Draft
Resolution Copper Pipeline Route Special Use Authorization

Reclamation Plan

Prepared for

RESOLUTION COPPER

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ACRONYMS/ABBREVIATIONS

Abbreviation	Unit or Term
amsl	above mean sea lever
A.R.S.	Arizona Revised Statute
CFR	Code of Federal Regulations
EIS	Environmental Impact Statement
ERU	Ecological Response Unit
FSH	Forest Service Handbook
FSM	Forest Service Manual
GPO	General Plan of Operations
H	Horizontal
kV	Kilovolts
NFS	National Forest System
NRCS	Natural Resources Conservation Service
PLS	Pure Live Seed
PMLU	Post-Mining Land Use
SRCE	Standardized Reclamation Cost Estimator
TNF	Tonto National Forest
TSF	Tailings Storage Facility
USFS	United States Forest Service
U.S.C.	United States Code
V	Vertical
WPS	West Plant Site
WRCC	Western Regional Climate Center

1 INTRODUCTION

Resolution Copper proposes to construct and operate an underground copper mine with associated facilities. One of the associated facilities is a tailings pipeline and corridor from the concentrator facility to the tailings impoundment. The pipeline corridor will cross National Forest System (NFS) lands and lands managed by the Arizona State Land Department (ASLD), along with private land.

Resolution Copper submitted an application for the tailings pipeline and corridor to the United States Forest Service (USFS) for consideration in the final environmental impact statement (FEIS) on September 7, 2020 (Resolution Copper, 2020). The Skunk Camp alternative tailings storage facility (TSF) location and pipeline route was identified in the FEIS and the draft Record of Decision (which are currently under revision). The TSF will require a pipeline to transport tailings from the processing facility. Power will also be necessary. Salt River Project (SRP) will provide the power and will address reclamation and closure of the transmission line and supporting infrastructure separately. The TSF and the mine reclamation and closure are also addressed in a separate plan. A separate reclamation plan has also been prepared for the portion of the pipeline route that crosses through state lands.

Reclamation and closure of the tailings pipeline on National Forest System lands covered in this reclamation plan will be overseen by the Tonto National Forest (TNF) and is applicable to those portions of land which are owned by the United States Forest Service.

Resolution Copper estimates that the operational life will be approximately 40 years, not including initial site construction and final reclamation. Construction is expected to take approximately 2 years and reclamation is projected to take 5 to 10 years. Post-closure monitoring would continue beyond closure.

1.1 PURPOSE OF THE REPORT

This reclamation plan has been prepared for the pipeline route as required by Forest Service regulation 36 Code of Federal Regulations (CFR) 251.56 and to establish the basis for the reclamation cost estimate and financial assurance for the Special Use Authorization. It is designed to return land disturbed by Resolution Copper's mining activities to a near natural condition and ensure the site does not pose any long-term risk to the people or surrounding environment. An overarching goal of this plan is to establish specific reclamation practices that would enable future land uses and meet the applicable requirements of federal and state regulatory programs.

This reclamation plan will be included in the terms and conditions of the special use authorization according to 36 CFR 251.56 to minimize damage to the environment, protect the public interest, and comply with water and air quality standards.

2 PROJECT DESCRIPTION

The pipeline route traverses both Pinal and Gila counties in Arizona. The pipeline route between the West Plant Site and TSF is shown on **Figure 1**.

2.1 LAND USE AND OWNERSHIP

The pipeline route traverses National Forest System (NFS) Lands (federal), Arizona State Lands (state) and Resolution Copper (private) lands. The land uses can be summarized as low-density cattle grazing, historic mining, public recreation, wildlife habitat, and exploration drilling.

Figure 1. Pipeline Route

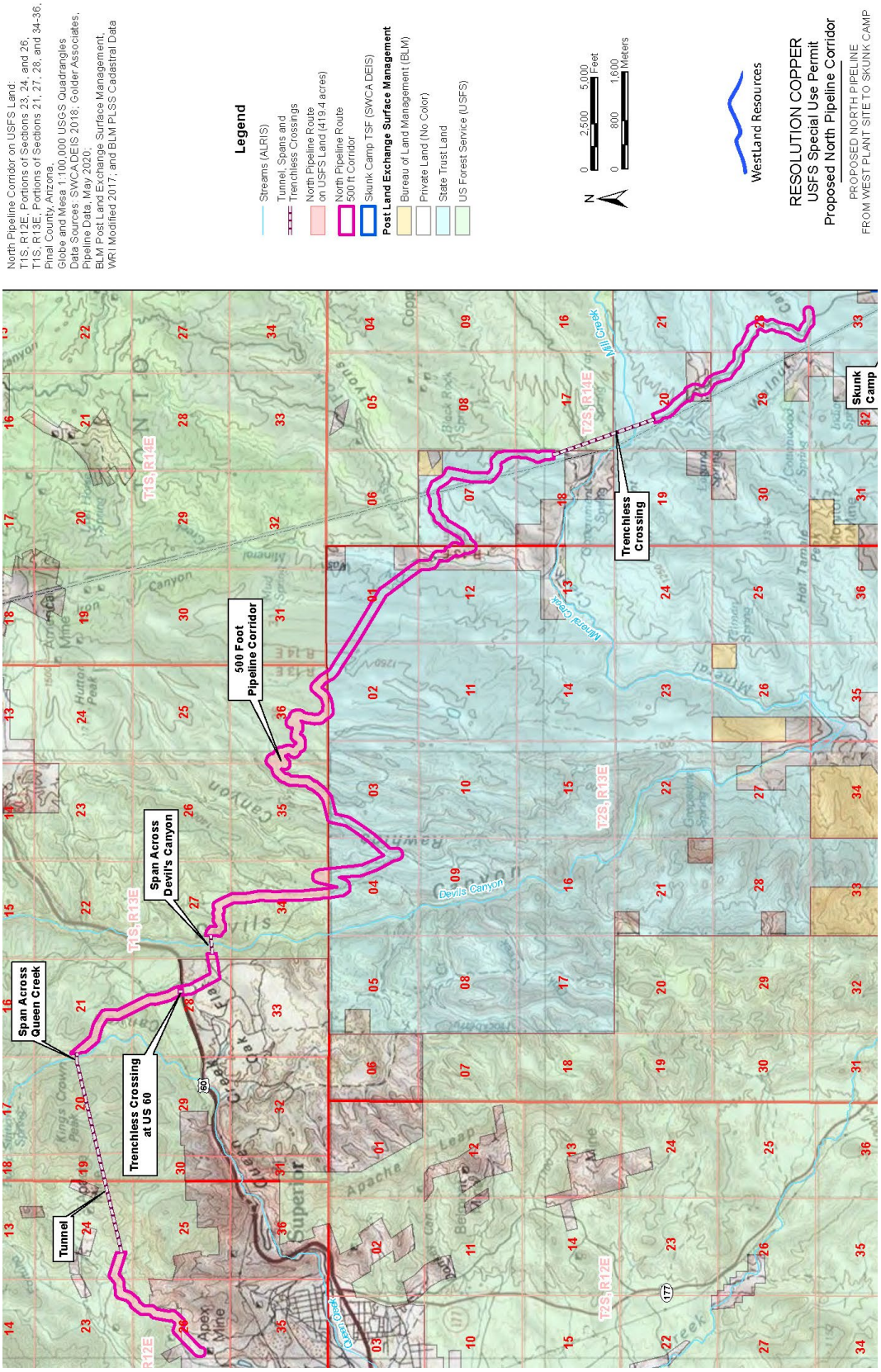


Table 1 itemizes the disturbance acres by facility within the pipeline route. This reclamation plan addresses the NFS lands. Disturbance acres shown below are based on the assumption that the pipeline corridor width is 200 feet of construction disturbance where the pipeline is placed in a trench and buried (**Figure 1**).

The pipeline includes a trenchless portion beneath US Highway 60, a bridge/span over Queen Creek and Devil's Canyon, and a trenchless portion beneath Mineral Creek/critical habitat for Yellow Billed Cuckoo and critical habitat for Gila Chub.

Table 1. Pipeline route Disturbance Acres by Landowner and Reclamation Regulatory Authority

Owner	Acres
NFS	287
Private	183
State Trust Lands	365
Total	835

Source (Resolution Copper, 2020, pp. 4, Table 2)

2.2 CORRIDOR TO TSF

The following description of the construction and configuration of the pipeline corridor is from the SF-299 application (Resolution Copper, 2020). The corridor to Skunk Camp (**Figure 1**) will contain:

- Pipelines for pyrite tailings and scavenger tailings lines between the processing plant and the TSF. Pipelines would vary from 10 to 34 inches in diameter. The pipelines will be subsurface and/or buried everywhere practicable except for bridge spans over Queen Creek and Devil's Canyon, crossing under U.S. Highway 60, and in tunnel sections.
- A 16-inch diameter water pipeline for the collection and return water to West Plant Site. The pipeline will be buried everywhere except for bridge spans over Queen Creek and Devil's Canyon.
- A transmission line to power the pump stations, the cyclone processing system, and administrative buildings (addressed in a separate Special Use Permit between SRP and the USFS).
- Access roads for construction, operation, maintenance and reclamation of the pipeline infrastructure generally adjacent to the pipelines, running along the same corridor except those areas with limited access, such as the tunnel in Silver King, bridge and water crossing segments (Queen Creek and Devils Canyon) and the trenchless crossing beneath U.S. Highway 60.
- Due to the varying topographic and geologic constraints along the pipeline corridor, multiple techniques would be used for installing the pipelines. It is anticipated that most of the pipeline would be installed buried using standard trenches and trench boxes. In portions of the corridor where underground construction is difficult due to the geology or topography, pipelines would be installed and secured at grade on pipe stands, approximately 1 foot above ground; however, these areas would be limited with the intent of avoiding above ground installation as much as practicable. Trenchless methods (horizontal directional drilling, micro tunneling and other boring methods) would be used to cross under roads, waterways, or for high-point mountain passes. This includes the trenchless crossing beneath US 60 and the tunnel section in Silver King Canyon. The proposed pipeline crossings for Queen Creek and Devils Canyon would be spanned using pipe bridges.

3 LEGAL REQUIREMENTS AND OTHER OBLIGATIONS

As stated in Section 1.1, this plan is intended to meet the regulatory requirements of federal regulatory programs. The pipeline route is subject to the following regulatory programs, policies, statutes, and rules:

- Title 36 CFR Part 251.56 – U.S. Department of Agriculture, Forest Service rules and procedures for special uses and
- TNF Forest Plan (USFS, 1985) regarding special use authorizations.

These regulations as they relate to the reclamation design basis are described in greater detail in Sections 3.1.1 through 3.1.3.

3.1 FOREST SERVICE RECLAMATION REQUIREMENTS

The following regulations provide the USFS the authority to manage surface resources in conjunction with special use authorizations and development on NFS lands:

- 36 CFR 219. These regulations implement the National Forest Management Act of 1976 (16 U.S.C. 1600 et seq.), require consideration of the relationship of nonrenewable resources, such as minerals, to renewable resources, and set forth the minimum requirements for integrating the nonrenewable mineral resource into a forest plan.
- 36 CFR 251.56. Terms and conditions of the special use authorization to minimize damage to the environment, protect the public interest, and comply with water and air quality standards.

Environmental Components.

a. Final configuration of the disturbed areas, including such items as roads (**Section 5.3.1**).

b. Revegetation of disturbed areas, including timing, kind, and amount (**Sections 5.2.6.4**).

c. Air quality management during and after operations (FSM 2580 and FSH 2509.19) (**Section 5.2.8**).

d. Watershed management, including runoff and erosion control, and riparian and wetland protection (FSM 2520 and FSH 2509.15) (**Section 5.1**).

e. Water quality management, including physical and chemical characteristics of surface and subsurface water during and after operations (FSM 2530 and FSH 2509.15) (**Sections 6.3** and **5.2.3**).

f. Visual resource management during and after operations (FSM 2380 and FSH 2309.22) (**Section 4.2.2**).

g. Potential for the occurrence and control of hazardous or toxic substances, including acid mine drainage, that may contaminate air, water or soil (**Section 7.2.1.1**).

h. Fish and wildlife habitat reclamation or mitigation (FSM 2630 and FSH 2609.11) (**Section 5.2.7**).

i. Tailings associated facilities (**Sections 4.2.5.2, 4.2.6, 5.3.1** and **5.2.4**).

j. Arizona Pollutant Discharge Eliminating System – the construction, operation, and reclamation of the pipeline will require an AZPDES permit from Arizona Department of Environmental Quality Water Qualidty Division in accordance with Arizona Administrative Code A.R.S. Title 49 Chapter 2, Article 3.1 49-255.04.

3.2 2713.3 - PERFORMANCE BONDS

Where the Government's interest requires protection from damage to National Forest System lands, or particular circumstances of performance are involved, the authorization holder shall be required to furnish a bond. See FSM 6561.6 for bond requirements. A bond must not be used to enforce general conditions

of the permit; rather it applies only to those requirements which are readily identifiable and which are specified in the clause requiring the bond. The right to revoke for cause provides adequate enforcement authority, and a bond should not be used to supplement this authority.

The bond requirement should be only for the period of time that is needed to satisfy the requirements of the particular situation involved. For instance, a bond required to cover construction should be only for the period involved with the actual construction. In this case, bonding is needed either to ensure the completion of the buildings or other facilities as planned, or to return the site to an acceptable condition if construction plans falter.

When a bond is no longer necessary, inform the permittee so that the permittee may notify the surety. An outright release of a surety is not given. A statement that the case is closed or that the bonded requirement has been met is sufficient.

FSM 6561.6 for bond requirements *- A performance and/or payment bond may be required to secure obligations imposed on a special-use authorization holder by the authorization terms or any applicable law, regulation, or order.*

A bond must not be used to enforce general conditions of the permit; rather it applies only to those requirements which are readily identifiable and which are specified in the clause requiring the bond (FSM 2713.13).

The USFS will require a bond for reclamation and ongoing post-closure monitoring. The amount of the reclamation bond will be revisited every three (3) years. Post-closure monitoring may be adjusted based on the potential impact to resources from planned development activities during the next bonding increment. Monitoring may also be extended as needed to achieve the stated success criteria for a particular mitigation measure, such as for revegetation (see **Section 6**).

The bond calculations will be submitted separately as requested by the Forest Service after the objection period and before a final ROD is issued with revised reclamation and closure plan.

3.3 REVEGETATION REQUIREMENTS

Revegetation is a significant aspect of this reclamation plan and is designed to satisfy the regulations, policies, and plans briefly summarized in **Table 2** with their relevance to revegetation planning.

Table 2. Summary of Revegetation Legal Requirements

Guidance	Summary	Project-specific Application
Forest Service Manual 2000 – National Forest Resource Management (USFS, 2008)	Chapter 2070 (Vegetation Ecology) provides guidelines on the use of native plant materials in revegetation, rehabilitation, and restoration of ecosystems on NFS lands.	Areas will be reclaimed and revegetated as soon as practicable after disturbance. Where possible, reclamation and revegetation activities will be conducted concurrent with construction and mining operations, with monitoring and maintenance following completion of reclamation and revegetation.
TNF Land and Resource Management Plan (USFS, 1985)	Establishes the long-term management of the TNF. The plan accommodates multiple use, maximizes long-term net public benefits in an environmentally sound manner through sustained yield of goods and services from the Forest.	Reclamation, including revegetation, will return National Forest land uses to approved activities, including low-intensity grazing and wildlife habitat, recreation, and access to “maximize long-term net public benefits in an environmentally sound manner through sustained yield of goods and services from the Forest.”

Guidance	Summary	Project-specific Application
Federal Noxious Weed Act of 1974 (U.S. 1974, Amended 1990)	Pursuant to the Act, the U.S. Secretary of Agriculture has the authority to declare plants "noxious weeds" and limit the interstate spread of such plants. The Act directs federal agencies to prevent introduction of noxious and invasive species.	Federal noxious weeds are documented in the project area. A secondary goal of revegetation is limiting establishment of noxious weeds in reclaimed areas. This plan and the Resolution Copper Project Noxious Weed and Invasive Species Management Plan on National Forest System Lands (Resolution Copper, 2019) provide measures to prevent invasion of invasive species and encourage establishment and growth of native species.
Native Plant Materials Policy: A Strategic Framework (USFS, 2012b)	Establishes guidelines for use of native plants for land management projects, including reclamation and restoration efforts.	Application of native seed mixes or direct planting will be used for revegetation as soon as practicable following cessation of mining activities, reclamation grading or placement of cover growth media*.
Terrestrial Ecological Unit Inventory Technical Guide (USFS, 2005)	Provides national standards, suggested methods, and a list of criteria for defining, describing, and classifying terrestrial ecological units and types.	A total of nine vegetation communities occur within the analysis area. These were associated with TNF Ecological Response Units (ERUs), which have qualitative, quantitative, and measurable vegetation targets that could be used as vegetation performance criteria or standards for bond release. A 'static' vegetation performance criterion or standard for bond release is proposed based on the ERUs, cover material and underlying mined-material properties, climate, and PMLU goals.
Arizona Native Plant Law (A.R.S. Sec. 3-904)	Establishes a list of protected plants in Arizona and prohibits removal or destruction of wild-growing, protected plants without a permit.	Protected plants on Arizona State Trust land will be documented prior to disturbance for reclamation and closure. A Native Plant Inventory Report will be prepared, and a fee submitted to the Arizona State Land Department to acquire a permit.
State of Arizona Noxious Weed Statute (A.R.S. 3-4-244 to 3-4-244), Regulated and Restricted Noxious Weeds, Prohibited Noxious Weeds	Establishes regulation for the management of restricted and prohibited noxious weeds in the state of Arizona	Invasion of noxious weed species, including all those classified by the Arizona Department of Agriculture, on revegetated slopes will be prevented or strictly limited using measures delineated in this plan and the Noxious Weed and Invasive Species Management Plan on National Forest System Lands (Resolution Copper, 2019).

*Substrate composed primarily of mineral matter that is capable of supporting plant growth with or without the addition of growth media amendments or fertilizers. Cover growth media may include amended or un-amended and screened or unscreened A, B, and C horizons of the growth media column, as well as regolith, geologic material, and mine waste with physical and chemical properties (e.g. texture, density, water holding capacity, pH, soluble salts and metal content, base status, organic matter, and cation exchange capacity) that are not limiting to plant growth.

3.4 RESOLUTION COPPER ENVIRONMENTAL POLICIES AND STANDARDS

Environmental stewardship and conservation are key components of Resolution Copper's development strategy. Resolution Copper is committed to minimizing its impact on the surrounding environment and draws on its experience of operating and reclaiming mines all over the world, and on advice and input from environmental experts, regulatory agencies and the local community. This approach has helped Resolution Copper to develop a range of practical and best practice technological expertise that reduce potential environmental impacts and has also allowed Resolution Copper to form partnerships with conservation groups to further increase awareness and protection of the natural environment. Respect for the environment is an integral part of the Project development strategy, and under the corporate Rio Tinto requirements, Resolution Copper must conform to internal policies, guidelines, frameworks, manuals, standards (i.e. Rio Tinto's *Closure Standard*), and any other relevant documentation that helps reduce its environmental impacts as described in the following sections, and included in Rio Tinto's *Health, Safety, and Environmental Standards* presented in Appendix S of the General Plan of Operations for the mine (Resolution Copper, 2020b).

3.5 POST-MINING LAND USE

One of the main objectives of the applicable regulations and policies is to ensure that disturbed lands are returned to a use that is consistent with the post-mining land uses (PMLUs). "a near natural condition and ensure the site does not pose any long-term risk to the people or surrounding environment." PMLUs are expected to be similar to current land uses. Reclamation practices in this plan were established to foster future land uses, while protecting public safety, and establishing self-sustaining- native vegetation and the original pre-mining- contour (as appropriate) and self-sustaining drainage. For this plan, Resolution Copper assumed that all areas would be returned to these uses, however, the final reclamation land use will be determined nearer to the closure period and will depend on landowner preference.

Protect Public Safety and Environmental Protection

All reclaimed areas will have a PMLU to protect the public and the environment from unstable or contaminated conditions. Brush or rock piles may be used to reduce erosion, by providing a rougher surface for slowing water movement and trap weathered material for vegetation establishment.

Grazing and Wildlife Habitat

Portions historically used for grazing of domestic range animals will be reestablished to suitable environment for incidental grazing and wildlife use. The PMLU would be achieved through removing structures and fences, recontouring to stabilize slopes and returning the terrain similar to pre-mining conditions, and revegetation with native species. Wildlife habitat enhancement features (e.g., brush piles or rock piles) may be constructed in some areas to enhance local biodiversity by providing habitat for reptiles and small mammals and build structural diversity.

4 RECLAMATION AND CLOSURE DESIGN BASIS AND DESIGN STANDARDS

4.1 CLOSURE OBJECTIVES

The general goals of reclamation are to:

- Stabilize areas of surface disturbance,
- Control erosion and landslides,
- Isolate, remove, or control mineral waste materials,

- Implement protections for employees and public health and safety,
- Minimize disturbance to the extent practicable,
- Implement protections for water quality,
- Control water runoff,
- Limit duration of active post closure water management,
- Implement interim and concurrent reclamation as practicable,
- Where possible and practicable, return the disturbed areas to near-natural conditions,
- Salvage growth media resources during surface-disturbing activities so that they can be used for reclamation,
- Design facilities and reclaimed sites for long term stability,
- Reduce visual impacts by recontouring to a natural appearing topography, and revegetating with native vegetation at a density of cover to blend with surrounding landscape,
- Minimize or eliminate long term air, land, and water management requirements,
- Monitor to ensure that reclamation and closure standards and objectives are met,
- To the extent practicable, reclaim for land uses consistent with the Forest Plan (TNF, 1985),
- Ensure that reclamation is consistent with the approvals and permits from state and federal agencies,
- Initiate and complete final reclamation and closure upon permanent cessation of operations; and
- Establish financial assurance with the regulatory agencies to cover the costs of reclamation and closure, including post-closure monitoring.

The project-specific reclamation goals are as follows:

- Stabilize the project area,
- Establish proactive post-closure water management; and
- Establish a vegetative community for future wildlife use.

The following guidelines would be considered to determine the successful re-vegetation of disturbed areas:

- Successful establishment of the desired species,
- Evidence of vegetative reproduction processes,
- Evidence of overall site stability; and
- Indication that the revegetation cover of the reclaimed sites trending towards and/or matching the vegetation cover found in the adjacent reference areas.

4.2 ENVIRONMENTAL CONSIDERATIONS AFFECTING CLOSURE

The design of closure and reclamation success standards were developed based on environmental conditions of the project area. These conditions are briefly described.

4.2.1 Climate and Topography

The project is in an arid to semi-arid climate, with a mean annual precipitation of 18.60 inches in Superior, Arizona at 2,841 feet above mean sea level (amsl) (WRCC, 2020a) and 24.80 inches 2 miles east-northeast of Superior at approximately 4,200 feet amsl (WRCC, 2020b). Precipitation falls in a bimodal pattern: most of the annual rainfall within the region occurs during two main seasons, the cool season and the warm season. The annual average temperature in Superior is 69°F and daily temperatures typically range from 40°F to 100°F.

The cool season, from October through March, produces approximately 60% of the annual precipitation in Superior largely in the form of low-intensity rainfall events driven by the flow of continental air masses. Snow fall does not typically accumulate in the region. The warm season (locally termed the monsoon season), from July through September, produces approximately 33% of the annual precipitation largely in the form of high-intensity rainfall events driven by convective air flow that produces thunderstorms. This shorter duration, high-intensity nature of storms is a consideration for erosion, revegetation, facility stability, and net infiltration on closure covers. Only 7% (approximately) of the total mean annual precipitation falls during the three months of April, May, and June.

Annual average potential evaporation from stations of record in the proximity of the project area ranges from 107.42 inches at Sacaton to 95.78 inches at Winkleman to 91.30 inches at San Carlos Reservoir (WRCC, 2020c). The annual average potential evaporation within the area likely ranges from approximately 105 inches in the San Tan Valley to 85 inches atop the Apache Leap.

Elevations range from 1,565 feet in the southwest to 5,394 feet in the northeast. The wide range of elevations within the Project area coupled with the high-intensity summer storms would have an impact on erosion, re-vegetation, and facility stability.

4.2.2 Visual Resources

The corridor is in an area of varied landscape vegetation types. Reclamation of the area would reduce the post-closure visual (aesthetic) impacts by removing structures, rounding slope crests, blending slopes into surrounding topography, and revegetating disturbed areas with plant communities similar to undisturbed areas. To the extent practicable, areas initially constructed or completed to their final configuration during operations would be concurrently reclaimed during operations.

4.2.3 Land Use

Currently portions of the project area are located within grazing allotments. Reclamation activities would need to be consistent with the approved land uses in the TNF Forest Plan, State Land requirements, and any other affected landowners depending on where the corridor traverses.

4.2.4 Water Resources

Investigations have mapped riparian vegetation, ordinary high-water mark and drainage and flow characteristics of the streams and tributaries (i.e., ephemeral, intermittent, or perennial). The Dripping Spring Wash, the Stone Cabin Wash, and the Skunk Camp Wash, are in the vicinity of the TSF site and no natural ponds are present. The pipeline route crosses or passes beneath Mineral Creek, Devil's Canyon and Queen Creek. Mineral Creek and Devils' Canyon both have continually saturated reaches, but project infrastructure crossings are located away from those areas.

4.2.5 Vegetation

4.2.5.1 Goals

The primary goal of re-vegetation is to return disturbed areas that will be reclaimed to as close to pre-disturbance vegetation conditions as possible that are consistent with the PMLU goals of low-intensity grazing, public recreation, and wildlife habitat. This goal is anticipated to be achieved within the 5-year closure period following completion of re-vegetation activities using the standard industry best practices existing at the time of closure. Following this period, plant canopy cover and species diversity are expected to improve over time, as natural vegetation communities become re-established on Project-related disturbed areas that will be reclaimed.

In some cases, due to many decades of fire suppression, grazing, and/or invasion of non-native species, an earlier successional phase may be desired compared to the pre-disturbance condition, as outlined in

the current TNF Forest Plan revision process. An earlier successional phase may include, for example, less woody species (e.g., one-seed juniper and mesquite) and more native perennial grass species cover.

The secondary goals of revegetation are to limit growth media erosion, sediment transport, and noxious and invasive weed growth and spread. Achieving these goals is also critical to achieving the primary re-vegetation goal, as stated above.

4.2.5.2 Vegetation and Growth Media

Resolution Copper has completed a survey and baseline study to characterize vegetation at the TSF and utility corridor (WestLand Resources, Inc., 2020). Four vegetation communities cover approximately 90 percent of the total project area (USFS, 2019, pp. 176-177) as follows (from greatest to least acreage) and shown on **Figure 2**.

Project features within western portions located in lower elevation areas occur within the Upland and Lower Colorado River Sonoran Desertscrub communities. Project features at higher elevations are mainly within the Interior Chaparral biotic community. Riparian is present along some of the main drainages within Upland and Interior Chaparral, including portions of Queen Creek. Lists of representative plants and animals from these communities are provided in Brown (Brown, 1994). Common species are likely to be widely distributed across these biotic communities, with the exception of the highly disturbed sites in the existing mining areas. Vegetation within these communities varies.

One federally listed plant species under the Endangered Species Act (ESA), Arizona Hedgehog Cactus (AHC) occurs in the vicinity of the East Plant site (mine area and portions of the pipeline and transmission lines). Its known range extends from the Superstition Wilderness south to Devils Canyon, east along US 60 to Top of the World and south to the Mescal and Pinal mountains (AGFD 2003, Baker 2013, Viert 1996, WestLand 2013b) AHC occurs from 3,300 ft to 5,700 ft (AGFD 2003) in Interior Chaparral and Madrean Evergreen Woodland habitats as mapped by Brown and Lowe (1980).

The following biotic communities are found along the corridor route, with Interior Chaparral and Semi-Desert Scrub/Grassland comprising most of the route.

Arizona Upland Subdivision of Sonoran Desertscrub

As defined by Brown (Brown, 1994), this community dominates upper bajadas and lower mountain slopes between 2,000 and 3,500 feet in elevation. Ocotillo (*Fouquieria splendens*), saguaro (*Carnegia gigantea*), foothill palo verde (*Parkinsonia microphylla*), ironwood (*Olneya tesota*), creosote bush (*Larrea tridentata*), triangle leaf bursage (*Ambrosia deltoidea*), blue palo verde (*Parkinsonia florida*), jojoba (*Simmondsia chinensis*), chain fruit cholla (*Opuntia fulgida*), and teddy bear cholla (*Opuntia bigelovii*) are common shrub species. Bush muhly (*Muhlenbergia porteri*) occurs on some sites. Species diversity and percent cover are greater than the more arid Lower Colorado Desertscrub.

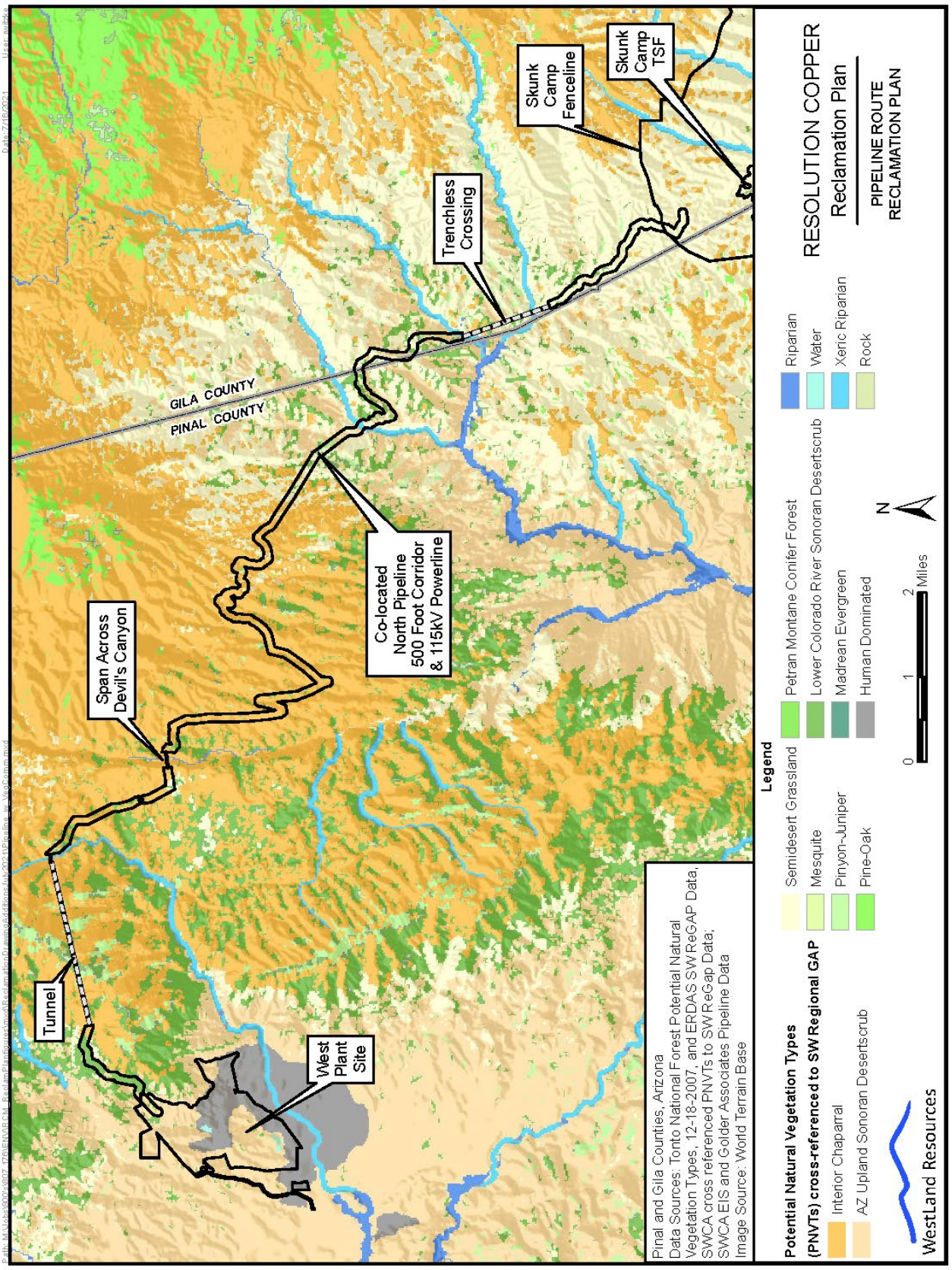
Semi-Desert Scrub/Grassland

As defined by Brown (Brown, 1994), this community dominates lower mountain slopes between 3,500 and 4,500 feet in elevation. Black grama (*Bouteloua eriopoda*), tobosa grass (*Pleuraphis mutica*), threeawns (*Aristida* spp.), Arizona cotton top (*Digitaria californica*), bottlebrush squirreltail (*Elymus elymoidies*), and curly mesquite (*Hilaria berlangeri*) are common grasses (Brown, 1994) (Simonin, 2000) (Innes, 2012). Sotol (*Dasylirion wheeleri*), beargrass (*Nolina microcarpa*), turpentine bush *(Ericameria laricifolia),* snakeweed *(Gutierrezia sarothrae),* banana yucca (*Yucca baccata*), soaptree yucca (*Yucca elata*), mesquite (*Prosopis glandulosa, P. juliflora*), whitethorn acacia (*Vachellia constricta),* and catclaw acacia *(Senegalia greggii)* are common shrubs.

Interior Chaparral

As defined by Brown (Brown, 1994), this community dominates upper mountain slopes between 4,000 and 5,500 feet in elevation. Shrub live oak *(Quercus turbinella),* Wright's silktassel *(Garrya wrightii),* pointleaf manzanita *(Arctostaphylos pungens),* Emory oak *(Quercus emoryi),* one-seed juniper (*Juniperus*

Figure 2. Vegetation Communities within the Pipeline Route Analysis Area



monosperma), sugar sumac *(Rhus ovata),* barberry *(Berberis haematocarpa),* Englemann's hedgehog *(Echinocereus engelmannii*), Englemann's prickly pear *(Opuntia engelmannii),* crucifixion thorn (*Canotia holacantha*), desert ceanothus (*Ceanothus greggii),* and mountain mahogany *(Cercocarpus ledifolus)* are common shrubs (Brown, 1994) (League, 2005). Grasses include black grama (*Bouteloua eriopoda*), hairy grama (*Bouteloua hirsuta*), sideoats grama (*Bouteloua curtipendula*), threeawnsand bull muhly (*Muhlenbergia emersleyi*).

Great Basin Conifer Woodland

This woodland is dominated by Rocky Mountain pinyon pine (*Pinus edulis*) and one-seed juniper (*Juniperus monosperma*). Alligator juniper (*Juniperus deppeana*) and Madrean Oak Woodland species such as Emory oak (*Quercus emoryii*) and Arizona white oak (*Quercus arizonica*) can also occur. Typical understory grass species include blue grama (*Bouteloua gracilis*) and several muhleys (*Muhlenbergia* sp*.).* Shrubs include snakeweed (*Gutierrezia sarothrae*), Gambel oak (*Quercus gambelii*), cliffrose (*Purshia mexicana*), and Interior Chaparral species such as canyon live oak (*Quercus turbinella*) and Wright's silktassel (*Garrya wrightii*). Cacti include hedgehogs such as Engelmann hedgehog (*Opuntia engelmannii*) and prickly pears such as beavertail cactus (*Opuntia basilaris*).

Riparian

Riparian communities occur between 3,000 and 4,500 feet in elevation, largely in Devils Canyon, and xeroriparian communities occur between 2,800 and 4,500 feet in elevation, largely along Queen Creek and Dripping Spring Wash.

Vegetation Alliances

Discrete vegetation alliances noted during field survey include Juniper Woodland Alliance, Shrubland Alliance and Sparsely Vegetated Areas, Mesquite-Catclaw Acacia Alliance, Deciduous Riparian Alliance and Pondweed Dominated Earthen Tank. The descriptions of these alliances can be found in the vegetation assessment report (WestLand Resources, Inc., 2020). These alliances can be used to further refine the final vegetation success guideline listed in Section 4.2.5.3..

4.2.5.3 Revegetation Goals

This section identifies the revegetation goals and describes planned revegetation activities. This section includes growth media management plans that guided development of the revegetation plan.

Revised Forest Plan Desired Future Conditions

The *TNF Land and Resource Management Plan* provides direction regarding vegetation management (USFS, 1985). However, desired future conditions for vegetation were informed by recent work on the revised TNF Plan (USFS, 2019). These desired future conditions are based on Ecological Response Units (ERUs), which are mapped ecosystem types that represent the range of conditions that occur under natural disturbance regimes such as fire, which are not necessarily representative of disturbances regimes associated with mining. The distribution and condition of ERUs are tied to growth media health, climate, topography, and other environmental factors.

Desert Ecosystems ERU

The Desert Ecosystems ERU includes both the Lower Colorado River Sonoran Desertscrub and Upland Sonoran Desertscrub (USFS, 2019). The desired future conditions include a vegetation community composition and structure of 10 to 25 percent perennial grass and cacti cover (i.e., canopy cover), presence of saguaro and mesquite that provide habitat for cavity-nesting birds, and limited infestation of non-native grasses (ideally less than 1 percent cover) to mitigate fine-fuel potential to increase fire susceptibility.

Semi-Desert Grassland ERU

The desired future conditions of the Semi-Desert Grassland ERU include a vegetation community composition and structure that includes a variety of cool- and warm-season understory plants, less than 10 percent tree and shrub canopy cover, and limited non-native species cover (USFS, 2019) . Native herbaceous vegetation cover provides fine fuels to support stand-replacing fires; however, non-native annual vegetation should be limited to mitigate the spread, intensity, and severity of uncharacteristic fire.

Interior Chaparral ERU

The desired future conditions of the Interior Chaparral ERU include a vegetation community composition and structure of 40 percent cover on dry sites and 80 percent cover on wet sites dominated by shrub live oak, annual regeneration of native grasses and forbs during most years, and low cover of non-native annual species (USFS, 2019).

- Growth Media

The project is in an area largely controlled by bedrock; thus, very little growth media is present in the area. The growth media that is present is poorly developed, which may affect closure. Site-specific growth media data were collected, and soil maps were generated from U.S. Department of Agriculture Natural Resources Conservation Service soil surveys. The area does contain alluvial sand and gravel as well as Gila Conglomerate all of which can be used as growth media for cover design. If topsoils are available (even if shallow), these soils would be stored separately from other growth media and applied only as topdressing.This approach was used at the West Plant Site (WPS) for reclamation where crushed Apache Leap Tuff and White Tail Conglomerate containing no sulfides was used as cover material over the historic Magma Copper Tailings and supports a vegetative cover.

During construction, growth media would be segregated to maintain integrity and avoid mixing better growth media with unsuitable media.

4.2.6 Wildlife Habitat

Common wildlife species expected to occur are typical of those associated with the existing vegetation communities. Mammals in Interior Chaparral include cottontail rabbit, various mice, and deer; birds include scrub jay, several towhees, and canyon wren; and reptiles include various rattlesnakes, kingsnake, and fence lizard (Brown 1994). Mammals in Semi-Desert Grassland include black-tailed jack rabbit and kangaroo rat; birds include quail, flycatcher, and raven; and reptiles include various lizards, toads, and snakes (Brown 1994). Mammals in the Upland Sonoran Desertscrub include javelina, gray fox, and wood rat; birds include white-winged dove, several woodpeckers, and elf owl; and reptiles include Gila monster, Arizona coral snake, and western whiptail (Brown 1994). Mammals in the Lower Colorado Sonoran Desertscrub include desert bighorn sheep, kit fox, and antelope squirrel; birds include phainopepla, curve-billed thrasher, and cactus wren; and reptiles include chuckwalla, sidewinder, and various lizards (Brown 1994). Extensive baseline biological studies have been conducted. Wildlife surveys have included group-specific surveys for bats, raptors, passerine birds, reptiles, and amphibians.

Wildlife has been monitored using motion-sensitive cameras since 2008 (WestLand Resources, Inc., 2018a). Species detected include javelina (*Tayassu tajacu)*, raccoon (*Procyon lotor*), Gambel's quail (*Callipepla gambelii*), white-tailed deer (*Odocoileus virginianus)*, white-nosed coati (*Nasua narica*), rock squirrel (*Otospermophilus variegatus*), gray fox (*Urocyon cinereoargenteus*), mountain lion (*Puma concolor), coyote* (*Canis latrans*), Sonoran desert toad (*Incilius alvarius*), American badger (*Taxidea taxus*), Gila monster (*Heloderma suspectum*), western diamondback rattlesnake (*Crotalus atrox*), gopher snake (*Pituophis melanoleucus),*and Steller's jay (*Cyanocitta stelleri*). Audubon Arizona conducted Yellow-billed cuckoo surveys in 2019 and Audubon and WestLand in 2020 in the vicinity of the TSF and pipeline corridor areas. Cuckoos were not detected, and 57 other species that were encountered, nine of which have special conservation status (Purple Martin, Gila Woodpecker, Gilded Flicker, Bell's Vireo, Abert's Towhee, Costa's Hummingbird, Willow Flycatcher, Gray Vireo, and Lucy's Warbler) were

reported. A full list of birds observed during the 2019 Resolution survey is in the report (Prager & Wise, 2019).

Surveys for amphibian and reptile species associated with aquatic features were conducted (WestLand Resources, Inc., 2018b). WestLand observed lowland leopard frogs, sunfish, cray fish, juvenile bullfrogs, black-necked gartersnake (*Thamnophis cyrtopsis*), Sonoran desert toad (*Incilius alvarius*), Sonora mud turtle (*Kinosternon sonoriense*), canyon treefrog (*Hyla arenicolor*), and red-spotted toad (*Anaxyrus punctatus*).

5 CLOSURE ACTION PLAN

Closure activities represent the proposed approach based on site-specific conditions, industry practice, and legal and other requirements at the time of preparation (2021). Closure actions are based on the project environmental considerations and design basis described in Section 4.

Reclamation practices and technology are constantly evolving and improving. Reclamation practices discussed here have proven successful at other operations. Future opportunities to incorporate new reclamation technologies or implement improved reclamation measures will be considered during periodic reclamation and closure plan reviews with state and federal agencies.

5.1 HEALTH AND SAFETY HAZARDS STANDARDS

During closure, hazards from closure-specific activities include heavy vehicle traffic, falls, electrical, chemical, weather, air quality, water, material handling, suspended overhead loads, processing chemicals, and hazardous wastes. Some of the facilities from the historic mining operations are old and may contain previously undiscovered lead-based paint or asbestos. Decontamination of equipment and buildings could generate additional wastewater that may require treatment before disposal. Resolution Copper health, safety and environmental programs will identify these hazards and train closure staff accordingly. Post-closure health and safety hazards may be present for monitoring activities and security.

5.1.1 Physical Barriers and Warning Signs

Physical barriers or fencing would be placed in areas accessible to the public where final contours are not regraded to 3H:1V slopes or less (such as the subsidence crater). Weather-resistant warning signs would be placed at regular intervals, inspected routinely and replaced as deemed necessary.

5.1.2 Stability Considerations

Existing slopes would be reduced to a final slope angle which would minimize erosion and would result in geotechnical stability for these features, generally a maximum slope of 3H:1V. Erosional stability may be enhanced through establishment of vegetation, engineered channels to drain stormwater from reclaimed areas, and possibly placement of erosion-resistant cover materials.

5.1.3 Debris Management

Debris (trash, scrap metal, wood, etc.) from mine reclamation that poses a threat to public safety or creates a public nuisance would be disposed or recycled in accordance with applicable state and federal regulations, consistent with the PMLU.

Any potentially hazardous materials encountered during demolition would be analyzed to determine appropriate remediation and disposal methods. Any hazardous materials would be handled and disposed or recycled in accordance with applicable state and federal regulations.

5.2 GENERAL DESIGN STANDARDS

5.2.1 Decommissioning and Demolishing Facilities

Resolution Copper will demolish, remove, and reclaim the surface of all existing or new facilities used by the Resolution Copper Project.

Resolution Copper would recover and remove salvageable equipment not required for post-closure monitoring. Removed equipment would be shipped to buyers, recyclers, or approved waste disposal facilities.

Areas would be tested for contamination before structures and facilities are removed. Areas of potential contamination would be analyzed and evaluated to determine if remediation is required, and if so, excavated, and removed. Removed material would be disposed of on- or off- site, depending on the results of the evaluation.

5.2.2 Recontouring

Resolution Copper has established design criteria to control ponding, runoff, and erosion. The top surface and outslopes, as well as disturbed surfaces, would be recontoured to:

- Appear natural (size, shape, transition) compared to surrounding terrain;
- Prevent water from creating ponds, thereby reducing the potential for infiltration to underlying materials;
- Control runoff, thereby reducing the potential for erosion and creation of ponds; and
- Improve stability, thereby reducing the potential for mass movements.

Final reclamation slopes for earthworks would generally be a maximum of 3H:1V. Compacted areas would be cross-ripped along the topographic contour, regraded, and recontoured to provide for erosion control and to blend into the surrounding topography and terrain to promote post-mining visual quality, land use, and revegetation. Final slopes would depend on constraints (such as, property boundary lines or other linear features). Slope lengths would generally be limited to 300 feet, although exceptions may be made (such as property boundaries). For slope lengths longer than 300 feet, intermediate benches with V-ditches would be installed to control runoff.

Post-reclamation conditions would assume current material and pore water conditions and long-term drained conditions. Resolution Copper's design criteria for stability require a minimum factor of safety for slope stability of 1.5 for static conditions and 1.1 for pseudostatic conditions.

Recontouring would be accomplished by local cut-to-fill, importing clean fill, or importing mass grading fill. Clean fill would consist of the same material as used for the closure covers placed in lifts and compacted. Mass grading fill would consist of mine materials and/or natural materials from multiple on-site locations and easily handled.

5.2.3 Water Quality Management

5.2.3.1 Surface Water/Stormwater Management Plans Following Closure

Water management would focus on reaching a steady state for groundwater surrounding the facilities and that reclamation has been completed to allow for stormwater discharge. Additional post-closure stormwater management information is discussed within the context of closure of the pipeline corridor.

5.2.4 Closure Covers (Growth Media)

The pipeline corridor would not receive closure covers. Suitable cover growth media can be practicably salvaged from the pipeline corridor using standard earth moving equipment. The suitable growth cover

will be salvaged, stored, and reapplied on areas that have been prepared for reclamation. If the phasing of construction, material handling, and reclamation allow, growth media will be 'live handled'[1], the period of growth media storage will be limited to the extent practicable, or when long-term storage of growth media is necessary, growth media will be placed in stockpiles that maximize the area of the stockpile surface. This can effectively limit the volume of imported Gila Conglomerate and the amount of growth media amendment necessary for the revegetation of the pipeline route.

Gila Conglomerate

The Gila Conglomerate cover material is approximately 50 percent gravel, 40 percent sand, and 10 percent silt/clay. The conglomerate is a type of sedimentary rock composed of pre-existing rocks that have been cemented together, including sandstone, carbonates, argillite, hornfels, granitic rocks, and quartz and feldspar (Lawson, 2011). Gila Conglomerate is relatively easy to excavate and handle using standard earth moving equipment. It is non-potentially acid generating, contains an excess of neutralization potential and readily weathers into finer-grained material for plant growth media.

The generally coarse nature of the Gila Conglomerate, the low fines content, and the high rock fragment content is expected to provide good erosion protection on slopes.

Revegetation Plan

Dressen (2008) identified factors that are key components to successful revegetation using native grasses in arid southwest environments. These factors, which are also applicable to seeding of native forbs, shrubs, and trees, are as follows:

- Seed Depth – Emergence versus moisture. The depth of seed placement is a critical factor; the goal is to balance shallow seeding depths to allow high rates of emergence versus better growth media moisture conditions found with increasing depth, which are critical to seedling survival.
- Dormancy – An advantageous trait for seed to persist for later precipitation events or future years. If less than optimal moisture conditions have allowed most seed to germinate but then die of desiccation, the presence of some dormant seed can provide a viable seed reserve.
- Growth Media Compaction – Survival depends on rapid root extension. The ability of seedling roots to follow the downward drying front is inhibited by shallow compaction zones or claypans.
- Seed-to-Growth Media Contact – To facilitate imbibition of growth media moisture by seed. Large growth media voids can prevent adequate seed-to-growth media contact and reduce upward capillary movement of growth media moisture that can retard germination and growth
- Moisture Relations and Growth Media Texture – Infiltration depth versus water holding capacity. The most important factor in arid ecoregions is growth media moisture. The influence of growth media texture on the depth of moisture penetration can be a key variable in seeding success.
- Mulch – Essential in arid regions. A layer of mulch reduces evaporation and wind and water erosion, and aids infiltration; it provides the maximum benefit from the small amount of precipitation received in arid climates. Application of the proper amount of weed-free material is important.
- Weed Control – Limit the weed seed bank. Dense stands of annual and perennial weeds can out-compete seedling grasses for growth media moisture, light, and nutrients, and prevent establishment. Weeds are an undesirable plant type for revegetation success.
- Grass Types and Planting Dates – The type of photosynthetic pathway determines the optimal temperatures (70-75°F for cool season and 85-95°F for warm season) and temperature limitations (40°F for cool season and 55°F for warm season) for growth and germination.

1 Refers to the removal of growth media from an area prior to the initiation of mining and related activities and the haulage and immediate placement of the cover growth media onto another area of disturbance that is prepared for permanent reclamation.

These and other factors influence development of the seed mixtures (**Attachment A**, seeding, seedbed preparation and amendment, mulching, and weed management plans.

5.2.5 Seedbed Preparation

Seedbed preparation will include pocketing and/or roughening of the surface to create microsites, which facilitate vegetation establishment and growth through improved shading and moisture conditions within cover growth media. Establishment of these microsites should also facilitate adequate burial of applied seed with cover growth media. If seeds are not adequately buried with cover growth media, seeded areas will be deeply cross ripped along the contour, pitted, chain-dragged or harrowed as long as microsites are maintained.

5.2.5.1 Growth Media Amendments

To promote vegetation establishment, growth media amendments that are tailored to growth media conditions and the needs of revegetation species would be applied immediately prior to seeding, consisting of mulch, biochar, certified-weed free compost, or other commercially available growth media amendments. These amendments would increase the nutrient availability, erosion resistance, and water holding capacity of cover growth media.

Growth media fertilizer will be applied sparingly, if at all, to encourage the establishment and diversity of native plants and to prevent establishment of noxious weeds. The objective of growth media fertilization is a short-term nutrient supply to promote the establishment and growth of desirable plants. Subsequently, long-term nutrient requirements will be satisfied through the development of natural nutrient cycling and plant communities that are not fertilizer dependent. Use will be based on local climate, vegetation nutrient requirements, growth media nutrient deficiencies as determined by sampling and analysis, and vegetation response to cultural treatments. If invasive or noxious weeds are prevalent in the area, nitrogenous fertilizers may not be applied or only applied after emergence of native perennial plants.

5.2.5.2 Mulches

Certified noxious and invasive weed-free mulch will be applied to the surface of the cover growth media only when it does not delay the emergence of seedlings and when it is affixed to the surface of cover growth media by crimping, co-application with tackifier, surface netting and staking, or other methods. Mulch is important to the revegetation success because it:

- simulates plant litter under natural conditions and its benefits appear to be greatest in arid climates (Lawson, 2011);
- provides one of the few opportunities to preserve limited growth media moisture and can increase infiltration (Dressen, 2008); and
- limits growth media loss attributable to rain splash.

Native grass hay is an effective material for mulching large seeding projects. Mulch will be applied at a rate of 1 to 2 tons per acre. Erosion-control fabric and other erosion control practices instead of or in addition to mulching will be applied to erosion-prone areas as appropriate.

5.2.6 Reclamation Seed Mixes

The proposed long-term vegetation community seed mixes are provided in **Attachment A.** The criteria for each species in the seed mixes include demonstrated erosion control capacity, existing or alternative desired vegetation dominance, commercial availability, contribution to wildlife habitat, and livestock palatability.

All mixes will be certified weed free. Selection of species for each seed mixture can be modified in the future based on revegetation success, growth media and climatic conditions, and availability.

The reclamation seed mixes will be applied per the slope, aspect, and elevation of the reclaimed surfaces and erosion control needs and the previously identified vegetation community. The seed mixtures are listed by location.

The exact seed mixes applied may differ from the proposed mixtures depending on commercial availability from year to year. Seed mixes will be submitted to the TNF for approval prior to application. Modification to the seed mixes may also be made based on the performance of interim and concurrent reclamation. The performance of individual species on reclaimed sites will be considered and seed mixtures and their application locations modified to better meet reclamation and PMLU goals.

5.2.6.1 Seeding Rate and Quality

When broadcasting seeding, higher rates are usually needed because fewer of the seed will land at an optimal burial depth (Dressen, 2008). A recommended total seeding rate for a mix of pure live seed (PLS) per acre is shown in Attachment A**.** The proportion of each species will depend on the species composition of the desired plant community, seedling vigor (competition between species), seed size, seed dormancy, and PLS seed cost. Seeds would be tested for purity, and percent live seed prior to use.

5.2.6.2 Seed Application Methods

Dry broadcast seeding will be the primary seeding method and will be accomplished using a hydroseeder, hand-operated cyclone-type seeder, or mechanical broadcast seeder followed by raking.

5.2.6.3 Vegetation Salvage and Transplanting

In Upland Sonoran Desertscrub, saguaros less than 20 feet in height and other select cacti would be salvaged and transplanted to the extent practicable if encountered in the project footprint. There is a low survival rate for transplanted saguaros taller than 20 feet and transplanting success is much higher for “spears” (saguaros without arms) less than 10 feet tall. Best management practices for saguaro transplanting developed by the Arizona Game and Fish Department (Arizona Game and Fish Department, 2019) would be implemented.

5.2.6.4 Timing of Revegetation Activities

Disturbed areas that will be reclaimed will be seeded as soon as practicable following completion of cover growth media application and seedbed preparation. Seeding is optimally completed prior to the most reliable precipitation of the year, which in the bimodal climate is the monsoonal precipitation of July, August, and early September. Optimally, seedbed preparation will occur as close to mid-to-late June as possible in anticipation of these warm season rains. Optimally, seed will be applied immediately thereafter in late June or early July. Depending on success, seedbed preparation and seeding could also be conducted in October following the monsoonal rains and prior to late fall/winter precipitation, although this would be considered a secondary option as precipitation during this time is typically not as reliable as that of the monsoon season.

Three types of reclamation, in terms of timing, will be conducted as part of the project and can be defined as follows:

- Interim Reclamation: Temporary reclamation of land disturbed by construction and mining that will be re-disturbed by mining, or concurrent or final reclamation (see definitions below); cannot be permanently reclaimed concurrent with mining; and where temporary stabilization of disturbed ground would limit growth media erosion, sediment transport and noxious weed establishment and spread. Interim reclamation activities may include creation of micro-topographic features; sowing of interim reclamation seed mixture(s); application of mulch or erosion control fabric on erosion-prone areas; and installation and maintenance of best management practices. Examples of areas where interim reclamation may occur include road cut and fill slopes.

- Concurrent Reclamation: Final or permanent reclamation of land disturbed by construction and mining that will not be re-disturbed during mining or final reclamation and can be permanently reclaimed concurrent with mining.
- Final or Permanent Reclamation: Final or permanent reclamation of land disturbed by construction and mining that cannot be reclaimed until mining is completed.

Interim revegetation efforts will emphasize erosion control, weed management and sustaining growth media productivity. Interim revegetation will occur on growth media (and potentially woody debris) stockpiles, and on road and operation yard cut and fill slopes.

Seeding would occur when weather conditions are favorable for germination, emergence, and seedling survival.

5.2.6.5 Noxious and Invasive Plant Management

Growth of noxious and invasive plants would be prevented as part of revegetation activities during reclamation. Surveys for noxious, invasive, and non-native species were conducted within and adjacent to the pipeline route. A total of 31 invasive plant species are known to or could possibly occur. Tamarisk (*Tamarix* sp.), Bermuda grass (*Cynodon dactylon*), buffel grass (*Pennisetum ciliare*), and fountain grass (*Pennisetum setaceum*) were all observed within some of the larger drainage systems. Filaree (*Erodium cicutarium*) and Sahara mustard (*Brassica tournefortii*) were found in some upland areas. Red brome (*Bromus rubens*) is a ubiquitous groundcover.

Of the non-native invasive species identified, the most damaging to revegetation is red brome due to its ability to invade and displace desirable vegetation and its effect on wildfires in desert scrub and grassland communities.

To prevent the proliferation of the noxious and invasive weeds, Resolution Copper will implement the *Noxious Weed and Invasive Species Management Plan on National Forest System Lands* (Resolution Copper, 2019). The plan will focus on the following:

- Preventing the introduction of non-native species;
- Controlling the spread of existing populations; and
- Preventing the introduction of noxious weeds using integrated weed management techniques.

Integrated weed management techniques involve a combination of weed control strategies. The four strategies of weed control are cultural, biological, physical, and chemical.

- Cultural control would be accomplished by educating site employees on the identification and importance of weeds and by developing a revegetation seed mix that promotes native plant competition. Competitive native plants are included in the reclamation seed mixtures.
- Physical control may involve hand pulling, cutting, or mowing in areas of low-density infestations. Tilling would also be used in high-density areas.
- Chemical controls (herbicides) would be timed with the application of physical controls to maximize their effect (chemical methods will be used on NFS only with prior approval from the USFS, including type, rate, frequency and total quantity of application, in accordance with the Tonto National Forest Integrated Treatment of Noxious or Invasive Weeds decision (USFS, 2012a) or current decision).
- Biological controls have not been developed for most invasive plants possibly invading disturbed areas and are not likely to be used as part of the integrated weed management. However, treatments that include seeding of native plant species can be effective.

Control of noxious and invasive weeds would be limited through successful revegetation. Mulch, compost, erosion control materials and other reclamation materials used on-site would be certified weed-free. Seed mixes would be approved by the USFS and all seed used would be tested for the presence of noxious

and invasive weeds. If invasive or noxious weeds are prevalent in the area, nitrogenous fertilizers may not be applied or only applied after emergence of native perennial plants.

Equipment and materials used for closure, reclamation, and monitoring will be inspected to ensure undesirable weed plants, seeds, and propagules are not transported to the site. To eliminate vectors for weed propagation, all contractors will wash and clean all equipment and containers prior to entry to the site or at the Resolution Copper light vehicle wash facilities.

Vehicle wash facilities will be fitted with air and water wash systems to accommodate the weed management protocol described here. The air wash system will be used specifically for Sahara mustard (*Brassica tournefortii*) weed control. The air and water wash system will be used to clean commercial and contractor vehicles to reduce the potential introduction of other noxious and invasive weeds.

As roadsides and recently disturbed areas are most vulnerable to weed infestations, undesirable weed control will focus on these areas. Annual weed monitoring would be conducted during the growing season to determine the presence and location of individual and populations of undesirable weeds.

5.2.6.6 Revegetation Success Monitoring and Adaptive Management

Annual monitoring of revegetated sites will be used to adjust and improve management decisions regarding seedbed preparation, seed mix, and timing. The accumulation of understanding and subsequent adaptation of management strategies depends on feeding the monitoring and assessment results back into the decision-making process. This plan's monitoring and assessment efforts are designed to ensure that key resource parameters are adequately measured and appropriately focused to contribute to any changes needed to achieve success.

5.2.7 Wildlife Habitat Reclamation

As one of the identified PMLUs, wildlife habitat is supported by the early successional vegetation after reclamation, the post-mining topography, and access. Early successional habitat is characterized primarily by grasses and forbs, often with shrubs pioneering into the site over time. This type of structure and cover is essential for a variety of wildlife species in the desertscrub, semi-desert grassland, and interior chaparral biotic communities. An essential component of early successional habitat for many wildlife species is native warm-season grasses and forbs. As opposed to non-native cool-season grasses that grow well during the spring and fall, warm-season grasses grow during June, July, and August. They are typically bunch grasses that grow in clumps and are especially beneficial to ground-feeding birds as they allow mobility between the clumps. Early successional habitat provides cover and structure for wildlife to use for food and shelter.

The reclamation plan has incorporated measures in addition to the revegetation practices outlined above to meet this objective. These include wildlife habitat enhancement features (e.g., brush piles or rock piles) in some areas to enhance local biodiversity by providing habitat for reptiles and small mammals and build structural diversity.

5.2.8 Air Quality Management

During closure activities (i.e. grading, demolition, cover placement), Resolution Copper would continue to implement control measures defined by their operational air quality permit and management plan.

Resolution Copper would take reasonable precautions to minimize fugitive dust emissions from dust-generating activities as required by the dust control permit through Pinal County. Resolution Copper has identified sources of fugitive dust emissions and developed control measures and strategies to be implemented prior to and during dust-generating activities. Fugitive dust emissions would be visually monitored in accordance with required opacity protocols and standards.

A dust-suppression program would continue to be implemented for the gravel roads, which includes periodic watering and/or chemical treatment to control fugitive dust generation. A water truck would run

periodically in the drier months, wetting the unpaved roads, and a motor grader would remove any rock, silt, or other debris from the unpaved roads. Speed limits would be in place on access roads to reduce the generation of fugitive dust.

5.2.9 Visual Resource Management

To the extent that the engineering design and stability requirements permit, Resolution Copper would vary slope angles, avoid long linear features and overly simple geometric forms, and revegetate with an approved seed mix, to reduce the visual contrast with the surrounding landscape.

5.3 AREA-SPECIFIC CLOSURE AND RECLAMATION

5.3.1 Roads

Asphalt and other paved surfaces would be demolished. Asphalt and other paved surfaces would be segregated from other demolition debris, and debris would be disposed of at an approved facility. Bridges and culverts would be stabilized or removed. Water bars would be installed on steeper segments to control runoff and erosion.

Construction roads that are no longer needed during operations or post closure for monitoring would be closed and reclaimed concurrently. Roads that would not be used to access post-closure monitoring sites would be closed during final closure. This would include placing barriers at road entrances such as boulders and berms, roughing and cross-ripping the road along the natural contour, scarification, and reseeding with an approved seed mix.The road between the WPS and the TSF for the pipeline would not be required for the PMLU and would be reclaimed, except where access is required for the transmission line if the transmission line is to remain for post closure use.

5.3.2 Pipeline Route

All fences would be removed. Culverts would be taken out. The tailings pipelines would be removed.

All pipelines in the TSF corridor will be removed and hauled to a recycler or disposed of at an approved facility. Removal of the pipeline will be similar to the construction, with a similar amount of disturbance, equipment used, and timeframe.

The electrical system infrastructure includes overhead transmission lines and substations. Transmission lines and substations owned by electric utilities would be left in place or removed at the discretion of the utility provider. Transmission lines which are owned by Resolution Copper would be removed during facility demolition activities.

Vegetation that has grown in over the pipelines or adjacent to access roads that would be removed will be disposed of in accordance with applicable regulations, in consultation with the TNF and state. Disposal locations will be identified prior to vegetation removal. Protected native plants will be removed and replaced per applicable guidelines.

5.3.3 Underground Facilities

Skunk Camp Pipeline Corridor includes a tunnel about 8,760 feet long constructed through the ridge. The 15-by-15-foot tunnel will include a pipe rack sufficient to carry four pipes, ventilation and allow maintenance access (Golder, 2020). To close the tunnel, the tunnel will be backfilled and the portals sealed with concrete bulkheads. Material from the development rock stockpile at West Plant will be used as the backfill material, which may include material removed during tunnel construction. Backfill methods may include hauling and placing rock utilizing underground equipment, such as load-haul-dump units. The most efficient process would involve placing backfill from each end of the tunnel as the material will need to be shuttled in relatively small quantities, dumped and pushed into place to minimize the void space at the top of the backfill. It may also be feasible to create a pumpable backfill, using excavated

material mixed with cement and/or a foaming additive to create a flowable mixture, which would likely require crushing and selective sizing of the backfill material. Backfilling by either of these methods will stabilize the tunnel opening and significantly reduce subsidence risk. Closure of the portals can be accomplished by a concrete bulkhead, likely on the order of less than 2 feet, or utilizing reinforced concrete masonry walls. Wood and steel forms will be constructed within the opening and pumping concrete into the form to seal the opening.

All entrances to the underground pipeline would be closed to prohibit access and reclaimed. Surface entrances for the underground pipeline tunnel will not be suitable for bat habitat and therefore bat-accessible structures will not be placed.

6 RECLAMATION PERFORMANCE STANDARDS AND RESOLUTION COPPER MONITORING

To ensure that objectives are met, measurable performance standards are based on regulatory requirements and recommendations. The USFS does not identify specific standards for special use authorization reclamation. This plan includes measurable performance standards and that performance standards be developed at a minimum for:

1. Revegetation,
2. Soil and water conservation measures,
3. Mass stability of overburden or other waste embankments,
4. Concurrent reclamation; and
5. Post-mining land configuration.

6.1 RECLAMATION MONITORING

Project-specific reclamation monitoring programs will be designed and implemented for each reclamation task. Reclamation performance monitoring will commence immediately after the reclamation works have been completed. Detailed performance standards and associated reclamation performance monitoring will be determined closer to the actual reclamation period. General guidelines are stipulated in this plan. As information on the success of closure methods becomes available from monitoring concurrent and interim reclamation projects, the design of closure projects would be refined, and the monitoring requirements better understood. In particular, further details of closure and post-closure monitoring need to be developed for the planned revegetation, long-term surface water quality, and long-term physical and erosional stability.

Resolution Copper would monitor reclamation success for at least 5 years following pipeline decommissioning and final reclamation. Reclaimed areas would be monitored for growth media erosion and revegetation success. Resolution Copper would evaluate vegetative cover and species composition during the first, third, and fifth years after final reclamation. Adjacent undisturbed vegetation communities and vegetation reference areas would be established to serve as a means of comparing project revegetation and natural vegetation. The reference area would be selected from representative undisturbed plant communities adjacent to areas of disturbance.

6.2 REVEGETATION SUCCESS

The first year's performance goal will be to establish vegetation cover sufficient to limit erosion. Following the first year, the performance goal will be to attain the desired plant communities. Revegetation monitoring methods and erosion and slope stability monitoring methods are described below.

Revegetation success will be determined based on statistically valid estimates of percent plant canopy cover, species diversity, and non-native plant species composition of logical reclamation management units in the project site in comparison to an appropriate reference site and/or desired future condition.

6.2.1 Reclamation Performance Standards

Recovery of ground-clearing disturbances requires more time than non-ground-clearing disturbances because the former can severely compact growth media and remove seedbanks, microbial communities, and nutrients (Abella, 2010).

ADEQ Final Stabilization requirements for SWPPP

3.1.2.2 Final Stabilization. Final stabilization means that one of the following conditions (1, 2, or 3) is met:

1. All soil disturbing activities at the site have been completed; all construction materials, waste, and temporary erosion and sediment control measures (including any sediment that was being retained by the temporary erosion and sediment control measures) have been removed and properly disposed; and either a. and/ or b. below is met:

   a. A uniform (i.e., evenly distributed, without large bare areas) vegetative cover with a density of 70% of the native background vegetative cover for the area is in place on all unpaved areas and areas not covered by permanent structures. When preconstruction native background vegetation covered less than 100% of the ground (e.g., arid areas, beaches), the 70% coverage criteria is adjusted as follows: if the native vegetation covered 50% of the ground, 70% of 50% (.70 X .50 = .35) or 35% cover density would be required, or

   b. Equivalent permanent stabilization measures (such as the use of riprap, gabions, gravel, or geotextiles) have been employed.

2. For individual lots in residential construction, final stabilization means that the homebuilder:

   a. Has completed final stabilization as specified in Part 3.1.2.2(1)(a) above, or

   b. Has established temporary stabilization, including perimeter controls, for an individual lot prior to occupation of the home by the homeowner and has informed the homeowner of the need for, and benefits of, final stabilization.

3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to water of the U.S., and areas that are not being returned to their preconstruction agricultural use shall meet the final stabilization criteria above. Any non-vegetative stabilization methods must achieve the same levels of stabilization as specified in Part 3.1.2.2(1).

Vegetation reference areas that will not be disturbed by mining activities can be found adjacent to the planned surface disturbance within or adjacent to the project site. These reference areas generally reflect characteristic vegetation communities, pre-disturbance conditions, and desired PMLU conditions.

These criteria may be satisfied by plant communities established on a disturbed site where vegetation cover, diversity, and composition of non-native plant species meet or exceed the primary and secondary revegetation goals.

Reclamation maintenance will initially be based on vegetation data collected during the first 4 years following completion of final reclamation activities and qualitative monitoring results as previously discussed. These practices will be focused on meeting perennial vegetation cover values as close to the bond release criteria as possible. The data collected in year 5 will be discussed with the appropriate regulatory agency and, if deemed necessary, remedial measures will be devised and implemented.

Revegetation of project-related disturbed areas that will be reclaimed will be considered successful if vegetation is native and self-sustaining, and revegetated lands could support land use goals (i.e., low-

intensity grazing, public recreation, and use as habitat for native wildlife). The prevalence of invasive and noxious weeds would need to be similar to or less than that found in reference sites.

Agency input on the revegetation plans and success criteria described in this section will be considered in the development and refinement of the final revegetation plans.

Desert Ecosystems

Based on the proposed seed mix and previously noted reclamation projects in southeastern Arizona and southwestern New Mexico with similar vegetation communities and climate, and where Gila Conglomerate was used as a cover growth media, successful revegetation would be considered as the establishment of two to three shrub species, one to two grass species, one to two forb species, and one to two succulents. An example might be establishment of brittlebush, saltbush, and creosote bush; purple three awn and sand dropseed; desert marigold and desert trumpet; and silver cholla and beavertail cactus. Desirable plant canopy cover would range from 5 percent to 15 percent for year 1 and from 10 percent to 30 percent for year 5. The influences of growth media amendments, mulch and other inputs to the reclaimed system on vegetation growth will last longer than 5 years and it may take far longer for some of the warm season grasses and shrubs to establish from seed. In addition, to be considered "self-sustaining," the vegetation on reclamation lands must experience at least one drought cycle. Therefore, 5 years, or more, is likely required before attainment of these cover values and diversity standards and a determination of "self-sustaining."

Semi-Desert Grassland

Based on the proposed seed mix and previously noted reclamation projects in southeastern Arizona and southwestern New Mexico with similar vegetation communities and climate, and where Gila Conglomerate was used a cover growth media, successful revegetation would be considered establishment of two to three grass species, one shrub species, one to two forb species, and one to two succulents. An example might be establishment of tobosa grass, black grama, and squirreltail; four-wing saltbush; Mexican golden poppy and desert marigold; and Palmer's century plant and sotol. Desirable plant canopy cover would range from 5 percent to 15 percent for year 1 and from 10 percent to 30 percent for year 5.

Interior Chaparral

Based on the proposed seed mix and previously noted reclamation projects in southeastern Arizona and southwestern New Mexico with similar vegetation communities and climate, and where Gila Conglomerate was used as a cover growth media, successful revegetation would be considered establishment of two to three shrub species, one to two grass species, one to two forb species, and one to two succulents. An example might be establishment of shrub live oak, Wright's silktassel, and mountain mahogany; sideoats grama and blue grama (*Bouteloua gracilis*); bladderpod (*Lesquerella* spp.) and globemallow (*Sphaeralcea* spp.); Palmer's century plant and beargrass. Desirable plant canopy cover would range from 10 percent to 25 percent for year 1 and from 20 percent to 50 percent for year 5. As in natural succession, all reclaimed sites are expected to undergo seral stage changes until they reach a stable or climax plant community, which could take many decades or even hundreds of years.

6.3 SOIL AND WATER QUALITY

Surface drainage channels on reclaimed areas will be inspected for indication of instability, headcutting, or reduced capacity to safely pass the design storm event or retain transported sediments. The location, dimensions and connectivity of significant erosion, slope failures, and channel scour and sedimentation features will be documented. Documented sites will be revisited in following years to determine if new accretion, erosion, or movement has occurred since last observed.

Monitoring of surface runoff would continue in the post-closure period until such time that Resolution Copper has demonstrated that the water resources meet state water quality standards, including stabilization requirements of the AZPDES permit.

6.3.1 Erosion and Sediment Control Monitoring

Soil stability will be estimated for all reclaimed areas using the qualitative descriptors shown in **Table 3**. A reclamation specialist will observe each reclaimed area and assign one of the qualitative descriptors twice annually for erosion control purposes, once in the spring and once in the fall for 5 years for performance monitoring purposes. The observations will be made at the same time the vegetation performance observations are made. The monitoring results will be used to aid in determining the cause of any failures which are encountered and to locate problem areas before erosion becomes widespread enough to affect reclamation success.

Any reclaimed area larger than 100 feet by 100 feet receiving an evaluation score (**Table 3**) of Class 3 or lower that persists more than 1 year will be investigated. Areas receiving a score of Class 2 or lower will receive treatment to correct the erosion immediately. If the vegetative cover, riprap, or other erosion control measures are found to be inadequate, the measures will be revised or redone. Any obvious reasons for the failure will be noted and rectified. Climatic data for the time period involved will also be considered while making a determination of the cause of the failure.

Table 3. Qualitative Descriptors of Soil Surface Status

Characteristic	Soil movement	Flow patterns	Rills and gullies
Class 1	Subsoil exposed over much of area	Flow patterns are numerous and readily noticeable; may have large barren fan deposits	May be present at depths of over 3 inches, sharply incised gullies cover most of the area, and 50 percent are actively eroding
Class 2	Soil and debris deposited against minor obstructions	Flow patterns contain silt, sand deposits, and alluvial fans	Rills at depths of 1 to 3 inches occur in exposed areas at intervals of 60 inches; gullies are numerous and well developed, with active erosion along 10 to 50 percent of their lengths or a few well-developed gullies with active erosion along more than 50 percent of their length
Class 3	Moderate movement of soil is visible and recent	Well defined small, and few with intermittent deposits	Rills at depths less than 6 inches occur in exposed places at intervals of less than 100 inches; gullies present, with active erosion along less than 10 percent of their length; some vegetation may be present
Class 4	Some movement of soil particles	Evidence of deposition of particles	Evidence of some rills in at infrequent intervals of over 100 inches; evidence of gullies that show little bed or slope erosion; some vegetation is present on slopes
Class 5	No visual evidence of movement	No visual evidence of flow patterns	No visual evidence of rills; may be present in stable condition; vegetation on channel bed and side slopes

6.3.2 Slope Stability Monitoring

Inspections will be conducted to gauge slope movement, cut slope and rock face failures, and other indications of deep-set slope instability. Indications of slope failure may include, but are not limited to, surficial fractures that progressively widen and elongate, and/or surface cracks that are located above prominent, recently observed surface bulges.

Slope stability will be monitored during the vegetation and erosion inspections. A trained inspector will look for signs of slope movement, cut slope and rock face failures, and other indications of deep-set slope instability. The location and dimensions of significant surficial cracks and fill-slope bulges will be

monitored. This information will be used to determine if surface cracks are the result of deferential settling or slope instability. Surficial fractures which progressively widen and elongate, or surface cracks which are located above a prominent, recently observed surface bulge will be considered an indication of slope failure. Appropriate corrective actions will be taken.

6.4 CONCURRENT RECLAMATION SUCCESS

The goals of concurrent reclamation are to ensure soil stability, protect water and air quality, and initiate revegetation. These goals will be measured as described in **Sections 6.2** and **6.3**. Following completion of concurrent reclamation until final bond release, maintenance activities will occur to satisfy performance guidelines above. Maintenance activities may include one or more of the following:

- Sediment removal from sediment basins and stormwater drainage channels and diversions as necessary to maintain their design capacity,
- Diverting surface water away from reclaimed areas where erosion jeopardizes attainment of reclamation standards,
- Stabilizing rills, gullies, other erosion features or slope failures that have exposed mine waste,
- Noxious weed control; and
- Reseeding or re-applying treatments will occur in areas where it is determined through monitoring and agency consultation that reclamation will unequivocally not meet reclamation standards.

6.5 POST MINING LAND CONFIGURATION

Post mining configuration is described in **Section 5.2.2**, success criteria in **Sections 6.2** and **6.3**.

6.6 LONG-TERM OPERATION, MAINTENANCE AND MONITORING

Resolution Copper would apply to the agencies for release of the financial assurance upon successful completion of reclamation. Reclamation and closure success would be determined by the standards and performance criteria specified in this Plan and other permits. This may include requests for partial release of one-off construction items (i.e., removal of a building or facility) as well as full bond release upon final determination of revegetation success.

6.6.1 Long-Term Maintenance

Resolution Copper expects that post-closure site maintenance may be necessary for a limited period following initial reclamation.

6.6.1.1 Roads

Required access roads would be maintained after closure by Resolution Copper as required for post-reclamation maintenance.

6.6.1.2 Fences

Fences maintenance would be performed on an as-needed basis during standard maintenance routines.

7 SCHEDULE

The proposed schedules for concurrent, interim, and final reclamation are described below. Resolution Copper is committed to adaptive management to make improvements to reclamation and closure based on both the evolution of new technologies and the monitoring results of concurrent and final reclamation.

7.1 CONCURRENT RECLAMATION

Concurrent reclamation is a key component of this reclamation plan, as is monitoring the effectiveness of both concurrent and final reclamation actions. For the special use authorizations, concurrent reclamation are final reclamation activities that occur immediately after construction or maintenance of the pipeline. Concurrent reclamation would occur within construction footprints outside ultimate as-built facilities.

Where practicable, growth medium would be removed from areas to be affected by surface facilities.

Timing, kind, and amount of reclamation to be accomplished concurrently with mineral activities includes:

- Construction roads that are no longer needed during operations
- Areas initially constructed or completed to their final configuration during operations would be concurrently reclaimed during operations to the extent practicable

7.2 INTERIM RECLAMATION AND INTERIM SHUTDOWN

A shutdown would be considered interim or temporary if mining and processing operations cease for more than 90 days, but not more than three years. Interim reclamation does not apply to the pipeline route, exceot ti maintain the pipeline and access roads and monitoring.

It is possible that, due to mechanical or technical difficulties, unfavorable economic conditions, or other unforeseen events, mining and processing may be temporarily suspended. In the event of an unplanned temporary closure, the following plan would be implemented:

- The USFS would be notified within 30 days of the temporary closure of the mine process facilities. The State of Arizona would be notified concurrently with the USFS. This notification would include a description of the procedures and controls that have been, or would be, initiated to maintain the process components in accordance with all permit conditions during the temporary closure period.
- Resolution Copper would maintain personnel on site for mine dewatering, the care and maintenance of equipment and infrastructure, and to provide for ongoing environmental monitoring and reporting activities, studies, and reclamation. Care and maintenance activities are required during a shutdown so that operations may be efficiently resumed when appropriate. Personnel would remain on site in order to conduct routine maintenance and inspections and maintain compliance with requirements in environmental permits and GPO, as well as exercise key equipment and infrastructure. Environmental activities performed by Resolution Copper personnel (such as monitoring, continuing stormwater best management practices, and reporting) are required by both Arizona and federal permits even during reduced, suspended, or standby operations.
- Roads would be maintained as necessary to allow access to project site facilities. Utilities, such as electricity, water, and gas that are needed for the operation would continue to function.

Current plans do not include seasonal closure; however, if closure is necessary in response to other unfavorable weather events, the operation would be temporarily closed following plan elements:

- In the event of a seasonal closure, the USFS and State of Arizona would be notified within 30 days. The notification would include a description of the procedures and controls that have been or would be carried out to maintain the process components during the closure period.

7.2.1.1 Measures to Isolate or Control Toxic or Deleterious Materials

Storage of toxic or deleterious materials, explosives or hazardous materials in the pipeline corridor is not expected.

7.2.1.2 Monitoring During Periods of Non-Operation

All provisions of other regulatory requirements would continue to be met during the temporary closure period, including all monitoring, notifications, and report submittals. Site monitoring and leak detection systems for vessels and piping containing process solution would continue throughout temporary closure.

7.3 FINAL RECLAMATION

Final reclamation of the pipeline route would be implemented once underground mining and ore processing is complete.

Years	List of activities
0-1	• Initial inspection and evaluation of all above ground structures, • Plan for and initiate demolition and removal. • Agreements with other owners as to need for facilities for post mining land use (roads, transmission lines, etc.). • Closure and inspection of pipelines. • Recontouring of reclamation sites to post-closure contours. • Installation of erosion control measures • Reseeding • Erosion monitoring
1-5	• Demolition and salvage/recycling/disposal of all above ground facilities. • Removal/salvage/recycling/disposal of pipelines, • Recontouring of roads not needed for post-mining land use. • Monitoring and revegetation as needed • Erosion control monitoring and mitigation
5-18	• Seepage monitoring and mitigation • Vegetation success monitoring and mitigation • Erosion monitoring and mitigation

7.4 POST-CLOSURE CARE AND MAINTENANCE

Post-closure maintenance would continue as necessary to meet regulatory requirements, and would focus on water management, land usage, and mitigation requirements.

8 MINE RECLAMATION AND CLOSURE COSTS

8.1 RECLAMATION FINANCIAL ASSURANCE

Resolution Copper is required to establish and maintain sufficient financial assurance for agencies to properly reclaim areas disturbed by the Preferred Alternative. A detailed cost estimate will be submitted to the USFS as required (before a final USFS ROD).

For facilities on NFS lands, closure and financial assurance would be covered under the 36 CFR 251 regulations.

This plan will be finalized prior to the issuing of authorizations and will be reviewed and revised as needed, along with the calculation of the bond amount on a regular frequency established by each federal and state regulatory agency.

8.2 METHODOLOGY

8.2.1 Model to Be Used

Tetra Tech will complete a reclamation and closure cost estimate to accompany this closure and reclamation plan.

For estimating reclamation and closure costs, Version 1.4.1 Build 17b of the Standardized Reclamation Cost Estimator (SRCE) was used. The SRCE is spreadsheet software developed as part of a cooperative effort between the Nevada Division of Environmental Protection, Bureau of Mining Regulation and Reclamation, the U.S. Department of Interior, BLM and the Nevada Mining Association (NvMA) to facilitate accuracy, completeness and consistency in the calculation of costs for Mine Site reclamation. The SRCE model is available in the public domain and hosted on the web site: http://www.nvbond.com.

The SRCE model was selected for the estimation of closure costs for the following reasons:

- Provides a standardized and systematic methodology for mine closure cost estimates. The routines provided in the model cover different operation units and aspects of mining projects.
- Uses widely accepted first principles methods to estimate quantities (lengths, areas, and volumes), productivities, and work hours required for various closure tasks based on input from the user.
- Facility dimensions are defined by the user.
- Equipment productivities are taken directly from Caterpillar Performance Handbook (2019).
- Personnel and other relevant productivities are established through the use of Means Heavy Construction Cost Data (2019).
- Utilization of realistic values derived from field experiences in mine closure studies for specific tasks such as well plugging, which are not directly available in any publication.
- Cost estimation flexibility, allowing utilization of local unit costs.
- Has been accepted by the USFS and Arizona state agencies in the past.

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ATTACHMENT A
RESOLUTION PROJECT AREA SEED MIX JUNE 2020

Resolution Project Area Seed Mix

Mark Taylor
Tonto National Forest
June 2020

The purpose of this document is to provide recommendations of suitable vegetative seed species for upland reclamation within the Resolution Copper Project Area. The Project Area (PA) covers a broad expanse of eco-types, ranging in elevation from about 1650 – 4200ft, covering roughly 8400 acres. General project location spans from the San Tan Valley in the west, to the vicinity of Superior, AZ, Oak Flat, and south into the Dripping Springs Mountains in Central AZ. For greater detail of project location, please refer to the Resolution Copper General Plan of Operations (https://www.resolutionmineeis.us/sites/default/files/project-files/resolution-copper-gpo-vol-1-20160509.pdf). Biotic communities present within the PA were considered when developing seed mixes. The following eco-types are known to occur within the PA, beginning with the lowest elevation: Lower Colorado River Sonoran Desert, Upper Sonoran Desert, Semi-desert scrub/grass, Interior Chaparral, Madrean Oak Woodland, and a small extent of Great Basin Conifer Woodland. Seed mixes for riparian species are not provided in this document due to the limited extent of footprint within both perennial and intermittent reaches (< 12ac total) and the likelihood of local species regenerating over short durations as influenced by localized (hydric) conditions.

Species consist of a selection of annual and perennial herbaceous (grass/forb) plants known to be native and supportive within each eco-type. Local knowledge, prior experience, and observational accounts of past performance, has been very useful in establishing proposed seed mixes. Native shrub/tree life forms have been excluded from primary seed lists due to often re-establishing under natural conditions over short durations. This becomes beneficial because of maintaining local genetics and adaptions, within these unique environments. If necessary in the future, shrub and tree species may certainly be considered. One area in the PA where such an issue may present itself, is Skunk Camp Tailings Storage Facility. Potential challenges associated with this site may include lacking or degraded soil properties and substrate issues. Thought should also be taken into consideration underneath and near powerline corridors. If shrubs and trees are planned to be utilized, we suggest waiting a couple years following initial efforts to determine extent of natural regeneration. If these life forms are deemed to be lacking, plug and/or pole plantings may be desirable for certain species (e.g., legumes) and when possible, obtained from the project vicinity or local growers. Plug and pole plantings are known to enhance establishment of these life forms while aiding in creating a more advanced seral stage, providing added benefit to understory species. Attempting to sow seed of certain shrub and tree species, to include members of the legume family, may result in low success, partly due to a combination of lacking or improper seed scarification and predation.

Other considerations influencing success include a mix of biotic and abiotic factors such as: timing of work, soils, geology, aspect, elevation, land use, adaptations of proposed species, purity of seed lots, rate of use, availability of seed, influx of weeds, and other factors beyond our control such as weather (rainfall). Seeding during the cool season can be beneficial because it may allow growth to begin prior to the warm season with adequate rainfall. Multiple seeding efforts as well as adjustments to species use and seeding rates (lbs. /ac) may be necessary to enhance results. Due to the extended duration of this project, no set time interval is provided to conduct additional seeding efforts. A few other useful concepts to consider in conjunction with seeding to *potentially* improve success, include the following: utilization of weed free mulch and/or straw to enhance nutrient content and improve moisture holding capacities, mycorrhiza for improved root/plant health and growth, erosion wattles and mats to reduce erosion and create microhabitats, tilling and/or drilling where terrain permits for seed bed preparation, weed management, and hydro-seeding as a form of broadcasting. Relative to hydro-seeding; adding tackifier (glue) is a common ingredient which aids in temporarily holding seed and fertilizer in place and is particularly useful along slopes.

A list of prospective native seed sources are provided in Appendix A. Although not always possible to obtain, seed from local growers should initially be pursued due to the greater likelihood of obtaining more localized genetics, which can lead to improved success. Of similar importance, seed lots need to be reviewed to certify noxious weed free content prior to purchase. Occasionally, seed lots may be rejected due to the presence of other undesirable weed species, therefore, prior review is important. Guidelines covering the certified weed free process are included below in Appendix B as well as the noxious weeds of Tonto National Forest in Appendix C. Currently, Tonto National Forest along with partners, are in the initial stages of obtaining local native seed stock to be grown for reclamation use. Since this project is in its infancy, very limited stock is presently on hand. Over time, it is anticipated that a greater diversity of local species and quantity will be available.

Generalized seed lists below take into consideration project locations, elevation and eco-type. Unfortunately, soils data is lacking. A number of species selected, result from past success, are known to cover broad eco-types, and are relatively common. Additional species have been added in some cases due to potential future availability issues. A separate alternative list containing shrubs and trees has been provided, should future needs dictate. One other option to consider and not included in seed lists, is to utilize cuttings from neighboring cacti species (prickly pear and cholla species) and locally salvaged plants. Following adaptive management concepts, it is expected that future modifications may be appropriate considering availability, revegetation success, purity of seed, growth media, rate of use, climatic conditions, and other unforeseen circumstances. An attempt was made to consider plant palatability for wildlife and desirability to pollinator species.

The following lists are specific to the major project components with supplementary use stated for corridors (MARRCO, pipelines, and powerlines).

Filter Plant and Loadout Facility Species Seed List

Grass	Scientific Name	PLS pounds/acre
Six weeks needle grama	*Bouteloua aristidoides*	2.0
Purple Three-awn	*Aristida purpurea*	1.0
Spider Grass	*Aristida ternipes*	0.5
Forbs	Scientific Name	PLS pounds/acre
Desert Senna	*Cassia covesii*	0.5
Desert Marigold	*Baileya multiradiata*	0.5
Indian Wheat	*Plantago patagonica*	0.5
Coulter's Globemallow	*Sphaeralcea coulteri*	0.5
Globemallow	*Sphaeralcea ambigua*	0.25
Fiddleneck	*Amsinckia intermedia*	0.25
AZ poppy	*Kallstroemia grandiflora*	0.25

Filter Plant and Loadout Facility Alternative Species Seed List

Grass	Scientific Name	PLS pounds/acre
Big galleta	*Hilaria rigida*	0.5
Arizona panicgrass	*Urochloa arizonica*	0.5
Six weeks grama	*Bouteloua barbata*	0.5
Forbs	Scientific Name	PLS pounds/acre
Brownfoot	*Acourtia wrightii*	0.5
Cinchweed	*Pectis papposa*	0.5
Lupine	*Lupinus sparsiflorus*	0.5
White tackstem	*Calycoseris wrightii*	0.25
Whoolly daisy	*Eriophyllum lanosum*	0.25
Shrubs and Trees	Scientific Name	PLS pounds/plugs/poles/acre
Brittle bush	*Encelia farinosa*	1.0
Chuckwallas delight	*Bebbia juncea*	0.5
Triangleleaf bursage	*Ambrosia deltoide*	0.5
Wire lettuce	*Stephanomeria exigua*	0.25
Graythorn	*Ziziphus obtusifolia*	0.25
Desert hackberry	*Celtis pallida*	0.25
Desert milkweed	*Asclepias subulata*	5 + Plug
Mesquite	*Prosopis velutina*	5 – 10 Plug/pole
Blue Palo Verde	*Parkinsonia florida*	5 – 10 Plug/pole
Ironwood	*Olneya tesota*	5 – 10 Plug/pole

The Filter Plant and Loadout Facility list will suffice for the MARRCO Corridor up to approximately the forest boundary. Shrubs and trees have been added if deemed necessary to utilize. Recommendations for tree species, hackberry and milk weed:

- Utilize plug/pole plantings when possible for the species noted above.
- Consider selecting micro-habitats, particularly for trees, and desert hackberry along larger natural drainage courses or around edges of areas where storm water may collect. These species serve as common xeric riparian plants in lower elevations along drainages in the vicinity.
- Milkweed may be planted in association with microhabitats containing other lower growing herbaceous and subshrub species and along edges of smaller drainages. This is considered a very desirable pollinator species.

Baseline Species Seed List

Grass	Scientific Name	PLS pounds/acre
Six weeks needle grama	*Bouteloua aristidoides*	2.0
Purple Threeawn	*Aristida purpurea*	1.0
Sand dropseed	*Sporobolus cryptandrus*	0.5
Forbs	Scientific Name	PLS pounds/acre
Mexican Gold Poppy	*Eschscholzia californica ssp. mexicana*	1
Globemallow	*Sphaeralcea ambigua*	0.5
Indian Wheat	*Plantago patagonica*	0.5
Desert Senna	*Cassia covesii*	0.25
Desert Marigold	*Baileya multiradiata*	0.25

The Baseline seed mix has been utilized in recent project work without the need to incorporate shrub/tree life forms. Local shrub and tree species have quickly regenerated under natural conditions, avoiding need to incorporate. This list will also suffice for the Magma Arizona Railroad Company (MARRCO) Corridor on forest, up to the West Plant.

West Plant Species Seed List

Grass	Scientific Name	PLS pounds/acre
Six weeks needle grama	*Bouteloua aristidoides*	2.0
Purple Threeawn	*Aristida purpurea*	1.0
Sand dropseed	*Sporobolus cryptandrus*	0.5
AZ cottontop	*Digitaria californica*	0.5
Fluff grass	*Erioneuron pulchellum*	0.5
Forbs	Scientific Name	PLS pounds/acre
Mexican Gold Poppy	*Eschscholzia mexicana*	1
Globemallow	*Sphaeralcea ambigua*	0.5
Indian Wheat	*Plantago patagonica*	0.5

Desert Senna	*Cassia covesii*	0.5
Desert Marigold	*Baileya multiradiata*	0.5
AZ poppy	*Kallstroemia grandiflora*	0.5
Lupine	*Lupinus sparsiflorus*	0.5
Chia	*Salvia columbariae*	0.5
Brownfoot	*Acourtia wrightii*	0.5

West Plant Alternative Species Seed List

Grass	Scientific Name	PLS pounds/acre
Curly mesquite	*Hilaria belangeri*	0.5
Bush muhly	*Muhlenbergia porteri*	0.5
Slim tridens	*Tridens muticus*	0.5
Six weeks grama	*Bouteloua barbata*	0.5
Forbs	**Scientific Name**	**PLS pounds/acre**
Fiddleneck	*Amsinckia intermedia*	0.5
Tanseyleaf aster	*Machaeranthera tanacetifolia*	0.5
Desert chicory	*Rafinesquia neomexicana*	0.25
White tackstem	*Calycoseris wrightii*	0.25
Shrub and Trees	**Scientific Name**	**PLS pounds/plugs/poles/acre**
Brittle bush	*Encelia farinosa*	0.25
Trixis	*Trixis californica*	0.25
Fairy duster	*Calliandra eriophylla*	0.25
Twin berry	*Menodora scabra*	0.25
Chuckwallas delight	*Bebbia juncea*	0.25
Wire lettuce	*Stephanomeria exigua*	0.25
Hop bush	*Dodonaea viscosa*	0.25
Four-wing saltbush	*Atriplex canescens*	0.25
Mesquite	*Prosopis velutina*	5 – 10 Plug/pole
Foothills Palo Verde	*Parkinsonia microphylla*	5 – 10 Plug/pole
Blue Palo Verde	*Parkinsonia florida*	5 – 10 Plug/pole

The West Plant seed list may also suffice for work near the Silver King vicinity, particularly lower lying areas below ~ 3500ft. Four-wing saltbush would be best utilized along legacy tailings/waste rock areas.

East Plant Species Seed List

Grass	Scientific Name	PLS pounds/acre
Six weeks needle grama	*Bouteloua aristidoides*	2.0

Sideoats grama	*Bouteloua curtipendula*	1.0
Canebeard grass	*Bothriochloa barbinodis*	0.5
Squirrel tail	*Elymus elymoides*	0.5
Sprangeltop	*Leptochloa dubia*	0.5
Plains Lovegrass	*Eragrostis intermedia*	0.5
Sand Dropseed	*Sporobolus cryptandrus*	0.5
Forbs	Scientific Name	PLS pounds/acre
Desert Marigold	*Baileya multiradiata*	0.5
Globemallow	*Spharalcea ambigua*	0.5
Desert Senna	*Cassia covesii*	0.5
Whorled milkweed	*Asclepias subverticillata*	0.25
Goodding's Verbena	*Glandularia gooddingii*	0.25
Tanseyleaf aster	*Machaeranthera tanacetifolia*	0.25
Parry penstemon	*Penstemon parryi*	0.25

East Plant Alternative Species Seed List

Grass	Scientific Name	PLS pounds/acre
Hairy grama	*Bouteloua hirsuta*	1.0
Purple Threeawn	*Aristida purpurea*	1.0
Plains birstlegrass	*Setaria macrostachya*	1.0
Six weeks grama	*Bouteloua barbata*	0.5
Bull muhly	*Muhlenbergia emersleyi*	0.5
Forbs	Scientific Name	PLS pounds/acre
Lupine	*Lupinus sparsiflorus*	0.5
Western mugwort	*Artemisia ludoviciana*	0.5
Narrowleaf penstemon	*Penstemon linarioides*	0.5
Fleabane	*Erigeron divergens*	0.25
Blue flax	*Linum Lewisii*	0.25
Shrubs and Trees	Scientific Name	PLS pounds/plugs/poles/acre
Fairy duster	*Calliandra eriophylla*	0.25
Twin berry	*Menodora scabra*	0.25
Turbinella oak	*Quercus turbinella*	0.25
Wire lettuce	*Stephanomeria exigua*	0.25
Red-berry juniper	*Juniperus coahuilensis*	5 – 10 Plug/pole
Sugar sumac	*Rhus ovata*	5 – 10 Pug/pole

The East Plant mix may be used for the higher elevations (~ 3500ft +) along the tailings pipeline and power line corridors. This list will also suffice for what some may refer to as juniper woodland type.

Skunk Camp Tailings Storage Facility Species Seed List

Grass	Scientific Name	PLS pounds/acre
Six weeks needle grama	*Bouteloua aristidoides*	2.0
Purple Threeawn	*Aristida purpurea*	1.0
Sideoats grama	*Bouteloua curtipendula*	0.5
Sand Dropseed	*Sporobolus cryptandrus*	0.5
AZ Cottontop	*Digitaria californica*	0.25
Fluffgrass	*Erioeuron pulchellum*	0.25
Sixweeks fescue	*Vulpia octoflora*	0.25
Forbs	Scientific Name	PLS pounds/acre
Desert Marigold	*Baileya multiradiata*	0.5
Desert Senna	*Cassia covesii*	0.5
Globemallow	*Spharalcea ambigua*	0.5
Mexican Gold Poppy	*Eschscholzia mexicana*	0.5
AZ poppy	*Kallstroemia grandiflora*	0.25
Fiddleneck	*Amsinckia intermedia*	0.25
Deer-vetch	*Lotus rigidus*	0.25
Indian wheat	*Plantago patagonica*	0.25
Tanseyleaf aster	*Machaeranthera tanacetifolia*	0.25

Skunk Camp Tailings Storage Facility Alternative Species Seed List

Shrubs and Trees	Scientific Name	PLS pounds/plugs/poles/acre
Turbinella oak	*Quercus turbinella*	0.5
Four-wing saltbush	*Atriplex canescens*	0.5
Hop bush	*Dodonaea viscosa*	0.25
Trixis	*Trixis californica*	0.25
Twin berry	*Menodora scabra*	0.25
Fairy duster	*Calliandra eriophylla*	0.25
Jojoba	*Simmondsia chinensis*	0.25
Chuckwallas delight	*Bebbia juncea*	0.25
Mesquite	*Prosopis velutina*	5 – 10 Plug/pole
Sugar sumac	*Rhus ovata*	5 – 10 Plug/pole
Red-berry juniper	*Juniperus coahuilensis*	5 – 10 Plug/pole

Important to consider placement/use within habitat for the following species: Turbinella oak, sugar sumac, red-berry juniper. North facing slopes or areas of increased levels of moisture

would be more suitable for these species due to the transitioning of habitat in this area. Saltbush is known to uptake toxic properties in soils, particularly in tailings and waste rock sites.

Appendices

Appendix A – Prospective native seed and plant producer contact information:

Brett Bamert: bbamert@bamertseed.com

TJ Curtis: tj@curtisseed.com

Tren Hagman: tren@graniteseed.com

Forrest Smith (Texas Natives): Forrest.Smith@tamuk.edu

Apache Junction

Shady Way Garden
566 W Superstition Blvd.
Apache Junction, AZ 85220
480-288-9655

Chandler

Arizona Cactus Sales
1619 South Arizona Avenue
Chandler, AZ 85248
480-963-1061

Clarkdale

Arizona Botanical
Jason Lavelle
1601 Hwy 89-A
PO Drawer 160
Clarkdale, AZ 86324

928-634-2166
1-800-428-7936
email

Flagstaff

The Arboretum at Flagstaff
4001 S. Woody Mountain Road
Flagstaff, AZ 86001
928-774-1442

Flagstaff Native Plant and Seed
400 E. Butler Ave.
Flagstaff, AZ 86001
928-773-9406
email

Warner's Nursery & Garden Center
1101 E Butler
Flagstaff, AZ 86001
928-774-1983

Marana

Kelly Green Trees
14399 N. Wentz Road
Marana, AZ 85653
520-682-2616

Payson

Plant Fair Nursery
97 E. AZ Hwy 260

Payson, AZ 85541
928-474-6556
email

Phoenix

Armenta Seed
700 N. Neely St. Ste 2
Gilbert, AZ 85233

Desert Botanical Gardens
1201 North Galvin Parkway
Phoenix, AZ 85008
480-941-1225

Desert Gardens Nursery
21222 N. Cave Creek Road
Phoenix, AZ 85024-5501
602-569-1300

Desert Tree Farms
2744 East Utopia Road
Phoenix, AZ 85050
602-569-6604

Mountain States Wholesale Nursery
10020 W. Glendale Avenue
Glendale, AZ 85307
800-840-8509 or 623-247-8509

Native Resources International, Inc.
1540 W Happy Valley Rd.
Phoenix 85085
623-869-6757

Phoenix Desert Nursery
3525 E. Southern Ave.
Phoenix, AZ 85040
602-305-9275

Signature Botanica LLC
Julie and Steve Plath
PO Box 512
Morristown, AZ 85342
623-238-3341
email

Western Tree Company
3401 East Southern Avenue
Phoenix, AZ 85040
602-243-6125

Prescott Area

Highlands Center for Natural History
1375 Walker Rd
Prescott AZ 86303
928-776-9550

The Native Garden
602 Montezuma Street
Prescott, AZ 86303
928-237-5560
email

Terroir Seeds
P O Box 4995
Chino Valley AZ 86323
888-878-5247

Watters Garden Center
1815 W. Iron Springs Road
Prescott, AZ 86305
928-445-4159
email

Queen Creek

Arid Zone Trees
PO Box 167
Queen Creek, AZ 85242
480-987-9094
email

Superior

Boyce-Thompson Arboretum
37615 U.S. Highway 60
Superior, AZ 85273
520-689-2723

Tempe

Wild Seed Inc.
Rita Jo Anthony
PO Box 27751
Tempe, AZ 85285-7751
602-276-3536

Tucson

Arid Adaptations
PO Box 90678
Tucson, AZ 85752
520-289-4083

B&B Cactus Farm Inc.
11550 E. Speedway Boulevard
Tucson, AZ 85748
520-721-4687

Bach's Greenhouse Cactus Nursery
8602 N. Thornydale Road
Tucson, AZ 85742
520-744-3333

Civano Nursery
5301 S. Houghton Road
Tucson, AZ 85747
520-546-9200 x 16
email

Desert Seed Source
Chuck LeFevre
P.O. Box 1479
Oracle, AZ 85623
520-896-0671 or email

Desert Survivors Nursery
1020 W. Starr Pass Boulevard
Tucson, AZ 85713
520-884-8806

Harlow Gardens
5620 E. Pima St.
Tucson, AZ 85712
520-298-3303
email

Landscape Cacti
7711 Bopp Road
Tucson, AZ 85735
Jon Weeks
520-883-0020
email

The Magic Garden Nursery
7909 E. 22nd St
Tucson, AZ 85710
520-885-7466
email

Native Seeds/SEARCH (Southwestern Endangered Arid Land Resources Clearing House)
3061 N Campbell
Tucson, AZ 85719
520-622-5591

Nighthawk Natives Nursery (seeds)
Gary Maskarinec
email

Wildlands Restoration (plants)
Bernadette Jilka
2944 N. Castro Ave.
Tucson, AZ 85705
520-882-0969
email

Plants for the Southwest
50 E. Blacklidge Drive
Tucson, AZ 85705
520-628-8773

Rillito Nursery & Garden Center
6303 N. La Cholla Boulevard
Tucson, AZ 85741
520-575-0995

Silverbell Nursery
2730 N. Silverbell Road
Tucson, AZ 85745
520-622-3894

Starr Nursery
3340 W. Ruthann Road
Tucson, AZ 85745
520-743-7052

Tohono Chul Park
Tohono Chul Plant Database
7366 N. Paseo del Norte
Tucson, AZ 85704
520-742-6455

Tucson Cactus and Succulent Society
P.O. Box 64759
Tucson, AZ 85704
520-742-6455

Tucson Botanical Gardens Nursery
2150 N. Alvernon Way
Tucson, AZ 85712
520-326-9686

Tucson Plant Materials Center
3241 North Romero Rd
Tucson, AZ 85705
520-292-2999

Vail

Wild Desert Nursery
Deborah Hendzel
PO Box 232
Vail, AZ 85641
520-971-2581
email

Yucca

Destination: Forever Ranch and Gardens
PO Box 306
Yucca, AZ 86438

Elgin

Arizona Revegetation and Monitoring Company
Jim Koweek
HC1 Box 389
Elgin, AZ 85611
520-455-5780
email

Flagstaff

EnvironSystems Management, Inc.
23 East Fine Ave.
Flagstaff, AZ86001

928-226-0236
email

Flagstaff Native Plant and Seed
400 E. Butler Ave.
Flagstaff, AZ 86001
928-773-9406
email

Landscape Design Evolved
Flagstaff: 928-526-1429
Sedona: 928-254-3892
email

Phoenix

Palo Verde Designs
Lisa Kelk
9842 S 45th Place
Phoenix, AZ 85044-5515
602-471-7350
email

Tucson

Bobcat Garden Design
Alan Tasky
6350 N Bobcat Lane
Tucson, AZ 85743-9278
520-907-8809
email

Desert Seed Source
Chuck LeFevre
PO Box 1479
Oracle, AZ 85623
520-896-0671
email

Gardening Insights
520-603-2703
email

Sonoran Gardens, Inc.
4261 W. Jeremy Place, Lot 2
Tucson, AZ 85741
520-579-9411

Tohono Chul Park
7366 N Paseo del Norte
Tucson, AZ 85704

Turner Design, LLC
4930 N. Calle la Vela
Tucson AZ 85718
520-405-4633
email

Wheat Scharf Associates
442 N 6th Avenue
Tucson, AZ 85705
520-884-7911
email

Yucca

Destination: Forever Ranch and Gardens
PO Box 306
Yucca, AZ 86438

Appendix B - Summary of Guidelines for Weed-Free Seed, Forage, Mulch, and Fill Materials in Region 3

To ensure that invasive weed species are not introduced during projects involving NFS lands in Region 3, the following set of guidelines should be implemented for (1) seed testing for invasive weed seed and (2) inspection, testing, and/or certification of forage, mulch (straw or wood), and fill materials.

The Regional guidelines may be modified on a case-by-case basis.

Tests for Pure Live Seed (PLS) and percentages of plant species present in the seed mixture should show compliance with contracted seed specifications. Seed tests should also indicate whether seed from noxious, prohibited, restricted, or forest-prohibited weed species is present also utilizing state noxious weed lists. .

Weed-free specifications

Seed lots should not contain any appreciable amount of cheatgrass (*Bromus tectorum*), Japanese brome (*Br. japonicus*), Russian thistle (any *Salsola* species), or any weed species prohibited by a national forest unless specifically authorized by the COR (Contracting Officer's Representative). For all other weed species, the combined total weight of seed from such species should not exceed 0.5% in a seed lot. In addition, the seed lot should contain no more than 2% by weight (total) of other types of non-weedy seed which includes seed from agronomic crops and native, non-weedy plant species other than those specified in the contracted seed mix.

Seed testing

A number of seed labs (State-affiliated and private) in the Southwest perform seed testing according to Association of Official Seed Analysts (AOSA) standards. Further information on seed labs can be found at these websites:

1. AOSA contact list for seed labs (http://www.aosaseed.com/members_directory)
2. Colorado Seed Laboratory (http://seedlab.colostate.edu/testing_info.html)
3. New Mexico State Seed Laboratory (http://www.nmda.nmsu.edu/seed-lab/)

Randomly select seed bags to sample, doing no more than 30 in a lot.

Utilize AOSA standards to determine purity, germination, moisture, inert materials, non-contractual types of crop seed, and weed seed.

Purchase Orders or Contractor-Furnished Items and Services

The following should be included as part of (1) a seed purchase order or (2) the items listed in a contract for meeting special equipment, ground support, and documentation needs:

1. All bags used for seed or seed stored in bulk lots should meet appropriate State seed law labeling requirements and have the following information listed on tags or transportation paperwork as appropriate:

    a) Name and variety of each seed component in excess of five percent of the whole; hybrids should be labeled as such when present.

    b) Lot number or other lot identification.

c) Origin (State or County, if known) – This includes information on yellow certification tags used for the *Source Identified Seed* class when requested by a task order. If origin is unknown, that fact should be stated.

d) Net weight – Percentage by weight of all Pure Live Seed (PLS).

e) Percentage by weight of inert matter.

f) Percentage by weight of all other crop seeds.

g) The name and rate of occurrence per pound of weed seed present.

h) The name and rate of occurrence per pound of each kind of noxious weed seed present.

i) Test results for percent germination or tetrazolium for each seed species.

j) The calendar month and year the test was completed.

k) Name and address of the company or person responsible for analysis of seed.

l) Name and address of the company selling the seed.

Appendix C – Tonto National Forest Noxious Weed Species List.

Latin name	Common name	AZ Dept. of Agriculture Weed List*	APHIS (Federal Weed List)	On neighboring states' weed lists?	Tonto category**	AZ-WIPWG class ***
Acroptilon repens	Russian knapweed	P, Res.		CA, CO, NM, NV,UT	A	H
Aegilops cylindrica	Jointed goatgrass	P, Res.		CA, CO, NM	B	L
Ailanthus altissima	Tree of heaven				C	
Alhagi maurorum	Camelthorn	P, Res.		CA, CO, NM, NV,	A	M
Arundo donax	Giant reed				B	H
Asphodelus fistulosus	Onionweed		x	NM	A	L
Avena fatua	Wild oats			CO	C	M
Brassica nigra	Black mustard				B	
Brassica tournefortii	Asian mustard				C	M
Bromus catharticus	Rescuegrass				C	

Bromus diandrus	Ripgut brome				C	M
Bromus japonicus	Japanese brome				C	
Bromus rubens	Red brome				C	H
Bromus tectorum	Downy brome			CO	C	H
Cardaria draba	Globe-podded hoary cress	P, Res.		CA, CO, NM, NV UT	A	M
Cardaria pubescens	Hairy white-top	P		CA,	A	M
Carduus acanthoides	Plumeless thistle	P		CA, CO	A	
Carduus nutans	Musk thistle			CA, CO, NM, NV, UT	A	M
Cenchrus echinatus	Southern sandbur	P, Reg.		CA,	A	
Cenchrus spinifex	Field sandbur	P, Reg.		CA,	A	
Centaurea biebersteinii	Spotted knapweed	P, Res.		CA, CO, NM, NV, UT	A	M ?
Centaurea diffusa	Diffuse knapweed	P, Res.		CA, NM, NV, UT	B	M
Centaurea melitensis	Malta starthistle			NM, NV	C	M
Centaurea solstitialis	Yellow starthistle	P, Res.		CA, CO, NM, NV, UT	C	H
Chondrilla juncea	Rush skeletonweed	P		CA, CO, NV	A	M
Chorispora tenella	Blue mustard			CA, CO	A	
Cirsium arvense	Canada thistle	P		CA, CO, NM, NV, UT	A	M
Cirsium vulgare	Bull thistle			CO, NM	C	
Convolvulus arvensis	Field bindweed	P, Reg.		CA, CO, NM, UT	C	M
Dimorphotheca cuneata	White bietou				A	
Dipsacus fullonum	Common teasel			CO, NM	B	
Eleagnus angustifolia	Russian olive			CO, NM	A	H
Elymus repens	Quackgrass	P, Res.		CA, CO, UT	B	L
Eragrostis curvula	Weeping lovegrass				C	L ??
Eragrostis Lehmanniana	Lehmann's lovegrass				C	H
Euphorbia esula	Leafy spurge	P		CA, CO, NM, NV, UT	A	H
Euryops subcarnosus	Sweet resinbush				A	H ?
Isatis tinctoria	Dyer's woad	P		CA, CO, NM, NV, UT	A	
Kochia scoparia	Kochia				A	
Leucanthemum vulgare	Oxeye daisy			CO	A	L
Linaria dalmatica	Dalmatian toadflax	P, Res.		CA, CO, NM, NV	A	M ?
Linaria vulgaris	Yellow toadflax			CO, NM, NV	A	M
Lythrum salicaria	Purple loosestrife	P		CA, CO, NM, NV, UT	A	
Melilotus officinalis	Yellow sweetclover				C	M
Nerium oleander	Oleander				B	
Oncosiphon piluliferum	Globe chamomile				B	
Onopordum acanthium	Scotch thistle	P, Res.		CA, CO, NM, NV, UT	B	L
Peganum harmala	African rue	P		CA, CO, NM, NV	A	
Pennisetum ciliare	Buffelgrass	P, Reg.			C	H ?
Pennisetum setaceum	Fountain grass				C	H ?
Pentzia incana	Karoo bush				A	
Polygonum cuspidatum	Japanese knotweed			CA,	A	

Potentilla recta	Sulfur cinquefoil			CO, NV	A	
Pyracantha sp.	Pyracantha				B	
Rhus lancea	African sumac				B	M
Salsola kali & S. tragus	Russian thistle				C	
Salvia aethiopis	Mediterranean sage			CA, CO, NV	A	
Schismus arabicus	Arabian schismus				C	M
Schismus barbatus	Mediterranean grass				C	M
Sinapis arvensis	Wild mustard			CO	B	
Tamarix chinensis	Five-stamen tamarisk			NM	C	H ?
Tamarix parviflora	Smallflower tamarisk			CO, NM, NV	C	H ?
Tamarix ramosissima	Saltcedar			CO, NM, NV	C	H ?
Ulmus pumila	Siberian elm			NM	A	M
Vinca major	Periwinkle				B	M

Definitions: *Arizona State Dept. of Agriculture Weed List: P= Prohibited. These weeds are prohibited from entry into the state. **Reg. = Regulated**. These weeds **MAY** be controlled or quarantined if found within the state, to prevent further infestation. **Res. = Restricted.** These weeds **SHALL** be controlled or quarantined if found within the state. **Tonto Weed List: Class A weeds** are of limited distribution in Arizona, or unrecorded in the state. They pose a serious threat. Management goal is eradication. **Class B weeds** are of limited distribution in Arizona, common in some places in the state. Management goal is to contain their spread, decrease population size, then eliminate. **Class C weeds** have spread beyond our capability to eradicate them. Management goal is to contain spread to present size, then decrease the population if possible.

***AZ-WIPWG = Arizona Wildland Invasive Plant Working Group rating. H = High.** These species have severe ecological impacts on ecosystems; invasiveness attributes are conducive to moderate to high rates of dispersal and establishment; species are usually widely distributed. **M = Medium.** These species have substantial and apparent ecological impacts on ecosystems; invasiveness attributes are conducive to moderate to high rates of dispersal, often enhanced by disturbance; ecological amplitude and distribution range from limited to widespread. **L = Low.** These species have minor yet detectable ecological impacts; invasiveness attributes result in low to moderate rates of invasion; ecological amplitude and distribution are generally limited, but the species can be problematic locally.

? = Additional designation for some species whose current ecological amplitude and distribution are limited. Species are capable of invading unexploited natural communities, based on initial, localized observations or behavior in similar ecosystems/communities elsewhere.

RESOLUTION COPPER

102 Magma Heights – P.O. Box 1944
Superior, AZ 85173
Tel.: 520.689.9374
Fax: 520.689.9304

29 September 2022

Via email to: cory.brunsting@usda.gov

Cory Brunsting
US Forest Service
Supervisor's Office
2324E McDowell Road
Phoenix, AZ 85006-2496

Subject: Resolution Copper Mining, LLC – Revised Final Draft Resolution Copper Pipeline Route Special Use Authorization Reclamation Plan Final EIS

Dear Mr. Brunsting,

Enclosed for your review and consideration please see the revised final Draft Resolution Copper Pipeline Route Special Use Authorization Reclamation Plan which addresses your review recommendations.

Should you have any questions or require further information please do not hesitate to contact me.

Sincerely,

Willard Antone III
Senior Manager, Permitting and Approvals; Resolution Copper Company, as Manager of Resolution Copper Mining LLC

Enclosed: Resolution Copper, Draft Resolution Copper Pipeline Route Special Use Authorization Reclamation Plan September 2022