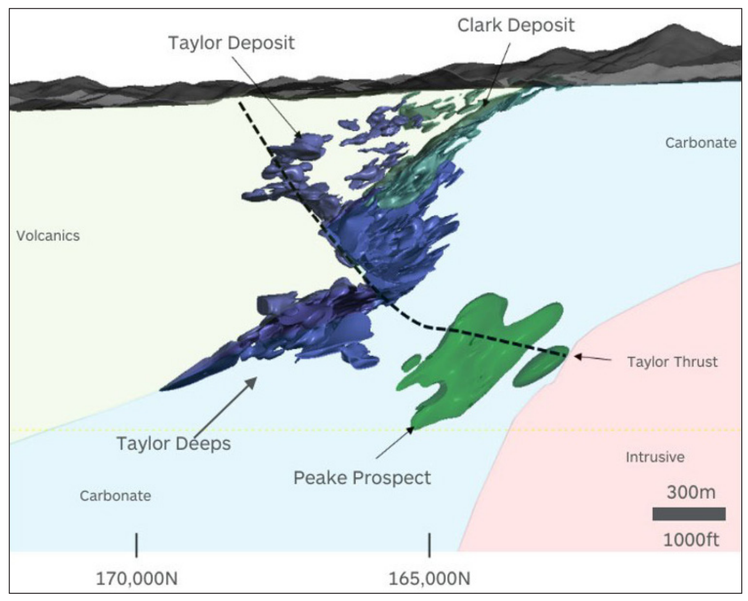
Geological Resources and Geotechnical Conditions

The proposed project would disturb and remove rocks and minerals through the mining of naturally occurring zinc, lead, silver, and manganese from underground. No open pit mining is proposed. Zinc and manganese are identified by the United States Geological Survey as critical minerals.

Dry Stack Tailings Storage Facility

Tailings and waste rock would be placed in a lined, dry stack tailings storage facility which is distinct from a traditional tailings dam/lagoon. Placement of tailings at the surface would expose rocks and minerals to air and water that could lead to acid rock drainage and metals leaching. Runoff water would be captured, treated, and discharged.



Simplified cross section view of host rock with detailed 3D modeling of ore bodies beneath Hermosa Critical Minerals project area.

Geologic Hazards

Increased surface water discharge from the mine during the monsoon season is unlikely to exacerbate natural flooding downstream. Earthquakes, landslides, or subsidence could destabilize mine excavations, tailings facilities, roads, power lines, and other mine facilities.

Environmental Consequences

Under all alternatives:

- Anticipated ground surface subsidence of up to 3-9 inches, depending on the location, by the end of mine life.
- Induced seismicity unlikely.
- Very low likelihood of tailings storage facility instability.

Dry Stack Tailings Facility (TSF1) on South32 Hermosa private land.

The following presents a comparison of effects between alternatives:

Alternative 1 – No Action

- Impacts to rock, minerals, and fossils from underground mining and exploratory drilling.
- No potential for disturbance of federally designated significant cave.

Alternative 2 – Proposed Action

- Impacts to rock, minerals, and fossils greater than under Alternative 1 due to larger underground mining footprint.
- Potential for disturbance of a federally designated significant cave.

Alternative 3 – Modified Proposed Action

- Impacts to rock, minerals, and fossils the same as under Alternative 2.
- No potential for disturbance of federally designated significant cave.

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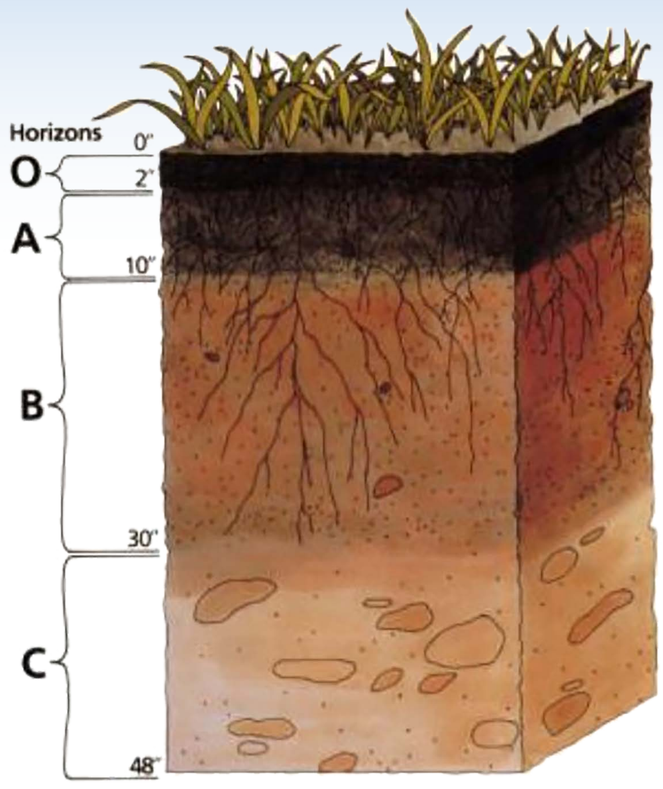
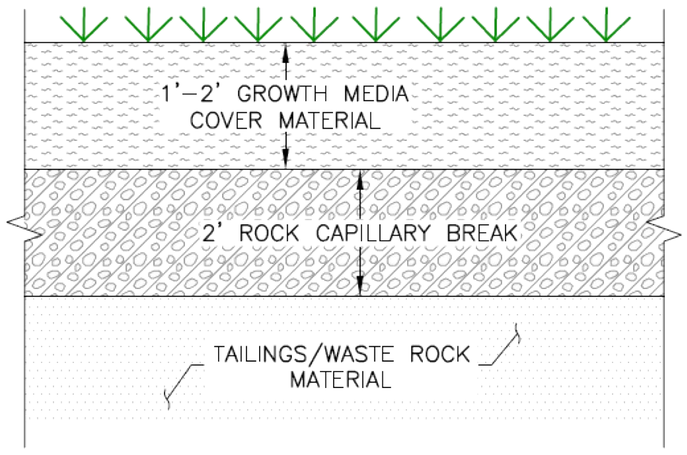
Soils

Soils play a crucial role in supporting vegetation and retaining moisture in the arid environment. Soil types in the region range from shallow (less than 20 centimeters) to deep (200 centimeters), with varying proportions of sand, silt, clay, and unweathered rocks.



Soil Horizons, Patagonia Mountains, NRCS



Okane Consulting Conceptual TSF cover system configuration.

Environmental Consequences

Under all alternatives:

- The proposed project would disturb and expose soils by clearing vegetation, grading, and stockpiling, which would make soils more susceptible to erosion and reduce soil productivity.
- Activities could result in soil removal, disturbance of soils, loss of soil productivity, and increases of contaminants in the soil.
- Potential impacts to soils will also depend on the success of stockpiling soils and reclamation/revegetation success.
- Mine dewatering and lowering of the water table may contribute to the drying of soils at locations where there is an existing hydrologic connection between shallow surface water and the regional groundwater aquifer, which can reduce soil moisture, generate dust, and lead to increased sedimentation and turbidity in waterways.

The following presents a comparison of effects between alternatives:

Alternative 1 – No Action

- Impacts to soil could occur on private land but much of that land has been previously disturbed.
- Impacts to soil from stockpiling, soil erosion, potential for dust generation, and impacts to soil moisture.

Alternative 2 – Proposed Action

- Impacts to an additional 448.5 acres (442.5 acres on NFS land and 6.0 acres on private land) compared to Alternative 1 – No Action. Impacts would be greater due mostly to the TSF2 footprint and from construction of the Primary Access Road.
- Impacts to soil would be greater than under Alternative 1 – No Action due to the increased footprint.

Alternative 3 – Modified Proposed Action

- Impacts to an additional 496.9 acres (449.4 acres on NFS land and 47.5 acres on private land) compared to Alternative 1 – No Action. Impacts would be greater due mostly to the TSF3 footprint.
- Impacts to soil would be greater than under Alternative 1 – No Action and Alternative 2 – Proposed Action due to the increased footprint.

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