MEMORANDUM

Date: August 24, 2026

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: Jan Lesher
County Administrator

Re: **Copper World and Water Resource Impacts East of the Santa Rita Mountains**

Background

Attached is a report entitled "Copper World East of the Santa Rita Mountains". The report examines anticipated impacts of Hudbay's proposed Copper World Phase 1 mining activities on the east side of the Santa Rita Mountains, with particular emphasis on groundwater resources, springs and streams, and water quality.

On July 20, 2026, I responded to Hudbay's correspondence regarding the proposed Copper World project and advised that the County continues to be concerned about the proposed project's impacts to water resources on the east side of the Santa Rita Mountains. I indicated that a more comprehensive review of those issues was underway. This report provides this additional review and will also be forwarded to Hudbay.

Impacts to the Cienega Watershed

While much of the recent discussion surrounding the Copper World project has focused on the proposed mine's west-side facilities and impacts to the Santa Cruz watershed, Phase 1 of the project continues to include two pits and associated infrastructure within the Cienega Creek watershed on the east side of the mountain range. Hudbay has also continued to describe Phase 1 as the foundation for a future Phase 2 expansion that could ultimately affect 6,500 acres total including public land within Coronado National Forest if the mining industry is successful in their efforts to overcome the legal constraints that currently restrict the disposal of waste rock and tailings on national forest lands.

The report concludes that many of the concerns Pima County raised during the prior federal Environmental Impact Statement (EIS) process for the Rosemont Mine remain applicable today. These include aquifer depletion, impacts to groundwater-dependent springs and streams, degradation of water quality, loss of wildlife habitat, and inadequate reclamation planning. However, unlike the former Rosemont Mine proposal, Phase 1 of Copper World is proceeding without an EIS because the current proposal is limited to private land and is thus not subject to the National Environmental Policy Act (NEPA). As a result, many of the federal monitoring, reporting, and mitigation requirements that previously applied are no longer required, and

changes in federal and state regulatory frameworks have further reduced environmental oversight over projects like this.

Reduction in Stream Flows

Among the principal concerns are impacts from dewatering of the Rosemont (East) Pit, creation of a hydraulic sink that alters the direction of groundwater flows towards the pit, and long-term groundwater depletion associated with perpetual pit lake evaporation following mine closure. All these impacts are expected to reduce the groundwater available to sustain Cienega Creek, Empire Gulch, Davidson Canyon, and other groundwater-dependent ecosystems. The report notes that protecting these irreplaceable resources has been the focus of decades of conservation investments by Pima County, the State of Arizona, the Bureau of Land Management, and numerous other partners.

Water Quality Impacts

The report also identifies significant concerns regarding water quality impacts. Because groundwater extracted from the Rosemont Pit cannot be transferred across the Tucson Active Management Area boundary for use in the mine's west-side operations, Hudbay has proposed discharging excess groundwater into natural drainages on the east side. Questions remain regarding the quality of that water, the location of any proposed discharges, and whether these discharges will be subject to permitting requirements or other oversight. In addition, the report notes that the project's Aquifer Protection Permit exempts the Rosemont Pit from groundwater quality compliance monitoring requirements that would otherwise provide additional regulatory oversight.

Additional concerns discussed in the report include potential mobilization of naturally occurring metals during blasting and excavation of the Broadtop Butte area, the absence of commitments to continue pre-construction surface water quality monitoring that occurred under the Rosemont Mine proposal, and the adequacy of reclamation planning and financial assurances based on an evolving mine design. The County's Regional Flood Control District will continue its own surface water monitoring efforts, including water quality monitoring on County-owned and District properties, where recent increases in dissolved metals in base flows have warranted continued attention.

The report documents other actions that have reduced water quality protections over time. For example, beginning in 2012, mine technical staff encouraged the Arizona Department of Environmental Quality (ADEQ) to remove the Outstanding Waters designation from lower Davidson Canyon, a designation that provided enhanced protections under the Clean Water Act. The report states that ADEQ subsequently removed that designation in 2022 and later revised its Outstanding Waters rules in ways that narrowed future application of these protections to streams across Arizona. These regulatory changes, combined with reductions in federal Clean Water Act jurisdiction, further limit the environmental safeguards that were available during the earlier Rosemont Mine review process.

Available and Evolving Information

It is important to recognize that the report is based on publicly available information, much of which continues to evolve. Hudbay has indicated that the project design remains subject to change pending completion of a definitive feasibility study, and inconsistencies currently exist among various permitting documents, investor presentations, and technical reports. The recently acquired Cactus Mine in Pinal County and its connections to Copper World could also affect operations and related impacts. The absence of a comprehensive federal environmental review makes it very difficult, if not impossible, for both the public and reviewing agencies to fully understand the full scope of impacts that could result from this project.

Summary

County staff will continue to review project developments, monitor water quality on County-owned properties within affected watersheds, and engage with state agencies regarding the project. Departments are currently reviewing past performance standards and mitigation requirements associated with prior iterations of this project and are identifying which measures continue to be applicable, in preparation for staff's review of the final feasibility study which is expected this year. The results of that review will be also shared with the Board.

JKL/anc

Attachment

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Copper World East of the Santa Rita Mountains

Julia Fonseca, Madrean Resources

Summary of Concerns

Copper World's Phase 1 proposes to mine both sides of the crest of the Santa Rita Mountains. This report focuses on the east-side land and water impacts of Phase 1 mining. The effects largely remain the same as those Pima County expressed to the regulatory agencies during the development of the Rosemont Environmental Impact Statement (EIS) and the mine's associated permits. These include aquifer depletion, loss of wildlife habitat, and impacts to runoff and recharge on adjacent public lands that have been under stress already due to over two decades of drought and increased heat. Specific concerns regarding Phase 1 Copper World include:

1. The conversion of thousands of acres of the northern Santa Rita Mountains to an industrial zone for resource extraction, for without Phase 1 investments of power, water, access and ore processing, there can be no later expansions.
2. Perpetual and unmitigated loss of groundwater and alteration of groundwater gradients caused by the pit lake that would form at closure of the Rosemont (East) pit. Partial backfilling could reduce the long-term effects of perpetual losses to the aquifer caused by a pit lake, but is not proposed.
3. Significant impacts to and diversion of surface water that will, with onsite groundwater pumping and the Rosemont pit lake evaporation, deplete the aquifer in perpetuity, threatening springs and streams that are currently adjacent and downgradient from the mine.
4. The inadequacy of reclamation planning, bonds and standards to remediate and maintain the site after closure.
5. Underestimation of flood volumes and peak discharges, which creates greater risks for the success of approaches intended to control movement of pollutants from disturbed areas.
6. Inadequate standards and mitigation measures for water quality protection under state and federal law. Given that this setting is more sensitive than many others, the concern was always that state and federal regulatory requirements and mitigation commitments for the Rosemont mine were inadequate.

Now, many of the reporting, monitoring and mitigation commitments associated with the Rosemont proposal are gone. Important state and federal regulatory requirements under the Clean Water Act that used to apply have also been weakened or no longer exist.

Background and Purpose

Since the 1970s, Pima County residents have been concerned about the potential effects of open-pit mining in the northern Santa Rita Mountains. Pima County has a long history of providing copper; the effects of open-pit mines are not unknown to its populace. At the same time, groundwater-dependent ecosystems associated with Cienega Creek, Empire Gulch and Davidson Canyon have been the focus of decades of water and habitat protection efforts by local governments, the state, and U. S. Bureau of Land Management.

Reflecting popular sentiment, Pima County Board of Supervisors opposed this mine in the 1990s, and opposed it again after participating in studies of the Rosemont Copper Project's environmental impacts earlier this century. The county's position is rooted in the deep and permanent impacts that this particular mine would have on land and water in the Coronado National Forest and beyond, including County-owned lands dedicated as mitigation for urban development under the Endangered Species Act.

The proposed mine configuration has changed somewhat to include new areas on the west flank of the mountain. While much attention has been placed on the potential impacts of Copper World on residents of the Santa Cruz valley, in a tour of Hudbay lands on May 22, 2026, Hudbay representatives said they still plan to mine on the eastern side as well. During the tour with Pima County officials, Hudbay confirmed that early Phase 1 operations would require excavations below the water table, which is currently a source of recharge to the Cienega groundwater basin.

This memorandum describes in general terms what is known about the proposed construction and operation of the first 20 years of Copper World on the east side of the mountain crest. The impacts on water resources, the proposed mitigations and monitoring will be the primary focus. The description of proposed operations and impacts is based on various publicly-available reports submitted by Hudbay and its contractors to investors and regulatory agencies. In reading the description, bear in mind that the entire proposal is a moving target for a number of reasons, among them:

1. The mine layout has changed due to changes in law, and Hudbay's acquisition of additional lands or property interests in lands.
2. Additional drilling and exploration, and changes in the market for various metals expand the potential to exploit minerals on lands beyond what was originally proposed. Hudbay continues to improve its understanding of potential mineral resources in the Santa Rita Mountains outside the confines of the current mine proposal.

3. Proposed operations have changed and will change due to market considerations, influx of capital, geochemical tests, acquisition of the Cactus mine, and related studies that have not yet been released or completed.

As a result of various factors, Hudbay iterates its so-called Phase 1 proposal and adjusts. As a result, there are inconsistencies between the various permitting documents and the most recent descriptions of Copper World presented by Hudbay to investors and others.

Hudbay and its partner Mitsubishi will use results from a new feasibility study, yet to be issued, as a basis for deciding whether to proceed with Copper World, and if so, how. Hudbay's ongoing acquisition of the former Cactus mine near Casa Grande has delayed their final investment decision on Copper World, according to a May 2026 presentation. The Cactus mine has greater access to existing infrastructure and lower start-up and operational costs. The May 2026 Hudbay presentation (slides 32-35/39) mentions the potential for combining operations of the two. We expect that the companies may reveal more changes to their plans later this year, after they release the definitive feasibility study for Copper World in compliance with Canadian law.

Most of the Copper World reports currently available describe only the first phase. Further, there will be no environmental impact statement (EIS) for Copper World Phase 1, so long as the proposed layouts in permitting documents are confined to their private land. With no definitive and complete proposal to review and no revised EIS, the public is at a significant disadvantage In understanding the full impacts of Copper World.

Location of east-side mining impacts

The east side of the Santa Rita Mountains drains toward Tucson via the Cienega Creek watershed. This watershed has been a focus of land and water conservation efforts dating back to the 1970s, when mining and subdivision proposals arose. The predominant land use in the watershed remains livestock grazing, with several low-density ex-urban residential developments accessed mainly by state highway 83.

A Ninth Circuit Court of Appeals decision in 2022 invalidated the Forest Service's past assumption of Hudbay's rights to dispose of waste and tailings on National Forest lands. Hudbay's revised plans, renamed Copper World, include different shapes for the Rosemont pit (also called the East pit), and additional excavations near the crest of the mountains that were not part of earlier plans.

Figure 1 shows the location of all six proposed pits and waste rock facilities (WRFs) associated with the Phase 1 Copper World proposal in relation to the private land owned by Hudbay. The current design reflects the relocation of mineral processing operations proposed in the Rosemont EIS, as well as the initial disposal of tailings, to the west side of the crest. Phase 1 pit excavations and waste rock disposal would still occur east of the crest.

Copper World East of the Santa Rita Mountains

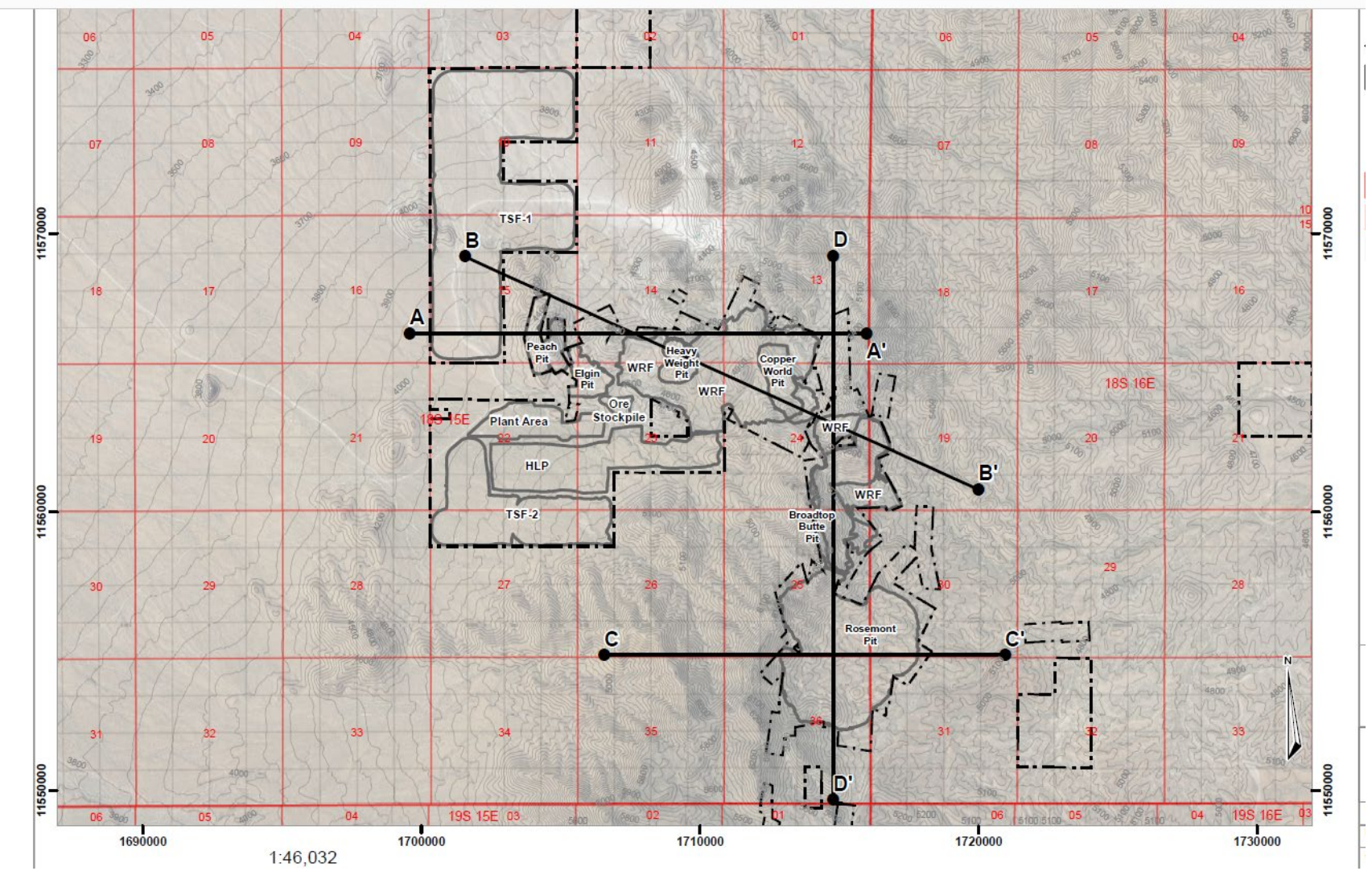

Figure 1. Phase 1 open pits and waste rock disposal locations, relative to Hudbay's private property. Darkest lines represent locations of geological cross-sections (from Figure 62-1 March 31, 2023 map by Piteau)

Hudbay still hopes for a second phase of mining, albeit with a different configuration than was previously approved by the Forest Service (Figure 2 and 3). The total impact area is very large, around 6500 acres, not counting the Sahuarita wellfield and utility corridors. Overall mine life for both phases of Copper World is now estimated to be 44 years, not 25-30 years as was cited in the earlier Rosemont Environmental Impact Statement (EIS).

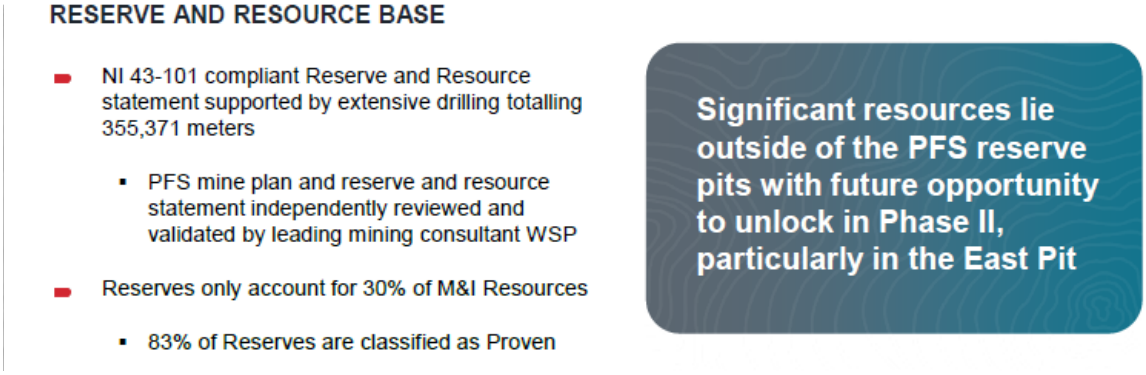

Figure 2. Excerpt from June 2026 slide deck (Hudbay presentation to investors)

Phase 2 would require a legal entitlement to use public lands administered by the U. S. Forest Service and Bureau of Land Management. In the wake of the Ninth Circuit's decision, the National Mining Association has taken up Hudbay's cause to lobby Congress for a bill that, if approved, provides easy access to federal lands for waste and tailings disposal. A land exchange approved by Congress might also provide the means for a second phase of mining and dumping on federal lands.

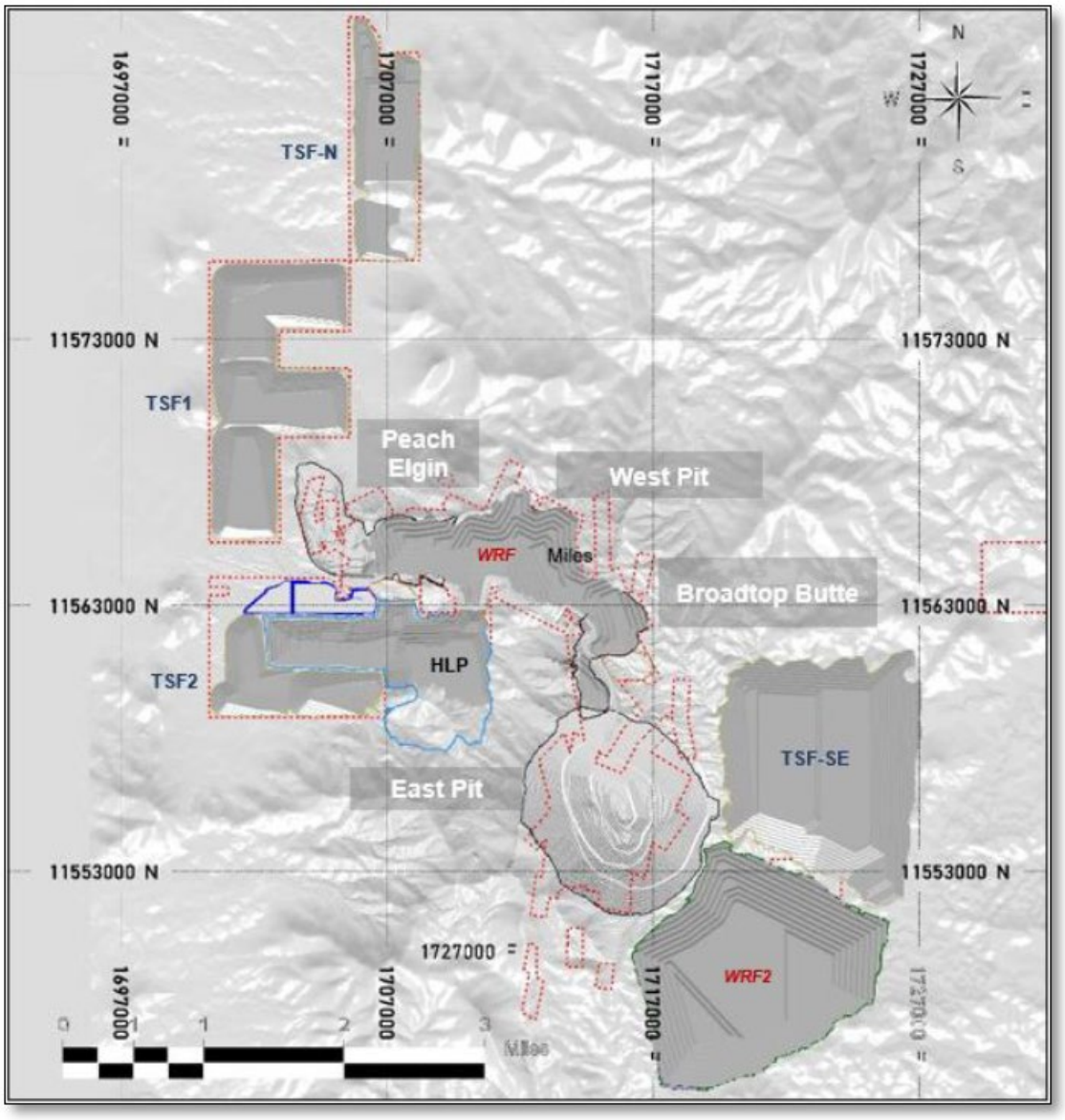

Figure 3. Waste rock (WRF2) and tailings storage features (TSF-SE) for Copper World Phase 2 on the east side of the Santa Rita Mountains. Red outlines Hudbay's private land (from Figure 16-21 of the Copper World Preliminary Feasibility Study)

Two of the six pits proposed for Copper World's Phase 1 activities, the East or Rosemont pit and the Broadtop Butte pit, would be excavated along and below the mountain crest, mostly within the Cienega Creek basin (Figure 4). All of the other pits lie in the Santa Cruz basin. Figure 4 was created using the Rosemont Pimamap, where readers can find additional data layers to compare and contrast Copper World to the previous mine configurations. Figure 4 shows the Phase 1 pit outlines in red, relative to Phase 2 pit expansion in orange.

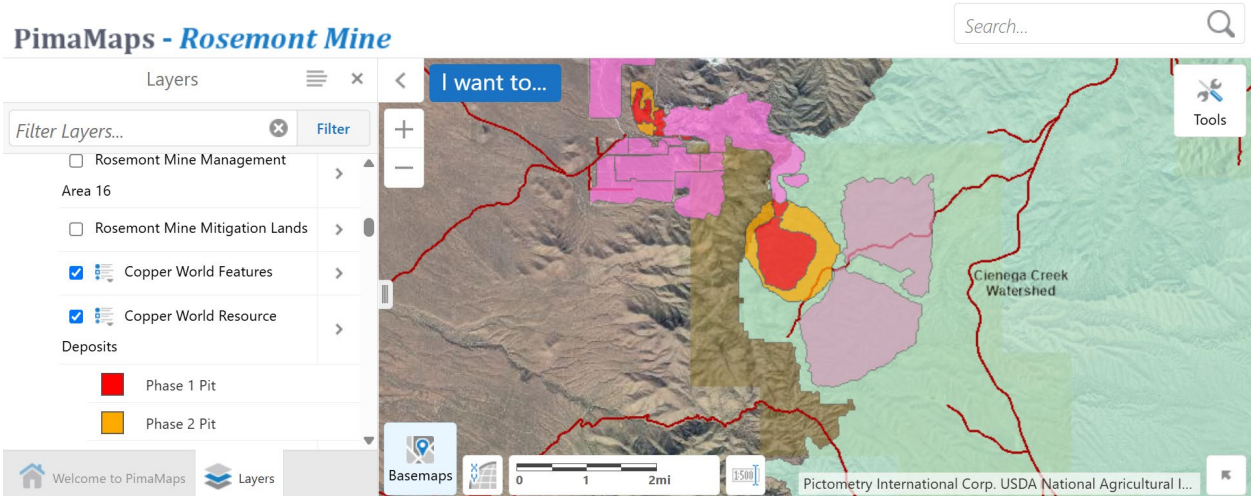

Figure 4. Copper World Phase 1 and Phase 2 pits, and Phase 2 east-side waste rock and tailings placement (brown) in relation to Cienega Creek watershed (green).

For a closer look at the pits and waste rock facilities on the east side of the mountain, begin by referring to Figure 1, which shows the location of cross-section D-D' which runs north to south, just east of the mountain crest. The Phase 1 configuration includes two new pits situated near the crest of the mine: Copper World and Broadtop Butte. Copper World drains north into Sycamore Canyon; this is part of the Santa Cruz watershed, so it is not discussed further here. The Broadtop Butte pit is shown in cross-section in Figure 5. This pit would be carved into the crest of the mountain. It would then be backfilled with waste rock to a height similar to the existing topography.

The East/Rosemont pit remains the single largest and deepest of the six proposed open-pits associated with Copper World, but it would have a sub-optimal shape in Phase 1 due to its confinement to private land. The Phase 2 pit would be extended farther toward the crest of the mountains and be slightly larger than what was analyzed in the Rosemont EIS.

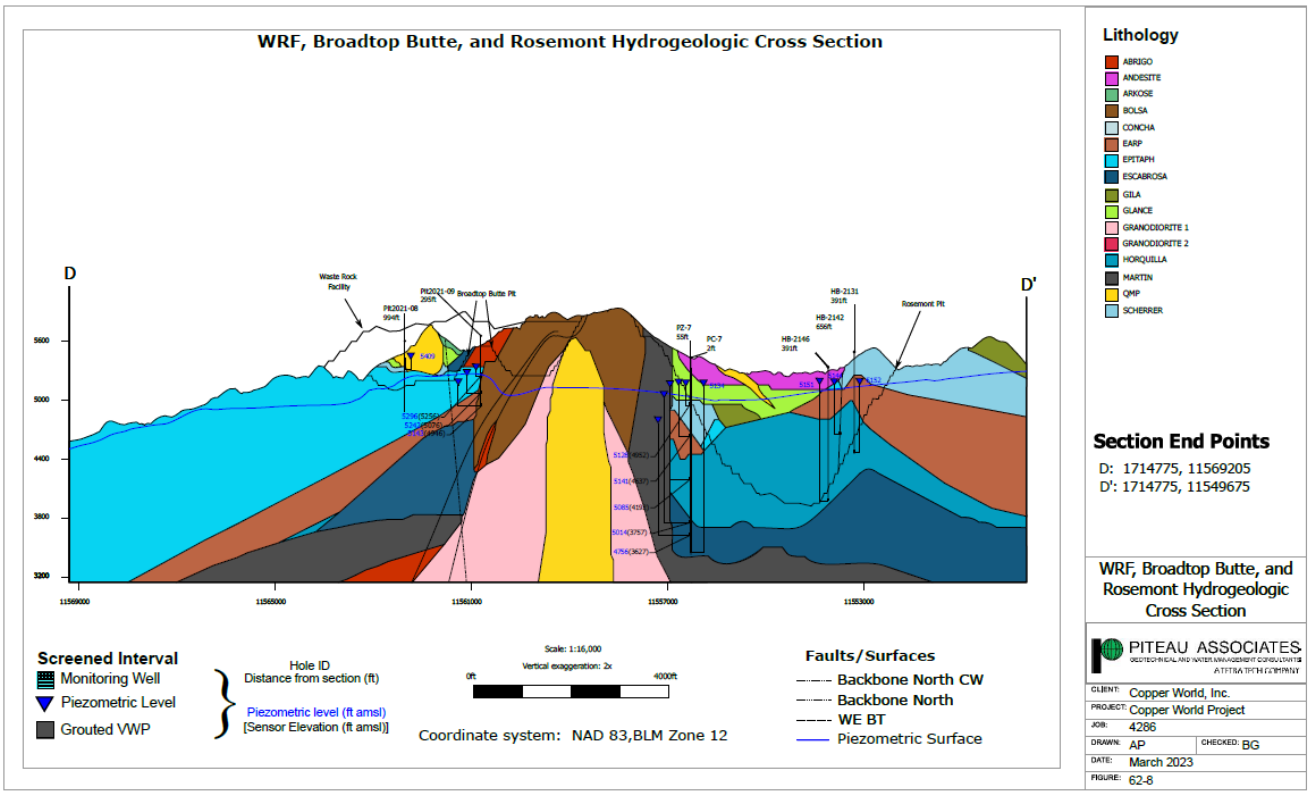

Figure 5. Broadtop Butte and East/Rosemont pit features relative to local geology as referenced in cross-section D-D' of Figure 1. (Piteau Associates)

For a closer look at the East/Rosemont pit, see Figure 6 cross-section. The Phase 1 pit wall would impinge on the high slopes of the mountain (Figure 6). The Phase 1 wall facing Highway 83 would be much more visible than described in the Rosemont Copper EIS, unless and until Phase 2 waste rock and tailings would be stacked high enough to obscure the sightlines.

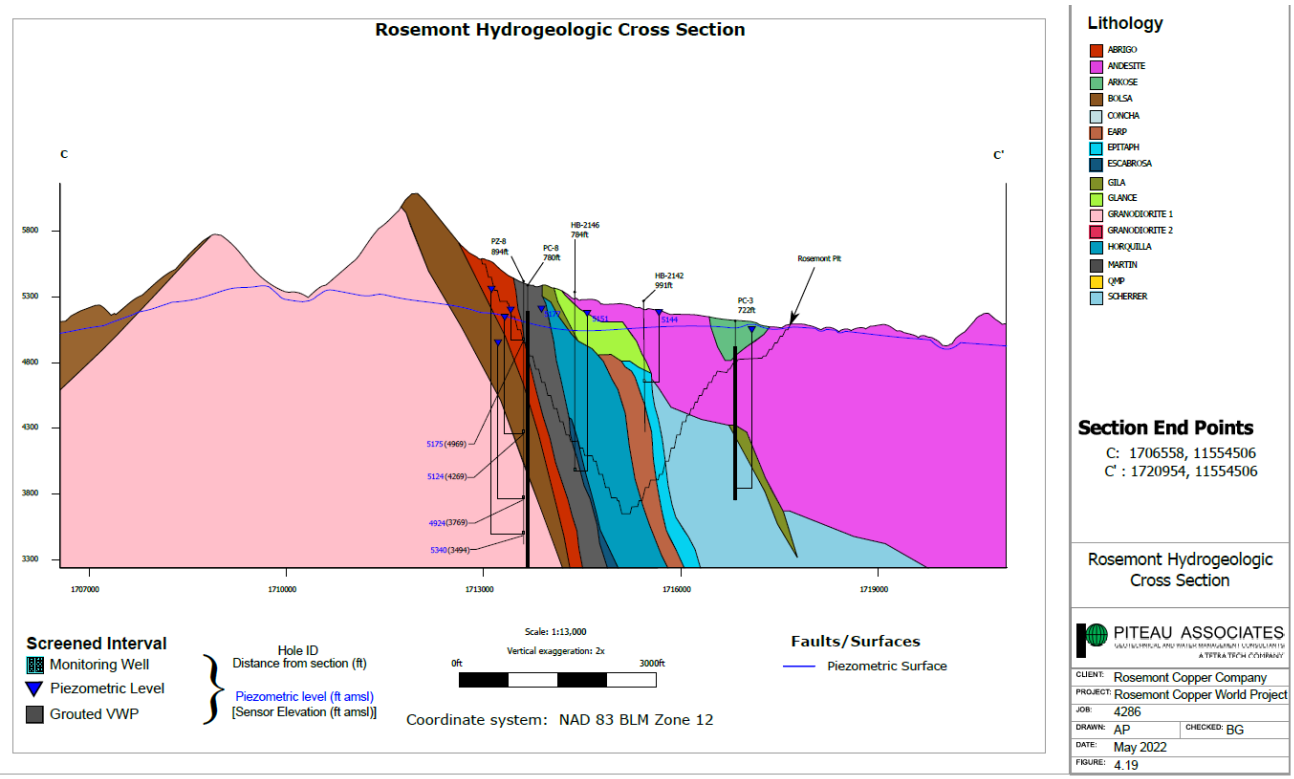

Figure 6. Rosemont or East pit geological cross-section C-C' as marked on Figure 1 (Piteau Associates)

Some Specifics Regarding the Phase 1 Copper World Proposal

<u>Dewatering the aquifer</u>

The Phase 1 East/Rosemont pit extends to a much deeper level than the Broadtop Butte pit. Note the "piezometric surface" as shown on Figure 5; this is the level to which groundwater currently rises in boreholes. Both pits would penetrate below the water table into alluvial and limestone aquifer materials, but only the Broadtop Butte pit would be backfilled.

Even during Phase 1, the depth of the pit, the type of material intersected, and the steepness of the East/Rosemont pit walls would require a substantial groundwater pumping operation at the East/Rosemont pit to "dewater" the geologic formations that would be penetrated. Hudbay's 2023 Preliminary Feasibility Study for Copper World (PFS) and more recent communications with County staff during the June 2026 field tour indicate that dewatering would commence during the earliest phases of construction. Dewatering is done to prevent flooding of the pit, increase pit wall stability, and improve worker safety (Figure 7). Much of the dewatering would occur during the first two years to reduce pore pressures in the formations prior to excavation.

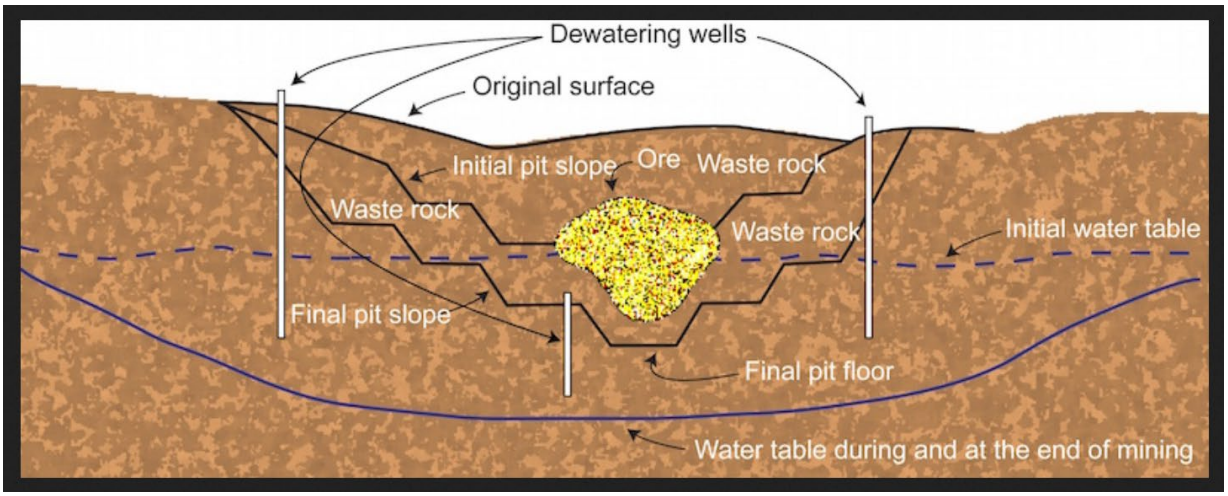

Figure 7. Conceptual cross-sectional diagram of mine pit dewatering (Great Basin Watch)

Both the PFS and the Rosemont Copper dewatering strategy called for drilling horizontal and vertical wells. The Forest Service limited the amount of pre-production groundwater dewatering to 18,500 acre-feet, but that mitigation measure no longer applies to Copper World Phase 1 operations so long as no Forest Service permissions are needed for construction or operations. Pre-production refers to the first two years of stripping the land surfaces to expose the ore.

The Copper World PFS calls for a minimum of 12,000 acre-feet of pumping from vertical dewatering wells over the mine life, however that source does not indicate how much might be extracted during pre-production phase, nor how much might come from the horizontal dewatering wells in Phase 1. In practice, no one can predict exactly how much removal of groundwater would actually need to occur, or how fast; this is usually determined through monitoring the effects of pumping on water levels in nearby monitoring wells.

Additional pumping of rainfall and runoff from the pit would need to occur in both pits during construction and operation, but these are expected to be minor considerations for the Broadtop Butte pit in comparison to the runoff into East/Rosemont pit, which has a much larger area of collecting surfaces. Over 700 acre-feet per year of rainfall would be expected in a 467-acre East/Rosemont pit based on the configuration in the Aquifer Protection Permit application (Table 6-03).

Groundwater pumping and disposal

By superimposing the Tucson Active Management Area (TAMA) boundary on the Rosemont Pimamap, one can see that much of the Broadtop Butte pit and all of the East/Rosemont pit lie outside the TAMA boundary. The location of the TAMA boundary affects where groundwater pumped from the Cienega basin may be taken.

Arizona Revised Statutes 45-551 prohibits the direct or indirect transportation of groundwater from outside the TAMA to inside the TAMA. This limits the use of groundwater extracted from the East/Rosemont pit. It can be used for dust control on the east side of the mountains. Groundwater cannot legally be conveyed for construction or mineral processing operations of the Copper World facilities that are now located on the west side of the mountains.

The rate of pumping for dewatering may not always balance with needs for construction dust control on the mine's east side. There may also be periods of temporary closure during operations when dewatering remains necessary. Excess groundwater extracted from the East/Rosemont pit could be discharged as runoff on the east side of the Santa Rita Mountains, however any such discharges would need to conform to state water quality standards, and possibly require Forest Service permission. The Copper World APP application (p. 45) proposed to discharge groundwater to streambeds in the area:

Water management for the Rosemont Pit will be different than the west side pits due to its location outside of the Tucson Active Management Area (AMA). Water from the Rosemont Pit dewatering wells will be used for general dust suppression with excess water released to a natural drainage on the east side of the pit. Water collected in the pit sump, whether from groundwater inflow, precipitation or stormwater runoff, can be used either for dust suppression inside the pit shell or pumped to the process circuit.

Pumped groundwater is likely to be rich in metals, and it is unknown whether it would meet standards for discharge to any streambeds. Water quality from the pit sump is also of unknown quality. Both sources would have to be monitored and possibly treated before release to streams, as is done at the South32 mine near Patagonia. Pima County requested ADEQ to ask Hudbay to disclose the location of any discharges to natural drainages. We do not have this information. As of August 2024, Arizona Department of Environmental Quality noted in their APP responsiveness summary that Hudbay had not applied for a permit to discharge groundwater as runoff to streams.

Groundwater impacts

One of the major premises underlying the east-side operations has always been the perpetual maintenance of a "hydraulic sink" to control the direction of flow of any contaminants arising from the fragmentation and exposure of sulfide minerals to oxygen and other weathering processes. Evaporation from the East/Rosemont pit will draw down aquifer levels and alter normal direction of groundwater movement from the mountain crest toward the lower elevations in the Cienega basin, but the question is how quickly and to what degree.

Hudbay's contractors predict that the East/Rosemont Pit would be a hydrologic sink during post-closure but it was not demonstrated that it will always be so during construction, operation,

closure or temporary closure periods. Pima County requested additional safeguards. Verification that the sink is maintained was formerly required by the Forest Service and has been incorporated into the aquifer protection permit. Reporting will continue until the end of the post-closure period.

However, no aquifer water quality protection compliance requirements will be in force at the Rosemont pit during Phase 1. The exemption of the East/Rosemont pit from compliance with the aquifer water quality standards occurred during deliberations on the Aquifer Protection Permit (APP) in 2025. Pima County wanted the groundwater quality around the East/Rosemont pit to be regulated under the APP and monitored via water samples taken at point-of-compliance wells.

In response to Pima County comments in the Copper World APP review, Hudbay agreed to install two wells to the east and downgradient of the East/ Rosemont Pit to monitor water levels, but these are not permit compliance wells. ADEQ exempted the pit under Arizona Revised Statutes Section 49-250(B), so no groundwater quality sampling can be required at these downgradient wells. ADEQ cannot enforce any impairments of groundwater quality standards at the water-level monitoring wells nearest the pit. The Forest Service had formerly required reporting of water quality from an extensive monitoring network beyond the APP compliance wells, but this is no longer part of Hudbay's commitments.

Pima County also requested that ADEQ consider how sustained discharges from dewatering operations to the washes may affect the early development and maintenance of the hydraulic sink conditions at the East Pit, but this was not done. Hudbay assures us that Phase 1 dewatering will be sufficient to keep contaminants from the regional aquifer, but it is not demonstrated that this would be true if discharges to washes and recharge from sustained, multi-day storms occurs. Dewatering would also need to continue during periods of temporary closure.

The sink is a double-edged sword: if it forms too slowly, contaminants may be discharged to downgradient locations during operations, but when it does form, it has the effect of reducing the natural discharge of groundwater to streams and springs. In the long-term, these evaporative losses from the aquifer affect more and more area, resulting in lowering of the water table, with consequent impacts to domestic and stock wells, and surface flows in streams and springs.

After closure, pumping ceases, and then the evaporation of groundwater seeping into the pit lake becomes an essential requirement for maintaining the hydraulic sink. Perpetual evaporation from the pit lake surface is supposed to keep groundwater flowing into the pit forever, which in theory prevents the migration of pollutants from the 600-foot deep pit lake to

the downgradient aquifer as minerals weather. For various reasons, the hydraulic sink conditions may not always be maintained even in areas where evaporation rates are usually high.

After mine closure, as the pit lake grows in size, the Rosemont pit lake will be increasingly looked at by migratory waterfowl as a place to rest. The Rosemont EIS concluded that the Rosemont pit lake would have concentrations of thallium and possibly ammonia that exceed aquifer water quality standards. The pit lake water quality is exempted from state water quality standards, so if the water quality is impaired, ADEQ lacks authority to impose remediation. The Forest Service required additional studies of pit lake geochemistry to inform potential mitigation measures. This does not apply to any pit lakes under Phase 1.

Impacts to reliability of spring and stream flows

Reduction in the volume and reliability of flows to tributary to streams in the National Forest would occur quickly due to construction of various mine features such as the pits and berms that would intercept runoff. The original Rosemont analyses identified 104 springs in the area, many of which were thought to respond to seasonal precipitation more than groundwater discharge per se. If this is true, then when flow paths from the crest are impeded by roads, pits and fills, spring reliability will be less.

The Forest Service attempted to minimize effect of waste rock and tailings on Forest streams through various mitigation measures, which are no longer in effect. McCleary Canyon's watershed was chosen for greater protection because of the presence of intermittent springs, wetlands, rare plants and streams. Phase 1 operations will interfere with runoff to this watershed more than was previously anticipated, because Hudbay now proposes mining at Broadtop Butte, part of the headwaters for this stream.

The pumping during dewatering might reduce flows at various groundwater-dependent springs and wetlands nearest the mine. The EIS analyses did not anticipate that any water from the dewatering would be released to streams, as is currently proposed in the APP for Phase 1. Such releases might offset some of the effects of pumping, but water from the pumps could require pre-treatment to meet state standards for discharge.

The pit lake is what causes the long-term damage to more distant riparian ecosystems such as Empire Gulch, Davidson Canyon and Cienega Creek. Surface water flow in Davidson Canyon to Lower Cienega Creek are primarily sourced not from direct or local precipitation and runoff, but rather from recharge in the mountain block which induces outflows of deeper, older, regionally recharged groundwater. A large pit lake re-directs mountain recharge to feed the perpetual evaporation of water from the lake surface.

The Rosemont EIS used several groundwater models and interagency review to predict how far and how fast the impacts of groundwater loss (due to the pit lake evaporation) might affect springs and stream flows.

Multiple models were needed because of the uncertainties regarding the subsurface conditions outside the mining area. The pit lake takes a long time to fully fill, and a full examination of the effects takes even longer, so the period of analysis used affects the conclusions. Compounding the difficulty of prediction of long-term impacts from the pit lake is the ongoing drought, and the uncertain trajectory of climate. The Forest Service required the mine to update the model based on new information gathered over an extensive monitoring network. This does not apply to Phase 1 of Copper World.

Pit lake effects on downgradient rivers and springs are common in many mined landscapes in the semi-arid West. Figure 8 illustrates schematically this process of the pit lake evaporation altering the direction of aquifer flows away from recharge to springs and streams.

The EIS generally predicted that the pit lake evaporation after closure would cause impacts to groundwater-dependent ecosystems. These impacts would begin in the immediate Rosemont area before spreading to more distant areas. Empire Gulch in Las Cienegas National Conservation Area was predicted to go from perennial to intermittent by the end of the first 50 years. Changes from perennial to intermittent flow status in upper Cienega Creek and Gardner were predicted occur 100 to 150 years, respectively.

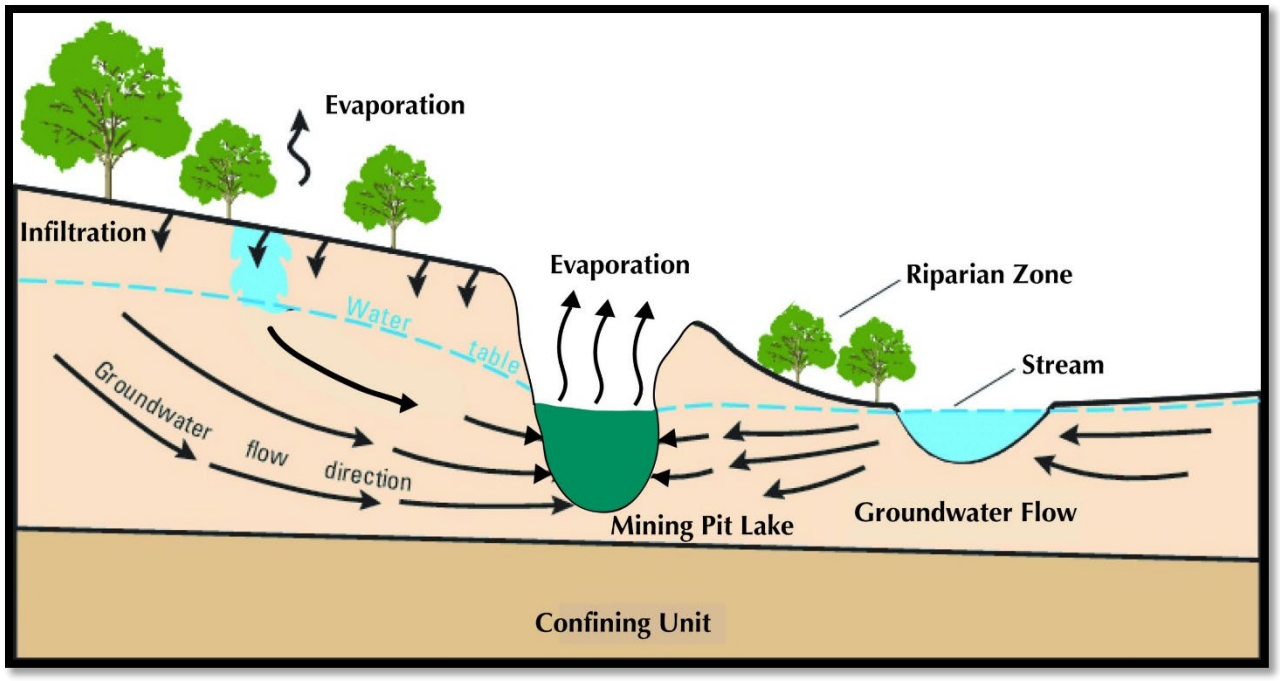

Figure 8. Conceptual diagram showing interception of groundwater from mountains to the west to the pit lake. Evaporation from the lake acts upon the aquifer like pumping a large-diameter well. (Great Basin Watch)

There will be no comparable monitoring, reporting, review and re-analysis for Copper World Phase 1 impacts, even if there is a permanent closure.

The original Rosemont proposal included many forms of mitigation for losses of wetlands and aquatic species, none of which will apply to Phase 1 of Copper World. The Forest Service and U. S. Fish and Wildlife Service had the power to impose additional mitigation measures for wildlife over time. Hudbay currently offers no mitigation for loss of wetlands or associated plants and animals. There are no replicates for the low-elevation wetland habitats at risk, which are nearly intact, in terms of native aquatic fauna. The already low volume of water discharge at the springs and streams on the eastern slopes of the mountain make them more vulnerable to loss.

Surface water quality impacts

Under the Copper World proposal, blasting, excavations and grading activities will begin at Broadtop Butte. The Broadtop Butte ore body has a different geology than was analyzed in the Rosemont EIS. According to Hudbay 2023 PFS, the rock that would be blasted and mined there is primarily a well-mineralized intrusive volcanic porphyry, with adjacent altered limestone. Stripping, blasting and excavation of Broadtop Butte and the adjacent slopes to the south would begin here while the Rosemont pit area is being dewatered. According to geochemical analyses by U. S. Geological Survey in 1973, there are indications of elevated concentrations of lead, arsenic, antimony, cadmium, zinc, silver, tellurium, and molybdenum in the rocks along the crest and eastern slopes of the Santa Ritas from the Broadtop deposit south.

The federal agencies have performed no new evaluations of surface water quality impacts of mining at Broadtop Butte and areas south along the crest. This is because Phase 1 layout is designed to avoid any U. S. Forest Service or the U. S. Bureau of Land Management lands. The Phase 1 aquifer protection permit issued by ADEQ examined the effect of backfilling the Broadtop Butte pit, but did not examine what metals might be released to surface-water streams from grading or construction activities.

Fortunately, Hudbay analyzed actual runoff from these eastern slopes into tributaries of Barrel Canyon. The Broadtop Butte area drains into McCleary Canyon. Barrel Canyon collects runoff from the proposed mine site via Wasp and McCleary Canyons. As part of the original Rosemont permitting process, Hudbay committed to continue to monitor and report the metals in surface runoff before construction to an interagency team that included the Forest Service, U. S. Fish and Wildlife Service and U. S. Environmental Protection Agency.

Based on Hudbay's monitoring during 2008 to 2015, both HudBay and the Forest Service Supplemental EIS acknowledged that the stormwater flows in Barrel Canyon or its tributaries Wasp and McCleary exceeded standards for certain metals, particularly copper and lead, less often for arsenic, selenium, thallium and silver. Hudbay discontinued surface water quality monitoring in Barrel Canyon and its tributaries following a flood in 2015, and no commitment has been made by Hudbay to renew surface water-quality monitoring or reporting.

Various additional design elements and mitigation measures were adopted to minimize surface water quality impacts during the Rosemont EIS process. The Pima County Regional Flood Control District felt the models used in designing various stormwater features underestimated the potential for runoff in the watersheds on the east flank of the mountains. The design and mitigation measures were accepted by the U. S. Forest Service and ADEQ as part of ensuring that they would not degrade surface water in lower Davidson Canyon. Although Pima County did not believe that the surface water mitigation measures were reliable or sufficient, none of these measures apply today.

The Rosemont mining facility once held Arizona Pollutant Discharge Elimination System (AZPDES) permits for construction and industrial activities under state statute ARS §49-255 that protects surface water quality and was which was adopted under section 402 of the Clean Water Act. Rosemont Copper obtained AZPDES Multi-sector General Permit (MSGP) coverage in 2013. The permit was terminated on August 31, 2023.

The regulatory scope of the Clean Water Act has been reduced since the original MSGP was issued and especially on May 25, 2023, when the United States Supreme Court released their decision in EPA vs Sackett, No. 21-454. This ruling redefined Waters of the United States to cover only permanent bodies of water with a "continuous surface connection" to "traditional interstate navigable waters." The decision reduces protections to many Arizona waterways that may not have a continuous connection to a permanent body of water. Under these current interpretations, Pima County does not believe that ADEQ will require Hudbay to obtain a permit for pollution management of stormwater runoff or surface water discharges.

Hudbay has no active permitting effort with ADEQ or the U. S. Army Corps of Engineers for permits under the Clean Water Act. Without effective control measures, pollutants can seep into the alluvium and fractured bedrock and migrate into the aquifer during blasting, stripping and grading activities.

Undoubtedly Hudbay would use some kind of runoff control measures during construction, but Pima County Regional Flood Control's earlier review of east-side hydrology indicated that Hudbay's contractors underestimated flood risks. The success of any approaches intended to control movement of pollutants from disturbed areas remains in question.

More ground disturbance in these watersheds has occurred since Hudbay's 2008-2015 runoff monitoring effort, including additional drilling and road construction. Hudbay attributed "background soils" as the source material for the observed exceedances in stormwater runoff in Barrel Canyon and its tributaries, as does the FEIS. If native rock and soils in this historic mining district are the principal source of metals in surface water runoff, grading of additional roads and stripping of vegetation and topsoil can be expected to mobilize more metals into runoff.

The metals liberated from natural soil disturbance, erosion of historic mining waste and tailings, mineral exploration drilling and blasting, and the stripping and grading that precede the actual excavations of the mine were regarded by the state as part of establishing the background or ambient water quality for any future permit conditions under state law and rules. Thus, more degradation of the surface water and aquifer water quality is allowed before any new standards are applied to operations of the mine.

The ecological significance and unimpaired water quality of base flows on the County's Bar V Ranch property in lower Davidson Canyon was documented and reviewed by the state in the early 2000s as a basis for an Outstanding Waters designation. (Base flows are the sustained flows in intermittent streams.) This protective designation was granted despite opposition by the mining industry's lobbyists.

Unanticipated increases in metal contaminants on County property in lower Davidson Canyon's base flows of water have been observed in recent years, including dissolved copper, lead, arsenic, and zinc. Although high concentrations of metals might be expected in transient flows of runoff coming from mineralized areas, the increased metal detected in sustained base flows on County property is surprising.

Under the Clean Water Act, the Outstanding Waters designation required the state to safeguard against impacts to lower Davidson Canyon and Cienega Creek, because it prohibited any degradation of water quality arising from sediment discharged to Barrel Canyon and its tributaries. As a result, the potential effects of the mine's sediment discharges were hotly contested among the federal agencies, including the U. S. Environmental Protection Agency, the U. S. Army Corps of Engineers. In 2012, public records show that the mine's technical staff began encouraging ADEQ to remove the Clean Water Act's protective designation from Davidson Canyon, or as they called it in 2016 emails to ADEQ, to "un-O" the Outstanding Waters.

That effort bore fruit. In 2022, the state withdrew the Outstanding Waters designation from lower Davidson Canyon on the basis of stormwater runoff showing elevated metals. The state also modified the rules governing how Outstanding Waters may be designated to narrow the potential application of antidegradation protections for Arizona streams in general.

The typical response for dealing with metal impairment in streams under the Clean Water Act is to establish a total maximum daily loading rate for each pollutant. However, the way that the Clean Water Act is interpreted relative to intermittent and ephemeral streams has changed since the original permits were obtained for the Rosemont project. It seems unlikely that any Clean Water Act provisions will apply to future mining in the northern Santa Rita Mountains.

Reclamation of the mine site is important in protecting surface waters long-term. How mine features are reclaimed is important in long-term stability of the land surface. Copper World's reclamation bonds were based on a premature 2021 plan that was submitted to the state mine inspector and approved in absence of a mine plan. The Phase 1 mine plan is still under development. Inadequate closure plans can lead to excessive erosion and surface water quality degradation down the road. Inadequate bonding means problems that emerge cannot be corrected with the available funds.

Conclusions

Phase 1 construction and operations on the east side of the Santa Rita mountains include the development of two open-pit mines. Mine development activities would quickly affect waters of the Coronado National Forest, with longer-term impacts on the aquifer and more distant streams and springs.

Federal, state and local government comments developed under the Rosemont EIS process were directed at making all phases of the mine less damaging and making the compensations more robust. Most of the streamflow, wetland, and aquifer protections and mitigations that come out of the Rosemont mine deliberations no longer apply to Copper World Phase 1.

Hudbay's plans for all phases of potential mining on the east side of the Santa Rita Mountains are still evolving. Additional discussions with Hudbay and ADEQ are warranted regarding the final layout, standards and mitigations applicable to east-side activities, should Hudbay decide to proceed with Phase 1.

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