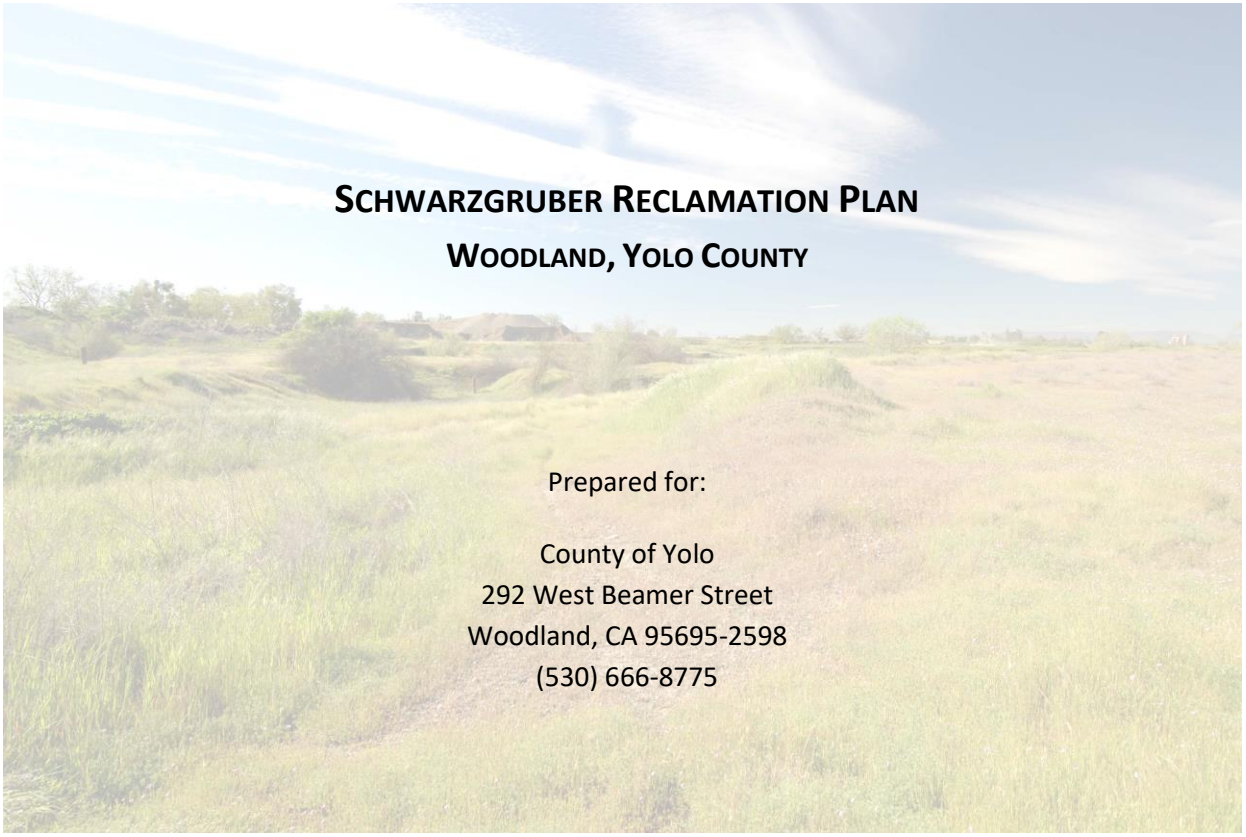
TEICHERT AGGREGATES



SCHWARZGRUBER RECLAMATION PLAN

WOODLAND, YOLO COUNTY

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TEICHERT AGGREGATES

CONTENTS

SCHWARZGRUBER RECLAMATION PLAN
Woodland, Yolo County – 2021

LIST OF TABLES

LIST OF FIGURES

SECTION 1.0

Introduction

This document presents Teichert Aggregate's (Teichert's) Reclamation Plan (Plan) for the Schwarzgruber Property (hereafter, the "Project"). The Project is an existing aggregate mining and processing facility located in Yolo County, approximately 2 miles west of the City of Woodland (Figure 1). Teichert proposes to revise the existing Project to supply aggregate material to its existing Woodland processing facility immediately to the west (Figure 1). The revised Project will include mining on approximately 40.7 acres of the 132.9[1] acre Project Site (Figure 2), conveying aggregate material to the Teichert Woodland processing facility, and a comprehensive reclamation plan that addresses all previously mined/disturbed areas on the Schwarzgruber Property.

The Project includes a 700-foot setback from the existing channel bank of Cache Creek, as required by the Yolo County Off-Channel Surface Mining Ordinance (OCSMO) and Surface Mining Reclamation Ordinance (SMRO). The 700-foot setback area represents previously mined land, which will be included as part of the comprehensive reclamation plan for the Project in accordance with current reclamation standards.

Reclamation of the Project Site will include 40.7 acres of open space and wildlife habitat, including grassland, oak woodland, riparian wetland, and seasonal pond. The primary goal of the reclamation effort is to create conditions that will allow for natural processes, such as native plant re-colonization, soil development, nutrient cycling, natural regeneration, and plant succession, to occur. In addition, habitat communities would be enhanced by the use of additional plant materials that are genetically and ecologically appropriate to the site.

In preparation of this document, information was collected from onsite field surveys, visits to nearby reclamation areas, and past experiences of Teichert's earlier reclamation projects. The reclamation plan embraces the Legislative intent that mined land is returned to a valid, quantifiable, and desirable post-mining use. This reclamation plan was developed in accordance with the reclamation standards developed by the State of California, Department of Conservation, Division of Mines and Geology pursuant to SMARA (Surface Mining and Reclamation Act) and as specified in the SMRO.

1.1 Project Site Location

The Project Site is located approximately 2 miles west of the City of Woodland, in unincorporated Yolo County (Figure 1). The Project consists of a single parcel (APN 025-350-010) totaling approximately

[1] The total site acreage reflects the addition of a 30-foot minimum setback along the Project Site's boundary within the Woodland Plant site, as required under CUP Condition 29. A lot line adjustment for the addition of the setback area was submitted to Yolo County concurrently with this final reclamation plan submittal. For this reason, the total acreage of the Project Site differs from what was originally cited in previous versions of this reclamation plan (132.3 acres).

Figure 1
Schwarzgruber Site Vicinity Map

Figure 2
Schwarzgruber Property and Mining Area

132.9 acres (Figure 2). The site is bounded by Cache Creek to the northwest, an unimproved right-of-way for County Road 96 to the east, the Magnolia Canal to the south, and Teichert's Woodland Plant to the southwest.

1.2 Existing and Surrounding Land Uses

The majority of the Schwarzgruber Property consists of currently mined lands. A small area along the northwestern boundary of the property includes Cache Creek and a constructed channel bank that separates the creek from the existing mine operation. Most of the site has been mined for aggregate material since 1947 and is currently being mined under use permits and reclamation plans that were approved in the early 1980s.

Adjacent land uses include agricultural farming to the south and east; three rural residential parcels with homes and associated farm buildings to the southeast; Teichert's aggregate processing facility (Woodland Plant) to the southwest; and a previously reclaimed mine site consisting of a water recharge basin and riparian area (also known as the Correll-Rodgers site) to the northeast. Additional mined properties occur north and west of Cache Creek and the Project Site, including Teichert's Muller Site and Granite Construction Company's Reiff Site.

Teichert's Woodland Plant has been operating since the 1950s. Processing facilities include, but are not limited to, rock and asphalt plants. The Woodland Plant is currently supplied by three approved mining sites (including the Muller, Storz and Coors properties [ZF 95-095]) totaling 252 acres.

1.3 Site Description

The Project Site consists of numerous excavations and gravel piles, in addition to an aggregate processing area near the southeastern portion of the property. Numerous spoil mounds are scattered throughout the central and eastern portions of the mined areas.

The topography of the site varies from excavated leveled areas to near vertical cut slopes. Elevations range from 60 to 96 feet above mean sea level (MSL), which reflect historical and ongoing aggregate mining activities. Cache Creek flows in a west to east direction along the northwestern portion of the property, just outside the proposed Project Site. A constructed bank separates the currently mined areas from Cache Creek and its associated vegetation. Based on a review of historic aerial photographs, it appears that the majority of the site served as the floodplain for Cache Creek prior to construction of the levee (USGS 1968).

Within the Project Site, three pond features were mapped by ECORP Consulting, Inc. (2011). One occurs within the active mining portion of the site, and is currently in use as part of the mining operation. The

remaining two ponds occur within the 700-foot setback area and will remain as part of the reclamation features for the site.

SECTION 2.0

Environmental Setting

The existing aggregate operation occupies the majority of the site (Figure 2). The northwestern portion of the property includes a constructed channel bank that separates Cache Creek from the active and historical mining operation. Details of the plant communities and potential wildlife that are present within the Project Site are described in the *Schwarzgruber Property Study Area Biological Resources Evaluation* prepared by Bumgardner Biological Consulting (2011) and *Wetland Delineation for Schwarzgruber Property* prepared by ECORP Consulting, Inc. (2011). The reports assess the potential for occurrence of special-status species and to identify potentially jurisdictional waters of the United States (U.S.).

2.1 Plant Communities and Habitat Types

The majority of the site consists of active or recently active mined areas, which are generally void of much vegetation. Inactive portions of the mined areas and existing spoil mounds are sparsely to moderately vegetated with various non-native annual grasses and forbs, including ripgut brome (*Bromus diandrus*), soft-chess brome (*Bromus hordeaceus*), annual fescue (*Festuca myuros*), red brome (*Bromus madritensis* ssp. *rubens*), wild oat (*Avena fatua*), Italian thistle (*Carduus pycnocephalus*), yellow star-thistle (*Centaurea solstitialis*), milk thistle (*Silybum marianum*), perennial mustard (*Hirschfeldia incana*), common burclover (*Medicago polymorpha*), red-stem filaree (*Erodium botrys*), bur-chervil (*Anthriscus caucalis*), and slender willow herb (*Epilobium brachycarpum*).

Slopes surrounding the perimeter of the mined areas, including channel bank itself, are dominated with ruderal species. Dominant species on slopes include milk thistle, yellow star-thistle, shortpod mustard and ripgut brome. Other common species include red brome, common fiddleneck (*Amsinckia menziesii* var. *intermedia*), and Italian thistle. Tree tobacco (*Nicotiana glauca*) is scattered throughout much of the site, with some large patches growing on slopes along the northern portion of the Project boundary.

Three ponds are present at the site. The two ponds located along the northern portion of the property (within the 700-foot setback area) are sparsely vegetated in the center, but more vegetated around the fringes where areas are seasonally inundated. Common vegetation associated with the ponds include knot grass (*Paspalum distichum*), rough cocklebur (*Xanthium strumarium*), broad-leaved peppergrass (*Lepidium latifolium*), everlasting cudweed (*Gnaphalium luteo-album*), prickly sow thistle (*Sonchus asper*), swamp grass (*Crypsis schoenoides*), and burhead (*Echinodorus berteroi*). Scattered woody riparian vegetation surrounding the perimeter of the ponds include Fremont's cottonwood (*Populus fremontii*), willows (*Salix gooddingii* and *S. exigua*), mule fat (*Baccharis salicifolia*), and tamarisk (*Tamarix parviflora*). The third pond, which is located within the active mining area near the center of

the site, is continually disturbed and part of the processing operation. Some hydrophytic vegetation exists within this feature, but is readily removed as part of ongoing maintenance.

An approximately 6.3 acre area of relatively undisturbed land (grassland) is present near the southeastern portion of the property. This area may historically have been farmed or disked, but is now typical of a grassland community within the region. Dominant species in this area include annual fescue, wild oat, redstem filaree, and common fiddleneck.

Larger, mature trees associated with the site are generally located along the southern and eastern boundary of the property. These include black walnut (*Juglans hindsii*), English walnut (*Juglans regia*), and almond (*Prunus dulcis*). Several of these trees are associated with various farm and storage buildings along the southern perimeter of the property.

The northwestern portion of the site is outside the Project boundary. This area includes a portion of Cache Creek and is dominated by riparian vegetation, including cottonwood, willows, valley oak (*Quercus lobata*), blue elderberry (*Sambucus nigra* subsp. *caerulea*), mule fat (*Baccharis salicifolia*), creeping wildrye (*Leymus triticoides*), and various annual grasses and forbs.

2.2 Wetlands

A wetland delineation was conducted by ECORP Consulting, Inc. in October 2010 to determine the location and extent of potential waters of the U.S. on the Project Site (ECORP 2011). The delineation was submitted to the U.S. Army Corps of Engineers (Corps) in February 2011 for verification. A total of 3.724 acres of non-jurisdictional aquatic features were mapped on site.

The non-jurisdictional aquatic acreage within the Project Area is associated with three ponds. Two of the ponds are located in the northern portion of the study area, appear to be mostly seasonal, do not appear to have been disturbed by mining activities for several years, occur within the 700-foot setback area, and will be avoided from proposed mining activities. The other pond is located in the southeast portion of the study area, and is used as part of the mining and processing operation.

2.3 Special-Status Species

According to Bumgardner Biological Consulting (2011), the vegetation communities and current habitat structure observed on site represent potentially suitable habitat for several regionally occurring special-status species. Portions of the site provides potential nesting and foraging habitat for several special status-birds including white-tailed kite (*Elanus leucurus*), Swainson's hawk (*Buteo swainsoni*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), and yellow-billed magpie (*Pica nuttallii*) and potential wintering habitat for merlin (*Falco columbarius*). The ponds located within the 700-foot setback area provide potential habitat for Sanford's arrowhead (*Sagittaria sanfordii*) and

western pond turtle (*Emys marmorata*). Lastly, the site supports the specific host plant, blue elderberry (*Sambucus nigra* supsp. *caerulea*), for the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

SECTION 3.0

Proposed Mining Operation

Mining on the Schwarzgruber Property is proposed as a single phase on approximately 40.7 acres of the 132.9 acre Project Site (Figure 3). The Project will include the removal of the existing processing facility on Schwarzgruber and conveyance of aggregate material to an adjacent site known as the Teichert Woodland Plant, which has been an ongoing processing operation since the 1950s. The Woodland Plant is currently supplied by three approved mining sites and are regulated by the Woodland Properties use permit (ZF 95-095) and development agreement (96-286).

The Schwarzgruber Project is anticipated to supply approximately 4.0 million tons of additional aggregate material to the Woodland Plant. Mining will occur up to a maximum depth of 20 feet MSL (mean sea level), approximately 38 to 76 feet below existing ground surface. Ultimate mining depths will vary depending on depths and quality of mineable material, but is anticipated to average approximately 30 feet MSL (roughly 28 to 66 feet below existing ground surface). The duration of mining at the Project Site will vary depending on market demand and quantity of PCC grade aggregate present onsite. The termination date is no later than 01 January 2028, which is when the Schwarzgruber Use Permit expires.

Mining will begin at the eastern and southern portions of the site and proceed to an average depth approximately 30 feet MSL. As mining progresses to the north and west, mining depths are anticipated to increase to the maximum 20 feet MSL. Slopes will be mined to a maximum ¾:1 (horizontal:vertical [H:V]), and less steep (1:1 to 2:1) where summer groundwater elevations occur. In general, reclamation will be concurrent with mining, with slope features along the eastern and southern boundary of the Project taking precedence during the reclamation process. The timing of mining and reclamation activities adjacent to the Magnolia Canal will be coordinated with the Yolo County Flood Control and Water Conservation District. Additional fines and silts generated from the processing plant may be used to complete reclamation of the remaining areas.

Other components of the mining and processing details of the Project are provided in the mine plan drawings prepared by Cunningham Engineering (2013). Additional details of the mine preparation and operation are summarized below.

3.1 Site Preparation

Current access to the site is from County Road 96. Prior to mining, this access will be closed off and rerouted through Teichert's Woodland processing facility. Fencing, as required by Section 10-5.510 of the SMRO, will consist of four-strand barbed wire (minimum 42 inches high) and will surround the perimeter of the Project Site. In addition, "no trespassing" signs will be posted every 200 feet along

Figure 3
Schwarzgruber Property and Mining Phase

fence lines. Any gates installed along the property will remain locked. Fencing will be placed on top of the existing channel bank along the northern and western boundaries and at the property line along the southern and eastern boundaries.

Prior to mining each area, steps will be taken to mark property boundaries and appropriate setbacks or buffers. Specific setbacks or buffers will be established for property boundaries and right-of-ways, Cache Creek, and any sensitive species/habitats. Conservation measures for sensitive species/habitats could include implementing specific mitigation requirements for direct impacts (e.g., removal of elderberry shrubs) or establishing setbacks and including other protective measures for potential indirect impacts (e.g., mining in close proximity to wetlands).

3.2 Protection of Sensitive Species and Wildlife Habitats

Specific setbacks or mitigation/conservation requirements will be implemented as determined by the appropriate regulatory agencies. Additional analysis and field surveys will be conducted to ensure that any special-status species and habitat impacts are identified and mitigation provisions made prior to any mining activities.

Given current disturbances on the site and the quality of existing habitat, reclamation of the mined areas is expected to provide a much higher habitat value for the species described above. Reclamation is intended to result in the creation of grassland, oak riparian woodland, riparian wetland, and seasonal pond habitat. Much of the site will be reclaimed to grassland which will benefit the breeding and winter resident raptors that forage there. Many of the native riparian trees shall be avoided to maintain potential nesting habitat for species such as white-tailed kite, Swainson's hawk, loggerhead shrike, and yellow-billed magpie, while additional areas will be created for future wildlife use. In addition, mature trees along the edge of County Road 96 and the southern edge of the site along Magnolia Canal shall be retained. Temporary, construction fencing shall be installed around the base of trees to prevent inadvertent damage during mining and reclamation activities. Established wetlands will also be avoided and substantial areas created, resulting in significantly more aquatic habitat. Reclamation would also benefit the valley elderberry longhorn beetle, as numerous elderberry shrubs are proposed in the oak riparian woodland community.

3.3 Soil Removal and Management

Preserving soil productivity and minimizing soil compaction are key components during the removal (mining) and replacement (reclamation) process. Article 9 Reclamation Standards section 3704(c) requires topsoil to be salvaged and stockpiled separately from the subsoil. Because historical mining activities conducted on the Project Site have resulted in the loss of much topsoil and overburden on site, only limited amounts will be required for removal and storage. Any existing overburden and topsoil present at the site will first be used to construct required MSHA (Mine Safety and Health

Administration) berms[2] around the perimeter of the pit. All remaining soils salvaged at the site will be used immediately after stripping to reclaim portions of slopes, or temporarily stockpiled at designated areas for future use in reclamation. There shall be no permanent piles of mine waste and/or overburden when reclamation is complete. Berms and stockpiles will be identified in the field and on maps depicting them as soil stockpile areas to prevent inadvertent use. Berms shall not exceed 4 feet in height and stockpiles shall not exceed 40 in height with slopes no steeper than 2:1 (H:V). In order to minimize soil compaction, all handling of soils (stripping, stockpiling, and reconstruction) will occur when soil moisture is low. Water trucks will be used to control dust.

Soil stockpiles that are not used for reclamation within one mining season will be planted with a native grassland seed mix to minimize soil erosion, maintain microbial activity, and discourage noxious weed establishment. Specific species in the mix and seeding rates for any temporary soil stockpiles and berms are summarized below.

Common Name	Scientific Name	Seeding Rate
Annual fescue	*Festuca microstachys*	12 lbs/acre
California brome	*Bromus carinatus*	8 lbs/acre
Blue wildrye	*Elymus glaucus*	4 lbs/acre
Arroyo lupine	*Lupinus succulentus*	6 lbs/acre
Total		**30 lbs/acre**

Seeding will occur prior to the end of October in each season soil stockpiling is completed. Seeding methods may include either hydro-seeding or broadcast seeding. In addition, erosion control materials (e.g., wattles, coconut fabric rolls, etc.) or retarding basins/ditches shall be installed surrounding the base of all soil stockpiles and berms to prevent soil runoff. Future management of stockpiles and berms will also include removing undesirable species (e.g., yellow star-thistle, milk thistle, etc.) and re-seeding as necessary. All soil management (handling, stockpiling, maintenance, and reconstructing) objectives are intended to limit impact on the soils while maintaining the function and productivity for future reclamation purposes.

3.4 Stormwater Management

The Project will be designed to prevent stormwater runoff from leaving the Project Site. V-ditches will be constructed along the southern and eastern boundary of the Project Site, paralleling the outer perimeter of the MSHA berm, and graded to allow stormwater runoff to collect in the proposed mining pit. The remaining areas of the Project Site consists of a below grade pit, which all stormwater runoff is currently contained by the surrounding slopes and existing channel bank. Final construction of the V-ditches have been incorporated into the mine plan drawings (Cunningham Engineering 2013) and calculated to ensure that the stormwater conveyance is designed to handle runoff from not less than a 20-year/1 hour intensity storm event. Culverts may be installed to channel excess runoff to the pit floor

[2] Safety berm, typically at least mid-axle high to the largest equipment used on site, constructed where a drop-off exists.

(future seasonal pond area). The remainder of the site consists of a below grade mine pit and V-ditches will not be required. At the conclusion of mining, the site would remain contoured so that stormwater runoff will be permanently directed to the reclaimed mining area and seasonal pond.

3.5 Flooding, Pit Capture, and Bank Erosion

A floodplain study conducted by Cunningham Engineering (2011) evaluated site-specific conditions at the Project Site using HEC-RAS model. The model results indicated that, within the proposed mining reach, the 100-year discharge from Cache Creek would be contained within the high banks on the south side of the channel.

The Off-Channel Mining Plan (OCMP) EIR determined that a 700-foot setback would be sufficient to prevent pit capture and associated bank erosion. This requirement was adopted under Section 10-4.429(d) of the OCSMO. Consistent with the OCMP and OCSMO, the mining area on the Project Site would be set back a minimum of 700 feet from the top of the Cache Creek bank. Because the proposed mining area complies with the 700-foot setback requirement, no site specific analysis of the effects of bank erosion or pit capture is required.

3.6 Storage of Equipment and Related Materials

All equipment, supplies, and other related materials will be stored at the Woodland Plant site in designated areas. Any waste produced through mining activities will be disposed of from the site according to all state and local health and safety ordinances. Mobile equipment may be stored at temporary staging areas on-site during active mining and reclamation activities, but would be removed from the site upon completion of all mining and reclamation activities.

3.7 Operational Areas and Haul Roads

Any remaining operational areas and haul roads that are not required for future use of the site shall be ripped and resoiled, if necessary. These areas will be seeded with native grasses and forbs similar to that described in Section 5.3 and Table 4.

SECTION 4.0

Reclamation Overview and Areas

Reclamation will occur concurrent with mining operations and has been separated into two primary areas, specifically the 700-foot setback and mine pit area. A perimeter landscape (visual buffer) along the eastern edge of the property will also be planted with native trees and shrubs prior to mining as a condition of the permit. These plantings will remain after mining and as a reclamation feature (specifically additional oak riparian woodland habitat) for the site. Table 1 below summarizes the quantity of habitat types to be created within each of the areas. Included in the 700-foot setback area are the two existing ponds and associated riparian wetland habitat.

Table 1
Reclamation Phases and Habitat Types (Acres)

Habitat Type	700-Foot Setback	Mining Pit	Visual Buffer & Setbacks	Totals
Visual Landscape Buffer	--	--	1.0	1.0
Grassland Slopes	10.0	4.0	--	14.0
Grassland	26.3	--	1.4	27.7
Oak Riparian Woodland	--	1.7	--	1.7
Riparian Wetland	13.0[1]	2.5	--	15.5
Seasonal Pond	3.9[2]	32.4	--	36.3
Totals	**53.23**	**40.6**	**2.4**	**96.2**

[1] Includes 1.0 acres of existing riparian habitat to be avoided and 12.0 acres of riparian enhancement.
[2] Existing acres of seasonal pond habitat to be avoided and present post-reclamation.

The particular timing for the completion of mining and reclamation may vary depending on market conditions, quality of mineable materials and ultimate mining depths, acquisition and coordination with additional mineable areas, and availability of overburden/topsoil and processed fines. The estimated length of mining could range from 3 to 15 years. All reclamation is anticipated to be completed within 2 years following the conclusion of mining, followed by 5 years of post-reclamation monitoring.

The proposed mining includes maximum ¾:1 slopes (H:V), followed by minimum slopes of 2:1 (H:V) for reclamation. Slopes along the southern portion of the mining boundary paralleling the Magnolia Canal will be reclaimed with 3:1 (H:V) slopes. Perimeter landscaping along the eastern property boundary shall be planted prior to mining and consist of oak riparian woodland habitat. The pit floor will vary in depth and exist as a seasonal pond. The 700-foot setback area will be relatively level and support grassland, riparian wetland, and seasonal pond habitat.

Given the relative lack of overburden and topsoil on the Project Site, priority will be given to reclaiming the 2:1 and 3:1 slopes along the southern and eastern boundaries of the mining area. Any remaining

overburden and topsoil material will be placed along the northern and western edges of the mine pit and as the final layer within the remaining 700-foot setback area. Any shortage of "soil" for completing reclamation within the 700-foot setback area will be compensated by using "waste fines" (silts) generated from Teichert's Woodland processing plant. This material will be transported and placed prior to (beneath) the final placement of the remaining overburden and topsoil for the site. Reclamation shall include a minimum of at least 12 inches of soil (topsoil/overburden/silts) to be placed on all surfaces.

All slopes will be tracked-walked after final grading. Remaining areas within the 700-foot setback area (grassland) will be ripped to a minimum depth of 18 inches and disked to de-compact areas created through various equipment operations. As each constructed slope and area is completed, revegetation as described in Section 5 will be initiated the following fall and winter. Some revegetation may naturally become established during and immediately following mining of the excavated pit (i.e., in the form of willows and cottonwoods) where hydrological conditions are favorable. All remaining areas not establishing desired vegetation will be planted as described in Section 5.

SECTION 5.0

Revegetation Plan and Design

One of the important concepts underlying the development of a revegetation plan is the necessity to determine future use of the site subsequent to mining. Post-mining use at the Schwarzgruber property will include open space, including habitat for wildlife. This reclamation plan is specifically designed to provide for the development of the wildlife habitat component and is based upon the nature of the surrounding areas and characteristics of the property, available overburden, topsoil and waste fines, and site topography and hydrology. The habitat communities and their respective revegetation designs are detailed below and shown on Figures 4 and 5. These include habitat types to be created, methods of establishment, general planting locations relative to final elevations and groundwater levels, species types, and densities. The general plan is intended to optimize the wildlife habitat quality of the site and the aesthetic value of the area. Planting densities were determined based on several factors, including expected success, ultimate plant size, potential of natural recruitment, and desired level of habitat types.

Revegetation areas will consist of five different plant associations or communities, many of which may overlap or transition into one another. These include a visual landscape buffer, grassland slopes, grassland, oak riparian woodland, riparian wetland, and seasonal pond. These vegetation communities and associated microhabitats are typical of naturally occurring ones in the area. Each habitat community is not a monoculture but is designed to have a diversity of plants and conditions that will complement each other and provide a rich and diverse habitat for wildlife.

Soil depths and final elevations relative to groundwater levels will be a primary determinant of which plant associations or communities are appropriate for a given area. Ultimate mining depths and groundwater elevations will largely determine the riparian wetland and seasonal pond features and is expected to adjust over time in response to changing site conditions. According to a preliminary assessment of the proposed Schwarzgruber pond conducted by Luhdorff and Scalmanini (2011), pond levels will likely fluctuate seasonally about 10 feet during stable hydrologic periods when annual precipitation varies only moderately from the long-term average. In some instances, hydrology may be drastically altered during extreme wet or dry years, resulting in the potential expansion and contraction of these areas. To help compensate for this potential, a mixture of plant species that vary in moisture requirements and hydrological tolerance will be planted in those areas most likely to experience a changing or unexpected hydrology.

5.1 Visual Landscape Buffer

The visual landscape buffer will consist of a linear (30-foot wide), vegetated screen of native trees and shrubs between the mining area and the County Road 96 right-of-way (ROW) (Figures 4 and 5).

Figure 4
Proposed Reclamation Plan (Overhead View)

Figure 5
Proposed Reclamation Plan (Typical Cross-Sectional View)

Approximately 1,440 lineal feet (1 acre) within the 50-foot setback from the County Road 96 ROW will consist of the visual landscape buffer and be installed in two phases (see Visual Landscape Buffer, Vegetation and Maintenance Plan [Teichert 2013] for details). Prior to the commencement of mining (Phase 1), the outer 15-foot width (frontage portion) will be planted to buffer potential views of the mining and processing areas from the County Road 96 ROW. A small gap (125 feet) will exist in the visual landscape buffer near the southern portion to allow for a County Road 96 turnaround. A temporary access road and MSHA berm will be constructed behind the visual landscape buffer during mining operations, which will ultimately be removed and planted with additional native landscape plantings at the conclusion of mining (Phase 2). The visual landscape buffer is intended to be part of the final reclamation for the Project and expand on existing wildlife habitat values for the site.

Vegetation in the visual landscape buffer is typically represented by relatively drought-tolerant native trees and shrubs, including valley oak, western redbud (*Cercis occidentalis*), toyon (*Heteromeles* arbutifolia), and coyote brush (*Baccharis pilularis*). Table 2 shows planting specifications and minimum container sizes for the visual landscape buffer.

Table 2
Planting Specifications for the Visual Landscape Buffer

Common Name	Botanical Name	Container Size
Valley oak	*Quercus lobata*	15-gallon
Western redbud	*Cercis occidentalis*	1-gallon
Toyon	*Heteromeles arbutifolia*	1-gallon
Coyote brush	*Baccharis pilularis*	1-gallon

In general, plants will be installed in a natural mosaic pattern and will be arranged to maximize screening with shrubs concentrated at the east edge of the planting area and trees on the west edge. Spacing of tree plantings will be no closer than 20 feet on center to prevent future crowding and potential long-term decline. Shrub plantings will be spaced 5 to 10 feet on center and include a mosaic of mixed and same species.

5.2 Grassland Slopes

Grassland slopes will vary in steepness between 2:1 and 3:1 and consists of a mix of native grasses and forbs. A total of 14.0 acres of slopes is estimated to be created surrounding the perimeter of the proposed mining and previously mined (700-foot setback) areas (Figures 4 and 5). The majority of slopes will be reclaimed to 2:1, with the exception of a 3:1 slope along an approximately 1,200-foot portion paralleling the Magnolia Canal.

Slopes will be revegetated by broadcast seeding with an appropriate native grassland seed mix selected for its erosion control and habitat value. Typical species in the seed mix shall include blue wildrye

(*Elymus glaucus*), California brome (*Bromus carinatus*), annual fescue (*Festuca microstachys*), California poppy (*Eschscholzia californica*), and arroyo lupine (*Lupinus succulentus*). Additional plants expected to colonize these areas naturally would include soft-chess, ripgut brome, wild oat, red brome, and filaree (*Erodium botrys*, *E. cicutarium*, and *E. moschatum*), to name a few. Table 3 below shows seed mixes and seeding rates for the slopes following construction. All seeding rates are specified in terms of pounds, pure live seed (PLS).

Table 3
Seeding Specifications for Grassland Slopes (PLS)

Common Name	Botanical Name	Seed Rate
Blue wildrye	*Elymus glaucus*	14.0 lbs/acre
California brome	*Bromus carinatus*	12.0 lbs/acre
Annual fescue	*Festuca microstachys*	6.0 lbs/acre
California poppy	*Eschscholzia californica*	1.0 lbs/acre
Arroyo lupine	*Lupinus succulentus*	5.0 lbs/acre
Gumplant	*Grindelia camporum*	1.0 lbs/acre
Slender wheatgrass	*Elymus trachycaulus*	6.0 lbs/acre
Totals		**45.0 lbs/acre**

Native grass straw shall be applied on all slopes to be seeded at a rate of one bale for every 800 square feet of surface area. Seed and straw shall be adhered in place to prevent wind drift using a sprayed tackifier typically used in the hydroseeding process.

5.3 Grassland

Grassland habitat will consist of approximately 27.7 acres of relatively level ground within the 700-foot setback area and other previously disturbed areas surrounding the perimeter of the pit (Figures 4 and 5). This feature will be completed after all reclamation slopes have been constructed. The grassland community will surround the two ponds and their associated riparian wetland areas. Similar to the surrounding perimeter slopes, the grassland community will ultimately support various native grasses and forbs. Table 4 below shows seed mixes and seeding/planting rates for the grassland community.

Table 4
Seeding/Planting Specifications for Grassland (PLS)

Common Name	Botanical Name	Seed Rate
Blue wildrye	*Elymus glaucus*	18.0 lbs/acre
Annual fescue	*Festuca microstachys*	5.0 lbs/acre
Creeping wildrye	*Leymus triticoides*	200 plugs/acre
California poppy	*Eschscholzia californica*	1.0 lbs/acre
Arroyo lupine	*Lupinus succulentus*	4.0 lbs/acre
Gumplant	Grindelia camporum	1.0 lbs/acre
Slender wheatgrass	*Elymus trachycaulus*	6.0 lbs/acre
Red Fescue	*Festuca rubra*	3.0 lbs/acre
June Grass	*Koeleria macrantha*	2.0 lbs/acre
Narrow-leaf milkweed	*Asclepias fascicularis*	2.0 lbs/acre
Totals		**42.0 lbs/acre**

Areas to be reclaimed as grasslands will be broadcast seeded with a native mix consisting of blue wildrye, annual fescue, California poppy, and arroyo lupine. Creeping wildrye (*Leymus triticoides*) will also be planted from plugs at an average density of 200 plugs per acre. Plugs will be planted in random clusters to establish patches dominated by creeping wildrye.

5.4 Oak Riparian Woodland

The oak riparian woodland will be created in several random areas or patches along the 3:1 slopes paralleling the Magnolia Canal. A minimum of 1.7 acres will be planted as oak riparian woodland as conceptually depicted in Figures 4 and 5. This area will be seeded with the grassland seed mix, therefore, initially, these areas will predominantly resemble an open grassland community, but eventually grow into an oak woodland habitat as the plantings develop. Vegetation in this community is typically represented by relatively drought-tolerant riparian species, including valley oak, blue elderberry, coyote brush, California wild rose (*Rosa californica*), and California blackberry (*Rubus ursinus*). Table 5 shows planting specifications and minimum densities for the oak riparian woodland community.

Table 5
Planting Specifications for the Oak Riparian Woodland

Common Name	Botanical Name	Planting Density (seedlings/acre)
Valley oak	*Quercus lobata*	50
Blue elderberry	*Sambucus mexicana*	55
Coyote brush	*Baccharis pilularis*	20
California wild rose	*Rosa californica*	35
California blackberry	*Rubus ursinus*	30
California buckeye	*Aesculus californica*	8
Totals		**190**

Planting ratios of species may be modified due to existing sight conditions, relative proximity to groundwater elevations, and availability at the time of planting. In general, seedlings will be planted from Deepot™ 40[3] size containers. Alternative container size seedlings or methods, including direct seeding (i.e., oak acorns), may be substituted if monitoring suggests adequate survival and success rates. Hoary coffeeberry (*Frangula tomentella*) and toyon may be included as part of the landscape buffer, which will be planted along the southeastern perimeter of the property and ultimately exist as part of the oak riparian woodland community.

5.5 Riparian Wetland

The riparian wetland community will exist as a narrow fringe surrounding the entire seasonal pond where hydrological conditions are most suitable (Figures 4 and 5). It will also be expanded as benches or peninsulas at selected areas along the western and eastern edges of the seasonal pond, as well as the southwest corner (Figures 4 and 5). In general, the riparian wetland community represents a transition area between the seasonal ponds and grassland slopes or oak riparian woodland areas. At a minimum, 2.5 acres of riparian wetland shall be created within the mining area. The ultimate acres of riparian wetland habitat to be created within the proposed mining area will be dependent upon ultimate mining depths, available soils, and seasonal hydrological conditions. Narrow fringes of riparian wetland habitat totaling 1.0 acre presently surround the perimeter of the two ponds within the 700-foot setback area. These features will be avoided throughout the mining and reclamation process. Additional acres of riparian wetland habitat (approximately 12.0 acres, also referred to as riparian enhancement areas) shall also be created within the 700-foot setback along both of the existing ponds. Figures 4 and 5 illustrate conceptual areas where riparian enhancement habitat will be located.

The development of riparian wetland habitat will be accomplished largely by excavating areas (i.e., in the proposed enhancement areas within 700-foot setback) or creating terraces using existing waste fines from Teichert's Woodland processing facility (i.e., riparian wetland habitat proposed in the mining areas). Waste fines will be either trucked or routed in slurry form during the reclamation process. Slopes and riparian benches for the riparian wetland community will be created at an elevation around average high groundwater level to some distance (approximately 2 to 10 feet above and below that.

Condition of Approval 53 requires the incorporation of additional wetland and riparian enhancement in the southwest and southeast corners of the mining area, with changes to the southeast corner only required if the existing buildings are removed and that corner is mined. In response to this requirement, the reclamation plan was revised to include the following changes: 1) additional shoreline undulation along the southwestern corner, facilitated by a 50-foot lot line adjustment that allows for an additional 20 feet of scalloping located in the area gained by the lot line adjustment; and 2) the shifting of proposed riparian wetland areas from the eastern shoreline to the southeastern corner if the existing

[3] Seedlings grown in plant containers measuring 2.5" diameter x 10" deep; 40 cubic inches.

buildings are removed and the southeastern corner is mined. The total riparian wetland acreage goals for the mining area remain at 2.5 acres.

Plants tolerant of saturated soils and occasional inundation are characteristic of this community. Willows (*Salix gooddingii*, *S. laevigata*, and *S. exigua*), cottonwood (*Populus fremontii*), and mulefat (*Baccharis salicifolia*) are expected volunteers where hydrological conditions and soil moisture is favorable during establishment. Other species, including California box elder (*Acer negundo* var. *californicum*), Oregon ash (*Fraxinus latifolia*), California sycamore (*Platanus racemosa*), and California button willow (*Cephalanthus occidentalis* var. *californicus*), will be planted to supplement natural colonization and increase species diversity and wildlife habitat value. In addition to the plantings above, this area will be seeded with the grassland mix as well as creeping wildrye (14.0 lbs/acre) and mugwort (2.0 lbs/acre)Table 6 shows planting specifications and minimum planting densities for the riparian wetland community.

Table 6
Planting Specifications for the Riparian Wetland

Common Name	Botanical Name	Planting Density (seedlings/acre)
California Box Elder	*Acer negundo* var. *californicum*	30
Oregon Ash	*Fraxinus latifolia*	30
California Sycamore	*Platanus racemosa*	10
California Button Willow	*Cephalanthus occidentalis*	30
Fremont Cottonwood	*Populus fremontii*	20*
Black Willow	*Salix gooddingii*	25*
Red Willow	*Salix laevigata*	20*
Arroyo Willow	*Salix lasiolepis*	35*
Sandbar Willow	*Salix exigua*	20*
Mule Fat	*Baccharis salicifolia*	30*
Totals		**250**

* If natural recruitment does not occur as expected within the first 2 years following reclamation.

Planting ratios of species may be modified due to existing sight conditions, relative proximity to groundwater elevations, natural colonization, and availability at the time of planting. In general, seedlings will be planted from Deepot™ 40 size containers. In addition, if natural recruitment of willows, cottonwoods, or mule fat is not occurring as expected within the first two years following reclamation, additional plants of those species (seedlings or cuttings) will be planted at a density of 150 seedlings/cuttings per acre.

5.6 Seasonal Pond

The seasonal pond will consists of approximately 32.4 acres in the mining area and vary from being entirely inundated in winter to some areas entirely “dry” and exposed with little vegetation in summer

(Figures 4 and 5). Two smaller pond features are present within the 700-foot setback area and total 3.9 acres. These ponds will be avoided throughout the mining and reclamation process.

Substantial changes in water depth and hydrology are expected to minimize the extent and type of vegetation that can be established within the ponds. In drier years, it can be expected that the majority of the pond will consist of exposed areas with intermittent vegetation consisting of annual upland weeds, cattails, willows, and cottonwoods. In wetter years, much of the pond may be inundated for the majority of the year. Nevertheless, this seasonal and annual variation in water levels will provide habitat for a variety of wildlife species throughout different periods of the year. Per Section 10-5.519 of the SMRO, the use of any motorized watercraft shall be prohibited.

SECTION 6.0

Plant Procurement and Installation

A variety of different plant materials may be used in the restoration planting of the various communities. These include seeds, container-grown plants, and cuttings. The specific planting methods will depend upon which habitats and what materials are available at the time of planting. Plants collected and grown locally will always be given priority in the selection process. Plant materials should be collected in the vicinity of the project site in order to control the origin of the genetic stock and provide the most site-adapted ecotypes. Native seeds, plants and cuttings used for reclamation and restoration activities shall be ecotypes of Cache Creek Watershed genetic origin, including areas outside of Yolo County, and of Yolo County genetic origin when materials are used that originate from outside of the Cache Creek Watershed.

All seeding for grassland cover and erosion control will occur before the end of October, prior to the first major rains. Planting of trees and shrubs seedlings will generally occur between November and January, ideally after winter storms have moistened the ground. If cuttings are used for planting willows and cottonwoods, these will be planted during the dormant season, generally considered December through February.

Plants will not be installed in linear rows or of equal spacing, but randomly placed as individuals or in clusters intermixed with other species. Clumping of some species will also emphasize the variety of plant associations. Natural colonization by additional plants is expected to further enrich the site along various zones.

6.1 Direct Planting

The following are various technical specifications regarding plant materials, seeding or planting densities, and their installation. Often site requirements, timing, and specie types will dictate the method of planting. Contingent upon the results of monitoring, amendments to the soil prior to or during the time of planting may be required. Adding organic matter, such as compost, may provide significant benefits to the site, particularly when topsoil is minimal.

6.1.1 Planting Seeds (Erosion Control/Grassland)

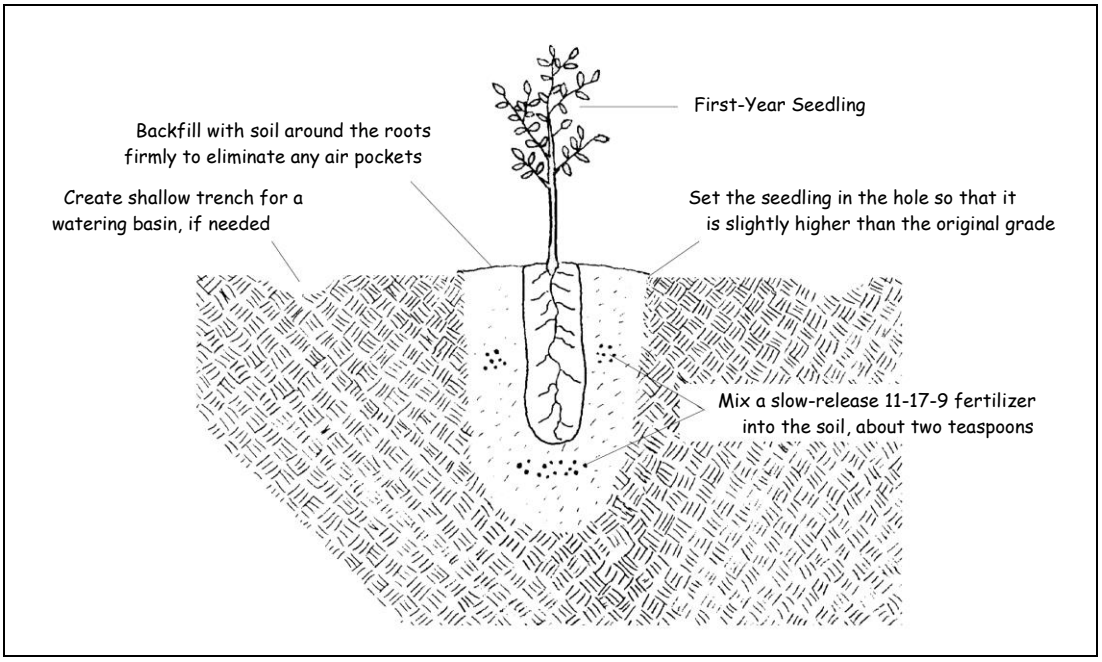
Seeding areas and techniques to establish vegetative cover on slopes and grassland communities will depend on a number of factors, especially hydrology, soils, existing terrain, and size of the area. Annual grasses and broadleaf weeds are likely to invade much of the area. However, native grasses and forbs will be planted at the site to increase native plant diversity. All seeding will take place in October, prior to the season's first major rains.

Prior to seeding, areas will be lightly tilled or harrowed, depending on how compacted the site is. All slopes will be track-walked with imprints perpendicular to the direction of the slope. Seeds will then be drilled using a seed drill or broadcast using a belly grinder or spreader mounted on a tractor. Seeding rates will vary depending on species used and areas to be revegetated (see Sections 5.1 and 5.2). Native grass straw shall be applied on all slopes to be seeded at a rate of one bale for every 800 square feet of surface area. Seed and straw shall be adhered in place to prevent wind drift using a sprayed tackifier typically used in the hydroseeding process. Seed, straw, and tackifier applications shall occur on a calm day with little or no winds to ensure even installation of broadcast seed, distribution of straw, and successful layer of tackifier.

6.1.2 Container/Seedling Installation

Seedlings will be grown out in containers from locally collected seeds or purchased from a local nursery shortly before installation. Planting holes for seedlings will be dug at least twice as deep and twice as wide as the seedling rood wad (Figure 6). A slow-release fertilizer (11-17-9) will be placed in each planting hole, one teaspoon at the bottom of the hole and another teaspoon with the backfill material. Holes shall be backfilled such that when the seedling is in place, the top of the root wad is level with or slightly above the grade of the surrounding ground. A shallow trench will be created surrounding each seedling for a watering basin, and each plant will be thoroughly watered immediately after planting.

Figure 6
Installing Container-Grown Plants



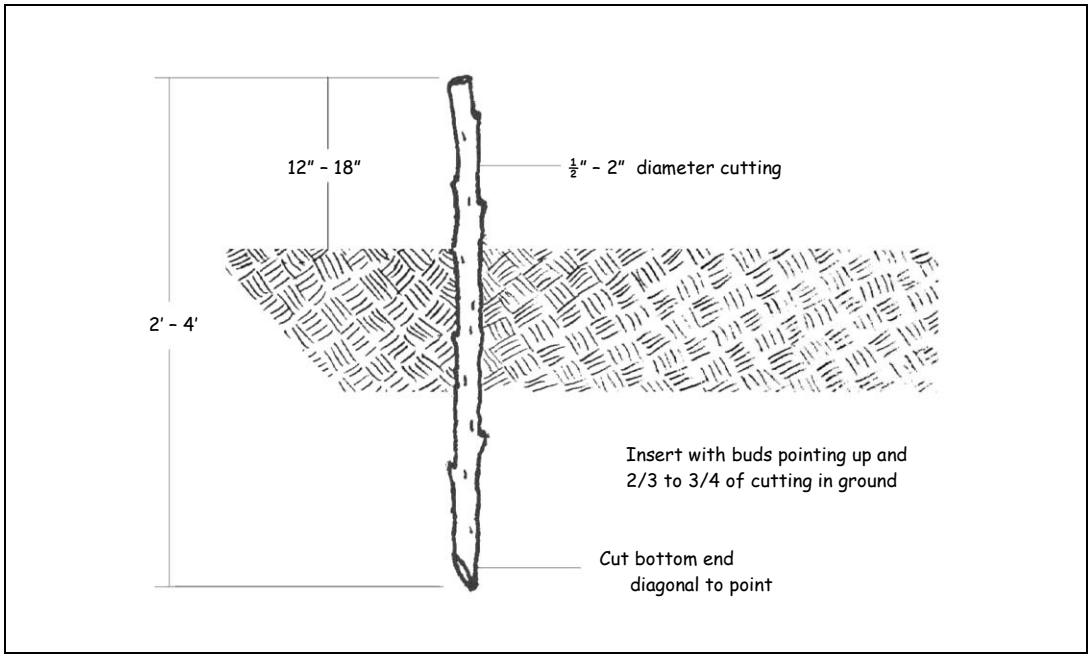
6.1.3 Planting Woody Cuttings

Some riparian and wetland species can be successfully propagated on site by collecting cuttings and planting them directly into the ground (Figure 7). Willows and cottonwood are the most widely used for cuttings. Mule fat and button bush are other species that have been readily planted successfully from cuttings. Planting cuttings can be the easiest form of restoration if an abundant supply is available, ground conditions are suitable, and hydrological conditions are present.

Cuttings should be collected and planted while they are dormant, usually from mid-December through February. However, some species (i.e., button bush) root better during the spring and summer months if ample water is available. All cuttings will be collected from adjacent or nearby areas. Cuttings are most likely to root if taken from young plants or vigorous young suckers.

The size of cuttings may vary from ½ to 2 inches in diameter and from 2 to 4 feet in length. First- and second-year stems of about ¾ to 1 inch in diameter work best for propagation. Planting cuttings will only occur when the ground is moist. Cuttings will be inserted so that the base end of the cutting is placed at the bottom of the hole. In loose soils, cuttings can be thrust into the ground by hand. On gravelly or compacted soils, the ground may need to be ripped or holes augured prior to planting. In general, at least two-thirds of the cutting should be in the ground. Cuttings may also be inserted diagonally or horizontally into the ground if enough moisture is available at the surface.

Figure 7
Pole Cutting Installation



6.1.4 Collection and Planting of Acorns

Depending on oak acorn production years and timing of restoration planting, oaks may be directly planted in the field from acorns. Acorns will be collected in the fall, inspected for viability, and stored in refrigeration until the ground is moistened by rains. Viable acorns will be separated from damaged ones by placing acorns in a bucket of water and discarding those that float to the top. Acorns may be stored in refrigeration for up to 2 months, but may begin to loose viability soon after.

Prior to planting acorns, the existing ground will be prepped by loosening the first 12 inches. This may be done by equipment (i.e., auger) or by hand (i.e., shovel). At each planting spot, two or three acorns will be placed about ½ inch below the surface. Plant protector tubes will be installed to identify planting locations and protect young shoots from animal damage.

6.2 Natural Colonization

Natural colonization, or regeneration, is the process where existing conditions (topography, soils, hydrology, weather, etc.) are favorable and plant species adapted to those specific conditions are able to grow and establish on their own. Although this process is difficult in some areas and may be extremely slow for some species, it is often the most appropriate and efficient form of restoring sites. Unfortunately, natural regeneration of plant communities is generally episodic; plant establishment does not occur every year due to fluctuations of yearly rainfall, extent of winter flooding, species competition, predation, as well as natural variations in annual seed production.

Natural colonization of desired or target vegetation is expected to some degree, but will most likely be dependent upon hydrological conditions. As discussed earlier in Section 5.4, where hydrological conditions and soil moisture is favorable, natural recruitment of desired vegetation can be expected. Willows, cottonwood, and mule fat are expected to colonize along riparian wetland zones where fine sediment is available to initiate seed germination. In other upland areas, coyote brush, blue elderberry, and valley oak may also establish naturally as part of the initial revegetation process, though generally in limited quantities and situations.

SECTION 7.0

Maintenance and Follow-Up of Restoration Plantings

In design and development of a restoration site such as this, there are numerous conditions and elements that may interfere with the accomplishment of the original goals and objectives. Some of the most critical factors affecting restoration are water availability, invasive species and weed competition, herbivory, and human vandalism. Each of these issues is addressed separately and a maintenance plan is included below. Acts of God, such as flood events, could alter reclamation deliverables if shoreline areas are washed away or depositional areas created.

7.1 Irrigation

A temporary drip irrigation system will be used for installed plants in the oak riparian woodland and some of the riparian wetland communities during the first 1 to 3 years of establishment. The length of supplemental irrigation will depend on soils, relative proximity to ground water, and seasonal rainfall patterns. Irrigation will be installed prior to the arrival of the dry season so that water can be provided to individual plantings before water stress becomes a problem. All irrigation systems will be installed to a portable water pump that will pump water form the created pond. A screen will be installed on the intake hose of the pump to minimize debris entering the irrigation system and clogging emitters. A domestic well located near the southeastern portion of the property may also be used as a source for supplying temporary irrigation water to plantings.

Individual seedlings shall be irrigated with two drip emitters, each applying water at a rate of 2 to 4 gallons per hour. A minimum of 8 gallons of water shall be applied to each planting once a week during the first year. Irrigation will be monitored and adjusted as necessary to ensure plants are properly watered. Future irrigation will be applied for the following one to two seasons, if necessary. The frequency of irrigation will be reduced gradually over the 1 to 3 year period, and the effects will be monitored to ensure successful weaning of the plants from artificial watering.

7.2 Weed Maintenance / Invasive Plants

Another critical factor potentially affecting young plants and overall reclamation objectives is competing vegetation. The amount of competition will vary depending on the species present, the existing seed bank in the soil material used for reclamation, hydrological conditions, and a number of other factors. Several measures will be implemented to lessen competition with weeds.

7.2.1 Weed Maintenance Around Individual Plantings

For individual tree and shrub plantings, a 3 to 5 foot circular area around each seedling will be mechanically cleared of weeds by hand or with a hoe. A weed control fabric at least 2 feet in diameter shall be installed at the base of each planting and stapled to the ground to remain in place. Once seedlings are established, herbicides (i.e., Roundup®) may be applied around individual plantings as needed for the first 3 years. The use of any chemical herbicide, however, must be coordinated with a qualified biologist to ensure that the most effective methods are applied and damage to non-target vegetation is minimized. If weeds are minimal, a weed maintenance program around individual plants may not be necessary, or weeds can simply be mechanically removed by hand.

7.2.2 Invasive Plants

The Schwarzgruber site is potentially subject to a number of invasive or noxious plants, particularly during the reclamation process as new areas are disturbed. A number of invasive plants have been identified within the lower Cache Creek watershed and could potentially threaten reclamation success of a project. The *California Invasive Plant Council* (Cal-IPC) maintains a list of non-native invasive plants that are considered a potential threat to wildland areas (Cal-IPC 2006, 2007). The Cal-IPC list is based on evaluation criteria (i.e., ecological impact, invasive potential, distribution) to assign plants to an overall inventory category of high, moderate, or limited. Table 1 provides examples of potential plants along the lower Cache Creek watershed and ranked with an overall rating of High by the Cal-IPC.

Table 7
Examples of Non-Native Plants Listed by Cal-IPC as 'High'

Common Name	Scientific Name	Cal-IPC Rating
Barbed goatgrass	*Aegilops triuncialis*	High
Giant reed	*Arundo donax*	High
Red brome	*Bromus madritensis* ssp. *rubens*	High
Yellow star-thistle	*Centaurea solstitialis*	High
Pampas grass	*Cortaderia selloana*	High
Fennel	*Foeniculum vulgare*	High
Hydrilla	*Hydrilla verticillata*	High
Perennial pepperweed	*Lepidium latifolium*	High
Creeping water-primrose	*Ludwigia peploides* ssp. *montevidensis*	High
Purple loosestrife	*Lythrum salicaria*	High
Parrot's feather	*Myriophyllum aquaticum*	High
Eurasian watermilfoil	*Myriophyllum spicatum*	High
Himalya blackberry	*Rubus armeniacus*	High
Medusahead	*Taeniatherum caput-medusae*	High
Smallflower tamarisk	*Tamarix parviflora*	High
Saltcedar	*Tamarix ramosissima*	High

It should be noted that some weeds, although ranked higher by the Cal-IPC, are of lesser concern within the lower Cache Creek region. Conversely, other weeds not listed as high of a priority may be of more

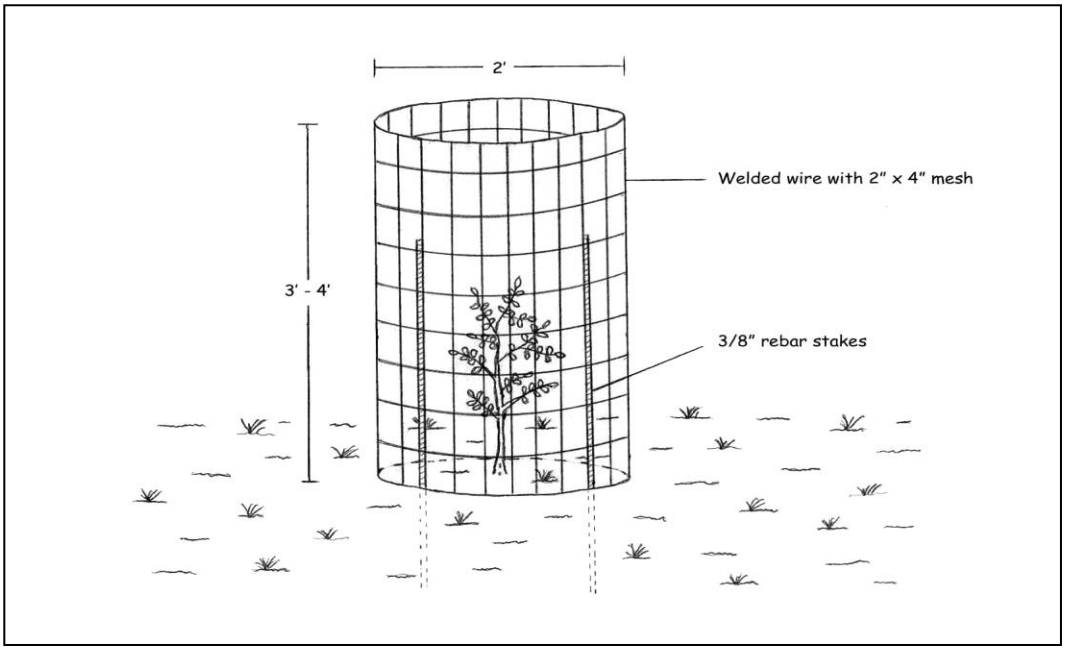
concern within the region. For example, red brome and fennel (*Foeniculum vulgare*) are notoriously invasive in the southern and coastal regions, respectively, but may be more tolerable in the Sacramento Valley Region. Other weeds not rated as "High" by the Cal-IPC, including ravenna grass (*Saccharum ravennae*), stinkwort (*Dittrichia graveolens*), tree of heaven (Ailanthus altissima), tree tobacco (Nicotiana glauca), edible fig (Ficus carica), poison hemlock (Conium maculatum), bull thistle (Cirsium vulgare), Italian thistle (Carduus pycnocephalus), milk thistle (Silybum marianum), canary grass (Phalaris aquatica), common teasel (Dipsacus fullonum), purple starthistle (Centaurea calcitrapa), and yellow flag iris (Iris pseudacorus) have been of huge concern in their respective habitat environments. Adjustments will be made to ensure that all of the most invasive and undesirable species are included within the management plan for the site.

A list of target species will be updated each year and those found at the site will be identified for removal. Management of invasive weeds will include both mechanical and approved/recommended chemical methods. Adjacent areas within the property boundaries will also be managed to minimize future spreading into reclaimed areas. The use of any chemical herbicide will be coordinated with a qualified biologist with an applicator license to ensure that the most effective methods are applied and damage to non-target vegetation is minimized. Monitoring and management of invasive weeds will continue to occur in the reclaimed areas throughout the end of the monitoring period.

7.3 Herbivory

To protect planted seedlings from deer, small rodents, rabbits, and beavers, it may be necessary to implement various measures that will reduce herbivory. If present, herbivory may be minimized through several approaches. First, oaks and other riparian plants may be protected from larger animals (i.e., deer or beavers) by installing wire cylinder cages around individual seedlings (Figure 8). Cages should be large enough to allow for some new plant growth before they can be browsed.

Figure 8
Installation of Cylindrical Cages to Protect Plants From Deer/Beaver



In other areas, plant protector tubes, or tree shelters, will be placed around seedlings if herbivory from voles or rabbits are evident. Tubes will be inserted approximately 4 inches into the ground to minimize voles from tunneling under them and left in place until they become of sufficient size to tolerate occasional browsing, usually after the first year or two. All wire cages and other plant protective material shall be removed from the site at the end of the five-year monitoring period.

7.4 Vandalism

The entrance into the Schwarzgruber site will be fenced and re-routed through Teichert's Woodland Plant. Visitors to the property will be required to register and receive safety orientation at the scalehouse. Any vandalism would most likely occur from trespassers along Cache Creek. Trespassing will be lessened by an adjacent, existing operating facility and through weekly visits to the site during the reclamation establishment period. In addition, signs will be placed around the area noting that the site is in progress of being revegetated and restored to wildlife habitat.

SECTION 8.0

Monitoring and Success Criteria

The primary objective of a monitoring program is to document the success or failure in attaining designated objectives and performance standards. For the Schwarzgruber Project, these objectives relate to success in plant establishment and the general conditions of revegetated areas. Monitoring is also designed to provide sufficient data to identify and evaluate the cause of problems in attaining success should they occur, and assist in devising appropriate corrective measures. A biologist or revegetation specialist with qualifications acceptable to the Yolo County Natural Resources Division and State Mining and Geology Board will conduct all monitoring and reporting requirements for the site.

8.1 Monitoring Time Period

Reclamation will be conducted in two primary areas, but include numerous features. Within each area, reclamation will be initiated in sections as mining operations continues to proceed to the next area. Each section will be identified and monitored annually for a minimum of 5 years following habitat implementation. Because reclamation and monitoring will occur annually as mining progresses, monitoring will represent various stages in vegetation and reclamation development. As monitoring areas are completed and all success criteria are met, monitoring and reporting for that particular area will end. If success criteria are not met, further monitoring and/or corrective measures will be required until such time that success criteria have been achieved.

8.2 Photo Monitoring

Photographs will be taken in late-spring or early summer while vegetative conditions are at their peak. A minimum of four permanent photo stations will be selected to qualitatively document changes in habitat development, types, and distribution over successive monitoring periods. Each photo station will be staked and mapped in the field with a GPS (global positioning system) unit with sub-meter accuracy and its direction of view recorded for future monitoring. Fixed features (i.e., mature trees, buildings, slope features, etc.) will be included in photos to provide a consistent reference and background against which yearly comparisons can be made. Representative photos during construction and revegetation will also be taken and included in monitoring reports.

8.3 Vegetation Monitoring

Vegetation monitoring has been developed separately for each of the habitat types proposed. A discussion of the monitoring methods and success criteria for each habitat type is provided below.

8.3.1 Visual Landscape Buffer

Plantings within the visual landscape buffer will be monitored annually to ensure that 100 percent of the plantings are established throughout the life of the mine operation. At the conclusion of mining, the adjacent access road will be ripped and planted with additional native trees and shrubs to expand on the existing landscape. These plantings are expected to provide additional habitat and be evaluated to meet similar criteria as those established for the oak riparian woodland habitat (see 8.3.4 below).

8.3.2 Grassland Slopes

Revegetation efforts on slopes will be evaluated based on total plant cover, species richness, and minimization of noxious or invasive weeds. Floristic surveys of reclaimed slopes will be conducted each spring when the majority of species are easily identifiable. Vegetation data will be collected using randomly placed 10 meter (m) long transects and using a point-line intercept method. Each transect will be treated as a sampling unit to calculate total absolute plant cover[4] for each unit and each species. Starting points for each transect shall be randomly generated using ArcGIS software (i.e., tool in Data Management Tools/Feature Class called Create Random Points) or any other scientifically justified method for generating random points. In addition, a random degree of direction between 0 and 360 degrees for each point will be produced. Once random points are created and a degree of direction for each point assigned, the information will be saved and uploaded into a GPS unit. Each point will be identified in the field using the GPS unit, and a transect will be established by laying a 10-m tape in the direction randomly assigned for that particular point. At every 0.1-m interval along each transect, all vegetation intercepted by a vertical pointed will be recorded. Sample sizes for all monitoring efforts will be sufficient to produce at least an 80 percent confidence level with a confidence interval width within 20 percent of the mean.

Total absolute cover of each transect will be calculated using the data collected at each transect.

$$\text{Total Cover of Transect X} = \frac{\text{Total \# of points where vegetation is recorded}}{\text{Total \# of points along each transect}}$$

Species richness data will be calculated by using 10-m^2 plots and the same transects as those established for collecting cover data. All species encountered within 0.5 meter of each transect will be recorded, and the data for the plots will be averaged to determine the number of species per 10-m^2 area. Noxious or invasive weeds shall be recorded separately from total plant cover and species richness data.

8.3.3 Grassland

Grassland monitoring will include similar methods and data collected for that used for the slopes (see Section 8.3.1 above). These include data for total cover, composition, and species richness.

[4] The actual proportion of the ground surface covered by a vertical projection of living foliage or stem (by single species or defined group of species) as viewed from above.

8.3.4 Oak Riparian Woodland

Oak riparian woodland monitoring will include an evaluation of native woody (trees and shrubs) species, including plant survival, total absolute cover, density, and species richness. A census of all plantings installed and those naturally recruited will be conducted each summer in which monitoring is required. At the time of installation, all plantings will be recorded with a GPS unit with sub-meter accuracy. Field maps of planting locations will then be generated to confirm the presence or absence (death) of plantings in the field. In addition, individual plantings will be assigned a vigor (health) ranking between 0 and 4 where: 0 = dead or missing, 1 = severe decline to nearly dead, 2 = possible decline or moderate defects, 3 = stable to fairly healthy, and 4 = healthy with good growth. The amount of new growth, growth patterns, and foliage color shall be considered when visually rating the health of each planting. Factors affecting these measurements may include weed competition, water, herbivory, soil characteristics, or disease. Only plantings with a vigor rating of 2 or high will be considered surviving plants.

To measure total absolute cover of oak riparian woodland vegetation, similar methods for collecting cover on the slopes and grassland communities will be used. Cover data for the oak riparian woodland habitat will be limited to evaluating native woody vegetation and invasive species. Understory vegetation (herbaceous layer) would not be appropriate early in the restoration process as certain maintenance measures (i.e., weed removal around seedlings) would affect cover values.
Density and species richness of native woody vegetation can be calculated using the GPS information of individual plantings, or in the case if much natural recruitment is present, using similar plots established for calculating species richness on the slope and grassland communities. Densities and species richness data for riparian woody species shall be calculated to represent numbers per acre.

8.3.5 Riparian Wetland

Riparian wetland monitoring will include similar methods and data collected for that used for the oak riparian woodland habitat (see Section 8.3.3 above). These include data for plant survival, total cover, density, and species richness.

8.4 Seasonal Pond Monitoring

The seasonal pond is not expected to necessarily support any form of permanent vegetation due to anticipated hydrological fluctuations. Nevertheless, this area will be monitored and managed for priority non-native and invasive aquatic and wetland weeds.

A staff gauge will be placed near the deepest portion of the pond to monitor water fluctuations each year. The depth of the pond will be recorded at least once monthly to determine pond depth and seasonal fluctuation patterns. In addition, inundation areas will be mapped using a GPS unit during the first year to describe the extent of inundation at various depths.

Per Section 10-5.524 of the SMRO, monitoring of groundwater is a condition of wet-pit mining. All groundwater monitoring shall continue for 10 years after the completion of reclamation.

8.5 Erosion Control Monitoring

Where reclamation has been completed, slopes will be observed regularly throughout its 5-year monitoring period. All observed erosion in excess of 6 square inches in cross-section and 6 feet in length will be corrected within 2 weeks after observation. These rills will be backfilled with additional soils, reseeded, and mulch applied if necessary. Long-term erosion control will be achieved through revegetation. Additional soil or supplemental materials (i.e., mulch, straw bales, or fiber blankets) will be applied if erosion continues. Adjacent roads will also be re-graded as needed to minimize any focal areas of erosion. The erosion control treatments will be monitored by Teichert and corrective measures will be employed throughout the reclamation monitoring period.

8.6 Wildlife Monitoring

Observations of wildlife (birds, amphibians, reptiles, or mammals) or their signs (i.e., tracks or scats) will be recorded whenever encountered, and a species list will be created for the site. A minimum of six site visits will be made each year to inventory wildlife use at the site.

8.7 Success Criteria

In order to determine whether the goals of the reclamation objectives have been met, a set of final success criteria have been developed. These success criteria for the different types of habitats created are provided in Table 7. All established criteria must be met and present at the end of the 5-year monitoring period.

Table 8 – Minimum Success Criteria

Habitat Type	Minimum Success Criteria
Grassland Slope	Total absolute vegetative cover must be at least 80%. Total absolute cover of noxious or invasive weeds must be less than 5%.* Species richness must average at least 4 species per 10-m^2, excluding noxious or invasive.
Grassland	Total absolute vegetative cover must be at least 70%.

Table 7 continued →

Table 8 (continued) – Minimum Success Criteria

Habitat Type	Minimum Success Criteria
Grassland (cont.)	Total absolute cover of invasive or noxious weeds must be less than 5%.* Species richness must average at least 4 species per 10-m^2, excluding noxious or invasive species.
Oak Riparian Woodland	Survivorship of installed plantings will be at least 70% (health/vigor rating of 2 or higher). Natural recruitment of native riparian woody species may be counted toward replacement seedlings. Total absolute cover of native riparian woody species must be at least 10%. Total absolute cover of invasive or noxious weeds must be less than 5%.* Density of native riparian woody species must be at least 135 plants per acre. Species richness must average at least 6 woody riparian oak woodland species per acre. Total amount established must be at least 2.5 acres (1.7 acres in mining area and 0.8 acres as part of the native landscape)
Riparian Wetland	Survivorship of installed plantings will be at least 70%. Natural recruitment of native riparian woody species may be counted toward replacement seedlings. Total absolute cover of native riparian woody species must be at least 50% Total absolute cover of invasive or noxious weeds must be less than 5%.* Density of native riparian woody species must be at least 150 plants per acre. Species richness must average at least 6 woody riparian species per acre. Total amount established must be at least 7.0 acres (2.5 acres in mining area and 4.5 acres in 700-foot setback area), in addition to the 1.0 acre already present within the 700-foot setback area.
Seasonal Pond	No criterion.

* Noxious or invasive weeds shall be considered those species listed as "high" by the Cal-IPC.

If the first 3 years of monitoring demonstrates low survival of seeded/planted native species, a second round of understory seeding and/or planting will be conducted across the site to supplement the initial seeding/planting to increase the likelihood of long-term success. If a reclaimed area or any reclaimed phase has been adversely affected by a natural disaster (i.e. flood, earthquake, fire, or other natural occurrence beyond the operator's control), contingency measures shall be implemented to the extent feasible. Teichert shall meet with regulatory personnel to evaluate and agree upon the feasibility of such corrective actions, taking into account the extent to what areas have been previously reclaimed

and destroyed prior to the natural occurrence, the effect of the natural occurrence on public health and safety, the site characteristics and proposed end use, etc.

SECTION 9.0

Monitoring Reports and Completion of Reclamation

Monitoring reports will summarize the reclamation responsibilities, construction and revegetation completed, monitoring implemented, and results compared to established success criteria. Photo documentation and field data will also be provided in appendices to the monitoring reports. If it is apparent that some reclamation features may not achieve intended success criteria, potential remediation opportunities will be evaluated or suggested and provided in the report.

9.1 As-Builts

An aerial photo of the site and constructed reclamation features will be taken within the first year following completion, or the boundaries of each feature will be mapped using a GPS unit with sub-meter accuracy, to report "as-built" conditions. In addition, constructed slopes will be surveyed to verify grade. All information will be provided in the first monitoring report and updated once again in the final monitoring report.

9.2 Annual Reports

Monitoring reports will be prepared and submitted annually to the Yolo County Natural Resources Division and Department of Conservation, Office of Mine Reclamation. At the end of the 5-year monitoring period, monitoring will cease, provided all the reclamation features are determined by the agencies to be in substantial compliance with the established success criteria. Reclamation monitoring and annual reporting will be extended beyond the 5-year period only if success criteria have not been met.

9.3 Due Dates

Monitoring reports shall be due on August 31st of each year. This allows time for remedial actions, if necessary, or enhancement opportunities to be discussed and implemented prior to the end of the construction season.

9.4 Agency Confirmation and Completion of Reclamation Responsibilities

Upon review of the final monitoring report, the County or State may require a site visit to confirm the completion of the reclamation requirements. Once it is deemed that all success criteria have been met

for the site, the performance bond will be released and the site will be allowed to continue to develop under natural processes.

SECTION 10.0

Revegetation Test Plot

Article 9 Reclamation Standards section 3705(b), requires revegetation test plots to be implemented concurrent with mining to determine the most appropriate revegetation procedures to be followed to ensure successful establishment of the proposed reclamation plan. The primary objective of a test plot is to document the success or failure in attaining designated objectives and performance standards. For Teichert's Schwarzgruber site, these objectives relate to success in slope, grassland, oak riparian woodland, riparian wetland, and seasonal pond habitat.

Teichert's mining and reclamation plan for the Schwarzgruber Property was developed on information from existing site conditions, availability of soils for reclamation, and extensive experience with the creation and monitoring of other reclamation sites throughout central and northern California. Specific reclamation features described in this plan have already been successfully created at several sites in the Woodland area. Teichert's Muller Reclamation Site, located just northwest and across Cache Creek, demonstrates similar reclamation features as those described for the Schwarzgruber Property and, therefore, is referenced as a revegetation test plot for the Schwarzgruber Project. In addition, the use of silt fines processed from the Woodland Plant will also be evaluated by incorporating test plots within the 700-foot setback of the Schwarzgruber site.

10.1 Teichert's Muller Reclamation Site

Teichert's Muller Reclamation Site is an approximately 135-acre site located just northwest of Cache Creek and the Schwarzgruber Property (Figure 9). It is one of several properties comprising Teichert's Woodland aggregate mine operation. The Muller Property was mined for sand and gravel from the late-1990's to 2008. Reclamation of the Muller Property includes reestablishment of both agricultural and natural habitat lands in areas disturbed by mining (Figure 10). An approximately 32-acre portion of the site (also known as Muller 30-Acre) was reclaimed to agriculture in 2006. Seven acres of slopes also surround the northern, western, and southern portion of the reclaimed agricultural field. The remaining 86 acre portion of the site (also known as Muller 90-Acre) was completed from 2008 and 2009 and includes similar reclamation features as those proposed for the Schwarzgruber Project. These include slopes, grasslands, oak riparian woodland, riparian wetland, and seasonal pond/lake habitats.

The first monitoring report for the Muller 90-Acre Reclamation Project was prepared in October 2010. The most recent report was submitted in 2012, representing third year monitoring results. On-going monitoring for this site and the results will be used to make inferences and adjustments as reclamation commences for the Schwarzgruber Project.

10.2 Silt Fines from Settling Ponds

The Schwarzgruber reclamation plan incorporates the use of silt fines to facilitate revegetation of certain habitat communities where soils may be lacking for revegetation. These silt fines originally occur as suspended sediment where it is processed at the Woodland Plant as refuse material. The refuse material is then pumped into settling ponds to allow for the sedimentation of solid particles from the water. The contents of the settled material (soil) consist of fine clays and sandy silt. The relative proportions between clays and silts vary, depending on the source site (mine location) and discharge location within the settling pond.

In reclamation applications, this material when 'dried' consists of finer textured soils that have a tendency to form surface crusts, may contain higher levels of soluble salts, and have poorer "tilth" or consistence. Nevertheless, it has been beneficial and highly successful in the revegetation of riparian wetland habitats. Species such as willows, cottonwoods, and cattails are very prolific in this material where hydrological conditions are favorable. Oaks and other associated species (i.e. coyote brush, elderberries, wild rose) have been observed on older mine slickens, which is of similar characteristic in soil texture. However, there is very little scientific information available on the use of this material in establishing large-scale oak woodland and grassland habitats.

In order to further evaluate the use of silt fines in establishing grassland and oak woodland species, a test plot shall be implemented within the 700-foot setback area of the Schwarzgruber Project prior to reclamation. The test plot shall include the application of silt fines at various depths, in addition to soil amendments (i.e. compost). All revegetation, maintenance, and monitoring of the test plot shall be conducted as described in Sections 6, 7 and 8 of this document.

Figure 10
Site Vicinity Map of Muller Pit

Figure 11
Muller Reclamation

SECTION 11.0

Reclamation Responsibility Designee

STATEMENT OF RESPONSIBILITIES

Submittal of the 2021 Final Schwarzgruber Reclamation Plan represents a commitment by Teichert Aggregates, a division of A. Teichert & Son, Inc., to reclaim the Schwarzgruber Property per the approved entitlement granted by Yolo County. Teichert accepts responsibility for reclaiming the mined lands in accordance with the attached reclamation plan. Assuring this obligation will be a surety bond to be held by the lead agency and the Department of Conservation, Office of Mine Reclamation.

Signed this _____ day of, _____2021

By _____
Dana Davis, President of Teichert Materials

By _____
Brandon Stauffer, Regional Operations Manager (Northwest) of Teichert Materials

SECTION 11.0

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