Alternative Techniques for Stabilizing Legacy Roads with Access Challenges

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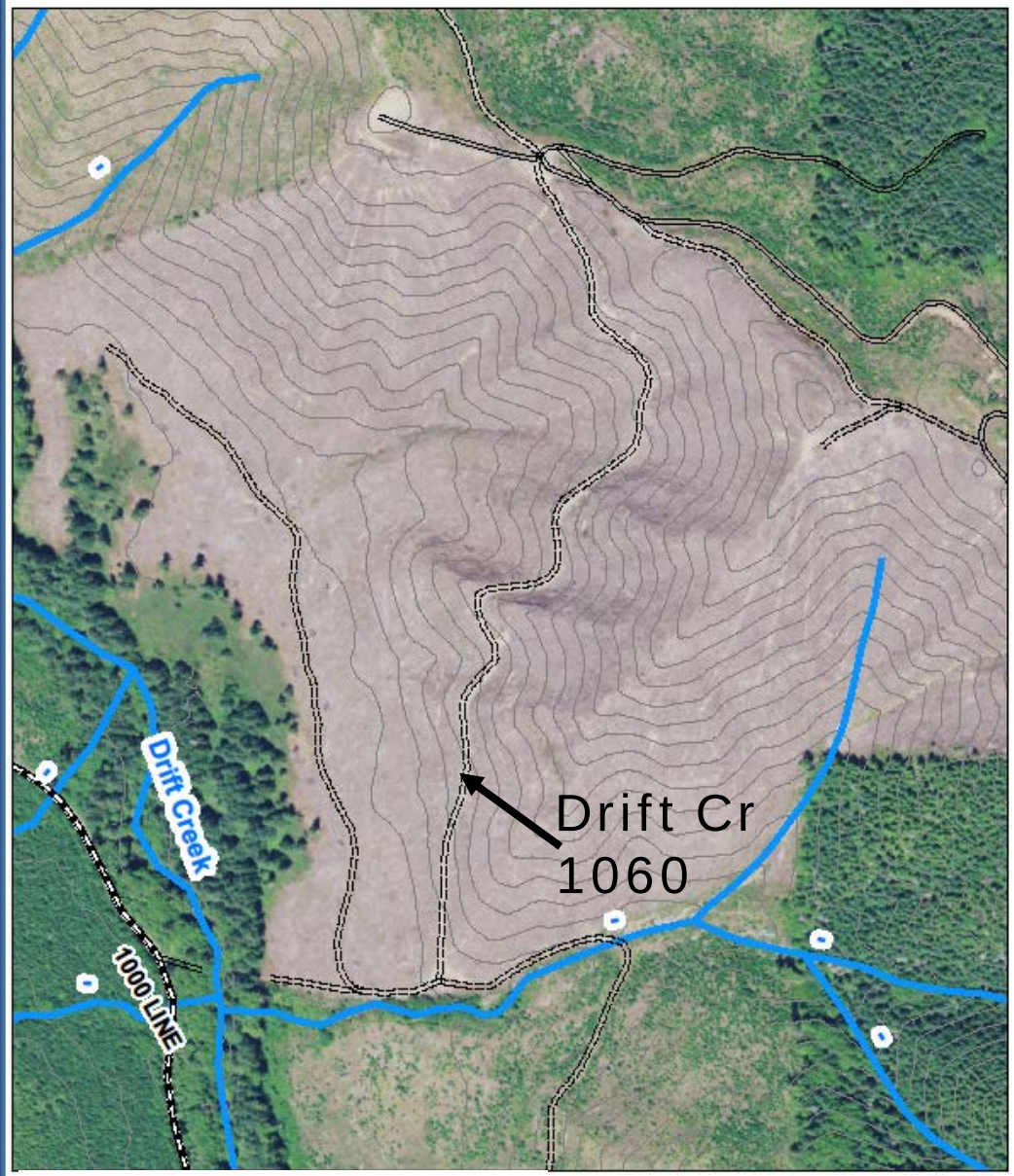
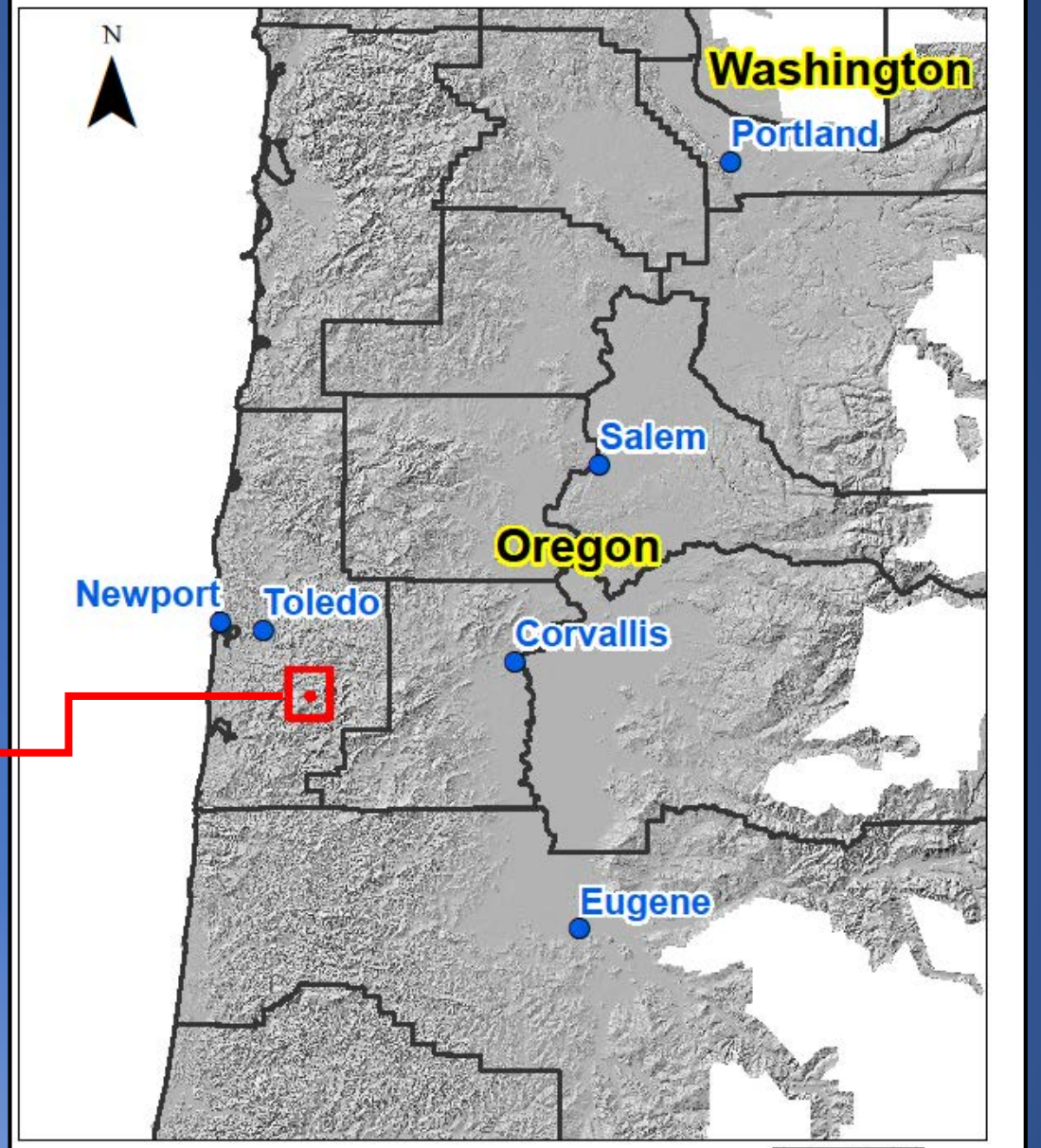
Alternatives for stabilizing failed legacy roads

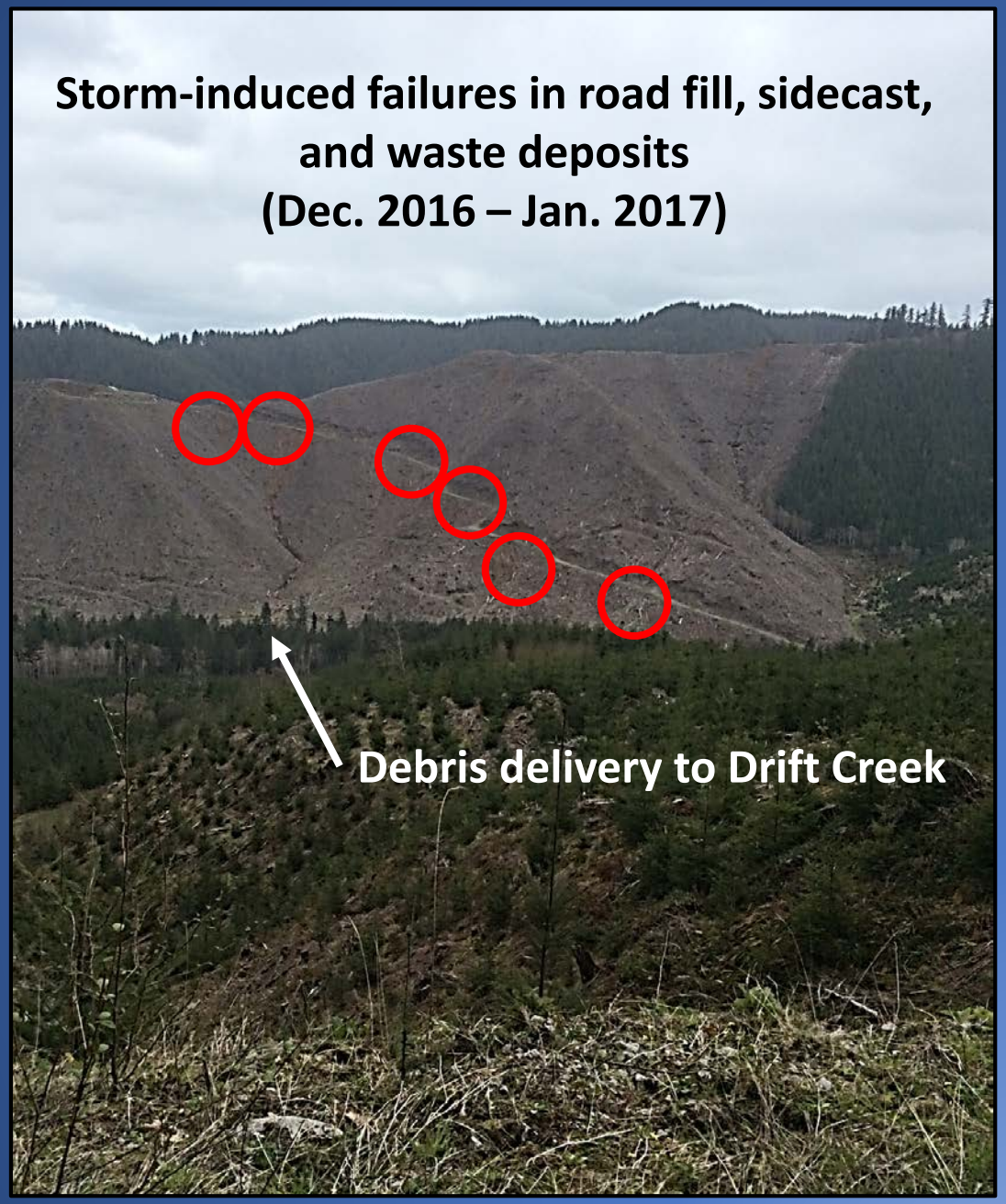
- rebuild
- realign
- vacate (decommission or deactivate)
- abandon permanently
  - *obliterate where feasible*
  - *walk away when inaccessible (e.g. orphaned roads)*



2016 NAIP image
40 ft LDEM contours



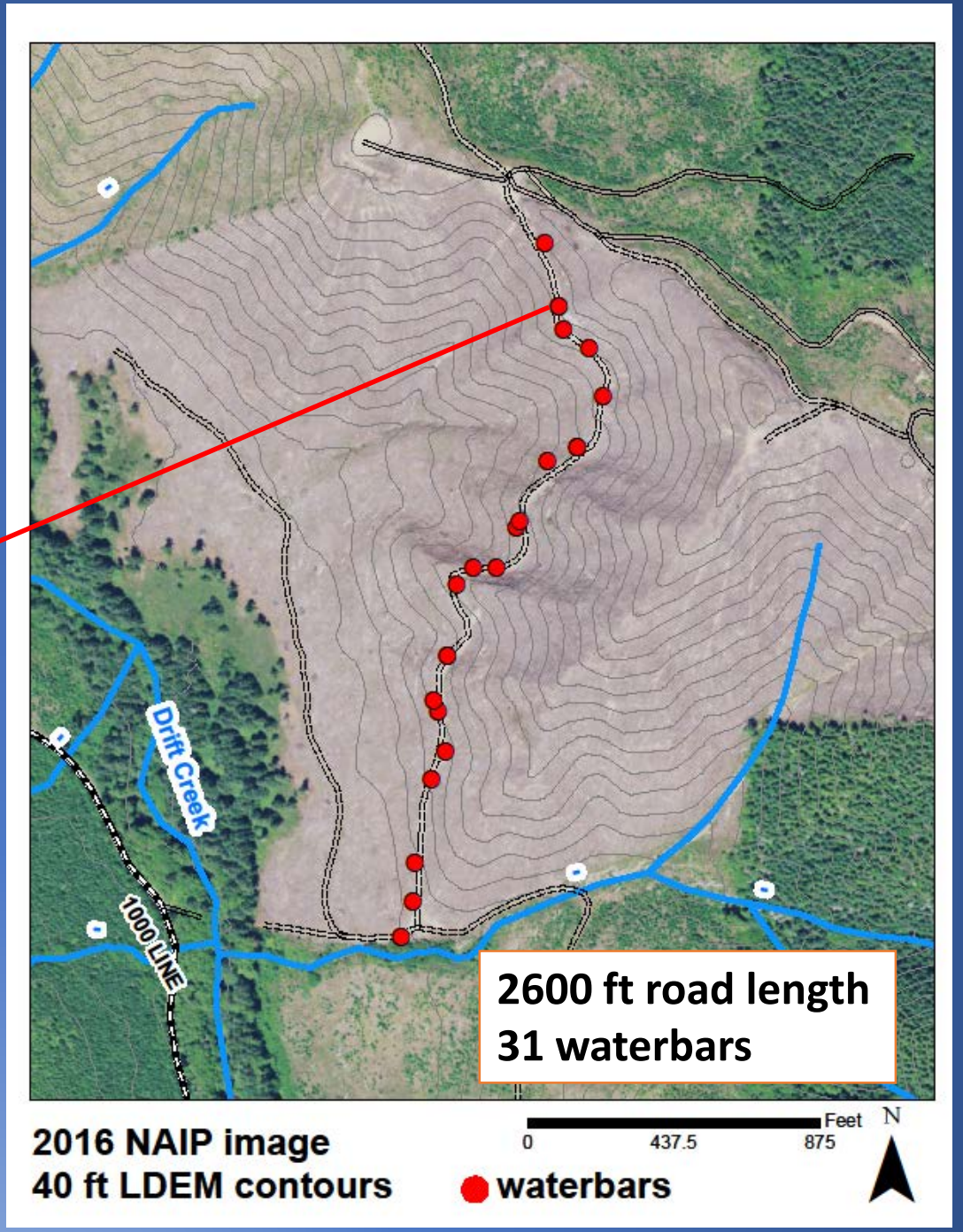
Lidar-derived hillshade image



Oregon Department of Forestry:

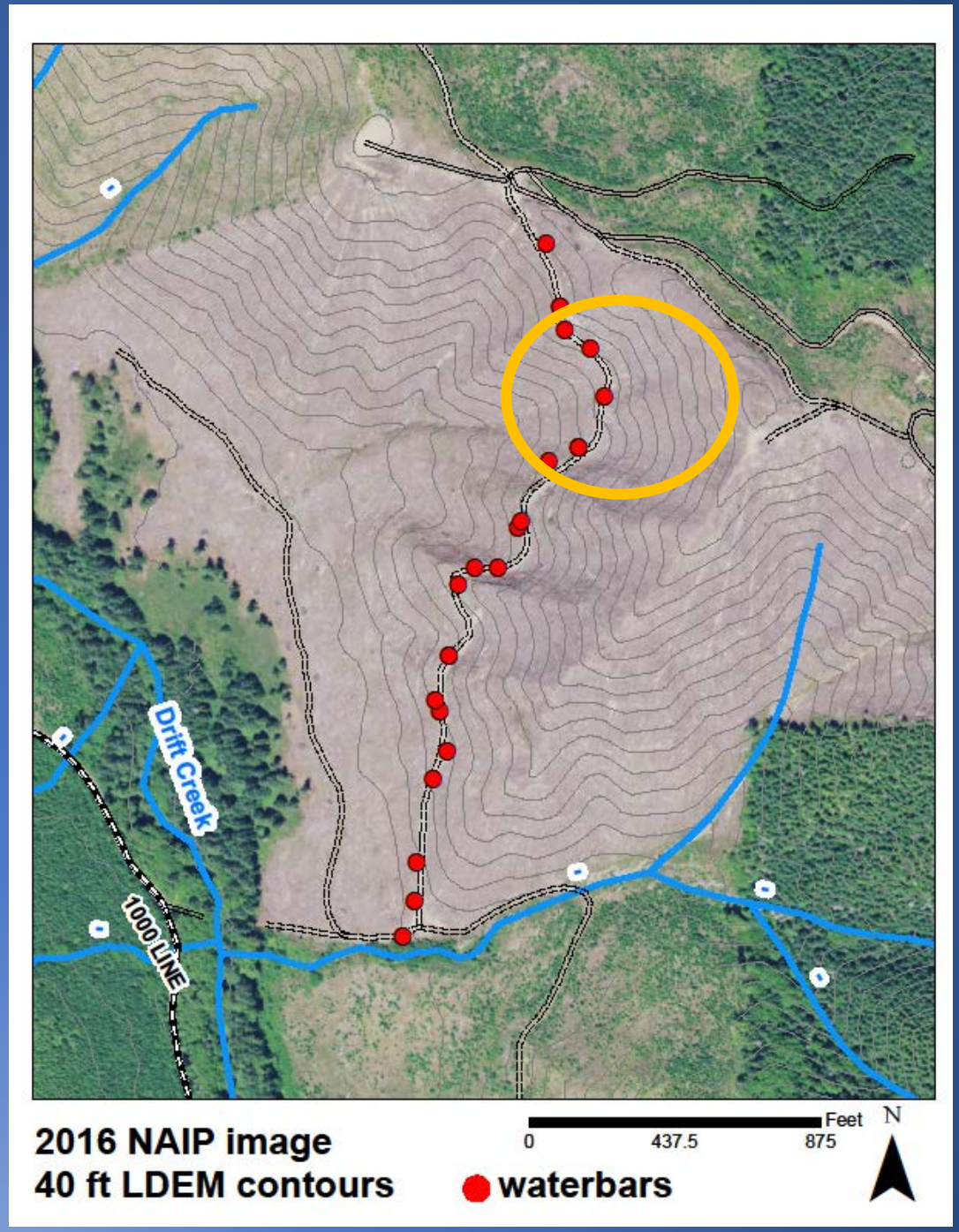
Written Statement of Unsatisfactory Condition:

- sidecast & fill stabilized by Feb. 2017
- road vacated by Sept. 2017


Drift Creek
1000 LINE
2600 ft road length
31 waterbars
2016 NAIP image
40 ft LDEM contours
waterbars
0
437.5
875
Feet
N

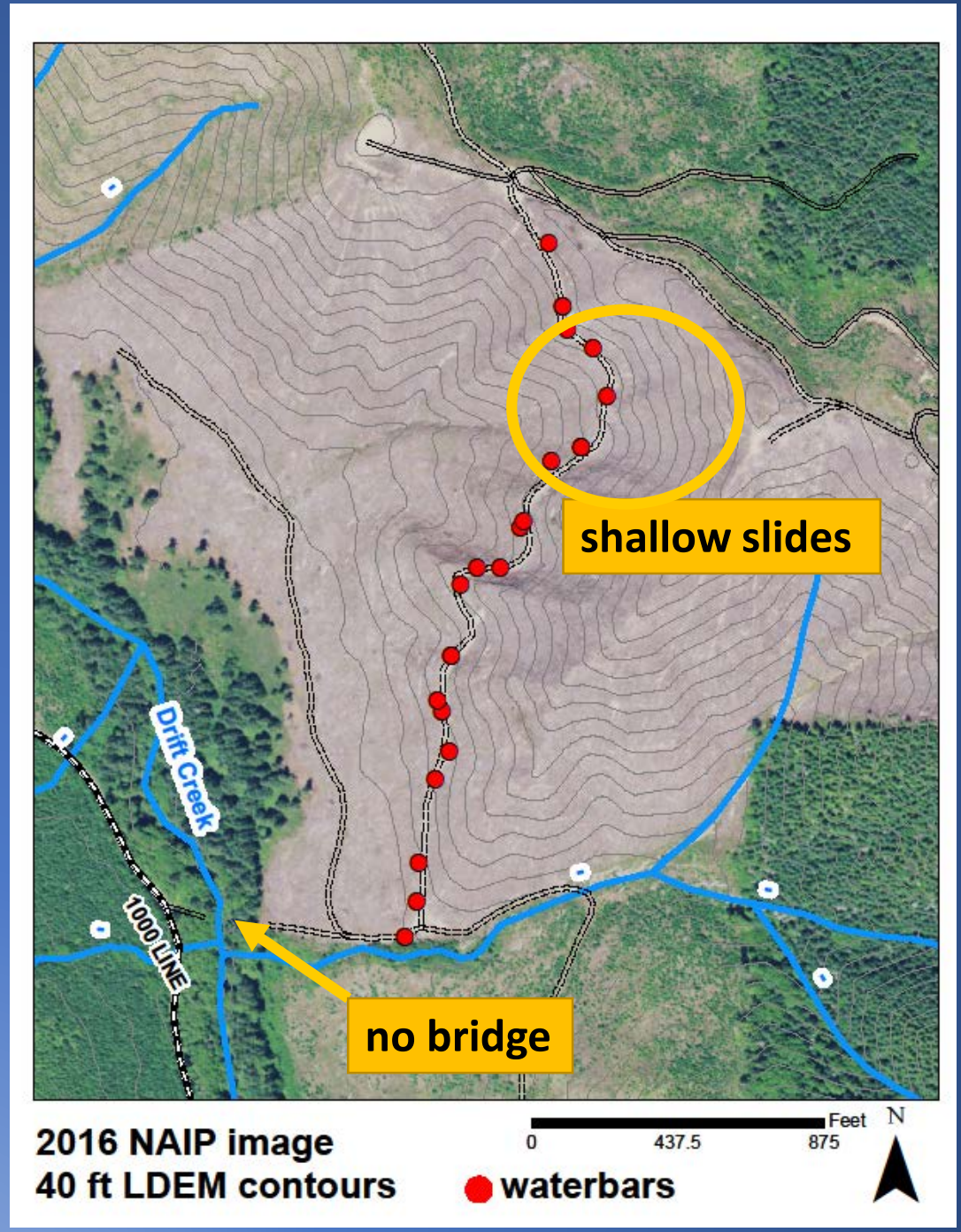
2016 Google Earth image

old shallow landslide complex



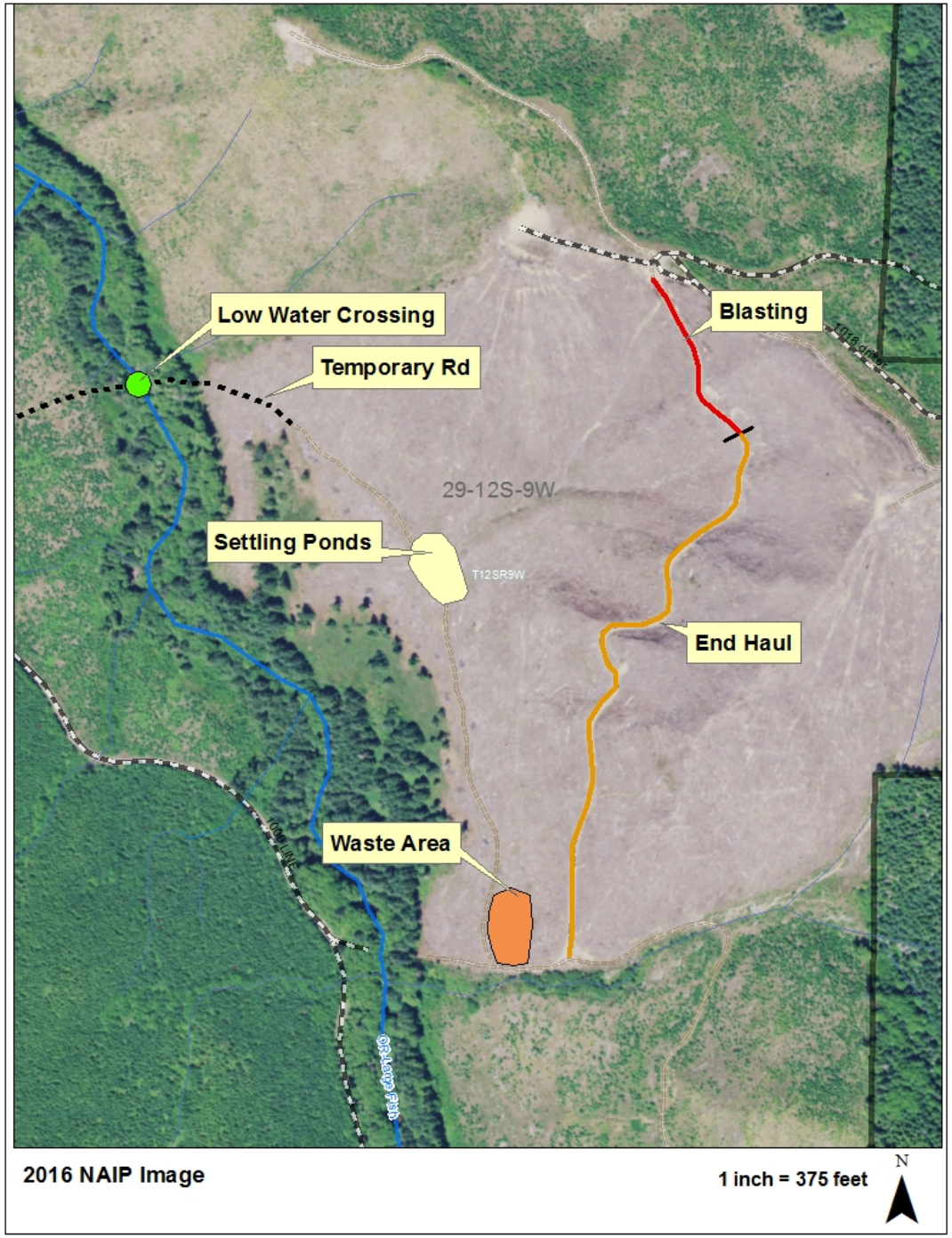
Road stabilization and abandonment challenges

- Potential for road realignment to trigger catastrophic shallow landslides
- No bridge over Drift Creek
- Steep grade (20+ percent)
- Upper 1/3 of road unsafe for heavy equipment
- Full sidecast removal not possible with conventional equipment



Project Breakdown

Blasting	End Haul
600 feet	2,000 feet
Drill	• Excavator • Dump trucks • Off-hwy truck
Full road abandonment	• Sidecast pullback • Waterbar abandonment • Outslope road
Even dispersal of material across hillside	Material placed in waste area



Blasting Specs & Cost Comparison

	Shot 1	Shot 2
Linear Road Length (ft)	400	200
Drill Bit Diameter (in)	3.5	3.5
Hole Spacing (ft)	6 x 6	6 x 6
Min Depth (ft)	5	3
Max Depth (ft)	18	18
Total Number of Holes	258	122
Total Bore Footage (ft)	2961	1233
Max Wt of Explosives/Hole (lb)	56.73	60.27
Powder Factor (lb/TMCY)	2.37	1.37

Cost Breakdown: Blasting vs Pull Back

Per linear foot of road treated:
blasting cost 4.8 times pull back

Did it work?

35 ft. maximum excavator reach

Sidecast pullback on lower 2/3 road

Conclusions

PROS	CONS
Full road abandonment	Expensive
Even dispersal of material	May not be effective in timbered areas
Effective in areas with limited access	Dependent on soil type & conditions
Effective in areas with no viable waste areas	Limited to dry season only
Eliminates road drainage issues present in pullback areas	
Eliminates safety issues of equipment working on steep or unstable ground	
Reduction in landslide potential	

Would we try blasting again?

ABSOLUTELY

QUESTIONS?

Credits & Acknowledgement:

Video Credits: Aggregate Resource Industries, Inc
Photo Credits: Jill Bell, Matthew Fiorito, Susan Shaw

Thanks to:

- Stokes Construction
- Aggregate Resources Industries, Inc
- Ted Perreard, Driller (ARI)
- Timber Supply
- Matthew Fiorito, Harvest Manager (Weyerhaeuser)
- ODF – West Oregon District

STOKES Construction

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