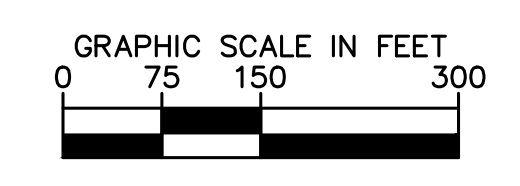
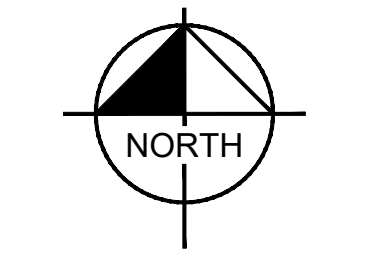
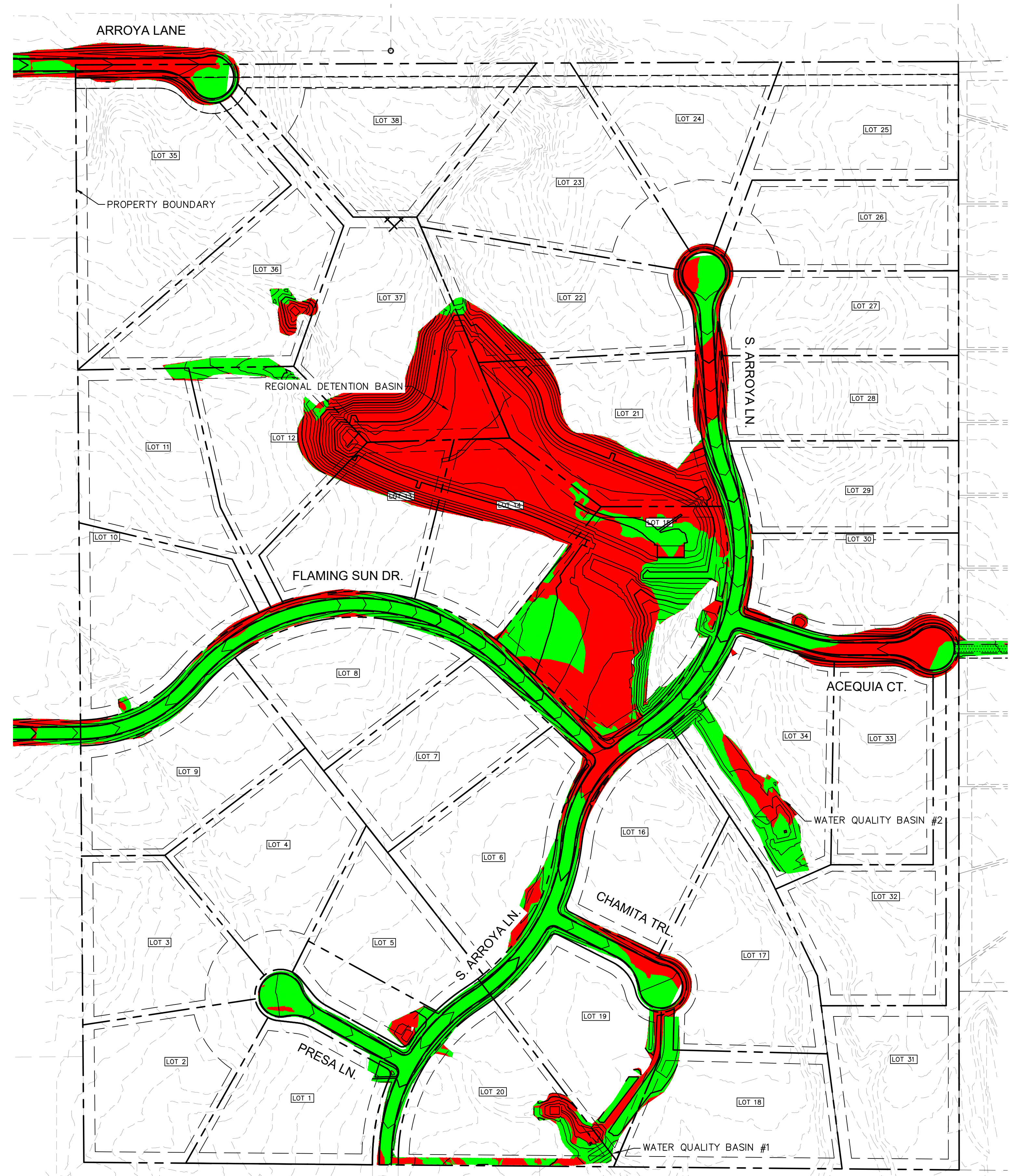


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LEGEND

- CUT AREA
- FILL AREA

TOTAL CUT: 92,000 CY
 TOTAL FILL: 33,500 CY
 NET: 58,500 CY (CUT)*
 REGIONAL POND: 81,600 CY (CUT)
 5,440 CY (FILL)
 *RAW NET VALUE - NO FILL FACTOR APPLIED
 VALUES DO NOT INCLUDE STREAM STABILIZATION
 EARTHWORK NUMBERS



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

NO.	REVISION	BY	DATE	APPR

Kimley»Horn
 2022 KIMLEY-HORN AND ASSOCIATES, INC.
 2 North Nevada Avenue Suite 900
 Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
 DRAWN BY: MJK
 CHECKED BY: KRK
 DATE: 12/23/2022

EAGLEVIEW
 EL PASO COUNTY, COLORADO
 GRADING AND EROSION CONTROL PLAN
 CUT FILL MAP

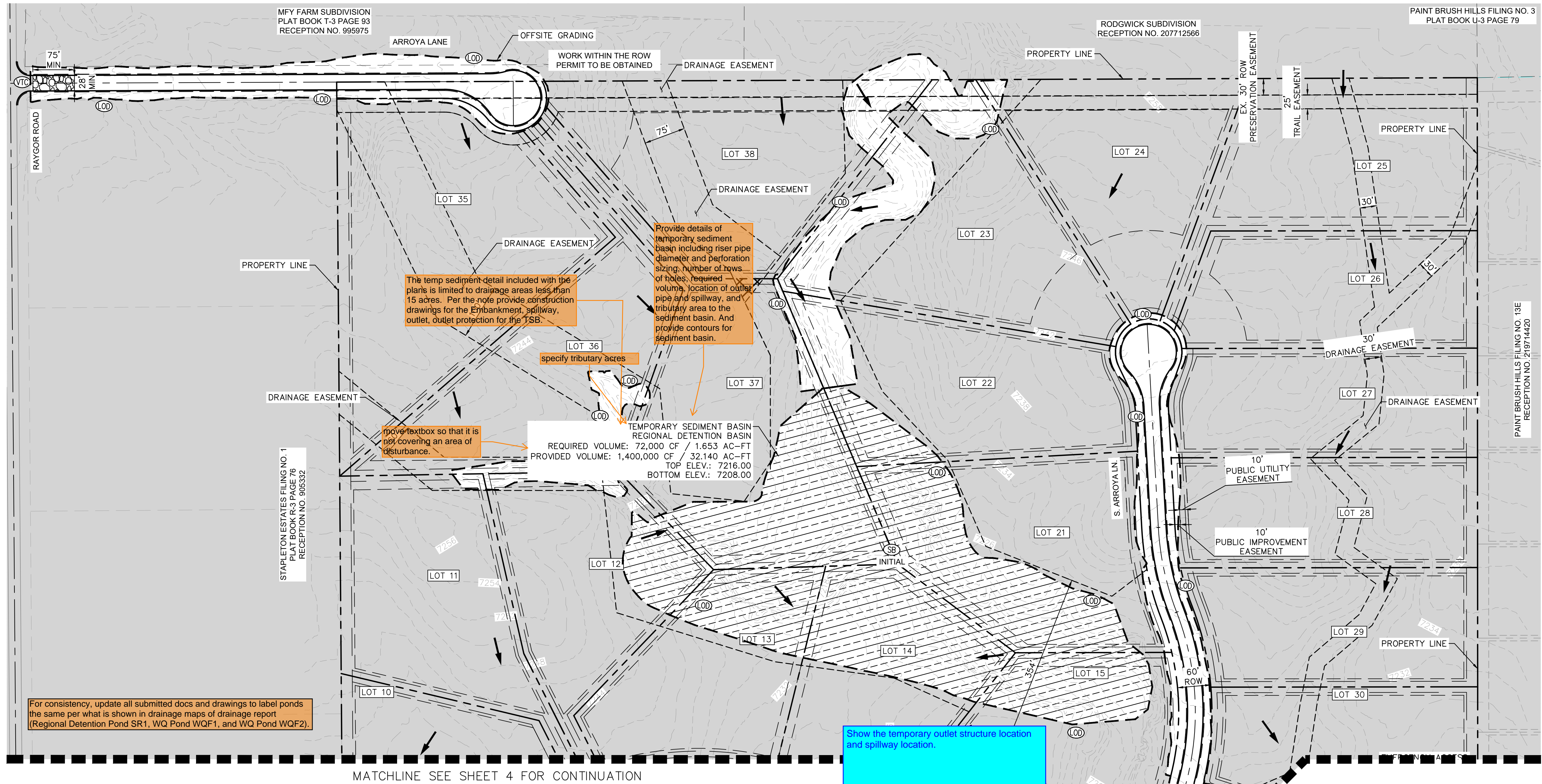
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 Kimley-Horn and Associates, Inc.

PROJECT NO.
 196106001

SHEET
 2

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For consistency, update all submitted docs and drawings to label ponds the same per what is shown in drainage maps of drainage report (Regional Detention Pond SR1, WQ Pond WQF1, and WQ Pond WQF2).

The temp sediment detail included with the plans is limited to drainage areas less than 15 acres. Per the note provide construction drawings for the Erybankment, spillway, outlet, outlet protection for the TSB.

Provide details of temporary sediment basin including riser pipe diameter and perforation sizing, number of rows of holes, required volume, location of outlet pipe and spillway, and tributary area to the sediment basin. And provide contours for sediment basin.

specify tributary acres

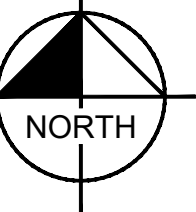
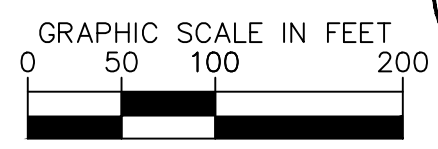
move textbox so that it is not covering an area of disturbance.

TEMPORARY SEDIMENT BASIN REGIONAL DETENTION BASIN
REQUIRED VOLUME: 72,000 CF / 1.653 AC-FT
PROVIDED VOLUME: 1,400,000 CF / 32.140 AC-FT
TOP ELEV.: 7216.00
BOTTOM ELEV.: 7208.00

Show the temporary outlet structure location and spillway location.

Correct property line to heavy black line all sheets

show grading for TSBs



MATCHLINE SEE SHEET 4 FOR CONTINUATION

LIMITS OF CONSTRUCTION

ONSITE DISTURBANCE	= ±34.02 ACRES
OFFSITE DISTURBANCE	= ±0.00 ACRES
TOTAL	= ±34.02 ACRES

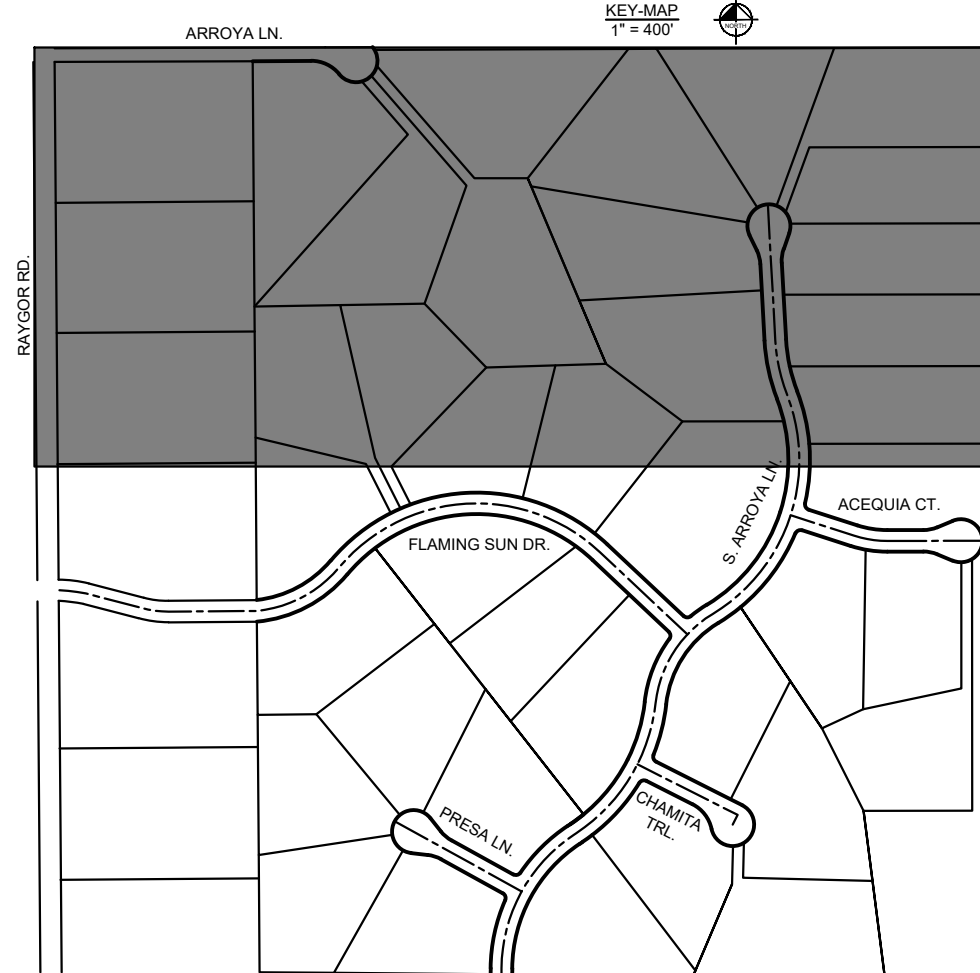
LEGEND

- PROPERTY LINE
- DRAINAGE EASEMENT
- LIMITS OF DISTURBANCE/CONSTRUCTION
- SILT FENCE
- CONSTRUCTION FENCE
- SEDIMENT CONTROL LOGS
- CONCRETE WASHOUT AREA
- STABILIZED STAGING AREA

- EROSION CONTROL BLANKET
- VEHICLE TRACKING CONTROL
- SOIL STOCKPILE
- TEMPORARY SEDIMENT BASIN
- EXISTING FLOW ARROW
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR

NOTES

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Kimley»Horn
2022 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
DRAWN BY: MJK
CHECKED BY: KRK
DATE: 12/23/2022

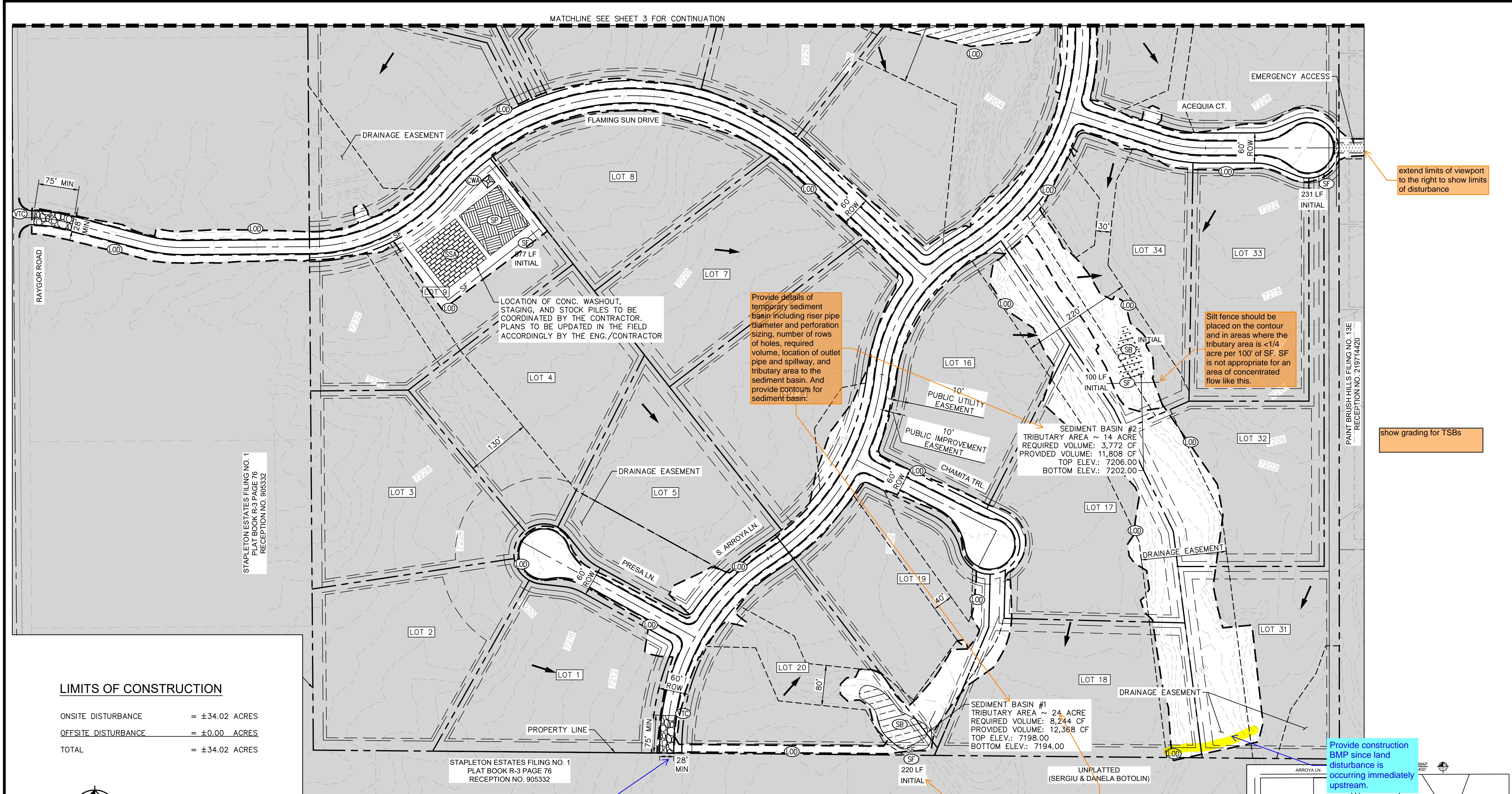
EAGLEVIEW
EL PASO COUNTY, COLORADO
GRADING AND EROSION CONTROL PLAN
INITIAL GEC PLAN

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Kimley»Horn and Associates, Inc.

PROJECT NO. 196106001
SHEET 3

NO.	REVISION	BY	DATE	APPR.

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extend limits of viewport to the right to show limits of disturbance

Silt fence should be placed on the contour and in areas where the tributary area is <1/4 acre per 100' of SF. SF is not appropriate for an area of concentrated flow like this.

show grading for TSBs

Provide construction BMP since land disturbance is occurring immediately upstream.

This access does not seem necessary. Recommend replacing with a temporary barricade and limiting traffic through Flaming Sun Dr.

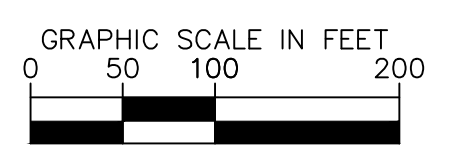
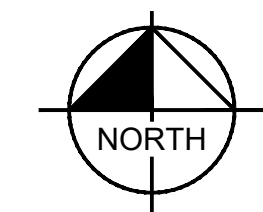
Provide details of temporary sediment basin including riser pipe diameter and perforation sizing, number of rows of holes, required volume, location of outlet pipe and spillway, and tributary area to the sediment basin. And provide contours for sediment basin.

SEDIMENT BASIN #2
TRIBUTARY AREA ~ 14 ACRE
REQUIRED VOLUME: 3,772 CF
PROVIDED VOLUME: 11,808 CF
TOP ELEV.: 7206.00
BOTTOM ELEV.: 7202.00

SEDIMENT BASIN #1
TRIBUTARY AREA ~ 24 ACRE
REQUIRED VOLUME: 8,244 CF
PROVIDED VOLUME: 12,368 CF
TOP ELEV.: 7198.00
BOTTOM ELEV.: 7194.00

LIMITS OF CONSTRUCTION

ONSITE DISTURBANCE	= ±34.02 ACRES
OFFSITE DISTURBANCE	= ±0.00 ACRES
TOTAL	= ±34.02 ACRES



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LEGEND

	PROPERTY LINE		ECB EROSION CONTROL BLANKET
	DRAINAGE EASEMENT		VTC VEHICLE TRACKING CONTROL
	LIMITS OF DISTURBANCE/CONSTRUCTION		SS SOIL STOCKPILE
	SILT FENCE		SB TEMPORARY SEDIMENT BASIN
	CONSTRUCTION FENCE		EXISTING FLOW ARROW
	SEDIMENT CONTROL LOGS		EXISTING MINOR CONTOUR
	CONCRETE WASHOUT AREA		EXISTING MAJOR CONTOUR
	STABILIZED STAGING AREA		PROPOSED MAJOR CONTOUR
			PROPOSED MINOR CONTOUR

Kimley & Horn
2022 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
DRAWN BY: MJK
CHECKED BY: KRK
DATE: 12/23/2022

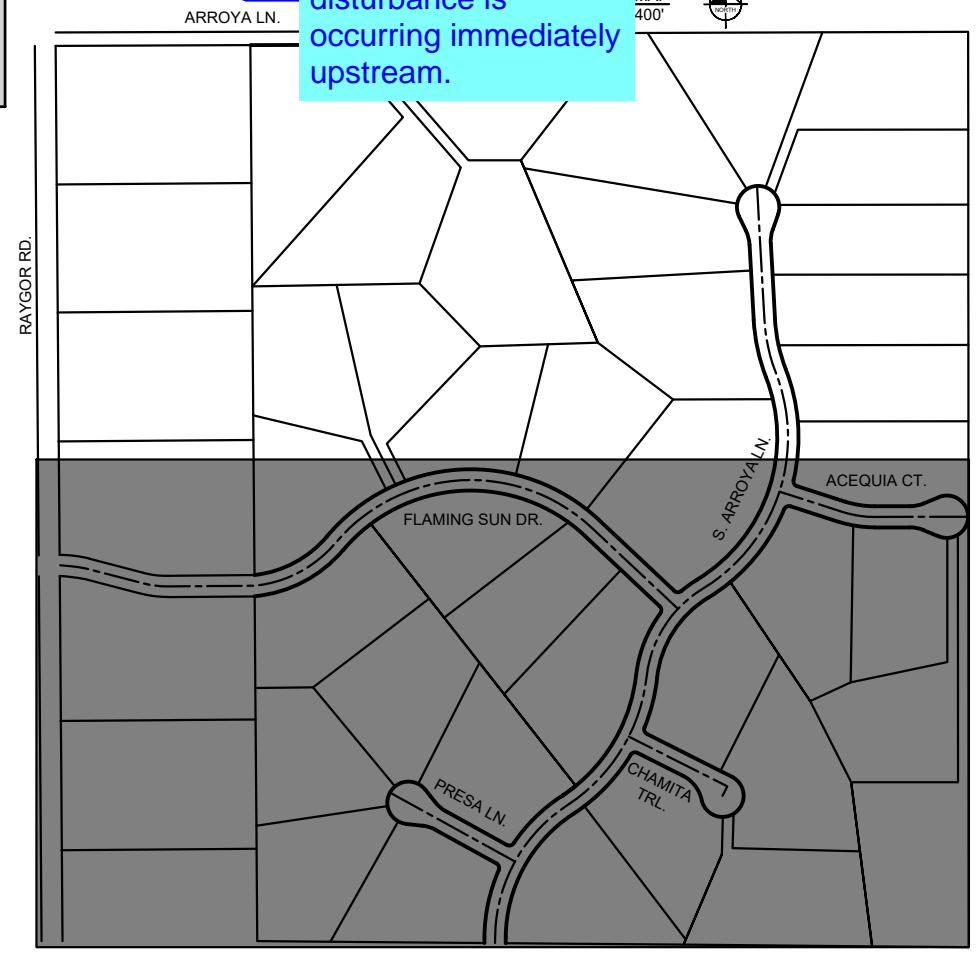
**EAGLEVIEW
EL PASO COUNTY, COLORADO
GRADING AND EROSION CONTROL PLAN
INITIAL GEC PLAN**

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CONSTRUCTION

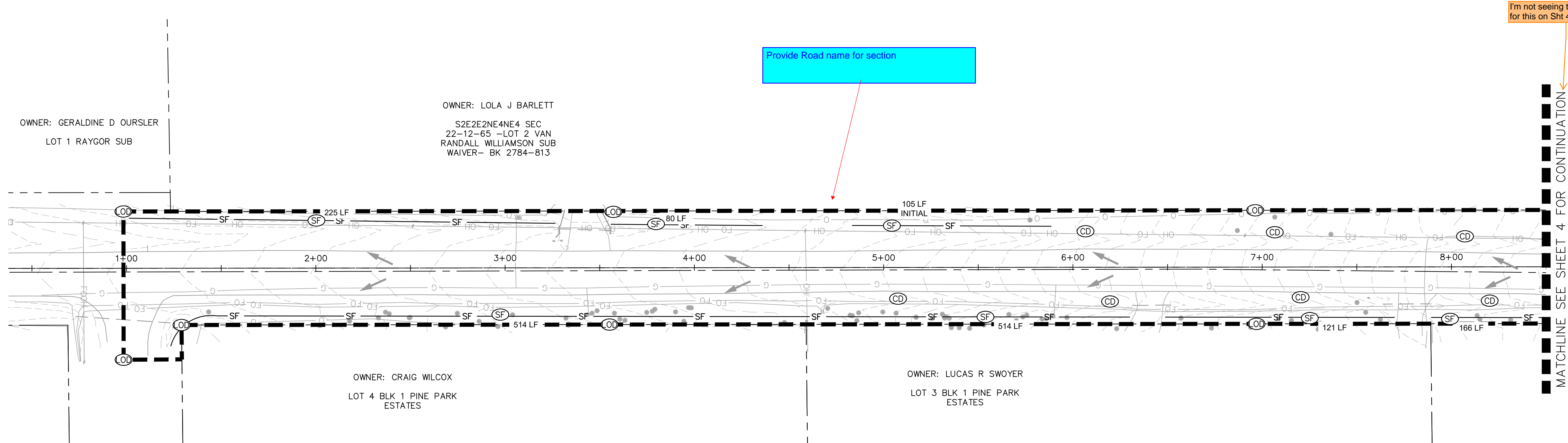
PROJECT NO.
196106001

SHEET
4

NO.	REVISION	BY	DATE	APPR.



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NOTES

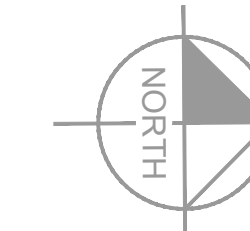
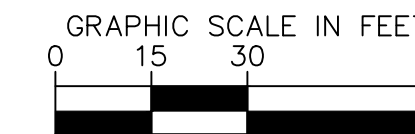
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LEGEND

	PROPERTY LINE		
	LIMITS OF DISTURBANCE/CONSTRUCTION	SIZE OF SCL (STRAW WADDLE)	SPACING (PER VERTICAL FEET OF FALL)
	SILT FENCE	9 INCH	1.5 FEET
	CHECK DAMS (NOTE 8)	12 INCH	2 FEET
	CULVERT INLET/OUTLET PROTECTION	16 INCH	2.67 FEET
	FLOW ARROW		
	EXISTING MINOR CONTOUR		
	EXISTING MAJOR CONTOUR		
	PROPOSED MAJOR CONTOUR		
	PROPOSED MINOR CONTOUR		

LIMITS OF CONSTRUCTION

ONSITE DISTURBANCE	= ±0.00 ACRES
OFFSITE DISTURBANCE	= ±2.55 ACRES
TOTAL	= ±2.55 ACRES



I'm not seeing the matchline for this on Sht 4.

MATCHLINE SEE SHEET 4 FOR CONTINUATION

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
 2022 KIMLEY-HORN AND ASSOCIATES, INC.
 2 North Nevada Avenue Suite 900
 Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
 DRAWN BY: MJK
 CHECKED BY: KRK
 DATE: 12/23/2022

EAGLEVIEW
 EL PASO COUNTY, COLORADO
 GRADING AND EROSION CONTROL PLAN
 OFF-SITE INITIAL GEC PLAN

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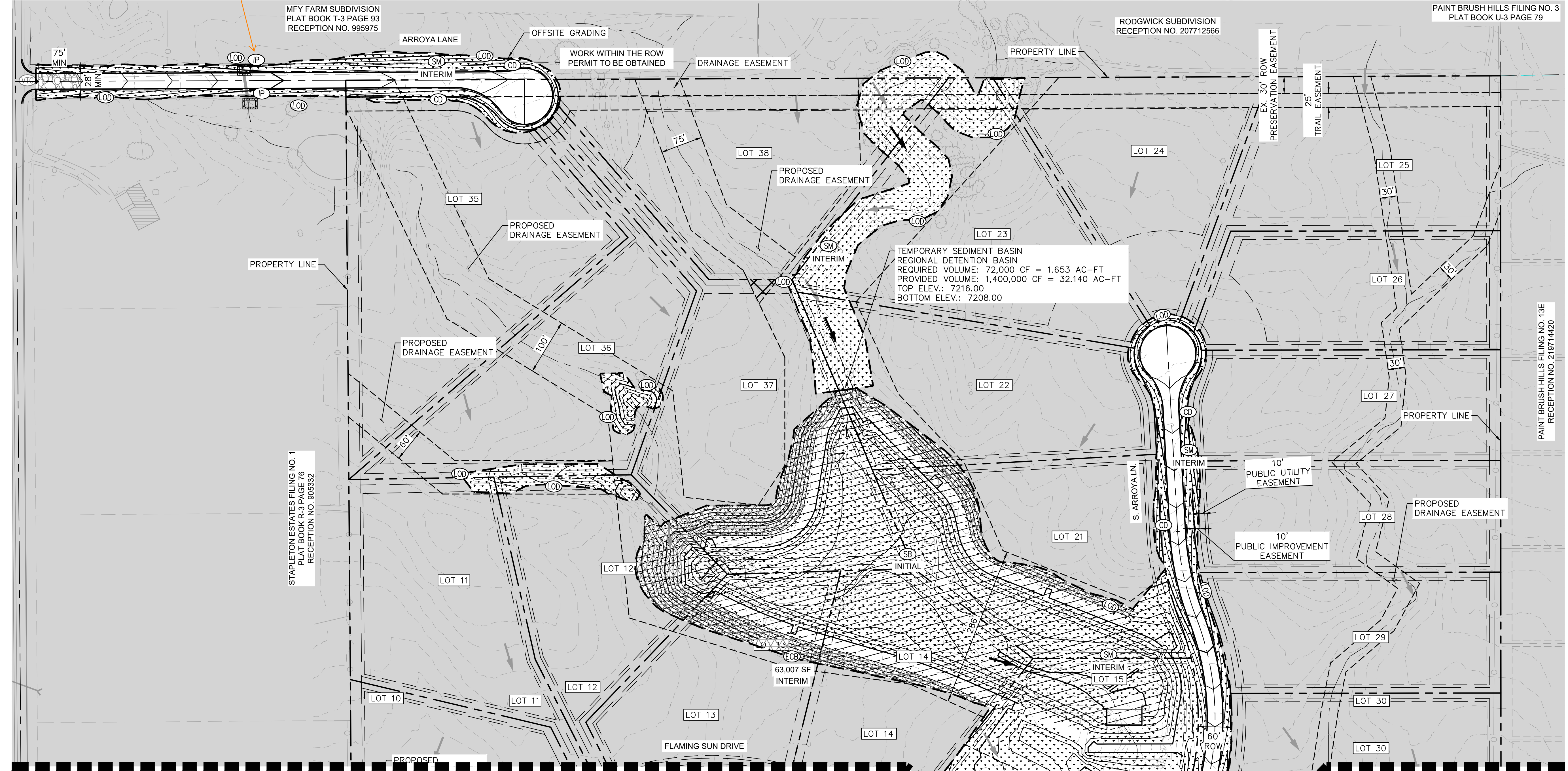
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196106001

SHEET
5



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Provide detail on final sheets for IP.



MFY FARM SUBDIVISION
PLAT BOOK T-3 PAGE 93
RECEPTION NO. 995975

RODGWICK SUBDIVISION
RECEPTION NO. 207712566

PAINT BRUSH HILLS FILING NO. 3
PLAT BOOK U-3 PAGE 79

STAPLETON ESTATES FILING NO. 1
PLAT BOOK R-3 PAGE 76
RECEPTION NO. 905332

PAINT BRUSH HILLS FILING NO. 13E
RECEPTION NO. 219714420

MATCHLINE SEE SHEET 8 FOR CONTINUATION

SIZE OF SCL (STRAW WADDLE)	SPACING (PER VERTICAL FEET OF FALL)
9 INCH	1.5 FEET
12 INCH	2 FEET
16 INCH	2.67 FEET

NOTES

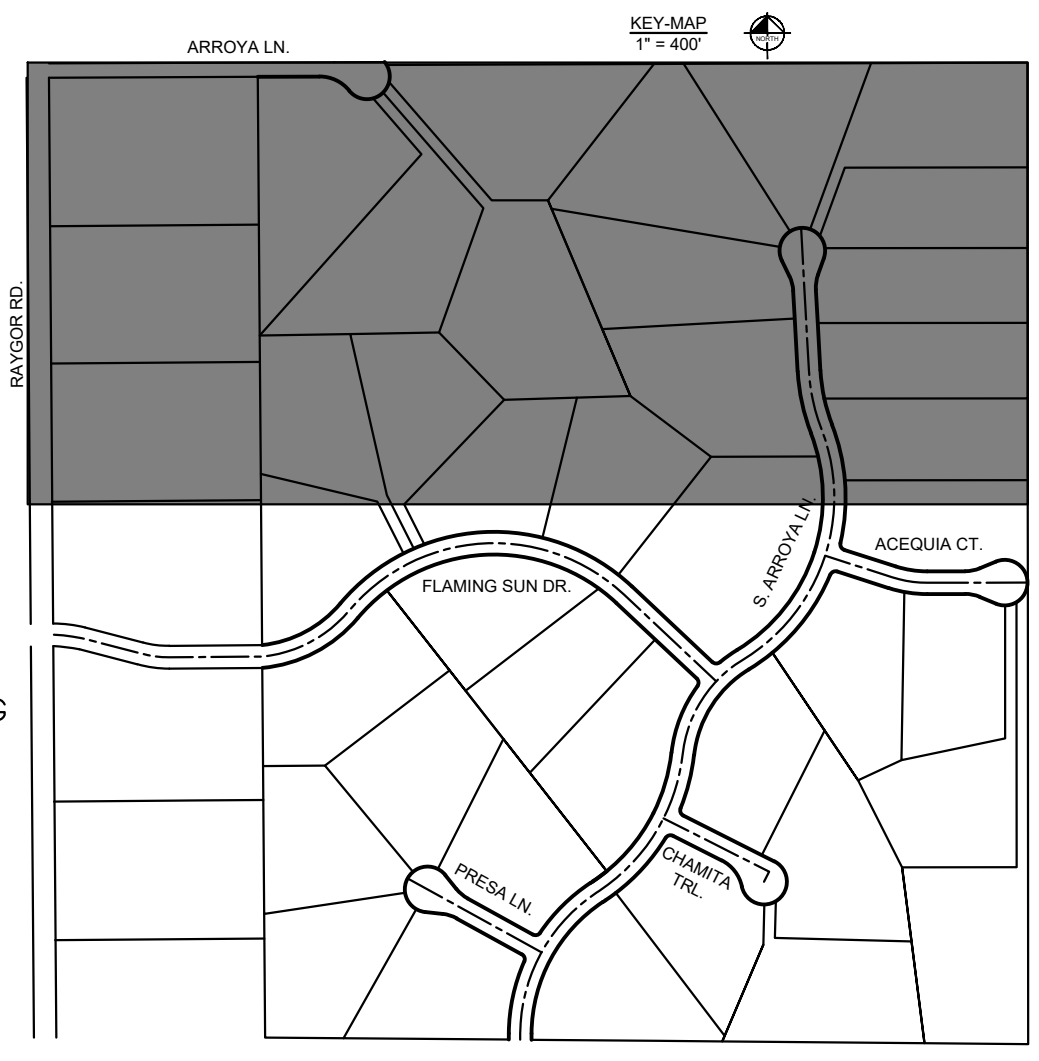
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LIMITS OF CONSTRUCTION

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OFFSITE DISTURBANCE	= ±0.00 ACRES
TOTAL	= ±34.02 ACRES

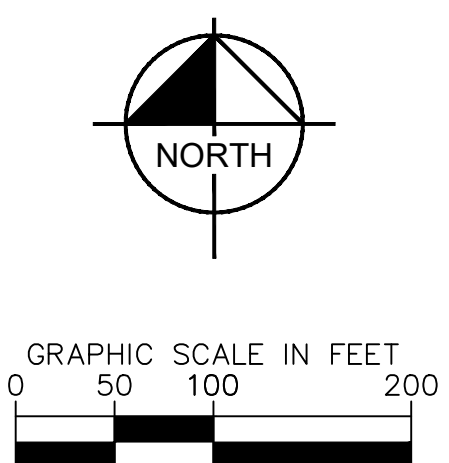
LEGEND

	PROPERTY LINE		EROSION CONTROL BLANKET
	DRAINAGE EASEMENT		VEHICLE TRACKING CONTROL
	LIMITS OF DISTURBANCE/CONSTRUCTION		SOIL STOCKPILE
	SILT FENCE		TEMPORARY SEDIMENT BASIN
	CONSTRUCTION FENCE		TEMP./PERM. SEEDING AND MULCHING
	CULVERT INLET/OUTLET PROTECTION		EXISTING FLOW ARROW
	CONCRETE WASHOUT AREA		EXISTING MINOR CONTOUR
	STABILIZED STAGING AREA		EXISTING MAJOR CONTOUR
	CHECK DAMS (NOTE 8)		PROPOSED MAJOR CONTOUR
			PROPOSED MINOR CONTOUR



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Clarify that this is referencing the table on the left, not on some detail below. But also provide a detail on final sheets for CDs and SCLs

Turn on proposed major contour labels on this sheet.

NO.	REVISION	BY	DATE	APPR

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2 North Nevada Avenue Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

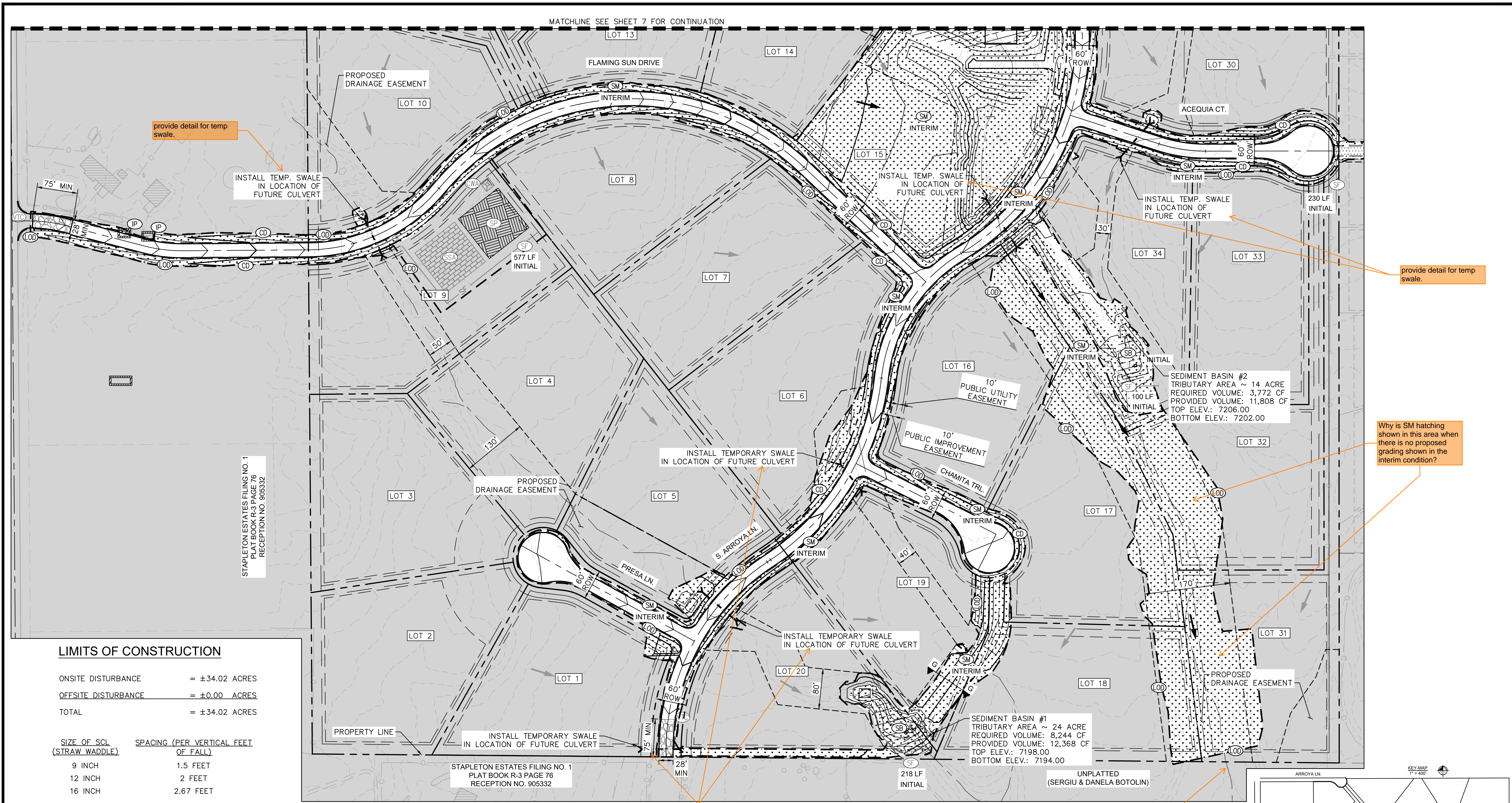
DESIGNED BY: MJK
DRAWN BY: MJK
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EAGLEVIEW
EL PASO COUNTY, COLORADO
GRADING AND EROSION CONTROL PLAN
INTERIM GEC PLAN

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PROJECT NO.
196106001
SHEET
7

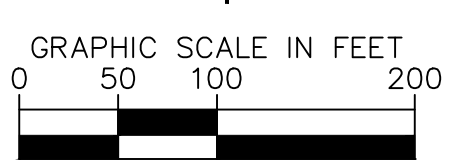
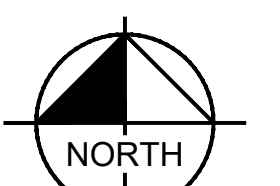
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LIMITS OF CONSTRUCTION

ON-SITE DISTURBANCE	= ±34.02 ACRES
OFF-SITE DISTURBANCE	= ±0.00 ACRES
TOTAL	= ±34.02 ACRES

SIZE OF SCL (STRAW WADDLE)	SPACING (PER VERTICAL FEET OF FALL)
9 INCH	1.5 FEET
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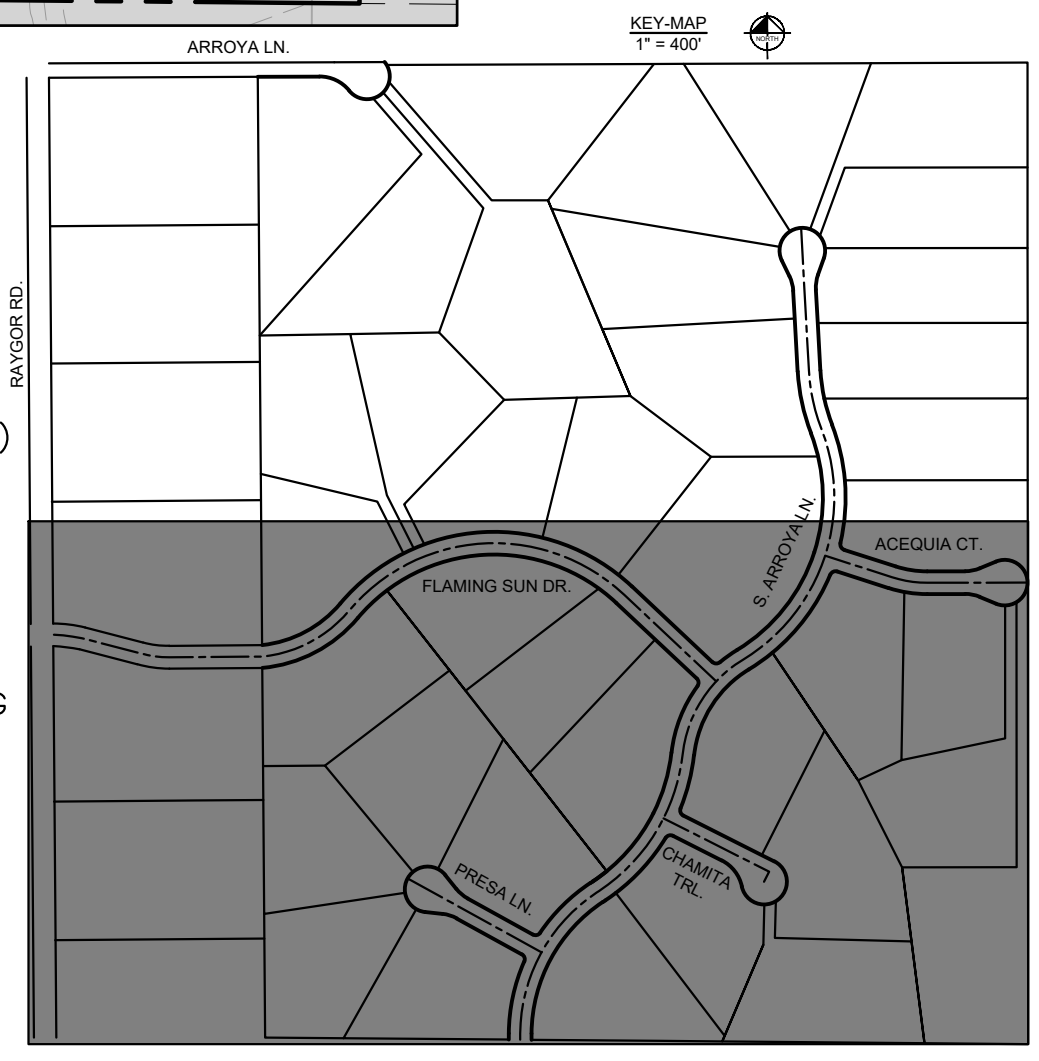


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LEGEND

---	PROPERTY LINE	[Pattern]	ECB	EROSION CONTROL BLANKET (NOTE 4)
---	DRAINAGE EASEMENT	[Pattern]	VTC	VEHICLE TRACKING CONTROL
---	LIMITS OF DISTURBANCE/CONSTRUCTION	[Pattern]	SS	SOIL STOCKPILE
SF	SILT FENCE	[Pattern]	SB	TEMPORARY SEDIMENT BASIN
CF	CONSTRUCTION FENCE	[Pattern]	SM	TEMP./PERM. SEEDING AND MULCHING
IP	CULVERT INLET/OUTLET PROTECTION	[Symbol]	---	EXISTING FLOW ARROW
CWA	CONCRETE WASHOUT AREA	[Symbol]	-64XX-	EXISTING MINOR CONTOUR
SSA	STABILIZED STAGING AREA	[Symbol]	-64XX-	EXISTING MAJOR CONTOUR
CD	CHECK DAMS (NOTE 8)	[Symbol]	-54XX-	PROPOSED MAJOR CONTOUR
		[Symbol]	-54XX-	PROPOSED MINOR CONTOUR



provide detail for temp swale.

show this linetype on the Legend.

If any is shown on plans, provide a detail for CF in final sheets.

Turn on proposed major contour labels on this sheet.

NO.	REVISION	BY	DATE	APPR

Kimley»Horn
 2022 KIMLEY-HORN AND ASSOCIATES, INC.
 2 North Nevada Avenue Suite 900
 Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
 DRAWN BY: MJK
 CHECKED BY: KRK
 DATE: 12/23/2022

EAGLEVIEW
 EL PASO COUNTY, COLORADO
 GRADING AND EROSION CONTROL PLAN
 INTERIM GEC PLAN

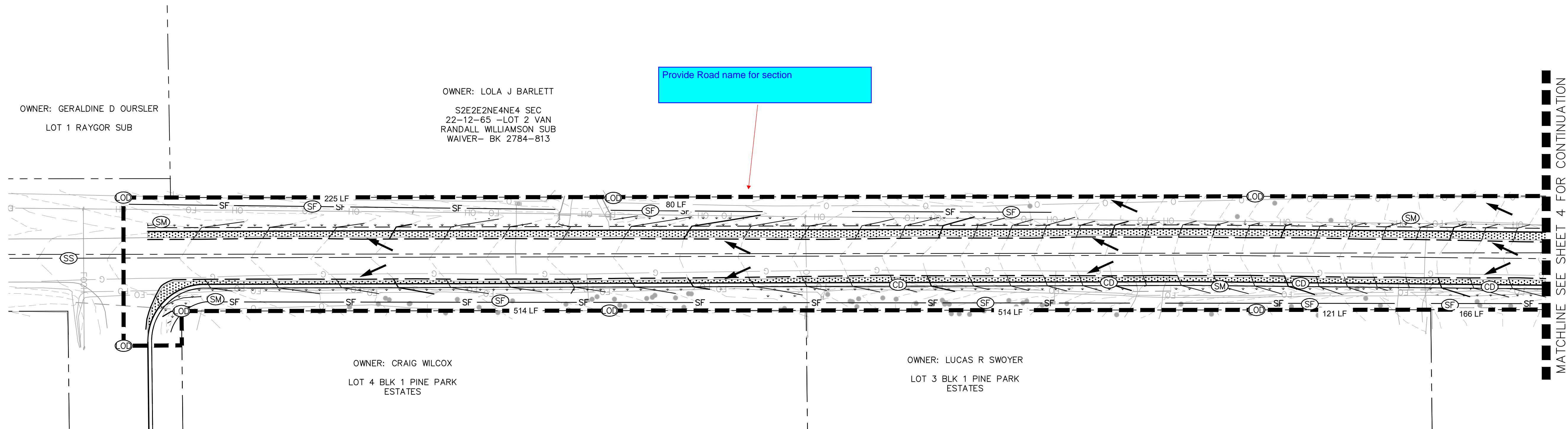
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Kimley»Horn
 Kimley-Horn and Associates, Inc.

PROJECT NO.
196106001

SHEET
8

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NOTES

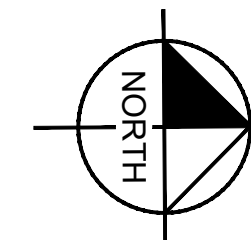
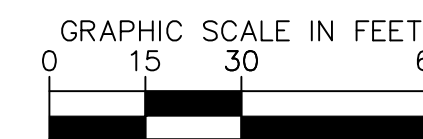
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LEGEND

	PROPERTY LINE		SIZE OF SCL (STRAW WADDLE)		SPACING (PER VERTICAL FEET OF FALL)
	LIMITS OF DISTURBANCE/CONSTRUCTION		9 INCH		1.5 FEET
	SILT FENCE		12 INCH		2 FEET
	CHECK DAMS (NOTE 8)		16 INCH		2.67 FEET
	CULVERT INLET/OUTLET PROTECTION				
	TEMP./PERM. SEEDING AND MULCHING				
	FLOW ARROW				
	EXISTING MINOR CONTOUR				
	EXISTING MAJOR CONTOUR				
	PROPOSED MAJOR CONTOUR				
	PROPOSED MINOR CONTOUR				

LIMITS OF CONSTRUCTION

ONSITE DISTURBANCE	= ±0.00 ACRES
OFFSITE DISTURBANCE	= ±2.55 ACRES
TOTAL	= ±2.55 ACRES



MATCHLINE SEE SHEET 4 FOR CONTINUATION

NO.	REVISION	BY	DATE	APPR.

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 2 North Nevada Avenue Suite 900
 Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
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 CHECKED BY: KKK
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EAGLEVIEW
EL PASO COUNTY, COLORADO
GRADING AND EROSION CONTROL PLAN
OFF-SITE INTERIM GEC PLAN

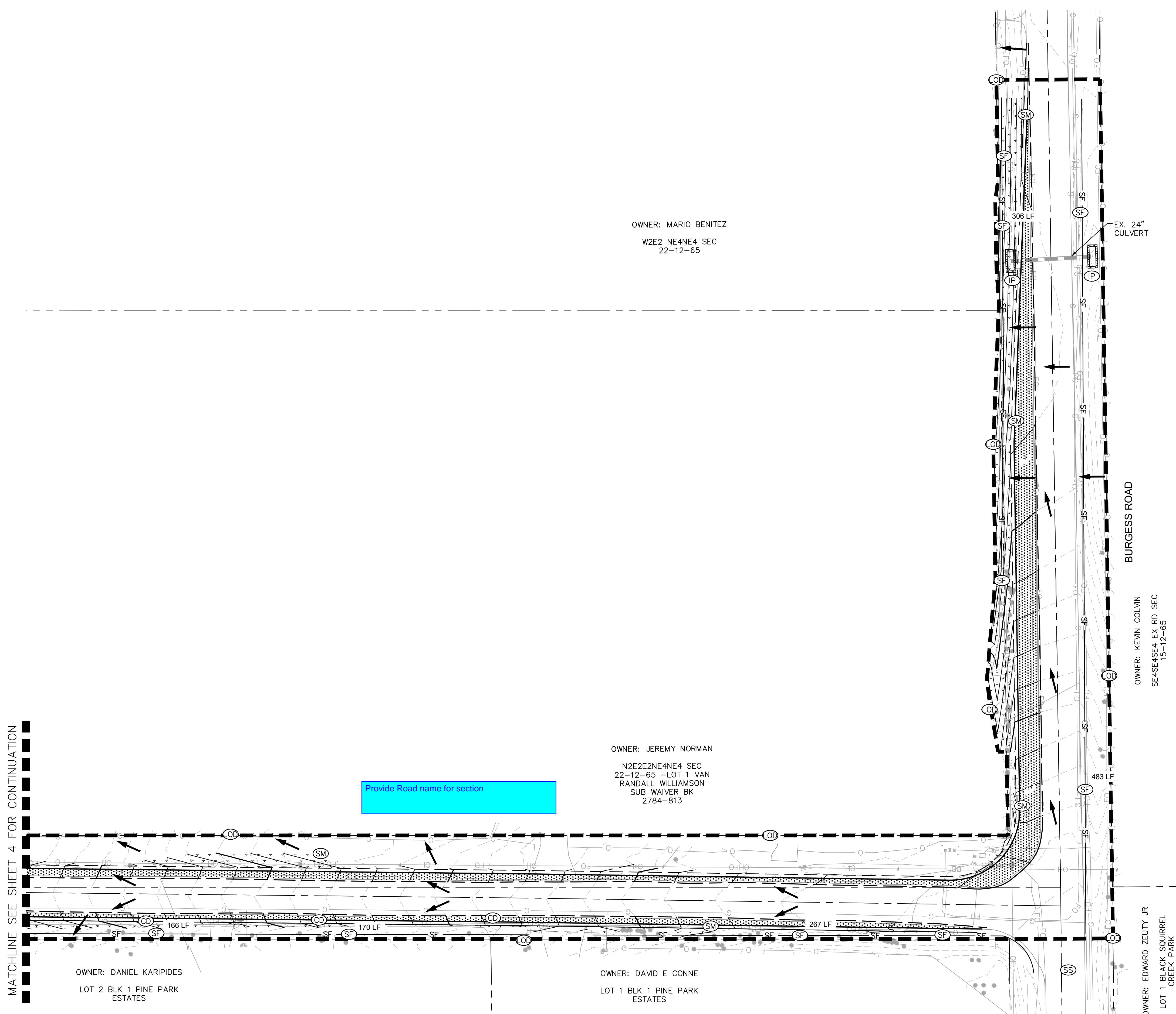
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 BEFORE YOU DIG, GRADE, OR EXCAVATE
 FOR THE MARKING OF UNDERGROUND
 MEMBER UTILITIES

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Provide Road name for section

NOTES

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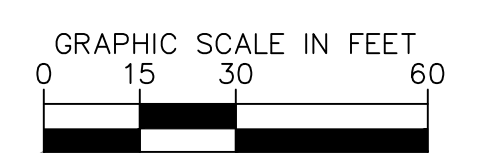
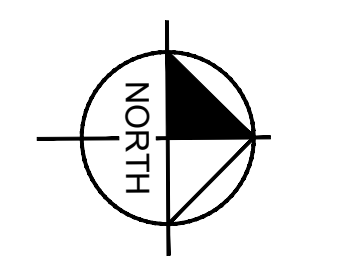
LEGEND

- PROPERTY LINE
- OD LIMITS OF DISTURBANCE/CONSTRUCTION
- SF SILT FENCE
- CD CHECK DAMS (NOTE 8)
- IP CULVERT INLET/OUTLET PROTECTION
- SM TEMP./PERM. SEEDING AND MULCHING
- FLOW ARROW
- 64XX EXISTING MINOR CONTOUR
- 64XX EXISTING MAJOR CONTOUR
- 54XX PROPOSED MAJOR CONTOUR
- 54XX PROPOSED MINOR CONTOUR

SIZE OF SCL (STRAW WADDLE)	SPACING (PER VERTICAL FEET OF FALL)
9 INCH	1.5 FEET
12 INCH	2 FEET
16 INCH	2.67 FEET

LIMITS OF CONSTRUCTION

ONSITE DISTURBANCE	= ±0.00 ACRES
OFFSITE DISTURBANCE	= ±2.55 ACRES
TOTAL	= ±2.55 ACRES



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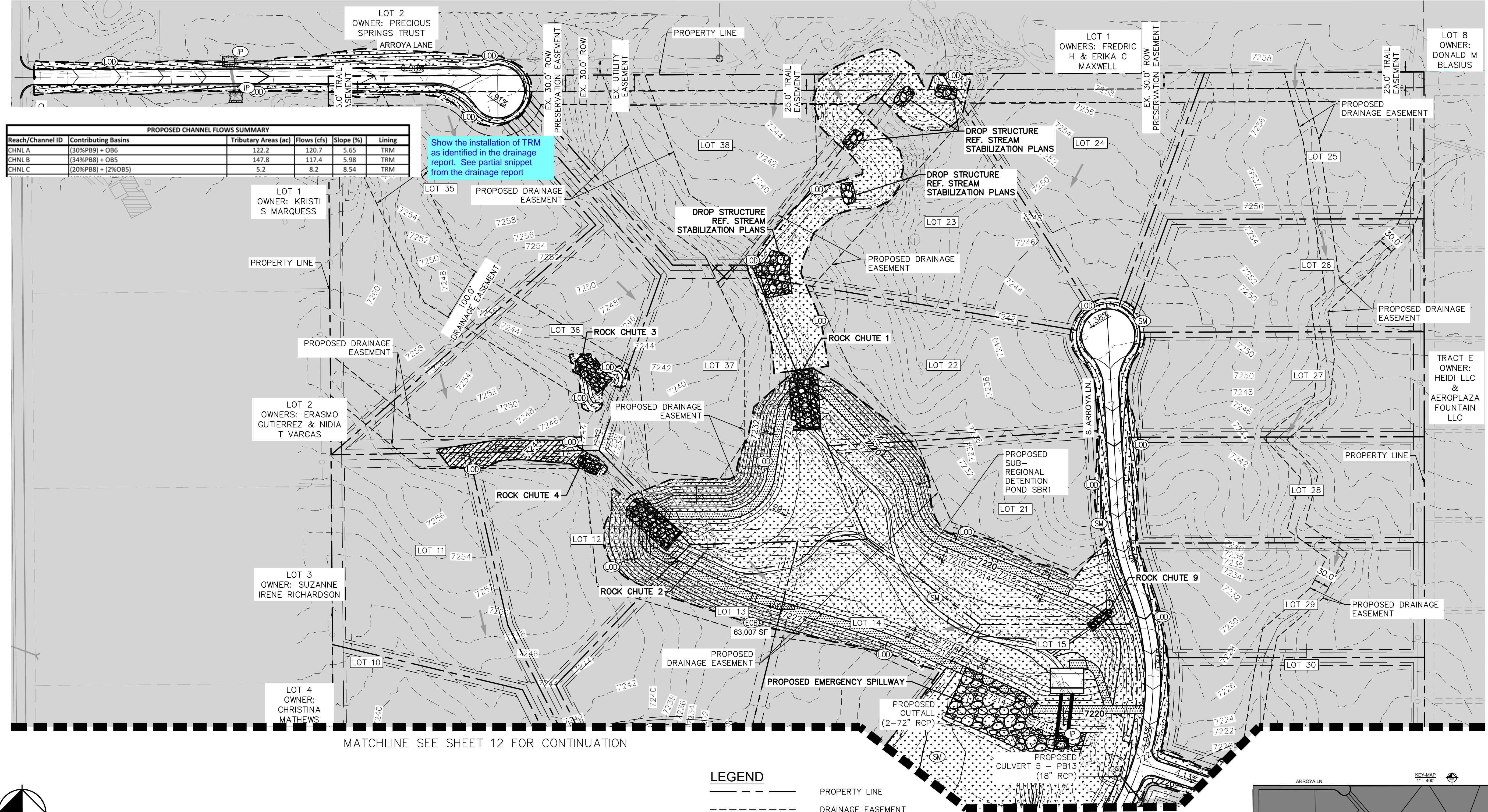
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GRADING AND EROSION CONTROL PLAN
 OFFSITE - INTERIM GEC PLAN

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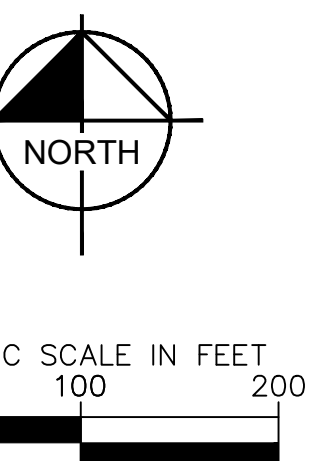
PROJECT NO.
 196106001
 SHEET
 10



PROPOSED CHANNEL FLOWS SUMMARY					
Reach/Channel ID	Contributing Basins	Tributary Areas (ac)	Flows (cfs)	Slope (%)	Lining
CHNL A	30%PB9) + OB6	122.2	120.7	5.65	TRM
CHNL B	34%PB8) + OB5	147.8	117.4	5.98	TRM
CHNL C	20%PB8) + (2%OB5)	5.2	8.2	8.54	TRM

Show the installation of TRM as identified in the drainage report. See partial snippet from the drainage report

MATCHLINE SEE SHEET 12 FOR CONTINUATION



NOTES

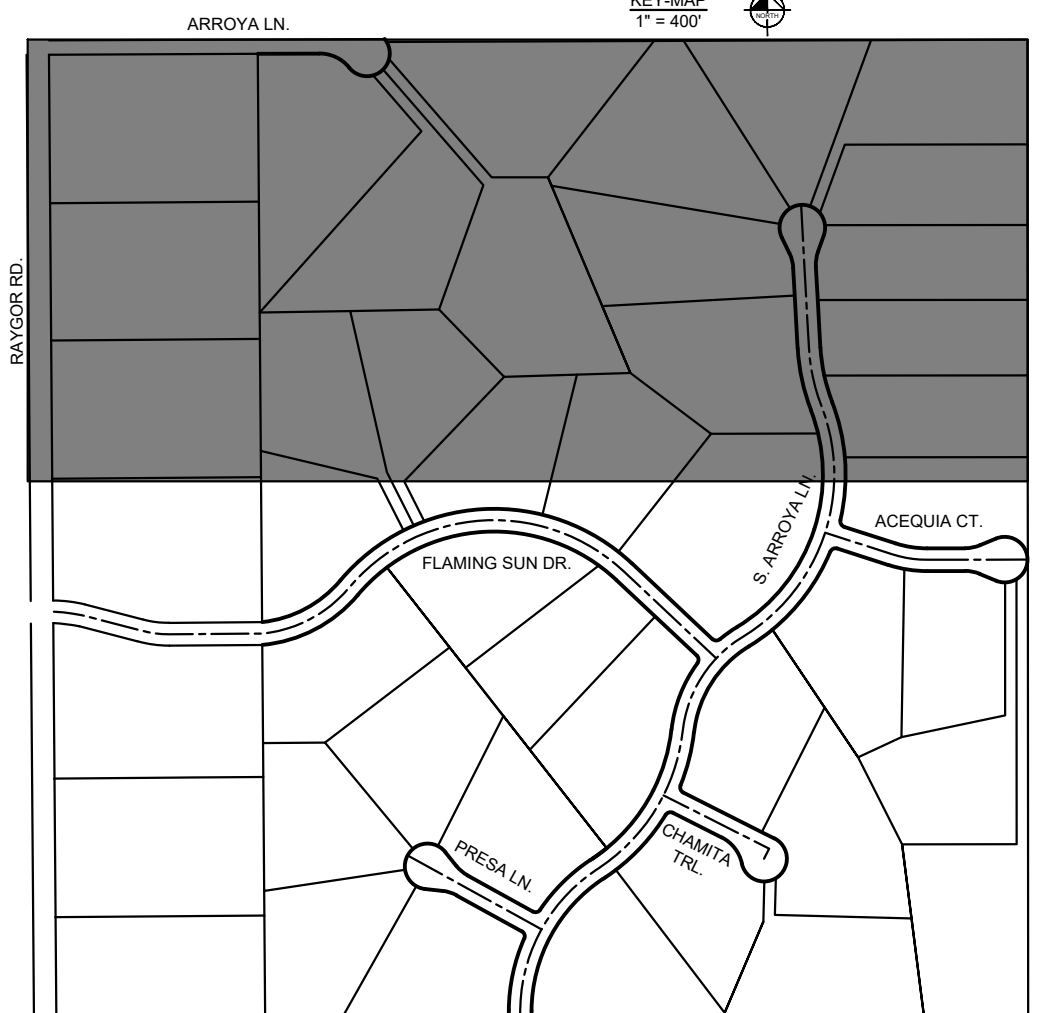
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- ⊙ LIMITS OF DISTURBANCE
- ⊙ EROSION CONTROL BLANKET
- ⊙ PERMANENT SEEDING AND MULCHING
- ⊙ CULVERT INLET/OUTLET PROTECTION
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- - -64XX- - - EXISTING MINOR CONTOUR
- - -64XX- - - EXISTING MAJOR CONTOUR
- - -54XX- - - PROPOSED MAJOR CONTOUR
- - -54XX- - - PROPOSED MINOR CONTOUR

LIMITS OF CONSTRUCTION

ONSITE DISTURBANCE	= ±34.02 ACRES
OFFSITE DISTURBANCE	= ±0.00 ACRES
TOTAL	= ±34.02 ACRES



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Kimley»Horn
2022 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
DRAWN BY: MJK
CHECKED BY: KRK
DATE: 12/23/2022

EAGLEVIEW
EL PASO COUNTY, COLORADO
GRADING AND EROSION CONTROL PLAN
FINAL GEC PLAN

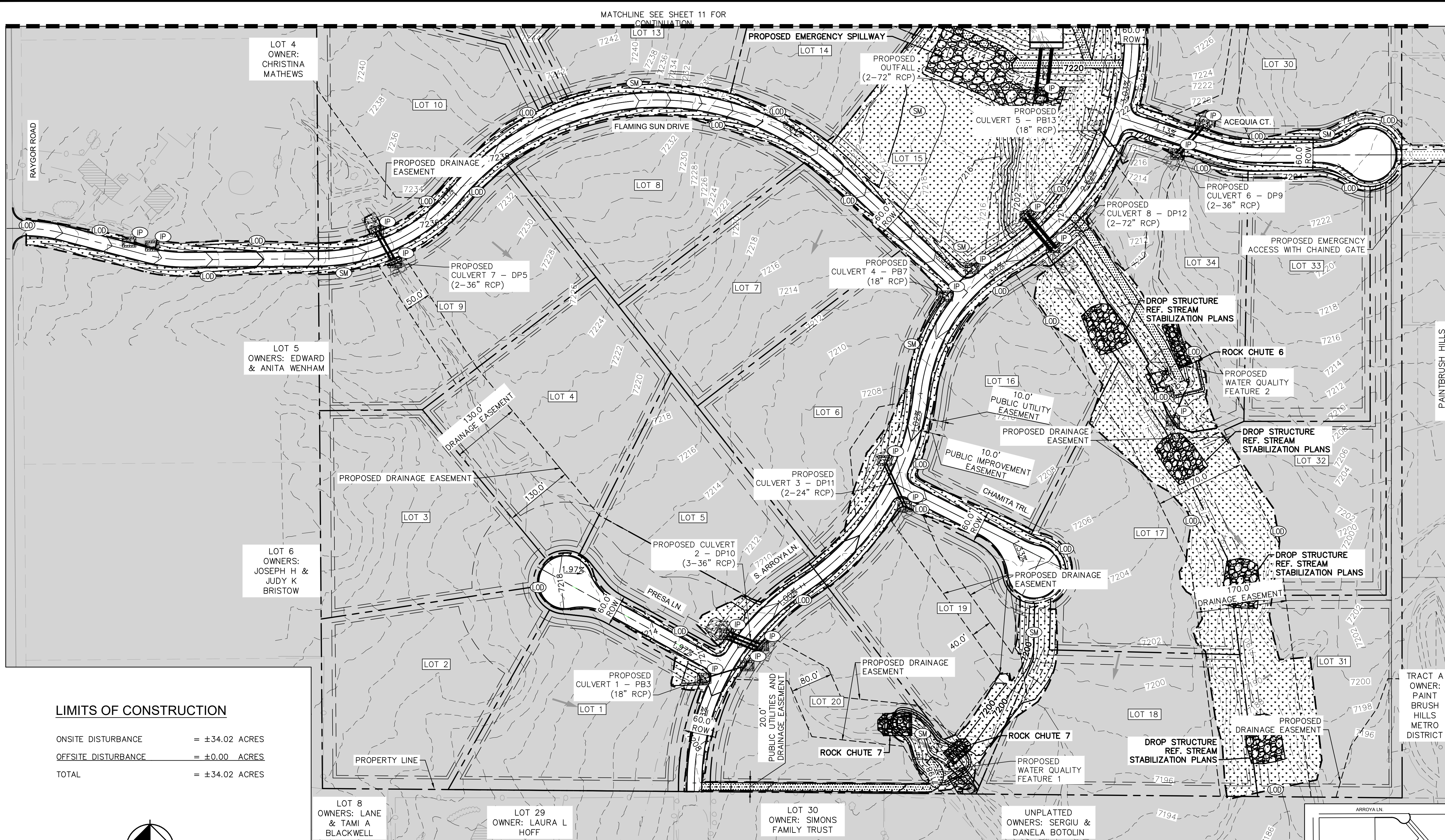
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PROJECT NO.
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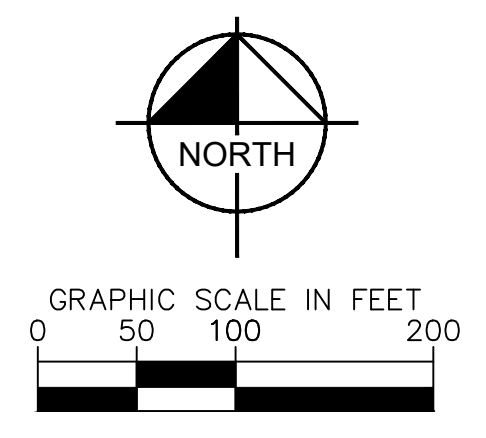
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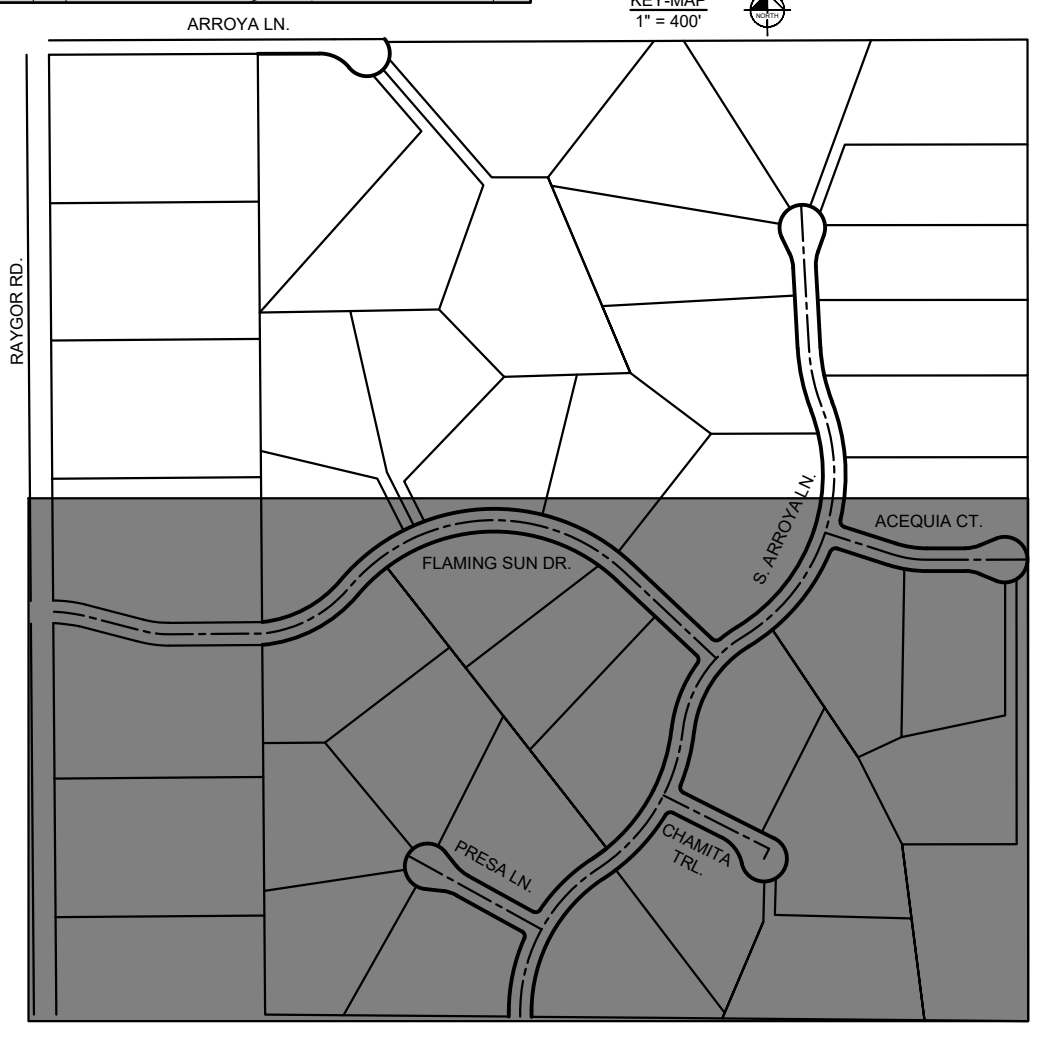


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- ⊙ EROSION CONTROL BLANKET
- SM PERMANENT SEEDING AND MULCHING
- IP CULVERT INLET/OUTLET PROTECTION
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- PROPOSED FLOW ARROW
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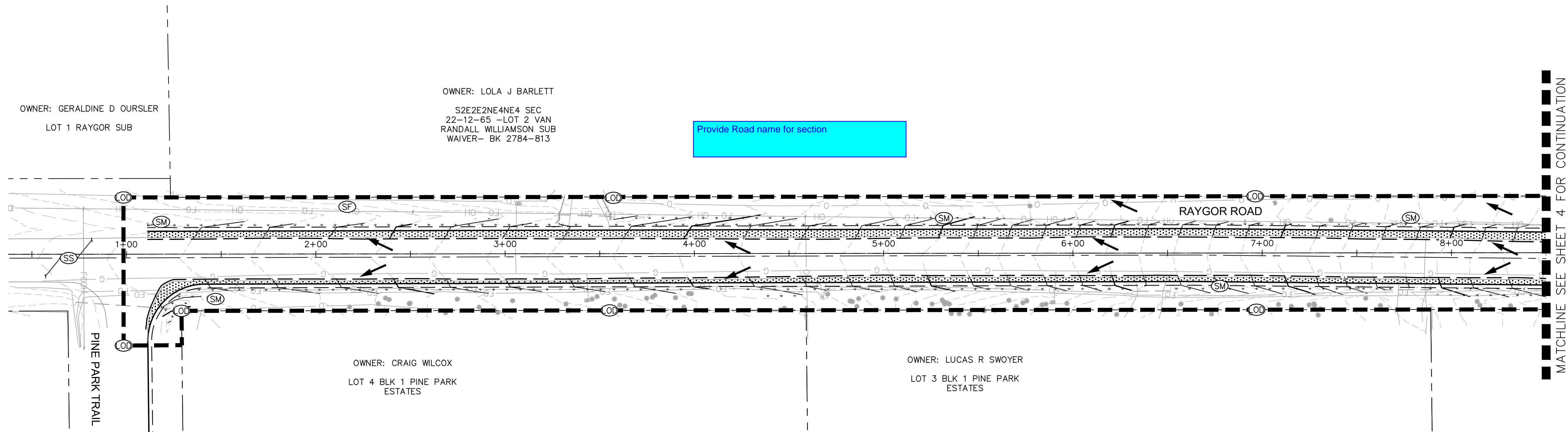


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DESIGNED BY: MJK DRAWN BY: MJK CHECKED BY: KRK DATE: 12/23/2022	
EAGLEVIEW EL PASO COUNTY, COLORADO GRADING AND EROSION CONTROL PLAN FINAL GEC PLAN	
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PROJECT NO. 196106001	
SHEET 12	

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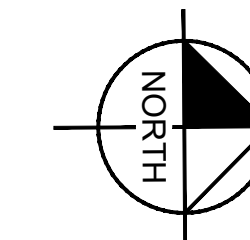
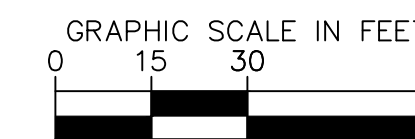
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LEGEND

- PROPERTY LINE
- (OD)— LIMITS OF DISTURBANCE/CONSTRUCTION
- (SM)— TEMP./PERM. SEEDING AND MULCHING
- FLOW ARROW
- - - -64XX- - - - EXISTING MINOR CONTOUR
- - - -64XX- - - - EXISTING MAJOR CONTOUR
- 54XX— PROPOSED MAJOR CONTOUR
- 54XX— PROPOSED MINOR CONTOUR

LIMITS OF CONSTRUCTION

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OFFSITE DISTURBANCE	= ±2.55 ACRES
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MATCHLINE SEE SHEET 4 FOR CONTINUATION

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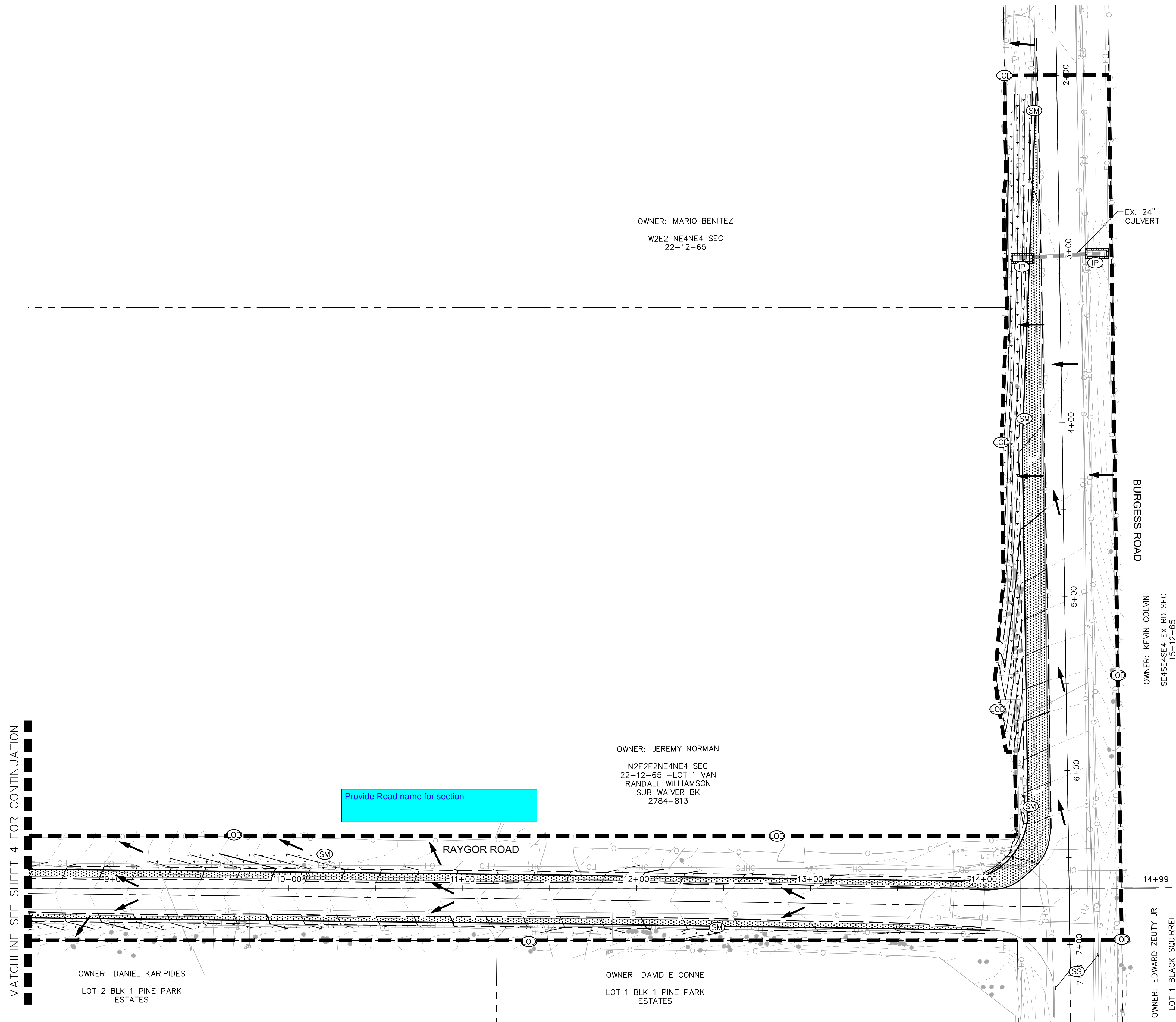
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W2E2 NE4NE4 SEC
22-12-65

OWNER: JEREMY NORMAN
N2E2E2NE4NE4 SEC
22-12-65 -LOT 1 VAN
RANDALL WILLIAMSON
SUB WAIVER BK
2784-813

OWNER: DANIEL KARIPIDES
LOT 2 BLK 1 PINE PARK
ESTATES

OWNER: DAVID E CONNE
LOT 1 BLK 1 PINE PARK
ESTATES

OWNER: KEVIN COLVIN
SE-4SE4SE4 EX RD SEC
15-12-65

OWNER: EDWARD ZELUTY JR
LOT 1 BLACK SQUIRREL
CREEK PARK

BURGESS ROAD

Provide Road name for section

NOTES

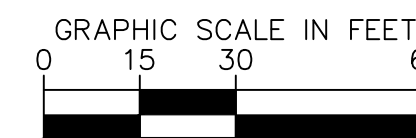
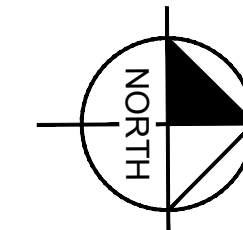
1. THE INTENT OF THIS PLAN IS TO IDENTIFY THE EROSION CONTROL PRACTICES RECOMMENDED. THE CONTRACTOR SHALL REFERENCE ADDITIONAL CONSTRUCTION PLANS FOR DEMOLITION OF EXISTING AND CONSTRUCTION OF PROPOSED IMPROVEMENTS.
2. ADJACENT STREETS SHALL BE KEPT CLEAN AND FREE OF SEDIMENT AND/OR DEBRIS AT ALL TIMES.
3. TEMPORARY STABILIZATION (TS) SHALL BE IMPLEMENTED WITHIN THE DISTURBED PORTIONS OF THE PROJECT SITE NO LATER THAN 14 DAYS FOLLOWING THE CEASE OF CONSTRUCTION ACTIVITIES WITHIN THE DISTURBED AREAS.
4. PERMANENT STABILIZATION (PS) MAY BE USED WITHIN AREAS OF TEMPORARY STABILIZATION (TS) AT THE CONTRACTOR'S DISCRETION. STABILIZATION SHALL BE APPLIED IN ACCORDANCE WITH APPLICABLE TEMPORARY STABILIZATION SEQUENCING REQUIREMENTS.
5. CONTRACTOR SHALL UTILIZE ROLLED EROSION CONTROL PRODUCTS (STRAW-SINGLE NET EROSION CONTROL BLANKETS AND OPEN WEAVE TEXTILES) ON ALL SLOPES 3H:1V OR GREATER TO ACHIEVE REQUIRED STABILIZATION.
6. CONTRACTOR SHALL MAINTAIN ACCEPTABLE EROSION CONTROL PRACTICES WITHIN THE ANTICIPATED LIMITS OF CONSTRUCTION IDENTIFIED HEREIN. BEST MANAGEMENT PRACTICES AND STABILIZATION SHALL BE COMPLETED AS IDENTIFIED HEREIN IN ACCORDANCE WITH OWNER REQUIREMENTS.
7. ALL WORK IN THE HODGEN ROAD AND MERIDIAN ROAD ROW REQUIRES A ROW PERMIT FROM EL PASO COUNTY. CONTRACTOR IS RESPONSIBLE FOR APPLYING FOR AND OBTAINING ALL NECESSARY ROW PERMITS.
8. SILT FENCE TO BE INSTALLED PRIOR TO COMMENCEMENT OF ONSITE GRADING AND CONSTRUCTION ACTIVITIES.
9. DEMOLITION, REMOVAL, OVEREXCAVATION AND SOIL TREATMENT SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER RECOMMENDATIONS AS NOTED IN THE APPROVED PROJECT GEOTECHNICAL REPORT.
10. VEGETATION COVER IS ABOUT 90% CONSISTING OF NATIVE GRASSES, TREES AND SHRUBS, BASED ON VISUAL INSPECTION.
11. NO ASPHALT OR CONCRETE BATCH PLANTS SHALL BE USED FOR THIS PROJECT.
12. CHECK DAMS TO BE PLACED IN TEMPORARY AND PERMANENT DRAINAGE SWALES AND ROADSIDE DITCHES AND TO BE SPACED AS DEEMED NECESSARY. RIRPRAP IN CHECK DAMS TO BE SUBSTITUTED WITH SCL.

LEGEND

- — — — — PROPERTY LINE
- — — — — (OD) LIMITS OF DISTURBANCE/CONSTRUCTION
- (SM) TEMP./PERM. SEEDING AND MULCHING
- (P) CULVERT INLET/OUTLET PROTECTION
- FLOW ARROW
- - - - -64XX- - - - - EXISTING MINOR CONTOUR
- - - - -64XX- - - - - EXISTING MAJOR CONTOUR
- 54XX — — — — — PROPOSED MAJOR CONTOUR
- 54XX — — — — — PROPOSED MINOR CONTOUR

LIMITS OF CONSTRUCTION

ONSITE DISTURBANCE	= ±0.00 ACRES
OFFSITE DISTURBANCE	= ±2.55 ACRES
TOTAL	= ±2.55 ACRES



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

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
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2 North Nevada Avenue Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
DRAWN BY: MJK
CHECKED BY: KKK
DATE: 12/23/2022

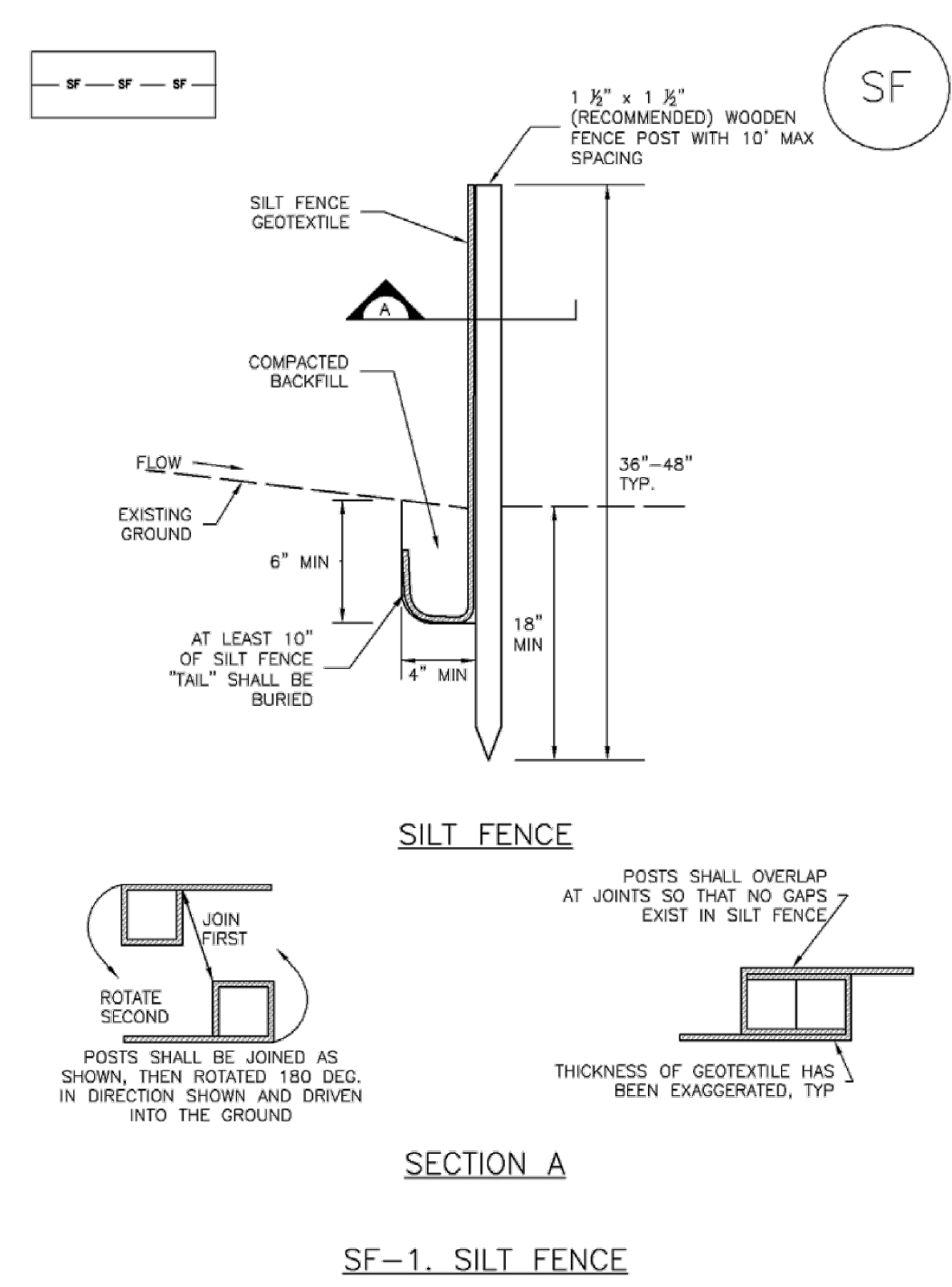
**EAGLEVIEW
EL PASO COUNTY, COLORADO
GRADING AND EROSION CONTROL PLAN
OFF-SITE FINAL GEC PLAN**

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PROJECT NO.
196106001
SHEET
14

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Silt Fence (SF) SC-1



November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SF-3

SC-1 Silt Fence (SF)

SILT FENCE INSTALLATION NOTES

- SILT FENCE MUST BE PLACED AWAY FROM THE TOE OF THE SLOPE TO ALLOW FOR WATER PONDING. SILT FENCE AT THE TOE OF A SLOPE SHOULD BE INSTALLED IN A FLAT LOCATION AT LEAST SEVERAL FEET (2-5 FT) FROM THE TOE OF THE SLOPE TO ALLOW ROOM FOR PONDING AND DEPOSITION.
- A UNIFORM 6" X 4" ANCHOR TRENCH SHALL BE EXCAVATED USING TRENCHER OR SILT FENCE INSTALLATION DEVICE. NO ROAD GRADERS, BACKHOES, OR SIMILAR EQUIPMENT SHALL BE USED.
- COMPACT ANCHOR TRENCH BY HAND WITH A "JUMPING JACK" OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
- SILT FENCE SHALL BE PULLED TIGHT AS IT IS ANCHORED TO THE STAKES. THERE SHOULD BE NO NOTICEABLE SAG BETWEEN STAKES AFTER IT HAS BEEN ANCHORED TO THE STAKES.
- SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH 1" HEADS. STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC DOWN THE STAKE.
- AT THE END OF A RUN OF SILT FENCE ALONG A CONTOUR, THE SILT FENCE SHOULD BE TURNED PERPENDICULAR TO THE CONTOUR TO CREATE A "J-HOOK." THE "J-HOOK" EXTENDING PERPENDICULAR TO THE CONTOUR SHOULD BE OF SUFFICIENT LENGTH TO KEEP RUNOFF FROM FLOWING AROUND THE END OF THE SILT FENCE (TYPICALLY 10' - 20').
- SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

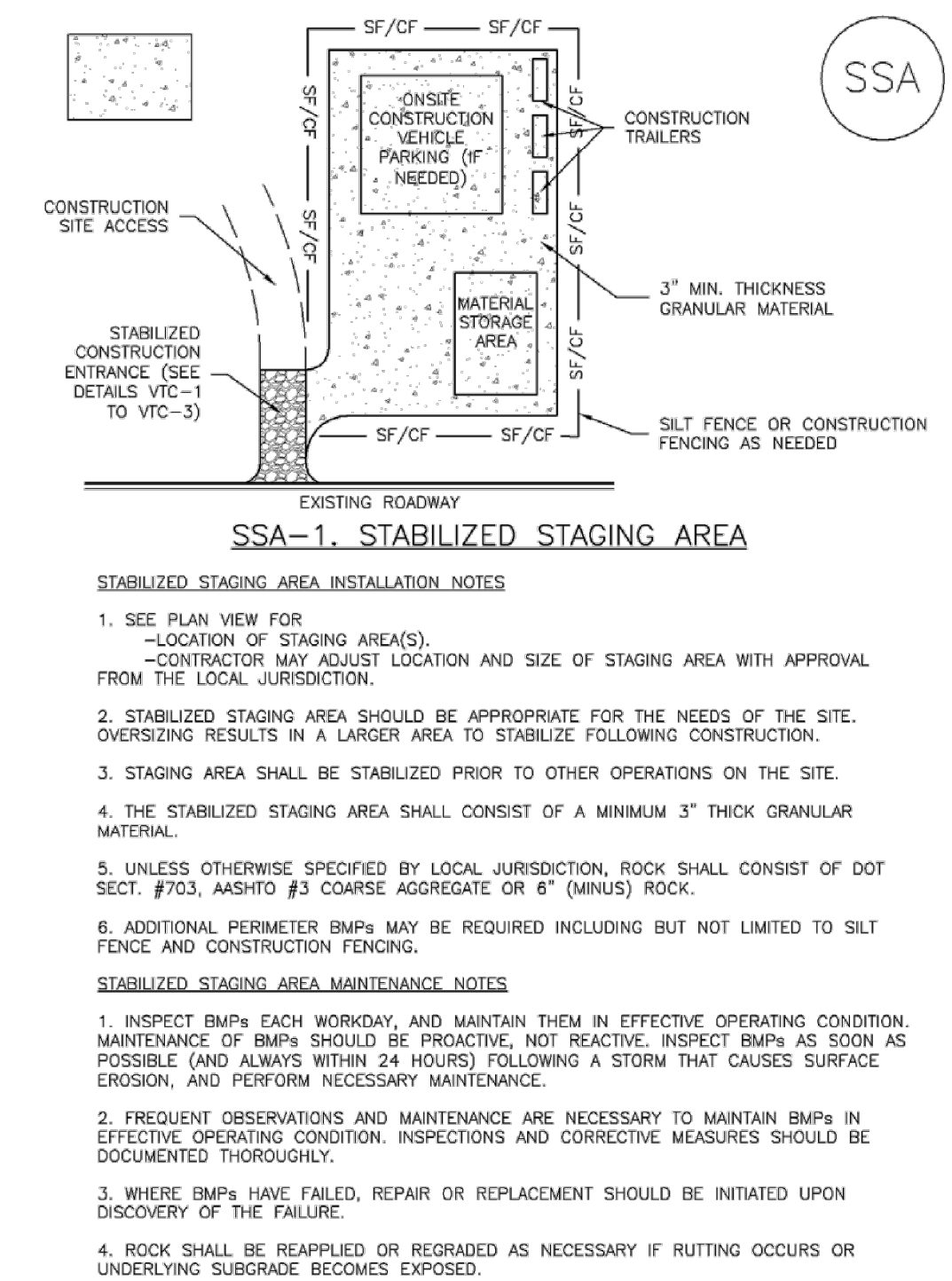
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
- SEDIMENT ACCUMULATED UPSTREAM OF THE SILT FENCE SHALL BE REMOVED AS NEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BMP. TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 6".
- REPAIR OR REPLACE SILT FENCE WHEN THERE ARE SIGNS OF WEAR, SUCH AS SAGGING, TEARING, OR COLLAPSE.
- SILT FENCE IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION, OR IS REPLACED BY AN EQUIVALENT PERIMETER SEDIMENT CONTROL BMP.
- WHEN SILT FENCE IS REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

SF-4 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Stabilized Staging Area (SSA) SM-6



November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SSA-3

SM-6 Stabilized Staging Area (SSA)

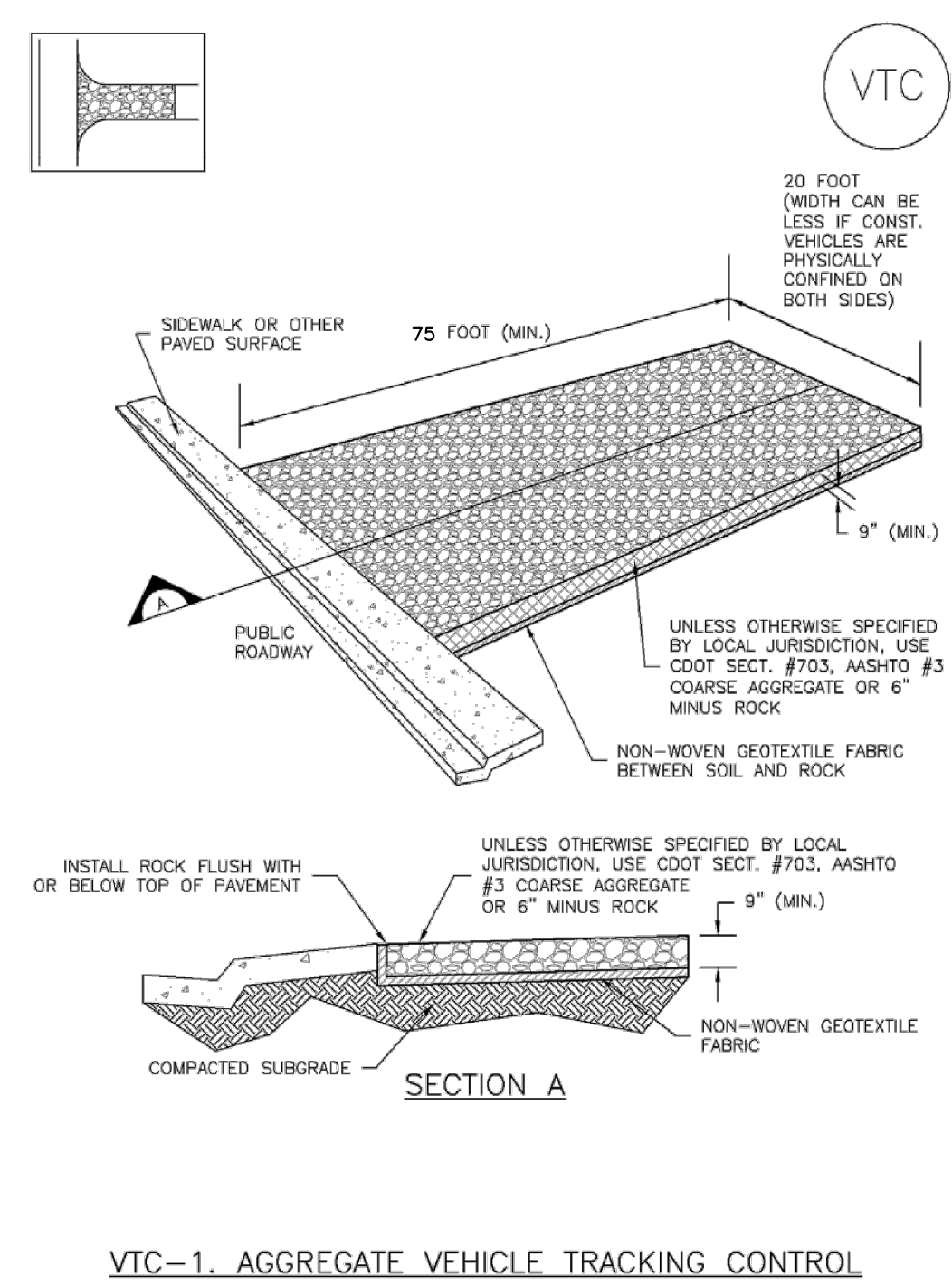
STABILIZED STAGING AREA MAINTENANCE NOTES

- STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING/LOADING OPERATIONS.
- THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.
- NOTE: MANY MUNICIPALITIES PROHIBIT THE USE OF RECYCLED CONCRETE AS GRANULAR MATERIAL FOR STABILIZED STAGING AREAS DUE TO DIFFICULTIES WITH RE-ESTABLISHMENT OF VEGETATION IN AREAS WHERE RECYCLED CONCRETE WAS PLACED.
- NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

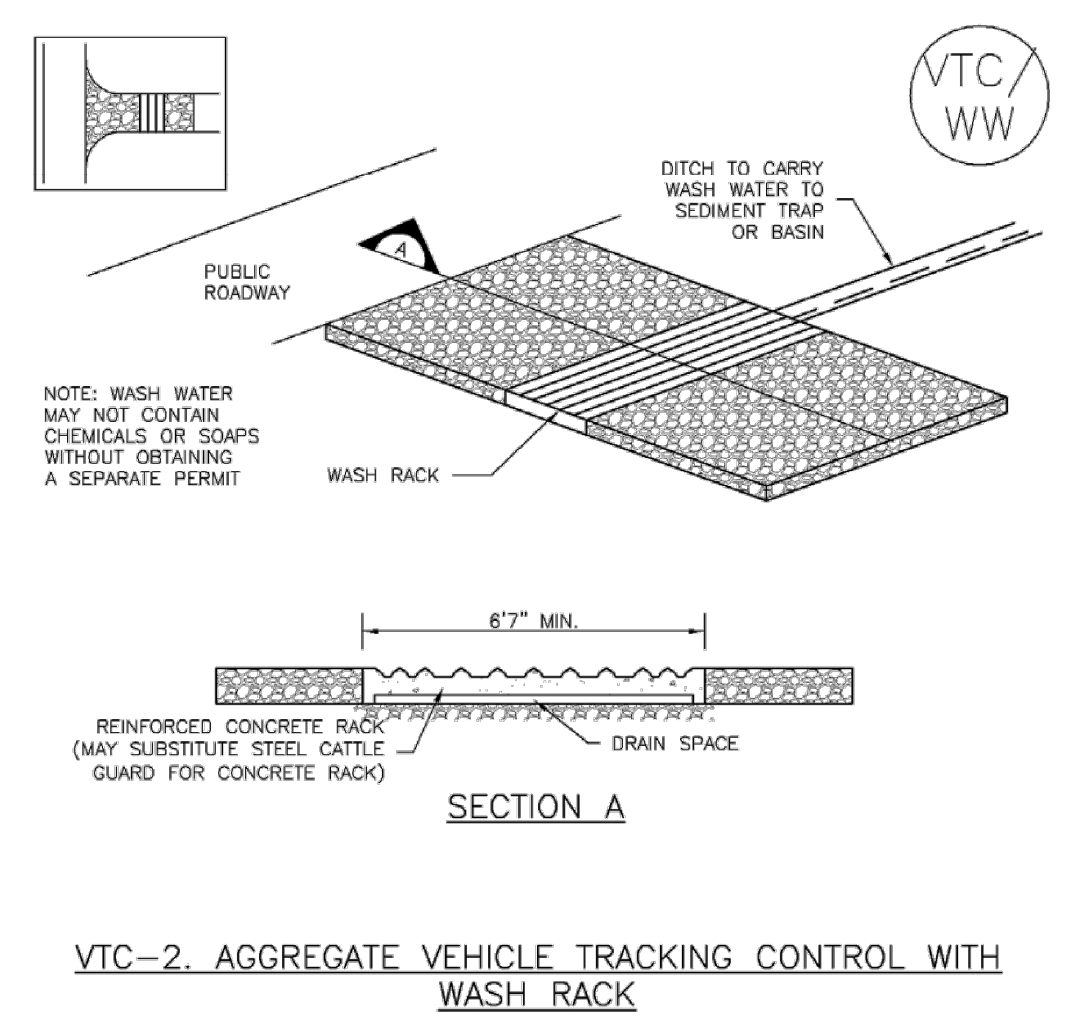
SSA-4 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Vehicle Tracking Control (VTC) SM-4



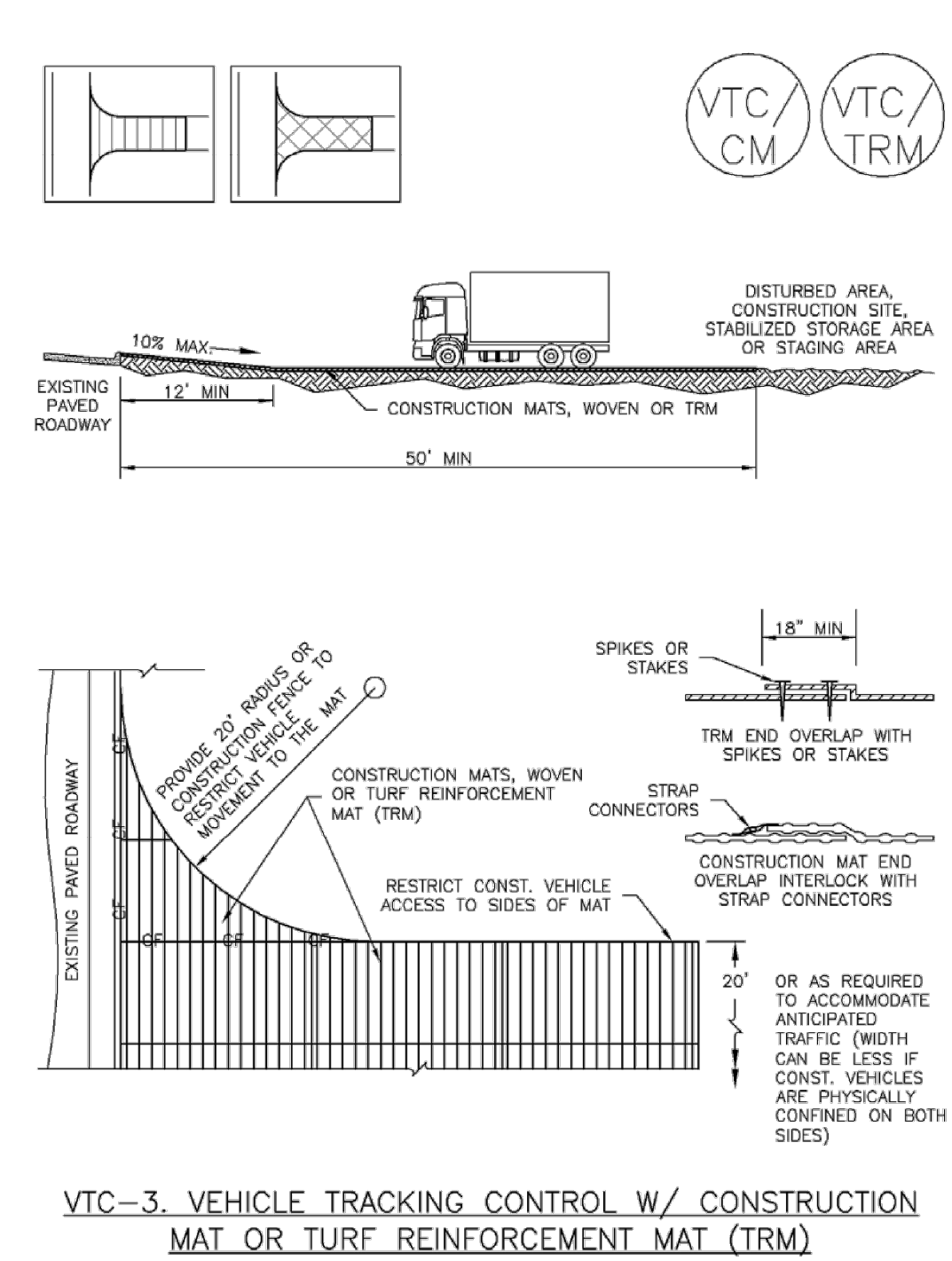
November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 VTC-3

SM-4 Vehicle Tracking Control (VTC)



VTC-4 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Vehicle Tracking Control (VTC) SM-4



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SM-4 Vehicle Tracking Control (VTC)

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

- SEE PLAN VIEW FOR -LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S). -TYPE OF CONSTRUCTION ENTRANCE(S)/EXIT(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM).
- CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.
- A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT-OF-WAYS.
- STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- A NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
- ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.
- SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

(DETAILS ADAPTED FROM CITY OF BROOKFIELD, COLORADO, NOT AVAILABLE IN AUTOCAD)

VTC-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

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DESIGNED BY: MJK
DRAWN BY: MJK
CHECKED BY: KRK
DATE: 12/23/2022

EAGLEVIEW EL PASO COUNTY, COLORADO GRADING AND EROSION CONTROL PLAN GEC DETAILS

NO. REVISION BY DATE APPR

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PROJECT NO. 196106001
SHEET 16

Sediment Basin (SB)

SC-7

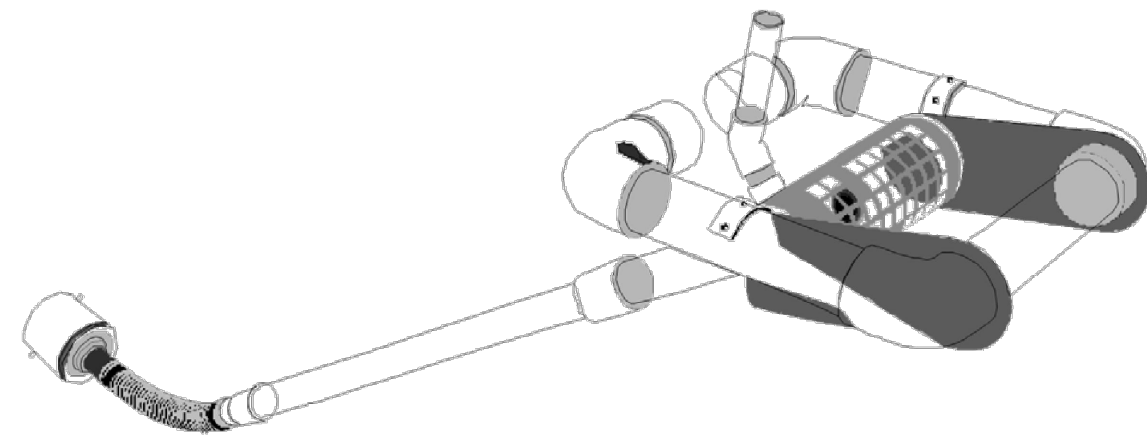


Illustration SB-1. Outlet structure for a temporary sediment basin - Faircloth Skimmer Floating Outlet. Illustration courtesy of J. W. Faircloth & Sons, Inc., FairclothSkimmer.com.

- **Outlet Protection and Spillway:** Consider all flow paths for runoff leaving the basin, including protection at the typical point of discharge as well as overtopping.
 - **Outlet Protection:** Outlet protection should be provided where the velocity of flow will exceed the maximum permissible velocity of the material of the waterway into which discharge occurs. This may require the use of a riprap apron at the outlet location and/or other measures to keep the waterway from eroding.
 - **Emergency Spillway:** Provide a stabilized emergency overflow spillway for rainstorms that exceed the capacity of the sediment basin volume and its outlet. Protect basin embankments from erosion and overtopping. If the sediment basin will be converted to a permanent detention basin, design and construct the emergency spillway(s) as required for the permanent facility. If the sediment basin will not become a permanent detention basin, it may be possible to substitute a heavy polyvinyl membrane or properly bedded rock cover to line the spillway and downstream embankment, depending on the height, slope, and width of the embankments.

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SC-7

Sediment Basin (SB)

Maintenance and Removal

Maintenance activities include the following:

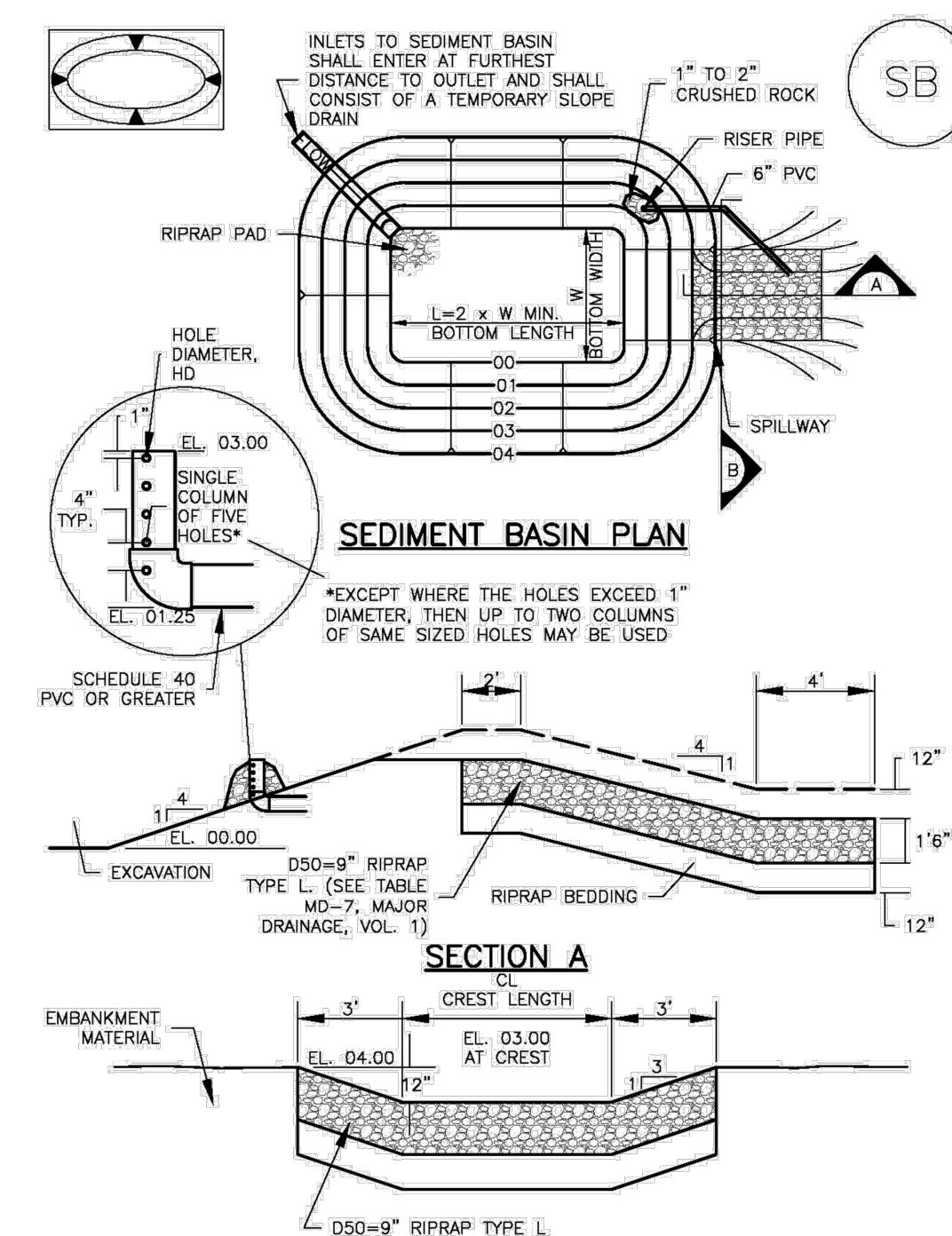
- Dredge sediment from the basin, as needed to maintain BMP effectiveness, typically when the design storage volume is no more than one-third filled with sediment.
- Inspect the sediment basin embankments for stability and seepage.
- Inspect the inlet and outlet of the basin, repair damage, and remove debris. Remove, clean and replace the gravel around the outlet on a regular basis to remove the accumulated sediment within it and keep the outlet functioning.
- Be aware that removal of a sediment basin may require dewatering and associated permit requirements.
- Do not remove a sediment basin until the upstream area has been stabilized with vegetation.

Final disposition of the sediment basin depends on whether the basin will be converted to a permanent post-construction stormwater basin or whether the basin area will be returned to grade. For basins being converted to permanent detention basins, remove accumulated sediment and reconfigure the basin and outlet to meet the requirements of the final design for the detention facility. If the sediment basin is not to be used as a permanent detention facility, fill the excavated area with soil and stabilize with vegetation.

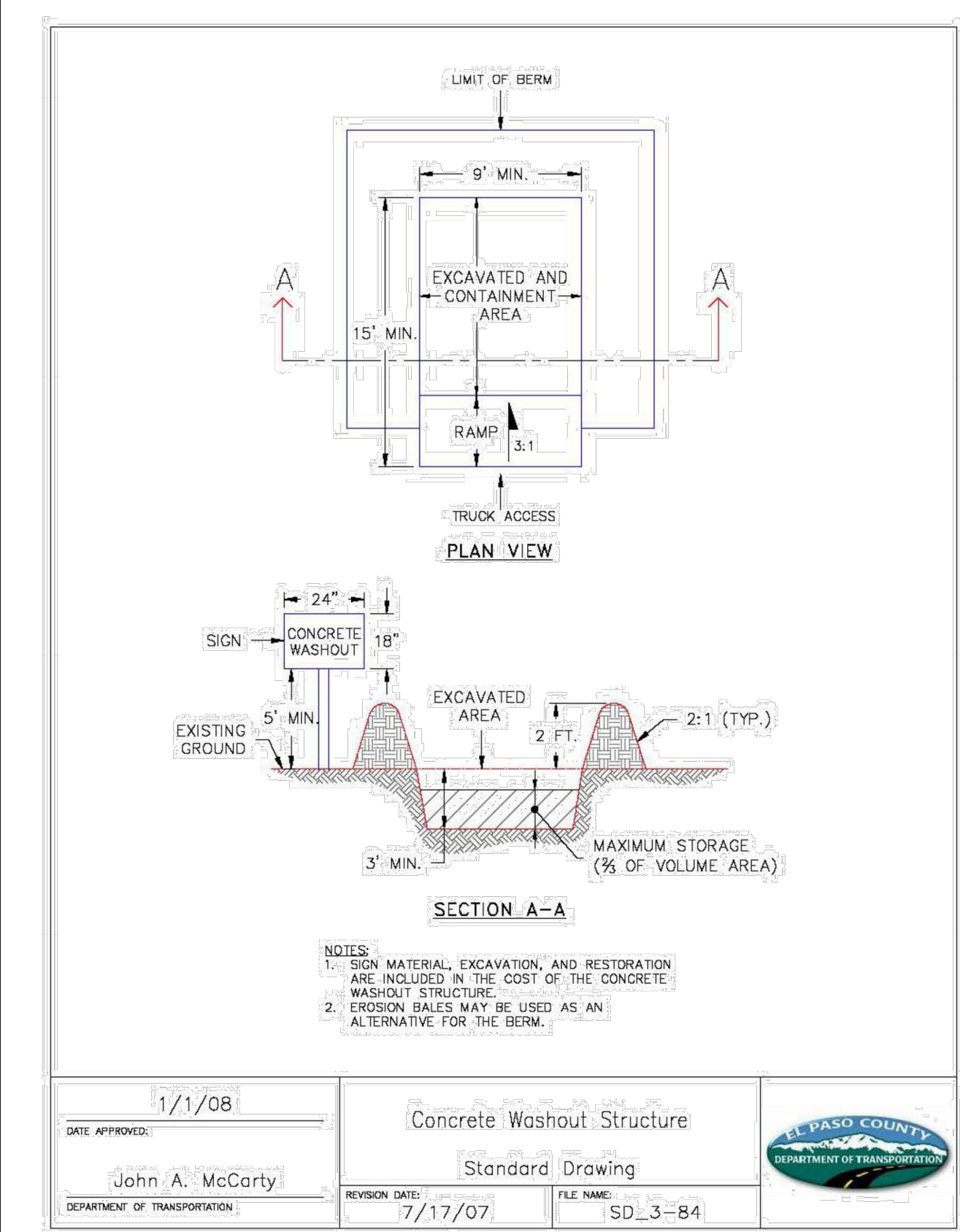
August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SB-4

Sediment Basin (SB)

SC-7



August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SB-5



DATE APPROVED: 1/1/08
 JOHN A. MCCARTY
 REVISION DATE: 7/17/07
 FILE NAME: SD_3--84
 Concrete Washout Structure
 Standard Drawing
 EL PASO COUNTY DEPARTMENT OF TRANSPORTATION

SC-7

Sediment Basin (SB)

Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	12 1/2	2	3/32
2	24	3	1/8
4	48	4	1/4
6	36 1/2	6	3/16
7	43	9	1/8
8	47 1/2	11	1/8
9	51	12	1/8
10	55 1/2	13	1/8
11	59 1/2	15	1/8
12	64	16	1/8
13	67 1/2	18	1 1/16
14	70 1/2	21	1 1/8
15	73 1/2	22	1 3/16

Clarify. Sheets 4 & 5 shows three sediment basins. Identify the appropriate sizing for each basins since the plan sheet does not indicate the upstream area for each sediment basin.

14ac TSB shown on Sht 4 above.

- SEDIMENT BASIN INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
 - LOCATION OF SEDIMENT BASIN.
 - TYPE OF BASIN (STANDARD BASIN OR NONSTANDARD BASIN).
 - FOR STANDARD BASIN, BOTTOM WIDTH W, CREST LENGTH CL, AND HOLE DIAMETER, HD.
 - FOR NONSTANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT H, NUMBER OF COLUMNS N, HOLE DIAMETER HD AND PIPE DIAMETER D.
 - FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.
 - SEDIMENT BASINS SHALL BE INSTALLED PRIOR TO ANY OTHER LAND-DISTURBING ACTIVITY THAT RELIES ON BASINS AS A STORMWATER CONTROL.
 - EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
 - EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
 - PIPE SCH 40 OR GREATER SHALL BE USED.
 - THE DETAILS SHOWN ON THESE SHEETS PERTAIN TO STANDARD SEDIMENT BASIN(S) FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

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Sediment Basin (SB)

SC-7

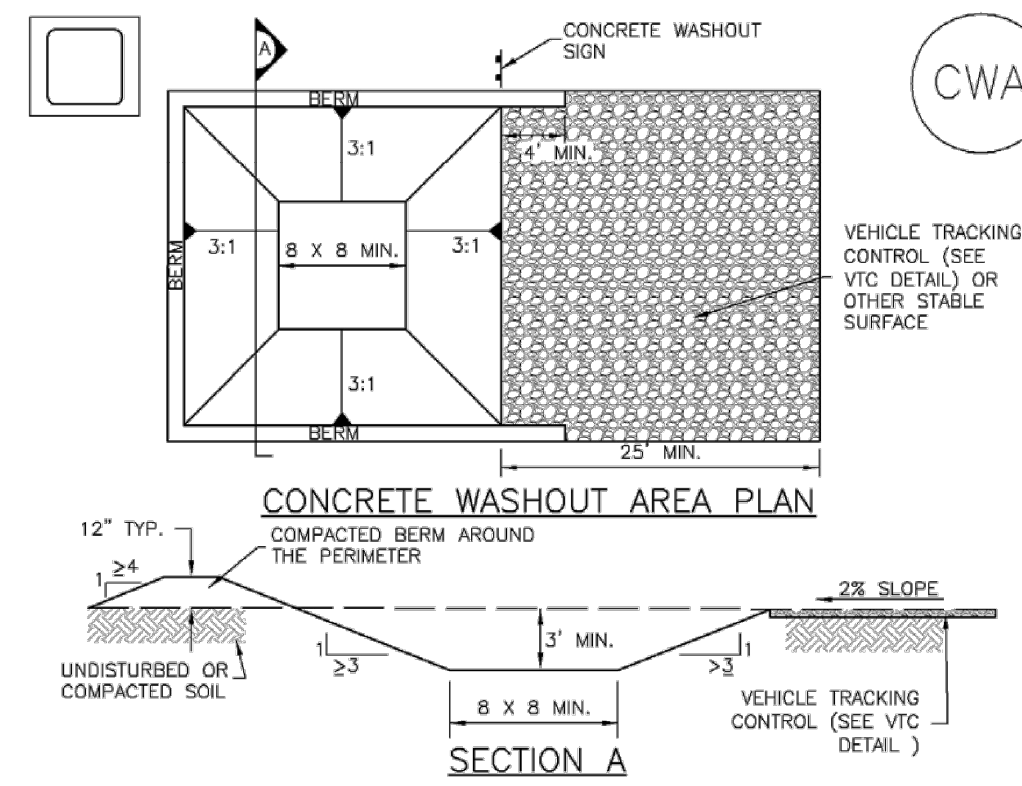
SEDIMENT BASIN MAINTENANCE NOTES

- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - SEDIMENT ACCUMULATED IN BASIN SHALL BE REMOVED AS NEEDED TO MAINTAIN BMP EFFECTIVENESS, TYPICALLY WHEN SEDIMENT DEPTH REACHES ONE FOOT (I.E., TWO FEET BELOW THE SPILLWAY CREST).
 - SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS ACCEPTED BY THE LOCAL JURISDICTION.
 - WHEN SEDIMENT BASINS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.
- (DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)
 NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

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Concrete Washout Area (CWA)

MM-1



- CWA INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
 - CWA INSTALLATION LOCATION.
 - DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1,000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (16 MIL MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A LINED ABOVE GROUND STORAGE ARE SHOULD BE USED.
 - THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
 - CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8' BY 8' SLOPES LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.
 - BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.
 - VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
 - SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
 - USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 CWA-3

MM-1

Concrete Washout Area (CWA)

CWA MAINTENANCE NOTES

- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE. CONCRETE MATERIALS, ACCUMULATED IN PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2'.
 - CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
 - THE CWA SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.
 - WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.
- (DETAIL ADAPTED FROM DOUGLAS COUNTY, COLORADO AND THE CITY OF PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD).
 NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 CWA-4

NO.	REVISION	BY	DATE

Kimley-Horn
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 2 North Nevada Avenue Suite 900
 Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: MJK
 DRAWN BY: MJK
 CHECKED BY: KRK
 DATE: 12/23/2022

EAGLEVIEW
 EL PASO COUNTY, COLORADO
 GRADING AND EROSION CONTROL PLAN
 GEC DETAILS

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

PROJECT NO.
 196106001

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Rolled Erosion Control Products (RECP) EC-6

Description

Rolled Erosion Control Products (RECPs) include a variety of temporary or permanently installed manufactured products designed to control erosion and enhance vegetation establishment and survivability, particularly on slopes and in channels. For applications where natural vegetation alone will provide sufficient permanent erosion protection, temporary products such as netting, open weave textiles and a variety of erosion control blankets (ECBs) made of biodegradable natural materials (e.g., straw, coconut fiber) can be used. For applications where natural vegetation alone will not be sustainable under expected flow conditions, permanent rolled erosion control products such as turf reinforcement mats (TRMs) can be used. In particular, turf reinforcement mats are designed for discharges that exert velocities and shear stresses that exceed the typical limits of mature natural vegetation.



Photograph RECP-1. Erosion control blanket protecting the slope from erosion and providing favorable conditions for revegetation.

Appropriate Uses

RECPs can be used to control erosion in conjunction with revegetation efforts, providing seedbed protection from wind and water erosion. These products are often used on disturbed areas on steep slopes, in areas with highly erosive soils, or as part of drainage stabilization. In order to select the appropriate RECP for site conditions, it is important to have a general understanding of the general types of these products, their expected longevity, and general characteristics.

The Erosion Control Technology Council (ECTC 2005) characterizes rolled erosion control products according to these categories:

- Mulch control netting:** A planar woven natural fiber or extruded geosynthetic mesh used as a temporary degradable rolled erosion control product to anchor loose fiber mulches.
- Open weave textile:** A temporary degradable rolled erosion control product composed of processed natural or polymer yarns woven into a matrix, used to provide erosion control and facilitate vegetation establishment.
- Erosion control blanket (ECB):** A temporary degradable rolled erosion control product composed of processed natural or polymer fibers which are mechanically, structurally or chemically bound together to form a continuous matrix to provide erosion control and facilitate vegetation establishment. ECBs can be further differentiated into rapidly degrading single-net and double-net types or slowly degrading types.

Table with 2 columns: Functions, Yes/No. Rows: Erosion Control (Yes), Sediment Control (No), Site/Material Management (No).

November 2010 Urban Drainage and Flood Control District RECP-1
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EC-6 Rolled Erosion Control Products (RECP)

- Turf Reinforcement Mat (TRM):** A rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh, and/or other elements, processed into a permanent, three-dimensional matrix of sufficient thickness. TRMs, which may be supplemented with degradable components, are designed to impart immediate erosion protection, enhance vegetation establishment and provide long-term functionality by permanently reinforcing vegetation during and after maturation. Note: TRMs are typically used in hydraulic applications, such as high flow ditches and channels, steep slopes, stream banks, and shorelines, where erosive forces may exceed the limits of natural, unreinforced vegetation or in areas where limited vegetation establishment is anticipated.

Tables RECP-1 and RECP-2 provide guidelines for selecting rolled erosion control products appropriate to site conditions and desired longevity. Table RECP-1 is for conditions where natural vegetation alone will provide permanent erosion control, whereas Table RECP-2 is for conditions where vegetation alone will not be adequately stable to provide long-term erosion protection due to flow or other conditions.

RECP-2 Urban Drainage and Flood Control District November 2010
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Rolled Erosion Control Products (RECP) EC-6

Table RECP-1. ECTC Standard Specification for Temporary Rolled Erosion Control Products (Adapted from Erosion Control Technology Council 2005)

Table with 5 columns: Product Description, Slope Applications*, Channel Applications*, Minimum Tensile Strength†, Expected Longevity. Rows include Mulch Control Nets, Netless Rolled Erosion Control Blankets, Single-net Erosion Control Blankets & Open Weave Textiles, Double-net Erosion Control Blankets, Erosion Control Blankets & Open Weave Textiles (slowly degrading), and Erosion Control Blankets & Open Weave Textiles.

* C Factor and shear stress for mulch control nettings must be obtained with netting used in conjunction with pre-applied mulch material. (See Section 5.3 of Chapter 7 Construction BMPs for more information on the C Factor.)

† Minimum Average Roll Values, Machine direction using ECTC Mod. ASTM D 5035.

‡ C Factor calculated as ratio of soil loss from RECP protected slope (tested at specified or greater gradient, H:V) to ratio of soil loss from unprotected (control) plot in large-scale testing.

§ Required minimum shear stress RECP (unvegetated) can sustain without physical damage or excess erosion (> 12.7 mm (0.5 in) soil loss) during a 30-minute flow event in large-scale testing.

¶ The permissible shear stress levels established for each performance category are based on historical experience with products characterized by Manning's roughness coefficients in the range of 0.01 - 0.05.

‡ Acceptable large-scale test methods may include ASTM D 6459, or other independent testing deemed acceptable by the engineer.

§ Per the engineer's discretion. Recommended acceptable large-scale testing protocol may include ASTM D 6460, or other independent testing deemed acceptable by the engineer.

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EC-6 Rolled Erosion Control Products (RECP)

Table RECP-2. ECTC Standard Specification for Permanent Rolled Erosion Control Products (Adapted from: Erosion Control Technology Council 2005)

Table with 4 columns: Product Type, Slope Applications, Channel Applications, Minimum Tensile Strength. Rows show TRMs with a minimum thickness of 0.25 inches (6.35 mm) per ASTM D 6525 and UV stability of 80% per ASTM D 4355 (500 hours exposure).

† For TRMs containing degradable components, all property values must be obtained on the non-degradable portion of the matting alone.

‡ Minimum Average Roll Values, machine direction only for tensile strength determination using ASTM D 6818 (Supersedes Mod. ASTM D 5035 for RECPs)

§ Field conditions with high loading and/or high survivability requirements may warrant the use of a TRM with a tensile strength of 44 kN/m (3,000 lb/ft) or greater.

¶ Required minimum shear stress TRM (fully vegetated) can sustain without physical damage or excess erosion (> 12.7 mm (0.5 in) soil loss) during a 30-minute flow event in large scale testing.

‡ Acceptable large-scale testing protocols may include ASTM D 6460, or other independent testing deemed acceptable by the engineer.

Design and Installation

RECPs should be installed according to manufacturer's specifications and guidelines. Regardless of the type of product used, it is important to ensure no gaps or voids exist under the material and that all corners of the material are secured using stakes and trenching. Continuous contact between the product and the soil is necessary to avoid failure. Never use metal stakes to secure temporary erosion control products. Often wooden stakes are used to anchor RECPs; however, wood stakes may present installation and maintenance challenges and generally take a long time to biodegrade. Some local jurisdictions have had favorable experiences using biodegradable stakes.

This BMP Fact Sheet provides design details for several commonly used ECB applications, including:

- ECB-1 Pipe Outlet to Drainageway
- ECB-2 Small Ditch or Drainageway
- ECB-3 Outside of Drainageway

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Rolled Erosion Control Products (RECP) EC-6

Staking patterns are also provided in the design details according to these factors:

- ECB type
- Slope or channel type

For other types of RECPs including TRMs, these design details are intended to serve as general guidelines for design and installation; however, engineers should adhere to manufacturer's installation recommendations.

Maintenance and Removal

Inspection of erosion control blankets and other RECPs includes:

- Check for general signs of erosion, including voids beneath the mat. If voids are apparent, fill the void with suitable soil and replace the erosion control blanket, following the appropriate staking pattern.
- Check for damaged or loose stakes and secure loose portions of the blanket.

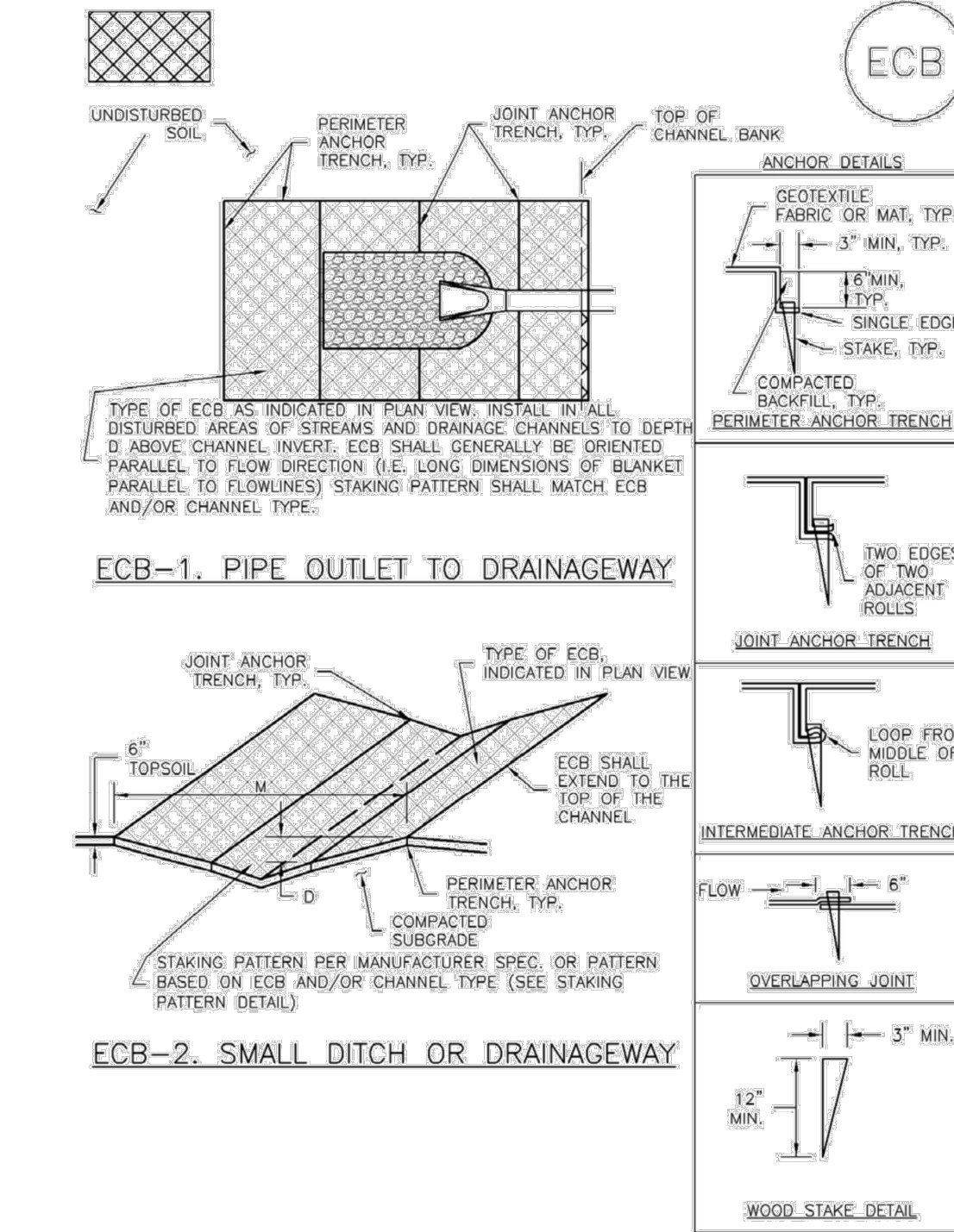
Erosion control blankets and other RECPs that are biodegradable typically do not need to be removed after construction. If they must be removed, then an alternate soil stabilization method should be installed promptly following removal.

Turf reinforcement mats, although generally resistant to biodegradation, are typically left in place as a dense vegetated cover grows in through the mat matrix. The turf reinforcement mat provides long-term stability and helps the established vegetation resist erosive forces.

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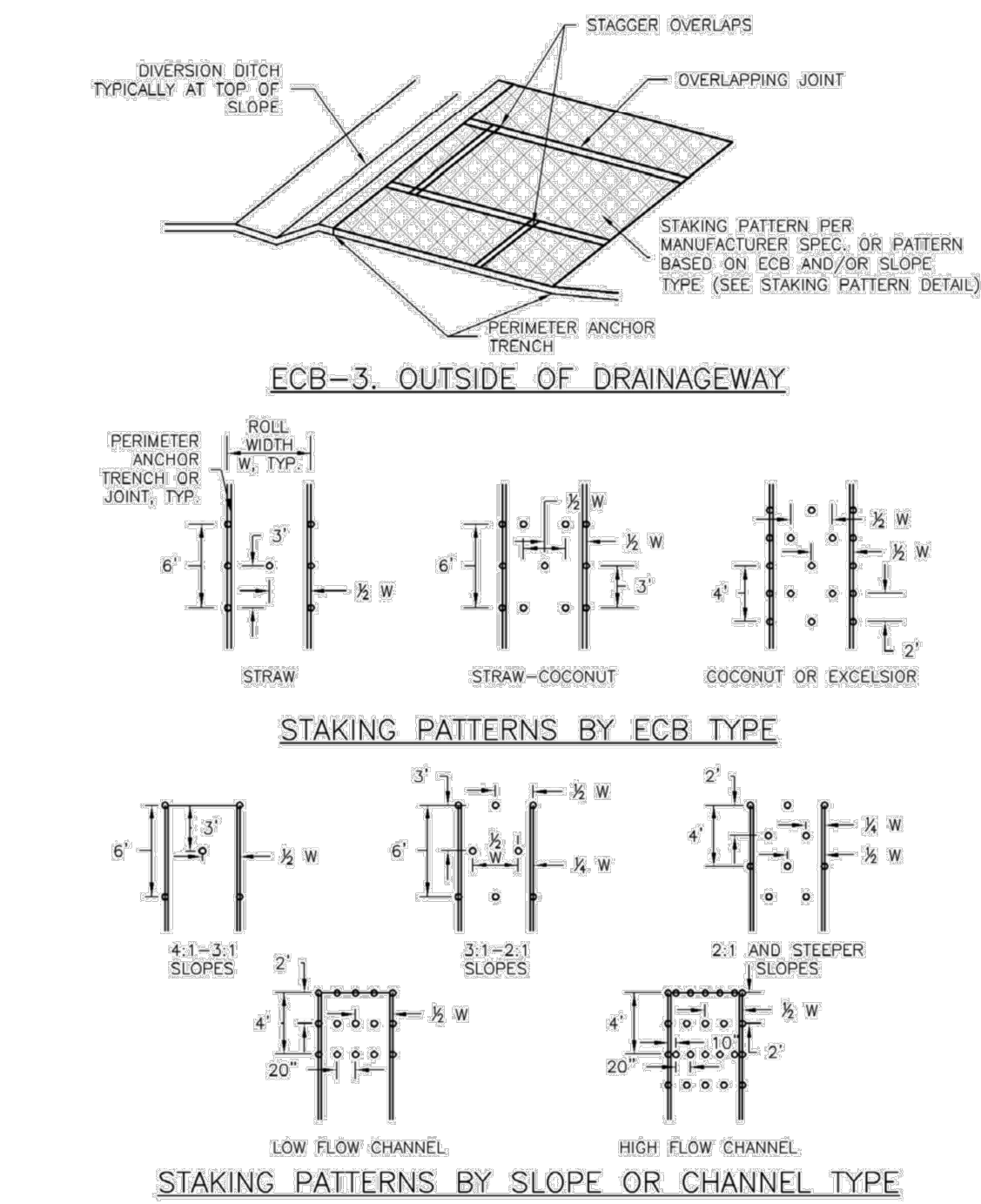
EC-6 Rolled Erosion Control Products (RECP)



RECP-6 Urban Drainage and Flood Control District November 2010
Urban Storm Drainage Criteria Manual Volume 3

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Rolled Erosion Control Products (RECP) EC-6



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EC-6 Rolled Erosion Control Products (RECP)

EROSION CONTROL BLANKET INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATION OF ECB.
 - TYPE OF ECB (STRAW, STRAW-COCOONUT, COCONUT, OR EXCELSIOR).
 - AREA, A, IN SQUARE YARDS OF EACH TYPE OF ECB.
- 100% NATURAL AND BIODEGRADABLE MATERIALS ARE PREFERRED FOR RECPs, ALTHOUGH SOME JURISDICTIONS MAY ALLOW OTHER MATERIALS IN SOME APPLICATIONS.
- IN AREAS WHERE ECBs ARE SHOWN ON THE PLANS, THE PERMITEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO ECB INSTALLATION AND THE ECB SHALL BE IN FULL CONTACT WITH SUBGRADE; NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
- PERMETER ANCHOR TRENCH SHALL BE USED ALONG THE OUTSIDE PERIMETER OF ALL BLANKET AREAS.
- JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF ECBs TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL ECBs EXCEPT STRAW WHICH MAY USE AN OVERLAPPING JOINT.
- INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF ROLL LENGTH FOR COCONUT AND EXCELSIOR ECBs.
- OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF ECBs TOGETHER FOR ECBs ON SLOPES.
- MATERIAL SPECIFICATIONS OF ECBs SHALL CONFORM TO TABLE ECB-1.
- ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING ECBs SHALL BE RESEDED AND MULCHED.
- DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM THOSE SHOWN HERE.

TABLE ECB-1. ECB MATERIAL SPECIFICATIONS

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	RECOMMENDED NETTING*
STRAW*	-	100%	-	DOUBLE/NATURAL
STRAW-COCOONUT	30% MIN	70% MAX	-	DOUBLE/NATURAL
COCONUT	100%	-	-	DOUBLE/NATURAL
EXCELSIOR	-	-	100%	DOUBLE/NATURAL

*STRAW ECBs MAY ONLY BE USED OUTSIDE OF EMPHASE AND DRAINAGE CHANNEL.
*ALTERNATE NETTING MAY BE ACCEPTABLE IN SOME JURISDICTIONS.

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Table with columns: NO., REVISION, BY, DATE, APPR.


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<p style="text-align: center;">Rolled Erosion Control Products (RECP) EC-6</p> <p style="font-size: small; margin-top: 10px;">EROSION CONTROL BLANKET MAINTENANCE NOTES</p> <ol style="list-style-type: none"> 1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE. 2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY. 3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE. 4. ECBs SHALL BE LEFT IN PLACE TO EVENTUALLY BIODEGRADE, UNLESS REQUESTED TO BE REMOVED BY THE LOCAL JURISDICTION. 5. ANY ECB PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE REPAIRED OR REINSTALLED. ANY SUBGRADE AREAS BELOW THE GEOTEXTILE THAT HAVE ERODED TO CREATED A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEDED AND MULCHED AND THE ECB REINSTALLED. <p style="font-size: x-small; margin-top: 5px;">NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.</p> <p style="font-size: x-small; margin-top: 5px;">(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO AND TOWN OF PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD)</p> <hr style="width: 100%; border: 0; border-top: 1px solid black; margin-top: 10px;"/> <p style="font-size: x-small; margin-top: 5px;">November 2010 Urban Drainage and Flood Control District RECP-9 Urban Storm Drainage Criteria Manual Volume 3</p> <p style="font-size: x-small; margin-top: 5px;">You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)</p>	<p style="text-align: center;">Mulching (MU) EC-4</p> <p>Description</p> <p>Mulching consists of evenly applying straw, hay, shredded wood mulch, rock, bark or compost to disturbed soils and securing the mulch by crimping, tackifiers, netting or other measures. Mulching helps reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff. Although often applied in conjunction with temporary or permanent seeding, it can also be used for temporary stabilization of areas that cannot be reseeded due to seasonal constraints.</p> <p>Mulch can be applied either using standard mechanical dry application methods or using hydromulching equipment that hydraulically applies a slurry of water, wood fiber mulch, and often a tackifier.</p> <p>Appropriate Uses</p> <p>Use mulch in conjunction with seeding to help protect the seedbed and stabilize the soil. Mulch can also be used as a temporary cover on low to mild slopes to help temporarily stabilize disturbed areas where growing season constraints prevent effective reseeding. Disturbed areas should be properly mulched and tacked, or seeded, mulched and tacked promptly after final grade is reached (typically within no longer than 14 days) on portions of the site not otherwise permanently stabilized.</p> <p>Standard dry mulching is encouraged in most jurisdictions; however, hydromulching may not be allowed in certain jurisdictions or may not be allowed near waterways.</p> <p>Do not apply mulch during windy conditions.</p> <p>Design and Installation</p> <p>Prior to mulching, surface-roughen areas by rolling with a crimping or punching type roller or by track walking. Track walking should only be used where other methods are impractical because track walking with heavy equipment typically compacts the soil.</p> <p>A variety of mulches can be used effectively at construction sites. Consider the following:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="2" style="text-align: center;">Mulch</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Erosion Control</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: left;">Sediment Control</td> <td style="text-align: center;">Moderate</td> </tr> <tr> <td style="text-align: left;">Site/Material Management</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>  <p style="font-size: x-small; margin-top: 5px;">Photograph MU-1. An area that was recently seeded, mulched, and crimped.</p> <hr style="width: 100%; border: 0; border-top: 1px solid black; margin-top: 10px;"/> <p style="font-size: x-small; margin-top: 5px;">June 2012 Urban Drainage and Flood Control District MU-1 Urban Storm Drainage Criteria Manual Volume 3</p> <p style="font-size: x-small; margin-top: 5px;">You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)</p>	Mulch		Erosion Control	Yes	Sediment Control	Moderate	Site/Material Management	No	<p style="text-align: center;">EC-4 Mulching (MU)</p> <ul style="list-style-type: none"> Clean, weed-free and seed-free cereal grain straw should be applied evenly at a rate of 2 tons per acre and must be tacked or fastened by a method suitable for the condition of the site. Straw mulch must be anchored (and not merely placed) on the surface. This can be accomplished mechanically by crimping or with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is the recommended method for areas flatter than 3:1. Mechanical crimpers must be capable of tucking the long mulch fibers into the soil to a depth of 3 inches without cutting them. An agricultural disk, while not an ideal substitute, may work if the disk blades are dull or blunted and set vertically; however, the frame may have to be weighted to afford proper soil penetration. Grass hay may be used in place of straw; however, because hay is comprised of the entire plant including seed, mulching with hay may seed the site with non-native grass species which might in turn out-compete the native seed. Alternatively, native species of grass hay may be purchased, but can be difficult to find and are more expensive than straw. Purchasing and utilizing a certified weed-free straw is an easier and less costly mulching method. When using grass hay, follow the same guidelines as for straw (provided above). On small areas sheltered from the wind and heavy runoff, spraying a tackifier on the mulch is satisfactory for holding it in place. For steep slopes and special situations where greater control is needed, erosion control blankets anchored with stakes should be used instead of mulch. Hydraulic mulching consists of wood cellulose fibers mixed with water and a tackifying agent and should be applied at a rate of no less than 1,500 pounds per acre (1,425 lbs of fibers mixed with at least 75 lbs of tackifier) with a hydraulic mulcher. For steeper slopes, up to 2000 pounds per acre may be required for effective hydros seeding. Hydromulch typically requires up to 24 hours to dry; therefore, it should not be applied immediately prior to inclement weather. Application to roads, waterways and existing vegetation should be avoided. Erosion control mats, blankets, or nets are recommended to help stabilize steep slopes (generally 3:1 and steeper) and waterways. Depending on the product, these may be used alone or in conjunction with grass or straw mulch. Normally, use of these products will be restricted to relatively small areas. Biodegradable mats made of straw and jute, straw-coconut, coconut fiber, or excelsior can be used instead of mulch. (See the ECM/TRM BMP for more information.) Some tackifiers or binders may be used to anchor mulch. Check with the local jurisdiction for allowed tackifiers. Manufacturer's recommendations should be followed at all times. (See the Soil Binder BMP for more information on general types of tackifiers.) Rock can also be used as mulch. It provides protection of exposed soils to wind and water erosion and allows infiltration of precipitation. An aggregate base course can be spread on disturbed areas for temporary or permanent stabilization. The rock mulch layer should be thick enough to provide full coverage of exposed soil on the area it is applied. <p>Maintenance and Removal</p> <p>After mulching, the bare ground surface should not be more than 10 percent exposed. Reapply mulch, as needed, to cover bare areas.</p> <hr style="width: 100%; border: 0; border-top: 1px solid black; margin-top: 10px;"/> <p style="font-size: x-small; margin-top: 5px;">MU-2 Urban Drainage and Flood Control District June 2012 Urban Storm Drainage Criteria Manual Volume 3</p> <p style="font-size: x-small; margin-top: 5px;">You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)</p>
Mulch										
Erosion Control	Yes									
Sediment Control	Moderate									
Site/Material Management	No									

GEC Checklist Item Z. Include details for the following BMP's. Examples of acceptable details for each are provided.

Only include if its anticipated that it will be used.

BMP	Detail # and Source				
	ECM (Appendix F)	DCM (Vol 2: Chap 3.3)	MHFD (USDCM Vol 3: Chap 7)	COS - Stormwater Construction Manual (App E)	CDOT Standard Plans on M-208 1
Check Dam	SD_3-62 (sand bags)	CD-1 (rock/straw)	EC-12 (rock only)	X	X (rock only)
Construction Fence			SM-3		
Inlet Protection	SD_3-60 (sandbags at drop inlet and gutter upstream of inlet) SD_3-86 (for steep slope above inlet)	IP-1 (SF at drop inlet), IP-2 (straw bale at drop inlet) IP-3 (rock socks or blocks around inlet), IP-4 (rock socks in upstream gutter)	SC-6 (RS & blocks around curb and drop inlets, rock socks at culverts, SF & straw at drop inlets)	X	X
Sediment Control Log	SD_3-85 SD_3-86 SD_3-87		SC-2	X	X

NO.	REVISION	BY	DATE

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