

CROSSROADS MIXED USE

COUNTY OF EL PASO, STATE OF COLORADO

EARLY GRADING & EROSION CONTROL PLANS

A map showing the location of the site. The site is a shaded rectangular area. It is located south of East Fork Sand Creek, east of Highway 24, and west of Marksheffel Road. Other roads shown include Palmer Park Blvd, Omaha Blvd, Galley Rd, and Highway 94. An arrow points from the word 'SITE' to the shaded area.

LOT 1
SOFTBALL WEST
SUBDIVISION NO. 2
TAX ID #5408-00-7001

LOT 2
SOFTBALL WEST
SUBDIVISION NO. 2
TAX ID #5405-00-7004

EXISTING MEADOWBROOK PARKWAY

EXISTING U.S. HIGHWAY NO. 24

SITE

SITE MAP
N.T.S.

1. ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD LOCATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO SPRINGS.
3. CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOILS AND GEOTECHNICAL REPORT AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIME INCLUDING THE FOLLOWING:
 - 3.1 EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
 - 3.2 CITY OF COLORADO SPRINGS/EL PASO COUNTY ENGINEERING CRITERIA MANUAL VOLUMES 1 AND 2.
 - 3.3 COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARDS SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION.
 - 3.4 CDOT M&S STANDARDS.
4. IT IS THE DESIGN ENGINEERS RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITION BOTH ONSITE AND OFFSITE ON THE CONSTRUCTION PLANS. ANY MODIFICATION NECESSARY DUE TO CONFLICT OMISSIONS OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPERS RESPONSIBILITY TO RECTIFY.
5. ONCE THE ESCOP HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL BMPs AS INDICATED ON THE GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY PCD INSPECTIONS STAFF.
6. IT IS THE CONTRACTORS RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORM WATER QUALITY CONTROL PERMIT (ESCQP), US ARMY CORPS OF ENGINEER ISSUED 401 AND/OR 404 PERMITS AND COUNTY AND STATE FUGITIVE DUST PERMITS.
7. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE CONSTRUCTION SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
8. ANY TEMPORARY SIGNAGE AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DPW AND MUTCD CRITERIA.
9. CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRE BY EL PASO COUNTY DPW INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
10. THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY (OWNER/S). PRIOR TO ANY OFFSITE DISTURBANCE GRADING, OR CONSTRUCTION.

STAGING AREA TO BE DETERMINED BY CONTRACTOR IN THE FIELD. THE LOCATIONS SHALL BE DELINEATED ON THIS PLAN BY THE CONTRACTOR.

TEMPORARY SEDIMENT TRAP LOCATIONS WILL BE DETERMINED BY THE CONTRACTOR IN THE FIELD.

EXISTING SITE TERRAIN GENERALLY SLOPES FROM NORTH TO SOUTHWEST AT GRADE RATES THAT VARY BETWEEN 2% TO 6%

THERE ARE NO BATCH PLANTS ON SITE.

AREAS LEFT OPEN FOR 30 DAYS OR MORE, OTHER THAN FOR UTILITY AND DRAINAGE CONSTRUCTION SHALL BE SEEDED AND/OR MULCHED.

NO PORTION OF THIS PROPERTY IS LOCATED WITHIN A DESIGNATED FEMA FLOODPLAIN IN ACCORDANCE WITH FLOOD INSURANCE RATE MAPS (FIRM) 08041C0756G, EFFECTIVE DATE DECEMBER 7, 2018.

EXISTING VEGETATION: THE SITE ORIGINALLY CONSISTED OF PRAIRIE GRASSES AND SHRUBS. NO OTHER NOTABLE VEGETATION EXISTED. THE SITE IS PROPOSED FOR AN INDUSTRIAL PARK SUBDIVISION. IF THE SUBDIVISION IS NOT COMPLETED, THE ENTIRE SITE SHOULD BE RESEEDED PER EPC SPECIFICATIONS. FOR AREAS OUTSIDE OF THE DEVELOPED LOTS, THE GROUND SHOULD BE RESEEDED PER EPC CRITERIA AS SHOWN ON THE GRADING AND EROSION CONTROL PLAN. THE VEGETATION SHOULD BE VISUALLY INSPECTED TO EXCEED THE AMOUNT OF VEGETATION THAT EXISTS IN NON-DISTURBED AREAS AROUND THE SITE.

THIS GRADING AND EROSION CONTROL PLAN WAS PREPARED UNDER MY DIRECTION AND SUPERVISION AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. SAID PLAN HAS BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR GRADING AND EROSION CONTROL PLANS. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARING THIS PLAN.

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH THE REQUIREMENTS OF THE GRADING AND EROSION CONTROL PLAN.

Danny Mientka (Sep 17, 2021 10:34 MDT)

DANNY MIENTKA, COLORADO SPRINGS EQUITIES LLC OWNER

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 DIRECTORS DISCRETION.

JENNIFER IRVINE, P.E. DATE _____
COUNTY ENGINEER / ECM ADMINISTRATOR

1. BASED ON USGS NGVD 29 VERTICAL DATUM MONUMENT R76
ELEVATION = 6286.32'

SHEET 1	TITLE SHEET
SHEET 2	SITE GRADING PLAN
SHEET 3	GEC DETAILS
SHEET 4	GEC DETAILS

TIMING: NOVEMBER 2021-DECEMBER 2021
 ANTICIPATED STARTING AND COMPLETION TIME PERIOD OF SITE GRADING:
 SEPTEMBER 2022

SEPTEMBER 2022	
EXPECTED DATE ON WHICH THE FINAL STABILIZATION WILL BE COMPLETED	
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AREAS 29.049 AC
TOTAL AREA OF THE SITE TO BE CLEARED, EXCAVATED OR GRADED:
RECEIVING WATERS: SAND CREEK

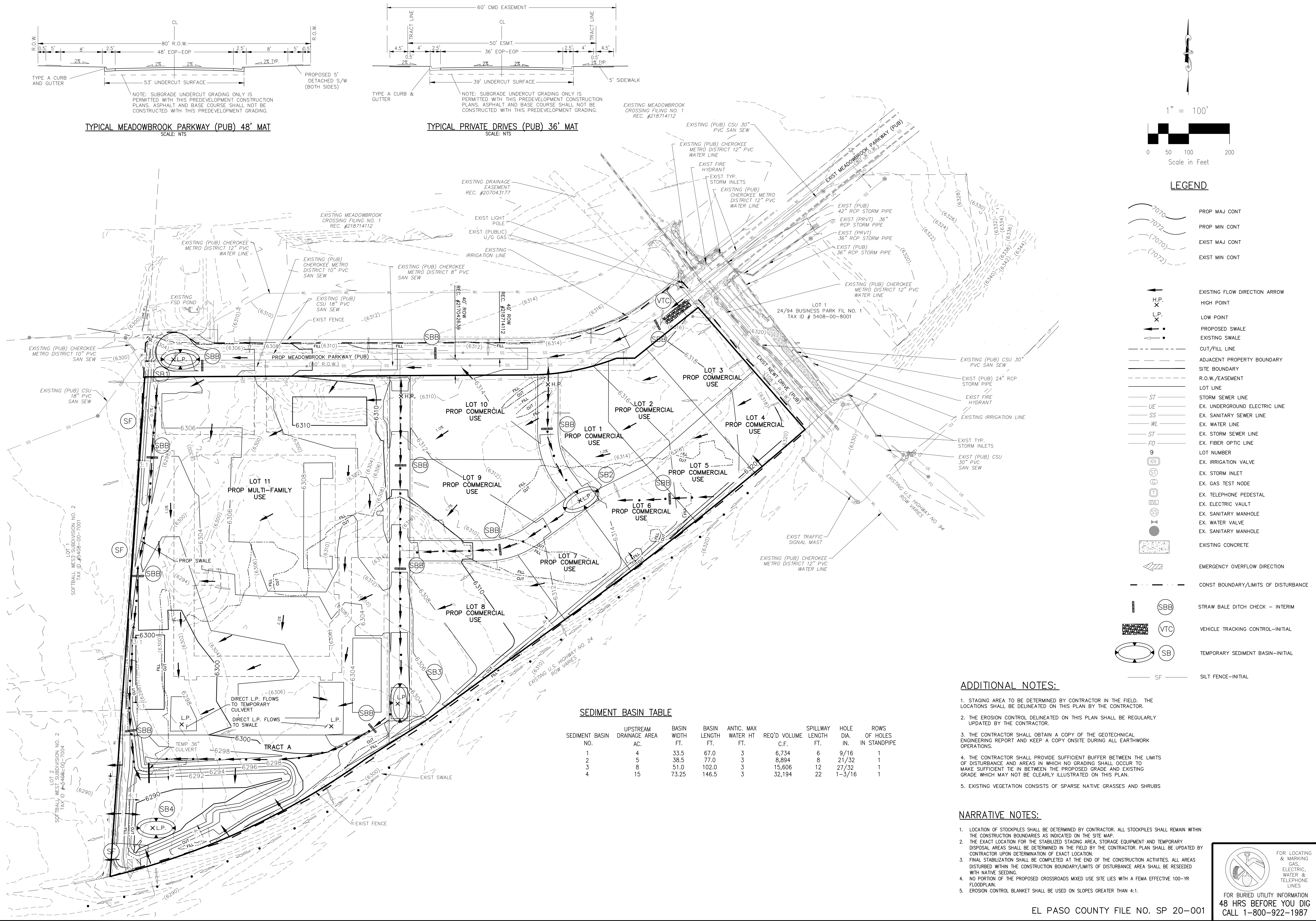
1. STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS, ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFF-SITE WATERS, INCLUDING WETLANDS.
2. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
3. A SEPARATE STORMWATER MANAGEMENT PLAN (SWMP) FOR THIS PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) OBTAINED PRIOR TO COMMENCING CONSTRUCTION. MANAGEMENT OF THE SWMP DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE DESIGNATED QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR. THE SWMP SHALL BE LOCATED ON SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.
4. ONCE THE ESQCP IS APPROVED AND A "NOTICE TO PROCEED" HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED GEC. A PRE-CONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
5. CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT COULD CONTRIBUTE POLLUTANTS TO STORMWATER. CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, AND DISTURBED LAND AREAS SHALL BE INSTALLED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
6. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE START AND IDENTIFY CHANGES. THOSE CHANGES ARE NEEDED TO ENSURE THE CONTROL MEASURES ARE MAINTAINED. THE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN.
7. TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS.
8. FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLANT DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
9. ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DESIGNED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT EFFECT THE DESIGN OR FUNCTION OF PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE EGM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
10. EARTH DISTURBANCES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE UNLESS SHOWN TO BE INFEASIBLE AND SPECIFICALLY REQUESTED AND APPROVED.
11. COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED. IF COMPACTION PREVENTION IS NOT FEASIBLE DUE TO SITE CONSTRAINTS, ALL AREAS DESIGNATED FOR INFILTRATION AND VEGETATION CONTROL MEASURES MUST BE LOOSENEED PRIOR TO INSTALLATION OF THE CONTROL MEASURE(S).
12. ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF SITE.
13. CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO ENTER STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUTS SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY, CREEK OR STREAM.
14. DURING DEWATERING OPERATIONS OF UNCONTAMINATED GROUND WATER MAY BE DISCHARGED ON SITE, BUT SHALL NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF UNLESS AN APPROVED STATE DEWATERING PERMIT IS IN PLACE.
15. EROSION CONTROL BLANKETING OR OTHER PROTECTIVE COVERING SHALL BE USED ON SLOPES STEEPER THAN 3:1.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
17. WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. CONTROL MEASURES MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
18. TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFF-SITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
19. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, SOIL, AND SAND THAT MAY ACCUMULATE IN ROADS, STORM DRAINS AND OTHER DRAINAGE CONVEYANCE SYSTEMS AND STORMWATER APPEARANCES AS A RESULT OF SITE DEVELOPMENT.
20. THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.

THE CITY OF COLORADO SPRINGS
RECOGNIZES THE DESIGN ENGINEER
AS HAVING RESPONSIBILITY FOR
THE DESIGN; THE CITY HAS
LIMITED ITS SCOPE OF REVIEW
ACCORDINGLY. RESUBMITTAL
REQUIRED IF CONSTRUCTION HAS
NOT COMMENCED WITHIN 180 DAYS
AFTER APPROVAL DATE.



FOR LOCATING
& MARKING
GAS,
ELECTRIC,
WATER &
TELEPHONE
LINES

FOR BURIED UTILITY INFORMATION
48 HRS BEFORE YOU DIG
CALL 1-800-922-1987



CROSSROADS MIXED USE

GRADING & EROSION CONTROL PLAN

PROJECT NO. 18-003

DESIGNED BY: CW

DRAWN BY: CW

CHECKED BY: VAS

DATE: 8/12/21

SCALE: HORIZONTAL: 1" = 100' VERTICAL: N/A

SHEET 2 OF 4

GR02

212 N WABATCH AVE, STE 305
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

CIVIL CONSULTANTS, INC.

FOR AND ON BEHALF OF M&S CIVIL CONSULTANTS, INC.

REVISIONS:
NO. DATE BY DESCRIPTION

APPROVED BY: DATE:

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

CAUTION

EC-2 Temporary and Permanent Seeding (TS/PS)

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses						
Common Name	Botanical Name	Growth Season ^a	Growth Form	Seeds/Pound	Pounds of PLS/acre	
Alkali Soil Seed Mix						
Alkali sacaton	<i>Sporobolus airoides</i>	Cool	Bunch	1,750,000	0.25	
Basin wildrye	<i>Elymus cinereus</i>	Cool	Bunch	165,000	2.5	
Sodar streambank wheatgrass	<i>Agropyron riparium 'Sodar'</i>	Cool	Sod	170,000	2.5	
Jose tall wheatgrass	<i>Agropyron elongatum 'Jose'</i>	Cool	Bunch	79,000	7.0	
Arriba western wheatgrass	<i>Agropyron smithii 'Arriba'</i>	Cool	Sod	110,000	5.5	
Total					17.75	
Fertile Loamy Soil Seed Mix						
Ephraim crested wheatgrass	<i>Agropyron cristatum 'Ephraim'</i>	Cool	Sod	175,000	2.0	
Dural hard fescue	<i>Festuca ovina 'luriculata'</i>	Cool	Bunch	565,000	1.0	
Lincoln smooth brome	<i>Bromus inermis leys 'Lincoln'</i>	Cool	Sod	130,000	3.0	
Sodar streambank wheatgrass	<i>Agropyron riparium 'Sodar'</i>	Cool	Sod	170,000	2.5	
Arriba western wheatgrass	<i>Agropyron smithii 'Arriba'</i>	Cool	Sod	110,000	7.0	
Total					15.5	
High Water Table Soil Seed Mix						
Meadow foxtail	<i>Alopecurus pratensis</i>	Cool	Sod	900,000	0.5	
Redtop	<i>Agrostis alba</i>	Warm	Open sod	5,000,000	0.25	
Reed canarygrass	<i>Phalaris arundinacea</i>	Cool	Sod	68,000	0.5	
Lincoln smooth brome	<i>Bromus inermis leys 'Lincoln'</i>	Cool	Sod	130,000	3.0	
Pathfinder switchgrass	<i>Panicum virgatum 'Pathfinder'</i>	Warm	Sod	389,000	1.0	
Alkat tail wheatgrass	<i>Agropyron elongatum 'Alkat'</i>	Cool	Bunch	79,000	5.5	
Total					10.75	
Transition Turf Seed Mix^c						
Ruebens Canadian bluegrass	<i>Poa compressa 'Ruebens'</i>	Cool	Sod	2,500,000	0.5	
Dural hard fescue	<i>Festuca ovina 'luriculata'</i>	Cool	Bunch	565,000	1.0	
Citation perennial ryegrass	<i>Lolium perenne 'Citation'</i>	Cool	Sod	247,000	3.0	
Lincoln smooth brome	<i>Bromus inermis leys 'Lincoln'</i>	Cool	Sod	130,000	3.0	
Total					7.5	

TS/PS-4 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 June 2012

Temporary and Permanent Seeding (TS/PS) EC-2

Table TS/PS-2. Minimum Drill Seeding Rates for Perennial Grasses (cont.)						
Common Name	Botanical Name	Growth Season ^a	Growth Form	Seeds/Pound	Pounds of PLS/acre	
Sandy Soil Seed Mix						
Blue grama	<i>Bouteloua gracilis</i>	Warm	Sod-forming bunchgrass	825,000	0.5	
Camper little bluestem	<i>Schizachyrium scoparium 'Camper'</i>	Warm	Bunch	240,000	1.0	
Prairie sandreed	<i>Calamovilfa longifolia</i>	Warm	Open sod	274,000	1.0	
Sand dropseed	<i>Sporobolus cryptandrus</i>	Cool	Bunch	5,298,000	0.25	
Vaughn sidecoats grama	<i>Bouteloua curtipendula 'Vaughn'</i>	Warm	Sod	191,000	2.0	
Arriba western wheatgrass	<i>Agropyron smithii 'Arriba'</i>	Cool	Sod	110,000	5.5	
Total					10.25	
Heavy Clay, Rocky Foothill Seed Mix						
Ephraim crested wheatgrass ^d	<i>Agropyron cristatum 'Ephraim'</i>	Cool	Sod	175,000	1.5	
Oahe Intermediate wheatgrass	<i>Agropyron intermedium 'Oahe'</i>	Cool	Sod	115,000	5.5	
Vaughn sidecoats grama ^e	<i>Bouteloua curtipendula 'Vaughn'</i>	Warm	Sod	191,000	2.0	
Lincoln smooth brome	<i>Bromus inermis leys 'Lincoln'</i>	Cool	Sod	130,000	3.0	
Arriba western wheatgrass	<i>Agropyron smithii 'Arriba'</i>	Cool	Sod	110,000	5.5	
Total					17.5	

^a All of the above seeding mixes and rates are based on drill seeding followed by crimped straw mulch. These rates should be doubled if seed is broadcast and should be increased by 50 percent if the seeding is done using a Brillion Drill or is applied through hydraulic seeding. Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1. If hydraulic seeding is used, hydraulic mulching should be done as a separate operation.

^b See Table TS/PS-3 for seeding dates.

^c If site is to be irrigated, the transition turf seed rates should be doubled.

^d Crested wheatgrass should not be used on slopes steeper than 6H to 1V.

^e Can substitute 0.5 lbs PLS of blue grama for the 2.0 lbs PLS of Vaughn sidecoats grama.

June 2012 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 TS/PS-5

EC-2 Temporary and Permanent Seeding (TS/PS)

Table TS/PS-3. Seeding Dates for Annual and Perennial Grasses				
Seeding Dates	Annual Grasses (Numbers in table reference species in Table TS/PS-1)		Perennial Grasses	
	Warm	Cool	Warm	Cool
January 1–March 15			✓	✓
March 16–April 30	4	1,2,3	✓	✓
May 1–May 15	4		✓	
May 16–June 30	4,5,6,7			
July 1–July 15	5,6,7			
July 16–August 31				
September 1–September 30		8,9,10,11		
October 1–December 31			✓	✓

Mulch

Cover seeded areas with mulch or an appropriate rolled erosion control product to promote establishment of vegetation. Anchor mulch by crimping, netting or use of a non-toxic tackifier. See the Mulching BMP Fact Sheet for additional guidance.

Maintenance and Removal

Monitor and observe seeded areas to identify areas of poor growth or areas that fail to germinate. Reseed and mulch these areas, as needed.

An area that has been permanently seeded should have a good stand of vegetation within one growing season if irrigated and within three growing seasons without irrigation in Colorado. Reseed portions of the site that fail to germinate or remain bare after the first growing season.

Seeded areas may require irrigation, particularly during extended dry periods. Targeted weed control may also be necessary.

Protect seeded areas from construction equipment and vehicle access.

TS/PS-6 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 June 2012

Mulching (MU) EC-4

Description

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.

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.

Appropriate Uses

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.

Standard dry mulching is encouraged in most jurisdictions; however, hydromulching may not be allowed in certain jurisdictions or may not be allowed near waterways.

Do not apply mulch during windy conditions.

Design and Installation

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.

A variety of mulches can be used effectively at construction sites. Consider the following:

Mulch	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No

Photograph MU-1. An area that was recently seeded, mulched, and crimped.

June 2012 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 MU-1

EC-4 Mulching (MU)

- 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 erosion control 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 hydroseeding. 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.

Maintenance and Removal

After mulching, the bare ground surface should not be more than 10 percent exposed. Resupply mulch, as needed, to cover bare areas.

MU-2 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 June 2012

Chapter 12 Open Channels

By measuring "bankfull" characteristics within the Jimmy Camp Creek drainage basin, a 67 square-mile tributary to Fountain Creek, and applying regression methods, a relationship between drainage area and channel dimensions has been developed. Bankfull channel dimensions can be useful to determine the configuration of the "low-flow channel" within the main channel. This is the portion of the channel that is most active and most affected by changes in hydrology due to development. Even with effective detention facilities upstream of "natural" channel reaches, it is anticipated that increases in flow volumes and frequency will cause channels to become unstable. By stabilizing the low-flow portion of the channels, it is anticipated that more significant channel stabilization projects can be avoided, reducing the overall cost of drainage facilities.

Allowable velocities for unlined low-flow channels are shown in Table 12-3. Criteria for lined channels are provided in the Major Drainage Chapter of Volume 1 of the UDFCD Manual.

Table 12-3. Hydraulic Design Criteria for Natural Unlined Channels			
Design Parameter	Erosive Soils or Poor Vegetation	Erosion Resistant Soils and Vegetation	
Maximum Low-flow Velocity (ft/sec)	3.5 ft/sec	5.0 ft/sec	
Maximum 100-year Velocity (ft/sec)	5.0 ft/sec	7.0 ft/sec	
Froude No., Low-flow	0.5	0.7	
Froude No., 100-year	0.6	0.8	
Maximum Tractive Force, 100-year	0.60 lb/sf	1.0 lb/sf	

^a Velocities, Froude numbers and tractive force values listed are average values for the cross section.

^b "Erosion resistant" soils are those with 30% or greater clay content. Soils with less than 30% clay content shall be considered "erosive soils."

Normally, a low-flow channel exhibits some meandering and sinuosity in natural channels. Stabilized channels should feature a meander pattern typical of natural channels. Side slopes for low-flow channel banks shall be no steeper than 4H:1V without adequate bank stabilization. Flatter slopes are encouraged and may provide improved vegetative cover, bank stability and access.

3.1.1.1 Low-Flow Channel Dimensions

Based on the Jimmy Camp Creek drainage base channel analyses, the bankfull regression equation for design low-flow cross-sectional area is provided as Equation 12-1 below.

Where:

$$A_{low-flow} = 21.3 D^{0.34}$$

Equation 12-1

$A_{low-flow}$ = design low-flow cross-sectional area (ft²)

D = tributary drainage basin area (mi²)

From the design low-flow cross-sectional area, the design low-flow width for any drainage basin is calculated by Equation 12-2a below.

$$W_{low-flow} = [(W_{bankfull}/D_{bankfull})_{reference} * A_{low-flow}]^{0.5}$$

Equation 12-2a

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Drainage Criteria Manual, Volume 1 12-13

Stabilized Staging Area (SSA) SM-6

Diagram illustrating the Stabilized Staging Area (SSA) setup. The diagram shows a rectangular area labeled "SSA-1. STABILIZED STAGING AREA" adjacent to an "EXISTING ROADWAY". The area is bounded by a "3" MIN. THICKNESS GRANULAR MATERIAL" wall and a "SILT FENCE OR CONSTRUCTION FENCING AS NEEDED". Inside the area, there is a "CONSTRUCTION VEHICLE PARKING (IF NEEDED)" area and a "MATERIAL STORAGE AREA". The area is also labeled "SSA" in a circle.

STABILIZED STAGING AREA INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - LOCATION OF STAGING AREA(S).
 - CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
- STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
- STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
- THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.
- ADDITIONAL PERIMETER BMP'S MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

STABILIZED STAGING AREA MAINTENANCE NOTES

- INSPECT BMP'S EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMP'S SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMP'S 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 BMP'S IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BMP'S HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
- ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

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EROSION CONTROL CRITERIA:

EROSION CONTROL MEASURES SHALL BE IMPLEMENTED IN A MANNER THAT WILL PROTECT PROPERTIES AND PUBLIC FACILITIES FROM THE ADVERSE EFFECTS OF EROSION AND SEDIMENTATION AS A RESULT OF CONSTRUCTION AND EARTHWORK ACTIVITIES WITHIN THE PROJECT SITE.

- PRIOR TO START OF GRADING OPERATIONS, LOCATE AND SET THE SILT FENCE AND VEHICLE TRACKING CONTROL AS SHOWN ON THE EROSION CONTROL PLAN.
- THE SILT FENCE SHALL BE KEPT IN PLACE AND MAINTAINED UNTIL EROSION AND SEDIMENTATION POTENTIAL IS MITIGATED. REMOVAL OF SILT AND SEDIMENT COLLECTED BY THE SILT FENCES IS REQUIRED ONCE IT REACHES HALF THE HEIGHT OF THE SILT FENCES.
- EROSION CONTROL DEVICES SHOULD BE CHECKED AFTER EVERY STORM OR NOT MORE THAN EVERY 14 DAYS. REPAIRS OR REPLACEMENT SHOULD BE MADE AS NECESSARY TO MAINTAIN PROPER PROTECTION.

SOIL EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN TWENTY-ONE (21) CALENDAR DAYS AFTER FINAL GRADING, OR FINAL EARTH DISTURBANCE HAS BEEN COMPLETED. DISTURBED AREAS AND STOCKPILES WHICH ARE NOT AT THE FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS SHALL ALSO BE MULCHED WITHIN 21 DAYS AFTER INTERIM GRADING. AN AREA THAT IS GOING TO REMAIN IN AN INTERIM STATE FOR MORE THAN 60 DAYS SHALL ALSO BE SEEDED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND BMP'S SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED.

NOTE:

SEE URBAN DRAINAGE CRITERIA MANUAL (VOL. 3) FOR INSTALLATION AND MAINTENANCE (TYP)

FOR LOCATING & MARKING GAS, ELECTRIC, WATER & TELEPHONE LINES

FOR BURIED UTILITY INFORMATION
48 HRS BEFORE YOU DIG
CALL 1-800-922-1987

CROSSROADS MIXED USE

GRADING & EROSION CONTROL DETAILS

PROJECT NO. 18-003

DATE: 8/12/21

SCALE: HORIZONTAL: N/A VERTICAL: N/A

DESIGNED BY: CWM

DRAWN BY: VAS

CHECKED BY:

212 N. WABATCH AVE., STE 305
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

FOR AND ON BEHALF OF M&S CIVIL CONSULTANTS, INC.

WIRJIL A. SANCHEZ, COLORADO P.E., NO. 37160

NO. DATE: BY: DESCRIPTION:

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

CAUTION

GR04

SHEET 4 OF 4