



STORMWATER MANAGEMENT PLAN
FOR
Triggerfish Pad

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1. INTRODUCTION

The intent of this plan is to provide site-specific guidance and recommended best management practices (BMPs) to ensure erosion and sediment control during the construction and interim reclamation of the Bison IV Operating, LLC (Bison) proposed Triggerfish pad location. Bison, the operator, has developed this plan to comply with Federal, State and local criteria and guidelines as they relate to stormwater management.

2. SITE DESCRIPTION

2.1 General

The Triggerfish Pad will be located entirely within Township 7N, Range 62W, Section 29 in Weld County, Colorado. For the purposes of this plan, the limit of disturbance refers to the proposed development of an Oil and Gas Location and is hereafter referred to as the Site. The Limit of Disturbance (LOD) measures approximately 16.0 acres. The area to undergo interim reclamation measures approximately 9.5 acres. Approximately 6.5 acres of land will remain un-reclaimed.

2.2 Topography and Land use

The Site slopes downward to the northeast at a 1-2% grade. The Site is located on grassland, classified for the purposes of this plan as rangeland. The Site is located within the Western Great Plains Range and Irrigated Region Land Resource Region (LRR) of the Central High Plains, southern part Major Land Resource Region (MLRA). The soil make-up of the proposed LOD can be found within the table below. Soil type 72 has a soil loss tolerance of 5 and a susceptibility to water erosion rating of 0.20.

Map Unit Legend			
Weld County, Colorado, Northern Part (CO617)			
Weld County, Colorado, Northern Part (CO617)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
72	Vona loamy sand, 3 to 9 percent slopes	16.0	100.0%
Totals for Area of Interest		16.0	100.0%

2.3 Natural features

Two unnamed tributaries to Crow Creek are located within 500 feet of the proposed oil and gas location. Both tributaries are mapped on the National Hydrography Dataset (NHD) as intermittent streams and as riverine features on the National Wetlands Inventory (NWI) map. Neither of these features were

observed to contain wetland vegetation, hydrologic indicators or ordinary high-water marks at the time of the field survey. No unmapped wetlands or waterways were identified at the time of the field survey. Stormwater BMPs will be installed prior to initiating construction, as necessary.

A vegetation survey was completed by RPG Resources on July 6th, 2023. Vegetation within the LOD was as follows: needle-and-thread (*Hesperostipa comata*), blue grama grass (*Bouteloua gracilis*), prickly pear cactus (*Opuntia macrohiza*), prairie sagewort (*Artemisia frigida*), rubber rabbitbrush (*Chrysothamnus nauseosus*), slimflower scufpea (*Psoraleidium tenuiflorum*), field bindweed (*Convolvulus arvensis*), and Russian thistle (*Salsola tragus*). Field bind weed (*Convolvulus arvensis*) a list C noxious weed species, was observed throughout the LOD at the time of the field survey.

3. FIELD-WIDE STORMWATER MANAGEMENT PLAN

An approved field-wide Stormwater Management Plan for Bison is in place, as referenced throughout this site-specific Stormwater Management Plan. All personnel, including applicable contractors, shall comply with the contents of both the site-specific and field wide SWMP plans. The SWMP plan additionally provides information regarding non-stormwater discharges.

4. QUALIFIED STORMWATER MANAGER

Bison has applied for permit coverage for stormwater discharges associated with construction activities. The authority to dedicate the financial and human resources to implement control measures, make repairs, and/or make changes in design is ultimately provided by the Stormwater Management Plan for Bison. The Qualified Stormwater Management Plan Administrator will ensure that the SWMP is followed.

The Qualified Stormwater Management Plan Administrator and a designated Program Manager will manage the SWMP Team. The SWMP Team will consist of other Qualified Stormwater Managers, who will assist in conducting stormwater inspections, disseminating installation and repair information, and maintaining stormwater inspection records. Overall, the SWMP Team is responsible for:

- Implementing spill/upset cleanup procedures;
- Notifying local authorities and local residents of reportable releases;
- Coordinating various stages of implementing Control Measures (CMs);
- Conducting inspections;
- Maintaining records; and
- Coordinating a preventive maintenance program and housekeeping measures.

5. POTENTIAL POLLUTION SOURCES

Potential pollution sources associated with the construction phase of the Barracuda development include the following:

- Operated construction equipment such as bulldozers, skid-steers, cranes, and excavators.
- Vehicles used to transport equipment and employees.
- Any temporary standing equipment such as a light plant or tools such as a hand drill which

- require petroleum-based fuel.

6. SPILL PREVENTION PROCEDURES AND PRACTICES

Bison shall implement the following discharge and spill prevention measures such as scheduled discharge prevention meetings, published procedures for loading/unloading, inspection of drainage areas, ditches, and accumulated stormwater prior to discharge, employing sufficient container capacity and design, a program of flow line maintenance, and any additional procedures which the operator sees fit to mitigate spills and discharges.

Additional procedures to be implemented over the course of the lifetime of the proposed pad location include the installation of secondary containment, the installation of drip pans, the building of retention ponds, as well as the implementation of any barriers or booms which may aide in spill prevention.

In order to respond to discharges or spills which may occur over the course of construction or the life of the proposed pad location, Bison shall implement practices such as thorough employee training regarding contaminant handling, proper recovery and disposal of any and all contaminated materials, and published processes for spill and discharge reporting.

7. STATE INSPECTION REQUIREMENTS

The required inspection schedules are minimum frequency and do not affect the permittee's responsibility to implement control measures in effective operating condition as prescribed in the SWMP. Proper maintenance of control measures may require more frequent inspections. Site inspections shall start within 7 calendar days of the commencement of construction activities on site.

7.1. Person Responsible for Conducting Inspections

The person(s) inspecting the site may be on the permittee's staff or a third party hired to conduct stormwater inspections under the direction of the permittee(s). The permittee(s) is responsible for ensuring that the inspector is a qualified stormwater manager.

7.2. Inspection Frequency

The Permittee(s) must conduct site inspections in accordance with the following minimum frequencies unless the site meets the requirements of Section 6.3.

- a. At least one inspection every 7 calendar days; or
- b. At least one inspection every 14 calendar days, if post-storm event inspections are conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosion. Post-storm inspections may be used to fulfill the 14-day routine inspection requirement.
- c. When site conditions make the schedule required in this section impractical, the permittee(s) may petition the division to grant an alternate inspection schedule. The alternative inspection schedule may not be implemented prior to written approval by the division and incorporation into the SWMP.

7.3. Inspection Frequency for Discharges to Outstanding Waters

Permittee(s) must conduct site inspections at least once every 7 calendar days for sites that discharge to a water body designated as an Outstanding Water by the Water Quality Control Commission.

7.4. Reduced Inspection Frequency

The permittee may perform site inspections at the following reduced frequencies when one of the following conditions exists:

a. Post-Storm Inspections at Temporarily Idle Sites

For permittee(s) choosing to combine 14-day inspections and post-storm-event-inspections, if no construction activities will occur following a storm event, post-storm event inspections must be conducted prior to re-commencing construction activities, but no later than 72 hours following the storm event. The delay of any post-storm event inspection must be documented in the inspection record. Routine inspections must still be conducted at least every 14 calendar days.

b. Inspections at Completed Sites/Areas

When the site, or portions of a site, are awaiting establishment of a vegetative ground cover and final stabilization, the permittee(s) must conduct a thorough inspection of the stormwater management system at least once every 30 days. Post-storm event inspections are not required under this schedule. This reduced inspection schedule is allowed if all the following criteria are met:

- i. All construction activities resulting in ground disturbance are complete;
- ii. All activities required for final stabilization, in accordance with the SWMP, have been completed, except for the application of seed that has not yet occurred due to seasonal conditions or the necessity for additional seed application to augment previous efforts; and
- iii. The SWMP has been amended to locate those areas to be inspected in accordance with the reduced schedule allowed for in this paragraph.

c. Winter Conditions Inspections Exclusion

Inspections are not required for sites that meet all of the following conditions: construction activities are temporarily halted, snow cover exists over the entire site for an extended period and melting conditions posing a risk of surface erosion do not exist. This inspection exception is applicable only during the period where melting conditions do not exist, and applies to the routine 7-day, 14-day, and monthly inspections, as well as the post-storm-event inspections. When this inspection exclusion is implemented, the following information must be documented in accordance with permit requirements:

- i. Dates when snow cover existed;
- ii. Date when construction activities ceased; and

- iii. Date when melting conditions began.

7.5. Inspection Scope

a. Areas to be Inspected

When conducting a site inspection, the following areas, if applicable, must be inspected for evidence of, or the potential for, pollutants leaving the construction site boundaries, entering the stormwater drainage system or discharging into state waters:

- i. Construction site perimeter;
- ii. All disturbed areas;
- iii. Designated haul routes;
- iv. Material and waste storage areas exposed to precipitation;
- v. Locations where stormwater has the potential to discharge offsite; and;
- vi. Locations where vehicles exit the site.

b. Inspection Requirements

- i. Visually verify whether all implemented control measures are in effective operational condition and are working as designed in their specifications to minimize pollutant discharges.
- ii. Determine if there are new potential sources of pollutants.
- iii. Assess the adequacy of control measures at the site to identify areas requiring new or modified control measures to minimize pollutant discharges.
- iv. Identify all areas of non-compliance within the permit requirements and, if necessary, implement corrective action(s).

c. Inspection Reports

The permittee(s) must keep a record of all inspections conducted for each permitted site. Inspection reports must identify any incidents of noncompliance with the terms and conditions of this permit. Inspection records must be retained and signed in accordance with the SWMP. At a minimum, the inspection report must include:

- i. The inspection date;
- ii. Name(s) and title(s) of personnel conducting the inspection;
- iii. Weather conditions at the time of inspection;
- iv. Phase of construction at the time of inspection;
- v. Estimated acreage of disturbance at the time of inspection;

- vi. Location(s) and identification of discharges of sediment or other pollutants from the site;
- vii. Location(s) and identification of control measures needing maintenance;
- viii. Location(s) and identification of inadequate control measures;
- ix. Location(s) and identification of additional control measures needed that were not in place at the time of inspection;
- x. Description of the minimum inspection frequency utilized when conducting each inspection.
- xi. Deviations from the minimum inspection schedule. This would include documentation of division approval for an alternate inspection schedule;
- xii. After adequate corrective action(s) have been taken, or where a report does not identify any incidents requiring corrective action, the report shall contain a statement.

8. LOCAL INSPECTION REQUIREMENTS

As required by the MS4 Permit, the County is required to routinely inspect construction sites at a frequency of at least every 45 days. The Department of Public Works maintains the authority to increase inspection frequencies based on historical violations. It is the responsibility of the applicant to contact the Department of Public Works to schedule the first inspection, at which time, the temporary control measures necessary to begin construction will be inspected (i.e., perimeter control and vehicle tracking control). The applicant shall provide notice at a minimum of 7 days prior to commencing construction activity. Failure to schedule an inspection is considered a violation of MS4 requirements, and a Stop Work Order or other enforcement actions may be pursued.

During routine inspections, the inspector shall review the current site conditions using the documents submitted during the review process. Significant changes in plans may require modifications to be submitted for approval. Minor changes should be noted in the Grading Plan and Sediment & Erosion Control Plan, MS4 Pollution Prevention Plan, or SWMP, which are to be kept onsite at all times. The inspector shall assess all onsite control measures, pollutant sources, and discharge points to determine if an illicit discharge has occurred or has the potential to occur. If violations are found, the applicant will be notified both verbally and with a written inspection report. A compliance inspection then will be scheduled no later than 14 days from the date of the violation. If violations are not corrected by the time of the compliance inspection, escalating enforcement procedures shall be followed until the site reaches compliance. This may include a formal Notice of Violation (NOV) and the issuance of a Stop Work Order, for which all construction activity will cease until violations have been corrected. If violations continue to exist, judicial enforcement responses may be pursued depending on the severity and recalcitrance of the violations. Indicator (drive-by) inspections may be conducted at any time to assess site conditions. If the site passes indicator inspections, routine inspections may occur less frequently. However, if violations are found during indicator inspections, the applicant will be contacted to remedy the violations and to schedule a follow-up compliance inspection. When construction activity is completed, inspections shall occur at least every 90 days until the site has reached final stabilization, all temporary control measures have been removed, and the Colorado Discharge Permit System (CDPS) Construction Stormwater Permit has been terminated.

If the contractor is no longer associated with the site, the CDPS permit shall be transferred to the landowner, and the completed transfer shall be emailed to Public Works. A final walkthrough will be performed to release the Grading Permit.

9. SITE-SPECIFIC CONSTRUCTION OVERVIEW

Prior to commencement of any disturbance, perimeter BMPs will be installed to protect downgradient waterways from sediment pollution. Once the working area is secure, the access road and well pad will be stripped of topsoil to a depth consistent with the Topsoil Protection Plan. Once topsoil is stockpiled, grading material will be redistributed across the site between cut and fill areas to reach final pad subgrade elevation. During this process, fill areas will be properly compacted to ensure working surface integrity and minimize soil migration. Water will be used to assist with compaction as well as minimize dust migration as described in the Dust Mitigation Plan. The contractor will place capping material (road base) on the pad surface to a compacted depth of 4-6 inches to stabilize the location. This will also be performed on the access road. Lastly, slopes, channels and stockpiles will be stabilized with drill seed and mulch or similar equivalents.

10. POST-CONSTRUCTION PHASE

Bison shall follow all procedures described within their associated field-wide Stormwater Pollution Prevention Plan. Once the proposed location reaches the production phase, potential for pollution from stormwater run-off remains. Potential sources include:

- Chemical transport including loading and unloading;
- Vehicle and equipment fueling;
- Outdoor storage including those for chemicals and additives;
- Produced water and drilling fluid storage;
- Outdoor processing activities and machinery;
- Significant dust or particulate generating processes;
- Erosion and vehicle tracking from wells pads;
- Road surfaces and pipelines;
- Waste disposal practices;
- Leaks and spills; and
- Ground disturbing maintenance activities.

The Qualified Stormwater Program Manager will also manage the post construction phase. This includes the implementation of BMP's onsite such as inlet and outlet protections, seeding, and mulching. Employees and subcontractors associated with the site will be made aware of the specific BMP's onsite and how to report needed maintenance or repairs.

In order to mitigate discharges associated with ongoing operation of production facilities BMPs described within Section 11 of this report will be installed during the construction phase. As described below, certain BMPs such as outlet protection will be in place for the lifetime of the pad. Furthermore, inspections as described within sections 7-8 of this report shall take place over the course of the construction and post construction phases. Inspections shall be conducted by properly trained personnel in order to maintain the working order of the installed BMPs.

Erosion and sediment control BMPs implemented under this plan will be maintained in effective operational condition, in accordance with the manufacturer's specifications and good engineering, hydrologic, and pollution control practices. Routine inspections include a provision to evaluate the effectiveness of each implemented control measure and identify when maintenance is required. When control measure maintenance or replacement is required, Bison will correct the issue as soon as possible to minimize the discharge of pollutants.

11. 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 for Bison. Detailed design and maintenance information for each BMP has been included as an attachment (Appendix C).

11.1 Diversion Berm

Diversion berms made of compacted subsoil will be used along the east side of the disturbance area. The berms will function to divert runoff from offsite drainage, away from the pad area to help prevent unnecessary erosion and sediment transport on the pad. The berm will remain in place for the lifetime of the oil and gas location.

11.2 Vehicle Tracking Control

The vehicle tracking control will be made with coarse-aggregate surface underlaid by a geotextile, a construction mat, or a wheel wash located at the entrance/exit, the southern region of the Site. This will function in sediment control and materials management by reducing the tracking of sediment off Site. The vehicle tracking control will remain in place until site has been stabilized.

11.3 Outlet Protection

Rip-rap or grouted rip-rap will be used as outlet protection. Rip-rap will be placed at the culverts along the eastern side of the access road along the outlet of the detention pond on the northwestern corner of the disturbance area. Outlet protection will be installed to reduce the velocity of concentrated water flow to mitigate rill and gully erosion. All installed outlet protection will remain in place for the lifetime of the pad.

11.4 Inlet Protection

Inlet protection devices made of permeable geotextile fabrics will be installed below the inlet grate to filter runoff and remove coarse sediment and debris before runoff enters the storm drainage system. Two locations will use inlet protection. The first is on the northwest side of the disturbance area, at the inlet of the stormwater pond. One more will be used along the access road on the southern edge of the proposed pad location.

11.5 Stockpile Management

Topsoil will be stockpiled along the northeastern region of the disturbance area. To mitigate topsoil loss and migration of soil offsite, the topsoil will be contained using a silt fence along the perimeter of the stockpile. This fencing will remain in place at any time the stockpile is not being actively accessed and until vegetative cover is established. Additionally, erosion control devices shall be placed within 5-10 feet of the toe of slope.

11.6 Seeding

Once construction operations are complete, the soil surrounding the working pad surface will be seeded with the specified seed mix (see Appendix C). Establishing vegetative cover will help to stabilize the soil, reduce wind, and water erosion, minimize sheet flow and rill erosion, increase infiltration rates, and reduce overall surface runoff. The reclamation area will be regularly monitored for noxious weed growth. Re-seeding will occur as necessary to achieve uniform vegetative cover.

11.7 Mulching

Post seeding, a layer of straw or hay mulch will be installed via crimping within the areas which were seeded, to promote seed germination and further stabilization of the soil. Mulching helps to mitigate the impacts of rainfall and increase soil moisture retention. Mulching will be monitored and re-applied as necessary, until vegetative growth is established.

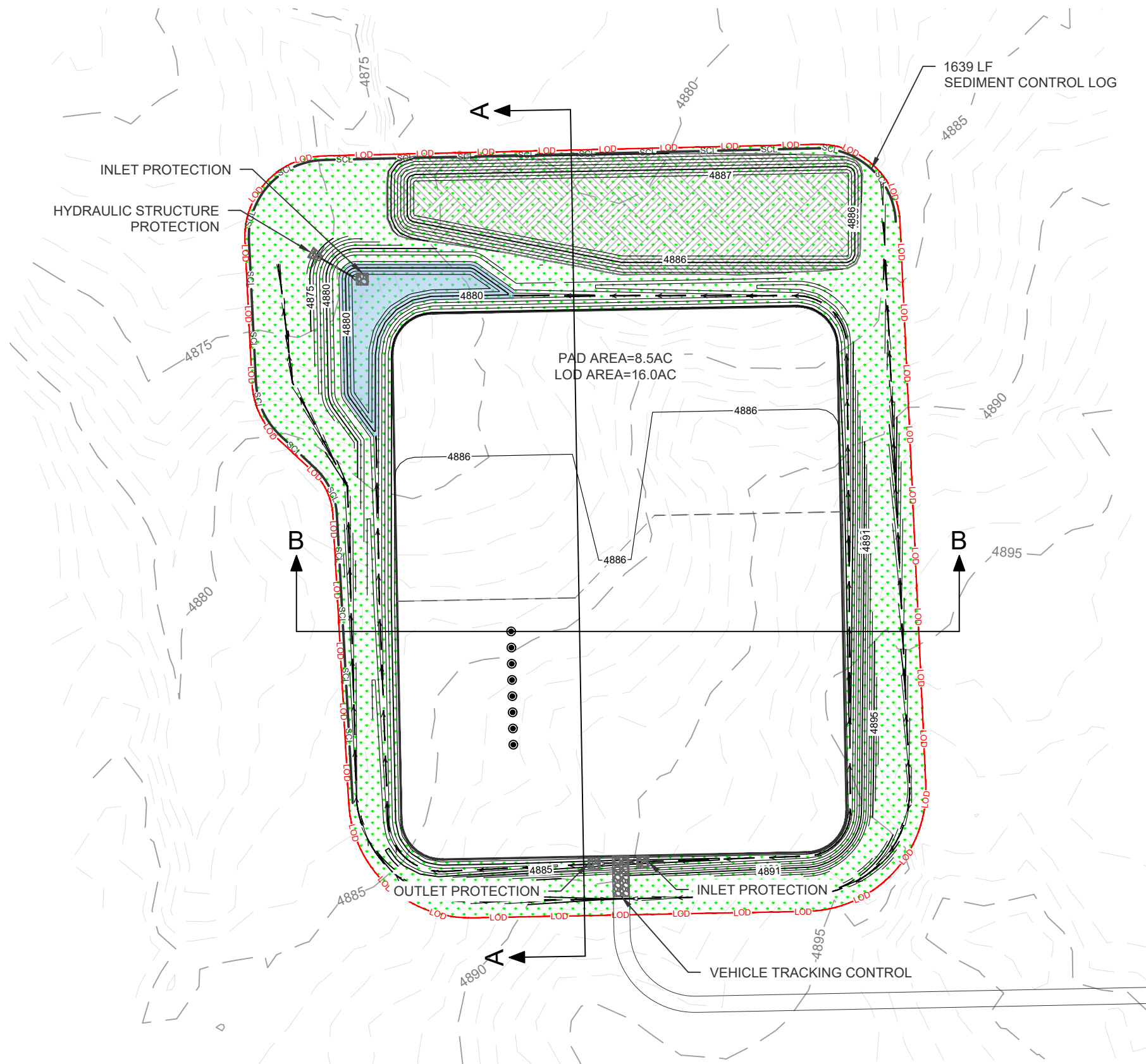
11.8 Sediment Control Logs

Sediment logs composed of excelsior, rocks, straw, coconut fibers, wood chips, or compost will be installed along the entire border of the disturbance area. Sediment control logs will aid in reducing flow velocities to mitigate rill erosion, and capture sediment to mitigate runoff. Sediment control logs will remain in place until the pad is stabilized.

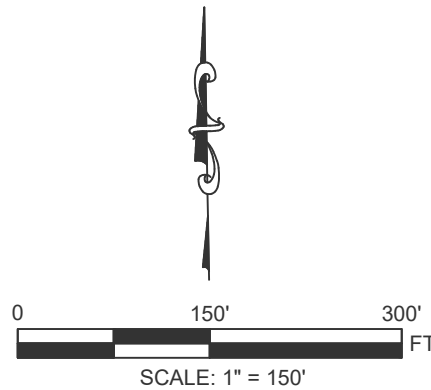
APPENDIX A

Stormwater Management Plan Exhibit

S:\RPGR\00 Projects\Bison IV\2023 Projects\Triggerfish\1 - Engineering\1 - Design Phase\1 - Civil 3D\1 - FOGDP\06 DETAILED GRADING PLAN.dwg Last Saved By: brainwater 10/6/2023 7:26 AM Plotted By: Buster Rainwater 10/6/2023 7:39 AM



LEGEND	
EXISTING	
	ACCESS ROAD
	SECTION LINE
	GRAVEL / ROAD BASE
	EXISTING INTERIM
	EXISTING INDEX
PROPOSED	
	LIMITS OF DISTURBANCE
	WELL PAD
	DIVERSION SWALE
	WELLHEAD LOCATION
	NATIVE GRASS SEEDING
	STORMWATER POND
	PROPOSED INTERIM
	PROPOSED INDEX
	IN/OUT PROTECTION
	VTC
	HYDRAULIC STRUCTURE
	SEDIMENT CONTROL LOG

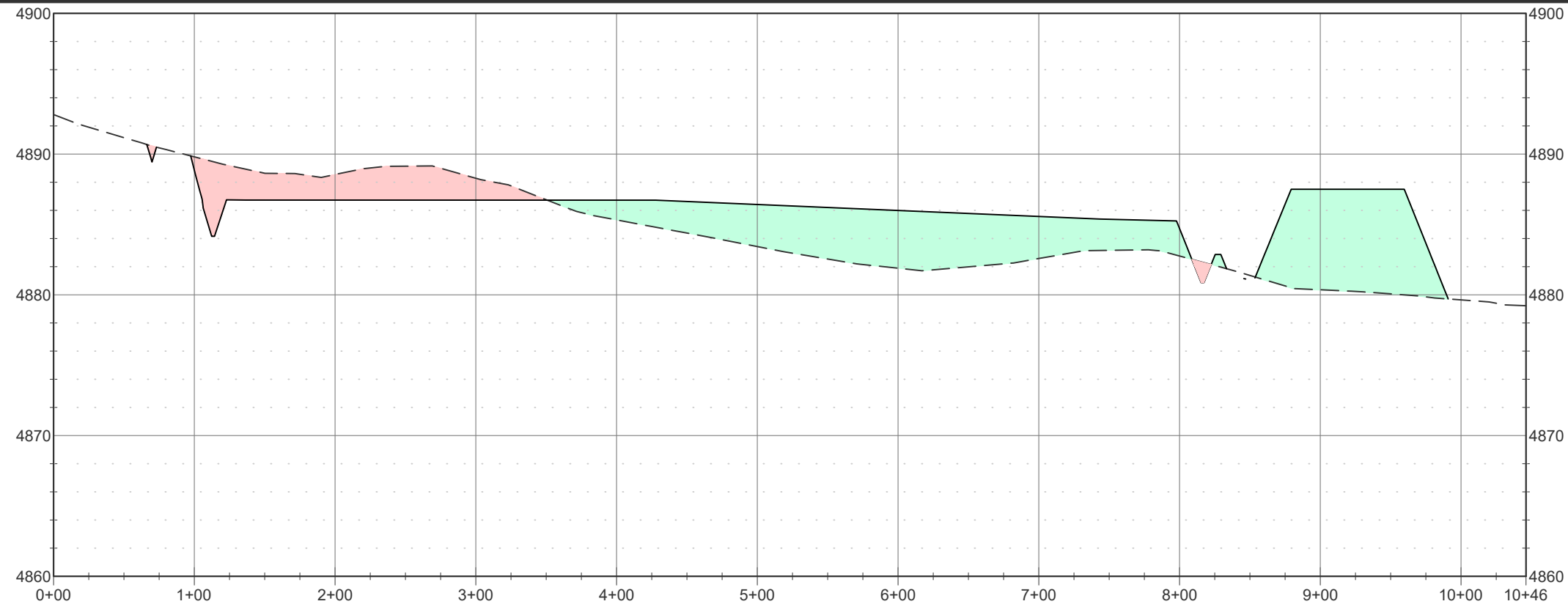


**TRIGGERFISH PAD
STORMWATER EXHIBIT**

SECTION 29, TOWNSHIP 07 NORTH,
RANGE 62 WEST, WELD COUNTY,
COLORADO

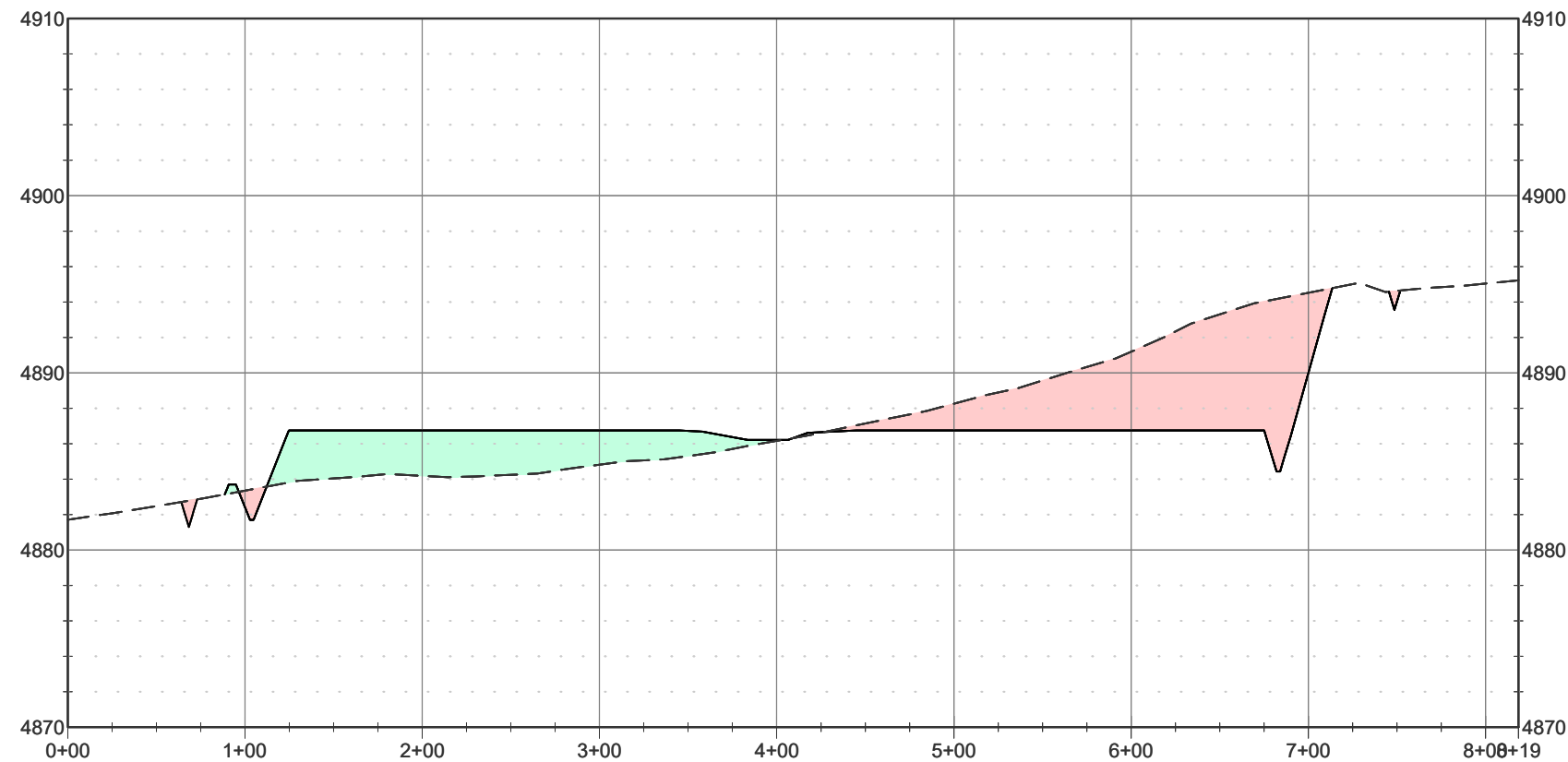
SHEET NAME:	SHEET NO.
CONSTRUCTION GRADING	01 OF 02

S:\RPGR\00 Projects\Bison IV\2023 Projects\Triggerfish\1 - Engineering\1 - Design Phase\1 - Civil 3D\1 - FOGDP\07 PAD CROSS SECTIONS.dwg Last Saved By: brainwater 10/5/2023 4:21 PM Plotted By: Buster Rainwater 10/6/2023 7:40 AM



SECTION A-A PROFILE VIEW

HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=10'



SECTION B-B PROFILE VIEW

HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=10'



**TRIGGERFISH PAD
STORMWATER EXHIBIT**

SECTION 29, TOWNSHIP 07 NORTH,
RANGE 62 WEST, WELD COUNTY,
COLORADO

SHEET NAME: CONSTRUCTION CROSS SECTIONS	SHEET NO. 02 OF 02
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APPENDIX B

BMP Data Sheets

17. Erosion Logs (EL)



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1. DESCRIPTION:

Erosion Logs are temporary control measures consisting of a bound cylindrical bundle of a combination of excelsior, straw, coconut fibers, wood chips, or compost and anchored to the ground with wooden stakes. It is used to reduce flow velocities, capture sediment and release runoff as sheet flow over stabilized areas.

2. CONTROL MEASURE USES

- ☒ Erosion Control
- ☒ Sediment Control
- ☐ Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 208](#) - Erosion Control

- a) [208.02 \(h\)](#) - Materials – Erosion Logs
- b) [208.05 \(I\)](#) - Construction BMPs
- c) [208.11](#) - Method of Measurement
- d) [208.12](#) - Basis of Payment

4. RELEVANT M-STANDARD DETAILS

[M-208-1](#), Sheet 2 of 11 (Erosion Log Applications)

[M-208-1](#), Sheet 3 of 11 (Toe of Slope Protection Applications)

[M-208-1](#), Sheet 6 of 11 (Erosion Log Installations)

5. BASIS OF PAYMENT

Pay Item	Description	Pay Unit
208-00012	Erosion Log Type 1 (9 inch)	LF
208-00002	Erosion Log Type 1 (12 inch)	LF
208-00013	Erosion Log Type 1 (20 Inch)	LF
208-00007	Erosion Log Type 2 (8 Inch)	LF
208-00008	Erosion Log Type 2 (12 Inch)	LF
208-00009	Erosion Log Type 2 (18 Inch)	LF
208-00022	Erosion Log Type 3 (9 Inch)	LF
208-00023	Erosion Log Type 3 (12 Inch)	LF
208-00024	Erosion Log Type 3 (20 Inch)	LF
208-00026	Coir Roll	LF



Erosion Logs along construction access road

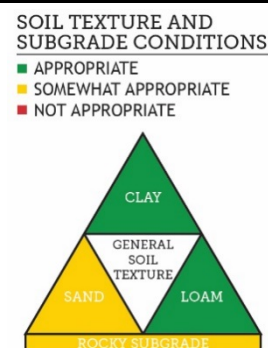
6. APPLICATIONS

- Use to intercept surface runoff, reduce flow velocities, and capture sediment.
- Where long slopes are present and at grade breaks, use Erosion Logs to prevent formation of concentrated flow paths.
- Upgradient of stormwater inlets, use Erosion Logs to filter sediment and capture debris.
- When vegetation hasn't established, use Erosion Logs as check dams in small drainage ditches.
- Use as perimeter control for stockpiles locations.

7. LIMITATIONS

- In ditches where continuous flows are expected, avoid using Erosion Logs
- Do not use below the ordinary high-water mark for stream applications.
- Can be dislodged after a storm event if appropriate anchoring is not provided.
- Only use as a temporary measure as bounding net is biodegradable and will release contents when degraded.

8. CONTROL MEASURE SOILS TRIANGLE



17. Erosion Logs (EL)



9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Ensure a maximum allowable tributary area of 0.25 acre with up to 150 feet of disturbed 3H:1V slope drains to the site per every 100 linear feet of Erosion Logs installed.
- Placement of Erosion Logs should meet the following maximum spacing requirements:

Flow Line Gradient	Maximum Check Dam Spacing based on Nominal Log Diameter (Feet)		
	8 to 9 Inches	12 Inches	18 to 20 Inches
0% to 2%	30	55	75
2% to 5%	25	40	55
5% to 10%	15	30	40
10% to 33%	10	15	20
33% to 50%	5	10	15

- The following are specific planning considerations for each Erosion Log type.
 - Erosion Log (Type 1) - Aspen wood excelsior contained in plastic netting. Plastic netting should not be used when regulatory permits prohibit their use or if there is a potential for plastic netting to endanger wildlife.
 - Erosion Log (Type 2) - Compost-wood blended material contained in geotextile bag. A longer-lasting control measure ideal for sites where filtering of hydrocarbons or dissolved metals are required.
 - Erosion Log (Type 3) - Aspen wood excelsior contained in natural fiber netting. A compostable (biodegradable) control measure ideal for locations where removing the logs might be labor intensive or cause damage to the existing vegetation.
 - Coir Roll - 100 percent coconut palm tree fiber contained in bristle coir netting considered a longer-lasting compostable (biodegradable) control measure used in stream bank restoration and wetland mitigation projects.

10. INSTALLATION CRITERIA

- Configure Erosion Logs perpendicular to concentrated flows and parallel to contour lines.
- Ensure Erosion Logs are trenched into the ground at least 2 to 3 inches to prevent riling and erosion beneath.
- Ensure wooden anchor stakes are embedded to a minimum depth of 12 inches and are placed at approximately 90 degrees from each other.
- When used for toe of slope protection measures, place Erosion or Coir Log 5 to 10 feet beyond the toe of the slope to provide storage capacity. Flare ends of Erosion Log upslope.
- When used as inlet protection measures, locate Erosion or Coir Logs at the edge of the concrete aprons or at the edge of the inlet grating if no concrete is present.

11. MAINTENANCE AND REMOVAL

- Visually inspect to ensure Erosion or Coir Log is installed properly and doesn't present erosion around it.
- If casting net is damaged, and the log becomes split, torn, or unraveled, remove and replace Log in-kind and dispose of damaged material properly.
- Remove sediment when sediment accumulates to half the height of the Log.
- Additional stakes are required if Log slumps or sags.
- Replace wooden stakes when broken or missing.
- When Erosion Log (Type 1) is no longer needed, remove and dispose of the log and accumulated sediment. Excelsior can be dispersed onsite with Engineer approval. All elements of the plastic netting must be picked up and disposed of at a landfill or recycling facility.

17. Erosion Logs (EL)



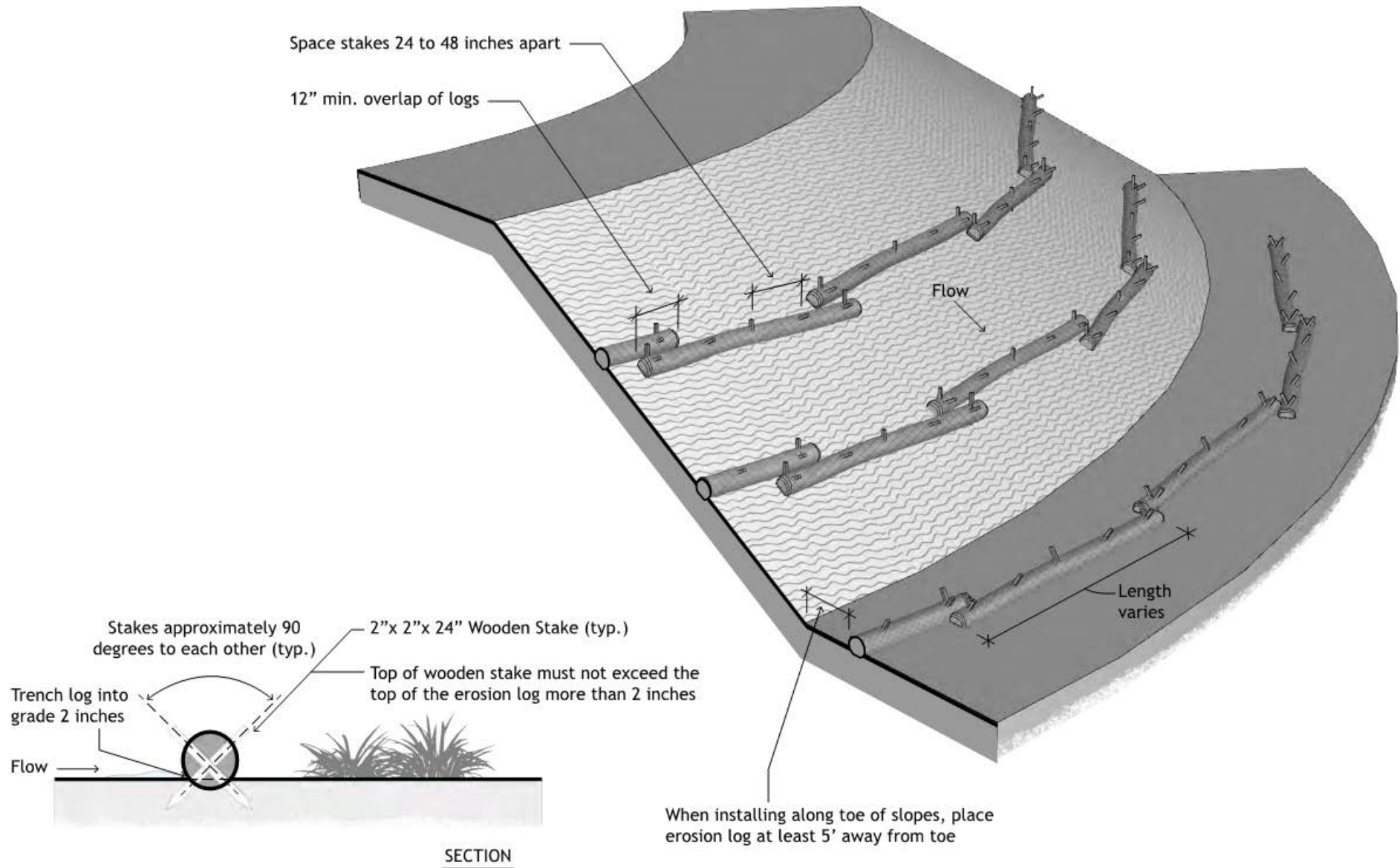
COLORADO
Department of Transportation

- When Erosion Log (Type 2) is no longer needed, remove and dispose of the log and accumulated sediment. With Engineer approval the compost-wood blended material can be dispersed onsite. All elements of the geotextile bag must be picked up and disposed of at a landfill or recycling facility.
- When Erosion Log (Type 3) and Coir Roll are no longer needed, dispose of the accumulated sediment; the Logs can remain onsite. All of the elements (entire Log and stakes) are compostable (biodegradable) and are not required to be removed for the permittee to terminate the stormwater construction permit.

17. Erosion Logs (EL)



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2. Mulching, Agricultural Straw or Hay, and Mulch Tackifier (MU)



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1. DESCRIPTION:

Mulching is a temporary control measure used for interim and permanent stabilization that consists of mechanically placing a uniform layer of agricultural straw or hay mulch that is crimped in and sprayed with tackifiers over disturbed construction areas. It protects disturbed areas immediately after seeding from the forces of rainfall impacts; it also increases infiltration. Mulching assists with germination success of seeded areas by conserving moisture and protecting against temperature extremes until permanent vegetation is established.



Straw Mulching on disturbed side slope

2. CONTROL MEASURE OBJECTIVES

- ☒ Erosion Control
- ☐ Sediment Control
- ☐ Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 213](#) - Mulching

- a) [213.02.\(a\)/\(c\)/\(f\)](#) - Materials
- b) [213.03.\(a\)/\(d\)/\(g\)](#) - Construction Requirements
- c) [213.04](#) - Method of Measurement
- d) [213.05](#) - Basis of Payment

4. RELEVANT M-STANDARD DETAILS

Section not applicable for this control measure.

7. LIMITATIONS

- Material availability can impact feasibility of this control measure.
- Potential for introduction of weeds and other non-native plant materials.
- Potentially costlier due to increased labor requirements
- Permanent stabilization strategies for slope applications steeper than 2.5H:1V should consider Soil Retention Blanket or Mulching (Hydraulically applied)

5. BASIS OF PAYMENT

Pay item	Description	Pay Unit
213-00002	Mulching (Weed Free Hay)	ACRE
213-00004	Mulching (Weed Free Straw)	ACRE
213-00061	Mulch Tackifier	LB

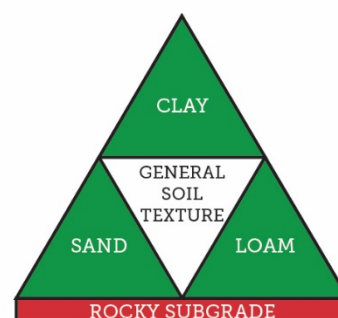
6. APPLICATIONS

- Use in conjunction with seeding to protect and stabilize disturbed soil.
- Use to cover disturbed areas for extended periods of time as a stabilization strategy.

8. SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



2. Mulching, Agricultural Straw or Hay, and Mulch Tackifier (MU)



COLORADO
Department of Transportation

9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Tackifier must be used in conjunction with straw mulch in accordance with Section 213.02(c).
- Apply simultaneously or immediately after mulching and crimping to provide uniform coverage.
- Agricultural hay or straw should not be specified in concentrated flow areas either as interim or permanent stabilization. Hay and straw can also clog inlets and should not be used within water quality extended detention basins or sand filter structures.
- Agricultural hay or straw should not be specified in concentrated flow areas either as interim or permanent stabilization.
- Hay and straw can also clog inlets and should not be used within water quality extended detention basins or sand filter structures.

10. INSTALLATION CRITERIA

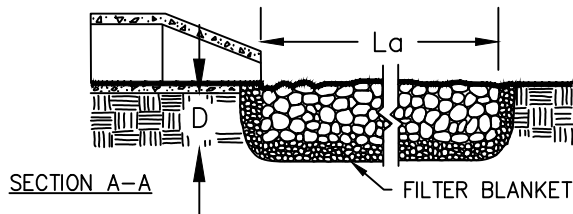
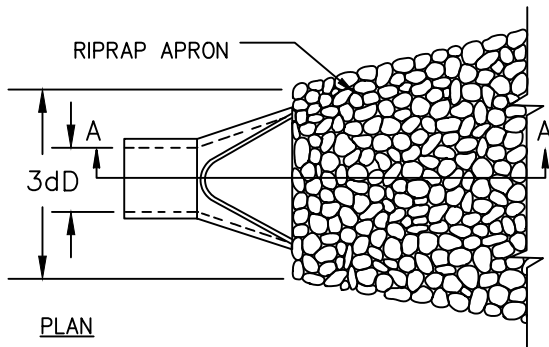
- Projects within Forest Service ROW or adjacent to sensitive areas might need special approval for the use of agricultural weed free straw or hay.
- Mulch materials should be air-dried and free of impurities in accordance with Section 213.
- For mulched areas to be seeded, native topsoil or approved equal (free of rocks, woody debris or soil clumps) shall be applied to disturbed areas in accordance with Section 207, or a Project Special Provision for Topsoil Management.
- Apply straw mulch at a rate of 1.5 to 2 tons per acre, in accordance with Section 213.
- Mechanically apply mulch at a depth of 1-2 inches. Hand application will require a thicker layer (2-3 inches, or as needed depending upon site conditions).
- Evenly distribute mulch over entire area, with at least 90% coverage.
- Apply mulch according to Section 213 using approved organic tackifier, crimping and anchoring within 4 hours.
- Do not place mulch on drainage channels, walls, sidewalks, pathways, or over existing vegetation.

11. MAINTENANCE AND REMOVAL

- Visually inspect at regular intervals and after every storm event to ensure mulch meets required coverage on all disturbed areas and slopes.
- Apply additional mulch as needed to meet the required soil coverage.
- Apply mulch tackifier with each additional mulching application.
- Manual inspection might be required to ensure appropriate adhesion has occurred.
- Mulching does not need to be removed as it will biodegrade with time.

RIPRAP OUTLET PROTECTION

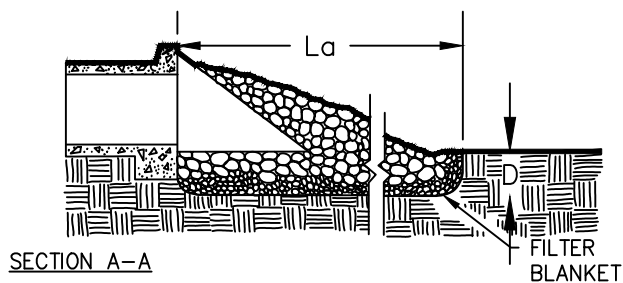
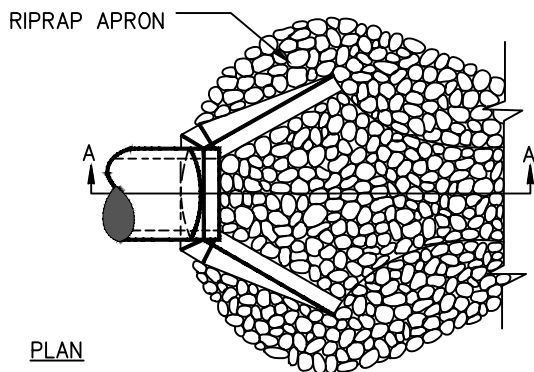
PIPE OUTLET TO FLAT AREA -- NO WELL DEFINED CHANNEL



NOTES:

1. L_a IS THE LENGTH OF THE RIPRAP APRON.
2. $D = 1.5$ TIMES THE MAXIMUM STONE DIAMETER BUT NOT LESS THAN 6".
3. IN A WELL-DEFINED CHANNEL, EXTEND THE APRON UP THE CHANNEL BANKS TO AN ELEVATION OF 6" ABOVE THE MAXIMUM TAILWATER DEPTH OR TO THE TOP OF THE BANK (WHICHEVER IS LESS).
4. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIPRAP AND THE SOIL FOUNDATION.

PIPE OUTLET TO WELL DEFINED CHANNEL



CITY OF CORDELE, GEORGIA - STANDARD DETAIL

RIPRAP OUTLET PROTECTION

DETAIL NO:

E-011

DATE:

7. Seeding (TS)



1. DESCRIPTION:

This control measure practice involves the establishment of a permanent, perennial vegetative cover over areas disturbed during construction activities. The main goal of seeding is to stabilize the soil, reduce wind and water erosion, minimize sheet flow and rill erosion, increase infiltration rates, and reduce overall surface runoff.

2. CONTROL MEASURE OBJECTIVES

- ☒ Erosion Control
- ☒ Sediment Control
- ☐ Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 212](#) - Seeding, Fertilizer, Soil Conditioner, and Sodding

[Section 207](#) - Topsoil

4. RELEVANT M-STANDARD DETAILS

Section not applicable for this control measure.

5. BASIS OF PAYMENT

Pay Item	Description	Pay Unit
212-00005	Seeding (Native)	LB
212-00006	Seeding (Native)	ACRE
212-00007	Seeding (Native)(Hydraulic)	ACRE
212-00009	Seeding (Temporary)	ACRE
212-00010	Seeding (Lawn)	LB
212-00011	Seeding (Lawn)	ACRE
212-00015	Seeding (Forbs)	LB
212-00020	Seeding (Forbs)	OZ
212-00022	Seeding (Riparian)	ACRE
212-00025	Seeding (Shrubs)	LB
212-00027	Seeding (Trees)	LB
212-00028	Seeding (Wetlands)	ACRE
212-00009	Seeding (Temporary)	ACRE



Drill Seeder Calibration

6. APPLICATIONS

- Used as part of the permanent stabilization steps for disturbed areas after construction activities are completed.
- Used only after topsoil has been dispersed on the site and soil conditioning amendments are applied.

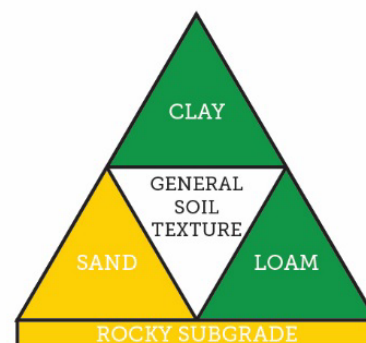
7. LIMITATIONS

- Permanent stabilization seeding can only be done in the approved seeding season windows for the different elevation ranges in Colorado.

8. SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



This Control Measure may be appropriate for all soil types with the appropriate installation procedures for topsoil requirements, and other considerations as directed by the Transportation Erosion Control Supervisor or Regional Environmental Staff

7. Seeding (TS)



COLORADO
Department of Transportation

9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Soil surface preparation must be completed before application of seed.
- To select species for the permanent stabilization see mixes, the Designer should utilize the CDOT Landscape Architecture Section's Native Seed Calculator, found at: <https://www.codot.gov/programs/environmental/news/native-seed-calculator>
- Topsoil management strategies must be included in the Stormwater Management Plan. These should include locations for the salvaged topsoil as either stock piles or windrow.
- Ground surface should not be compacted nor too loose.
- Temporary seeding consists of planting an annual grass.
- Drill seeding rates for temporary annual grasses are as follows:

Common Name	Botanical Name	Application Time	Seeding Rates (LBS PLS/acre)	Planting Depth (inches)
Oats	Avena sativa	October 1 - May 1	35	1 - 2
Foxtail Millet	Setaria italica	May 2 - September 30	30	1/2 - 3/4

- CDOT has created training videos demonstrating best field practices for landscape architecture pertaining to reclamation, revegetation, and stormwater management to help ensure compliance with CDOT Standard Specifications and CDPHE's regulations for transportation projects. These videos include guidance for:
 - [Percent Vegetation Cover](#)
 - [Soil Preparation, Ripping and Tilling](#)
 - [Composting and Fertilizers](#)
 - [Drill Seeding Application Rate](#)
 - [Straw Mulching](#)
 - [Crimping and Tackifier](#)

For more information visit the Landscape Architecture Program web page at:
<https://www.codot.gov/programs/environmental/landscape-architecture>

10. INSTALLATION CRITERIA

- Drill seeding is the most desirable method.
- Seeding seasons (Section 212.03) must be followed for native seeding.

11. MAINTENANCE AND REMOVAL

- Seeded areas require monitoring to ensure successful germination.
- Seeded areas require protection from vehicle and pedestrian traffic

29. Stockpile Management (SM)



COLORADO
Department of Transportation

1. DESCRIPTION:

Stockpile areas are used for temporary storage of construction materials and must be managed to minimize erosion and sediment transport from erodible material stockpiles.

2. CONTROL MEASURE USES

- ☐ Erosion Control
- ☐ Sediment Control
- ☒ Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 208](#) - Erosion Control

a) **208.07** - Stockpile Management

4. RELEVANT M-STANDARD DETAILS

No Standard Details exist for this Management Strategy.

5. BASIS OF PAYMENT

Pay item	Description	Pay Unit
208-00028	Plastic Sheeting	SY
213	Mulching	VARIES
208	Various items to contain perimeter	

6. APPLICATIONS

Areas where active and nonactive stockpiles of construction materials are stored.

7. LIMITATIONS

- Stockpiles should not be placed on paved areas unless no other practical alternative exists on-site.

8. APPROVED PRODUCTS LIST

Refer to: <https://www.codot.gov/business/apl>



Erosion Logs used for stockpile management practices

9. PROCEDURES

- Stockpiles should be placed a minimum of 50 feet away from State Waters and shall be confined so that no potential pollutants will enter State Waters and other sensitive areas. Stockpiles shall also be protected with a temporary perimeter control measure. Level-to-gently-sloping grassed areas provide good stockpile sites and should not be placed in or along wetlands, ditches, swales, or against slopes that are more than 2:1.
- Stockpiling of contaminated soils should be avoided. If unavoidable, these stockpiles should be covered with plastic sheeting with berms surrounding the stockpile to prevent runoff from leaving the construction site. Contaminated soils should be transported offsite.
- Implement wind erosion control practices in accordance with Wind Erosion Control (fact sheet No. 38) as appropriate on all stockpiles.
- Erodible stockpiles (including topsoil) must be contained with an acceptable control measure at the toe (within 5 to 10 feet of the toe) at all times

29. Stockpile Management (SM)



COLORADO
Department of Transportation

10. PROTECTION OF STOCKPILES FOR PROJECTS TEMPORARILY HALTED FOR 14 DAYS

- Soil Stockpiles:
 - Soil stockpiles should be covered or protected with interim stabilization in accordance with 208.04(e). If no longer needed, the stockpiles should be removed and disposed of properly.
- Stockpiles of aggregate base, or aggregate subbase:
 - These stockpiles should be covered or protected with a perimeter sediment barrier at all times. If no longer needed, the stockpiles should be removed and disposed of properly.
- Stockpiles of “cold mix”:
 - Cold mix stockpiles should be placed on and covered with plastic sheeting material at all times and surrounded by a berm.
- Stockpiles/storage of pressure treated wood with copper chromium and arsenic or ammonia, copper, zinc, and arsenate:
 - Treated wood should be covered with plastic sheeting material at all times and placed on pallets.
 - Along with plastic sheeting material, tarps can be used to cover unused materials and materials on pallets.

11. PROTECTION OF ACTIVE STOCKPILES

- Prior to the onset of precipitation, active stockpiles of the identified material should be protected further, as follows:
 - All stockpiles require temporary stabilization at the end of each day in accordance with 2018.04(e), and require a sediment barrier, such as Erosion Logs, Silt Fence, or Compacted Berms.
 - Stockpiles of cold mix should be placed on and covered with plastic sheeting material.

12. MAINTENANCE AND REMOVAL

- Routinely spot-check stockpile areas for compliance. Repair perimeter control and covers as needed. Sediment should be removed when sediment accumulation reaches half of the barrier height.
- Inspect containment structures or other perimeter controls routinely and repair when signs of degradation are visible.
- Remove stockpiles and dispose of properly if no longer needed.
- Re-vegetate or install other approved methods of final stabilization in areas where stockpiles and access roads are located.

21. Storm Drain Inlet Protection (IP)



COLORADO
Department of Transportation

1. DESCRIPTION:

Storm Drain Inlet Protection Devices are temporary control measures consisting of permeable geotextile fabrics installed below the inlet grate or configured as an inlet grate cover. Primarily used in paved areas to protect drop inlets or curb inlets, they are used to filter runoff and remove coarse sediment and debris before runoff enters a storm drainage system.

2. CONTROL MEASURE USES

- ☒ Erosion Control
- ☒ Sediment Control
- ☐ Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 208](#) - Erosion Control

- a) [208.02.\(n\)](#) - Materials
- b) [208.05.\(i\)](#) - Construction of Control Measures
- c) [208.11](#) - Method of Measurement
- d) [208.12](#) - Basis of Payment

4. RELEVANT M-STANDARD DETAILS

[M-208-1](#), Sheet 5 of 11 (Storm Drain Inlet Protection Types)

5. BASIS OF PAYMENT

Pay Item	Description	Pay Unit
208-00053	Storm Drain Inlet Protection (Type II) (84-Inch)	EACH
208-00054	Storm Drain Inlet Protection (Type II)	EACH
208-00055	Rigid Inlet Protection Device	EACH
208-00056	Storm Drain Inlet Protection (Type III)	EACH
208-00057	Storm Drain Inlet Protection (Type I) (144 Inch)	EACH
208-00058	Storm Drain Inlet Protection (Type I) (204 Inch)	EACH



Storm Drain Inlet Protection

6. APPLICATIONS

- Use where sediment-laden flows will potentially enter existing storm inlets.
- Use near construction areas that have not been stabilized.
- Use near construction entrance/exit points where vehicles may track sediment towards existing storm inlets
-

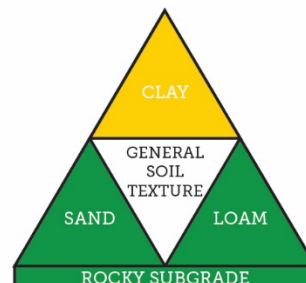
7. LIMITATIONS

- May pond water and represent an obstacle for pedestrian and vehicle traffic.
- In all situations, Inlet Protection Devices will require additional upstream control measures for sediment capture.
- Frequent maintenance is required to ensure proper control measure and Inlet Protection structure functioning.

8. CONTROL MEASURE SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



21. Storm Drain Inlet Protection (IP)

9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Specify inlet protection on all existing inlets on the Initial SWMP site maps. Use Inlet Protection to control sediment and other construction material from entering the catch basin and discharging directly to State Waters.
- Specify inlet protection on all proposed inlets on the Interim SWMP Site Maps to be phased in as the catch basin and grate is installed.
- Because of safety concerns, Storm Drain Inlet Types 1, 2 and 3 should be used when traffic flow is not within 3 feet of the inlet or other situations where aggregate bags may cause a safety concern for traveling public (for example, bike lanes or pedestrian crossings).
- The geotextile fabric material is required to have a minimum flow rate.
- Potentially hazardous conditions from water ponding on pavement surface should be considered.
- Verify size and configuration of existing inlets to ensure the inlets were installed according to the requirements of CDOT's M-604 standards.
- The following control measure may be used as inlet protection for paved areas: Aggregate Bags.
- The following control measures may be used as inlet protection for unpaved areas: Erosion Logs, Silt Fence (Reinforced), and Erosion Bales.
- When approved, the following design considerations apply:

Temporary Control Measure	Design Considerations
Aggregate Bag	<ul style="list-style-type: none">• Runoff flow must be below 0.5 cfs• Drainage area below 1 acre
Erosion Logs	<ul style="list-style-type: none">• Must be able to anchor logs• Drainage area below 1 acre
Erosion Bales	<ul style="list-style-type: none">• Must be able to anchor bales• Drainage Area below 1 acre
Silt Fence	<ul style="list-style-type: none">• Runoff must be sheet flowing and below 0.5 cfs• Low sediment capture• Drainage area below 1 acre

- Suggested guidelines for the use of Storm Drain Inlet Protection Types are listed below:

	Storm Drain Inlet Protection Type			
	Type I	Type II	Type III	Rigid
CDOT Standard Inlet Types (M-604 Standard Plans) Application	CDOT Type R	CDOT Combination Inlet	CDOT Vane Grate	Inlet Type C, D, and 13

10. INSTALLATION CRITERIA

- When installing nonstandard (project special provision) prefabricated Storm Drain Inlet Protection Devices, follow manufactures material standards and specifications.
- When using other control measures as Inlet Protection Devices, follow installation criteria previously outlined for each control measure.
- Follow installation procedures outlined in the CDOT M-208-1 Standard Details.
- For new inlets, the Inlet Protection Devices should be installed as soon as the catch basin and grate are installed.

21. Storm Drain Inlet Protection (IP)



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11. MAINTENANCE AND REMOVAL

- Visually inspect at regular intervals, and before and after every storm event to ensure Inlet Protection Device is installed properly and erosion has not presented around it.
- Inspect inlet structures at regular intervals and after every storm event for bypassed sediment materials that may accumulate inside the structure.
- Move and secure Inlet Protection Devices as needed to achieve optimum performance.
- Inlet Protection Devices that are damaged must be replaced immediately.
- Remove any sediment upstream of the Inlet Protection Device location and sediment that may have bypassed the Inlet Protection Device immediately upon inspection completion.
- When using other control measures as temporary inlet protection devices, follow the maintenance and removal recommendations provided for those control measures.
- Inlet Protection Devices must be removed after final stabilization of the construction site has been completed. Most prefabricated Inlet Protection Devices can be recycled and reused after properly washing the device. Ensure no sediment is released into the Inlet Structure.
- Other control measures must be disposed of following the recommendations listed in their corresponding fact sheets.
- All maintenance must be done without entering the catch basins (vault) structure because of safety concerns and confined space requirements.

8. Temporary Berm (TB)

1. DESCRIPTION:

Temporary Berms are temporary control measure barriers made of compacted subsoil or other approved materials such as embankment or sand bags. Their function is to intercept and divert sheet surface runoff away from areas not yet stabilized, prevent erosion, manage sheet flow, and reduce sediment transport.

2. CONTROL MEASURE USES

- ☒ Erosion Control
- ☒ Sediment Control
- ☐ Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 208](#) - Erosion Control

- a) **208.05 (d)** - Construction BMPS
- b) **208.11** - Method of Measurement

4. RELEVANT M-STANDARD DETAILS

[M-208-1](#), Sheet 7 of 11 (Grading Applications)

5. BASIS OF PAYMENT

Pay item	Description	Pay Unit
208-00300	Temporary Berm	LF

6. APPLICATIONS

- May be constructed across roadways (transverse berm) at a slight angle with respect to the centerline.
- May be constructed along the top edge of fill slopes or below the toe of exposed and erodible slopes (upslope or downslope side of a construction area). They can also be used at storm drain inlets (when approved) and across minor swales and ditches.
- May be used to construct Rough Cut Street Control measures.
- May be used to divert surface sheet flows from areas where flows may damage property or interfere with establishment of vegetation.
- May be used to divert surface runoff to other control measures like Sediment Traps.



Temporary Berm along access road

- May be used on relatively flat slopes to capture surface runoff to shorten the overall slope length before it has a chance to concentrate and cause rill and gully erosion

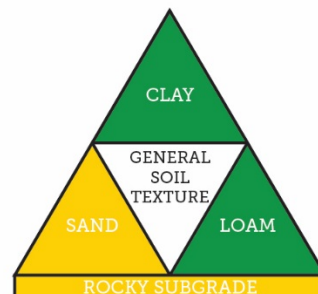
7. LIMITATIONS

- Only to be used as a temporary measure on flat areas with slopes less than 2H:1V.
- Must use a secondary erosion control measure device when sediment control is an objective.
- Susceptible to erosion when intercepted concentrated flows have high velocities.

8. SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



8. Temporary Berm (TB)



COLORADO

Department of Transportation

9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Temporary Berm:
 - Berm must be at least 18 inches tall or high enough to prevent overtopping.
 - Berm must have a minimum of 4- to 6-foot base.
 - Gradient of all receiving area above berm must be less than 2:1, or flatter.
 - Berms must be designed so that flow line of water is at a gradient of less than 3 percent. Greater than 3 percent may require the use of Check Dams in the flow line behind the berm.
 - Outlets of anticipated flow from captured water behind berms must be designed with additional control measures suitable to control concentrated flow. Maximum drainage area for each outlet must be limited to 2 acres.
 - Berms installed taller than 2 feet require additional control measures at the toe opposite of the conveyance side.

10. INSTALLATION CRITERIA

- Construct Temporary Berm using native subsoil materials that can be compacted. Topsoil may **not be used** to construct these structures.
- Temporary Berm must be compacted manually or by mechanical means.
- The berms shall be constructed at regular intervals along the road and shall be perpendicular to the longitudinal slope from the outer edge of the swale to the crown of the road.

11. MAINTENANCE AND REMOVAL

- Inspect Temporary Berms on a daily basis for signs of erosion, stability, and compaction. Whenever erosion is spotted, replace lost material and recompact berm to match original conditions.
- If intensive maintenance is necessary to keep this control measure functional, consider using a different control measure device (see Silt Dike [fact sheet No. 19] or Erosion Logs [fact sheet No. 17]).
- When upstream area is stabilized, Temporary Berms may be removed. Disturbed area around control measure must be cleared of any debris or sediment, receive subgrade soil preparation, and be seeded and mulched.
- Removed material for Temporary Berms may be distributed on-site at a location approved by the Engineer.

23. Vehicle Tracking Control (VTP)



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1. DESCRIPTION:

Vehicle Tracking Control is a temporary control measure that consists of stabilized layer of aggregate or a pre-fabricated structure that is used to minimize tracking of sediments from the construction site (exposed soil) to paved road surface. Related to vehicle tracking, CDPHE recognizes that fine grains (staining) may remain visible on the surfaces of offsite streets, other paved areas, and sidewalks after implemented sediment removal practices have been implemented.

2. CONTROL MEASURE USES

- ☐ Erosion Control
- ☒ Sediment Control
- ☒ Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 208](#) - Erosion Control

- a) **208.02** - Materials
- b) **208.02 (I)** - Materials - Vehicle Tracking Pad
- c) **208.05.(o)** - Construction BMPS - Vehicle Tracking Pad
- d) **208.11** - Method of Measurement
- e) **208.12** - Basis of Payment

4. RELEVANT M-STANDARD DETAILS

[M-208-1](#), Sheet 1 of 11 (Vehicle Tracking Pad)

5. BASIS OF PAYMENT

Pay Item	Description	Pay Unit
208-00070	Vehicle Tracking Pad	EACH
208-00075	Pre-Fabricated Vehicle Tracking Pad (Type 1)	EACH
208-00175	Pre-Fabricated Vehicle Tracking Pad (Type 2)	EACH
208-00071 ^a	Maintenance Aggregate (Vehicle Tracking Pad)	CY

^a Pay item is included for anticipated maintenance of Vehicle Tracking Pads based on the service life of the control measure in the field.



Vehicle tracking pad at entrance of construction site

6. APPLICATIONS

- Used at construction site entrance and exit locations.
- Used during wet weather periods when tracking of dirt is increased.

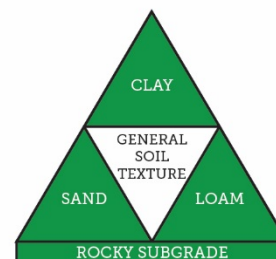
7. LIMITATIONS

- Additional Control Measures may be needed when Vehicle Tracking Control is graded towards paved surfaces.
- When installation of aggregate Vehicle Tracking Pad is not feasible, consider using Pre-fabricated Vehicle Tracking Pads.

8. CONTROL MEASURE SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



23. Vehicle Tracking Control (VTP)



COLORADO
Department of Transportation

9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Consideration of site grades, sight distances, and curves on public roads when selecting a location for Vehicle Tracking Pads.
- Aggregate-based Vehicle Tracking Pad must be at least 12 feet wide and 70 feet long.
- Pre-fabricated Vehicle Tracking Pad must be at least 12 feet wide and 35 feet long.
- If runoff flow paths are directed towards the Vehicle Tracking Pad, use Temporary Berms, Silt Dikes, or other runoff routing control measures to divert flows to a different location.
- Additional site management control measures (Silt Fence and plastic fence) should be designed to direct construction traffic to the egress point with the Vehicle Tracking Pad.

10. INSTALLATION CRITERIA

- To accommodate the traffic between pre-fabricated Vehicle Tracking Pad and paved surface, and the turning radius of construction vehicles anticipated on site; the specified vehicle tracking aggregate must be used.
- A geotextile separation layer and aggregate base course may be required to stop rutting under the pre-fabricated Vehicle Tracking Pads or areas where construction vehicles mount or dismount.
- Entrance/exit area must be excavated 6 inches, and Class 2 geotextile fabric must be installed and covered by a 6-inch aggregate layer. Aggregate must meet the gradation requirements listed in Section 208.02. (I)
- When using Pre-fabricated Vehicle Tracking Pads, follow manufacturer's specifications for installation. Ensure a clean, even surface is provided prior to installation and that the system is properly anchored prior to use.
- Install prior to any traffic leaving the site.
- Additional control measures should be incorporated to prevent sediment on the Vehicle Tracking Pad from leaving the site.

11. MAINTENANCE AND REMOVAL

- Visually inspect to ensure Vehicle Tracking Pad is installed and anchored properly.
- Daily cleanup may be required; if dirt is tracked onto the street it must be cleaned up within 24 hours (reference the Street Sweeping fact sheet [No. 35] for more information).
- Using Pre-fabricated Tracking will require more frequent maintenance than aggregate-based Vehicle Tracking Pads.
- Site Signage may be used to indicate and direct traffic to construction site exit locations with Vehicle Tracking Control.
- Vehicle Tracking Pads should only be removed when site is stabilized and the potential for vehicle tracking to occur does not exist. Aggregate from tracking pad may be washed and dispersed onsite at locations approved by the Engineer; Pre-fabricated Tracking Pads may be washed offsite, recycled, and reused.
- Some sites may require wheel washing stations, refer to the Vehicle and Equipment Management fact sheet (No. 37) for more information.

APPENDIX C

Seed Mix



Buffalo Brand Sandy Soil Mix

A mixture of warm season and cool season grasses for soils that are sandy to loamy and even clay based. Suited best for range conditions and pasture production in livestock operations. Range of adaptation is below 6500 ft. elevation.

20% Western Wheatgrass, Arriba
15% Thickspike Wheatgrass, Critana
15% Switchgrass, VNS
13% Annual Ryegrass, VNS
12% Sideoats Grama, Native
10% Sand Bluestem, Native
10% Blue Grama, Native
5% Sand Dropseed, VNS

Seeding Rate:

25-30 lbs. per acre

Broadcast Rate:

30-35 lbs. per acre

Available in 50 lb. and 25 lb. bags

*Buffalo Brand Seed is an independently owned seed company specializing in alfalfas, native grasses, forage grasses, turf grasses, small grains and annual forages. Our long-term success has been built upon putting family first while maintaining our commitment to exceed our customer's expectations at every opportunity. **Buffalo Brand Seed** has been supplying customers with high quality seed since 1958.*