ROCKY FLATS SITE
REGULATORY CONTACT RECORD 2016-04

Purpose: Upgrade of the East Subsurface Drain Located in the East Perimeter Channel of the Original Landfill, with Soil Disturbance Review Plan

---

Contact Record Approval Date: October 19, 2016

Site Contact(s)/Affiliation(s): Scott Surovchak, U.S. Department of Energy (DOE); Linda Kaiser, David Ward, Clay Carpenter, and Jeremy Wehner, Navarro Research and Engineering, Inc. (Navarro)

Regulatory Contact(s)/Affiliation(s): Carl Spreng, Colorado Department of Public Health and Environment (CDPHE); Vera Moritz, U.S. Environmental Protection Agency (EPA)

Dates of Consultation Meeting: July 18, September 20, and October 12, 2016

Consultation Meeting Participants: Scott Surovchak, DOE; Carl Spreng, CDPHE; Vera Moritz, EPA; Clay Carpenter, Linda Kaiser, John Boylan, George Squib, David Ward, and Michelle Hanson, Navarro

---

Introduction:

The actions described in this contact record should improve the diversion of groundwater away from the East Perimeter Channel (EPC) by repairing and upgrading the East Subsurface Drain (ESSD) in the NE corner of the Original Landfill (OLF) so that it functions as intended and is less likely to clog. These actions are consistent with the investigation done under the Rocky Flats Legacy Management Agreement (RFLMA) Contact Record (CR) 2016-03.

The purpose of the investigation approved in CR 2016-03 (installation of wells and piezometers with a Geoprobe) was to provide additional information about the groundwater regime in the areas that potentially have the greatest contribution to the slumping in the OLF. CR 2016-03 states that geotechnical consultants have determined that slope instability at the OLF can be attributed to three factors:

1. Comparatively weak soils that naturally underlie the OLF area;
2. A slope angle that is sufficiently steep such that the soils can mobilize downslope; and
3. Water that is introduced into the already weak soils from one or more sources, including surface run-on and runoff, precipitation and infiltration, and groundwater.

Of these three factors, options for reducing the volume of water entering the OLF area are the most practical.

The ESSD was installed in the northeast corner of the EPC during site closure as a field modification of the OLF area to intercept and divert groundwater away from the northeastern portion of the OLF during construction of the EPC and the eastern portion of the final land surface of the OLF area. The ESSD is upgradient of the area that exhibited the most significant slumping in 2016, and it no longer operates as installed. The ESSD was constructed as a rock drain with no geotextile filter fabric to reduce the potential for clogging. The drain cannot be cleaned without excavating it. It is not certain when the ESSD stopped working, but very little water, if any, flows out of the drain. The excavation of portions of the ESSD in the summer of 2015 (performed under CR 2015-06) failed to provide an outlet for water that might have been collecting in the buried rock drain.

Discussion:

Based on the information above, the ESSD needs to be repaired and upgraded so that it properly functions and is less likely to clog. This action should be completed before the spring of 2017, when groundwater levels are again anticipated to rise and additional hillside movement is more likely. The repair and upgrade include excavating and replacing approximately 134 feet of the 234 feet of existing clogged rock drain and replacing the westernmost 100 feet of the original ESSD with a segment that is slightly south of the current drain alignment (see Figure 1). This realignment will avoid digging in the steepest portion of the slope. The total length of the excavation will be approximately 234 feet, and it will range from a depth of approximately 15 feet at the upgradient end to zero feet where the drain daylights. An 8-inch perforated pipe, with cleanout risers appropriately located for observation and cleanout, will be contained within a gravel bed that will be wrapped in geotextile filter fabric as shown in Figure 1. The pipe and cleanouts will allow the continued maintenance of the drain and will therefore extend its operable lifetime. The trench that is excavated for this work will be entirely outside the waste footprint but inside the original OLF construction boundary. Some construction equipment may be placed on the OLF cover above the waste footprint to safely install the upgraded ESSD.

A portion of the repair and upgrade work to the ESSD will be performed in an already disturbed Preble's meadow jumping mouse critical habitat, within the OLF original construction boundary (see Figure 1). As required by the United States Fish and Wildlife Service (USFWS) Biological Opinion for the Preble's meadow jumping mouse at Rocky Flats, the USFWS will be a notified prior to start of construction.

As stated above, the groundwater appears to have the greatest potential impact on slope instability around the EPC and the eastern edge and western side of the OLF. Several stabilization methods are being evaluated, and data are being collected to determine the preferred approach for managing the groundwater before it enters the OLF and for improving the OLF slope stabilization. A second 8-inch pipe (nonperforated) will be installed within the excavated trench in case the alternative that is eventually selected to manage groundwater requires a method to convey groundwater from upgradient of the OLF to the hillside east of the OLF (see Figure 1). Precisely how or if this second pipe eventually would be used has not been determined; additional data must be collected and geotechnical conclusions evaluated before any approach to groundwater diversion can be finalized. However, it is most efficient to install this pipe as part of the ESSD action rather than to dig up the area again to install the pipe. This second pipe will be installed with an inlet riser located at the upgradient end of the pipe, about where the upgraded ESSD turns southeast (Figure 1).

IC Evaluation: The soil disturbance work is subject to Institutional Controls (ICs) 2, 3, and 6. Table 1 recaps these ICs.

Table 1. Institutional Controls

IC 2	Excavation, drilling, and other intrusive activities below a depth of three feet are prohibited, without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2.
	Objective: Prevent unacceptable exposure to residual subsurface contamination. **Rationale:** Contaminated structures, such as building basements, exist in certain areas of the Central OU (Central Operable Unit), and the Comprehensive Risk Assessment did not evaluate the risks posed by exposure to this residual contamination. Thus this restriction eliminates the possibility of unacceptable exposures. Additionally, it prevents damage to subsurface engineered components of the remedy.
IC 3	No grading, excavation, digging, tilling, or other disturbance of any kind of surface soils is permitted, except in accordance with an erosion control plan (including Surface Water Protection Plans submitted to EPA under the Clean Water Act) approved by CDPHE or EPA. Soil disturbance that will not restore the soil surface to preexisting grade or higher may not be performed without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2.
	Objective: Prevent migration of residual surface soil contamination to surface water. **Rationale:** Certain surface soil contaminants, notably plutonium-239/240, were identified in the fate and transport evaluation in the Remedial Investigation as having complete pathways to surface water if disturbed. This restriction minimizes the possibility of such disturbance and resultant impacts to surface water. Restoring the soil surface to preexisting grade maintains the current depth to subsurface contamination or contaminated structures.
IC 6	Digging, drilling, tilling, grading, excavation, construction of any sort (including construction of any structures, paths, trails, or roads), and vehicular traffic are prohibited on the covers of the Present Landfill and the Original Landfill, except for authorized response actions.
	Objective: Ensure the continued proper functioning of the landfill covers. **Rationale:** This restriction helps ensure the integrity of the landfill covers.

The required Soil Disturbance Review Plan (SDRP) for IC 2 is in Attachment 1. The *Erosion Control Plan for Rocky Flats Property Central Operable Unit*, which has been approved by CDPHE and EPA, provides erosion control best-management practices that meet the IC 3 requirements. Construction equipment may need to be positioned on the cover over the easternmost portion of the OLF waste footprint in order to construct the west end of the upgraded ESSD. Approval of this contact record provides authorization for this response action as required by IC 6.

Resolution: CDPHE reviewed the information regarding the proposed soil disturbance and excavation and after consultation with EPA, has approved this contact record. CDPHE has determined that the proposed activity will not compromise or impair the function of the remedy or result in an unacceptable release or exposure to residual subsurface contamination. CDPHE has also determined that the proposed project meets the rationale and objectives of IC 2 (IC 3 and IC 6 rationale and objectives have been addressed as stated above).

The work will be conducted after CDPHE's approval, but DOE will not conduct the approved soil disturbance until 10 calendar days after this Contact Record is posted on the Rocky Flats Site's website and stakeholders are notified of the posting in accordance with the RFLMA Public Involvement Plan.

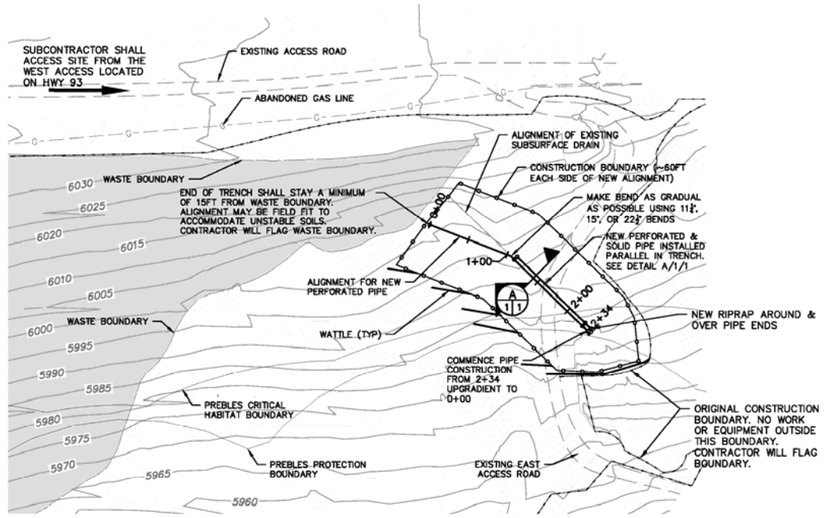
Progress and the completion of the work will be reported by DOE in RFLMA quarterly and annual reports of surveillance and maintenance activities for period(s) in which these activities occur.

Closeout of Contact Record: This contact record will be closed when the construction is completed, post-construction reseeding has been performed, and post-construction erosion controls are in place.

Contact Record Prepared by: David Ward, Clay Carpenter, and Jeremy Wehner, Navarro

---

Distribution:
Scott Surovchak, DOE
Carl Spreng, CDPHE
Vera Moritz, EPA
Linda Kaiser, Navarro
rc-westminster
File: RFS 0025.02
RF Contact Record File



ORIGINAL LANDFILL PLAN

N

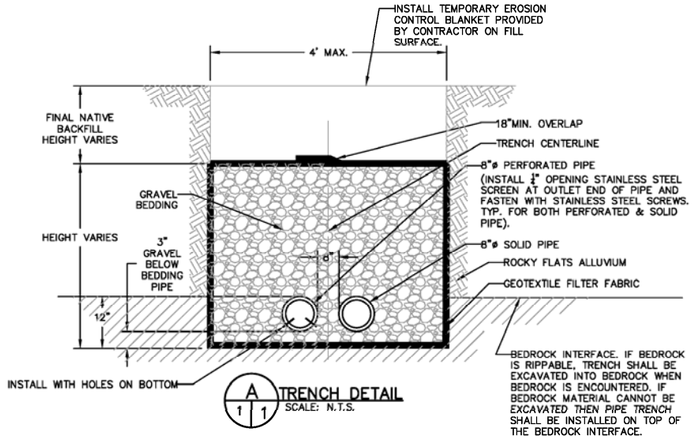
SCALE IN FEET
80 40 0 80 160 240
CONTOUR INTERVAL = 1 FEET

NOTES:

1. FIELD FIT ALIGNMENT AND LOCATIONS OF THE VERTICAL PIPES PER CONTRACTOR DIRECTION.
2. NATIVE BACKFILL SHALL BE COMPACTED IN 8" LOOSE LIFTS WITH THREE PASSES OF A VIBRATORY ROLLER. MOISTURE CONDITION BACKFILL AS NECESSARY TO PROVIDE COHESION OF BACKFILL TO CONTRACTORS SATISFACTION.
3. NO EXCAVATION SHALL TAKE PLACE INSIDE WASTE BOUNDARY.
4. INSTALL ACCESS-CONTROL FENCING ALONG CONSTRUCTION BOUNDARY TO RESTRICT ACCESS BY UNAUTHORIZED PERSONNEL INTO THE PROJECT WORK AREA. FENCING SHALL BE MINIMAL AND ONLY PLACED AROUND THE WORK AREAS. ACCESS-CONTROL FENCING SHALL, AT A MINIMUM:
   - BE 4 FT IN HEIGHT.
   - POSTS SET 10 FOOT ON CENTERS.
   - HIGH VISIBILITY PLASTIC, SAFETY FENCING OR APPROVED EQUAL.
   - POSTS AND FABRIC SHALL BE SECURE AND TIGHT AT ALL TIMES.
5. GEOTEXTILE FILTER FABRIC SHALL BE INSTALLED PER MANUFACTURERS INSTRUCTIONS. PROVIDE 18" OVERLAP ON ALL SEAMS. MATERIAL WILL BE PROVIDED BY CONTRACTOR.
6. GRAVEL BEDDING SHALL BE IN ACCORDANCE WITH CDOT 2011 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 703.02, COARSE AGGREGATE FOR CONCRETE, GRADATION NO. 67.
7. REMOVE EXISTING ROCK DRAIN WHEN ENCOUNTERED AND PLACE REMOVED MATERIAL AT CONTRACTOR'S STOCKPILE AREA.
8. ALL PIPE SHALL BE HDPE PE4710 DR 17 WITH BUTT FUSION WELDED JOINTS. PERSONNEL PERFORMING THE PIPE WELDING SHALL BE A MANUFACTURE'S AUTHORIZED TRAINED FUSION TECHNICIAN. WELDING QUALIFICATIONS AND PIPE MATERIAL PRODUCT SHEET SHALL BE SUBMITTED TO THE CONTRACTOR.
9. PERFORATED PIPE SPECIFICATIONS:

NOMINAL PIPE SIZE	HOLE SIZE	LONGITUDINAL HOLE SPACING	PERIMETER HOLE SPACING
8"	3/8"	5" +/- ½"	2@120° (+/-5°)

10. INSTALL PIPE FROM DOWN GRADIENT (STATION 2+34) TO UPGRADIENT (0+00)
11. INSTALL D50 = 6 INCH RIPRAP AT OUTLET END OF DRAIN LINE. BLEND WITH EXISTING RIPRAP.
12. PLACE WATTLES ALONG THE SOUTHERN EDGE OF THE CONSTRUCTION BOUNDARY AND MAINTAIN THROUGHOUT THE DURATION OF CONSTRUCTION. MATERIAL WILL BE PROVIDED BY CONTRACTOR.



A/1/1 TRENCH DETAIL
SCALE: N.T.S.

FIGURE 1

REVISION NO.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	PROJECT A/E	APPROVAL

U.S. DEPARTMENT OF ENERGY | Legacy Management
GRAND JUNCTION, COLORADO

NAVARRO
Work Performed Under DOE Contract No. DE-LM0000421
Navarro Research and Engineering, Inc.
Contractor to the U.S. Department of Energy Office of Legacy Management

PROJECT LOCATION: ROCKY FLATS SITE, GOLDEN, COLORADO
REFERENCE:

APPROVALS		
DRAWN BY	S. PITTON	9/29/16
CHECKED	S. PITTON	9/29/16
PROJECT ENGINEER	S. PITTON	9/29/16
ENGINEERING MANAGER	D. BRENNECKE	9/29/16
PROJECT LEAD	J. WEHNER	9/29/16
SITE MANAGER/LEAD	L. KAISER	9/29/16

OLF EAST SUBSURFACE DRAIN UPGRADE

PLAN, PROFILE, DETAILS

PROJECT NO. LTS-111-0056-07-001K
DRAWING NO. S15057-R00-C01-D
SHT. 1 OF 1

M:\LTS\111\0056\07\001K\S15057\S1505700.dwg 10/4/2016 1:01 PM clandoj

Attachment 1

Rocky Flats Legacy Management Agreement Soil Disturbance Review Plan

Proposed Project: Soil Disturbance Review Plan (SDRP) for the upgrade of the East Subsurface Drain (ESSD) located in the East Perimeter Channel (EPC) of the Original Landfill (OLF)

This SDRP provides information required by Rocky Flats Legacy Management Agreement (RFLMA) Attachment 2, "Legacy Management Requirements," Section 4.1, "Soil Disturbance Review Plan," regarding the work proposed by the U.S. Department of Energy.

Description of the proposed project, including the purpose, the location, and the lateral and vertical extent of excavation.

The proposed project is to repair and upgrade the clogged ESSD located in the northeast corner of the EPC of the OLF. It will include digging up a portion of the existing rock ESSD, which is approximately 15 feet below surface at its deepest location and runs approximately 234 feet to its zero-depth riprap outlet. A new 8-inch perforated pipe for collecting groundwater in that area and diverting it away from the OLF and EPC will be installed. Also, a new solid 8-inch pipe will be installed with an inlet riser for possible future use as a method for conveying groundwater from upgradient of the OLF to the South Interceptor Ditch SID. Both pipes will be buried together in graded gravel wrapped in a geotextile filter fabric (see Figure 1).

Information about any remaining subsurface structures in the vicinity of the proposed project (or state that there are none if that is the case).

There are no remaining subsurface structures in the vicinity of the proposed project. An abandoned buried natural gas line operated by Xcel Energy is in the utility easement corridor north of the OLF. The location and alignment of this abandoned line is well known and marked with signs. It is well outside of the soil disturbance area.

Information about any former Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern, or other known or potential soil or groundwater contamination in the vicinity of the proposed project.

The OLF is former IHSS 115. The OLF design had a 2-foot-thick soil cover over the location of the disposed waste materials and clean Rocky Flats Alluvium fill surrounding the waste materials for the placement and configuration of stormwater and seep-water management features. Limits of the waste area are shown in Contact Record 2016-04 Figure 1. The work that will be conducted to repair and upgrade the ESSD will not extend into the waste footprint. Work instructions are in place to appropriately manage any debris if encountered during this response action.

Contaminated groundwater of the "Industrial Area Plume" is present in the subsurface upgradient of the work area. This area of the plume is characterized by low (part-per-billion) concentrations of volatile organic compounds (VOCs). The recently installed wells and piezometers (CR 2016-03) that are upgradient of the construction area will be sample and analyzed for VOCs to support the evaluation of worker safety – primarily, potential exposures to workers during repair and upgrading of the ESSD, and for associated personal protective equipment (PPE) to be used when handling excavated materials or working in the excavation.

The project area is in the Upper Woman Creek Drainage Exposure Unit (EU) evaluated in the Comprehensive Risk Assessment, Appendix A, of the Remedial Investigation/Feasibility Study. The only contaminants of concern (COCs) identified for this EU are benzo[*a*]pyrene and dioxins/furans for surface soil/surface sediment.

Dioxin/furan concentrations were converted to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) toxicity equivalents (TEQs) for COC screening and risk characterization. Noncancer risks for benzo[*a*]pyrene and 2,3,7,8-TCDD TEQ were not evaluated because those COCs do not have noncancer toxicity values. Risks were calculated for benzo[*a*]pyrene and 2,3,7,8 TCDD TEQ. The estimated total excess lifetime cancer risk to the wildlife refuge worker at the EU is 8E-06.It is important to note that samples with the highest benzo[*a*]pyrene concentrations are located in an area that is now under 20 feet of soil following the closure of the OLF (i.e., re-grading and constructing the OLF cover). The dioxin/furan and benzo[a]pyrene are present in areas within the waste footprint, and therefore those contaminants are vertically and laterally separated from the excavation described in this contact record. There were no COCs identified for subsurface soil or subsurface sediment in this EU.