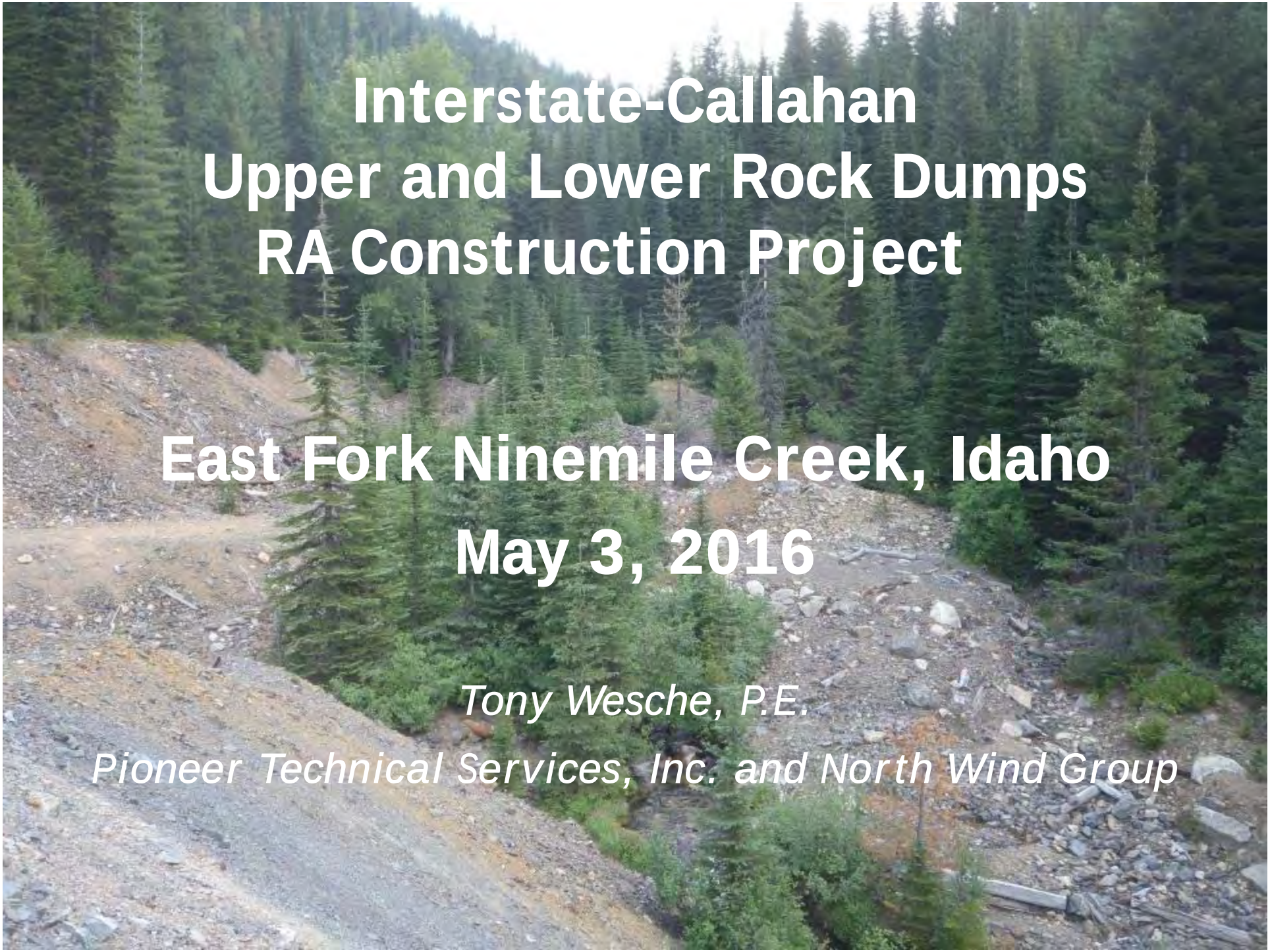


Interstate-Callahan
Upper and Lower Rock Dumps
RA Construction Project

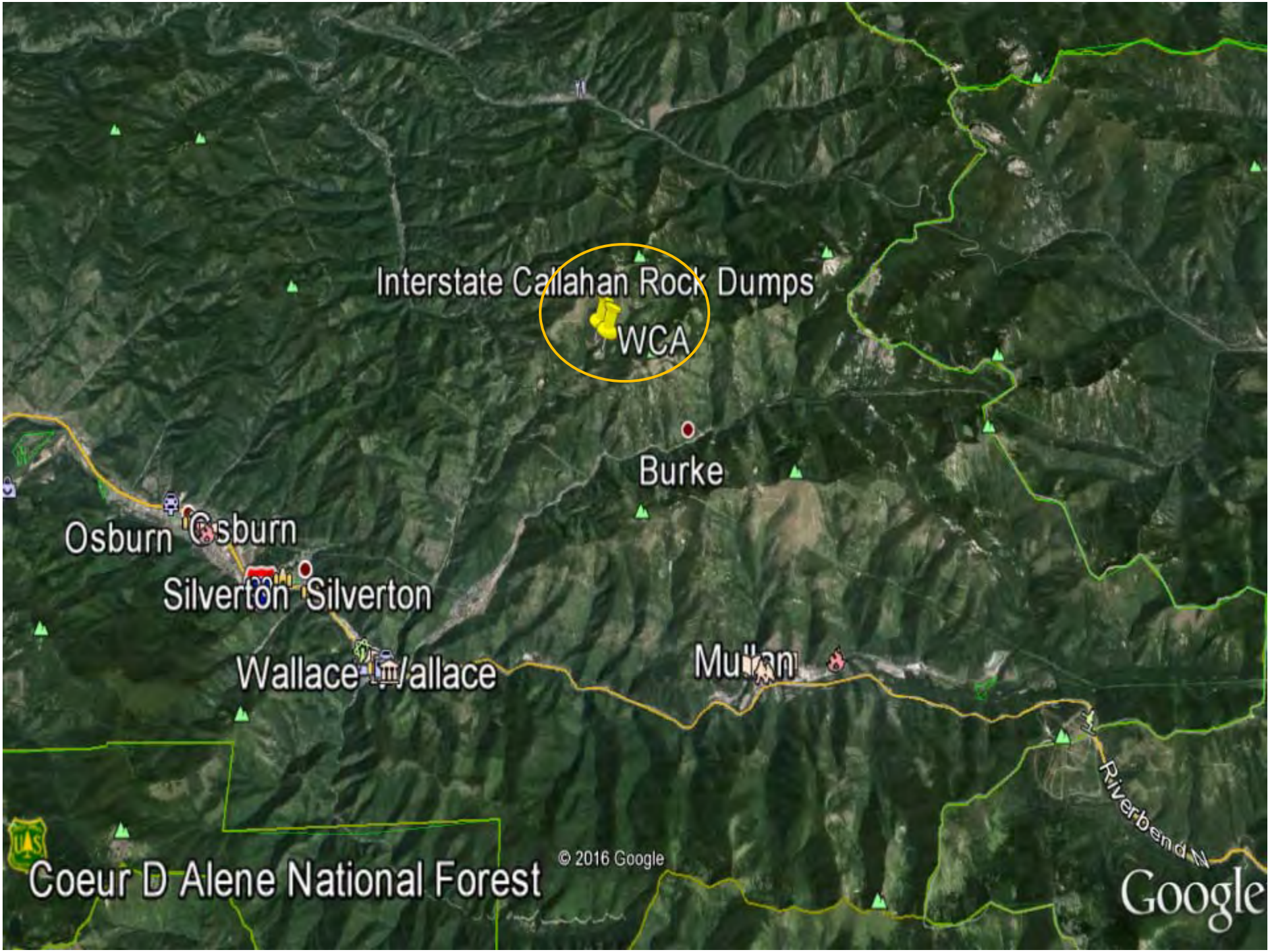
East Fork Ninemile Creek, Idaho
May 3, 2016

Tony Wesche, P.E.

Pioneer Technical Services, Inc. and North Wind Group

Presentation Topics

- Site History and Background
- Design Objectives and Constraints
- Mine Waste Excavation
- EFNM Creek and Tributary Reconstruction
- Revegetation


Interstate Callahan Rock Dumps
WCA
Burke
Osburn
Osburn
Silverton
Silverton
Wallace
Wallace
Mullan
Riverbend N
Coeur D Alene National Forest
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Interstate Callahan Rock Dumps
WCA

History of the Interstate-Callahan

- 1887 – J.F. Callahan filed claim
- 1887-1888 – Built cabin and began small scale mining
- 1906 – First ore shipment from Callahan Mine
- 1912 – Consolidated Interstate Mining Company formed
- 1912 and 1913 – Constructed mill and cable tramway
- 1915 – Cable tramway connecting Interstate-Callahan to the railroad
- 1918-1920 – Part time mining operations
- 1920 – Callahan Zinc-Lead Company Formed
- 1921-1923 – Part Time Mining Operations
- 1924-1935 – Period of no mining
- 1936 – Interstate-Callahan Mine Reopened
- 1937-1949 - Active Mining
- 1951-1965 – Sorted backfill for Lead and Zinc.

Jim Callahan at his Cabin in
Nine Mile Canyon - 1912

Bunker Hill Superfund Background

SUMMARY OF ASARCO SETTLEMENT

- ~$435 million for cleanup of the CDA Basin
  - Interstate-Callahan RA Construction = ~$4.2 M

- Coeur d'Alene Trust was formed to oversee and manage the money for cleanup under direction from EPA

Design Objectives

- Restore native ground surface within excavated areas to match surrounding native conditions.
- Restore stream channels, floodplains and riparian areas within the site to conditions similar to upstream reference areas.
- Minimize operations and maintenance and institutional controls requirements.
- Maintain recreational use and access consistent with current conditions and reasonably anticipated land use as determined by EPA, other Federal land management agencies, and the current landowner.

Design Constraints

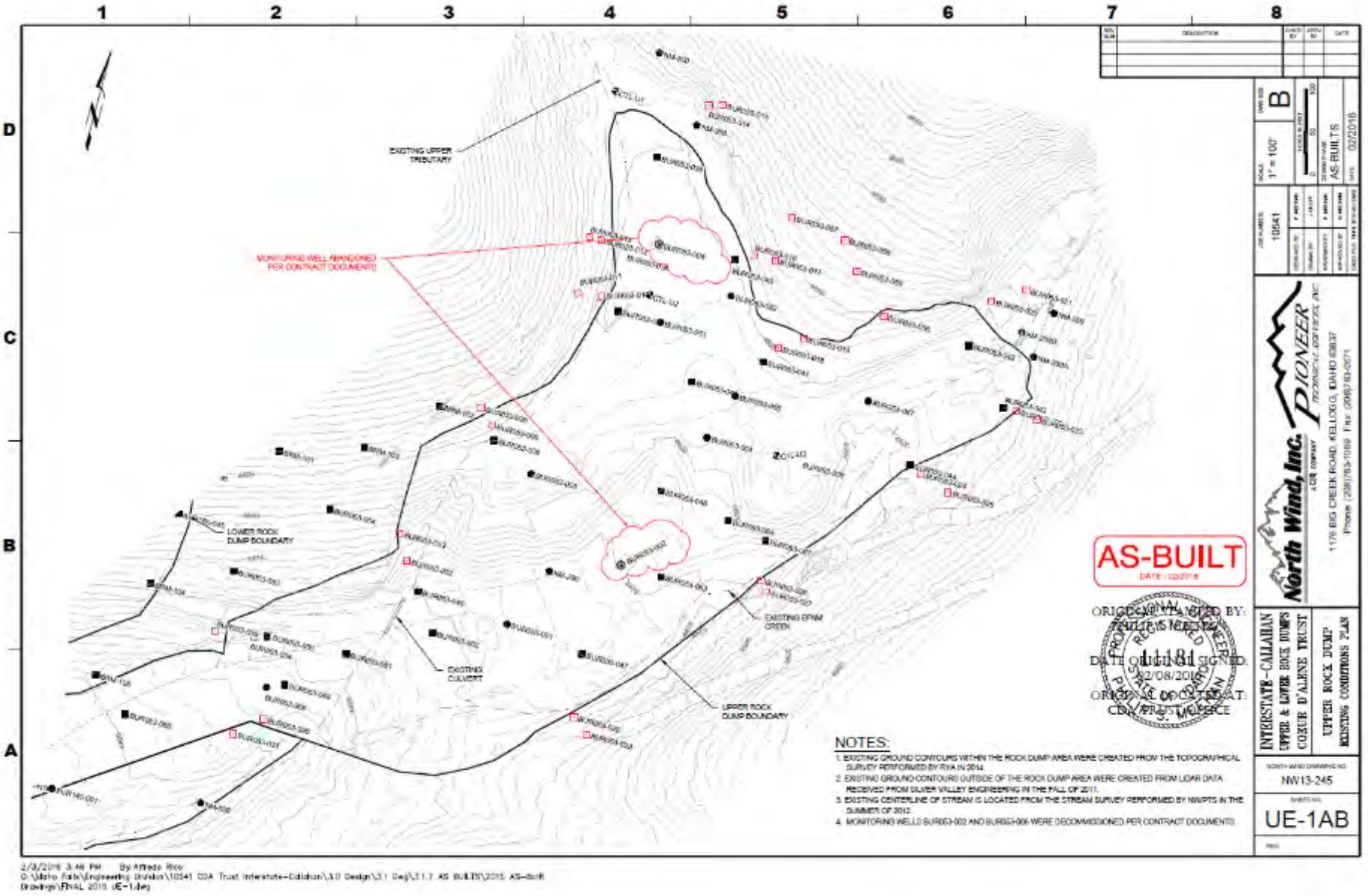
- Short construction season (approximately 120 working days) due to weather conditions
- Limited area for construction activities and stockpiling of materials
- Working on steep slopes
- Coordination with design and construction of the EFNM WCA


Mine Waste Excavation

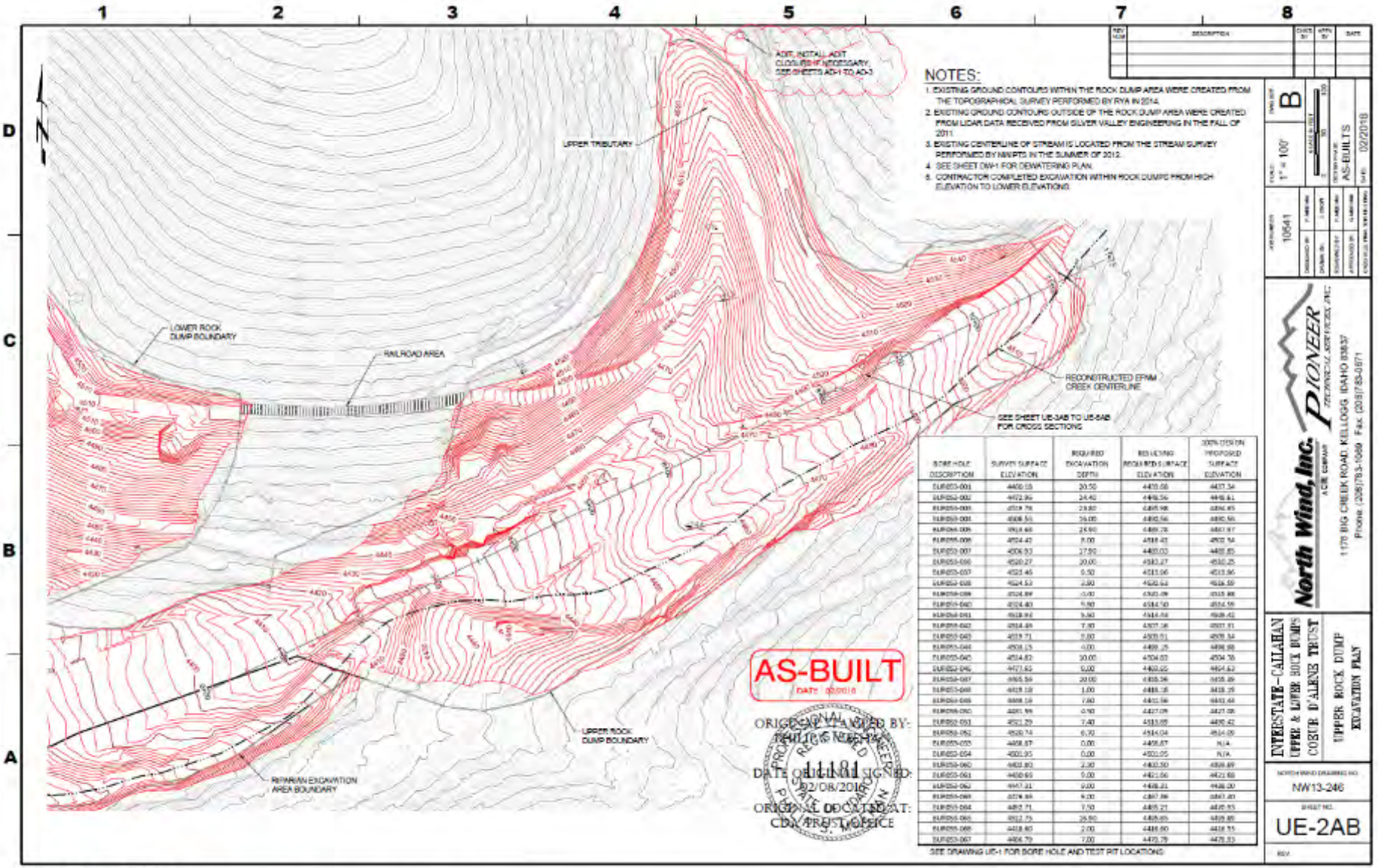
Excavation Design Basis

- Soil boring and test pit data used from 2011 and 2012 Trust site characterization investigations
- Achieve soil and sediment concentrations less than or equal to 530 mg/kg lead
- Characterization showed minimal leaching into native soils

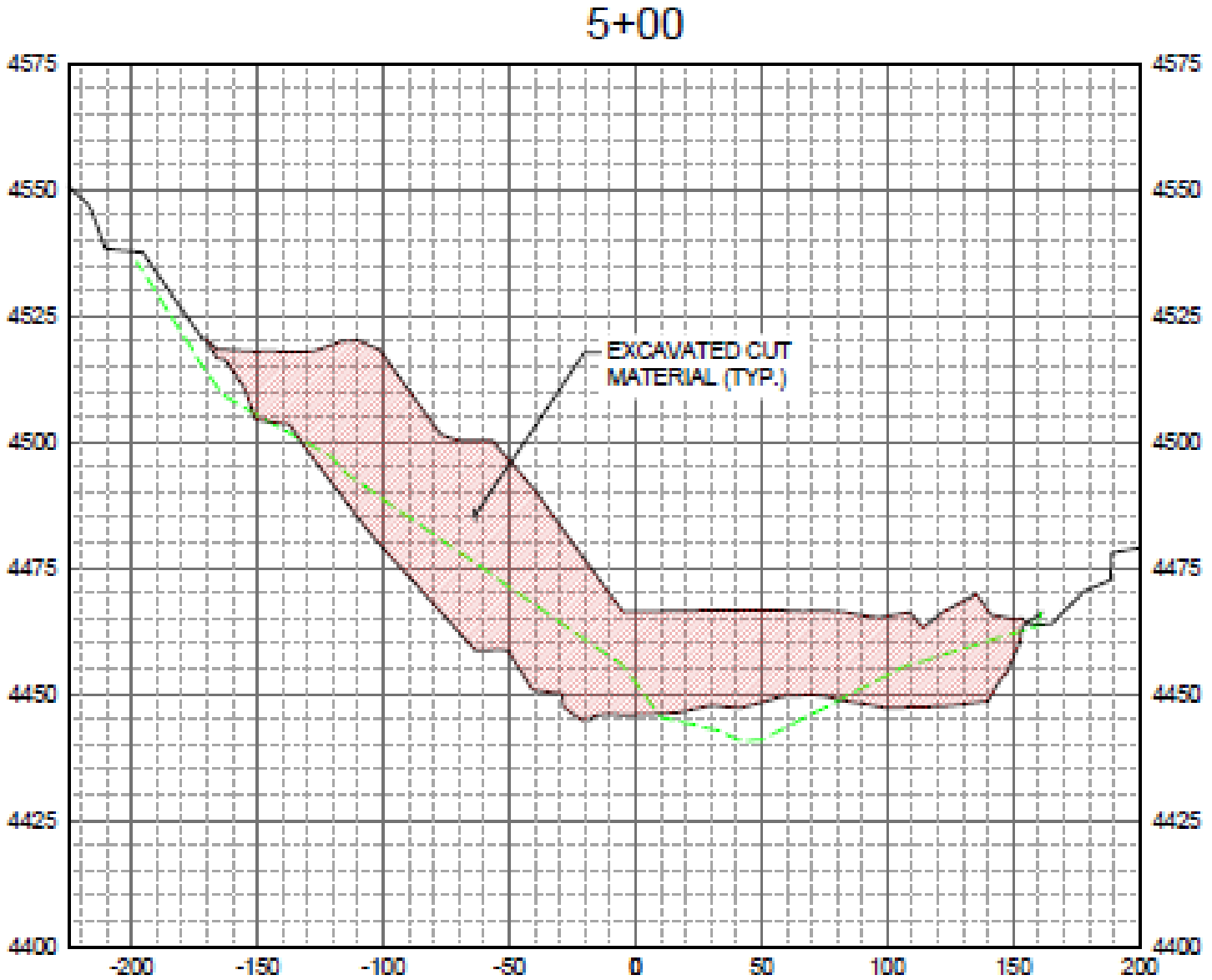
Upper Rock Dump



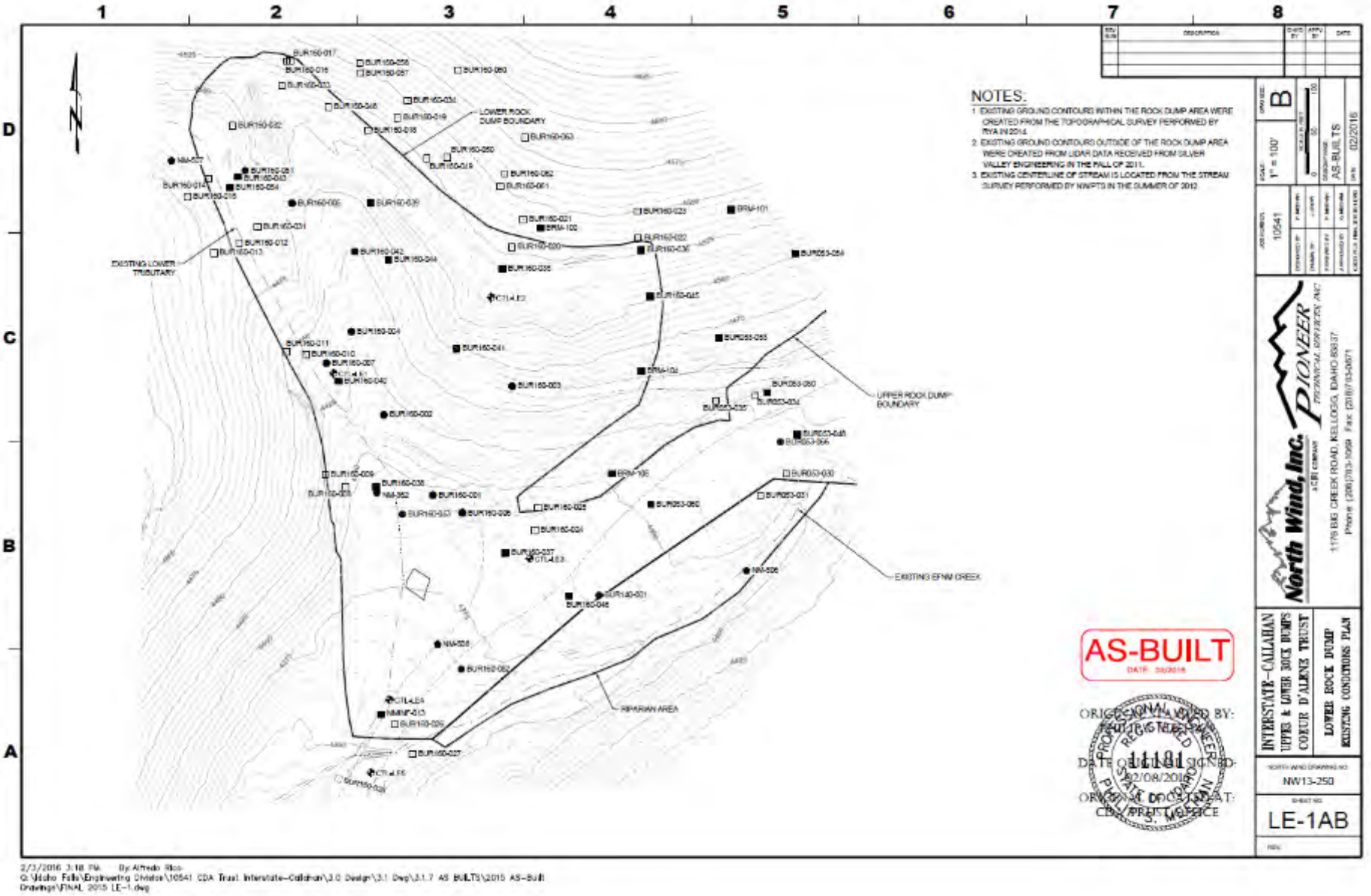
Upper Rock Dump Excavation



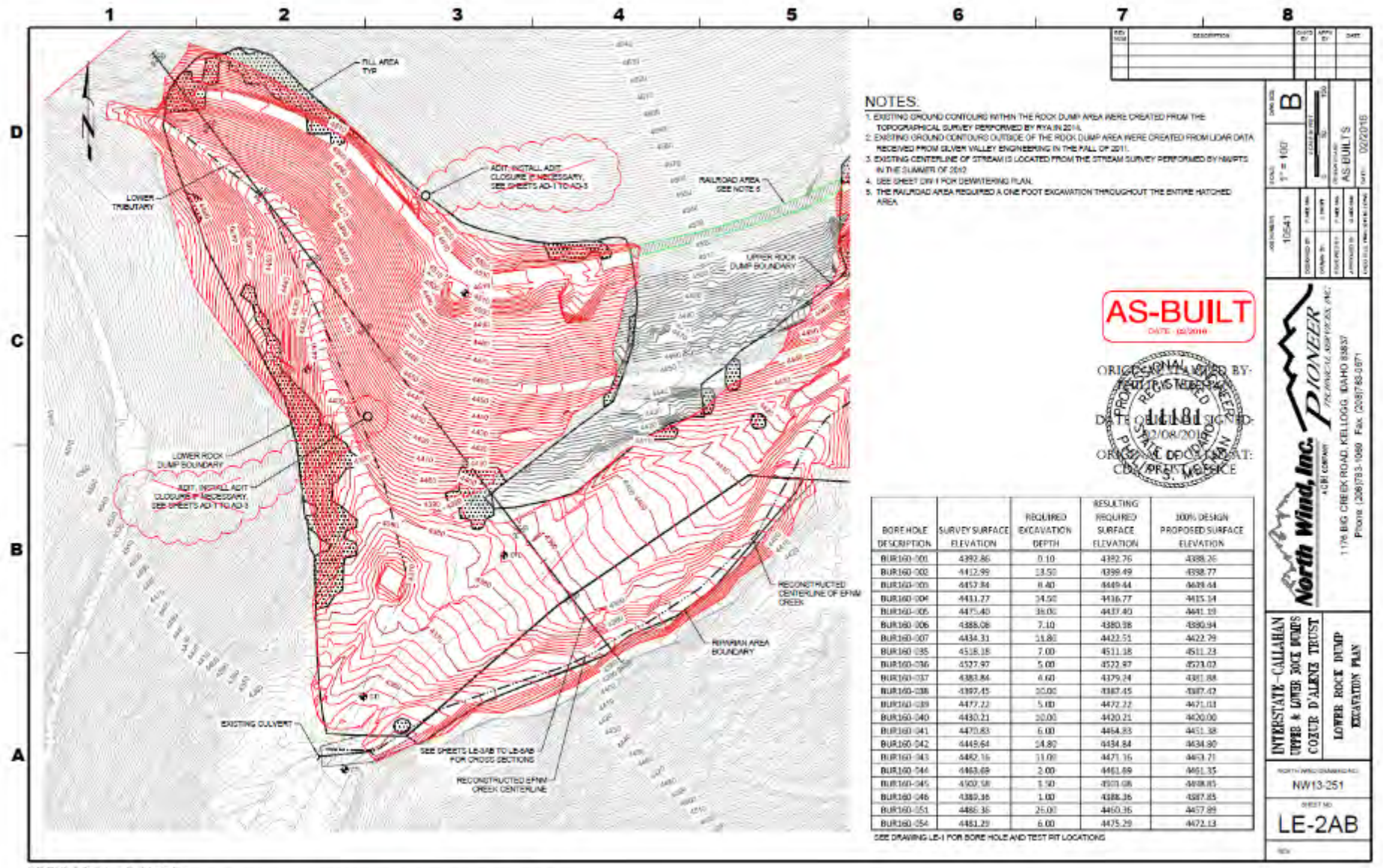
Field Modifications



Lower Rock Dump



Lower Rock Dump Excavation



BORE HOLE DESCRIPTION	SURVEY SURFACE ELEVATION	REQUIRED EXCAVATION DEPTH	RESULTING REQUIRED SURFACE ELEVATION	100% DESIGN PROPOSED SURFACE ELEVATION
BUR160-001	4392.86	0.10	4392.76	4388.26
BUR160-002	4412.99	13.50	4399.49	4398.77
BUR160-003	4453.84	8.40	4449.44	4439.44
BUR160-004	4451.27	14.50	4436.77	4435.14
BUR160-005	4475.40	36.00	4437.40	4441.19
BUR160-006	4388.08	7.10	4380.98	4380.94
BUR160-007	4434.31	11.80	4422.51	4422.79
BUR160-035	4518.18	7.00	4511.18	4511.23
BUR160-036	4527.97	5.00	4522.97	4523.03
BUR160-037	4383.84	4.60	4379.24	4381.88
BUR160-038	4397.45	10.00	4387.45	4387.42
BUR160-039	4477.22	5.00	4472.22	4471.03
BUR160-040	4430.21	10.00	4420.21	4420.00
BUR160-041	4470.83	6.00	4464.83	4461.38
BUR160-042	4449.64	14.80	4434.84	4434.80
BUR160-043	4482.16	11.00	4471.16	4463.71
BUR160-044	4463.69	2.00	4461.69	4461.35
BUR160-045	4503.58	5.50	4498.08	4498.85
BUR160-046	4389.36	1.00	4388.36	4387.85
BUR160-053	4486.36	26.00	4460.36	4457.89
BUR160-054	4481.29	6.00	4475.29	4472.13

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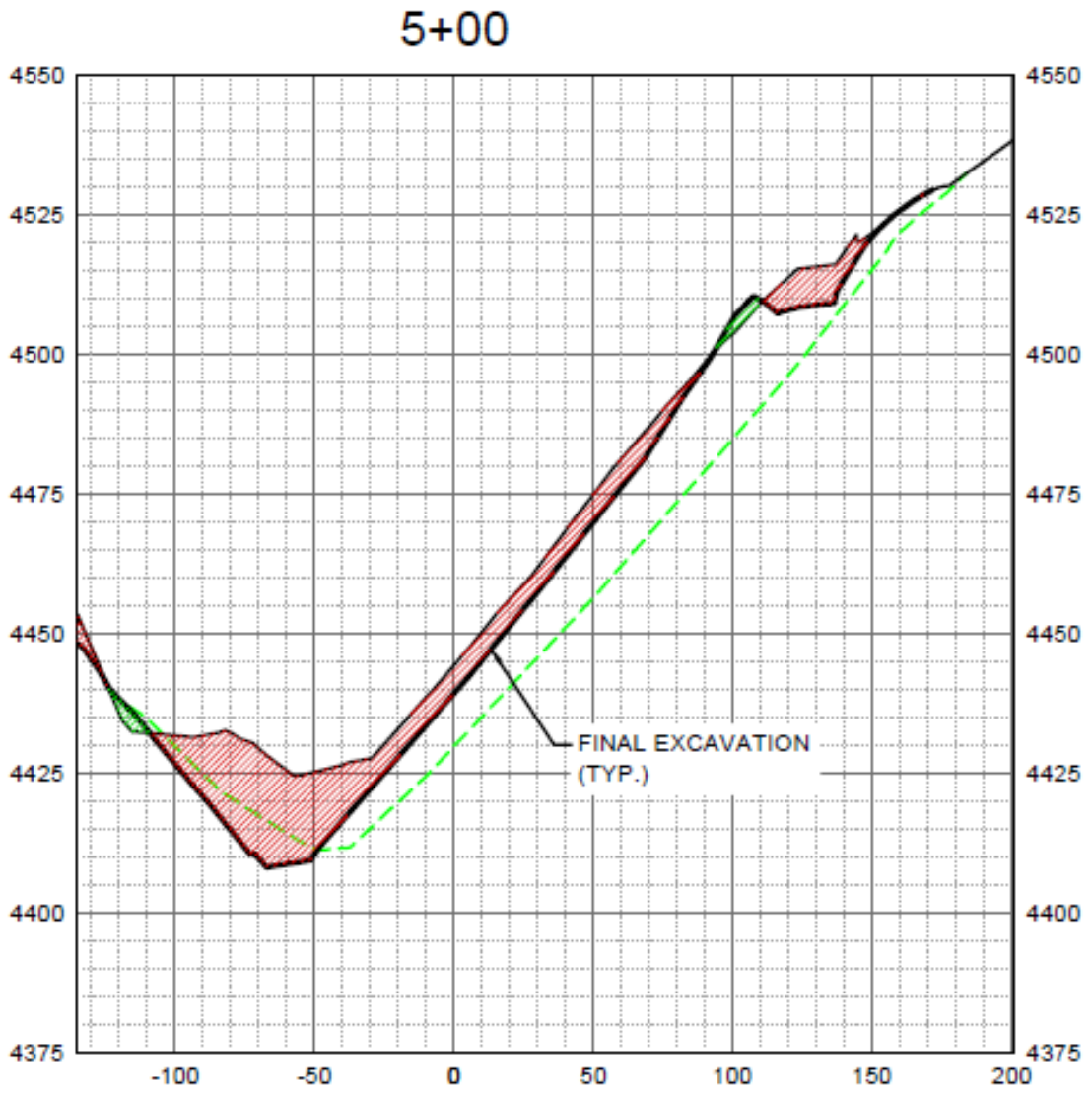
Field Modifications

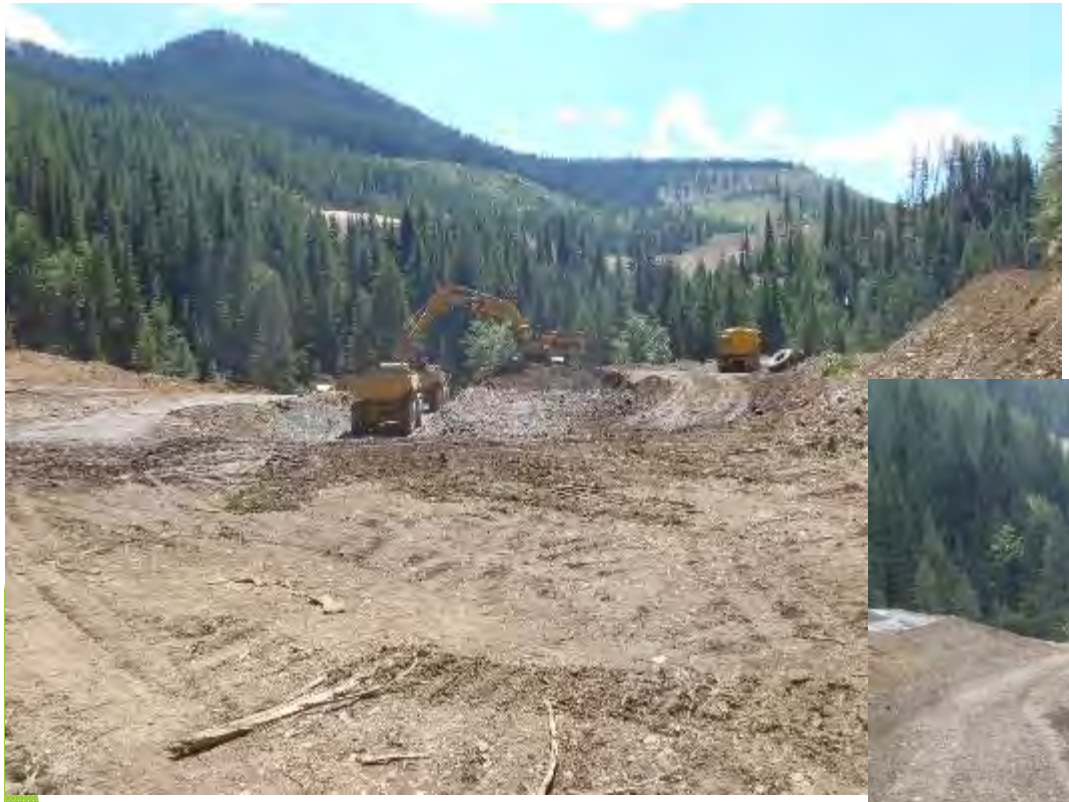


Excavation Design Summary

- Total excavation of 215,928 bank cubic yards of mine waste rock
- Approximately 27,345 bcy of general fill required for slope establishment, positive drainage and haul road reconstruction
- Total disturbed footprint was approximately 18 acres

Upper Rock Dump Excavation Pre/Post Photographs

Upper Rock Dump Excavation Pre/Post Photographs



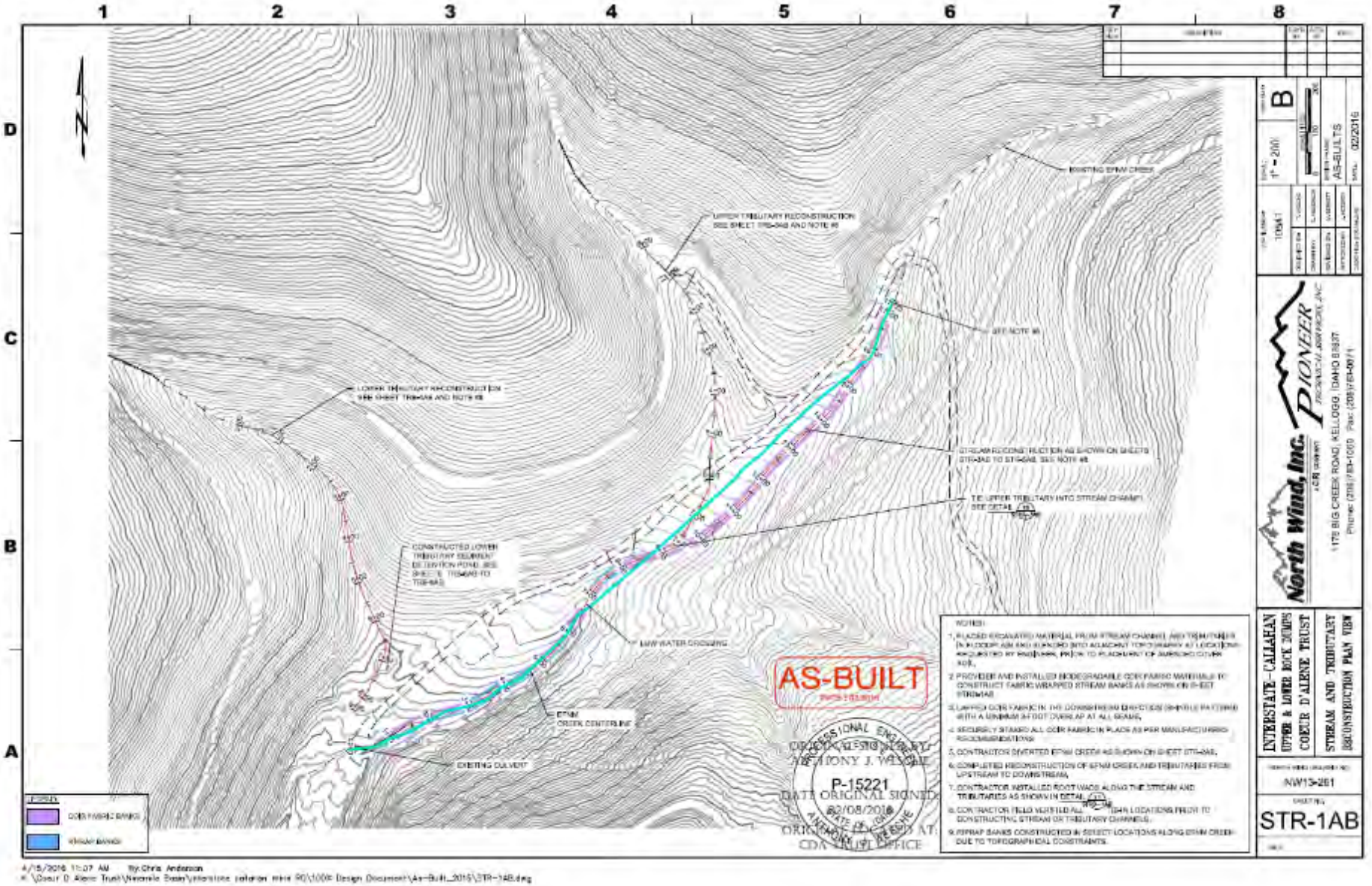
Lower Rock Dump Excavation Pre/Post Photographs

EFNM Creek and Tributary Reconstruction

Stream/Tributary Design Basis

- Design based upon upstream reference reach
- Diversion of EFNM Creek required during construction for waste excavation and stream reconstruction.
- Grade Controls, Step pools, and run sections
- Four designed structures incorporated (Rock Cross Vane, Double Log V-Structure, Armored Angled Log Step-Down, and Angled Rock Step Down)

EFNM Creek Channel Alignment



Grade Control Structure

Log Grade Control Structure

Incorporating Bedrock during Construction

Upper EFNM Creek

Lower EFNM Creek

Lower Tributary Reconstruction

Upper Tributary Reconstruction

Stream/Tributary Reconstruction Summary

- Reconstruction of approximately 1,692 linear feet of EFNM Creek
- Reconstruction of approximately 1,490 linear feet of Tributaries
- Installation of 37 Rock Cross Vane Structures in both EFNM Creek and tributaries
- Installation of 3 Double V-Log Structures
- 16 Armored Angled Log Step-Down Structures
- 17 Angled Rock Step-Down Structures
- 1,800 Riparian tubelings (alders and willow)


Revegetation

Revegetation

- Cover Soil (12-inches of imported cover soils from EFNM WCA)
- Amendment (3% Organic matter and lime incorporation was performed as part of EFNM WCA Construction Activities)
- Upland and Riparian Seed Mixes (consistent with EFNM basin native plant species)
- Tubelings (western red cedar, western larch, white pine, and lodgepole pine at 150 -200 tubelings per acre)

Locals enjoying dinner

Revegetation Summary

- 19.1 acres of revegetation
  - 16.5 acres of upland seed mix
  - 1.6 acre of riparian seed mix
- 25,993 cubic yards of amended cover soil
- 2,262 dry tons of organic amendment
- 19.1 acres of hydro-mulch
- 3,620 conifer tubelings
- 1,800 riparian tubelings
- 11,001 square yards of erosion control mat

Lessons Learned

- Flexible Designs
- Flexible Contracting Mechanisms
  - Unit Rate Bids
  - Time and Materials
- Development of a good working relationship between owner, engineer and contractor results in a successful project
- Ensure third-party surveyors understand final use for their data
- Double V-log Grade Control Structures has gradient limitations
- Use of cleared and grubbed materials, wood debris, and Hydro Straw BFM are viable erosion control methods on steep slopes
- Organic amended cover soils are needed for successful revegetation
- Elk love Cedar tubelings

THANKS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QUESTIONS