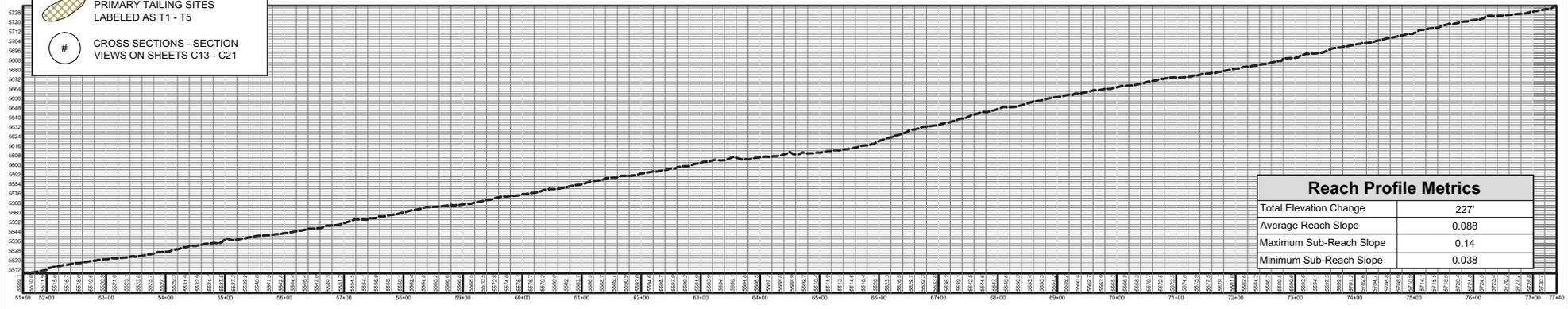


**LEGEND**

- STONEWALL CREEK CENTER LINE
- MAINTAINED ACCESS ROAD
- UN-MAINTAINED ROAD GROWN OVER WITH TREES
- POTENTIAL REPOSITORY SITES LABELED AS R1 - R5
- PRIMARY TAILING SITES LABELED AS T1 - T5
- CROSS SECTIONS - SECTION VIEWS ON SHEETS C13 - C21



Reach Profile Metrics	
Total Elevation Change	227'
Average Reach Slope	0.088
Maximum Sub-Reach Slope	0.14
Minimum Sub-Reach Slope	0.038

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 PROJECT ENG.: TC  
 DRAWN: TC  
 CHKD: DD

REVISION NO.	REVISION DESCRIPTION	DRAWN BY	REVISION DATE

PLAN & PROFILE 51+ 60 TO 77+40

STONEWALL CREEK RESTORATION  
 LINCOLN, MT

SHEET  
**C5**

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PLOT DATE: 6/21/2013 10:48 AM





**PROJECT REACH DESCRIPTION**

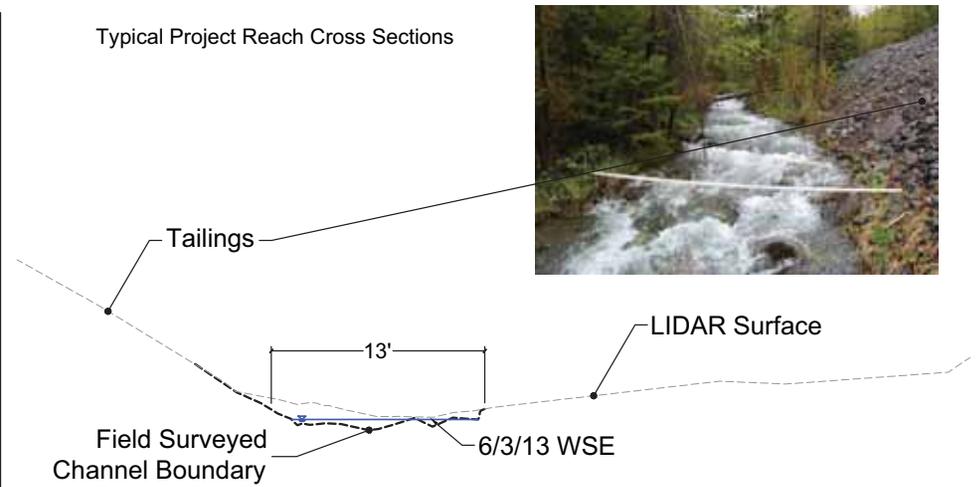
The project reach is approximately 4,200 feet in length and occurring on these plans between Stations 26+00 to 68+00. Elevation drop through the reach is primarily absorbed through the reach in small rock steps and cascades. The majority of pool habitat is associated with rock steps, but, in general, these features are smaller in lateral and longitudinal extent and are shallower and less complex than features in the reference area.

The channel is in general confined and isolated from a floodplain surface on both sides of the creek by either by tailing deposits or native valley slopes. There is a small floodplain at most locations that is establishing a riparian shrub community and some small conifers. Large wood recruitment is limited by proximity of source materials from the channel. The bottom right photo illustrates the capture of potential LWD by a road constructed on the top of a tailing surface.

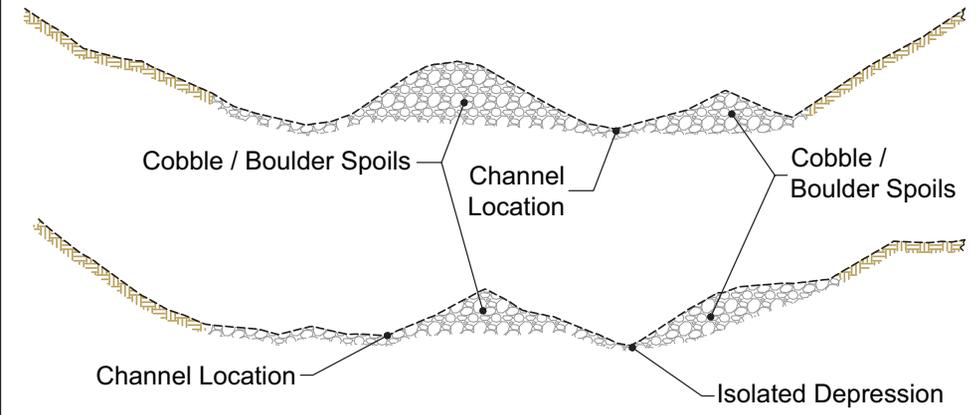
The tailing piles vary from nearly vegetation free talus to partially vegetated with conifers up to 1 foot in diameter. Vegetation often occurs on the top of the tailings on flatter surfaces. Side slopes are roughly equivalent to the angle of repose (34 to 38 degrees) of the materials and are easily destabilized by minor disturbances. Composition of the tailings on the surface is, in general, coarse cobbles but there are areas of fine gravels and even soil development. Fine materials should be segregated during tailing removal for use on floodplains. Tailing materials from 26+00 to 50+50 are naturally rounded to subangular. From 50+50 to the top of the reach the materials are angular.



**Typical Project Reach Cross Sections**



Cross Section Metrics	
Bankfull Width	13
Bankfull Area	11
Max Depth	1.3
Mean Depth	0.82
Flood Prone Width	14 - 30
Entrenchment Ratio	1.0 - 2.0
Width to Depth Ratio	16
Channel Classification	B3a



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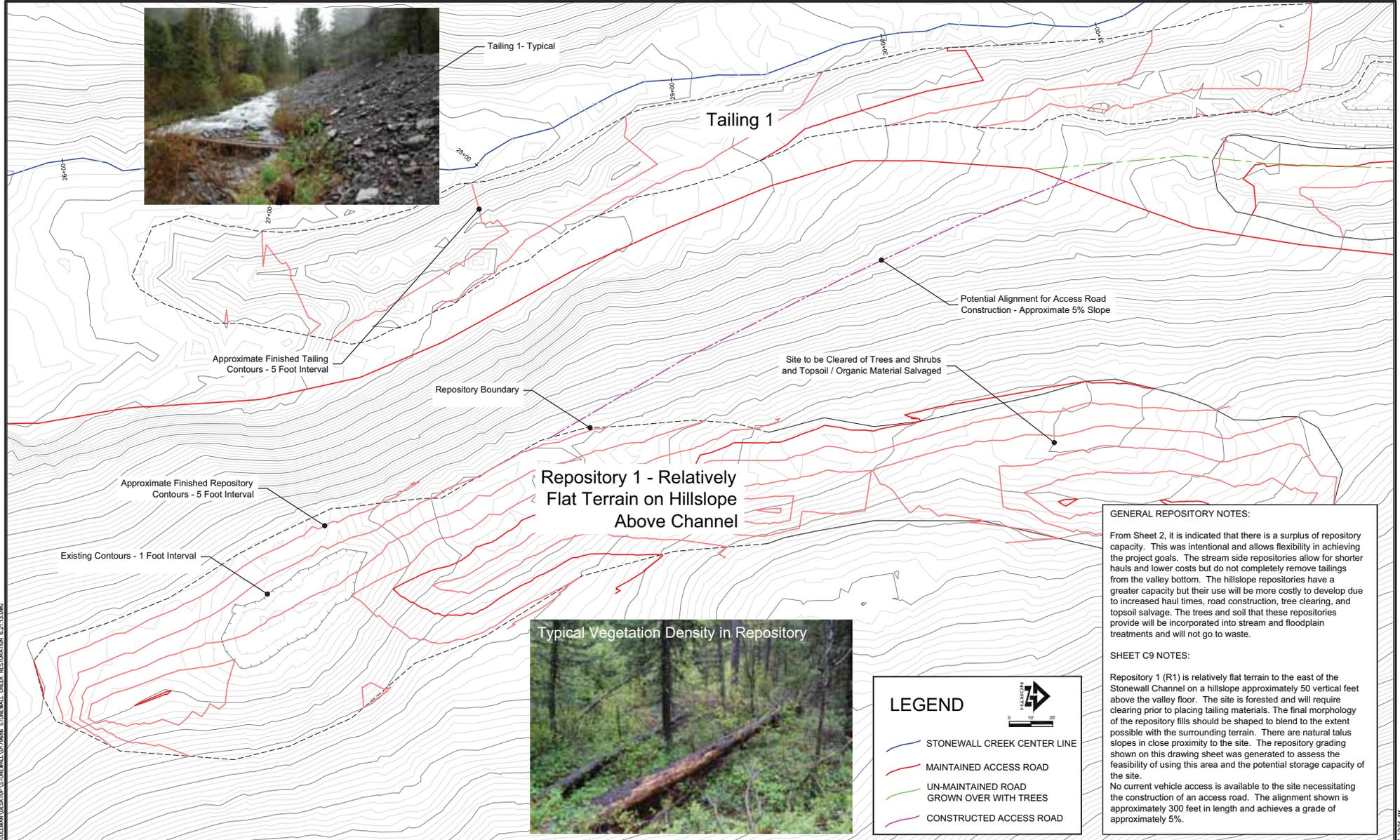
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EXISTING CONDITION DESCRIPTION  
 STONEMAN CREEK RESTORATION  
 LINCOLN, MT

SHEET  
**C8**



**GENERAL REPOSITORY NOTES:**

From Sheet 2, it is indicated that there is a surplus of repository capacity. This was intentional and allows flexibility in achieving the project goals. The stream side repositories allow for shorter hauls and lower costs but do not completely remove tailings from the valley bottom. The hillslope repositories have a greater capacity but their use will be more costly to develop due to increased haul times, road construction, tree clearing, and topsoil salvage. The trees and soil that these repositories provide will be incorporated into stream and floodplain treatments and will not go to waste.

**SHEET C9 NOTES:**

Repository 1 (R1) is relatively flat terrain to the east of the Stonewall Channel on a hillslope approximately 50 vertical feet above the valley floor. The site is forested and will require clearing prior to placing tailing materials. The final morphology of the repository fills should be shaped to blend to the extent possible with the surrounding terrain. There are natural talus slopes in close proximity to the site. The repository grading shown on this drawing sheet was generated to assess the feasibility of using this area and the potential storage capacity of the site.

No current vehicle access is available to the site necessitating the construction of an access road. The alignment shown is approximately 300 feet in length and achieves a grade of approximately 5%.

**LEGEND**

- STONEWALL CREEK CENTER LINE
- MAINTAINED ACCESS ROAD
- UN-MAINTAINED ROAD GROWN OVER WITH TREES
- CONSTRUCTED ACCESS ROAD

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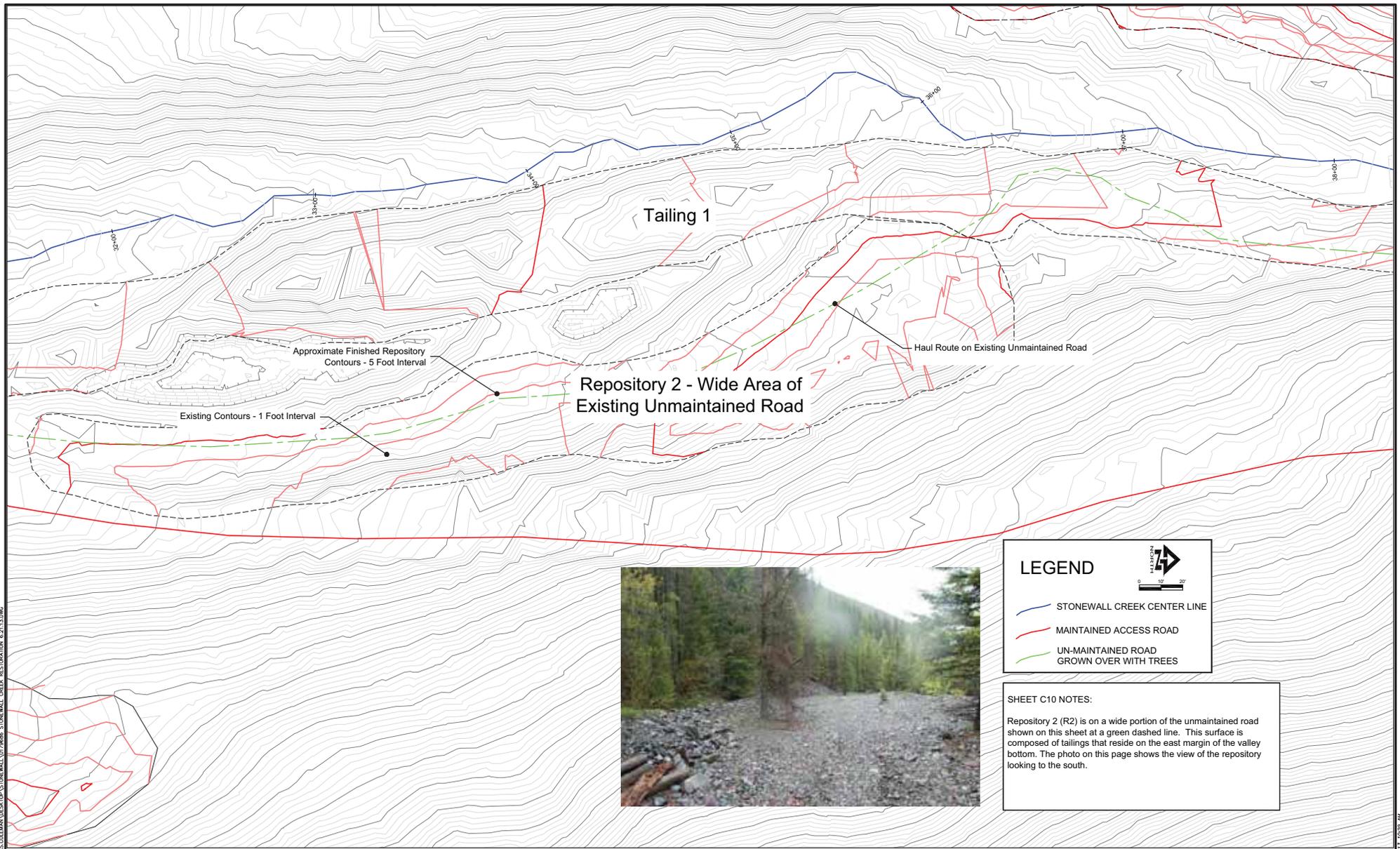
REVISION NO.	REVISION DESCRIPTION	DRAWN BY	REVISION DATE

TAILING EXCAVATION AND REPOSITORY DETAIL (R1 & T1)

STONEWALL CREEK RESTORATION  
 LINCOLN, MT

SHEET  
**C9**

US: NAD83; VT: NAD83; WGS84; UTM; STONEWALL CREEK RESTORATION; 6/21/13; 100%



**LEGEND**

- STONEWALL CREEK CENTER LINE
- MAINTAINED ACCESS ROAD
- - - UN-MAINTAINED ROAD GROWN OVER WITH TREES

**SHEET C10 NOTES:**

Repository 2 (R2) is on a wide portion of the unmaintained road shown on this sheet at a green dashed line. This surface is composed of tailings that reside on the east margin of the valley bottom. The photo on this page shows the view of the repository looking to the south.



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TAILING EXCAVATION AND REPOSITORY DETAIL (R2 & T1)

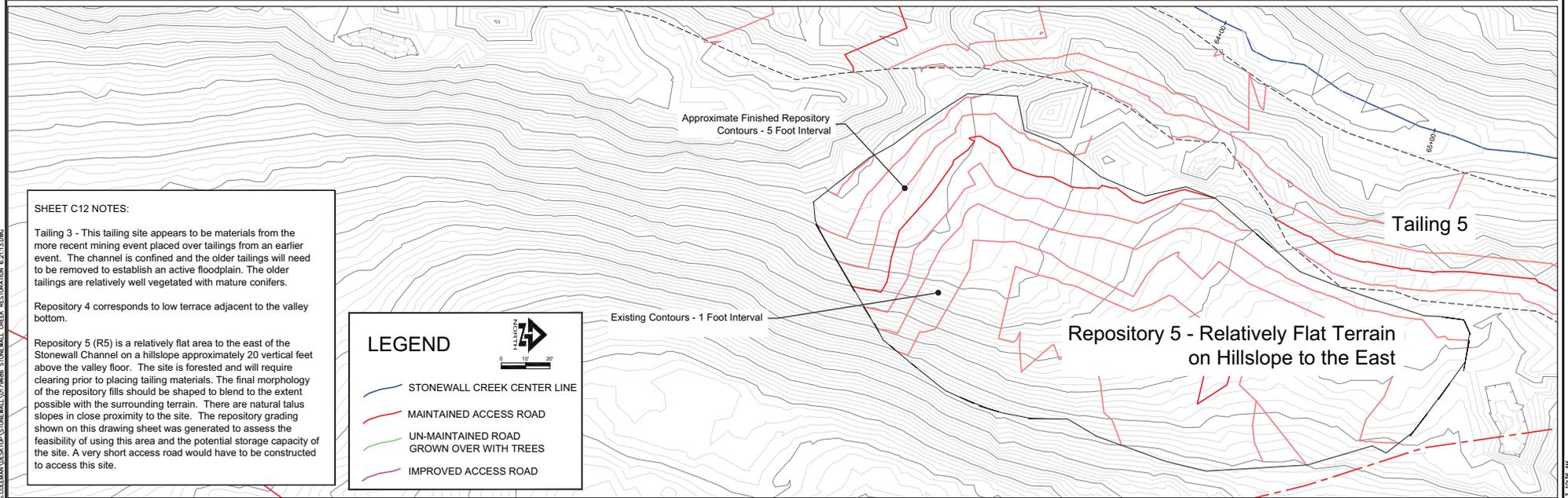
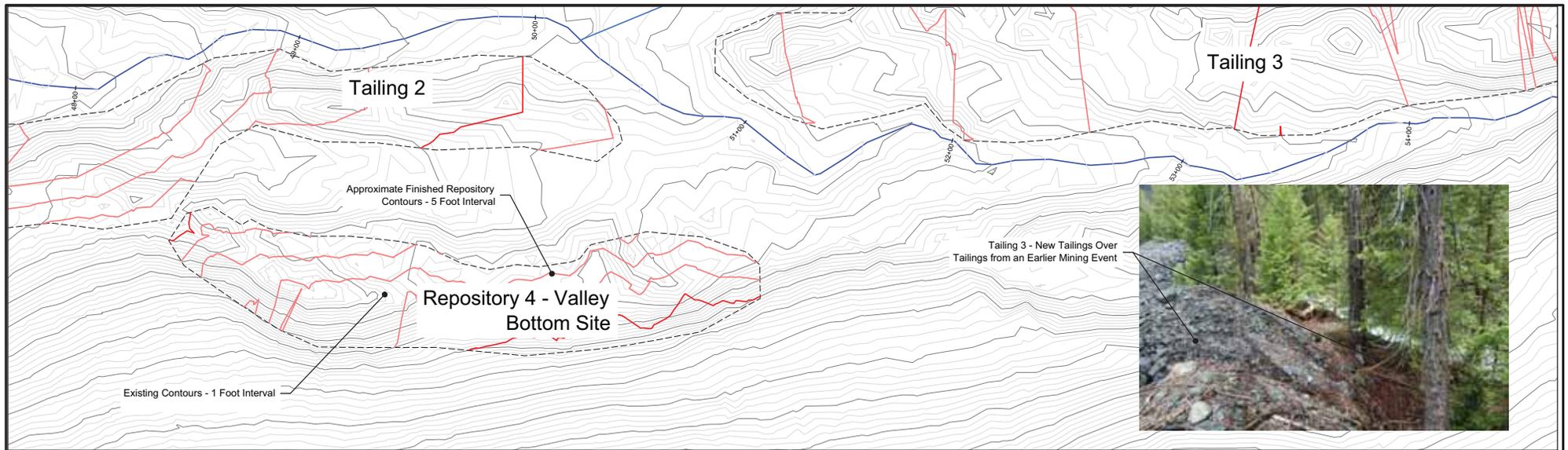
STONEWALL CREEK RESTORATION  
 LINCOLN, MT

SHEET  
**C10**

US:USERS:THOMAS.GUELMAN US:SCALE:30 US:UNITS:WALL US:APPID:311000 WALL US:APPID:311000 WALL US:APPID:311000 WALL US:APPID:311000 WALL

DATE PLOT: 6/28/2013 10:29 AM





**SHEET C12 NOTES:**

Tailing 3 - This tailing site appears to be materials from the more recent mining event placed over tailings from an earlier event. The channel is confined and the older tailings will need to be removed to establish an active floodplain. The older tailings are relatively well vegetated with mature conifers.

Repository 4 corresponds to low terrace adjacent to the valley bottom.

Repository 5 (R5) is a relatively flat area to the east of the Stonewall Channel on a hillslope approximately 20 vertical feet above the valley floor. The site is forested and will require clearing prior to placing tailing materials. The final morphology of the repository fills should be shaped to blend to the extent possible with the surrounding terrain. There are natural talus slopes in close proximity to the site. The repository grading shown on this drawing sheet was generated to assess the feasibility of using this area and the potential storage capacity of the site. A very short access road would have to be constructed to access this site.

**LEGEND**

- STONEWALL CREEK CENTER LINE
- MAINTAINED ACCESS ROAD
- UN-MAINTAINED ROAD GROWN OVER WITH TREES
- IMPROVED ACCESS ROAD



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TAILING EXCAVATION AND REPOSITORY DETAIL (R4, R5, T2 & T5)

STONEWALL CREEK RESTORATION  
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SHEET  
**C12**

US: US25053 THOMAS GUELMAN US25053 STONEWALL CREEK RESTORATION 6/21/13 10:00 AM