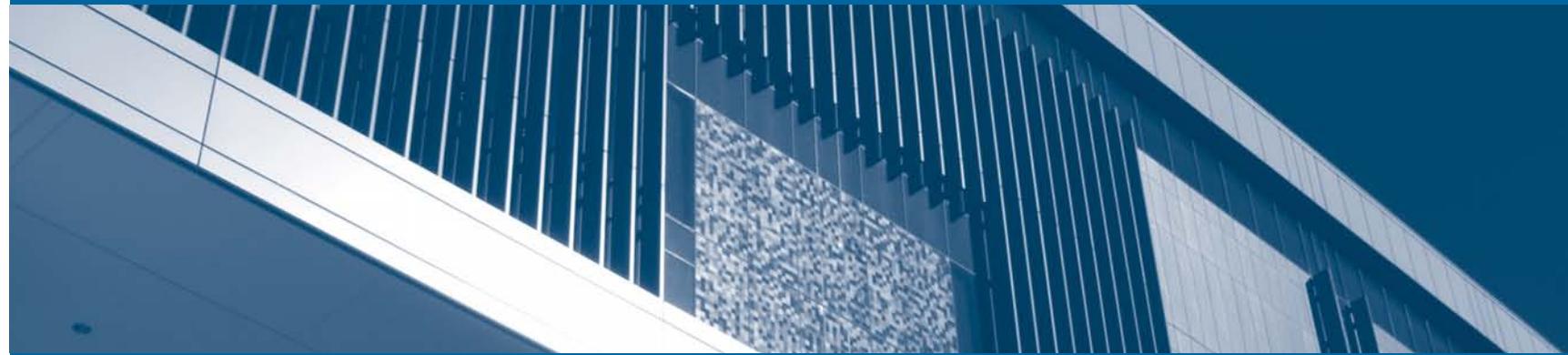


CHAPTER 7

Mining – Modernizing a Traditional Industry



Pima County has a long history of mineral extraction, particularly copper mining; and the industry remains an important component of our region's economy. Mining's impact has historically cycled through highs and lows of production and employment; but the forecasted mineral deposits in Pima County, combined with anticipated demand for base metals in an increasingly technology dependent society, ensures mining will continue to be a significant contributor to Pima County's economy.

Overall, the industry provides approximately 14,000 direct and indirect jobs within the County. The presence of 24 large- and small-scale mining operations in Pima County has fostered a large and diverse sector of companies providing logistical support that also contributes to our employment base. The economic impact of even a single mine in Pima County is significant. A 2013 economic analysis of one local copper mining operation, the Sierrita Mine operated by Freeport McMoRan Copper and Gold and located 20 miles south of Tucson, found a direct economic impact in Pima County of \$197.1 million, including \$112.4 million in direct compensation and \$66.7 million in vendor purchases. The combined direct and indirect impacts of the Sierrita Mine totaled \$310.4 million in 2013.

An estimated 60 percent of the nation's copper comes from southern Arizona, and the average wage paid by the large-scale mining operations is well above the median wage in



The UA is a leader in research of mine tailing remediation such as these near Green Valley.

County Board of Supervisors in 2012. For example, Pima County partnered with The University of Arizona and ASARCO to research the use of biosolids from Pima County wastewater plants to restore and revegetate mine tailings. This research benefited the mining industry, as well as the air quality for Pima County residents.

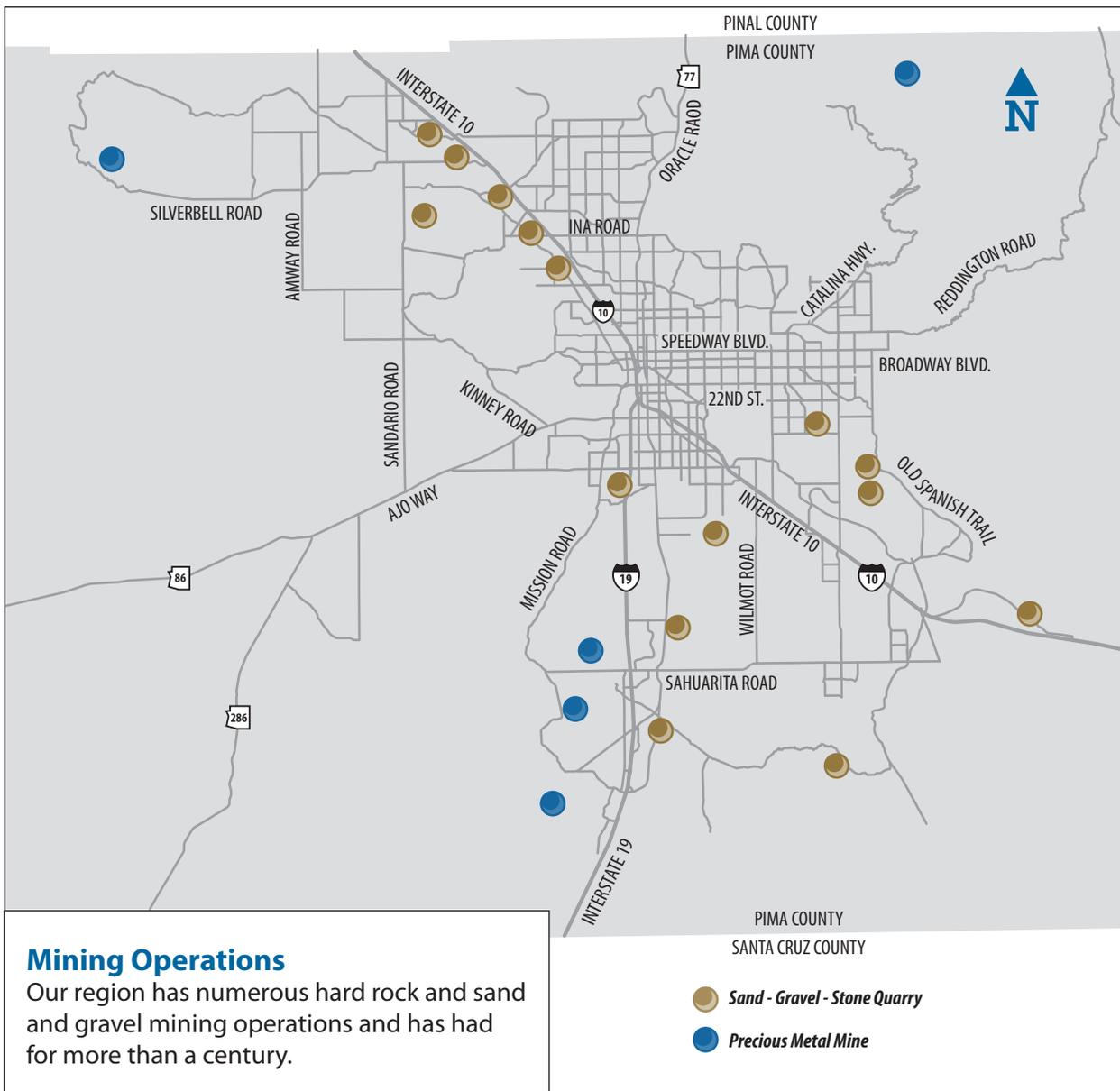
Pima County has also opposed incompatible mining operations in sensitive environmental areas, such as the proposed Rosemont Mine in the Santa Rita Mountains, where the County has spent years thoroughly documenting the adverse impacts the operation would bring to the human and natural environment.

With the majority acquisition of Augusta Resources by Hudbay Minerals, we have been encouraged that a more thoughtful and analytical approach to mining activi-

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Pima County. Recognizing the importance of mining to the nation and our region, the county has worked collaboratively with mining interests in the past, including Freeport McMoRan, ASARCO and the Oracle Ridge Mine in the Santa Catalina Mountains that was approved unanimously by the Pima

County Board of Supervisors in 2012. Recognizing the importance of mining to the nation and our region, the county has worked collaboratively with mining interests in the past, including Freeport McMoRan, ASARCO and the Oracle Ridge Mine in the Santa Catalina Mountains that was approved unanimously by the Pima County Board of Supervisors in 2012. Recognizing the importance of mining to the nation and our region, the county has worked collaboratively with mining interests in the past, including Freeport McMoRan, ASARCO and the Oracle Ridge Mine in the Santa Catalina Mountains that was approved unanimously by the Pima



agencies to commit that any mitigation required because the Rosemont Mining operation actually occurs in Pima County and within the watershed of the Cienega Basin, the most impacted by this particular proposal.

In our regulatory role, Pima County has sought corrective action and monetary fines from companies such as ASARCO when mine tailing dust has negatively affected the unincorporated community of Green Valley and risked the health of its residents. The impact of water-intensive mining in a desert environment and the effect of the industry on air and water quality,

drainage and the land are also areas of concern for the county and our residents.

Pima County must strike a prudent balance between promoting the economic wellbeing of our residents and adhering to the County's primary mission of protecting the health, safety and welfare of our citizens. Pima County will continue to oppose harmful and incompatible mining projects, but we should also encourage responsible operations that utilize modern technology and sustainable practices to mitigate the human and environmental impacts of this important industry. Below are five policy areas where the county can actively support mining activities.



Mining is an extractive industry and necessarily destroys habitat and ecosystems in the process. Mine operators should provide resource loss compensation in accordance with Pima County's Conservation Lands System.

A. Support Mining Activities that Provide Resource Conservation in Accordance with the Conservation Lands System Guidelines

The county has adopted natural resource conservation mitigation guidelines for activities that destroy or adversely impact natural ecosystems in the Sonoran Desert. These guidelines are known as the Maeveen Marie Behan Conservation Lands System (CLS) of the Sonoran Desert Conservation Plan

requirements of the SDCP will generally be supported by the county. These CLS set asides should also be cognizant of and offset any impacts to cultural, historic and water resources.

B. Advanced Mining and Resource Extraction Technology

In creating a significant mining industry, the abundant mineral resources that exist in Pima County have resulted in advanced

The Lowell Institute for Mineral Resources has more than 100 university researchers collaborating across 23 disciplines to advance sustainable development of mineral resources.

(SDCP). These guidelines are designed to offset the adverse impacts of habitat or ecosystem losses.

Mining activities, by nature, are extractive activities that remove resources; in this case mineral resources, for economic value. During this extractive operation, natural resources are adversely impacted, ecosystem values are degraded and adverse impacts occur to water and air resources. Those mining activities that agree to meet the natural resource and conservation

research that seeks to mitigate some of the most harmful effects of hard rock mining. The University of Arizona (UA) Department of Mining and Geological Engineering is recognized as one of the leading mining education institutions in the nation. The department conducts interdisciplinary research in efficient and sustainable mining and has been successful in transferring its technological achievements to the private sector.

The UA is also a leader in environmental research and sustainability, particularly in



The University of Arizona's Department of Mining and Geological Engineering is a national leader in developing new and innovative mining technologies.

the areas of water research and arid land studies that clearly have relevancy in the mining industry. The Lowell Institute for Mineral Resources (IMR) is at the forefront of mining research and has educational themes that include technology and environmental and social responsibility. The Lowell IMR has more than 100 university researchers collaborating across 23 disciplines to advance sustainable development of mineral resources. Research projects by the IMR, in partnership with Science Foundation Arizona and the mining industry, include the Center for Environmentally Sustainable Mining, solar energy, mine health and safety, groundwater, economic geology and community and environmental health. The University also is home to the Superfund Research Program, which has been continually funded by the National Institute of Environmental Health Sciences since 1989. The program seeks to address the health effects of contaminants in the Southwestern United States and the Mexico border region and includes focuses on environmental issues related to hazardous substances. Its research objectives include studying the toxicological effects of environmentally relevant arsenic exposure and studying wind-borne mine tailing particulates and the relation to lead metal contaminants.

In addition, the Israel Business Initiative, a program of the recently formed partnership between UA Tech Parks and the Offshore

Group, includes sector focus areas that include mining technology.

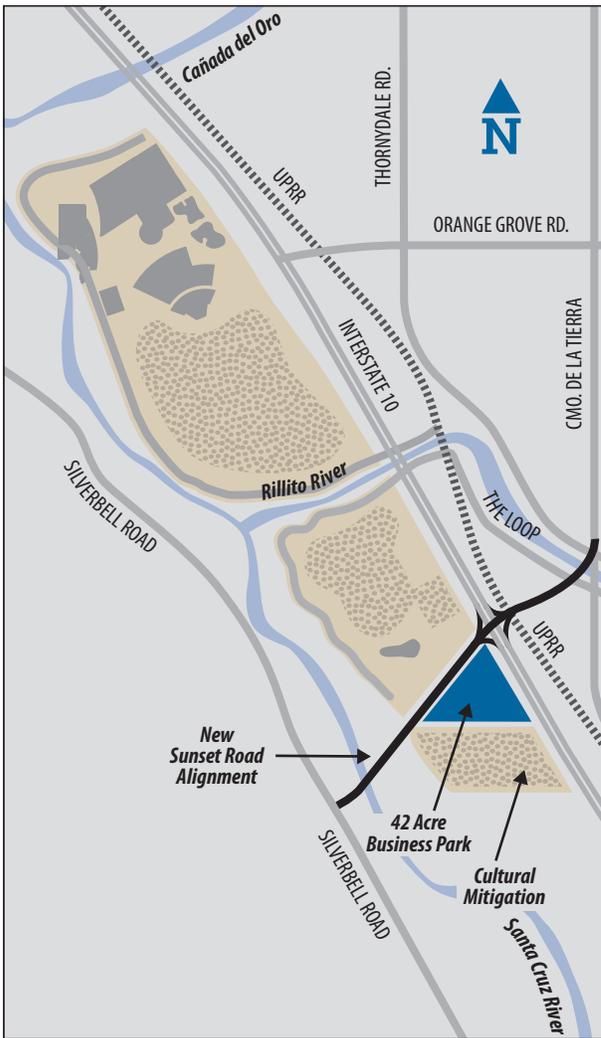
Regarding workforce development, Pima County has been in discussion with the Town of Sahuarita and the Joint Technical Education District (JTED) for development of the Southern Arizona Mining and Industrial Technology Center. Although funding sources for the center have yet to be firmly identified, Pima County supports the development of this center, as it would ensure the mining industry has a well-trained and sufficient workforce for the future.

As part of our economic development priorities, county staff from Community and Economic Development, Strategic Planning and Public Works will begin seeking partnerships with the relevant departments and programs of the UA and other entities to explore opportunities that support advanced mining technology and sustainability and promote resource extraction with minimum impact while accelerating economic development and job creation in Pima County.

C. Reclaiming Mining and Tailings Disposal Sites

Mining companies and individuals have laid claim to thousands of acres of subsurface mineral rights throughout Pima County. While not all of the patents will be developed, those that are will eventually require reclamation. Arizona currently has more abandoned mines than any other state and its reclamation liabilities remain significant. The county has in the past attempted to work with the Arizona State Land Department to condition reclamation as part of mineral leases. The county has also sought revision of the federal 1872 Mining Law.

While Pima County should continue to press for increased state and federal regulation and enforcement of mining reclamation requirements, in certain circumstances, concrete steps can also be taken by the county to return mining operations to productive economic and environmental uses. In 2012, the



Reclaiming Mine Sites

Pima County is repurposing more than 600 acres of a former sand and gravel mine into a recreation and natural park site. About 40 acres is planned for a business park.

county purchased 615 acres from CalPortland Cement Company located near Interstate 10 (I-10) and the confluences of the Santa Cruz River, Rillito River and the Cañada del Oro Wash. Much of this land requires reclamation due to extensive sand and gravel extraction operations. A significant portion of this property will be dedicated to the El Corazón de los Tres Ríos environmental restoration project, and a portion of the land will be developed as a primary employment center to further economic development. Pima County will proceed with the development of the primary employment center and attempt

to identify other reclamation projects that will result in environmental restoration and economic benefit while ensuring the taxpayers are not subsidizing or abetting negligent mining companies.

D. Collaborate with Mining Interests to Maximize Natural Resource Conservation

Mining companies are significant landholders in Pima County, and responsible companies are cognizant of the intensive environmental impacts their activities and byproducts bring. In addition to utilizing sustainable and technologically advanced mining techniques to mitigate their impacts, responsible mining operations seek to offset these impacts by engaging in natural resource conservation. Pima County's efforts related to the SDCP should be reviewed for opportunities to collaborate with responsible mining companies to increase natural resource conservation. The Sonoran Desert and our unique lifestyle are important but often understated components of business attraction and retention.

Pima County fully cooperated with Freeport McMoRan in the purchase of 8,300 acres of State Trust land to allow for the remediation of their existing mine tailings disposal facility, as well as to buffer their operations from other encroachment; whether it be urban development or other activities that would potentially be adverse to continued mining activity. The county will continue to support all mining entities that choose to acquire buffer lands, whether they are private or State Trust lands, to provide a natural resource buffer between other land use activities and active or abandoned mining operations. It is important these natural resource buffers be maintained in perpetuity and become part of the protection and conservation strategy for the Sonoran Desert ecosystem.

E. Maximizing Renewable Water Resources for Meeting the Water Supply Needs of Mining

Mining is a water-intensive industry. Pima County faces diminishing water supplies due

to naturally arid conditions inherent to the Sonoran Desert, as well as prolonged drought and climate change. Our Regional Wastewater Reclamation Department is the largest producer of renewable water in our region and is recognized for its expertise in quality effluent production and water conservation. In order to assist the mining industry in maximizing its use of renewable water, promote the conservation of a vital resource and sustain the economic benefits of mining operations, Pima County will work with the industry, the City of Tucson and other water providers to formulate strategies for the use of renewable water supplies in mining operations.

The county will also support activities for the direct reuse of Central Arizona Project (CAP) water, in lieu of groundwater, for mining operations. Currently, a number of legal and institutional constraints hamper mining industry access to renewable CAP water supplies. The county will support increased and improved access to these supplies for mining interests that choose to use renewable CAP water in lieu of groundwater for their mining operations.

Action Items

- 7.1** Continue to monitor and comment through the federal regulatory process on mining activities proposed or ongoing within Pima County with the goal of minimizing long-term adverse impacts of those operations and having any required mitigation provided within the area of actual impact.
- 7.2** Support mining activities that generally provide mitigation offsets in accordance with the established county conservation guidelines.
- 7.3** Continue to encourage advanced mining and resource extraction technology evolution to maximize recoverable economic minerals and minimize impacts to air, water and ecosystem resources of the county.
- 7.4** Continue to pursue reclamation efforts related to past mining activities and encourage relocation, stabilization and reforming of mine disposal sites and/or tailings disposals.
- 7.5** Promote use of renewable water supplies for all mining activities within Pima County.