CRESTONE PEAK RESOURCES

CIVITAS

TOPSOIL PROTECTION PLAN

FOR

Alamosa 5-64 6-1

Prepared For:

COLORADO
Oil & Gas Conservation Commission
Department of Natural Resources

1120 Lincoln Street, Suite 801
Denver, Colorado, 80203

Prepared By:

RPG RESOURCES

1720 South Bellaire Street
Denver, CO 80222
www.rpgres.com

Date Prepared: March 2022

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TOPSOIL PROTECTION PLAN	
Operator Location Name	Alamosa 5-64 6-1
Legal Description	S5 & S6, T4S, R64W, 6TH P.M.
Coordinates (Lat/Long)	39.649838 / -104.586004
County	Arapahoe

1. INTRODUCTION

This Topsoil Protection Plan (Plan) was prepared by RPG Resources, LLC (RPG) to support Crestone Peak Resources Operating, LLC (Crestone) in preparing a Form 2A to permit an oil and gas location on the above referenced project site (Location). The following procedures will be implemented to ensure protection of soils through all phases of oil and gas exploration and production.

2. PROCEDURES

Throughout construction, drilling, completions, and interim reclamation/production phases, soils will be removed, handled, stockpiled, and maintained to prevent degradation from contamination, erosion, compaction, and to the extent possible, loss of biological activity. Stormwater control measures and Best Management Practices (BMPs) will be implemented to ensure topsoil protection. Topsoil will be monitored regularly by Crestone personnel and during routine stormwater inspections. During construction, drilling, and completions operations, stormwater inspections will occur on a 14-day frequency and within 24 hours after the end of any precipitation or snowmelt event that causes surface erosion.

3. CONSTRUCTION

The topsoil depth was evaluated using soil physical and morphological characteristics. Six (6) soil test pits were evaluated across the proposed newly disturbed area for the Alamosa 5-64 6-1 Pad (see attachments). Two (2) of the test pit locations (SW (#1) and NE (#4) pits) had soil samples collected within the proposed topsoil salvage depths. Soil samples were submitted to Weld Laboratories in Greeley, CO to analyze for baseline agronomic soil properties. These results, once analysis is completed, will be used to apply soil amendments as needed.

Soil texture on average was recorded as clay loam from zero (0) to six (6) inches and loam from six (6) to 18 inches deep within all test pits in the field. The topsoil horizon was observed from nine (9) inches across the site and was delineated by the amount of organic matter and root material present as well as soil texture and structure. The majority of organic material observed was within the first two inches. Soil color was a consistent 10YR 4/3 from 0 to 18 inches deep within all six test pits.

Salvaged topsoil will be stored to the north and west in stockpiles with slopes no greater than 3:1 (see attached exhibit). Stockpiles will be vertically tracked by heavy equipment to inhibit wind and water erosion during active construction.

4. DRILLING AND WELL COMPLETIONS

Salvaged topsoil will be seeded while stockpiled during drilling and well completions operations. Seeding will occur when earthwork operations are complete. During normal operations and stormwater inspections, the Crestone employees and contractors will monitor the stockpile for erosion and establishment of undesirable and noxious weeds. Weeds will be treated mechanically with a mower whenever plant height exceeds 6 inches or before seed development. Chemical treatment of weeds with broad-leaf herbicides will only occur in spot-specific situations where prostrate weed growth or other site conditions preventing mechanical treatment are encountered. Soil sterilant and non-selective herbicides will not be used.

5. INTERIM RECLAMATION AND PRODUCTION

When the Location enters the production phase of operations, areas no longer in use will be interim reclaimed. Topsoil will be redistributed throughout the interim reclamation area and contoured to match pre-disturbance topography. The redistributed soils will be tilled to adequately prepare the seedbed for seeding operations.

Topsoil will continue to be monitored during 30-day stormwater inspections conducted until the disturbance meets the 70% of reference area cover specified for achieving final stabilization under applicable stormwater CDPHE stormwater permit requirements. Topsoil protection, weed management and erosion control/repair will continue throughout the life of the Location per Colorado Oil and Gas Conservation Commission (COGCC) 1000 Series Rules.

Throughout all phases of development, any identified erosion will be repaired as soon as practicable, which is typically within 72 hours. Additional stormwater control measures will be deployed as needed. All deployed temporary stormwater control measures will be maintained and will remain in place until the disturbance achieves final stabilization as defined in the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division COR400000 permit.

This Plan summarizes Crestone's standard operating procedures for topsoil protection as well as information relevant to topsoil protection acquired from publicly available databases and records analyzed by RPG.

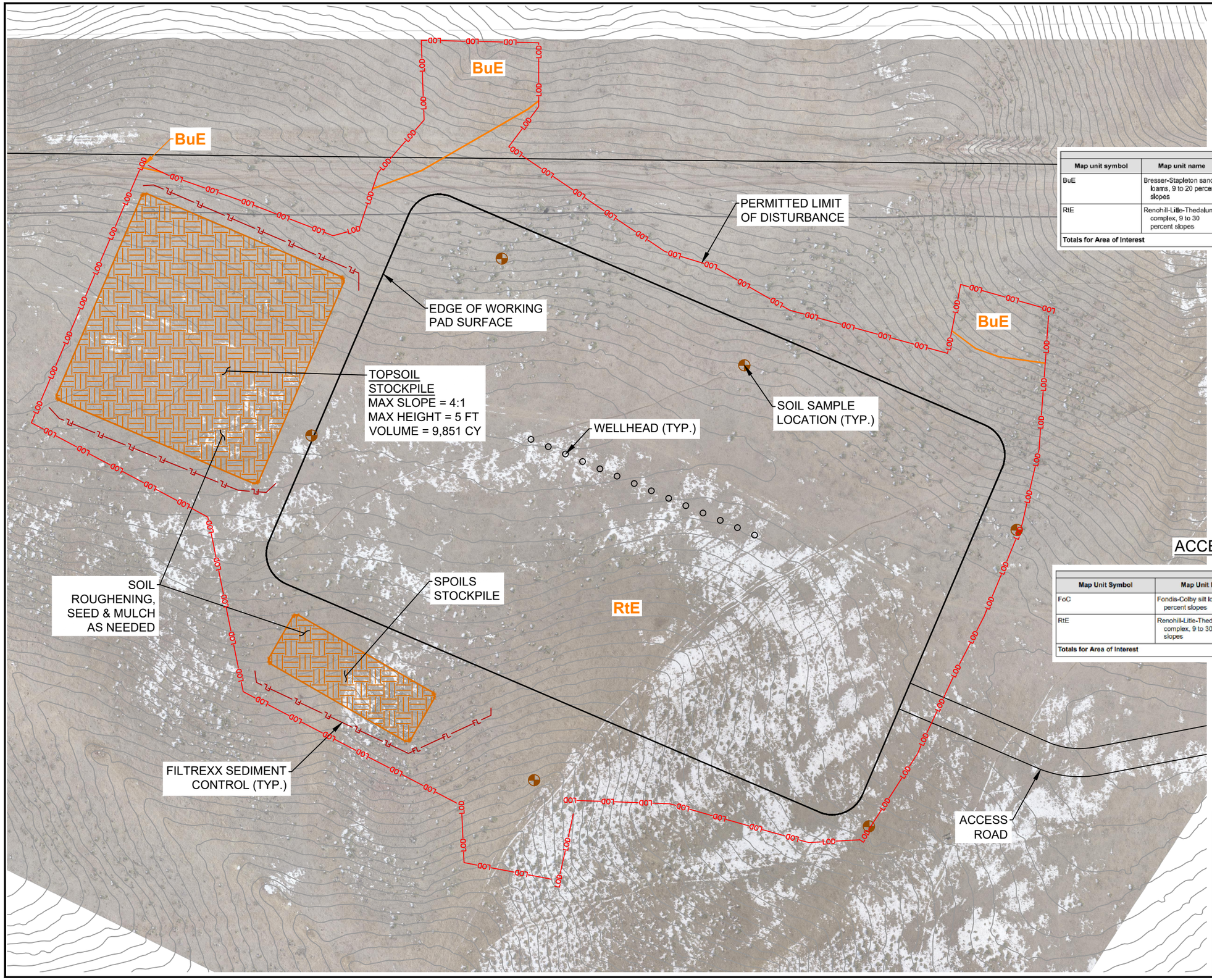
6. SITE-SPECIFIC BMPs

Each of the BMPs listed below are intended for use at this site specifically. These BMPs are also consistent with the field-wide SWMP. Detailed design and maintenance information for each BMP has been included as an attachment.

- Filtrexx® Sediment Control (FSC)
- Soil Roughening (SR)
- Seeding (S)
- Mulching (M)

Attachments:

1. Topsoil Management Plan Exhibit
2. BMP Details
3. Topsoil Test Pit ~~Photos~~



PAD AREA

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BuE	Bresser-Stapleton sandy loams, 9 to 20 percent slopes	B	0.5	3.6%
RtE	Renohill-Lille-Thedalund complex, 9 to 30 percent slopes	D	12.3	96.4%
Totals for Area of Interest			**12.8**	**100.0%**

ACCESS ROAD

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FoC	Fondis-Colby silt loams, 3 to 5 percent slopes	0.5	15.3%
RtE	Renohill-Lille-Thedalund complex, 9 to 30 percent slopes	2.8	84.7%
Totals for Area of Interest		**3.3**	**100.0%**

0 100 200 FEET

CRESTONE PEAK RESOURCES

DATE PREPARED: MARCH 2022
DATE REVISED: OCTOBER 2022

RPG RESOURCES

ALAMOSA 5-64 6-1

TOPSOIL MANAGEMENT PLAN EXHIBIT

1 OF 1

Filtrexx® Sediment Control (FSC)

Description

Filtrexx® Sediment control is a three-dimensional tubular sediment control and storm water runoff filtration device typically used for perimeter control of sediment and other soluble pollutants (such as phosphorus and petroleum hydrocarbons), on and around construction activities.

Applicability

Filtrexx® Sediment control is to be installed down slope of any disturbed area requiring erosion and sediment control and filtration of soluble pollutants from runoff. Sediment control is effective when installed perpendicular to sheet or low concentrated flow. Acceptable applications include:

- Site perimeters;
- Above and below disturbed areas subject to sheet runoff, inter-rill and rill erosion;
- Above and below exposed and erodible slopes;
- Around area drains or inlets located in a ‘sump’;
- On compacted soils where trenching of silt fence is difficult or impossible;
- Around sensitive trees where trenching of silt fence is not beneficial for tree survival or may unnecessarily disturb established vegetation;
- On frozen ground where trenching of silt fence is impossible; and
- On paved surfaces where trenching of silt fence is impossible.

Limitations

Filtrexx® Sediment control should not be placed on slopes steeper than 50%. Runoff from the top of cut/fills or on slopes steeper than 50% should be routed via other means through BMPs designed to manage surface flow. Appropriate diameter Filtrexx® Sediment control should be chosen based on the application.

Design Criteria

Maximum Slope Length Above Sediment Control in Feet*					
Slope Percent	8 in Sediment control	12 in Sediment control	18 in Sediment control	24 in Sediment control	32 in Sediment control
	6.5 in**	9.5 in**	14.5 in**	19 in**	26 in**
2 (or less)	600	750	1000	1300	1650
5	400	500	550	650	750
10	200	250	300	400	500
15	140	170	200	325	450
20	100	125	140	260	400
25	80	100	110	200	275
30	60	75	90	130	200
35	60	75	80	115	150
40	60	75	80	100	125
45	40	50	60	80	100
50	40	50	55	65	75

***** Based on a failure point of 36 in super silt fence (wire reinforced) at 1000 ft of slope, watershed width equivalent to receiving length of sediment control device, 1 in/ 24 hr rain event.

**Effective height of Sediment control after installation and with constant head from runoff as determined by Ohio State University.

Construction Specifications

- Sediment control used for perimeter control of sediment and soluble pollutants in storm runoff shall meet Filtrexx® Soxx™ Material Specifications and use Certified Filtrexx® FilterMedia™.
- Contractor is required to be Filtrexx® Certified™, or use pre-filled Filtrexx® Sediment control products manufactured by a Filtrexx® Certified Manufacturer™ as determined by Filtrexx® International, LLC (440-926-2607 or visit www.filtrexx.com). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application. Look for the Filtrexx® Certified™ Seal.
- Sediment control will be placed at locations indicated on plans as directed by the Engineer.
- Sediment control should be installed parallel to the base of the slope or other disturbed area. In extreme conditions (i.e., 2:1 slopes), a second Sediment control shall be constructed at the top of the slope.

- Effective Soxx™ height in the field should be as follows: 8” Diameter Sediment control = 6.5” high, 12” Diameter Sediment control = 9.5” high, 18” Diameter SiltSoxx™ = 14.5” high, 24” Diameter Sediment control = 19” high.
- Stakes shall be installed through the middle of the Sediment control on 10 ft centers, using 2 in by 2 in by 3 ft hard wood stakes. In the event staking is not possible, i.e., when Sediment control is used on pavement, heavy concrete blocks shall be used behind the Sediment control to help stabilize during rainfall/runoff events.
- Staking depth for sand and silt loam soils shall be 12 in, and 8 in for clay soils.
- Loose compost may be backfilled along the upslope side of the Sediment control, filling the seam between the soil surface and the device, improving filtration and sediment retention.
- If the Sediment control is to be left as a permanent filter or part of the natural landscape, it may be seeded at time of installation for establishment of permanent vegetation. The
- Engineer will specify seed requirements.
- Filtrexx® Sediment control is not to be used in perennial, ephemeral, or intermittent streams.

Maintenance Considerations

The frequency of inspection should be in accordance with the Storm Water Management Plan (SWMP) to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional Sediment control may be required to reduce effective slope length or sediment removal may be necessary.

Sediment shall be removed at the base of the upslope side of the Sediment control when accumulation has reached 1/2 of the effective height of the Sediment control, or as directed by the Engineer. Alternatively, a new Sediment control can be placed on top of and slightly behind the original one creating more sediment storage capacity without soil disturbance.

References

Filtrexx Land Improvement Systems, Specification Cut Sheets, Filtrexx International, LLC, 2010. http://www.filtrexx.com/Resources/Section4.1.1-SWPPPCutSheet-FiltrexxSedimentControl.pdf

Soil Roughening (SR)

Description

Soil (surface) roughening is an erosion control practice that involves tracking, scarifying, imprinting, or tilling a disturbed area to provide temporary stabilization of disturbed areas. Surface roughening creates variations in the soil surface that help to minimize wind and water erosion. Depending on the technique used, surface roughening may also help establish conditions favorable to establishment of vegetation.

Applicability

Soil roughening is most effective for areas of one acre or less and works well for the following applications:

- Any slope, but particularly fill slopes greater than 3:1;
- Areas with highly erodible soils; and
- Soils that are frequently disturbed.

Limitations

- Soil roughening is not appropriate for rocky slopes.
- Soil compaction might occur when roughening with tracked machinery.
- Soil roughening is of limited effectiveness in anything more than a gentle or shallow depth rain.
- If roughening is washed away in a heavy storm, the surface will have to be re-roughened.

Design Criteria

No formal design is required. However, the selection of the appropriate method depends on the type of slope. Steepness, mowing requirements, and/or a cut or fill slope operation are all factors considered in choosing a roughening method.

Construction Specifications

- To slow erosion, roughening should be done as soon as possible after grading activities have ceased (temporary or permanently) in an area.
- All cut and fill slopes should be roughened whenever possible.
- Do not blade or scrape the final fill slope face.
- Excessive compacting of the soil surface should be avoided during roughening, and areas should be seeded as soon as possible after roughening is completed.

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Roughening might need to be repeated after storm events.

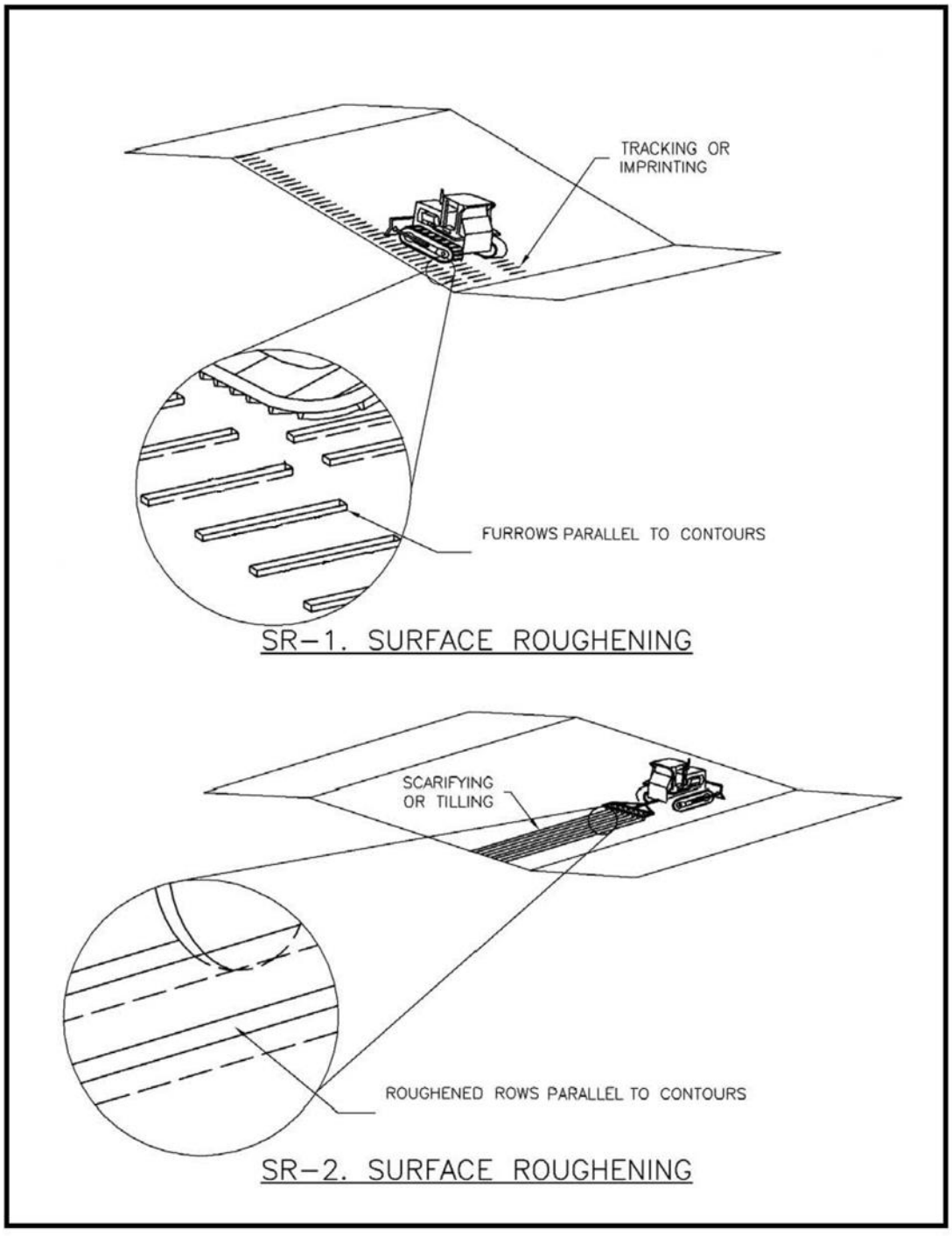
References

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites. April 2004.

New York State Department of Environmental Conservation, *New York Guidelines for Erosion and Sediment Control*. New York. August 2005. http://www.dec.ny.gov/chemical/29066.html

Figure SR-1


TRACKING OR
IMPRINTING
FURROWS PARALLEL TO CONTOURS
SR–1. SURFACE ROUGHENING
SCARIFYING
OR TILLING
ROUGHENED ROWS PARALLEL TO CONTOURS
SR–2. SURFACE ROUGHENING

Seeding (S)

Description

Temporary seeding can be used to stabilize disturbed areas that will be inactive for an extended period. Permanent seeding should be used to stabilize areas at final grade that will not be otherwise stabilized. Effective seeding includes preparation of a seedbed, selection of an appropriate seed mixture, proper planting techniques, and protection of the seeded area with mulch, geotextiles, or other appropriate measures.

Seeding establishes vegetation that reduces erosion and sediment displacement by stabilizing disturbed areas in a manner that is economical, adaptable to site conditions, and allows selection of the most appropriate plant material. Seeding also:

- Absorbs the impact of raindrops;
- Reduces the velocity of runoff;
- Reduces runoff volumes by increasing water percolation into the soil;
- Binds soil with roots;
- Protects soil from wind;
- Improves wildlife habitat; and
- Enhances natural beauty.

Applicability

Seeding is most effective on slopes no steeper than 2:1. Seeding may be used as a permanent control or a temporary control in areas where exposed soil surfaces are not to be re-graded for periods longer than 30 days. Such areas include denuded areas, soil stockpiles, berms, temporary road banks, etc.

Prior to seeding, ensure that areas to be revegetated have soil conditions capable of supporting vegetation. Overlot grading can result in loss of topsoil, resulting in poor quality sub-soils at the ground surface that have low nutrient value, little organic matter content, few soil microorganisms, rooting restrictions, and conditions less conducive to infiltration of precipitation. As a result, it is typically necessary to provide stockpiled topsoil, compost, or other soil amendments and rototill them into the soil to a depth of 6 inches or more.

Topsoil should be segregated during grading operations for use and spread on areas to be revegetated later. Topsoil should be viewed as an important resource to be utilized for vegetation establishment, due to its water-holding capacity, structure, texture, organic matter content,

biological activity, and nutrient content. The rooting depth of most native grasses in the semi-arid Denver metropolitan area is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil should be stripped, stockpiled, and ultimately reapplied across areas that will be revegetated.

Where topsoil is not available, sub-soils may need to be amended to provide an appropriate plant- growth medium. Organic matter, such as well digested compost, can be added to improve soil characteristics conducive to plant growth. Other treatments can be used to adjust soil pH conditions when needed. Soil testing, which is typically inexpensive, should be completed to determine and optimize the types and amounts of amendments that are required.

If the disturbed ground surface is compacted, ripped, or rototilled, the surface prior to placing topsoil. If adding compost to the existing soil surface, rototilling is necessary. Surface roughening will assist in placement of a stable topsoil layer on steeper slopes, and allow infiltration and root penetration to greater depth.

Prior to seeding, the soil surface should be rough and the seedbed should be firm, but neither too loose nor compacted. The upper layer of soil should be in a condition suitable for seeding at the proper depth and conducive to plant growth. Seed-to-soil contact is the key to good germination.

Limitations

The effectiveness of seeding can be limited by:

- High erosion potential during establishment;
- The need for stable soil temperature and soil moisture content during germination and early growth;
- The need to re-seed areas that fail to establish; and
- Limited seeding times depending on the season.

Proper seedbed preparation and the use of quality seed are important in this practice. Failure to carefully follow sound agronomic recommendations will often result in an inadequate stand of vegetation that provides little or no erosion control.

Seeding does not immediately stabilize soils. Prior to seeding, install necessary erosion and sediment control practices such as diversions, straw bales, and basins until vegetation is established.

Design Criteria

Successful plant establishment can be maximized with proper planning; consideration of soil characteristics; selection of plant materials that are suitable for the site; adequate seedbed preparation, liming, and fertilization; timely planting; and regular maintenance.

When to seed

Areas to be stabilized with vegetation must be seeded or planted one to four months after grading is completed unless temporary stabilization measures are in place. Temporary stabilization measures should be installed through “no growth” periods during winter months until the weather can support seed growth.

Seed mix

Climate, soils, and topography are major factors that dictate the suitability of plants for a particular site. Vegetation that has adapted to the site, has strong roots, and provides good ground cover should be used. Although a native seed mix is best, some grasses such as Vetiver have been used extensively worldwide because of their strong deep roots, adaptability, and non-invasive properties.

Construction Specifications

- Seeding does not immediately stabilize soils. Temporary erosion and sediment control measures should be in place to prevent off-site transport of sediments from disturbed areas until vegetation is established.
- Vegetation should not be established on slopes that are unsuitable due to inappropriate soil texture, poor internal structure or internal drainage, volume of overland flow, or excessive steepness, until measures have been taken to correct these problems.
- If the area has been recently loosened or disturbed, no further roughening is required. When the area is compacted, crusted, or hardened, the soil surface shall be loosened by disking, raking, harrowing, or other acceptable means to ensure good water infiltration and root penetration (see SOIL ROUGHENING [SR]).
- The soil on a disturbed site may need to be modified to provide an optimum environment for seed germination and seedling growth. To maintain a good stand of vegetation, the soil must meet certain minimum requirements as a growth medium. If any of the below criteria cannot be met then topsoil shall be applied. The existing soil must have these characteristics:

1. Enough fine-grained material to maintain adequate moisture and nutrient supply.
2. Sufficient depth of soil to provide an adequate root zone. The depth to rock or impermeable layers such as hardpans shall be 12 inches or more, except on slopes steeper than 2:1 where the addition of soil is not feasible.
3. A favorable pH range for plant growth. If the soil is so acidic that a pH range of 6.0 to7.0 cannot be attained by addition of pH-modifying materials, then the soil is considered an unsuitable environment for plant roots and further soil modification would be required.
4. Freedom from toxic amounts of materials harmful to plant growth.
5. Freedom from excessive quantities of roots, branches, large stones, and clods of earth, or trash of any kind. Clods and stones may be left on slopes steeper than 3:1 if they do not significantly impede good seed soil contact.

- Add fertilizer and/or lime, if necessary. Lime and fertilizer may be incorporated into the top 2 to 4 inches of the soil if possible. The addition of lime is equally as important as applying fertilizer. Lime will modify the pH and supply calcium and magnesium. Its effect on pH makes other nutrients more available to the plant.
- The appropriate seed shall be evenly applied with a broadcast seeder, drill, cultipacker or hydro-seeder. Seeding depth should be one-quarter to one-half inch.
- If necessary, apply mulch according to MULCHING (M). The mulch will hold moisture and modify temperature extremes and prevent erosion while seedlings are growing.

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Vegetation is considered established when a density of at least 70% of pre-disturbance

levels has been reached. Seeded areas should be inspected for failure and any necessary repairs and re-seeding should be made within the same season if possible.

References

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites. April 2004.

Keller, Gordon and James Sherar, *Low-Volume Roads Engineering, Best Management Practices Field Guide*. United States Department of Agriculture (USDA), Forest Service, US Agency of International Development (USAID), 2003. http://www.blm.gov/bmp/field%20guide.htm

Table S-1.

Minimum Drill Seeding Rates for Various Temporary Annual Grasses

Species[a] (Common name)	Growth Season[b]	Pounds of Pure Live Seed (PLS)/acre[c]	Planting Depth (inches)
Oats	Cool	35 - 50	1 - 2
Spring Wheat	Cool	25 - 35	1 - 2
Spring Barley	Cool	25 - 35	1 - 2
Annual Ryegrass	Cool	10 - 15	½
Millet	Warm	3 - 15	½ - ¾
Sudangrass	Warm	5–10	½ - ¾
Sorghum	Warm	5–10	½ - ¾
Winter Wheat	Cool	20–35	1 - 2
Winter Barley	Cool	20–35	1 - 2
Winter Rye	Cool	20–35	1 - 2
Triticale	Cool	25–40	1 - 2

a. Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching should be applied as a separate operation, when practical, to prevent the seeds from being encapsulated in the mulch.

b. See Table TS/PS-3 for seeding dates. Irrigation, if consistently applied, may extend the use of cool season species during the summer months.

c. Seeding rates should be doubled if seed is broadcast, or increased by 50% if done using a Brillion Drill or by hydraulic seeding.

Mulching (M)

Description

Mulching is a temporary erosion control practice in which materials such as grass, hay, wood chips, wood fibers, straw, or gravel are placed on exposed or recently planted soil surfaces. Mulching stabilizes soils by minimizing rainfall impact and reduces stormwater runoff velocity. When used in combination with seeding or planting, mulching can aid plant growth by holding seeds, fertilizers, and topsoil in place, preventing birds from eating seeds, retaining moisture, and insulating plant roots against extreme temperatures.

Mulch matting with materials such as jute or other wood fibers that are formed into sheets are more stable than loose mulch. Jute and other wood fibers, plastic, paper, or cotton can be used individually or combined into mats to hold mulch to the ground. Netting can be used to stabilize soils while plants are growing, although netting does not retain moisture or insulate against extreme temperatures. Mulch binders consist of materials that are sometimes used instead of netting to bind loose mulch.

Applicability

Mulching is often used after (or in combination with) seeding to help aid in the establishment of vegetation. Hydraulic application of mulch is often used in steep areas (up to 1:1) where regular mulching is difficult because of environmental constraints. Mulch matting, with net or anchoring to hold it in place, can also be used on steep slopes or in critical areas such as waterways. Mulch can last for one to two years and is most effective when used on an area less than two acres in size.

Limitations

- Mulching, matting, and netting might delay seed germination because the cover changes soil surface temperatures.
- The mulches are subject to erosion and may be washed away in a large storm.
- Maintenance is necessary to ensure that mulches provide effective erosion control.

Design Criteria

No formal design is required.

Construction Specifications

Site preparation

- Prior to mulching, install the necessary temporary or permanent erosion control practices and drainage system within or adjacent to the area to be mulched.
- Slope, grade, and smooth the site to fit the needs of the selected mulch products.
- Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Mulching and anchoring

- Select the appropriate mulch and application rate that will best meet the need and availability of material. When possible, organic mulches should be used for erosion control and plant establishment. See Table M-1 for suggested materials and application rates. Other materials include hydraulic mulch products with 100% post-consumer paper content and yard trimming composts. All materials should be free of seed.
- Apply mulch after soil amendments and planting is accomplished or simultaneously if hydro-seeding is used. See Table M-1 for installation guidelines.
- Use a mulch crimper to apply and anchor mulch. A crimper should have approximately 6-inch cleats with perpendicular, dull, disc blades. If a crimper is unavailable the Contractor shall apply the mulch and anchor it to the soil using one of the methods described in Table M-2. The mulch should be anchored the same day as the mulch application. Materials that are heavy enough to stay in place (for example, bark or wood chips on flat slopes) do not need anchoring. Mulches may or may not require a binder, netting, or tacking. Mulch binders should be applied at rates recommended by the manufacturer. Effective use of netting and matting material requires firm, continuous contact between the materials and the soil.

Hydraulic mulching

- For steep slopes or other areas where hydraulic application of mulch is desired, a high-quality type of hydraulic matrix known as a Bonded Fiber Matrix (BFM) may be used. A BFM refers to a continuous layer of elongated wood fiber strands that are held together by a water-resistant bonding agent to form a water-absorbing crust.
- A typical construction specification for wood fiber mulch (hydro-mulch) is as follows: Biodegradable green–dyed wood-cellulose-fiber mulch, which is non-toxic, free of plant growth- or germination-inhibitors, with maximum moisture content of 15% and a pH range of 4.5 to 6.5.
- A typical construction specification for weed-free-straw non-asphaltic tackifier is as follows: Organic derivative vegetative gum tackifier recommended by fiber-mulch manufacturer for a slurry application, which is nontoxic and free of plant growth-or germination-inhibitor.

- Hydraulic application of BFM must be done when no rainfall is expected, preferably within a 24-hour time period. Mix BFM in a hydraulic application machine (such as a hydro-seeder or a mulch blower) and then apply to the slope as a liquid slurry. The slurry must be constantly agitated to keep the proper application rate and achieve uniform effective coverage. The minimum application rate shall be 2,000 pounds per acre with a typical application rate between 3,000 and 4,000 pounds per acre.

Maintenance Considerations

The frequency of inspections should be in accordance with the Stormwater Management Plan (SWMP). Areas should be identified where mulch has loosened or been removed. Such areas should be re-seeded (if necessary) and the mulch cover replaced. If washout, breakage, or erosion occurs, surfaces should be repaired, re-seeded, and re-mulched, and new netting should be installed. Inspections should be continued until vegetation is firmly established.

Removal

Anchor netting and any other artificial mulch material should be removed when protection is no longer needed and then disposed of in a landfill.

References

United States Environmental Protection Agency (EPA), *National Pollutant Discharge Elimination System (NPDES). Construction Site Stormwater Runoff Control.* Washington, D.C., February 2003. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Horizon Environmental Services, Inc, Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites. April 2004

New York State Department of Environmental Conservation, *New York Guidelines for Erosion and Sediment Control*. New York. August 2005. http://www.dec.ny.gov/chemical/29066.html

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), *Field Office Technical Guide.* 2002. http://www.nrcs.usda.gov/technical/efotg/

Table M-1
Typical Mulching Materials and Application Rates

Material	Rate per Acre	Requirements	Notes
Organic Mulches			
Straw	1-2 tons	Dry, unchopped, unweathered; certified weed free	Spread by hand or machine; must be tacked or tied down
Wood fiber or wood cellulose	1/2 - 1 ton		Use with hydroseeder, may be used to tack straw. Do not use in hot dry weather.
Wood Chips	5 - 6 tons	Air dry. Add fertilizer N. 12 lb/ton	Apply with blower, chip handler, or by hand. Not for fine turf areas.
Bark	35 yd^3	Air dry, shredded, or hammermilled, or chips.	Apply with mulch blower, chip handler, or by hand. Do not use asphalt tack.
Nets and Mats			
Jute net	Cover area	Heavy, uniform; woven of single jute yarn. Used with organic mulch	Withstands water flow
Excelsior (wood fiber) mat	Cover area		

Table M-2
Mulch Anchoring Guide

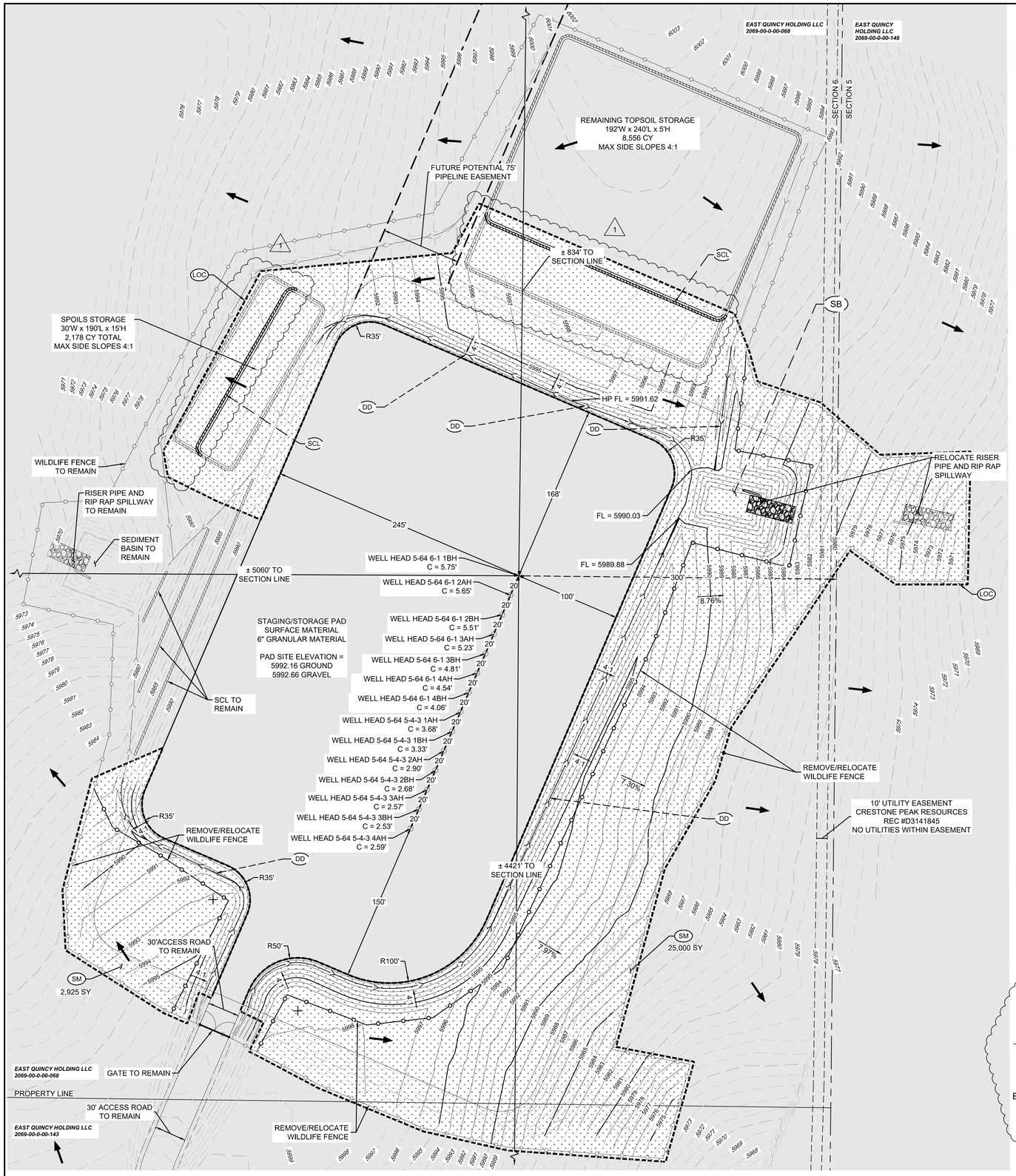
Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manuracturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
2. Wood cellulose fiber	Hay or straw	Apply hydroseeder immediately after mulching. Use 500 lbs. Wood fiber per acre. Some products contain an adheisive material, possibly advantageous.
3. Mulch anchoring tool/Crimper	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
4. Chemical	Hay or straw	Apply Terra Tack AR 120lbs./ac. In 480 gal. of water (#156/sec.) or Aerospray 70 (60gal./ac.) according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperatire higher than 45 deg. Ferhenheit are required.

Alamosa 5-64 6-1 Topsoil Test Pit Location Photo – February 10, 2022

Soil Test Pit #1

Alamosa 5-64 6-1 Topsoil Test Pit Location Photo – February 10, 2022

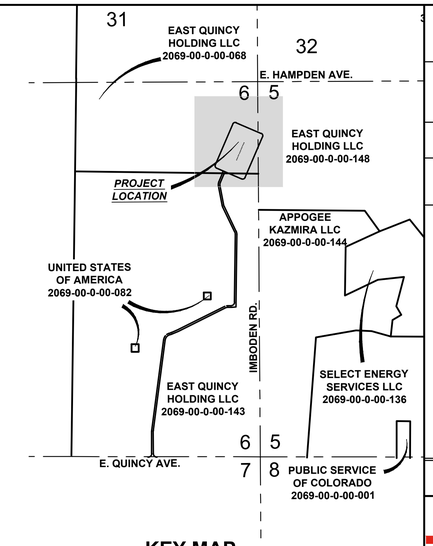
Soil Test Pit #4



PLAN: RECLAMATION WELL PAD SITE

ARAPAHOE COUNTY CASE NUMBER: AE20-002

NOTES:
1. SEE THE STANDARD NOTES AND DETAILS IN FIELD WIDE REPORT, REVISED APRIL 2019 (3 SHEETS) FOR ALL STANDARD DETAILS & ARAPAHOE COUNTY RULES AND REGULATIONS REGARDING STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES, NOTES AND LEGENDS OF BMP NAMES AND SYMBOLS.
2. QUANTITIES:
   PAD SITE ELEVATION = 5991.96' (GROUND), 5992.46' (GRAVEL)
   CUT SLOPES = 4:1
   FILL SLOPES = 4:1
   RECLAMATION TOPSOIL = 1886 CY REPLACED, 7966 CY STOCKPILED
   RECLAMATION TOTAL CUT = 6221 CY
   RECLAMATION TOTAL FILL = 8389 CY
   (INCLUDES 10% ADJUSTMENT FOR COMPACTION)
   RECLAMATION GRAVEL REMOVED OFFSITE = 2166 CY
   RECLAMATION SPOILS STOCKPILED = 1884 CY USED, 2178 CY STOCKPILED
   RECLAMATION TOTAL DISTURBED AREA = 5.78 ACRES
   RECLAMATION FENCED AREA = 9.54 ACRES
   RECLAMATION WORKING PAD SURFACE = 4.42 ACRES
   UN-RECLAIMED DISTURBANCE = 9.54 ACRES
3. ALL DIVERSION DITCHES ARE ANTICIPATED TO BE UNLINED.
4. THE DIMENSION OF THE CRUSHED ROCK AROUND THE SEDIMENT BASIN RISER PIPE IS LARGER THAN THE HOLE DIAMETER.
5. ALL BMP'S ARE FINAL UNLESS DASHED LINE TYPE.
   DASHED LINE TYPE BMP'S ARE INITIAL/INTERIM.



KEY MAP
SCALE 1" = 1000'

SOILS

EROSION POTENTIAL: USING THE US DEPARTMENT OF AGRICULTURE'S WEB SOIL SURVEY, TWO SOIL TYPES EXIST WITHIN THE PROJECT BOUNDARY, FONDIS - COLBY SILT LOAMS, 3 TO 5 PERCENT SLOPES (FoC), RENOHILL-LITLE-THEDALUND COMPLEX, 9 TO 30 PERCENT SLOPES (RIE). THE SOILS LISTED ABOVE FALL INTO THE HYDROLOGIC CLASSIFICATION GROUP C AND D, WHICH HAVE A SLOW INFILTRATION RATE. THE K FACTOR INDICATES THE SUSCEPTIBILITY OF A SOIL TO SHEET AND RILL EROSION BY WATER AND VARIES FROM 0.02 (LOW SUSCEPTIBILITY) TO 0.69 (HIGH SUSCEPTIBILITY). THIS PROJECTS AREA'S SOIL HAS AN AVERAGE K OF 0.34.

TYPE OF GROUND COVER: RANGELAND.

APPROXIMATE PERCENTAGE OF VEGETATIVE GROUND COVER: 50%-70%.

DEWATERING

IF DEWATERING IS REQUIRED, A STATE CONSTRUCTION DEWATERING DISCHARGE PERMIT IS REQUIRED FOR DISCHARGES TO A STORM SEWER, CHANNEL, IRRIGATION DITCH, ANY STREET THAT IS TRIBUTARY TO THE MENTIONED FACILITIES, OR ANY WATER OF THE UNITED STATES.

DRAINAGE

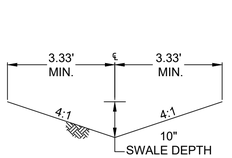
APPROXIMATE DRAINAGE PATTERNS: THE SITE LIES ON TOP OF A RIDGE AND DRAINS 2%-14% SLOPE EAST AND WEST.

RECEIVING WATERS/DRAINAGEWAY: THE PROJECT IS LOCATED WITHIN THE KERSTEN GULLY AND DEACON DRAW WATERSHED, WHICH ULTIMATELY DRAINS TO THE SOUTH PLATTE RIVER.

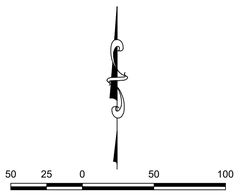
WETLANDS: THERE ARE NO WETLANDS WITHIN THE PROJECT LIMITS OF CONSTRUCTION.

SEDIMENT BASIN/TRAP: CALCULATIONS IN DRAINAGE LETTER.

DIVERSION DITCH CAPACITY: 2.39 CFS @ 0.25%

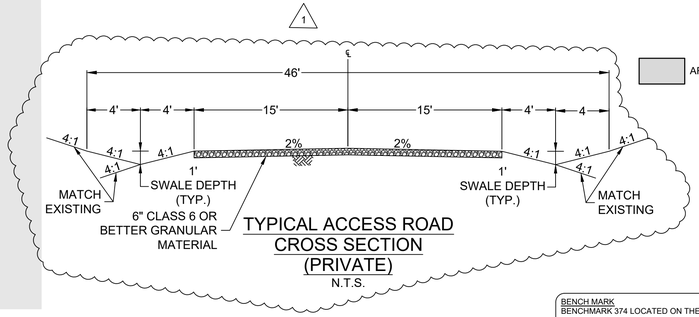


TYPICAL DIVERSION DITCH
CROSS SECTION
N.T.S.



SCALE: 1" = 50'

NO.	NO.		LEGEND
1	1	CBC	CUT BACK CURB
2	1	CD	CHECK DAM
3	1	CWA	CONCRETE WASHOUT AREA
4	1	CF	CONSTRUCTION FENCE
5	1	CM	CONSTRUCTION MARKERS
6	1	CS	CURB SOCK
7	1	DW	DEWATERING
8	2	DD	DIVERSION DITCH
9	2	ECB	EROSION CONTROL BLANKET
10	2	GMS	GROUT MIXING STATION
11	2	IP	INLET PROTECTION
12	2	RCD	REINFORCED CHECK DAM
13	2	RRB	REINFORCED ROCK BERM
14	2	RRC	RRB FOR CULVERT PROTECTION
15	2	SB	SEDIMENT BASIN
16	3	SCL	SEDIMENT CONTROL LOG
17	3	ST	SEDIMENT TRAP
18	3	SM	SEEDING AND MULCHING
19	3	SF	SILT FENCE
20	3	SID	SLOPE INTERCEPT DITCH
21	3	SSA	STABILIZED STAGING AREA
22	4	SR	SURFACE ROUGHENING
23	4	TSD	TEMPORARY SLOPE DRAIN
24	4	TSC	TEMPORARY STREAM CROSSING
25	4	VTC	VEHICLE TRACKING CONTROL
26	4	WW	VTC WITH WHEEL WASH
		LOC	ROCK AND RIPRAP GRADATIONS LIMITS OF CONSTRUCTION
		*EG	MAY MEET MAJOR MODIFICATION REQUIREMENTS



TYPICAL ACCESS ROAD
CROSS SECTION
(PRIVATE)
N.T.S.

AREA OUTSIDE OF LIMITS OF CONSTRUCTION, LOC

BENCH MARK
BENCHMARK 374 LOCATED ON THE SECTION LINE BETWEEN SECTIONS 12 AND 13, T5S, R64W, 6TH P.M., TAKEN FROM 1988 PUBLISHED DATUM BY THE UNITED STATES DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY AS BEING 6054.61 FEET.

CALL 811
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1-800-922-1987
UNCC UTILITY NOTIFICATION CENTER OF COLORADO

No.	Revisions	Date	Init.	Appr.	Date
1	UPDATED ACCESS ROAD FROM 23' TO 30'. SPOILS STORAGE UPDATED.	02/28/22	JRG		

Westwood
10333 E DRY CREEK RD.
SUITE 240
ENGLEWOOD, CO 80112
TEL: 720.482.9526
Westwoodps.com
Westwood Professional Services, Inc.

CRESTONE PEAK RESOURCES
OPERATING LLC
ATTN: KATHY DENZER
34501 E. QUINCY AVE., BUILDING 1
WATKINS, CO 80137
PHONE: (720) 410-8519

ALAMOSA 5-64 6-1 1BH, 2AH, 2BH, 3AH, 3BH, 4AH, 4BH, 5-4-3 1AH, 1BH, 2AH, 2BH, 3AH, 3BH, 4AH
GESC PLANS
RECLAMATION FINAL

SCALE: AS SHOWN
FILE NO: 8.13.03022822
DRAWN BY: KRW
CHECKED BY: MEL
DATE: 04-28-21

SHEET NUMBER 9

GESC PH1 REC.dwg