CREEKSIDE ENVIRONMENTAL CONSULTING, LLC
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EVREN NORTHWEST INC.
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December 4, 2018

Oregon Department of Environmental Quality
Cleanup Program, Northwest Region
Attn: Kevin Dana, Project Manager
700 NE Multnomah Boulevard, Suite 600
Portland, Oregon 97232

RE: RD/RA Installation Progress Report
Troh Legacy Landfill (ECSI No. 5257)

Mr. Dana,

Creekside Environmental Consulting (Creekside) has collaborated with EVREN Northwest, Inc. (ENW) on this Remedial Design/Remedial Action (RD/RA) Installation Summary Report / Annual Report for the subject site located at 10010 SE Vradenburg Road, in the City of Happy Valley[1]. Upon completion of the RD/RA, i.e., completion of the Managed Soil Cap remedial action alternative, Creekside-ENW will submit a Final RD/RA Installation Report pursuant to Creekside-ENW's RD/RA Work Plan. This progress report outlines the components of the Managed Soil Cap remedial action alternative that have been completed to date as well as those components that remain to be accomplished.

Managed Soil Cap Remedial Action Alternative

This organization of this RD/RA Installation Progress Report will draw upon the elements of the Managed Soil Cap remedial action alternative in Creekside-ENW's RD/RA Work Plan.

- Buttress Fill
    - Pre-Construction - engineering, permitting, import fill characterization
    - Construction – erosion and sediment controls, utilities, clearing and demolition, surveying, demarcation layer, subdrains, earthwork and post-grading erosion controls.
    - Post-Construction – erosion and sediment controls and remaining cap installation
- Soil Cap Management Plan
- Annual Report
- Management of Soil According to CMMP

A photographic log, which documents managed soil cap installation activities, is included as Attachment A.

[1] Formally described as the "*Eastern part of Tax Lot 401 of the East Scouters Mountain Development*."

Buttress Fill

A buttress fill was selected as the Managed Soil Cap remedial action alternative and included approximately 56,000 cubic yards of imported clean fill resulting in an engineered fill cap at a minimum of three (3) feet thick with the following characteristics:

- A grading and erosional control plan designed, signed and stamped by a professional engineer;
- Erosion control devices such as seeding (for vegetative cover), matting (blankets), cat tracking (to create ruts or grooves perpendicular to the slope, sediment fence and straw wattles;
- A demarcation layer installed at the base of the fill;
- A structural berm keyed into the toe of the slope; and
- A subdrain system consisting of longitudinal subdrains installed upslope along existing valleys, tied into a lateral subdrain installed along the edge of the keyway, which drains to sand filter drains positioned along the toe of the buttress fill.

Pre-Construction

Engineering - AKS Engineering & Forestry, LLC (AKS) developed an engineering design, grading and erosion control plan (AKS, 2017[2]) for a buttress fill slope to be constructed in conjunction with the soil cap. AKS' design drew upon a grading plan and geotechnical criteria in GeoPacific Engineering, Inc.'s Geotechnical Engineering Report (GeoPacific, 2017[3]). Subsequent modifications to GeoPacific's grading plan received on May 25, 2018[4], significantly reduced the amount of fill that would be placed over Troh Legacy Landfill. Under this modified plan, the landfill would still be capped with a minimum 3-foot-thick layer of clean soil; however, the majority of the fill would be placed such that the buttress fill slope and excavated keyways are positioned just beyond the south- and north-adjacent sides of the landfill as shown on the attached Figure.

Permitting - The necessary permits were all acquired prior to breaking ground, such as: National Pollutant Discharge Elimination System (NPDES) 1200-C construction storm-water permit; grading permit; demolition permit; Erosion Control Permit / Erosion and Sediment Control Plan; tree removal permit; and assorted other permits.

Import Fill Characterization – In May and June 2017, Creekside-ENW characterized surface soils[5] at Scouters Mountain Phase I residential subdivision marked for excavation and placement as cap materials on the nearby Troh Legacy Landfill. Scouters Mountain Phase I was divided into thirteen decision units (DUs), and representative surface soil samples were collected from each DU using Incremental Sampling Methodology (ISM). Thirteen surface soil samples and two replicate samples were analyzed for RCRA 8 Metals. All metals analyzed in 13 ISM samples and two replicate samples were either not detected or were below ODEQ's Clean Fill Screening Levels (CFSLs). Based on these findings, surface soils at Scouters

[2] AKS, 2017, Troh Landfill Grading, Erosion and Sediment Control Plans, 11 sheets, dated March 17, 2017.
[3] GeoPacific, 2017, Geotechnical Engineering Report, 10010 SE Vradenburg Road, Happy Valley, Oregon, dated May 3, 2017.
[4] AKS, 2018, Troh Landfill Grading Plan, received May 25, 2018.
[5] Creekside/ENW, 2017, Offsite Cap Soil Source Surface Soil Assessment, Troh Legacy Landfill Property, 10010 SE Vradenburg Road, Happy Valley, Oregon, dated June 14, 2017.

Mountain Phase I met or exceeded the clean fill criteria for placement at upland sites and were deemed suitable as buttress fill / cap material for the Troh Legacy Landfill.

Construction

Construction activities conducted by Kerr Contractors from August 2017 through September 2018 are briefly summarized in this section. After the construction of the Managed Soil Cap remedial alternative is completed, additional construction details will be provided in a Final RD/RA Installation Report. Site photographs representative of construction activities conducted during the August 2017 through September 2018 period are included in Attachment A.

Erosion and Sediment Controls – By August 2017, silt fence was installed around the perimeter of the disturbed area, and construction fence was installed on the bluff overlooking the landfill. In addition, two construction entrances bedded with pit run rock and gravel were constructed along the western boundary of the disturbed area (Figure 3. These construction entrances connected to haul routes for dump trucks and other heavy equipment transporting materials to and from the disturbed area.

Utilities – An overhead utility pole that crossed the landfill area was removed. A domestic water line that passed through the landfill area was re-routed around the perimeter of the landfill.

Clearing and Demolition – In August 2017, trees were felled, brush cleared, and grasses/weeds grubbed from the surface of the entire disturbed area. Logs, brush, root masses, brush and grass were hauled off-site for disposal. A shed was demolished, and demolition debris and metal were removed from the site for disposal and recycling. Straw was placed over the entire disturbed area of the site for erosion and sediment control purposes.

Surveying the landfill – By January 2018, AKS surveyed and placed stakes around the perimeter of the landfill. This surveyed area provided a visual boundary for demarcation grid placement, as well as pre-grading reference surface elevations for fill placement. Later AKS conducted a post-grading survey of the landfill area. The difference between pre-grading and post-grading elevations will be used to document that a minimum 3-foot clean soil cap was placed over the entire landfill area. These survey and cap thickness data will be presented in the Final RD/RA Installation Plan.

Demarcation Layer – In middle February 2018, White Securgrid® demarcation geotextile began to be installed in the ravine over the southern part of the landfill. The demarcation grid overlapped the surveyed landfill boundary at least a few feet. The 20-foot-wide rolls were overlapped a foot or more, taking care to thoroughly cover the entire surveyed Troh Legacy Landfill area. Demarcation grid installation continued through the end of May 2018, at the north end of the landfill.

Subdrains – 4-inch perforated flexible ABS drain pipe was installed along the centerline of the south ravine, the buttress fill structural keyways and other locations shown on the attached Figure. These subdrains were bedded in and covered with drain rock. These subdrains discharge along the eastern boundary of the disturbed area.

Buttress Fill and Landfill Cap – Earthwork began on the south buttress fill and landfill cap in early February 2018 and concluded in late August 2018. A structural keyway was excavated along the north and east sides of the buttress, and a subdrain was installed in this keyway. Imported soil transported to the south buttress and south part of the landfill was delivered to the east end of the haul route located near the

southwest corner of the disturbed area, where it was unloaded. From there, bulldozers pushed the soil to the south buttress fill area and south ravine of the landfill after the demarcation and subdrain were installed. The buttress fill was compacted using a sheeps-foot roller. The majority of fill ended up being placed in the south buttress area.

Earthwork began on the north buttress the first of June 2018 and continued through the end of August 2018. A structural keyway was excavated along the south and east sides of the buttress, and a subdrain was placed along the keyway. Imported soil transported to the north buttress and north part of the landfill was delivered to the southeast end of the haul road located near the northwest corner of the disturbed area, where it was unloaded. Bulldozers pushed the soil to the north buttress fill area and north part of the landfill after the demarcation grid was installed.

The remainder of the landfill was capped by pushing imported soil north from the south ravine area and south from the north buttress fill area, until all be the steep eastern edge of the landfill was capped with a minimum of three feet of clean imported soil. Due to steep terrain, a small area at the eastern margin of the former landfill site has been covered by demarcation fabric; however, has not yet received a protective cap. Based on Creekside test pit log for TP17, this area of the landfill has been covered with approximately one to two feet of pre-existing inert soil cap materials, which overlie the construction and demolition debris. The demarcation fabric and natural vegetation is anticipated to secure this uncapped area until it will be capped in the Summer of 2019.

Post-Construction

Erosion and Sediment Controls – At the end of August 2018, the north buttress fill was hydroseeded and straw wattles placed according to the Erosion and Sediment Control Plan. In early October 2019, straw wattles were placed on the remaining portions of the landfill and the south buttress fill, and the surface was hydroseeded. A disc was used to prepare the buttress fills and landfill cap surfaces for seeding. By November 2018, the grass seed has taken root and covered the buttress fills and landfill cap with a lush, green grass cover. No evidence of soil erosion has been observed during Creekside/ENW's site inspections. Since placement and compaction of the soil cap, there has been no evidence of landfill seeps previously observed at the toe of the landfill near its eastern margin.

Remaining Cap Installation - Due to steep terrain, any soil eventually placed over the uncapped portion of the steep, eastern edge of the landfill will be difficult to compact and stabilize. Stabilizing the eastward sloping terrain is important in protecting the forested area to the east. Accordingly, Creekside/ENW and AKS Engineering have proposed using a combination of soil and other means to act as the protective cover.

Specifically:

1. An additional 0.6 feet of soil in the TP17 cap area.
2. Placement of 1-foot thick layer of rip-rap.

Creekside and AKS will provide engineered drawings of the revised cap in this area. Kerr Contractors anticipates that the cap will be completed sometime during summer 2019.

Soil Cap Management Plan

A revised Soil Cap Management Plan[6] has been submitted to the ODEQ and The Holt Group / Holt Homes. This Soil Cap Management Plan is being followed by The Holt Group / Holt Homes.

Annual Report

This RD/RA Installation Progress Report is intended to satisfy the RD/RA Work Plan requirement for the first Annual Report. Subsequent annual reports will be submitted starting in 2019 and will be formatted as soil cap inspection reports.

Management of Soil According to CMMP

The buttress fill and managed cap installation work summarized in this report was consistent with the requirements of the Contaminated Media Management Plan. Since the north and south buttress fills were constructed beyond the landfill boundary, it was not necessary to excavate structural keyways in the landfill body. Furthermore, the earthwork was conducted in such a manner that it did not disturb, expose or uncover any buried solid waste. Therefore, there was no solid waste or surrounding impacted soils that required disposal at a RCRA Subtitle D landfill.

Should you have any questions regarding this summary, please do not hesitate to reach out to Creekside and/or ENW.

Sincerely,

Lynn D. Green

Lynn D. Green, CEG, Technical Manager
Principal Engineering Geologist, ENW

[6] Creekside, 2017, Soil Cap Management Plan, Former Troh Legacy Landfill, 10010 SE Vradenburg Road, Happy Valley, Oregon, revised May 4, 2017.

FIGURE

DRAWING 351-14002(v05)
APPROVED BY BJORGENSEN 11/28/2018
CHECKED BY P. TRONE 11/28/2018
DRAWN BY K. CLINE 05/12/2017

TL401

TL1600

TL1700

TL1800

TP-1 TP-2 TP-3 TP-4 TP-5 TP-6 TP-7 TP-8 TP-9 TP-10

TP16 TP17 TP18 TP19 TP20 TP21 TP22 TP23 TP24 TP25 TP27 TP28 TP29

SE PASS COURT ST

SE RAVEN ST

SE BOYCE AVE

SE MERIT WAY

SE STAR VISTA CT

SE REVEILLE LN (PVT)

364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 387 388 389 390 391 392 393 394 395 402 403 404 405 406 407 408 409 410 411 418 419 420 421 422 423 424 426 427 428 429 430 431 432 433 434 435 436 437 438

LEGEND:

- SUBJECT PROPERTY BOUNDARIES
- SUBJECT BUILDINGS
- BUILDING LOCATIONS
- TAX LOT BOUNDARIES
- 352 BUILDING LOTS (PROPOSED)
- FORMER LANDFILL AREAS
- GRADING LIMITS/ORANGE CONSTRUCTION FENCE
- STRUCTURAL KEYWAY
- BUTTRESS FILL
- DEMARCATION AND 3' MIN. CAP
- ST ST DRAINAGE PIPE
- HAUL ROUTE
- TP-1 GEOTECHNICAL TEST PIT BY GEOPACIFIC
- TP1 TEST PITS BY CREEKSIDE/ENW

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2012.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.

APPROXIMATE SCALE

0 100 200 FEET

N

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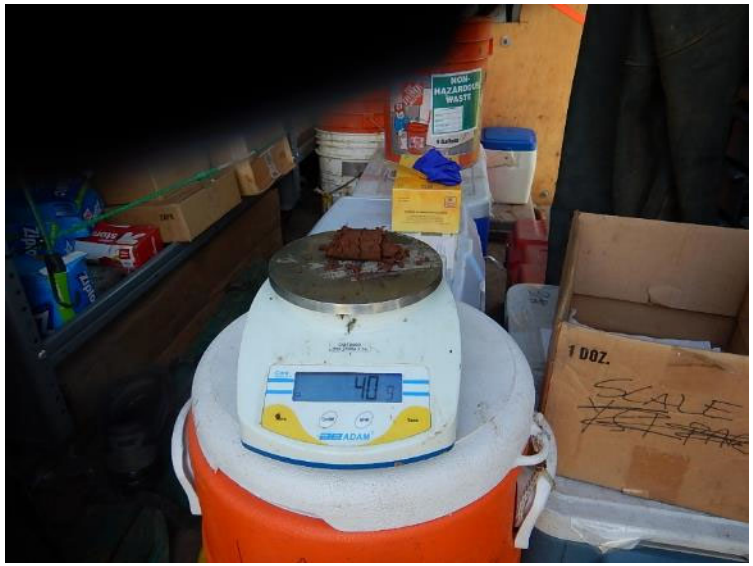
FIGURE 3

MANAGED CAP AND BUTTRESS FILL MAP

FORMER TROH LEGACY LANDFILL PROPERTY
10010 SE VRADENBURG ROAD
HAPPY VALLEY, CLACKAMAS COUNTY, OREGON

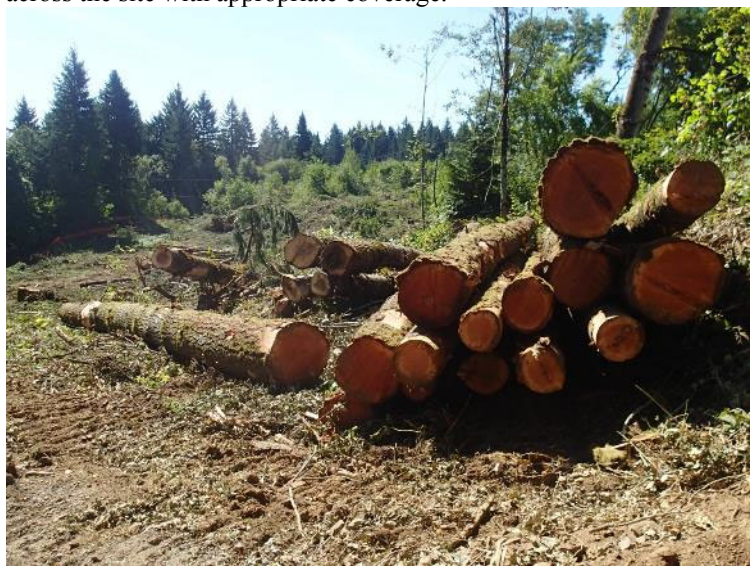
ATTACHMENT

Import Soil Characterization - soil samples were obtained using a stainless-steel probe, advanced approximately 6-inches bgs, with the lower 3 to 4 inches retained.



Import Soil Characterization – 64 subsamples (approx. 40-grams each) were combined into an incremental sample for analysis.

Import Soil Characterization - each subsample location was recorded using a handheld GPS unit. This assured obtaining 64 subsamples across the site with appropriate coverage.



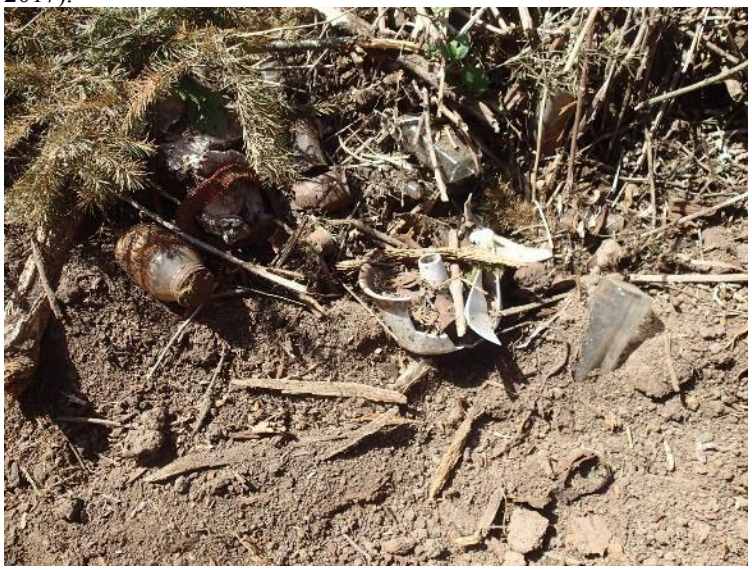
Surface of Troh Legacy Landfill was logged and cleared of brush – view south (August 16, 2017).

EVREN NORTHWEST INC. environmental & natural resource consultants	RD/RA Implementation Troh Legacy Landfill 10010 SE Vradenburg Road Happy Valley, Oregon	**Site Photographs**	Project No. 351-14002-11 Attachment **A**

A silt fence was installed around the perimeter of the disturbed area – view of east boundary looking south (August 16, 2017).

View south of cleared landfill surface with brush piles (August 22, 2017).

View looking west showing the de-vegetated landfill cap (August 31, 2017).



De minimis quantities of solid waste exposed at the ground surface were not removed since the entire landfill would be capped with 3 feet of soil.

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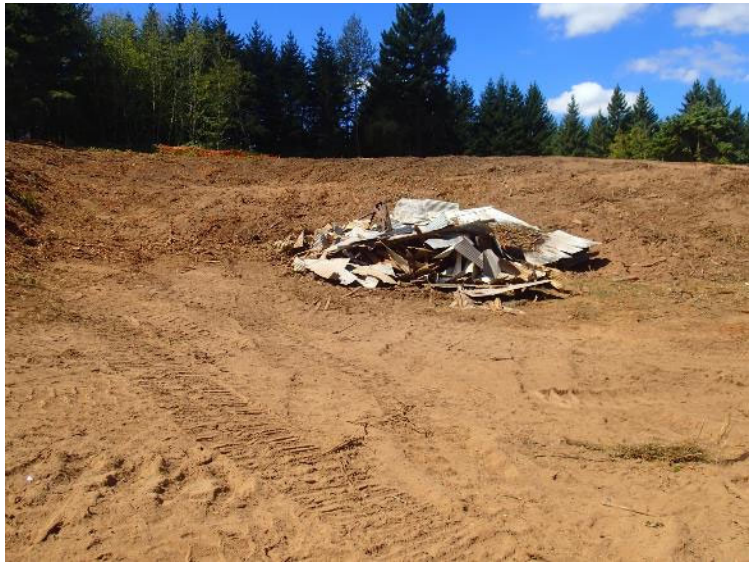
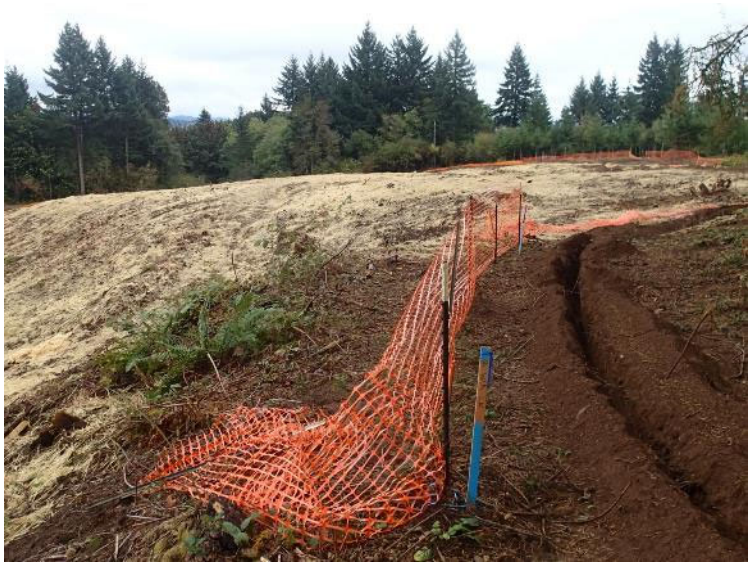
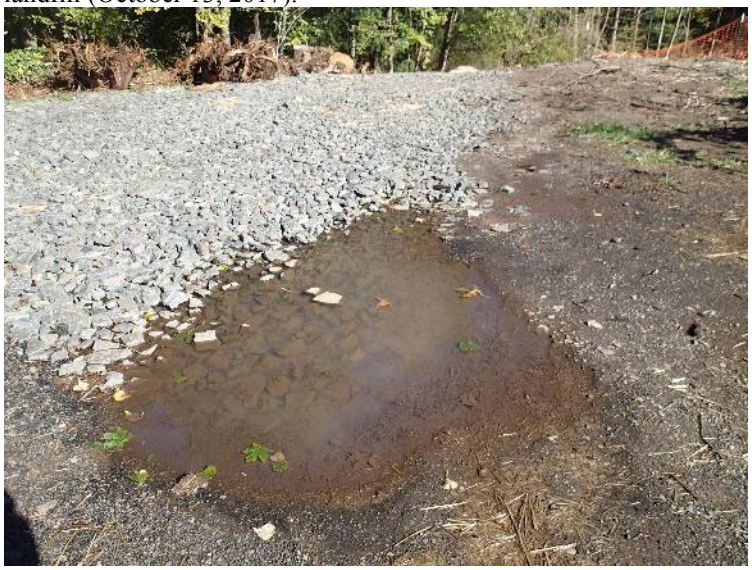


Demolition debris was gathered and disposed of or recycled (August 31, 2017).

Straw was placed over the soil surface for erosion control purposes – view south (September 29, 2017).



Water line to an east-adjacent residence was diverted around the landfill (October 13, 2017).



Rock was placed over the haul routes on the upslope west side of the landfill (October 13, 2017).

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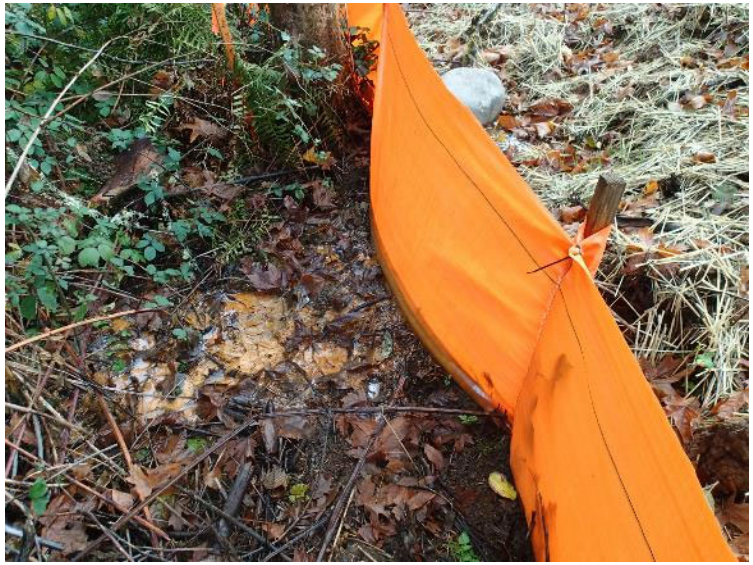
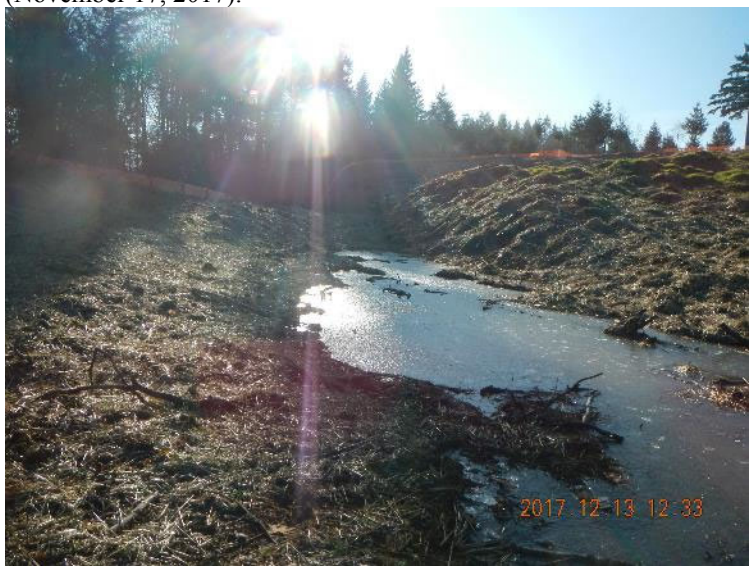
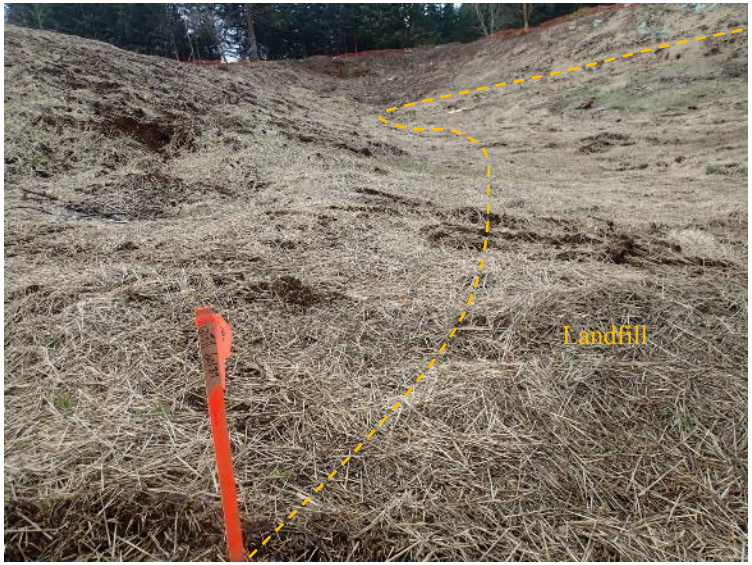


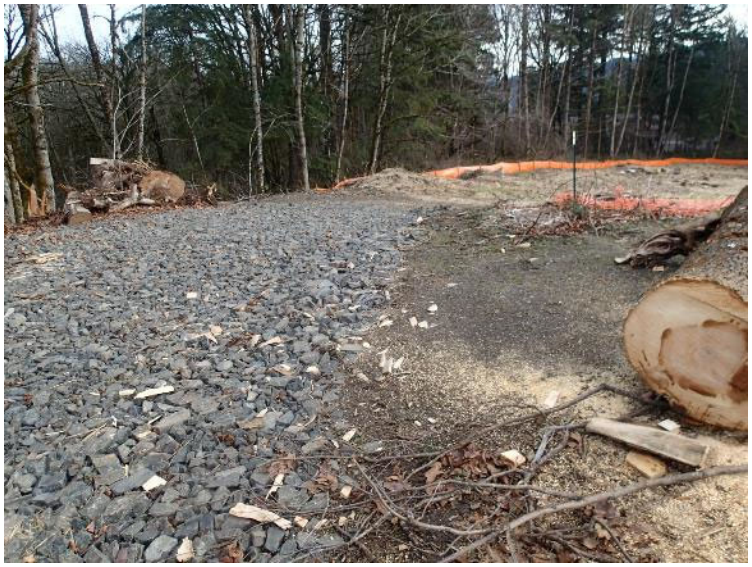
Seeps formed at the landfill toe (east) outside of the disturbed area (November 17, 2017).



Ponded water on the south side of the landfill at the base of the ravine – view south (December 13, 2017).



Surveyed landfill boundary (south) – looking west (January 2, 2018).



Northwest graveled haul road (January 2, 2018).

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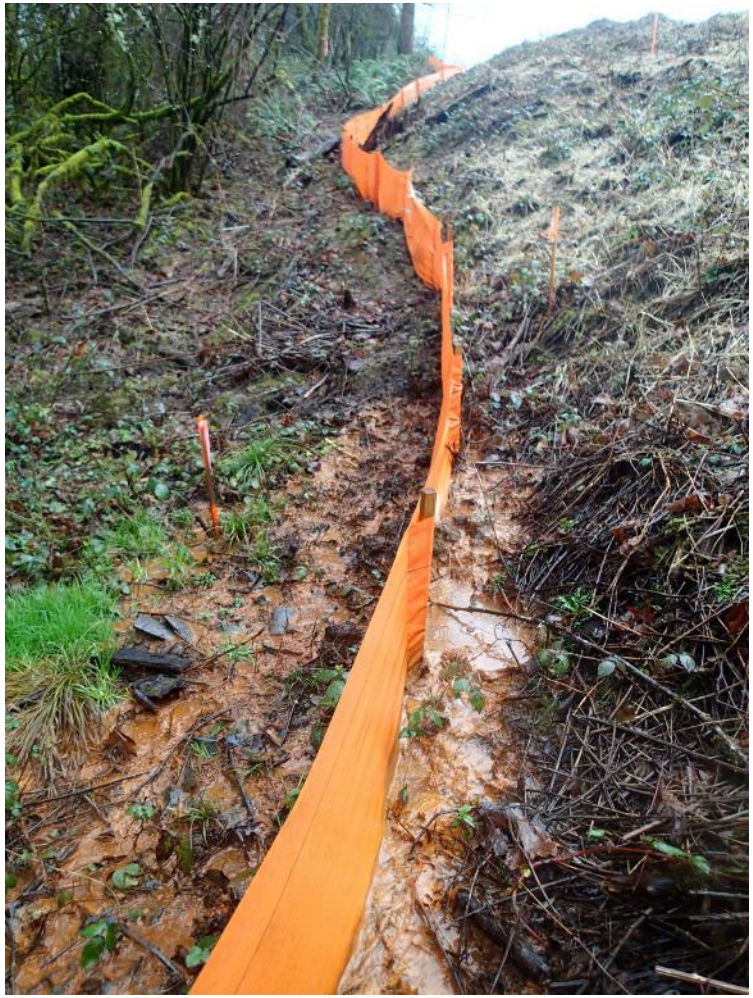
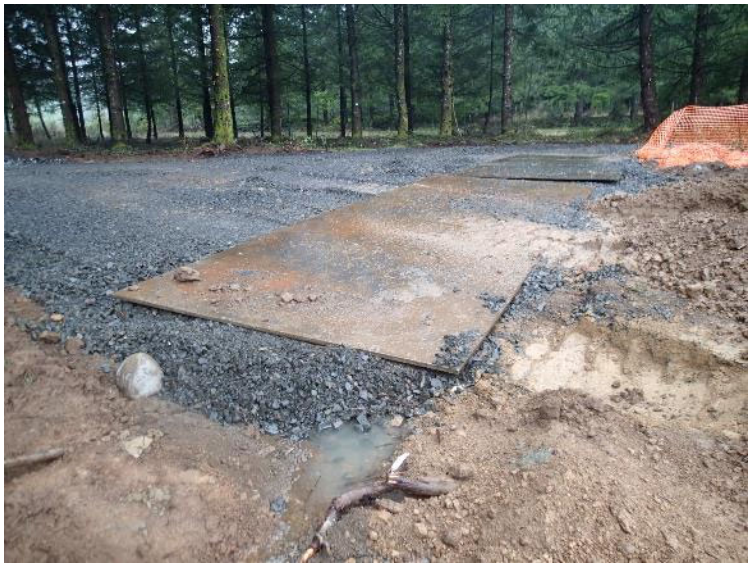
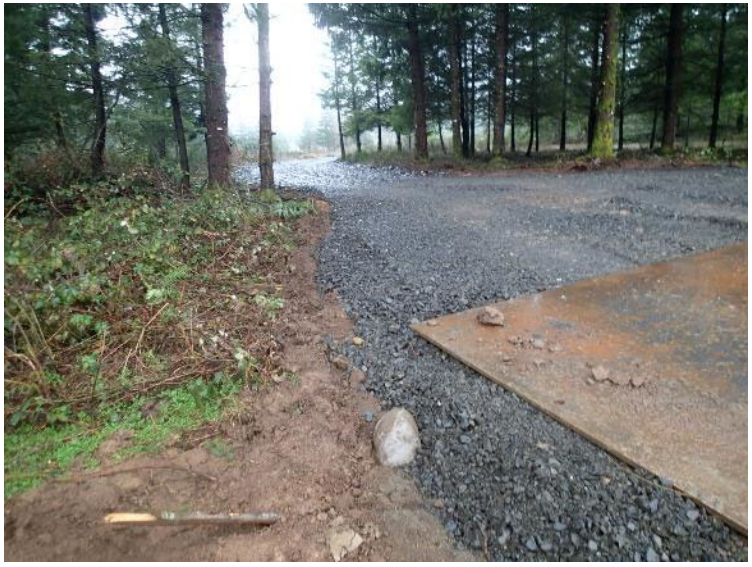


Seep at the landfill toe (January 18, 2018).



Steel plates positioned at unloading platform at the west margin of the landfill (January 18, 2018).



Graveled haul road west of the landfill (January 18, 2018).

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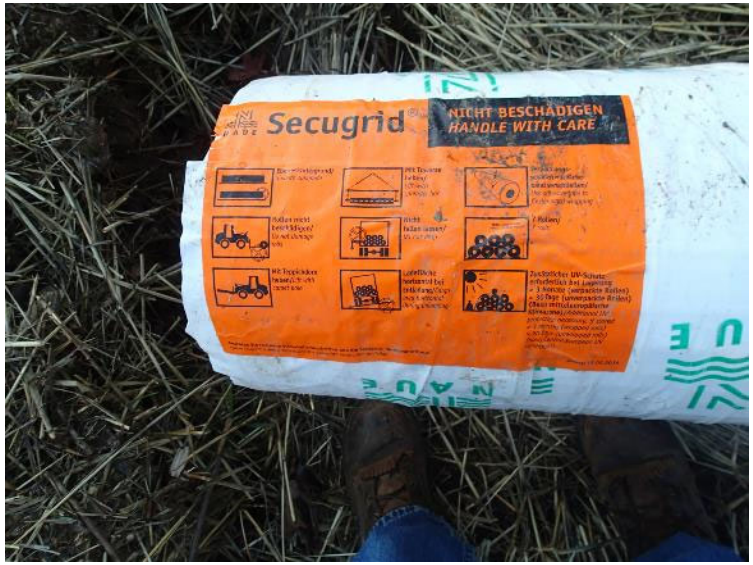
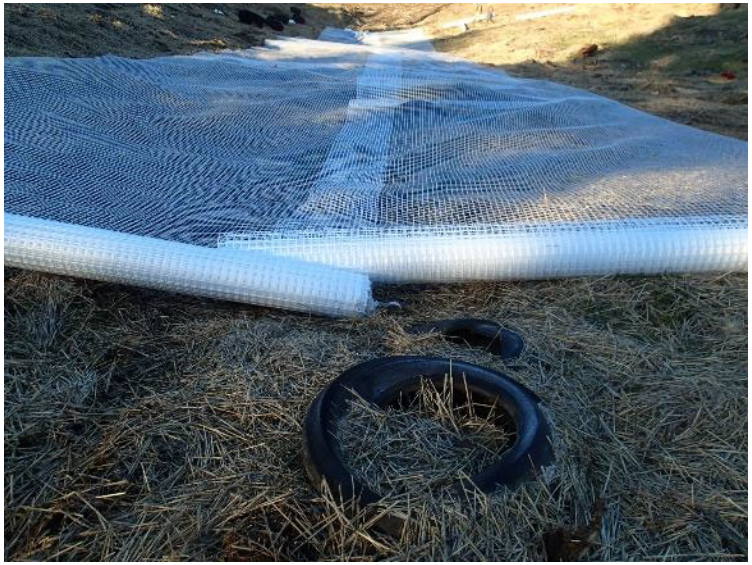


A roll of demarcation grid (geotextile) to be placed over the landfill footprint prior to installing cap (February 12, 2013).

A portion of the demarcation layer rolled out over the landfill – view east (February 12, 2018).



Close-up photo showing the overlapped demarcation grid – view west (February 12, 2018).

Construction of the buttress fill south of the landfill (right side of the demarcation represents the southernmost extent of the landfill) – view southeast (February 12, 2018).

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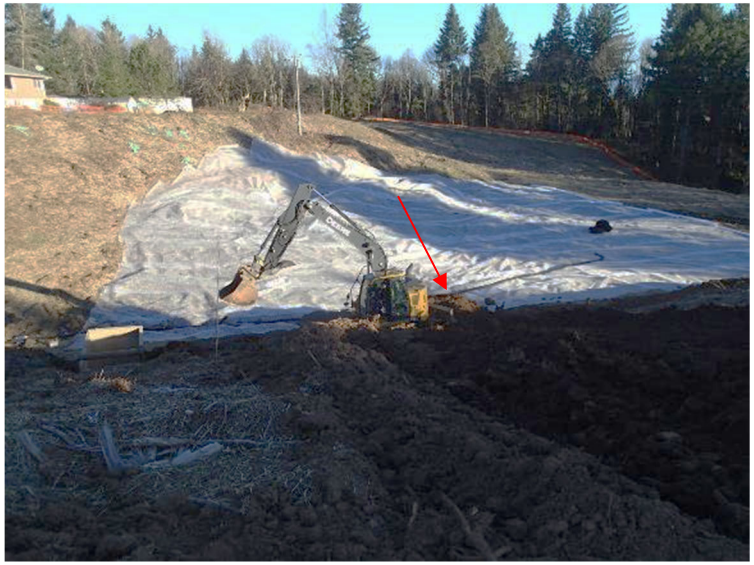

Demarcation placed over southwest corner of landfill. Note drain pipe placed along centerline of ravine – view north (February 13, 2018).

Drain pipe were bedded and covered with gravel prior to placing the soil cap (March 2, 2018).

View south of buttress fill and soil cap beginning to be installed above the demarcation grid (March 2, 2018).

Continued cap installation over the demarcation grid on the southwest part of the landfill – view northwest (March 3, 2018).

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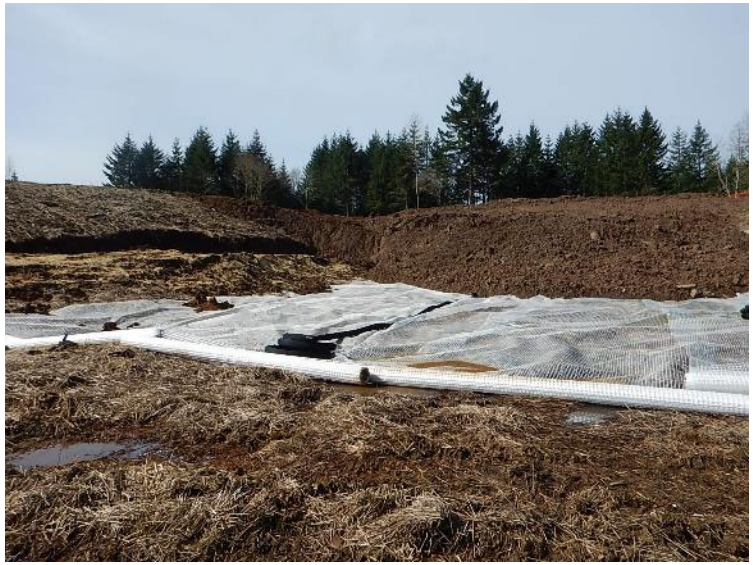
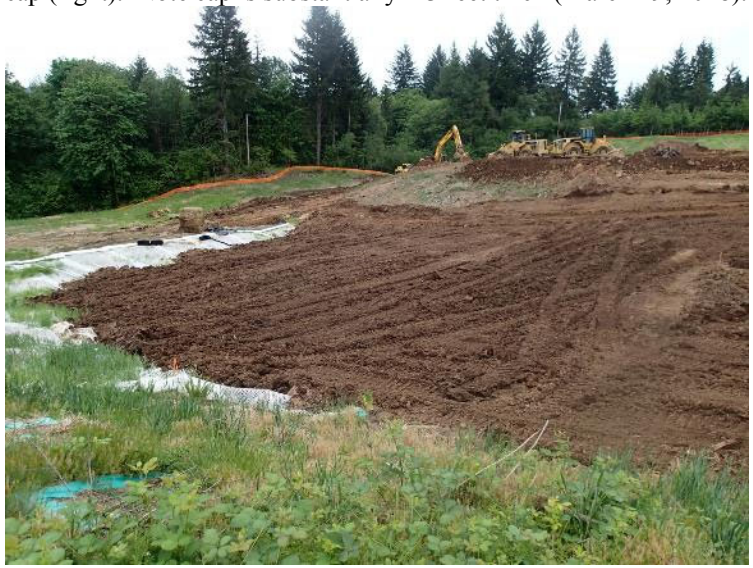
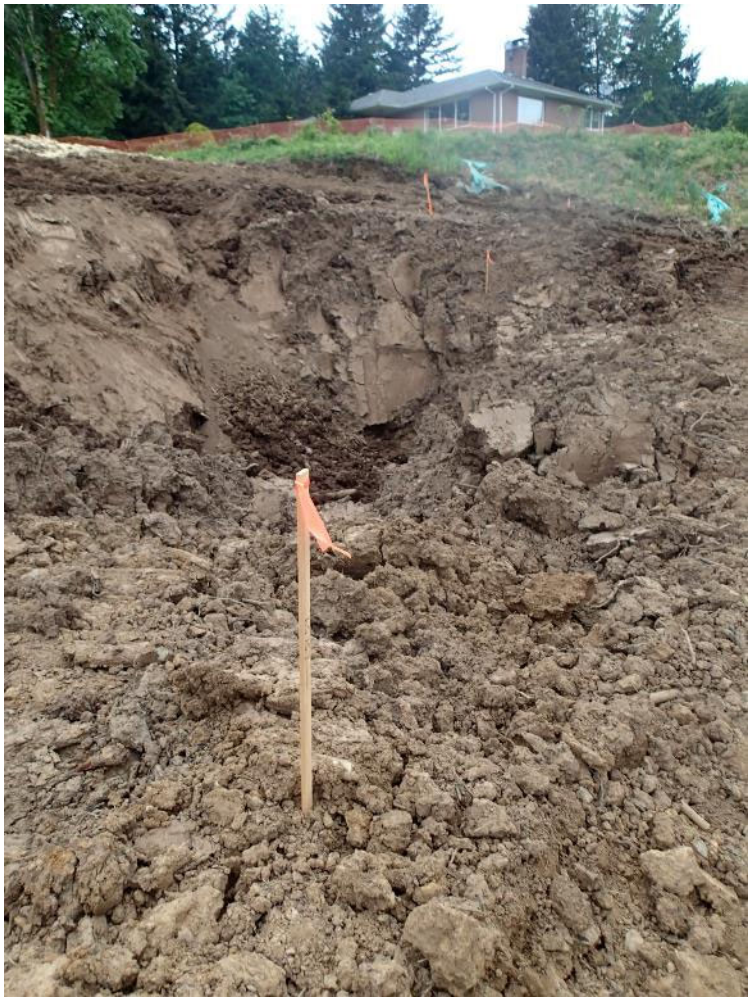


View west showing the buttress fill (left) and demarcation grid and cap (right). Note cap is substantially > 3 feet thick (March 29, 2018).



Landfill cap as it appears on May 17, 2018 – view southeast. Heavy equipment is sitting on the south buttress fill.



Close-up showing 3-foot-minum soil cap along western landfill boundary (May 17, 2018).

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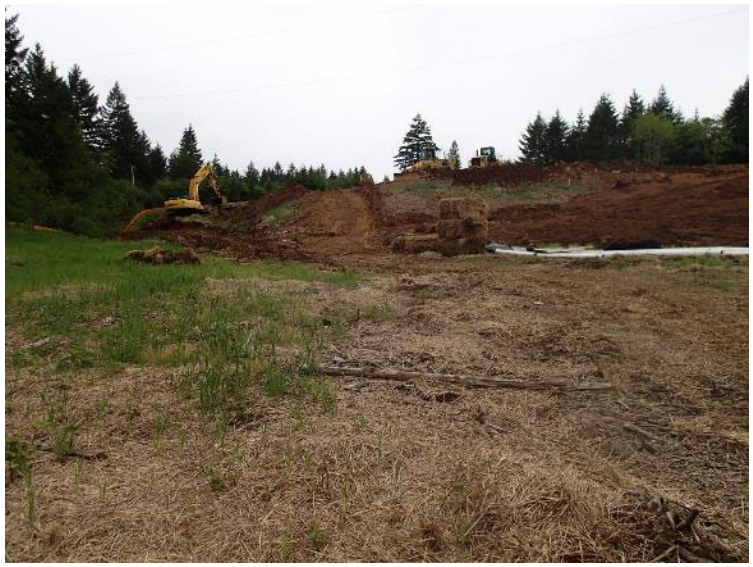
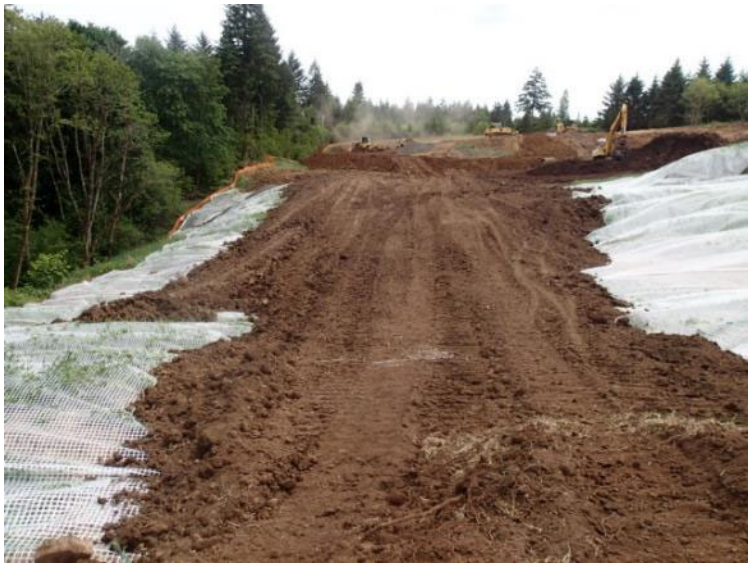
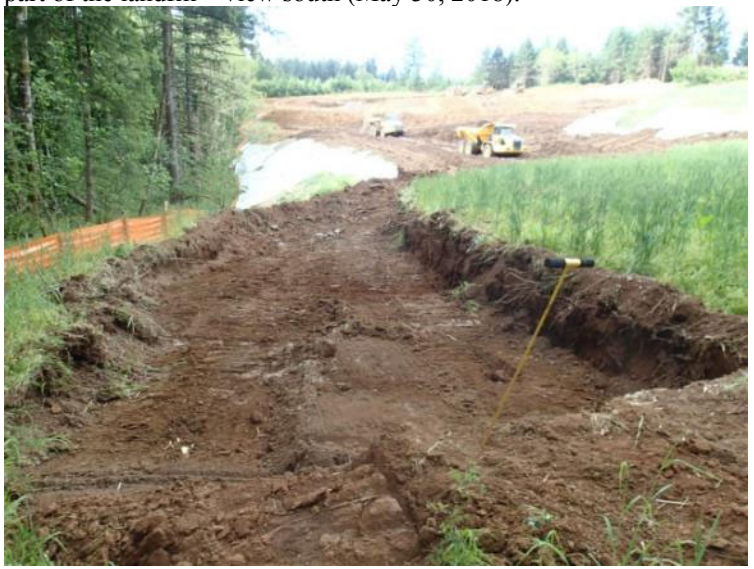


Keyway excavation of south buttress (May 17, 2018).

South buttress keyway (left) and bench (right) as seen on May 17, 2018).



Soil cap being installed over the demarcation grid at the east-central part of the landfill – view south (May 30, 2018).



Keyway excavation along the east side of the north buttress fill - view south (June 1, 2018).

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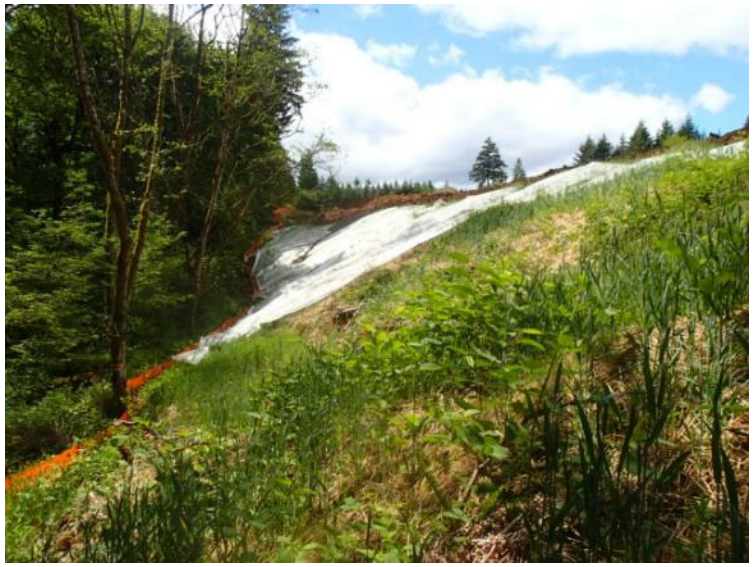
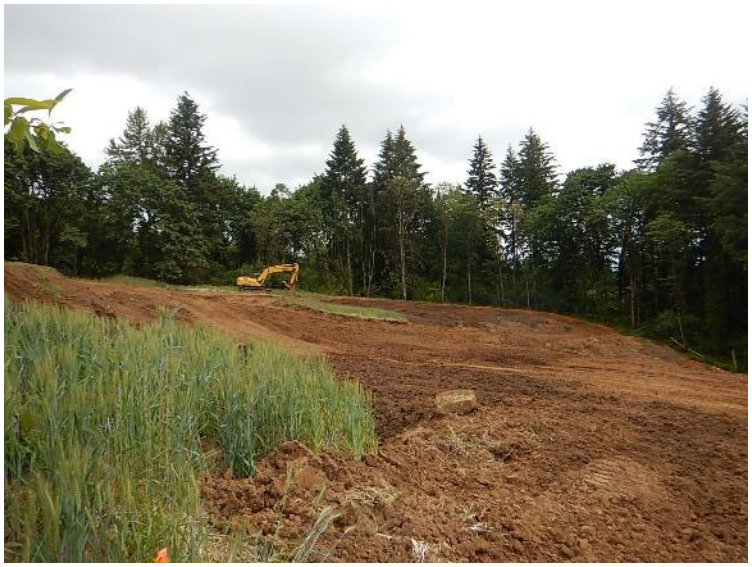
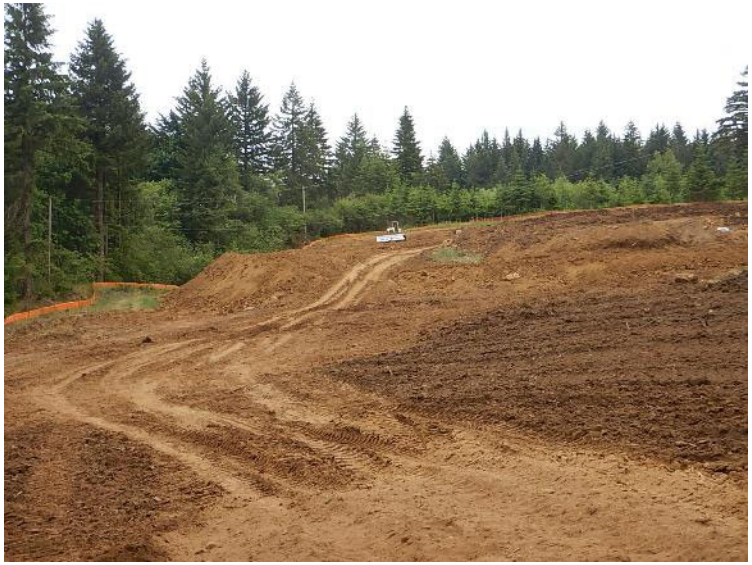


Demarcation grid installation along the east-central edge of the landfill - view south (June 1, 2018).

Cap installation at the north end of the landfill – view south (June 1, 2018).



View north of cap at the north end of the landfill (June 7, 2018).



South buttress fill (June 7, 2018).

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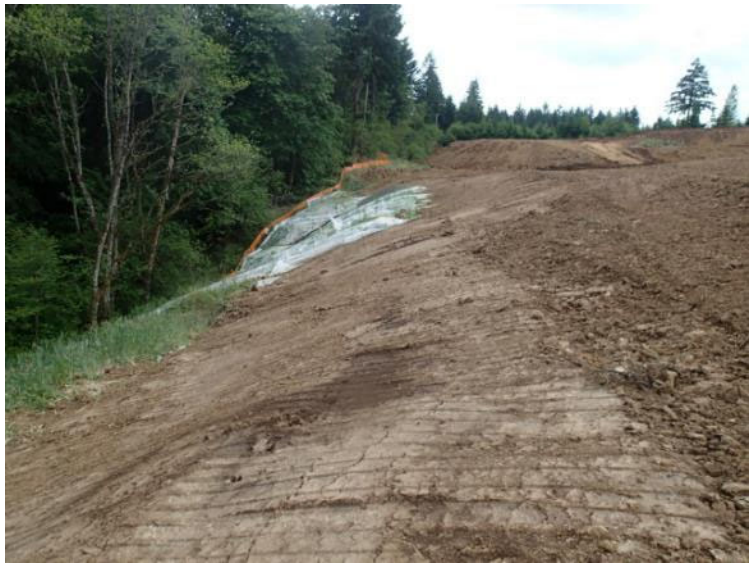
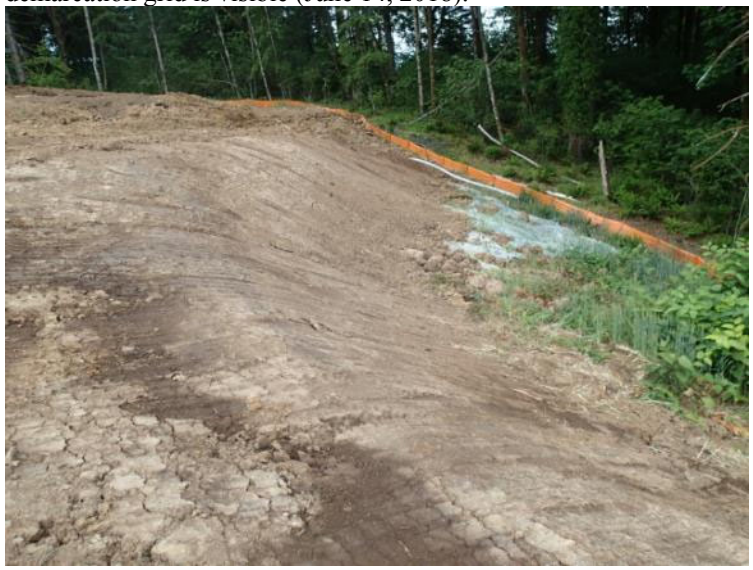
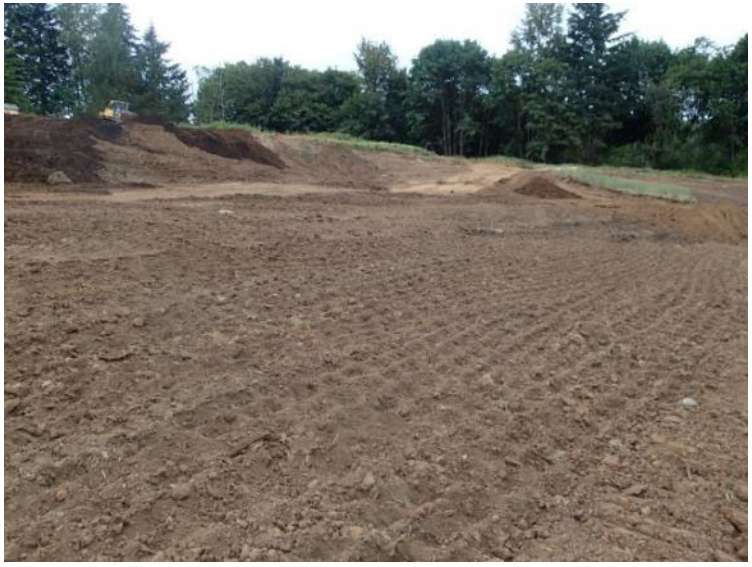


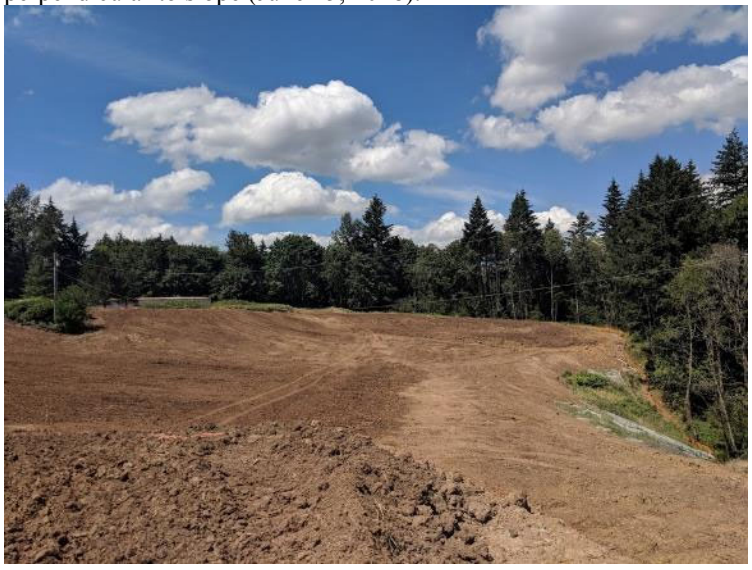
Cap along the east edge of landfill still needs to be completed where demarcation grid is visible (June 14, 2018).



Cap over the eastern landfill boundary – view north (June 14, 2018).



Cap surface was tracked and compacted with a sheepsfoot roller perpendicular to slope (June 25, 2018).



View north of the capped landfill from the vantage of the south buttress fill (July 6, 2018).

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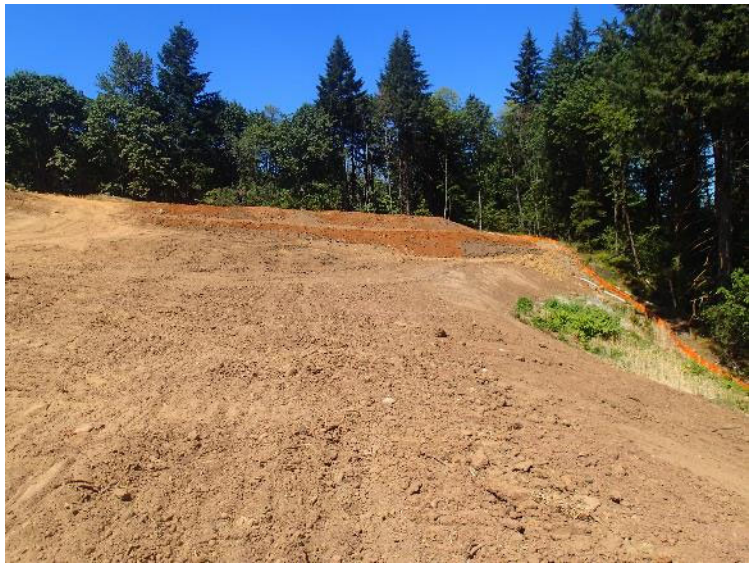
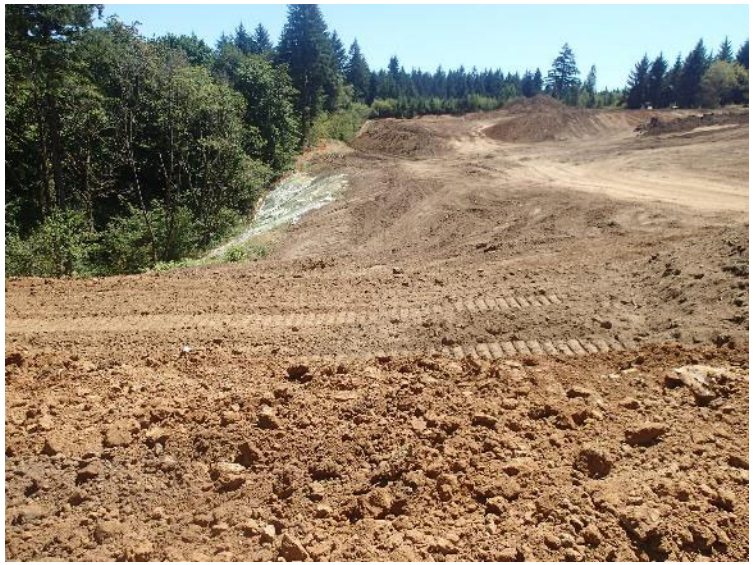
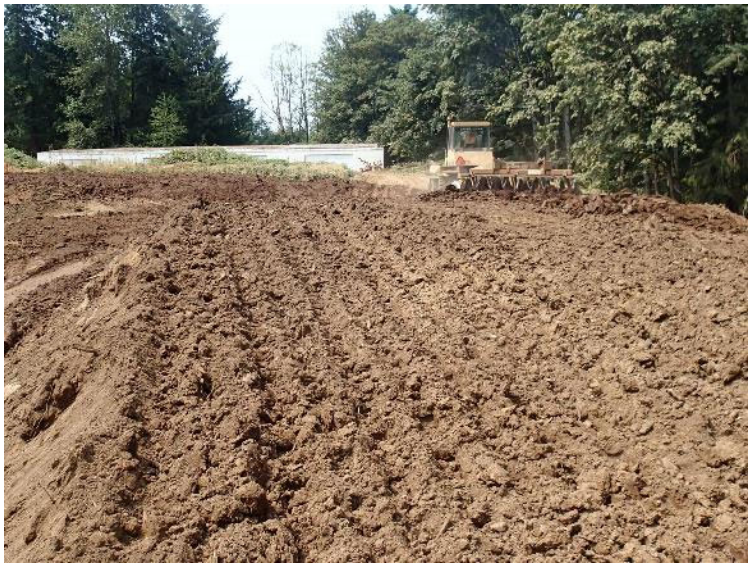


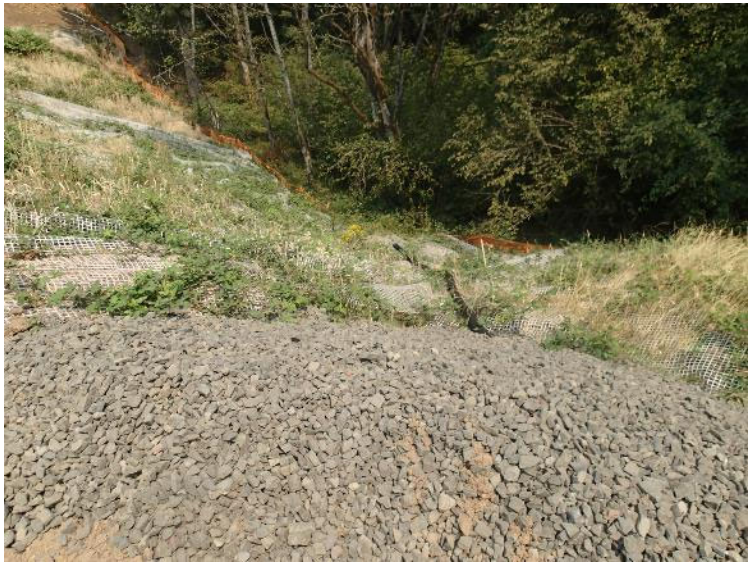
North buttress fill (July 24, 2018).



South buttress fill (under construction) from the perspective of the north buttress (July 24, 2018).



North end of landfill cap being prepared for seeding.



Drain rock was placed over the ravine drain line. Drain pipe exits at the eastern landfill boundary, which has not yet been capped as of this date (August 8, 2018).

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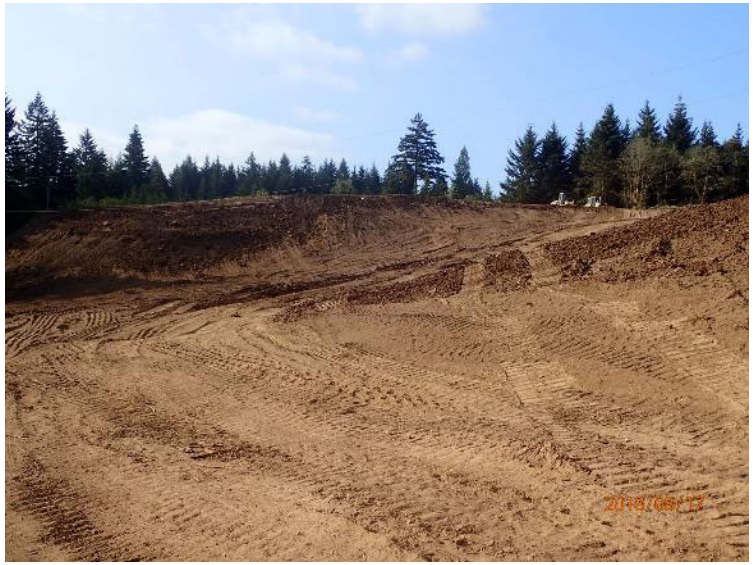
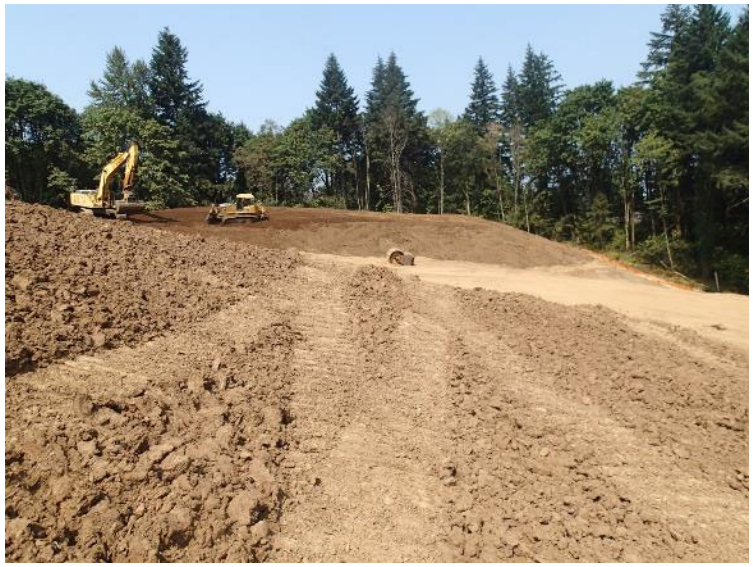
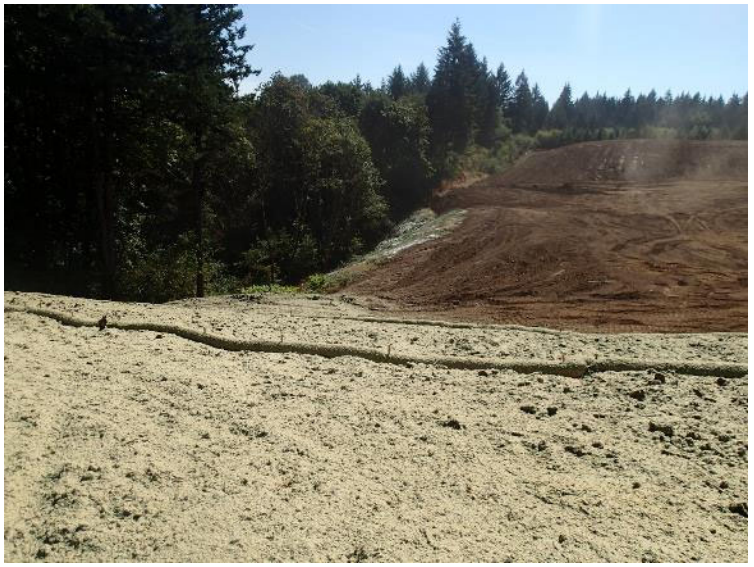


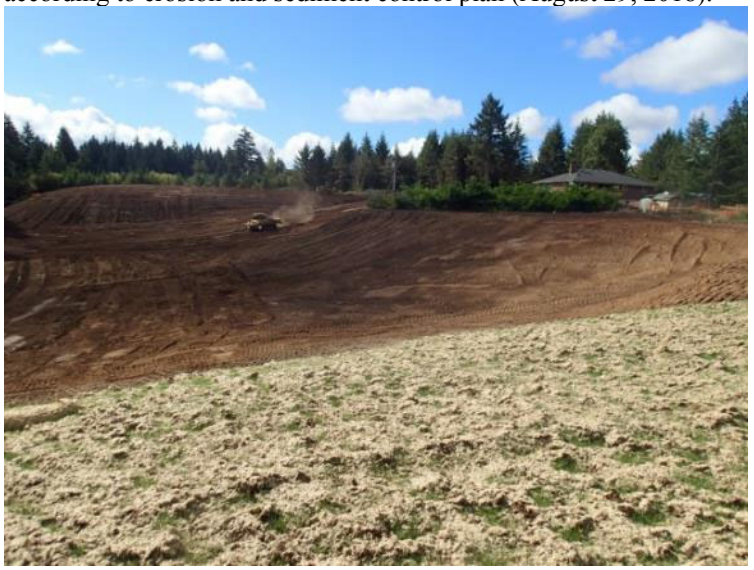
South buttress fill on August 17, 2018.



North buttress fill on August 22, 2018.



North buttress fill was hydroseeded and straw wattles placed according to erosion and sediment control plan (August 29, 2018).



Grass has taken root on the north buttress fill, and the remainder of the landfill is being prepared for hydroseeding (September 14, 2018).

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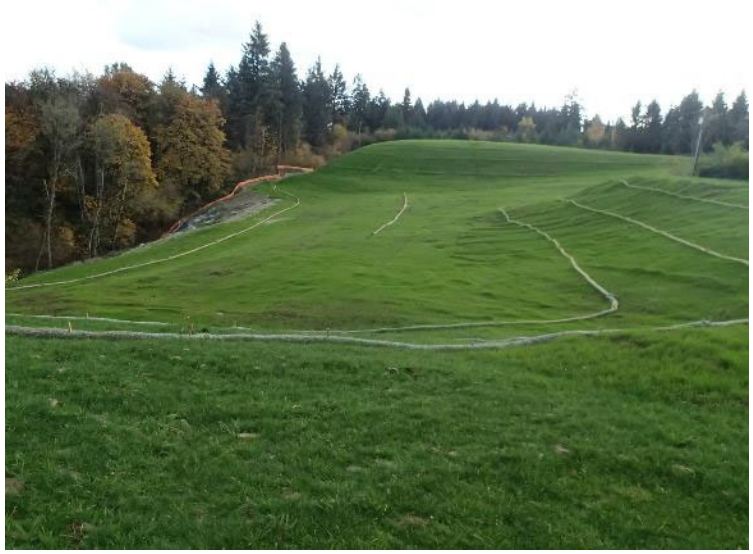
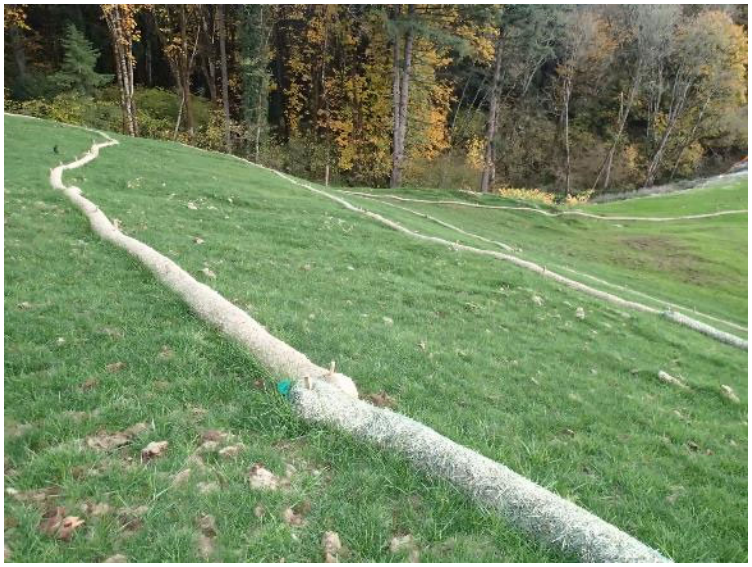
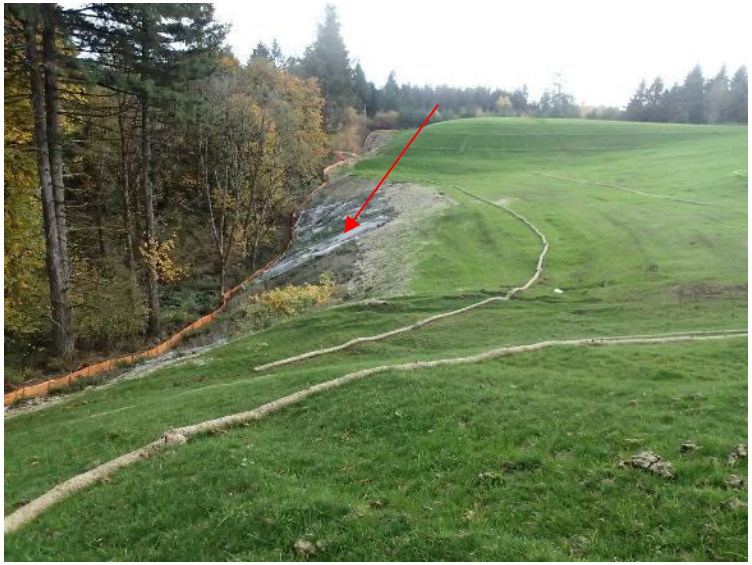
Straw wattles were placed on the remaining portions of the landfill, after which the ground surface was hydroseeded– view south (October 9, 2018).



Grass has taken root over the capped landfill and buttress fills – view south (November 6, 2018).



North buttress fill – view east (November 6, 2018).



Rip-rap is being considered to cap the steep, eastern margin of the landfill where the demarcation grid is still visible.

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