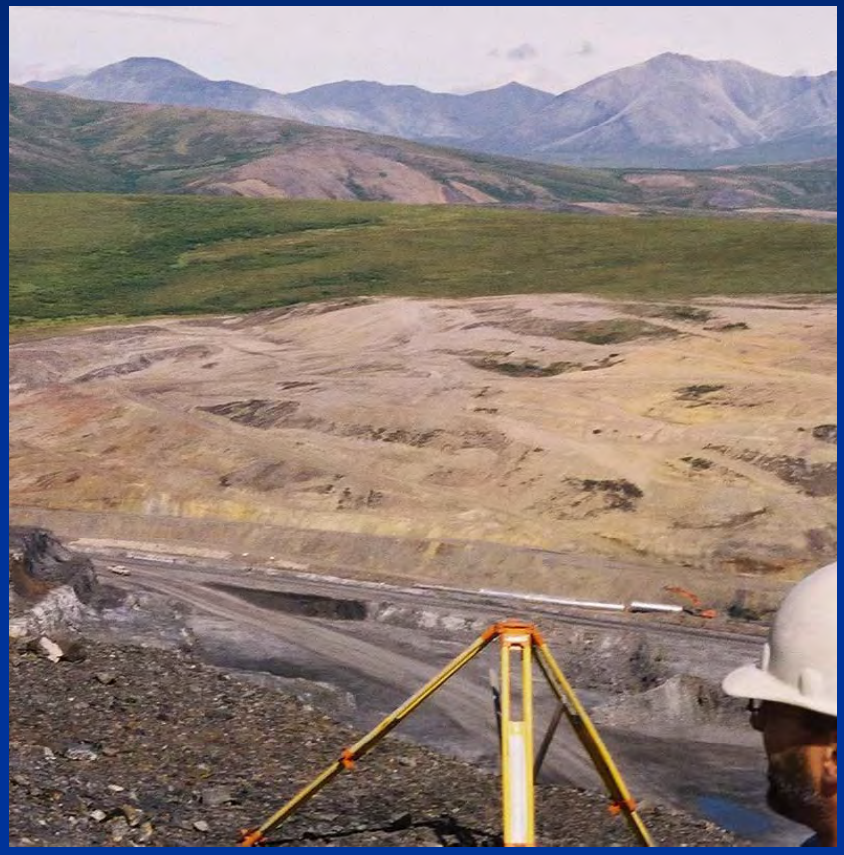
Closure and Reclamation Plan

- Objectives
- Plans for
  - Mine area
  - Tailings
  - Water management
- Schedule
- Cost estimates

Physical & Chemical Stability

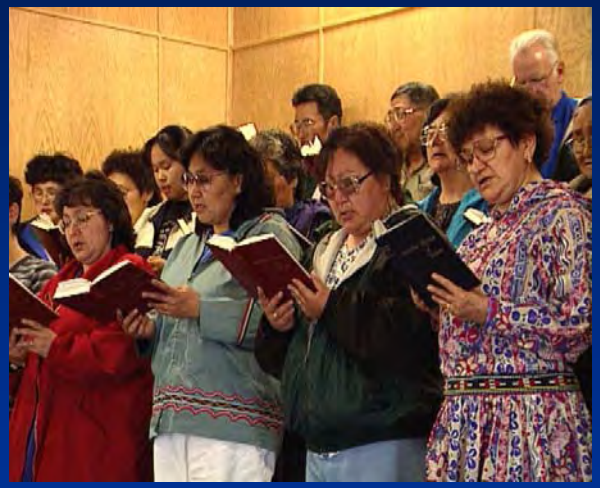
Water Quality

Technical Certainty



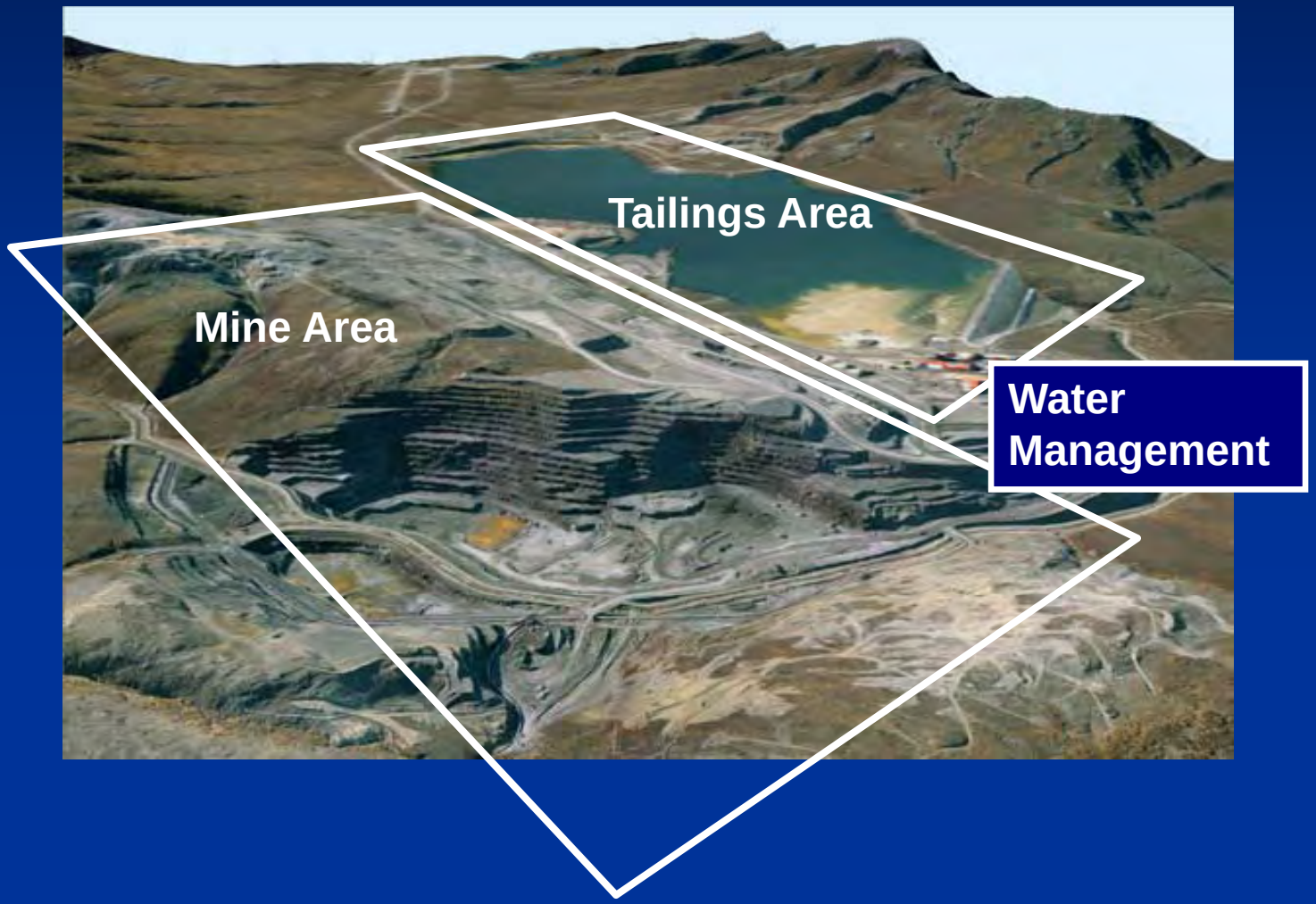
Subsistence Uses

Local & Regional Health



Local & Regional Benefits

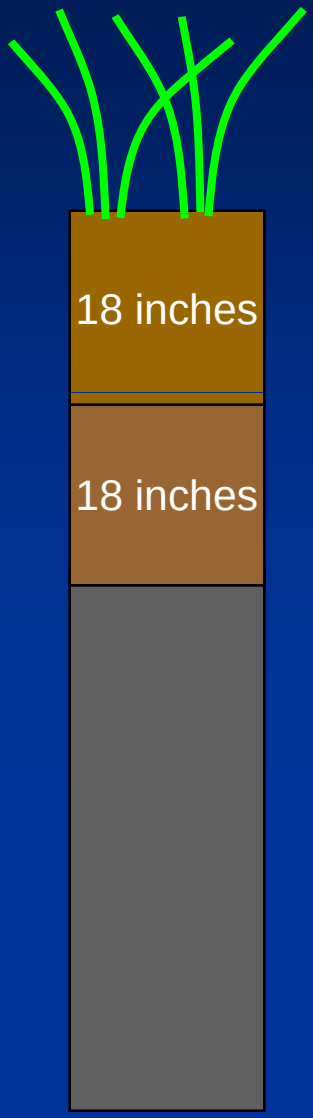
Selected Options

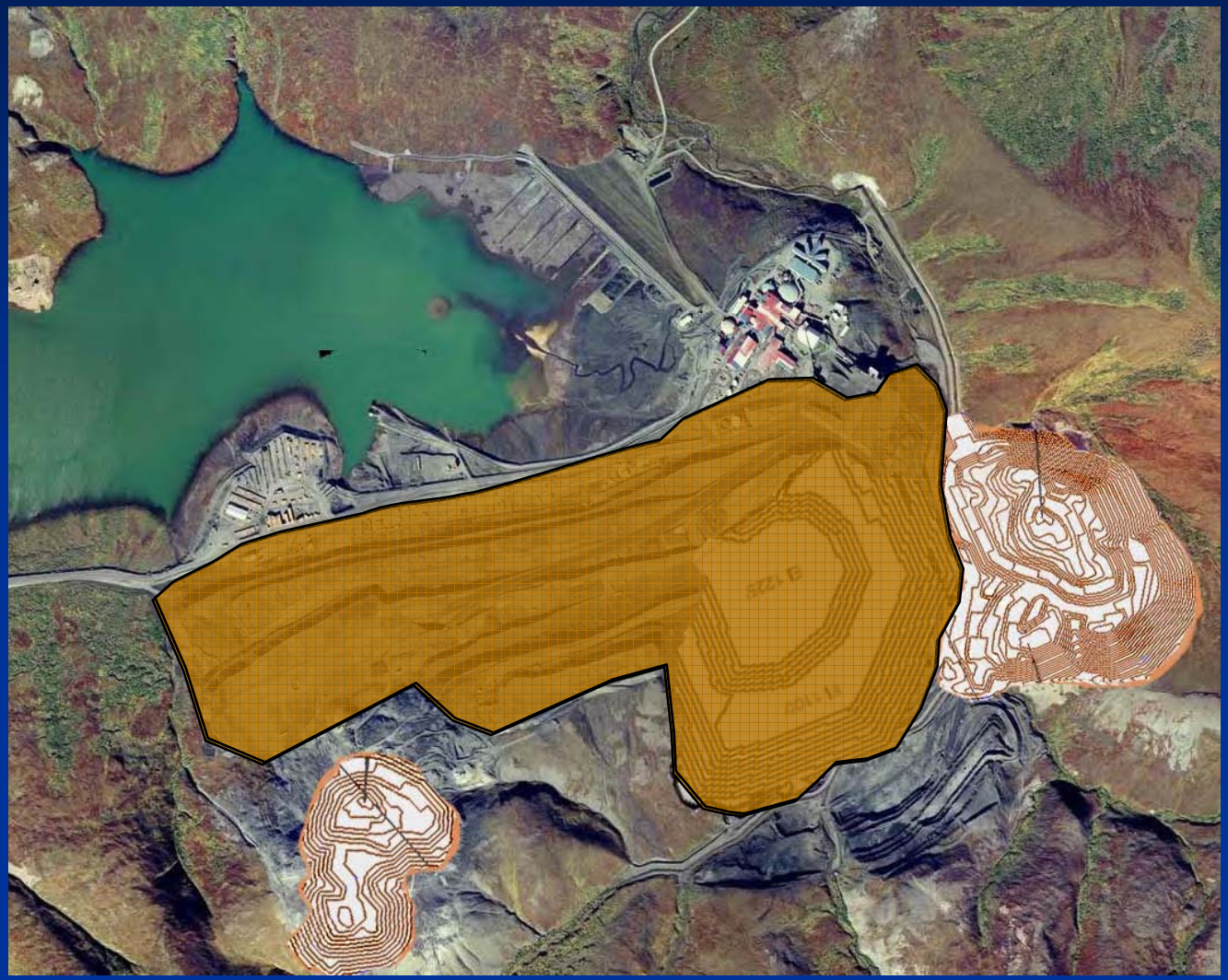


Mine Area Option 3 Complex Soil Cover

Waste Rock Re-Sloping

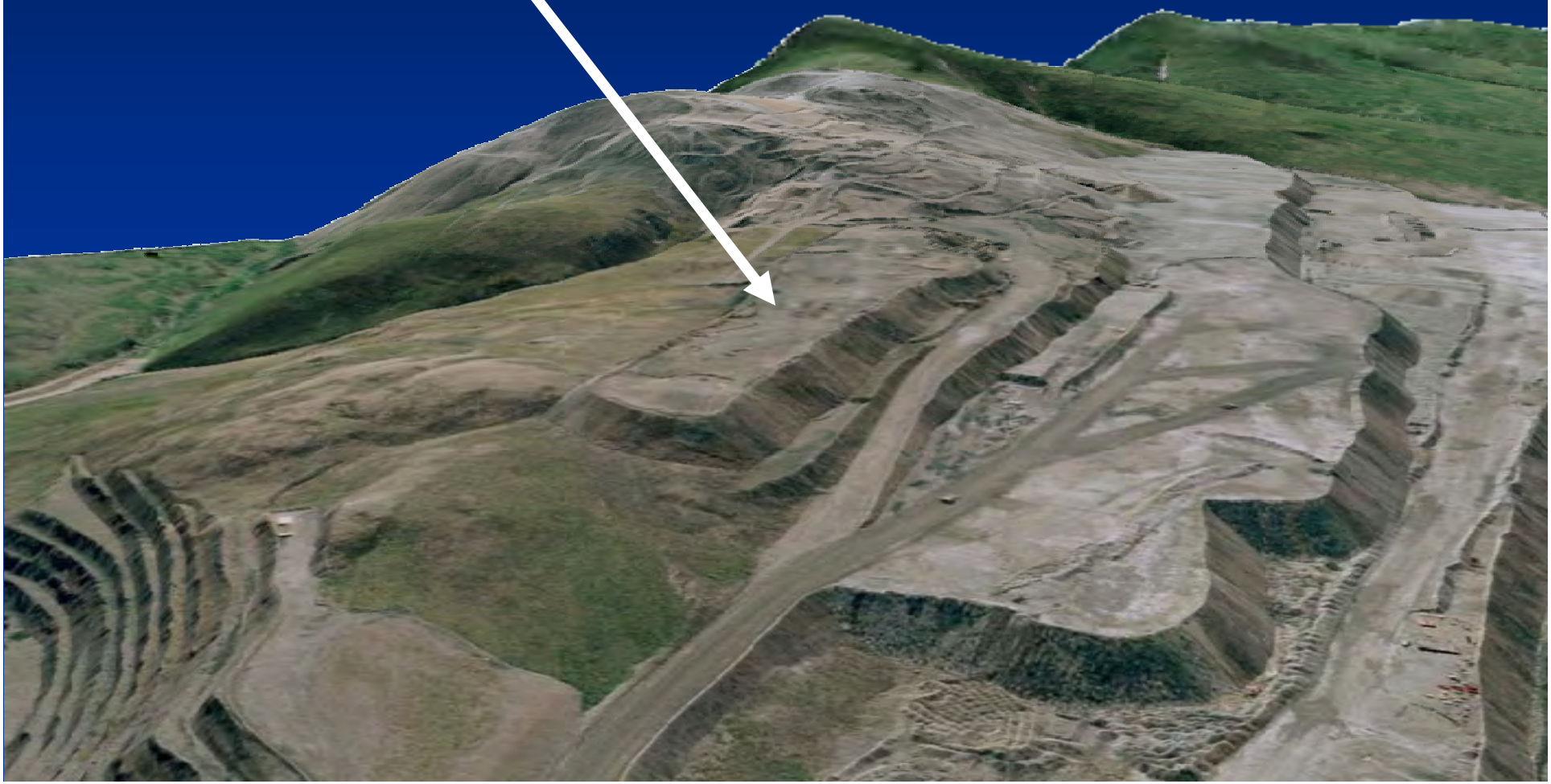
Complex Soil Cover





Cover Construction

- Oxide Stockpile



Pit Lakes

- Pit lakes will be contaminated

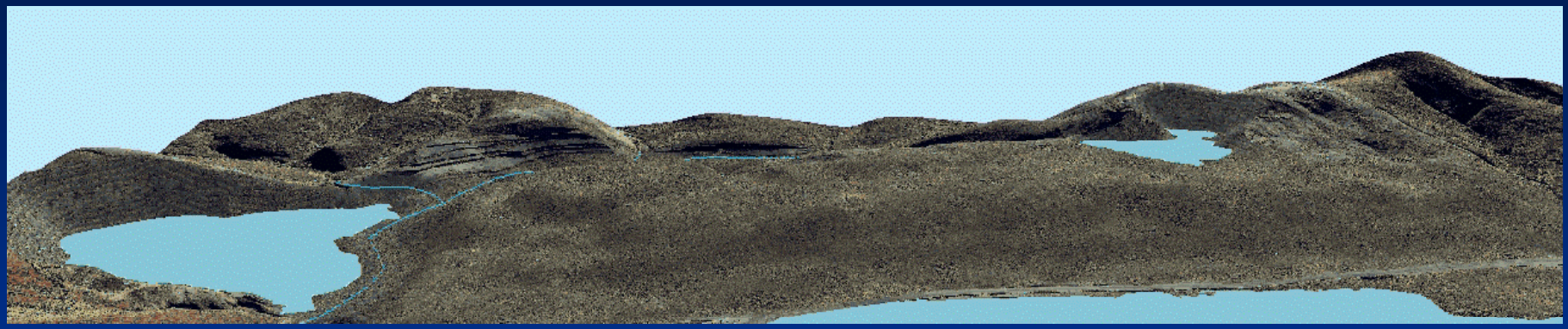
Pit Wall Cutbacks

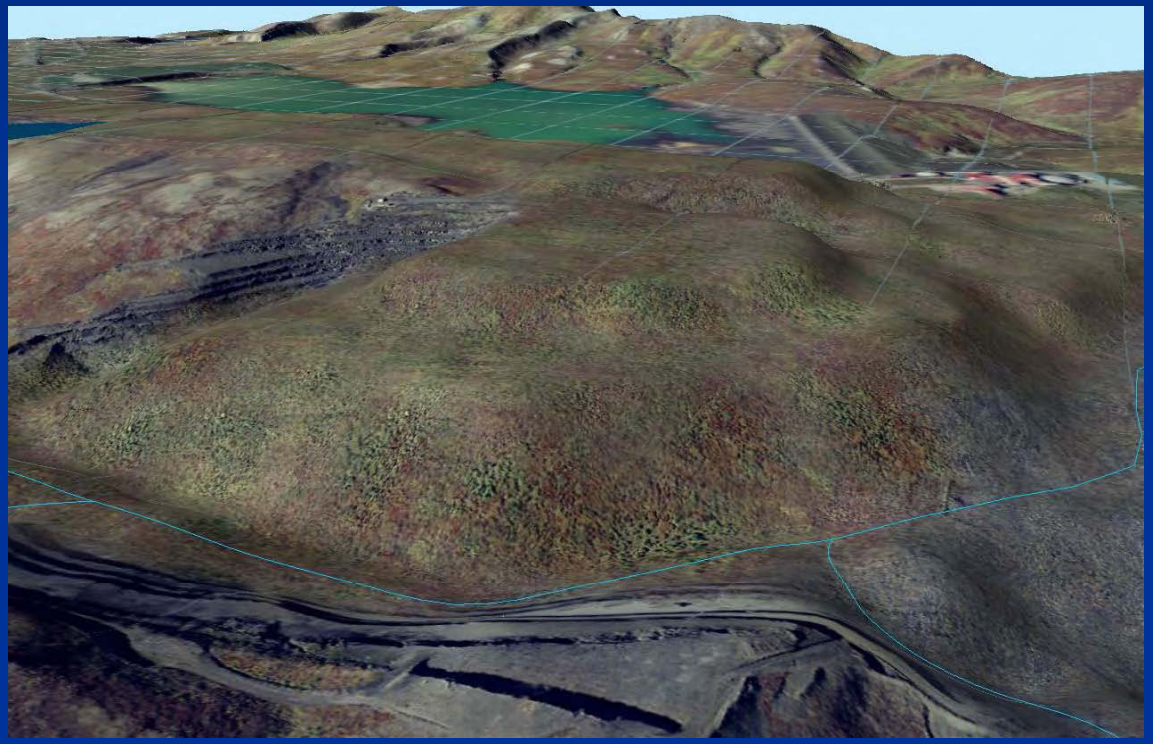
Pit Wall Berms

Red Dog Creek Diversion

- Re-build to new alignment
- Wide enough to pass 500-year flood

Mine Area after Closure





All reactive waste covered

Re-vegetation complete

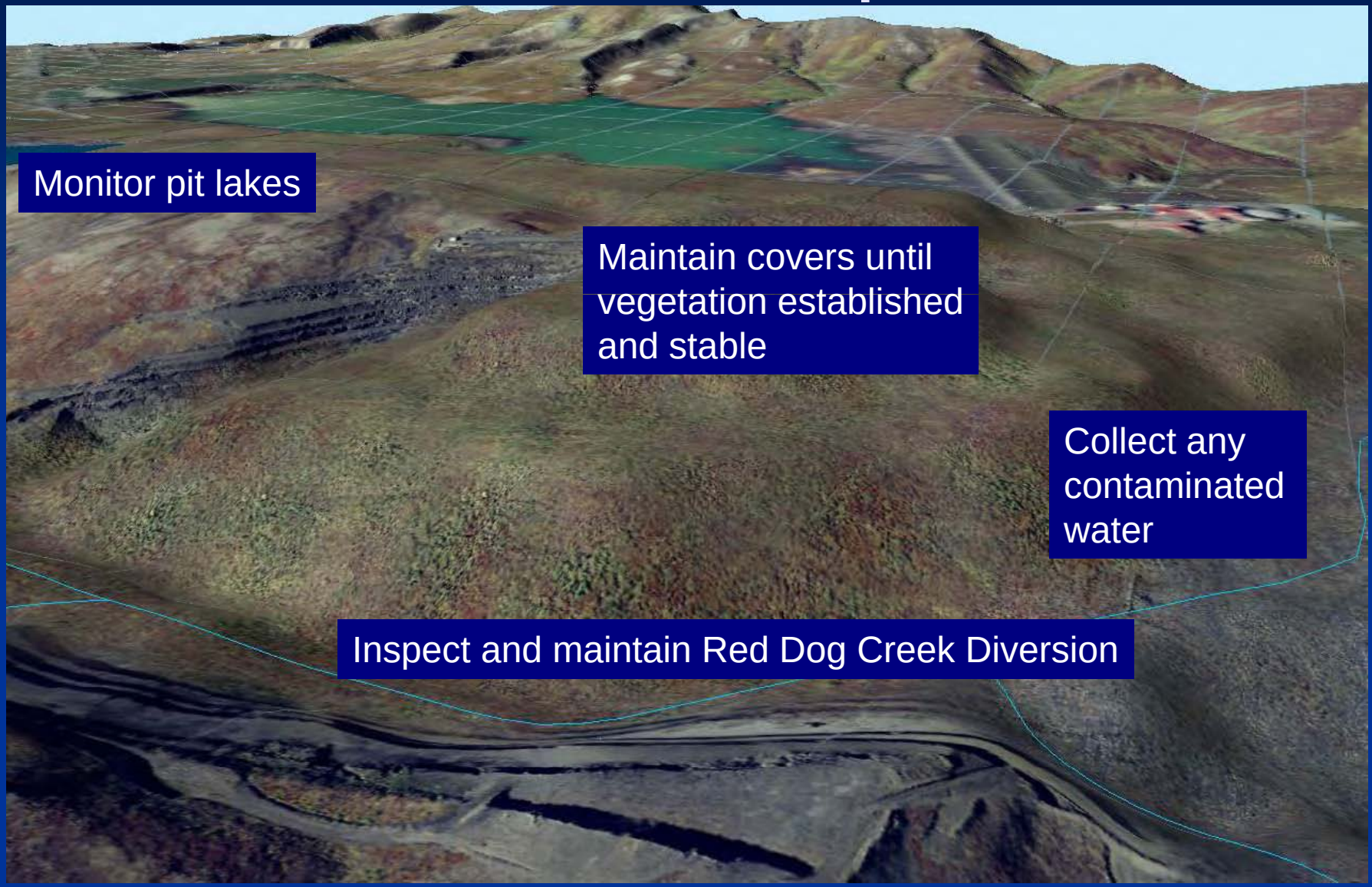
Remaining pit walls safe

Water in Aqqaluk and possibly Qanaiyaq pits

Red Dog Creek diversion upgraded for long term


2004.09.23

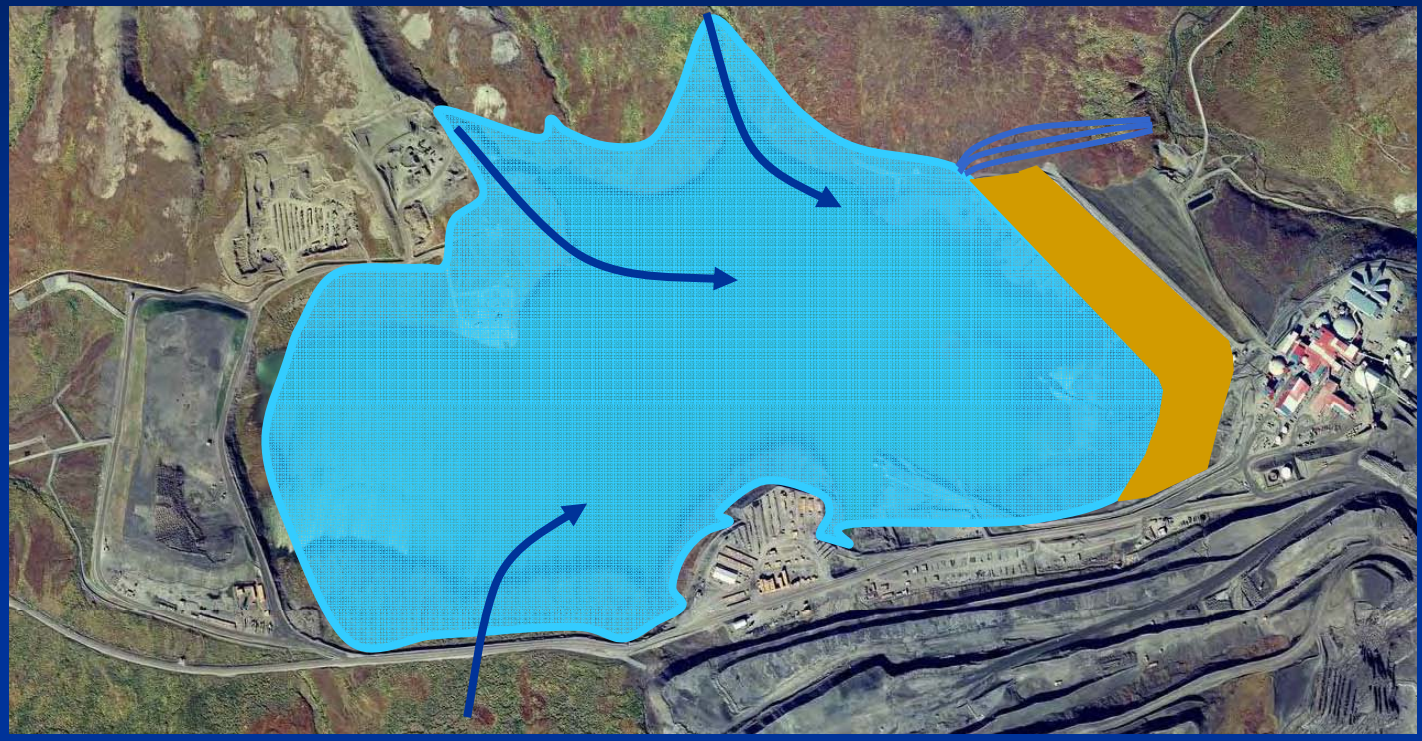
Post-Closure Requirements

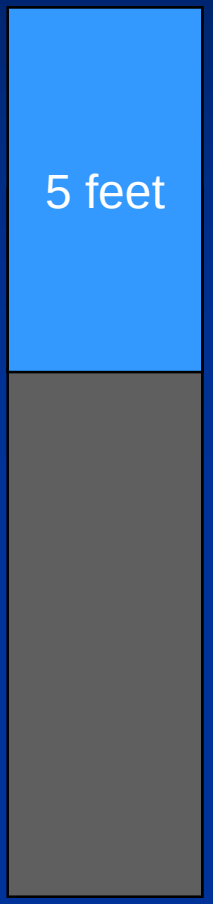


Tailings Area Option 2 Clean Pond

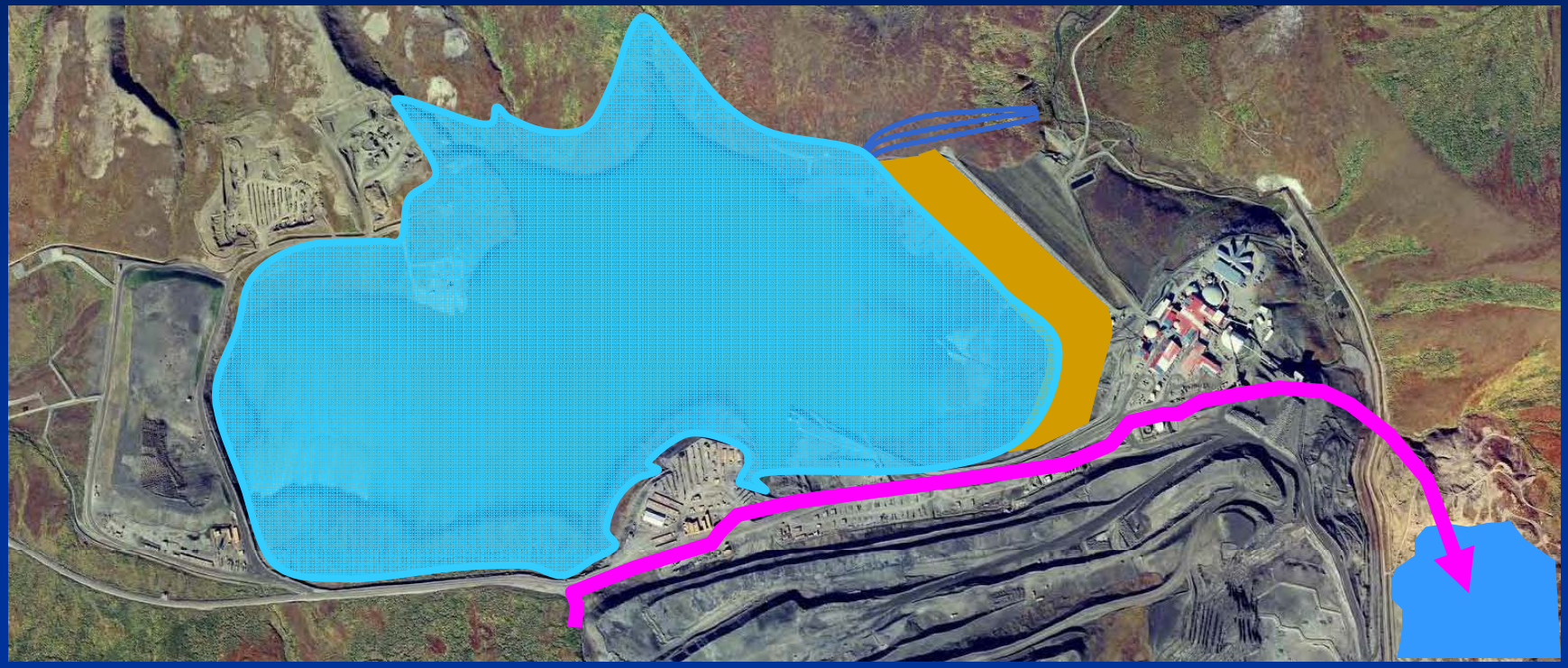
Chemical Stability

Clean Pond

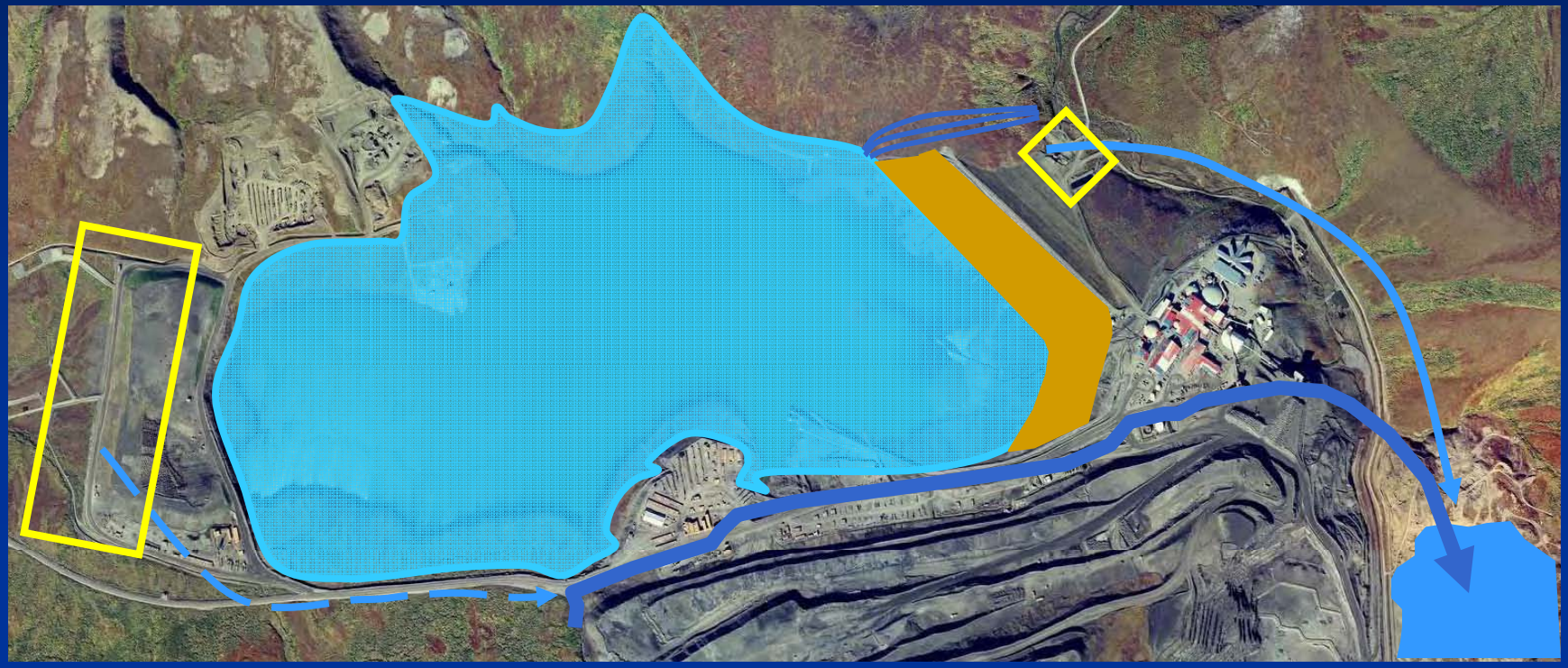




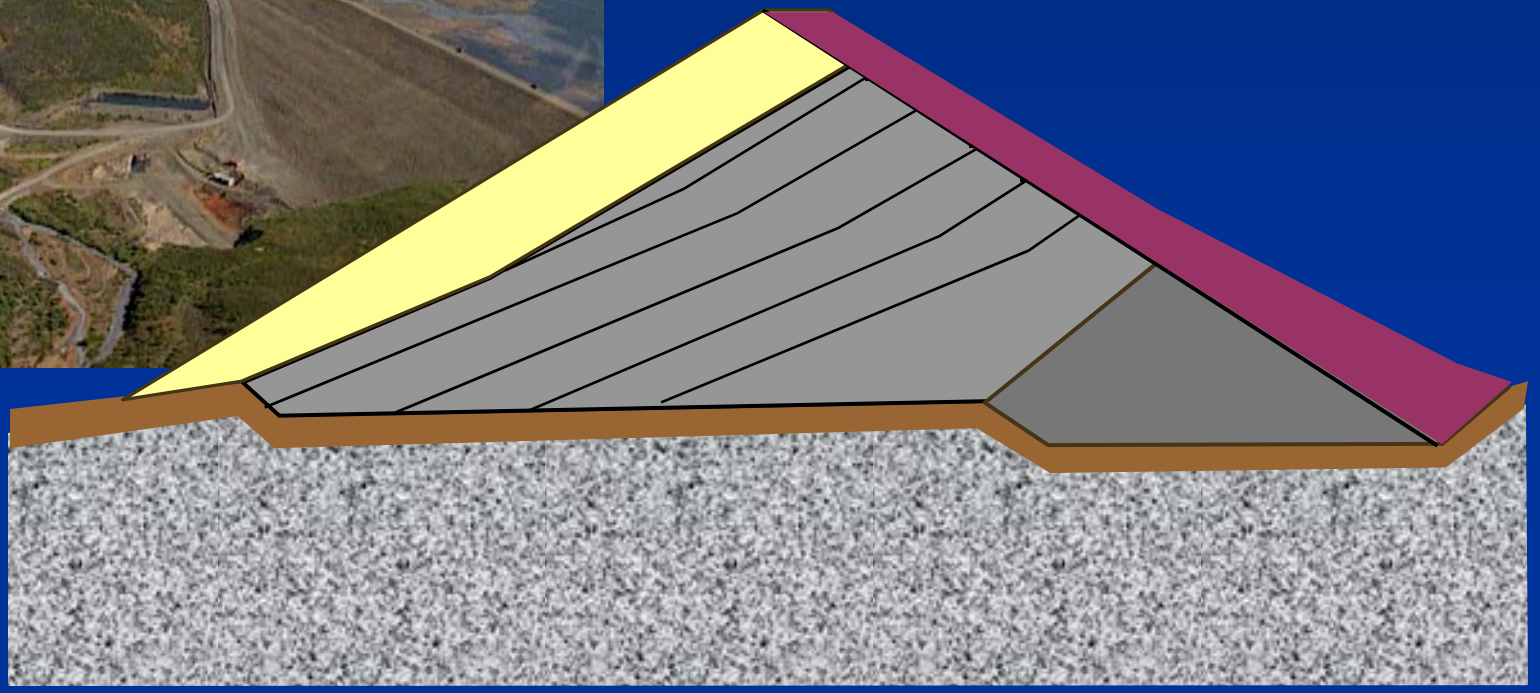
Contaminated Water to Aqqaluk Pit



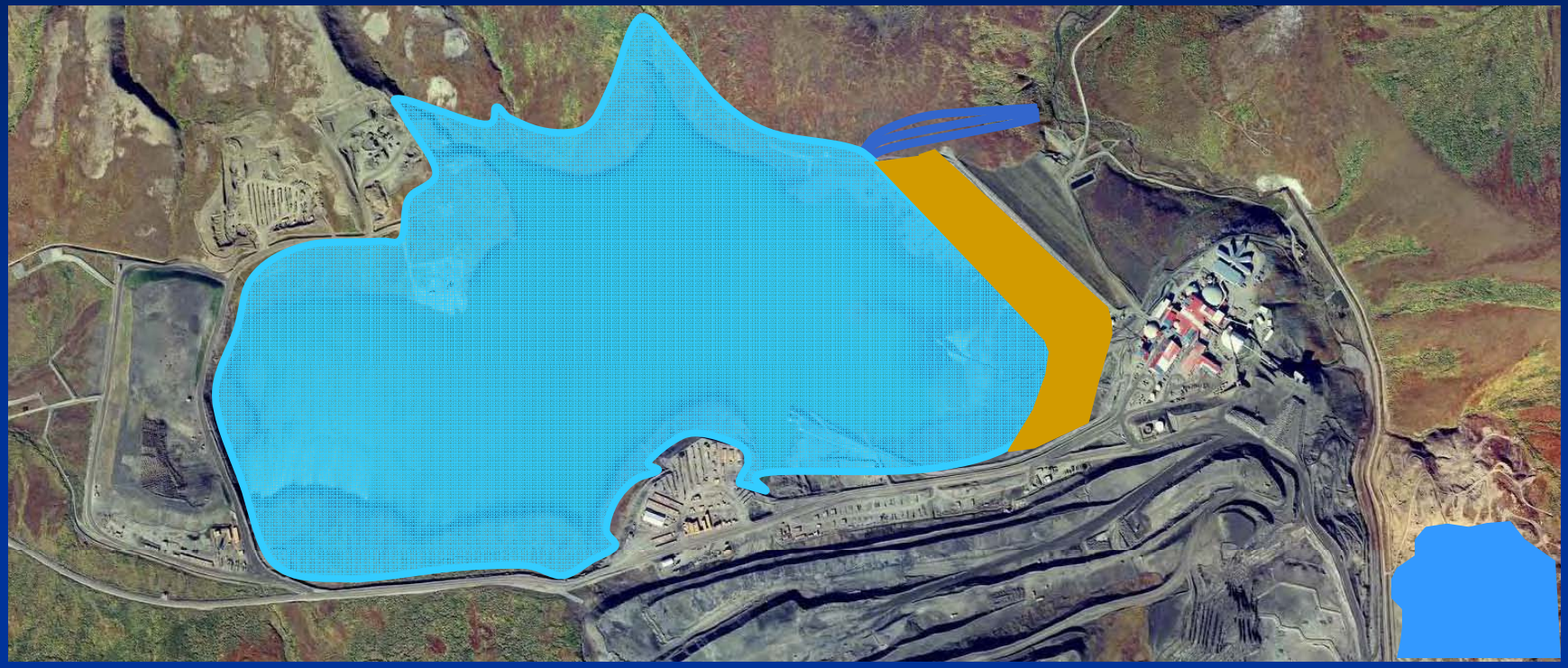
Seepage also to Aqqaluk Pit



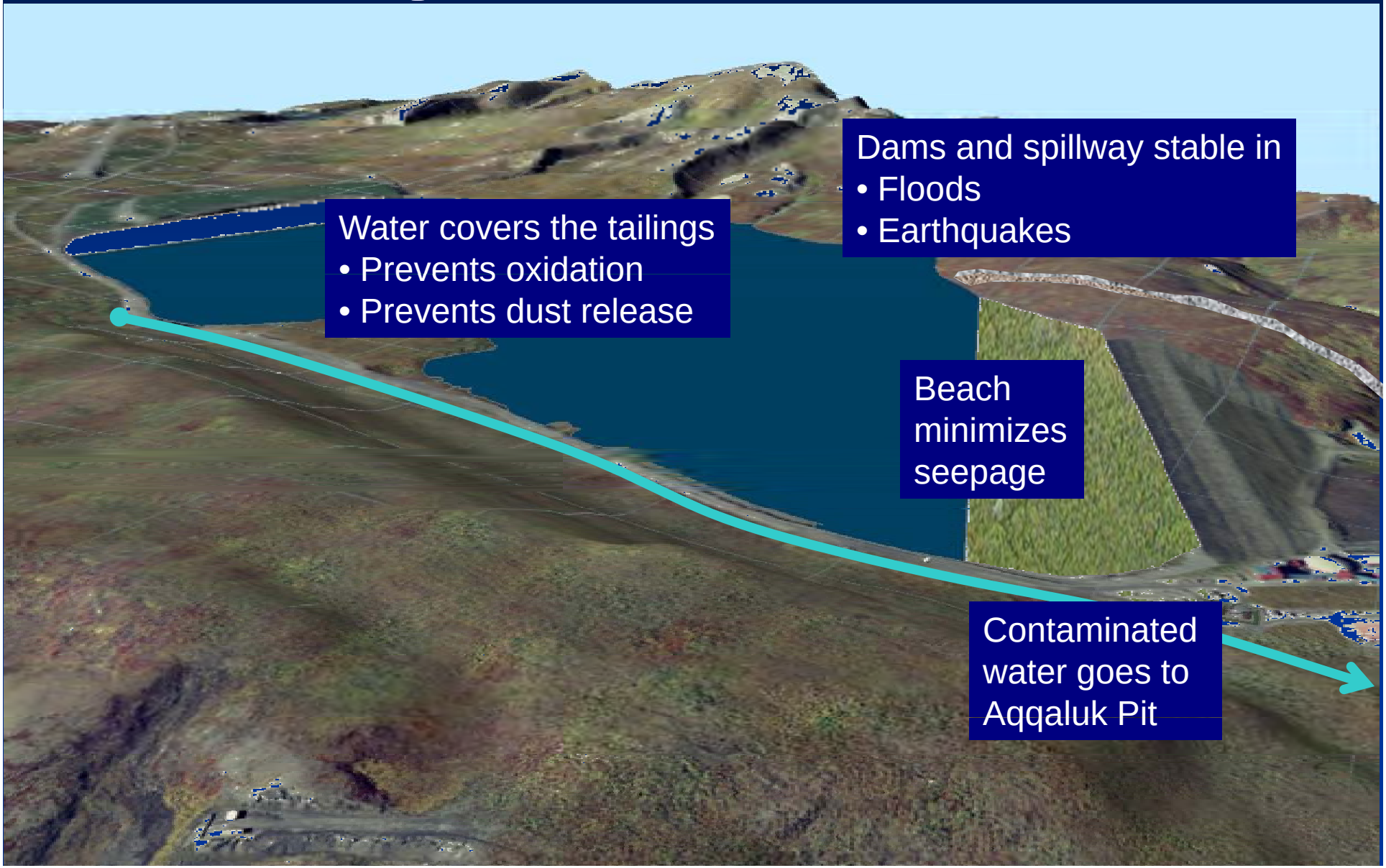
Physical Stability



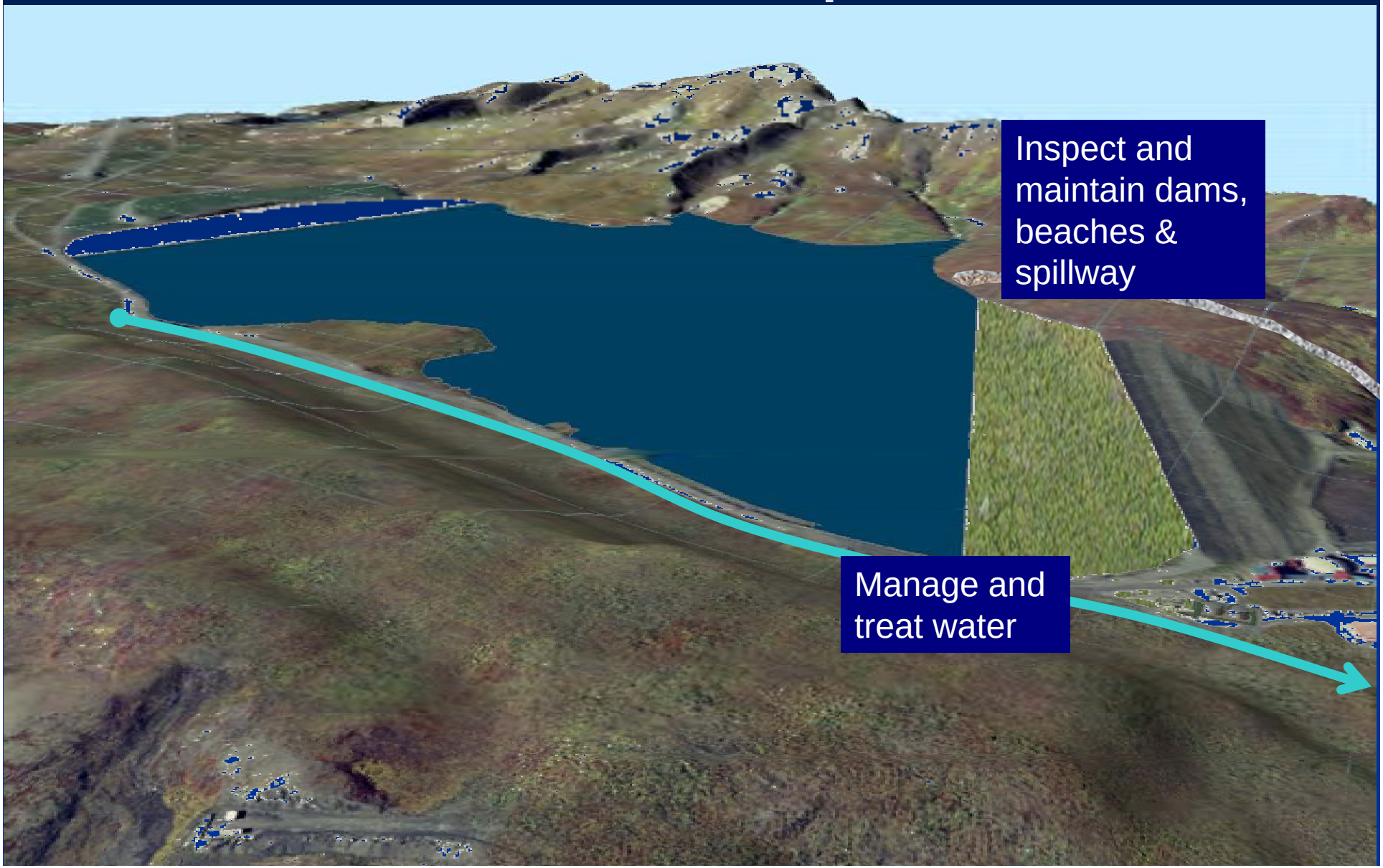
Physical Stability



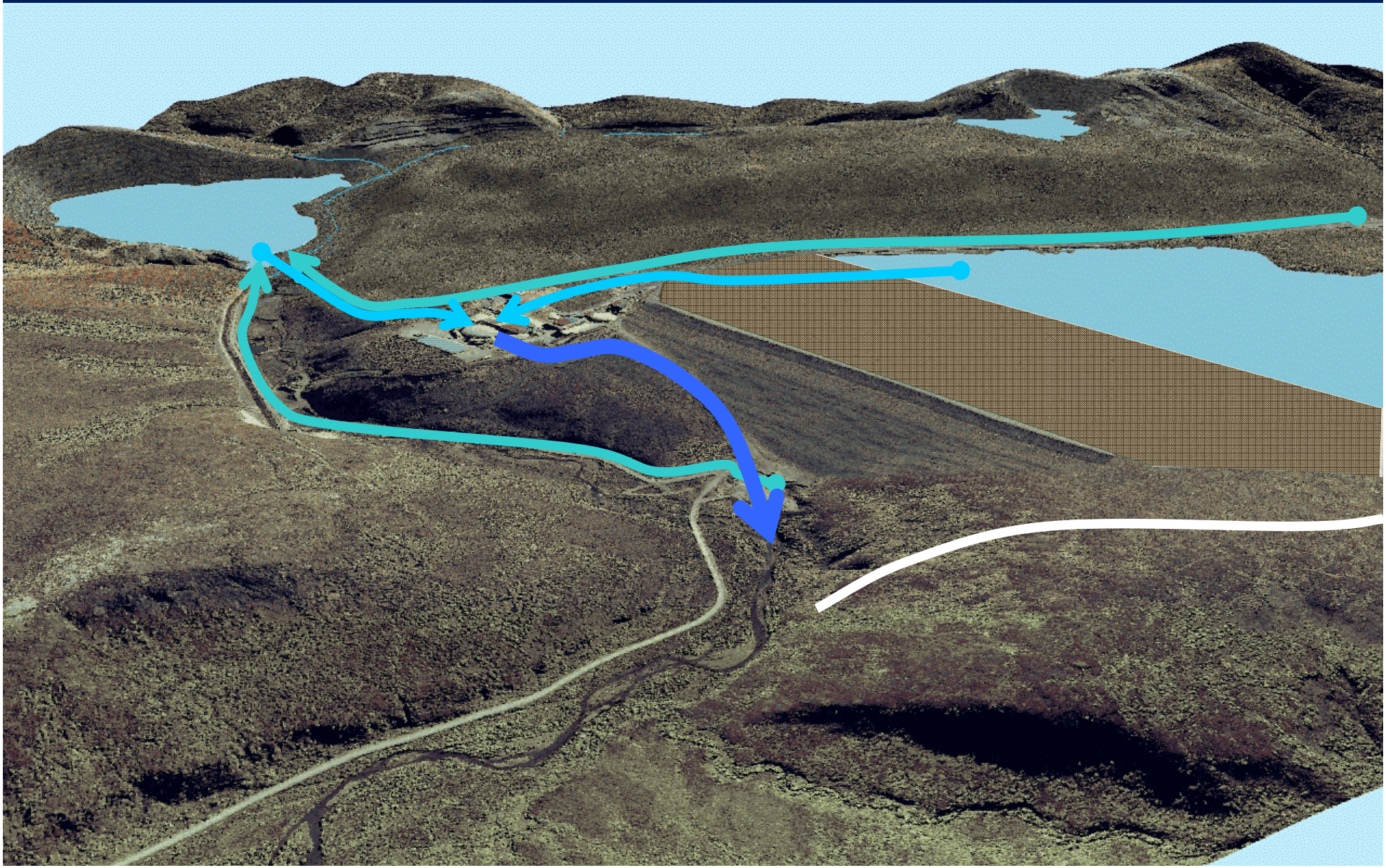
Tailings Area after Closure



Post-Closure Requirements



Water Management & Treatment



Water Treatment and Camp

Water Treatment and Camp

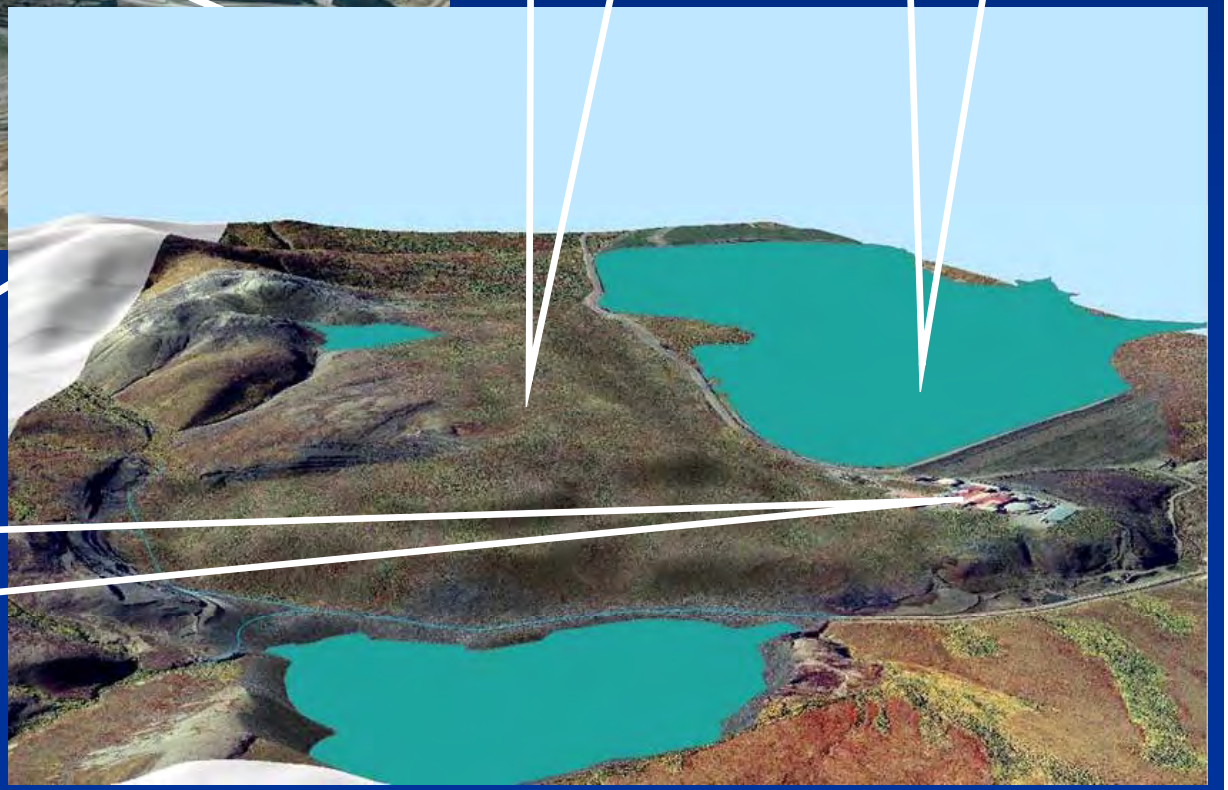
Post-Closure Requirements

- Winter water management
  - 7 people on site
  - 12-14 employees
- Summer water treatment
  - 15 people on site
  - About 30 employees

Summary

Complex Cover on all Waste Rock

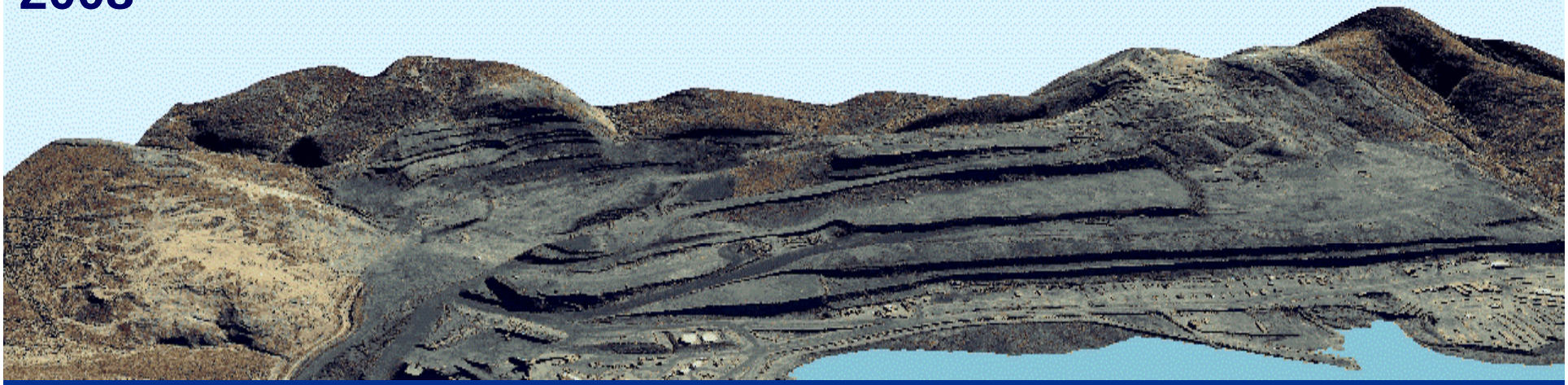
Water Cover on Tailings



Long-Term Treatment of Contaminated Water

Schedule

2008



2010

Schedule

2015

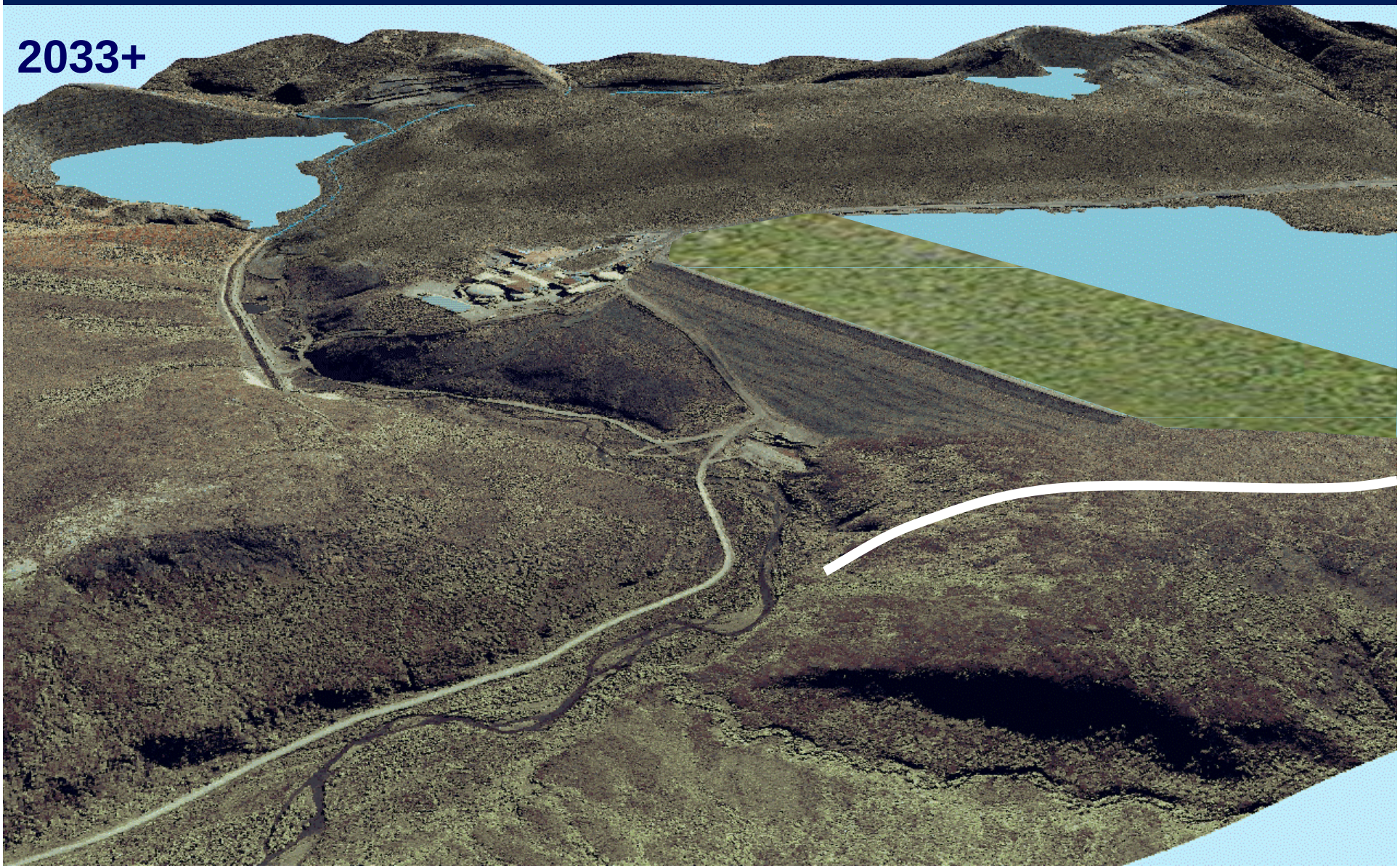
2020

Schedule

2025

2032-33

Schedule



Costs

- Estimates developed by SRK-Red Dog and reviewed by State
- Three parts
  - Suspension period if mine operations stop
  - Closure work in 2032-2033
  - Long-term post closure
- Need to assume third party does all the work

Costs

- Suspension period
  - $13,290,000 per year for five years
- Closure period
  - 2032-2033
  - $51,000,000 total
- Post-closure period
  - 2034 →
  - $10,540,000 per year

Treatment Methods

- Red Dog mine currently treats effluents using Lime treatment
- This process is considered Best Applicable Technology for acidic mine effluents
- Process alternatives assessed and Lime treatment is selected for closure
- Process is proven and simple and been in use for more than 30 years

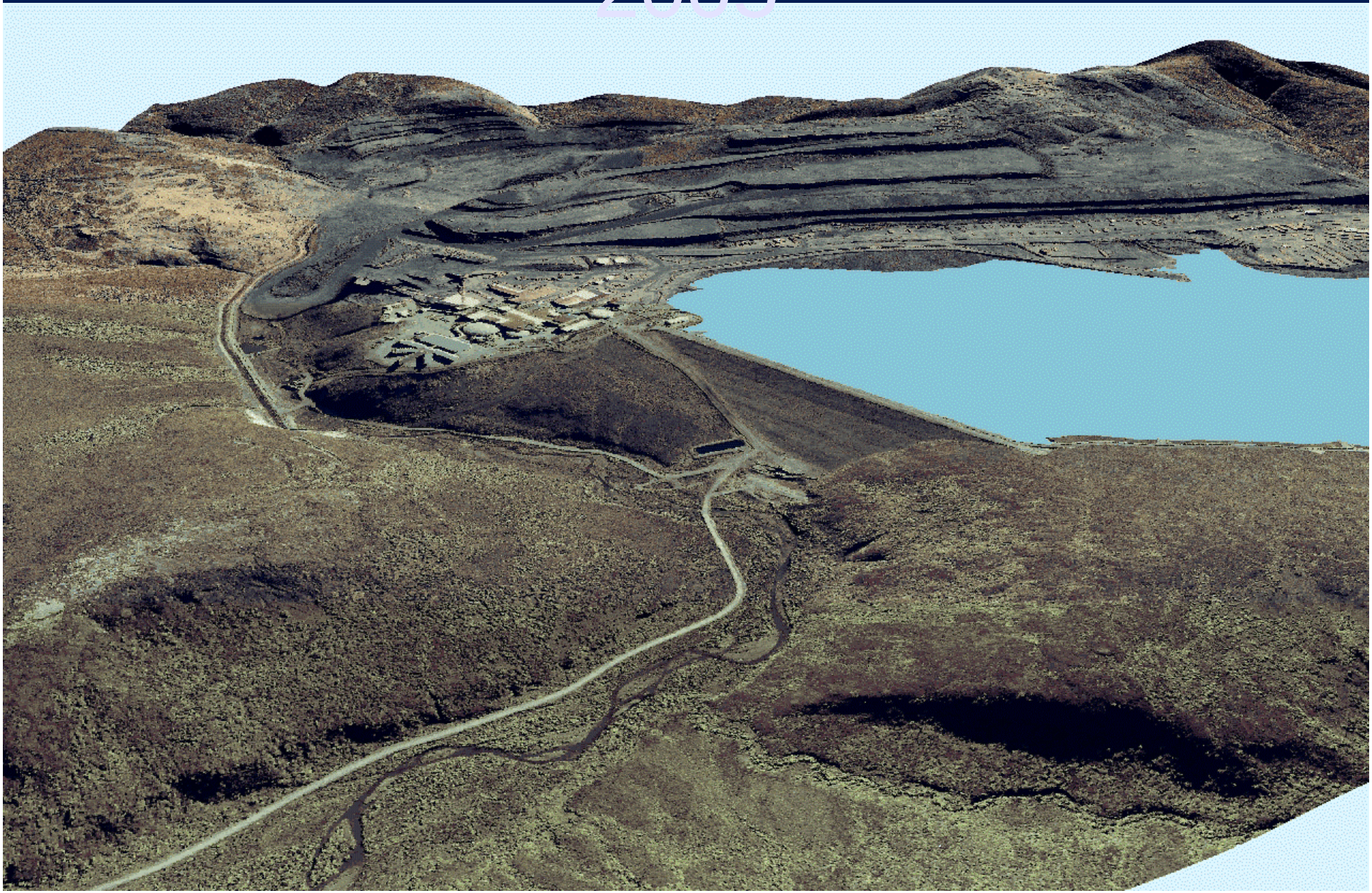
Contaminant Loadings

- Complex covers and flooded tailings will reduce contaminant loads by up to 75%
- After lime treatment, levels of sulfate and dissolved salts will be reduced at closure
- Tailings water over the long term may meet discharge standards without treatment

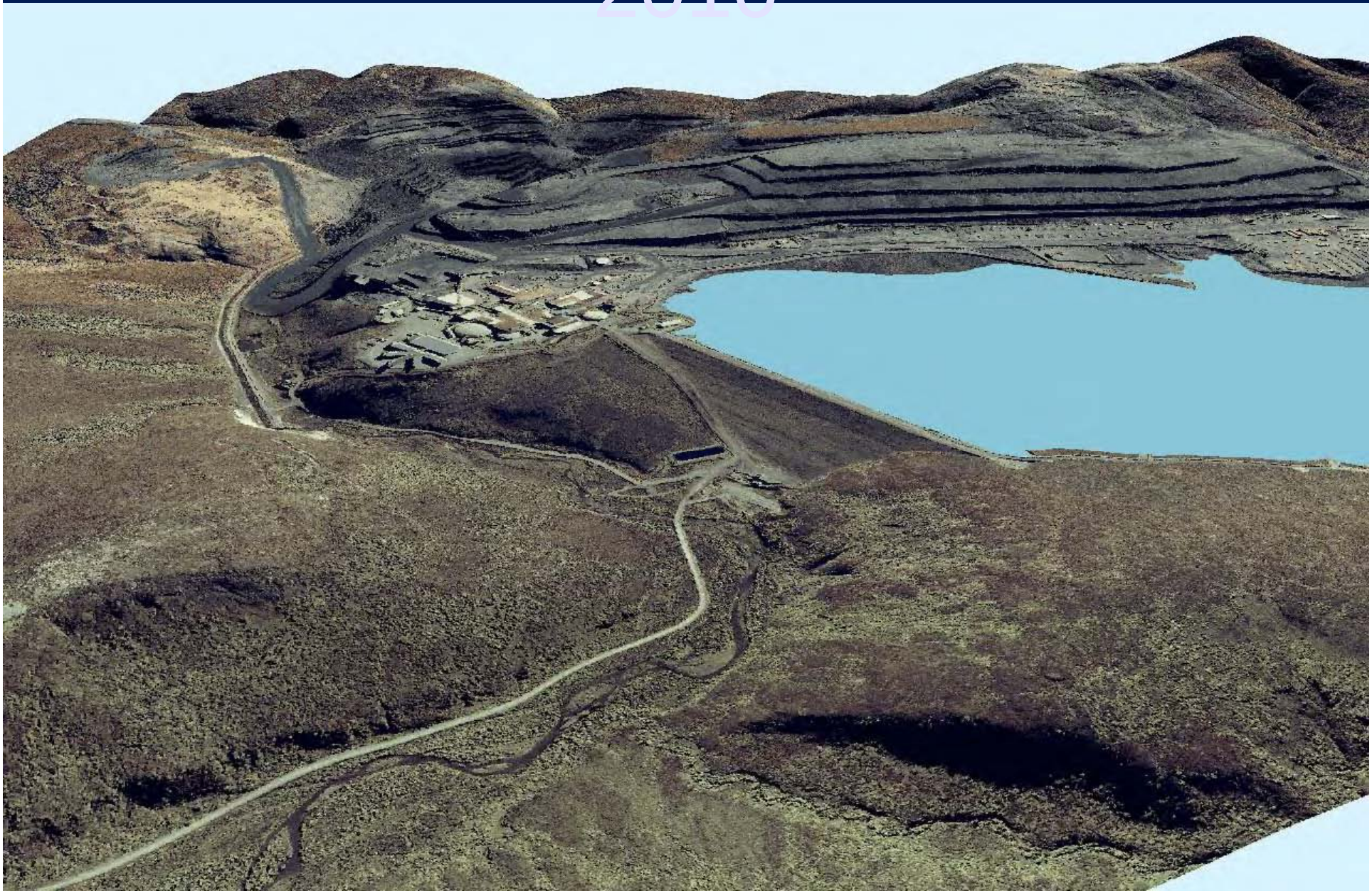
Treatment Application

- Continue with Year Round collection and storage of all contaminated water in the Aqqaluk Pit
- Seasonal treatment of the contaminated drainage in a lime treatment plant with discharge meeting permit levels
- On site disposal of treatment plant sludges (e.g. tailings basin and pits)

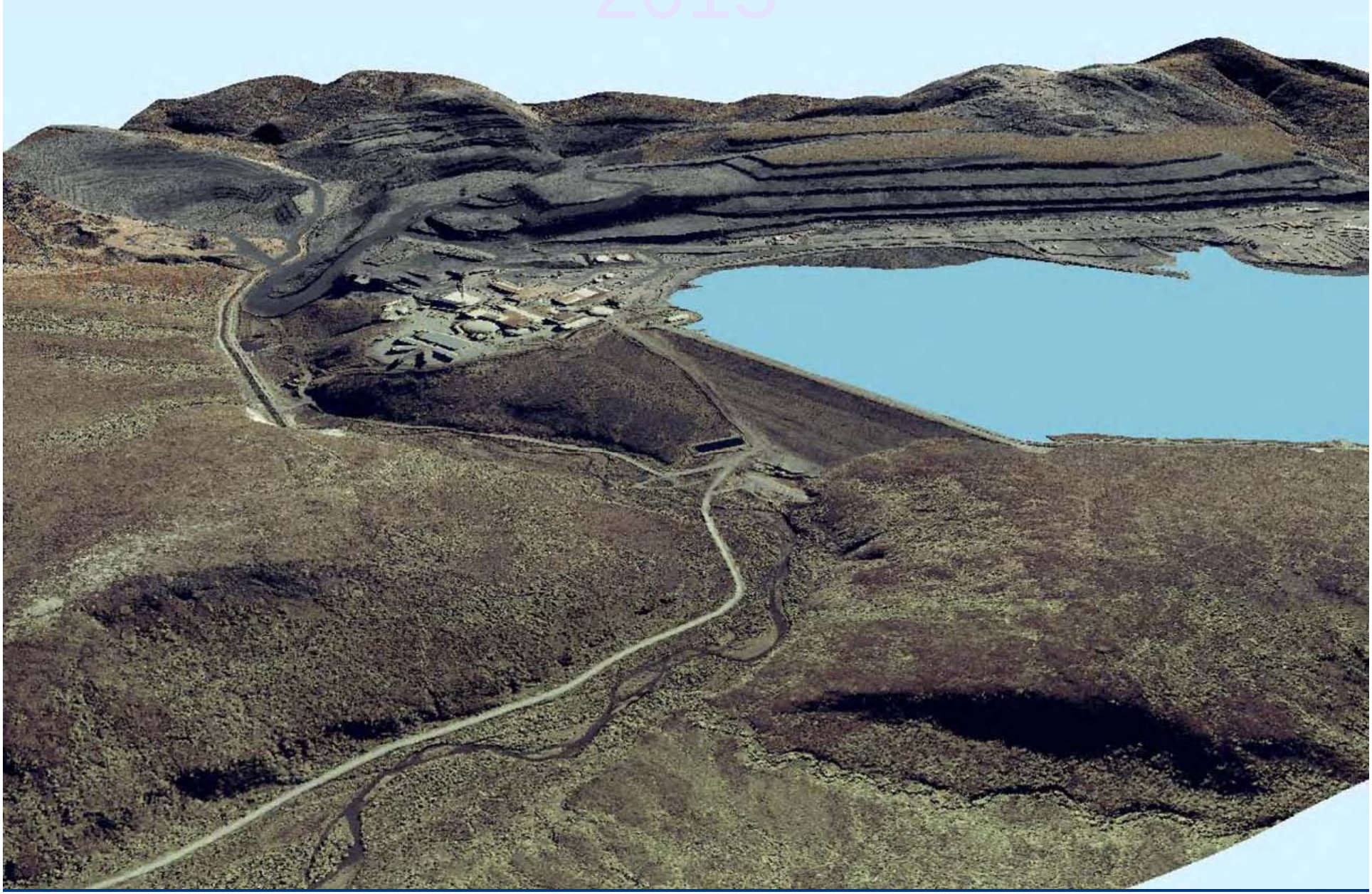
2005



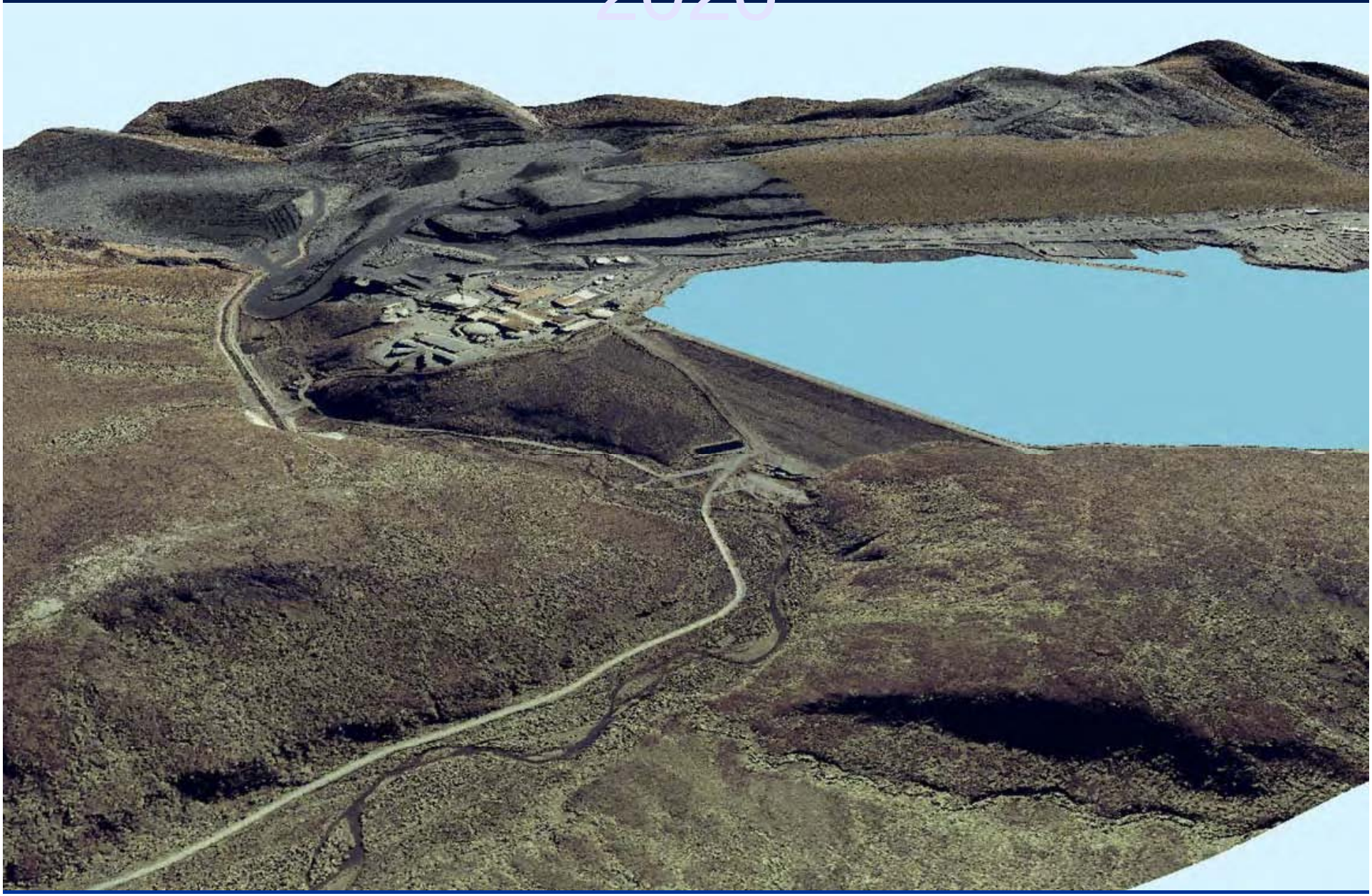
2010



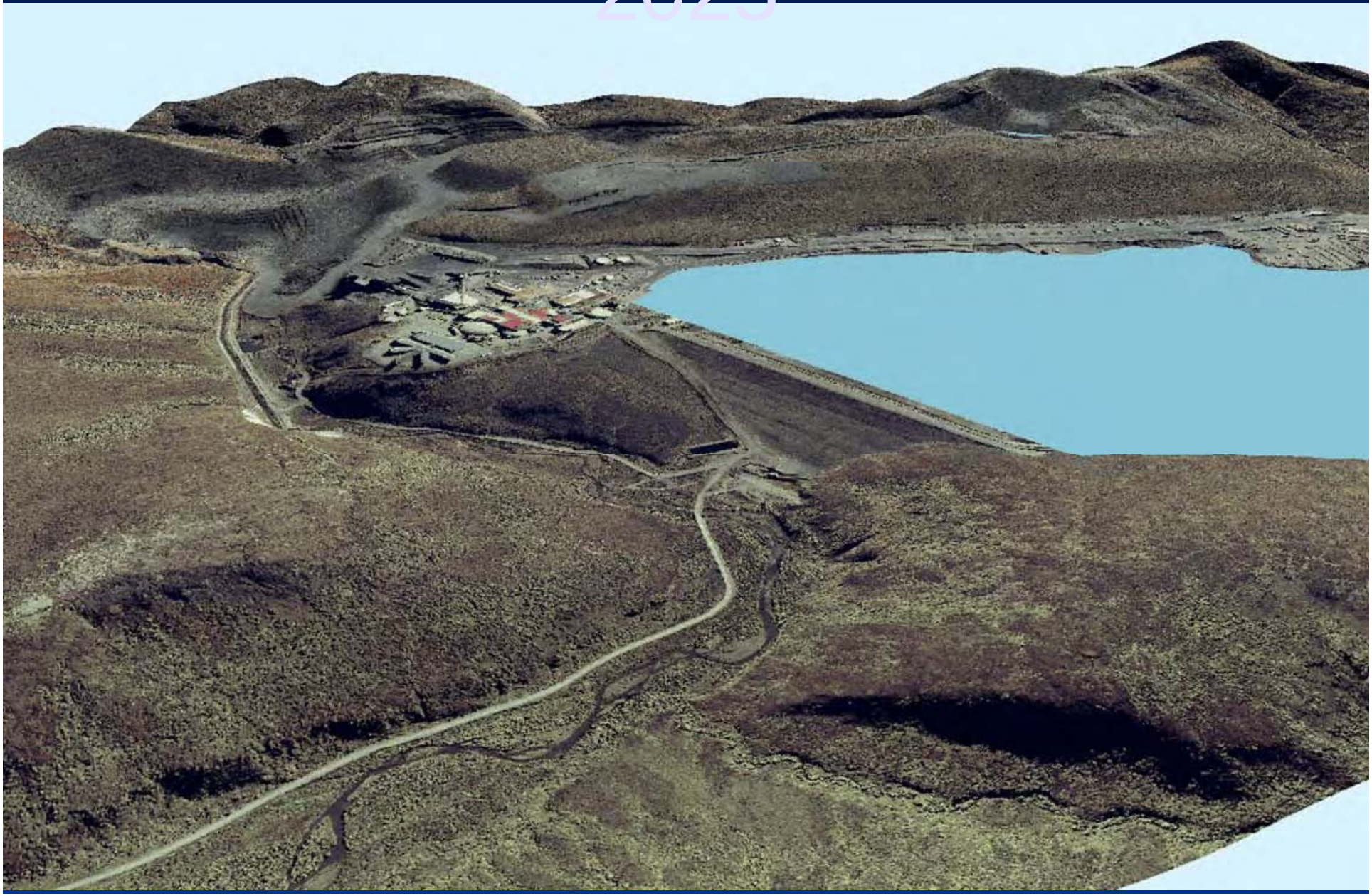
2015



2020



2025



Cover Construction