4.50	4.24
18	10'-0"	2'-1"	5	10.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,958	3'-3	2'-4	6'-9	2'-4	2.00	402		1.7	1.0	1.80	1.69
	12'-0"	2'-1"	5	12.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,958	3'-3	2'-4	8'-9	2'-4	2.00	447		1.4	0.8	2.20	2.07
	14'-0"	2'-1"	5	14.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,958	3'-3	2'-4	10'-9	2'-4	2.00	493		1.1	0.6	2.70	2.53
	16'-0"	2'-1"	5	16.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,958	3'-3	2'-4	12'-9	2'-4	2.00	539		0.90	0.50	3.30	3.10
	18'-0"	2'-1"	5	18.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,958	3'-3	2'-4	14'-9	2'-4	2.00	585		0.75	0.42	3.90	3.67
	20'-0"	2'-1"	5	20.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	1,958	3'-3	2'-4	16'-9	2'-4	2.00	631		0.63	0.35	4.50	4.24
20	10'-0"	2'-1"	5	10.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	2,158	3'-3	2'-4	6'-9	2'-4	2.17	435		1.7	1.0	1.80	1.69
	12'-0"	2'-1"	5	12.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	2,158	3'-3	2'-4	8'-9	2'-4	2.17	484		1.4	0.8	2.20	2.07
	14'-0"	2'-1"	5	14.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	2,158	3'-3	2'-4	10'-9	2'-4	2.17	533		1.1	0.6	2.70	2.53
	16'-0"	2'-1"	5	16.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	2,158	3'-3	2'-4	12'-9	2'-4	2.17	582		0.90	0.50	3.30	3.10
	18'-0"	2'-1"	5	18.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	2,158	3'-3	2'-4	14'-9	2'-4	2.17	631		0.75	0.42	3.90	3.67
	20'-0"	2'-1"	5	20.5	10	5	5	5	6	4	4	5	5	#8	#6	#6	2,158	3'-3	2'-4	16'-9	2'-4	2.17	680		0.63	0.35	4.50	4.24

HEADWALL AND TOEWALL QUANTITIES

HEADWALL BENT ANGLE	90° TO 75°			74° TO 60°			59° TO 45°		
CLEAR SPAN (S)	STIRRUPS #	STIRRUPS Z	REBAR QUANT. LBS/LF	STIRRUPS #	STIRRUPS Z	REBAR QUANT. LBS/LF	STIRRUPS #	STIRRUPS Z	REBAR QUANT. 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_3 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 (IF AVAILABLE IN THE TABLE).

▲ 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_3 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.

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Creation Date: 07/04/12 Initials: DDG		Date:	Comments
Last Modification Date: 04/05/19 Initials: JBE	(REV)	08/27/13	LRFD Design
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TRIPLE CONCRETE BOX CULVERT (CAST-IN-PLACE)

Issued By: Project Development Branch July 4, 2012

STANDARD PLAN NO.
M-601-3
Sheet No. 2 of 2

Is this applicable and has this been provided?

DESIGN DATA:

AASHTO LRFD EIGHTH EDITION, 2017
DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN, YIELD LINE METHOD

REINFORCED CONCRETE:
CONCRETE CLASS D (BOX CULVERT): f'_c = 4,500 PSI
REINFORCING STEEL: f_y = 60,000 PSI

LOADING:
AT-REST EARTH (FLUID) PRESSURE FOR CONCRETE STEM DESIGN = 55 PCF FOR 2 (MIN.) : 1 SLOPED BACKFILL
ACTIVE EARTH (FLUID) PRESSURE FOR CONCRETE FOOTING DESIGN = 40 PCF FOR 2 (MIN.) : 1 SLOPED BACKFILL
LIVE LOAD SURCHARGE = 2'
MINIMUM RESISTANCE FOR SOIL BEARING = 5.5 KSF
SOIL BEARING RESISTANCE FACTOR = 0.45

GENERAL NOTES:

1. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED $\frac{3}{4}$ IN.
2. WINGWALL FOOTING AND FLOOR OF BOX CULVERT SHALL BE PLACED MONOLITHICALLY.
3. DIMENSIONS "h", "h", "L", "m" AND ANGLE "θ" FOR WINGWALL SHALL BE AS SHOWN ON THE PLANS.
4. MINIMUM CLASS B LAP SPLICE LENGTH FOR BLACK REINFORCING BARS:

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

5. DESIGN DOES NOT CONSIDER ANY SCOUR EFFECTS.
6. WINGWALL DRAIN SHALL BE REQUIRED IF "h" ≥ 12.0 FT., SEE SHEET 2 OF 2 FOR DETAILS.

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Creation Date: 07/04/12 Initials: HHB		Date:	Comments
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WINGWALLS FOR PIPE OR BOX CULVERTS

Issued By: Project Development Branch July 4, 2012

STANDARD PLAN NO.
M-601-20
Sheet No. 1 of 2

c-BARS AND REINFORCING STEEL QUANTITY (EXCLUDE TOE WALL)

* REINFORCING STEEL QUANTITY INCLUDES STEM AND FOOTING QUANTITIES, BUT DOES NOT INCLUDE TOE WALL QUANTITIES.

L (MULTIPLE OF m) m (FT)	k (FT)	≤ (1.0 x m) c-BARS	* REINF. LB./L.F.	≤ (1.25 x m) c-BARS	* REINF. LB./L.F.	≤ (1.5 x m) c-BARS	* REINF. LB./L.F.	≤ (1.75 x m) c-BARS	* REINF. LB./L.F.	≤ (2.0 x m) c-BARS	* REINF. LB./L.F.	≤ (2.25 x m) c-BARS	* REINF. LB./L.F.	≤ (2.5 x m) c-BARS	* REINF. LB./L.F.	≤ (2.75 x m) c-BARS	* REINF. LB./L.F.	≤ (3.0 x m) c-BARS	* REINF. LB./L.F.	≤ (3.25 x m) c-BARS	* REINF. LB./L.F.	≤ (3.5 x m) c-BARS	* REINF. LB./L.F.
14	4	#4 @ 10"	53.60	#5 @ 10"	57.95	#5 @ 10"	57.10	#5 @ 8"	60.22	#5 @ 7"	62.43	#5 @ 7"	62.09	#5 @ 6"	65.35	#5 @ 6"	65.15	#6 @ 8"	67.10	#6 @ 8"	66.94	#6 @ 7"	70.66
	5	#4 @ 10"	55.86	#5 @ 10"	60.46	#5 @ 10"	59.60	#5 @ 8"	62.89	#5 @ 7"	65.23	#5 @ 7"	64.88	#5 @ 6"	68.34	#5 @ 6"	68.11	#6 @ 8"	70.17	#6 @ 8"	70.00	#6 @ 7"	73.90
	6	#5 @ 10"	64.43	#6 @ 10"	70.60	#6 @ 10"	69.69	#6 @ 8"	74.93	#6 @ 8"	74.45	#6 @ 7"	78.30	#6 @ 6"	83.64	#6 @ 6"	83.40	#6 @ 6"	83.22	#6 @ 6"	83.05	#7 @ 7"	89.64
	7	#5 @ 10"	67.29	#6 @ 10"	73.76	#6 @ 10"	72.83	#6 @ 8"	78.32	#6 @ 8"	77.84	#6 @ 7"	81.87	#6 @ 6"	87.45	#6 @ 6"	87.21	#6 @ 6"	87.02	#6 @ 6"	86.86	#7 @ 7"	93.73
	8	#5 @ 8"	74.71	#6 @ 8"	83.46	#6 @ 7"	87.09	#6 @ 6"	92.54	#7 @ 7"	99.47	#7 @ 7"	99.08	#7 @ 6"	107.11	#7 @ 6"	106.86	#7 @ 6"	106.66	#7 @ 6"	106.49	#7 @ 6"	106.35
	9	#5 @ 8"	78.10	#6 @ 8"	87.23	#6 @ 7"	91.03	#6 @ 6"	96.72	#7 @ 7"	103.93	#7 @ 7"	103.54	#7 @ 6"	111.90	#7 @ 6"	111.65	#7 @ 6"	111.45	#7 @ 6"	111.28	#7 @ 6"	111.13
13	4	#4 @ 10"	50.51	#4 @ 10"	49.25	#5 @ 10"	53.71	#5 @ 10"	53.09	#5 @ 10"	52.36	#5 @ 9"	53.85	#5 @ 8"	55.54	#5 @ 7"	57.85	#5 @ 7"	57.67	#5 @ 7"	57.51	#6 @ 9"	59.93
	5	#4 @ 10"	52.66	#4 @ 10"	51.37	#5 @ 10"	56.09	#5 @ 10"	55.46	#5 @ 10"	54.99	#5 @ 9"	56.29	#5 @ 8"	58.08	#5 @ 7"	60.51	#5 @ 7"	60.33	#5 @ 7"	60.17	#6 @ 9"	62.72
	6	#4 @ 10"	54.92	#5 @ 10"	59.48	#5 @ 9"	60.31	#5 @ 9"	67.56	#6 @ 9"	67.08	#6 @ 9"	66.70	#6 @ 8"	69.53	#6 @ 8"	69.28	#6 @ 7"	73.12	#6 @ 7"	72.95	#6 @ 7"	72.81
	7	#4 @ 10"	57.36	#5 @ 10"	62.16	#5 @ 9"	63.05	#6 @ 9"	70.66	#6 @ 9"	70.16	#6 @ 9"	69.78	#6 @ 8"	72.75	#6 @ 8"	72.50	#6 @ 7"	76.52	#6 @ 7"	76.35	#6 @ 7"	76.20
	8	#5 @ 10"	66.39	#6 @ 10"	72.82	#6 @ 8"	77.97	#6 @ 7"	81.68	#6 @ 7"	81.19	#6 @ 6"	86.67	#6 @ 6"	86.37	#7 @ 7"	93.18	#7 @ 7"	92.97	#7 @ 7"	92.80	#7 @ 7"	92.64
	9	#5 @ 8"	69.37	#6 @ 8"	76.10	#6 @ 8"	85.37	#6 @ 7"	89.37	#6 @ 7"	84.87	#6 @ 7"	90.59	#6 @ 6"	90.29	#7 @ 7"	97.39	#7 @ 7"	97.18	#7 @ 7"	97.00	#7 @ 7"	96.85
12	2	#4 @ 10"	43.91	#4 @ 10"	42.65	#4 @ 10"	41.82	#4 @ 10"	41.22	#4 @ 10"	40.78	#4 @ 9"	41.29	#5 @ 10"	44.61	#5 @ 10"	44.37	#5 @ 10"	44.18	#5 @ 10"	44.01	#5 @ 10"	43.87
	3	#4 @ 10"	45.82	#4 @ 10"	44.55	#4 @ 10"	43.71	#4 @ 10"	43.11	#4 @ 10"

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, $\theta°$	$\theta_a°$	$\theta_b°$
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

TRIPLE CONCRETE BOX CULVERT SECTION DETAIL

Include Figure on plans

WINGWALL (BOX CULVERT) SECTION DETAIL

PCD FILE NO. CDR-21-012

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

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Colorado Springs, Colorado 80903 (719) 453-0180

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

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EL PASO COUNTY, COLORADO
CONSTRUCTION DOCUMENTS
CULVERT DETAILS

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PROJECT NO. 196106001

SHEET 10

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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. GUARDRAIL ACROSS CULVERTS WITH A LENGTH OF 20 FT. OR LESS SHALL BE AS FOLLOWS:
   A. FILL HEIGHT AT GUARDRAIL POST 4B IN. OR GREATER: CONSTRUCTION AND PAYMENT WILL BE AS GUARDRAIL TYPE 3.
   B. FILL HEIGHT AT GUARDRAIL POST LESS THAN 48 IN. AND BLOCK FACE TO HEADWALL OFFSET OF 3 FT. OR GREATER: CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
   C. FILL HEIGHT AT GUARDRAIL POST 48 IN. OR LESS AND BLOCK FACE TO HEADWALL OFFSET LESS THAN 3 FT: CONSTRUCTION ACCORDING TO HEADWALL MOUNT DETAILS AND PAYMENT AS BRIDGE RAIL TYPE 3.
4. GUARDRAIL ACROSS CULVERTS WITH LENGTH GREATER THAN 20 FT. SHALL BE AS FOLLOWS:
   A. FILL HEIGHT AT GUARDRAIL POSTS 48 IN. OR GREATER: CONSTRUCTION AND PAYMENT WILL BE FOR STANDARD GUARDRAIL TYPE 3.
   B. FILL HEIGHT AT GUARDRAIL POSTS 48 IN. OR LESS: CONSTRUCTION AND PAYMENT IN ACCORDANCE WITH THE CONTRACT BRIDGE PLANS. WHEN BLOCK FACE TO HEADWALL OFFSET IS 3 FT. OR GREATER: CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
5. 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 A NEW STRUCTURE. FOR AN EXISTING STRUCTURE, THE RODS SHALL BE INSTALLED IN 1-1/4 IN. DIA HOLES WITH NON-SHRINK GROUT OR EPOXY CONFORMING TO ASTM C 881.
6. 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 (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.
7. 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.
8. POST ANCHORS, ENCASED IN CONCRETE, SHALL BE ASTM A 36 STEEL, AND NEED NOT BE GALVANIZED.
9. PRIOR TO FABRICATION OF BRIDGE RAIL, 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: Project Development Branch November 1, 2018

STANDARD PLAN NO. M-606-1

Sheet No. 19 of 19

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

NORMAL CENTER-TO-CENTER POST SPACING

GENERAL NOTES (CONTINUE ON SHEET 2)

1. TOLERANCE FOR TOP OF GUARDRAIL BEAM IS ±1 IN.
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 1½ 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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Division of Project Support JJP/LTA

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

Issued By: Project Development Branch November 1, 2018

STANDARD PLAN NO. M-606-1

Sheet No. 1 of 19

OFFSET NOTES

1. POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF POSTS.
2. THE GUARDRAIL BETWEEN POST (1) THRU (7) IS ON A STRAIGHT LINE FLARE.

SLOTTED RAIL TERMINAL (SRT-31)
(NCHRP 350 CERTIFIED)

END ANCHORAGES (FLARED)

NOTES

1. THE END ANCHORAGES (FLARED) SHALL EITHER BE THE SLOTTED RAIL TERMINAL SRT-31 AS MANUFACTURED BY TRINITY HIGHWAY PRODUCTS LLC (TELEPHONE #: 800-772-7976), OR THE FLEAT-350, 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. IN HEAVY SNOW LOCATIONS, TRIM POSTS (1) AND (2) OF THEY ARE WOODEN FLUSH WITH RAIL TOP AND TREAT END WITH SEALANT, IN CONFORMANCE WITH AASHTO M 133.
3. POSTS SHALL BE DRILLED FOR BREAKAWAY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
4. SEE SHEETS 1, 3 AND 5 FOR STANDARD GUARDRAIL TYPE 3 AND INSTALLATION DETAILS.
5. RETROREFLECTOR TABS SHALL NOT BE USED ON END ANCHORAGE POSTS.
6. DELINEATION ON THE CURB ON THE FACE, AND SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

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STANDARD PLAN NO. M-606-1

Sheet No. 6 of 19

PLAN VIEW
WIDENING FOR END ANCHORAGE (FLARED) *

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

PLAN VIEW
WIDENING FOR END ANCHORAGE (FLARED) WITH CURB OPTION A *

PLAN VIEW
WIDENING FOR END ANCHORAGE (FLARED) WITH CURB OPTION B *

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 T 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, 3, 5 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 MORE 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

Sheet No. 7 of 19

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

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SHEET 11

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STANDARD GUARDRAIL DETAILS

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 I 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 OR ASTM B 695, CLASS 50 TYPE 1	
HIGH STRENGTH BOLTS & NUTS	ASTM A 325		
HIGH STRENGTH STUDS & NUTS	ASTM A 449		
ROUND STEEL WASHERS	ASTM F 436		
RECTANGULAR WASHERS	AASHTO M 180		
OTHER FITTINGS	ASTM A 36	AASHTO M 111	

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.

TERMINAL SECTION (CONNECTOR)

THRIE BEAM
TERMINAL SECTION (CONNECTOR)

THRIE BEAM DETAIL

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	11/4	FULL (1 15/16)	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					

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M-606-1
Sheet No. 3 of 19

(PDB01 & PDE01)

WOOD POST & BLOCK
(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

STEEL POST & NOTCHED BLOCK
(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

(PWE01)

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 1¾ 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.
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 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 @@PDB01", @@PDE01", 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. GULUM 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.

TIMBER

STEEL

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

Computer File Information	
Creation Date: 11/01/18	Initials: JJP
Last Modification Date: 12/21/18	Initials: LTA
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Division of Project Support JJP/LTA

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

Issued By: Project Development Branch November 1, 2018

STANDARD PLAN NO.
M-606-1
Sheet No. 2 of 19

PCD FILE NO. CDR-21-012

NO.	REVISION	BY	DATE	APPR.
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

PRELIMINARY
FOR REVIEW ONLY
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Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
196106001

SHEET
12

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Culvert CDs_v2 redlines.pdf Markup Summary

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see comment on previous page regarding FG elevations.

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Include Figure on plans

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based on the contour it appears the wingwall needs to be extended.
Update all wingwall lengths.

Unresolved. Fix contours or extend retaining wall. The space between the contour lines indicated near vertical finished ground.