# Bear Creek Sediment Mitigation Project
# WSRA Grant Final Report – 2018

May 31, 2018


**Rocky Mountain Field Institute**
**815 South 25th Street, Suite 101**
**Colorado Springs, CO 80904**
**www.rmfi.org**

***Dedicated to the conservation and stewardship of public lands***

## Background

The Bear Creek Sediment Mitigation Project (Grant POGG1 2015-2) seeks to protect water quality in Bear Creek, improving the aquatic habitat for the last wild population of the greenback cutthroat trout, and enhance watershed health and function by reducing sediment transport into Bear Creek. In 2013, the Rocky Mountain Field Institute (RMFI) was awarded a grant from the Colorado Water Conservation Board's *Water Supply Reserve Account* to implement the aforementioned objectives, in concert with members of the Bear Creek Roundtable. The following pages provide an overview of the work accomplished on the project since its inception.

## Project Overview

Since the Bear Creek Watershed Restoration Implementation Project, an initiative of the Bear Creek Roundtable, was initiated in 2011, RMFI has worked with the City of Colorado Springs, Colorado Parks & Wildlife, and the United States Forest Service, among others, to evaluate the maintenance needs of the stream corridor in the Watershed. As the highest priority site for conservation of the greenback, project partners have been working to better manage activities within this high-value watershed and minimize impacts to the fish and its habitat. The goal of the Restoration Project is to ensure a thriving population of greenbacks in a watershed that will be resilient to changing climate conditions. One of the key issues in the watershed is sedimentation and its potential impact on stream conditions.

In particular, the Bear Creek Sediment Mitigation Project was designed to focus mitigation activities along High Drive. High Drive is managed by the City of Colorado Springs Parks, Recreation, & Cultural Services Department. High Drive is an unpaved, gravel road adjacent to the stream and is a known source of sediment. The Bear Creek Watershed geology consists of highly erosive decomposing granite, further enabling natural erosion caused by the presence of the soft-surface High Drive. In 2014, the road was converted to limit motorized traffic to administrative purposes only. However, the road remains a very popular thoroughfare for users accessing trails on City property and as a gateway to a multi-use trail network on the Pike National Forest. The Bear Creek Sediment Mitigation Project included the following three tasks:

1) Restore .75 mile of in-stream fish habitat and restore channel function
2) Stabilize one ephemeral draw that contributes excessive sediment into Bear Creek
3) Address the cause of degradation: Prioritize, design and implement highest priority sediment control features on High Drive to reduce sediment delivery into Bear Creek

Many of the initial project objectives were delayed to 2017, due to three primary reasons. One, work related to the protection of fish habitat could not commence until the NEPA decision was finalized, which occurred in June of 2016. Two, seasonal work restrictions are in place to best protect the fish's habitat during breeding which limited the months when work could occur. And lastly, historic storm events in 2013 and again in 2015 led to revisions in the implementation plan. After the 2013 event, the City of Colorado Springs received a FEMA Public Assistance grant to repair the damaged sections of High Drive. The mitigation work was scheduled to be completed in fall of 2015, however a second storm event delayed the work a second time. Unfortunately, delays with the FEMA fund approval process has resulted in incompletion of a significant component of the project – heavy machinery work to create sediment detention basins and narrowing of High Drive. That work (identified in the project proposal as Tasks #2

& #3) is expected to occur in 2018 but not within the timeframe of this grant award period. Therefore, RMFI is invoicing for significantly less than the awarded grant amount.

**Collaboration**

The Bear Creek Sediment Mitigation Project is a largescale collaborative effort between governmental entities, nonprofit organizations, and advocacy groups that have been working together as the Bear Creek Roundtable since 2009. The project not only includes government landowners including the U.S. Forest Service, City of Colorado Springs, El Paso County, and Colorado Parks and Wildlife. Nonprofit partners in addition to RMFI include the Sierra Club and Trout Unlimited. Advocacy groups representing recreational interests include the Colorado Motorcycle Trail Riders Association and Medicine Wheel Trail Advocates. Numerous other partners have participated in the roundtable process.

In addition to collaboration in planning, RMFI engaged community volunteers throughout the implementation phase of the project. Over the course of the project, community volunteers contributed 742 hours, valued at $1l7,912 (calculated @ $24.14/hour, per independentsector.org). In addition to volunteers, RMFI staff contributed the majority of the workload to the project, having spent 1,226 hours spread over 41 workdays on the project. Altogether, 1,968 work hours were spent on the project.

**Overview of Work Accomplished**

While all of the work accomplished fell under Task #1 Sediment Abatement – the work was technically sound, durable, and of high quality. As outlined in the grant proposal, sediment controlling measures included altering the road geometrics, (restoring the natural flow of water by eliminating the outslope berm); improving water conveyance elements that route flow to cross culverts or to rundowns; increasing the number of cross drains, reducing the road prism width; designing sediment traps at culvert entrances or exits; and closing/restoring rogue access points from High Drive to Bear Creek.

The work RMFI accomplished followed the assessment completed by CH2MHill in conjunction with the City of Colorado Springs (Appendix A). RMFI worked closely with the City to identify the location and number of high priority treatment sites.

<u>Work Statistics</u>

- 41 workdays
- 1,968 work hours
    - 742 community volunteer hours valued at $17,912 (@ $24.14/hour)
    - 1,226 RMFI staff hours
- 168 ft. buck-and-rail fence installed
- 23,242 square feet of restoration
- 57.25 lbs. native seed mix planted
- 1,153 native plants transplanted
- 67 check dams constructed
- 8 tons of rock utilized
- 15.55 cubic yards of soil
- 4.75 cubic yards of mulch
- 75 feet of trail improved
- 1,346 feet of trail restored
- 651 feet of drain installed
- 3 cross vanes built
- 1 headcut stabilized
- 1 retaining wall built

<u>2016 Workdays (11 total)</u>

September: 13-17, 21

October: 11-15

<u>2017 Workdays (24 total)</u>

July: 19-22

August: 9

October: 10-12, 14, 17-21, 25-28

November: 4, 14-17, 27, 29

<u>2018 Workdays (6 total)</u>

April: 30

May: 8-12

**Restoration Techniques Utilized**

*Log Stepfall*

One large headcut formation was contributing considerable sediment to Bear Creek. RMFI crews constructed a log stepfall structure to prevent the structure from continuing to erode (Figure 1).

*Bank Stabilization*

Along the majority of the High Drive corridor, the road gives way immediately to Bear Creek via steep slope. In many areas, the distance between the road and the creek is less than a few yards. Vegetation is sporadic. RMFI crews carefully installed erosion control matting and transplanted native vegetaion plugs to keep loose slopes from eroding into the stream (Figure 2).

*Rogue Trail Closure*

Between High Drive and Bear Creek exists several several "rogue" or social trails that provide access to the creek (often for dogs accompanying hikers) or serve as shortcuts to other trails in the canyon. The trails are very steep and allow direct access to the creek and at these points the increased sediment flow is disrupting the stream morphology and impacting the trout habitat. Under the NEPA agreement, human and pet contact with the creek is prohibited. Therefore, the closure and restoration of these areas was of great importance (Figure 3). RMFI utilized its 5-step restoration process: decompaction, seed, provide cover, naturalize, and close. Closure of rogue trails included installation of buck-and-rail fencing.

*Check Dams*

The installation of check dams was the biggest task associated with the project. Drainage control of the road corridor is of utmost importance to keep sediment movement to a minimum. Rock check dams were installed in an already-exiting drainage. Check dams are meant to slow the water and capture alluvium prior to the flow making its way to the stream (Figure 4).

*Culvert Maintenance*

Several Culverts that run perpendicular to High Drive and drain into Bear Creek were listed in the City of Colorado Springs objectives for sediment detention. One culvert was clogged with sediment and not draining properly. In order to improve the water flow and capture sediment, this culvert and several others were cleaned out and erosion control structures such as rock drains and check dams were constructed. Rock check dams were built both above and below the culvert, helping to slow the water flow and detain sediment before it reaches the creek (Figure 5).

*Road Narrowing*

A major objective of Tasks #2 and #3 is to narrow the High Drive roadway. This objective is still anticipated to occur, however due to the delayed project timeline the narrowing was not a major focus of this phase of the project. Still, RMFI crews did restore a small "test strip" of the road in order to inform future techniques. The berm on the outslope was removed (to restore natural sheet flow), a native seed mix was spread, erosion control matting installed, and native vegetation transplanted. A sign was installed to inform users of the future narrowing of the entire roadway (Figure 6).

***Photo Documentation***

**Figure 1 (above)**. Before and after images of a headcut treated with log stepfall structure.

**Figure 2**. Before and after images of erosion control matting installation and native vegetation transplants.

**Figure 3.** Before and after images of trail closure, restoration, and buck and rail fence installation.

**Figure 4.** Images of check dam installation and erosion control matting.

**Figure 5.** Before and after images of drain installation below culvert.

**Figure 6.** Before and after images of narrowing of High Drive.

*Additional photos available upon request*

**Future Work**

RMFI has worked in close partnership with the City of Colorado Springs to implement the bulk of the Bear Creek Sediment Mitigation Project along High Drive. In addition to habitat improvement efforts in the High Drive corridor, RMFI will continue to partner with the USFS to complete implementation of objectives derived through the NEPA process. RMFI entered into a 5-year agreement with the USFS in summer of 2015. The agreement provides funding to RMFI to assist with work objectives that may include: new trail construction, existing trail re-construction and maintenance, trail system planning and development, trail de-commissioning, trailhead development, campsite decommissioning, and storm water drainage improvements or re-alignment as needed to minimize erosion risk and sediment production within the Bear Creek Watershed. Other responsibilities outlined in the agreement include performing hillslope stabilization, erosion mitigation to prevent soil loss, stabilization of erosion gullies, riparian restoration, stream bank stabilization, and water quality protection.

**RMFI Contact Information**

Joe Lavorini
RMFI Program Director
719-471-7736 ext. 3#
joe@rmfi.org

Berm removed and Slope Re-vegetated

Repair damaged rock culvert. Existing Culvert to Remain

Ex. Stone Wall to Remain

Re-seed and Erosion Control Matting

Berm removed and Slope Re-vegetated

Existing Roadside "V" Drainage Ditch

Rip Rap Check Dams 25' O.C.

Gravel Base Sediment Basin

Existing Inlet and Culvert

25+00

Proposed Roadside "V" Drainage Ditch

Rip Rap Check Dams 25' O.C.
Existing Roadside "V" Drainage Ditch

Berm removed and Slope Re-vegetated

Ex. Stone Wall

Existing Rip Rap Swale to drain springs

20+00

Existing Roadside "V" Drainage Ditch

Gravel Base Sediment Basin
Road Rolling Dip (TYP)

Ex. Stone Bridge and Retaining Wall

Existing Stone Bridge

Berm removed and Slope Re-vegetated

Existing Roadside "V" Drainage Ditch

Rip Rap Check Dams 25' O.C.

Road Rolling Dip (TYP)

Existing Culvert

End Limit Project Area
00+51

Existing Roadside "V" Drainage Ditch



DESIGNED BY: D. Deitemeyer

DRAWN BY: D. Deitemeyer

DATE: FEB 12, 2015

SCALE: 1"=40'

REVISIONS:

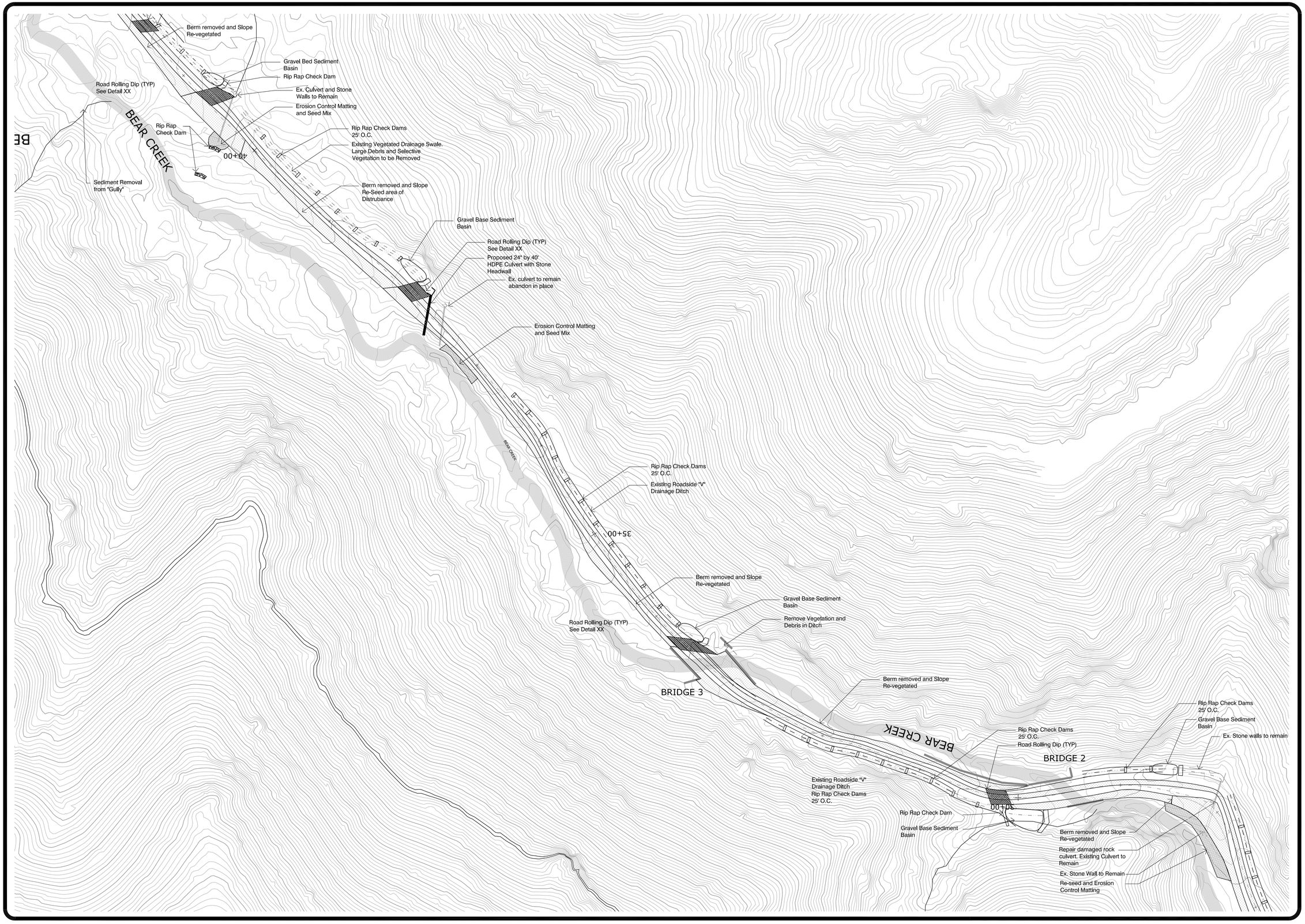
CITY OF COLORADO SPRINGS
PARKS, RECREATION AND CULTURAL SERVICES
1401 RECREATION WAY, COLORADO SPRING CO 80905 (719) 385-5940

TITLE:

# HIGH DR
# SEDIMENT MITIGATION PROJECT
# Preliminary Plans

SHEET 2 OF 4 SHEETS

FILE NUMBER:




BASE DATA DEPICTED HEREON COPYRIGHTED TO THE CITY OF COLORADO SPRINGS ON BEHALF OF COLORADO SPRINGS UTILITIES.

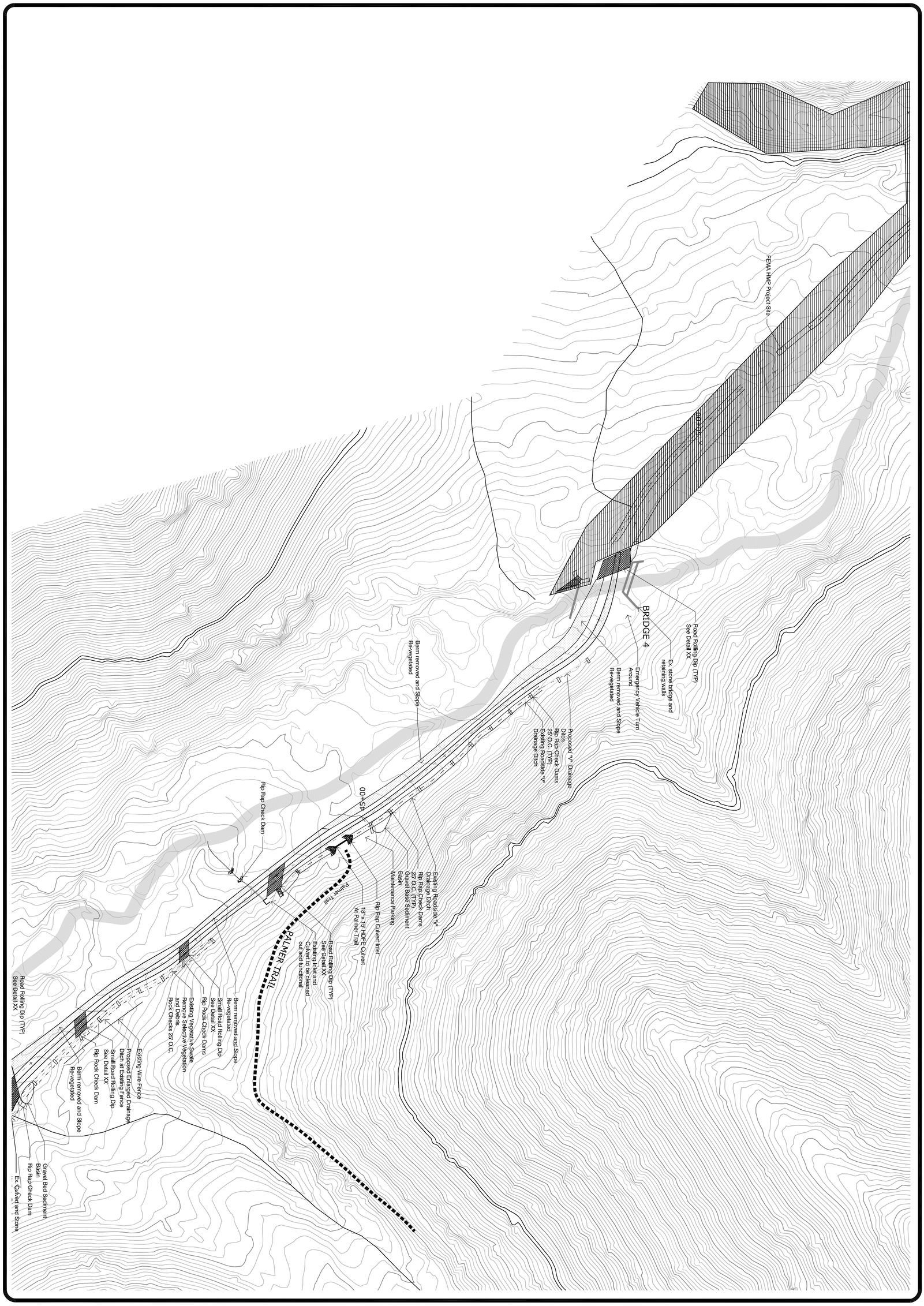
DESIGNED BY: D. Deitemeyer
DRAWN BY: D. Deitemeyer
DATE: FEB 12, 2015
SCALE: 1"=40'
REVISIONS:

CITY OF COLORADO SPRINGS
PARKS, RECREATION AND CULTURAL SERVICES
1401 RECREATION WAY, COLORADO SPRING CO 80905 (719) 385-5940

TITLE:
# HIGH DR SEDIMENT MITIGATION PROJECT
## Preliminary Plans

SHEET 3 OF 4 SHEETS

FILE NUMBER:




FILE NUMBER:

SHEET 4 OF 4 SHEETS

TITLE:

# HIGH DR
# SEDIMENT MITIGATION PROJECT
## Preliminary Plans


CITY OF COLORADO SPRINGS
PARKS, RECREATION AND CULTURAL SERVICES
1401 RECREATION WAY, COLORADO SPRING CO 80905 (719) 385-5940


DESIGNED BY: D. Deitemeyer
DRAWN BY: D. Deitemeyer
DATE: FEB 12, 2015
SCALE: 1"=40'
REVISIONS: