Appendix B

Boca Quarry 2011 Reclamation Plan

Teichert Aggregates
Boca Quarry
Reclamation Plan 2011

Lead Agency

Nevada County Community Development Agency
950 Maidu Avenue
Nevada City, CA 95959

Operator

Teichert Aggregates, Inc.
3500 American River Drive
Sacramento, CA 95864

Document Edited and Revised by

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Truckee, CA 96161

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Project Summary

Operation Name:	Boca Quarry
California Mine Identification Number:	91-29-0018
Mine Operator:	Teichert Aggregates
Street Address or P.O. Box:	3500 American River Drive
City, State, Zip Code:	Sacramento, California 95864
Telephone Number:	(916) 484-3317
Contact Person:	Jeff Thatcher
Owner of Property:	Pamela Dobbas
Owner of Mineral Rights:	Pamela Dobbas
Street Address or P.O. Box:	8260 Hubbard Road
City, State, Zip Code:	Auburn, CA 95602
Telephone Number:	(530) 823-5424
Location:	Approximately one mile northeast of the City of Hirschdale and 7 air (8 road) miles east of the Town of Truckee (Figure 1).
Assessor's Parcel Numbers:	48-090-12 and 48-200-03 (see Appendix A, Site Legal Description)
Section, Township and Range:	Section 26 and 27, Township 18 North, Range 17 East, Mount Diablo Base and Meridian (see Appendix A, Site Legal Description)
Latitude and Longitude (at center of project):	Latitude: N 39.37738° Longitude: W 120.06641°
Directions to the site:	From Interstate 80 East take the Hirschdale Road exit, turn left on Stampede Meadows Road (County Road 894Aa1), then turn right and follow West Hinton Road east and south to the Project Site.

Total parcel size(s):	230± acres
Total area to be mined:	Approximately 158 acres of total disturbance
Total area to be reclaimed:	Approximately 114 acres
Quantity and type of materials to be mined:	Up to 17 million tons (13 million cu. yd.) of construction aggregates.
Proposed start-up date and termination date:	Anticipated Start-up: Existing operation ongoing Expansion operation: May 2010 Anticipated Termination: May 2070
Potential land use after reclamation:	The site will be reclaimed to an open space condition as allowed under the existing County Zoning Code designation of Forest (FR).

SECTION 1 | Purpose and Objectives

1.1 SITE LOCATION AND SIZE

In this Reclamation Plan and associated documents, the term "Project Site" means the entire (approximately) 230-acre area of the two parcels in the eastern portion of Nevada County on Assessor Parcel Numbers (APN) 48-090-12 and 48-200-03, Mount Diablo Base and Meridian. The actual mining project will be carried out within a portion of these parcels, approximately 158 acres in area, that is referred to as the "Ultimate Disturbed Area". The term "Project region" is not a precisely circumscribed area, but is used in discussions of climate, biological resources, and so on, to refer to the general region of eastern Nevada County east of the Town of Truckee.

The site lies in Sections 26 and 27 of Township 18 North, Range 17 East, shown on the Boca California 7.5 U.S. Geological Service topographic map. The site is located approximately one mile northeast of the community of Hirschdale and about eight road miles east of the town of Truckee (see Figure 1, Regional Location, and Figure 2, Site Location). Under a separate project, a new paved County road will be built, extending south from West Hinton Road through APN 48-200-03 (see Figure 2 for proposed alignment). Paved County roads also currently provide access to the Project Site via Hirschdale Road; however, this latter access will not be used for mine operations or for commercial trucking access, though some light vehicles or emergency vehicles (fire department, rescue, or medical emergency vehicles) may access the site from Hirschdale Road. After the new County road is completed, the Hirschdale Road access will be closed to all vehicles.

1.2 PURPOSE OF PLAN

This Reclamation Plan for the Boca Quarry has been prepared in accordance with the requirements of the California Surface Mining and Reclamation Act (SMARA) found in California Public Resources Code (PRC) Section 2710 et seq., Title 14 of the California Code of Regulations (CCR) Section 3700 et seq. and Nevada County's (the Lead Agency) implementing ordinance as specified in the Nevada County Land Use Code (Chapter 11).

This document serves several purposes:

- It provides required contents for a reclamation plan as specified in PRC §2772 and CCR §3502;
- It provides a list of intended actions necessary to comply with Annual Minimum

Practices (CCR §3503) and Reclamation Standards (CCR §3800 et. seq.), where required, as part of operations or final reclamation;

- It will serve as a reference manual for the mine operator to guide site development consistent with the approved mining and reclamation plan, and assist in regulatory compliance for operational activities;
- It describes operational actions and monitoring specifications that will assist the Lead Agency in monitoring ongoing compliance with the approved plan; and
- It provides for a set of actions to be taken in the event the operation were to become idle, which are consistent with specified reclamation actions during operations and consistent with the final reclamation plan.

SMARA's reclamation plan requirements are found primarily in PRC §2772 and in CCR §3502. Minimum operating standards (CCR §3503) and reclamation performance standards (CCR §3700 et. seq.), as applicable to the operation and its approved plan, must be met during operations and reclamation. This plan employs a comprehensive approach to the statute and regulations to avoid ambiguity in determining regulatory compliance during operations and following reclamation.

1.3 RECLAMATION OBJECTIVES

The reclamation actions in this plan are specifically developed and formatted to address the fundamental objectives of SMARA and its implementing regulations. This Reclamation Plan provides corresponding actions designed to meet the following primary physical reclamation treatment objectives for the disturbed lands at this site:

- Minimize offsite effects of erosion and sedimentation through surface drainage designed to retain and/or infiltrate surface waters on-site.
- Maximize aggregate materials production through long term development of a single site, which increases the efficiency of production of construction aggregates, while minimizing the surface disturbance of new lands for mineral production.
- Develop mineral resources as private lands, minimizing potential public exposure to mining operations and post-reclamation quarries, while developing slopes and public right of way setbacks that provide for safety and long term stability.
- Implement a revegetation program consistent with surrounding vegetation and designed to establish self-sustaining vegetation.

1.4 POST-MINING LAND USE AND RECLAMATION OVERVIEW

SMARA requires a description of the "proposed use or potential uses" (or "end use") of a mined site after reclamation.

The site will be reclaimed to an open space condition as allowed under the existing County Zoning Code designation of forest which provides for production, protection, and management of timber (and support uses), equipment storage, temporary offices, low intensity recreational uses, and open space. The revegetation concept is not directed toward any specific wildlife or plant species habitat goal; rather, it is intended to reinitiate ecological succession into a generally similar vegetation composition to that which occurs presently. Therefore, it will serve to re-create a range of wildlife habitat conditions and resources that is similar to the present range of conditions; consequently, the reclaimed Project site can be expected to support the current wildlife uses.

Following mining, the Operator will reclaim the site, which will encompass the following types of activities:

- Hardrock cut slopes will be reduced to an angle that is consistent with engineering practice for long-term stability.
- Surfaces will be graded to ensure proper drainage.
- Equipment and facilities related to mining will be removed during reclamation so that subsequent land uses are not encumbered.

Mined areas (except unweathered rock slopes that are too steep for placement of reclamation growth media) will be resoiled and revegetated. Revegetation will include backfill with non-commercial or other rock materials and/or, overburden application of topsoil, and seeding with native species. Clean (uncontaminated) fill materials may be imported to supplement the available growth media.

SECTION 2 | Site Description and Environmental Setting

2.1 PHYSICAL ENVIRONMENT

Geology

The Project Site is characterized by a sequence of volcanic and sedimentary rocks of Pleistocene age that are locally overlain by a veneer of recent sediments. This overburden can be as much as 35 feet deep.

The volcanics, up to 170 feet thick, consist of basalt flows, some vesicular in nature, with fragmental flow top breccias. Volcanic cinder and ash deposits, as well as minor occurrences of welded rhyolitic tuff, are also present in the sequence. Fractures within the dense portions of the basalt flows are locally filled by clay accumulations that probably infiltrated down from the surface.

In the north part of the West Pit specifically, the rock is composed of a series of generally horizontal basalt flows separated by layers of ash and tuff or intervals of basalt boudlers, cobbles, and rubble. In the south part of the West Pit, soil, basalt, and rhyolitic tuff are exposed at the surface and are underlain by a layer consisting of basalt boulders in a clay matrix and locally interbedded with cinders. The basalt boulder layer is underlain by another layer of lithic tuff. The lithic tuff in the south part of the pit is generally poorly consolidated and moderately to strongly clay altered. Additional geological detail is included in the stability evaluation (Golder, 2010; Appendix C).

The bottom of the volcanic sequence overlies sedimentary claystone and sandstone sediments. The sedimentary sequence was not penetrated by the exploratory drilling but was more than 45 feet thick in one hole.

Soils

The Project Site is located on the eastern flank of the Sierra Nevada Mountains in the northern High Sierra Nevada district of the California Floristic Province. It is within Climate Zone 2 and is characterized by cold winters and a frost-free season of only 20-30 days, so all of the soils types are characterized as "frigid". The elevation of the Project Site ranges from 5,700 to 6,200 feet above mean sea level (amsl), and the terrain is mostly steep and rugged (see Figure 3, Existing Conditions: Aerial Photograph/Topography).

Figure 4, Soils, depicts soil map units that are found within the Project Site. The following soils occur within the Ultimate Disturbed Area, listed in order of decreasing area:

- Kyburz-Rock Outcrop-Trojan complex, 2 to 30 and 30 to 50 percent slopes
- Cinder land-Sierraville-Kyburz complex, 30 to 50 percent slopies

- Rubble-Lang-Jorge complex, 30 to 75 percent slopes
- Sierra-Trojan-Kyburz complex, 2 to 30 percent slopes

As is evident from the names of the map units, the area is pedologically complex, and the various soils types and exposed bedrock are distributed in a complicated mosaic of surface exposures, which was not mapped in detail in the soil survey.

Kyburz series is the soil type that occurs over most of the Ultimate Disturbed Area, specifically in the lowest bench of the West Pit. This soil is derived from volcanic rock and lake sediments, relatively highly weathered. They are classified as Ultic Haploxeralfs; Alfisols are well drained and are generally good soils to support plant growth, subject to climatic and some other limitations. The upper (A and B) horizons of these soils are sandy loams containing 15 to 20 percent gravel or cobble, and becoming increasingly acid below (down to a pH of 5.0). Fractured andesite is encountered at a relatively shallow depth (34 inches in the typical profile).

Sierraville series consist of fine montmorillonitic stony sandy loams derived from basic volcanic rocks, and are also classified as Ultic Haploxeralfs. They differ from Kyburz soils primarily in being deeper to bedrock, less acidic, and in lacking the component of lake-derived material. Rock content is similar.

Trojan series soils are also much deeper than Kyburz and differ from both of the preceding types in being mollisols (specifically, Ultic Argixerolls) and having much lower content of stones. Trojan soils are derived from both basaltic and andesitic volcanic rocks, specifically from breccias, which are usually a mixture of igneous rock types. As a mollisol, Trojan soils have a deeper A horizon than the other two main soils of the Project site, with organic material well distributed throughout by the action of burrowing rodents; therefore it is highly suitable for recovery and use in reclamation.

Jorge series soils occur in a complex with exposed rock (talus) covering the upper slopes of the mining area. Being formed from volcanic flow rocks, they are skeletal sandy loams (also Ultic Haploxeralfs) with chemistry that is slightly acid at the surface to strongly acid at depth. Rock content may be less than 20 percent near the surface but is typically about 50 percent throughout most of the profile.

Cinder, rubble, and rock outcrop land coverage represents exposed volcanic material of textures varying from porous to talus to monolithic outcrops.

An important characteristic of the soils of the Ultimate Disturbed Area is their moderate to high content of rock fragments of various sizes (gravel to cobble). This content of small rocks has useful

functions in soil ecology and in surface erosion control, and, if not screened out as a commercial product, may remain with the salvaged soil when it is used for reclamation, up to about 25 percent of soil volume. Examination of the soil surface in many types of habitats both within the Project site and generally in the region shows that a thin natural rock mulch layer is often present on top of the soil itself. This layer functions similarly to an applied organic mulch: it is important in erosion control, reduces water loss, moderates soil temperature, creates crevices in which seeds become wedged and germinate, and provides protective cover for organisms such as ants which are important in soil permeability and nutrient cycling. Retaining a moderate proportion of small stones within the reclamation growth medium provides a means of reestablishing this natural rock mulch as revegetation proceeds.

Another notable characteristic of the mapped soils types is their acidity at depth. This is a common characteristic of soils of the Project region and does not preclude the root systems of the locally native plants from growing into these moderately to strongly acidic soil strata.

Hydrology

There are no surface water features within the proposed area of disturbance; the low points of topographic valleys do not exhibit the surface indicators of seasonal or ephemeral tributaries (Lichvar and McColley, 2008). A spring and associated spring catchment, currently utilized by the property owner for commercial water bottling business, is located on the southern portion of the private properties within which the mining site is located. The spring and pond are not within the Ultimate Disturbed Area and will not be affected by expansion operations.

Groundwater has not been encountered in existing East Pit mining operations and is located below the proposed maximum depth of the expanded mining area.

Climate

The Project site lies to the east of Truckee, within the rain shadow of the Sierra Nevada crest but also still within the zone of orographic (elevationally-driven) precipitation. Average annual precipitation is approximately 22 inches of water, with 75 percent of that total arriving in the months November through March (WRCC, 2009); thus, essentially outside the growing season. In other words, the average amount of summertime precipitation is similar to, or even lower than, the amount of summertime precipitation in the intermountain deserts to the east, but with a colder overall climate. In brief, the cold but arid climate of the Project site precludes establishment and long-term sustainability of a high absolute cover plant community comprised primarily of grasses. This contrasts markedly with the circumstances of lower elevation sites, where temperatures are sufficiently warm for the growth of cool season grasses during the time that water is available. As noted below, the existing vegetation of the site does not feature any plant communities with a high proportion or absolute cover of grasses, and therefore such communities are not the long-term reclamation target.

2.2 VEGETATION AND WILDLIFE

Biological field studies have been carried out in 2006, 2007, and 2009 by EcoSynthesis: a general biological inventory and floristic plant survey covering the Project Site; additional general inventory and plant survey of the current (Forest Service) access road corridor; and a study of deer sign in area including the Ultimate Disturbed Area and much of the surrounding lands Background research included previous environmental studies conducted on the Project site and a California Natural Diversity Database (CNDDB) data search for special status plant and animal species with documented occurrences within the vicinity. These studies have been combined into one updated biological inventory report (Juncosa, 2009).

Vegetation

The main plant communities within the Project Site include Jeffrey pine/antelope bitterbrush, bitterbrush scrub, and curl-leaf mountain mahogany woodland (California Department of Fish & Game [DFG], 2003). Many large areas of rock outcrops and talus fields, virtually devoid of vegetation, are also present. Very small areas of wetland and riparian vegetation occur within the Project Site, but well outside the Ultimate Disturbed Area. Vegetation information provided here is a brief summary; refer to Juncosa (2009) for additional detail.

JEFFREY PINE/BITTERBRUSH

The predominant community on the Project Site in terms of area is Jeffrey pine/antelope bitterbrush, with a structure varying from moderate crown closure pine woodland to very open forest with a lower stratum of shrubs. Within this cover type, the average density of trees that are large enough to be seen in the aerial photograph and counted is approximately 20 trees per acre; a relatively low density in the context of regional pine/bitterbrush habitats.

The dominant tree is Jeffrey pine (*Pinus jeffreyi*), but white fir (*Abies concolor*) also occurs, as well as some possible ponderosa pines (*Pinus ponderosa*; difficult to discriminate reliably from Jeffrey pine without perfect identifying material). Antelope bitterbrush (*Purshia tridentata* var. *tridentata* and var. *glandulosa*) is the predominant understory shrub, mixed with varying amounts of wax currant (*Ribes cereum*), mountain sagebrush (*Artemisia tridentata* ssp. *vaseyi*), rabbitbrush (*Chrysothamnus nauseosus*), Utah service-berry (*Amelanchier utahensis*), green-leaf manzanita (*Arctostaphylos patula*) and squaw carpet (*Ceanothus prostratus*) and other species. Grasses (mostly native, specifically squirreltail, *Elymus elymoides*) and forbs provide a very small proportion of the understory cover and biomass.

The forested habitat in the westernmost portion of the Project Site supports several live, large diameter (> 30 inches diameter at breast height [dbh]) white fir and Jeffrey pine trees. Conifer trees exceeding 30 inches dbh are common throughout the northern Sierra Nevada, and there are no landmark designations for conifers in Nevada County.

SHRUB COMMUNITIES

Areas in the Project Site with soils that are too scanty to support coniferous trees are vegetated mostly by bitterbrush scrub. Although these scrub areas are generally dominated by antelope bitterbrush, the same associated shrubby species noted above for the pine-bitterbrush habitat also occur in the scrub. Locally (in irregularly shaped and generally very small patches), the shrub communities are dominated by other species such as tobacco brush (*Ceanothus velutinus* var. *velutinus*), curl-leaf mountain-mahogany (*Cercocarpus ledifolius* var. *intermontanus*), and/or Sierra (bitter) cherry (*Prunus emarginatus*). Tobacco brush colonizes post-fire landscapes in the Project region and is particularly abundant west of the mining area itself, where a fire occurred in pine-bitterbrush habitat decades ago. Sierra cherry and especially mountain-mahogany occur primarily in very rocky portions of the site, including some areas with virtually no exposed soil on the ground surface; this is significant from the standpoint of reclamation practice. Also, bitterbrush, cherry, and mountain-mahogany are all in the rose family and are therefore highly favored browse plants for mule deer. Thus, plants which grow well on seemingly relatively poor substrates are also valuable for one aspect of the post-mining open space land use.

Common herbaceous species in open or disturbed areas include cheatgrass (*Bromus tectorum*), gayophytum (*Gayophytum diffusum* var. *parviflorum*), blazing star (*Mentzelia laevicaulis*), and woolly mullein (*Verbascum thapsus*). No endangered or special status plant species were observed. A complete list of the plant species identified within the Ultimate Disturbed Area and access road corridor is included in Appendix B.

SPECIAL-STATUS SPECIES

Potentially suitable habitat for four special-status plant species occurs within the Project Site): Donner Pass buckwheat (*Eriogonum umbellatum* var. *torreyanum*), Carson Range rock cress (*Arabis rigidissima* var. *demota*), Mingan moonwort (*Botrychium minganense*), and Plumas ivesia (*Ivesia sericoleuca*). None of these species were observed within the Ultimate Disturbed Area during the field review, which included plant surveys carried out throughout that area and the access road alignment during the peak of blooming season for these species, over the course of two study years.

QUANTITATIVE VEGETATION SURVEY

In order to provide background information for the revegetation design, and establish a baseline to inform the development of minimum monitoring performance objectives for the proposed reclamation, a vegetation survey was conducted by Barry Baba of Teichert Aggregates in July 2006. The survey included inventorying all plant species and evaluating plant densities, cover and diversity of target species, specifically native tree and shrub species, using a series of randomly placed transects throughout the proposed mining boundaries.

Using AutoCAD software, a 100-meter grid was first created to establish the location of each transect. Starting points for potential transect locations were created at the grid vertices. Only points occurring on undisturbed areas were included in the grid; all actively mined or disturbed areas were removed as potential locations. Using a macro within ArcGIS software, a subset of 15 sample points was randomly identified. In addition, a random degree of direction between 0 and 360 degrees for each point was produced. Subsequently, this subset was loaded back into AutoCAD software, labeled and prepared for export into a Trimble GPS unit.

Each point was identified in the field using the GPS unit, and each transect was located by laying a 100-meter tape in the direction randomly assigned for that particular point. Each transect was then treated as a sampling unit for measuring density, cover and species richness. To measure plant densities, individuals of all target species occurring within 2 meters of the right side of each transect (sampling unit) were counted. To measure plant cover of target species, all native shrub/tree species intercepted by a vertical point at every 1-meter interval along each tape (transect) was recorded. Species richness was determined by the total number of different species occurring within the 2-meter belt transects used for measuring density. All 15 sample areas (3,000 m^2) were then combined to form a composite sample of density, cover and species richness for the area.

Common Name	**Botanical Name**	**Density** (plants/200 m^2)	**Absolute Cover** (%)
Jeffrey pine	*Pinus jeffreyi*	0.5 ± 0.3	3.5 ± 2.0
Ponderosa pine	*Pinus ponderosa*	2.3 ± 1.0	8.6 ± 4.9
White fir	*Abies concolor*	0.1 ± 0.1	0.6 ± 0.6
Bitterbrush	*Purshia tridentata*	58.1 ± 24.9	17.5 ± 6.1
Mountain sagebrush	*Artemisia tridentata*	0.7 ± 0.7	0.3 ± 0.3
Rubber rabbitbrush	*Chrysothamnus nauseous*	9.2 ± 3.3	2.9 ± 1.4
Wax current	*Ribes cereum*	5.7 ± 2.3	0.8 ± 0.6
Sierra gooseberry	*Ribes roezlii*	0.3 ± 0.2	0.1 ± 0.1
Tobacco brush	*Ceanothus velutinus*	1.8 ± 0.9	2.0 ± 1.0
Mountain mahogany	*Cercocarpus ledifolius*	0.9 ± 0.8	2.9 ± 2.4
Bitter cherry	*Prunus emarginata*	3.8 ± 3.7	3.5 ± 2.8
Utah service-berry	*Amelanchier utahensis*	0.9 ± 0.5	0.4 ± 0.3
Green-leaf manzanita	*Arctostaphylos patula*	1.7 ± 1.1	1.4 ± 1.0
Snowberry	*Symphoricarpos mollis*	0.1 ± 0.1	0.1 ± 0.1
Squaw carpet	*Ceanothus prostratus*	4.2 ± 2.7	1.5 ± 0.8
Totals		**89.9 ± 24.8**	**40.1 ± 6.3**

Table 2-1. Plant density and cover for common woody species at Boca Quarry. All data are presented with 80 percent confidence intervals.

Mean density of plant individuals and absolute cover figures for the vegetation found within the 15 quantitative study transects are given in Table 2-1. Mean species richness of target plants was 5.1 ± 0.7 species per 200 m^2.

The results are a composite quantitative representation of the patchwork of species association and community subtypes of the site, which vary additionally in their ecological successional status. Thus, no individual transect or small plot would be likely to have the average proportions of species that make up the composite vegetation cover over the entire 3,000 m^2 quantitative study area. However, the composite results are useful in establishing reasonable performance standards.

Wildlife

All of the wildlife species observed in the Project area and/or detected by sign (tracks, scat, distinctive burrows) are commonly found in the Project region. Wildlife species detected included several rodents, mule deer, coyote, black bear, and mountain lion. The Project Site and vicinity are transition range for the Loyalton-Truckee mule deer (*Odocoileus hemionus*) herd. The deer use the area when moving between higher elevation summer range and lower elevation winter range. No critical summer range is mapped within 13 miles of the Project site, and the nearest critical fawning habitat is three miles to the south. The Project site is also outside the major migration corridors mapped in the region by DFG in the early 1980s. Thus, the Project will not significantly affect any of the major deer habitat resources that are subject to Nevada County policy.

GAME SPECIES

Field study in June 2009 of evidence of actual migratory and summer use revealed that, as might be expected, deer sign (both old and fresh) is found primarily along travel routes between passages under Interstate 80 and the open, gently sloping scrub vegetation to the west and north of the Project site; these routes correspond to the minor migration corridors as identified by Kahle and Fowler (1982). Fresh deer sign was detected at only a few points within the area to be affected by mining activities, with more abundant sign found in the more suitable (less rocky) habitats north and west of the Project Site. Accordingly, impact upon the regional deer herd was determined to be less than significant under applicable guidelines.

SPECIAL-STATUS SPECIES

Six special status wildlife species are recorded from the Project region: northern goshawk (*Accipiter gentilis*), mountain beaver (*Aplodontia rufa californica*), willow flycatcher (*Empidonax traillii*), bald eagle (*Haliaeetus leucocephalus*), Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*), and mountain yellow-legged frog (*Rana muscosa*). However, suitable habitat for these species does not exist within the Ultimate Disturbed Area.

2.3 LAND USE

Surface Mining Permit

The Boca Quarry is an active quarry (CA Mine Id. #91-29-0018) that operates under Nevada County Conditional Use Permit (CUP) and Reclamation Plan U83-036, approved in 1983 and modified in 2007. The CUP modification and Reclamation Plan Amendment currently being sought would accommodate additional mining and subsequent reclamation.

Existing and Allowed Uses

The Applicant currently mines, processes, and transports crushed rock from the Boca Quarry to off-site markets. The site exists as an excavated slope and quarry floor, surrounded by relatively steep topography. Project site elevations range from approximately 5,700 feet above mean sea level (amsl) at the southern edge of the site to approximately 6,200 amsl at the northern site boundary. In addition to the current mining operation, other permitted activities in the vicinity include a spring water collection facility, a cellular antenna site, and timber production.

The Project site has a General Plan designation of Forest (FR) and is zoned Forest (FR) with a Mineral Extraction (ME) combining district (FR-160-ME). The conditions of the Nevada County Zoning Code Section L-11 3.22, Surface Mining Permits and Reclamation Plans, allow surface mining operations within an FR zone when an ME combining district overlay is in place, along with an approved CUP and an approved Reclamation Plan.

Visual Setting

The project is not visible from I-80 or any other state highway. Both the current operation and the proposed expansion are visible from a distance of about one mile away, along a short segment of a County road and from several private residences.

Agricultural Lands

None of the parcels on which mining and reclamation will occur are designated by the State Department of Conservation's Farmland Mapping Program as either Farmland of Statewide Importance, Unique Farmland of Local Importance, or Prime Farmland.

SECTION 3 | Proposed Mining Operation

This section describes the components and activities of the existing mining operation and modifications proposed under this application. Table 4-1 (Boca Quarry Mine and Reclamation Plan Data) summarizes key components of this operation. Exhibits 1, 2, and 3 which are included in the application package and CD provide large-format detail of the existing Project Site topography and aerial photograph (Exhibit 1), mine plan (Exhibit 2), and reclamation (Exhibit 3).

As shown on Figure 5, Mine Plan, the planned 230-acre Project Site includes the mining areas (East and West Pits); processing area; and other related components such as the scale, office, and internal access roads, and features outside the UDA such as the existing developed and permitted spring which provides the project's water source. The East Pit is the currently permitted (and nearly complete) mining operation and is the site of processing and administrative operations; the West Pit is the proposed expansion area. Mining and processing activities will affect up to 158 acres (Ultimate Disturbed Area, as shown on Figure 5). The nature of some on-site disturbances will depend, to some extent, on geologic factors encountered during excavation.

3.1 PHASING, MINING, ENGINEERING, AND DRAINAGE

The Project is an existing operation that is estimated to have reserves for up to an additional 30 years, depending on market conditions and the resulting production rates. The Project expansion is primarily a sidehill quarry operation, involving excavation of the West Pit quarry floor to a depth of between 40 and 60 feet below the rim formed by the surrounding land surface. The maximum depth of mining below existing topography will be 200 feet or less.

Mining for the overall Project will occur in three phases, beginning with the Phase I East Pit (largely complete). The second and third phases will involve mining of the West Pit. During Phase II, the lower (southern) portion of the West Pit will be mined to its maximum width and depth. The upper ridge of the West Pit will then be mined (Phase III), and the overburden from the ridge will be moved down to the lower area to be used as backfill in the lower pit, facilitating partially concurrent reclamation of the lowest (Phase II) bench.

Mining activities in the expanded permit area will be initiated with salvage of the uppermost layer of soil using dozers and/or scrapers; the available soil will be stockpiled for use in future reclamation activities (see general location of soil stockpiles on Figure 5).

Design/Operating Characteristics	Description/Parameters/Assumptions[1]
Operational Activities	
Mining	Excavation using dozers, scrapers, and excavators with occasional use of a drill rig and blasting.
Processing	Aggregate processing plant; screens and conveyors
Reclamation	Place soil on 3:1 and gentler slopes. Revegetate with species common to the area.
Mine And Reclamation Data	
Acreages	
Total Parcel(s)	230 acres
Acreage to be Disturbed (see Ultimate Disturbed Area, Fig. 5)	158 acres (West Pit = 100± acres; Permitted East Pit area = 40± acres; miscellaneous associated disturbance = 18± acres)
Acreage to be Reclaimed	114 acres
Volume[2]	
Annual Mine Production	1 million tons max.; approximately 570,000 tons, average
Total (Maximum) Mine Production	up to 17 million tons (approximately 13 million cu yd)[3]
Operations Period	
Mining	30 years (maximum)
Reclamation	Concurrent as slopes are completed. Final reclamation: 5 years after completion of mining
Mine Excavation Area Dimensions-West Pit	
Approximate Maximum Length[4]	3,500 feet
Approximate Maximum Width[4]	1,700 feet
Vertical Extent of Mining	<200 feet
Operating Schedule and Work Force	
Typical Operating Schedule	May 1 through October 31 Monday – Friday: 6:00 a.m. – 6:00 p.m.; Saturday: 7:00 a.m. – 4:00 p.m.
Employment	6-15 employees
Reclamation	
Open Space	114 acres

Notes:

1. All values are approximate.
2. Quantity based on current maximum production, and foreseeable demand. Actual demand will fluctuate based on economic conditions and regional growth requiring construction aggregate. See text for additional details.
3. Total construction aggregates for the planned 30-year life of the permit. Mining and reclamation may be completed within a shorter timeframe depending on market demand for the product. See text for additional details.
4. Measured at the longest and widest points.
5. Mining, processing, sales, and truck transport will generally take place between 6 a.m. and 6 p.m., Monday through Friday and between 7 a.m. and 4 p.m. on Saturday. Occasionally, operating hours may be 5 a.m. to 9 p.m. as a result of customer demand and/or operational considerations. The Project may also periodically operate 24 hours per day, 7 days per week for limited durations to service nighttime road improvement projects. The only operation allowed after 9:00 p.m. and before 6:00 a.m. is material loadout. Operating season will typically be May 1 - October 31; opening and closing dates may occasionally be earlier or later, but not exceeding 180 operating days per year. See text for additional details.

Table 3-1. Boca Quarry Expansion Project Plan Data

Overburden above the construction-grade aggregate material will be removed, followed by removal of hardrock aggregates (product) from the geologic formation through a multi-step process including drilling, blasting, and excavation using heavy equipment.

Due to the nature of the hardrock product on the site, drilling and blasting will be required to loosen the aggregate from the host rock formation. This typically is accomplished by drilling holes in a grid pattern over a portion of the formation. The design of shot configurations (i.e., drill hole patterns, diameter, depth, quantity, and delay) depends on the site rock conditions and the specific purpose of each shot.

Blasting will be conducted by a licensed explosives contractor, who will bring all materials on site at the time of each blast (no storage of blasting materials on site). An emulsion of ammonium nitrate and fuel oil (ANFO) will be mixed in the drill holes. These components are only explosive once combined and mixed; thus, in-hole mixing minimizes on-site hazards. Blasts will be detonated with a delay system to limit the quantity of explosive detonated in each delay period and to provide control over the detonation. The Applicant anticipates blasting no more than twice a week. The Nevada County Sheriff's Department will be given 24-hour notice prior to each blast. Explosives will be used according to the technical specifications of the manufacturer. Records will be kept, as specified by the federal Bureau of Alcohol, Tobacco, and Firearms (ATF).

Blasting and subsequent removal of product will create a series of benches extending into the face of the mountain. West Pit development will involve sequential excavation, benching, and slope grading, followed by site reclamation. Cross sections depicting the configuration of slopes and the final quarry floor are shown in Figure 6, Mine Plan Cross Sections (see also 'Detail A' inset of typical hard rock quarry slope detail). The hard rock quarry walls are designed and will be constructed at a reclaimed grade so as to leave a stable final slope consistent with the site-specific Slope Stability Evaluation (included as Appendix C to the Reclamation Plan). The exact dimensions of highwalls and benches are subject to revision in accordance with regular geotechnical examination of the exposed materials. Highwall angles and heights will be evaluated, and if necessary revised, to ensure slope stability.

Following blasting, bulldozers or similar excavating equipment will be used to load aggregate material into internal project haul trucks for transport to the crusher (processing plant) located in the East Pit. Rock fragments that are too large for transportation to the processing plant will undergo primary crushing in the active Quarry area, then be transported via haul trucks to the processing area. Overburden and/or other non-commercial material will be stockpiled or loaded into haul trucks for backfilling and concurrent reclamation of surfaces that are at their final configuration. These waste materials, combined with imported clean fill (see discussion below), will be used to backfill the lower (Phase II) pit to an as-yet undetermined elevation.

Additional clean backfill from construction excavation outside the Project Site may be brought in to supplement backfill operations and to provide a suitable plant growth medium. Along with Teichert's Martis Plant, the Project will provide the only local opportunity for disposal of clean fill in the greater Truckee/Lake Tahoe region, thus serving an important community need.

The lower (Phase II) backfilled pit will be porous due to the nature of the backfill material to be placed in the pit. Thus, surface water that does not infiltrate in upper portions of the West Pit will be captured and will infiltrate at the lower pit level. No release of surface water from the Project Site will occur. During operations, all runoff from disturbed surfaces will be collected by temporary diversion ditches and conducted to a sediment/infiltration basin (see Figure 5 for proposed location). A Stormwater Management Plan for the Boca Quarry West Pit has been prepared by Golder Associates (see Appendix D of the Boca Quarry 2011 Reclamation Plan). The plan conservatively sizes the stormwater detention basin capacity to contain two 100-year precipitation events occurring within a 7-day time interval without surface water discharge. For discussion and other key assumptions, please refer to Appendix D of the Boca Quarry 2011 Reclamation Plan.

3.2 MINING EQUIPMENT

The types of mobile equipment and/or machines to be employed at the Quarry are the same as those currently in use. These include: a dozer, self-loading scraper, front-end wheel loader, portable water pump, motor grader, conveyers, haul trucks, and a hydraulic excavator. A water truck is used for maintenance of surfaces and dust control. The type of vehicles varies somewhat over time, depending on availability, as well as the introduction of new models to suit changing on-site conditions and meet current emission standards. Short-term reclamation tasks may require importation of specialized equipment from time to time.

Equipment and structures at the site include both stationary and mobile equipment, such as screens, conveyors, an office building, and scales. These facilities are currently present and will remain essentially unaltered as part of this Application.

3.3 PROCESSING OPERATIONS

Aggregate materials loosened from the West Pit will be taken to the processing plant for screening and crushing, and will then be stockpiled for shipping. Processing to create construction aggregate products involves only crushing and screening of sorted and graded materials. The processing area for the Quarry will continue to be in the mined out East Pit (as shown on Figure 5), thus delaying final reclamation of much of the East Pit until the end of the Project life.

Off-Site Traffic

Commercial aggregates will be loaded onto aggregate haul trucks within the Project operational area and will be sold by weight at the time of loading. The Applicant (Teichert Aggregates) does not own or operate the commercial haul trucks that carry aggregates from the mining site to construction sites where the aggregates are used. Based on recent sales information, Teichert staff estimate that the average load leaving at the present Martis and Boca plants, which can reasonably be assumed to be approximately the same as the loads that will be sold in the future, is 18 tons (Hernnberger, personal communication, 2010). That is, roughly half of the trucks arriving to be loaded are single 12-ton dump trucks, and half are trucks with other configuration (such as long-bed trucks or ones towing a trailer) with approximately double that capacity.

Based upon experience at the Martis Plant, the maximum amount of backfill to be delivered to the Boca Quarry in any one year is estimated to be 250,000 tons; less in years of lower construction activity. Amount of clean backfill delivery correlates generally with aggregate demand (both being generated by civil construction activity), so years of lower aggregate production are also years of lower backfill acceptance.

The maximum annual mining rate of the Project is 1 million tons, thus the project could result in a maximum of 55,556 truck trips removing aggregates in such a year, plus a maximum of 13,900 truck trips delivering clean backfill. Maximum daily production (in terms of sales) is limited by the rate at which trucks can be loaded, weighed, and charged. Estimated maximum number of trucks that can be processed per day is 560; or 15,120 trucks per month. In addition, the project would generate up to 15 round trips per day for employees and one for a maintenance truck: a total of 576 vehicle round trips (maximum) per day, 15,552 per month (maximum) for all uses. These are totals for the fully operating project.

3.4 PROJECT RESERVES, PRODUCTION, AND OPERATING LIFE

Total reserves within the mine and reclamation plan design are estimated at over 17 million tons (about 13 million cubic yards, depending on the density ratio of the material which may range from a conversion factor [cu yd to tons] of 1.3 to 1.8). The annual volume to be mined is estimated to average about 300,000 to 500,000 tons per year, but could reach 1 million tons per year in very active construction years. The high grade construction aggregates products produced at the Quarry will likely be in demand during cyclically active building peaks.

Maximum daily production is limited by the rate at which trucks can be loaded and leave the site. Estimated maximum production per day is therefore 10,080 tons; or 272,160 tons per month.

While the longevity of the Boca Quarry is currently estimated at 30 years, this will be a function of production levels and market demand. Thus, if annual production averages in excess of 570,000 tons per year, the life of the Project will decrease accordingly.

3.5 OPERATING SCHEDULE AND WORK FORCE

The plant generally operates, and will continue to operate, on a single-shift basis during the period from May 1 to October 31, six days per week (total of 158 operating days minus any holidays). Based upon market demand or emergency needs such as urgent response to flood events, the quarry might open earlier or continue operations later than the dates stated above, but would not exceed 180 operating days per year. As noted in Table 4-1, mining, processing, sales, and truck transport from the site would generally take place between 6 a.m. and 6 p.m., Monday through Friday and between 7 a.m. and 4 p.m. on Saturday. From time to time, customer demand and/or operational considerations dictate periods of extended hours which can involve two shifts and result in operating hours starting at 5 a.m. and ending as late as 9 p.m. Certain public agency projects (such as Caltrans road improvement projects) may operate during nighttime hours to prevent traffic congestion associated with lane closures and heavy vehicle operations, in addition to emergency road repairs made necessary by natural disasters (e.g., flooding) or other unforeseen events. These road improvement or repair projects accordingly require materials to be supplied at night. The only operation allowed after 9:00 p.m. and before 6:00 a.m. is material loadout. Loadout could occur 24 hours per day and up to seven days per week for limited periods in order to service these projects. The duration of these expanded hours of operation would depend on the duration of the projects being supplied.

Operations, including mining, processing, and administrative functions, employ between 6 and 15 people. Employees are skilled workers in the construction materials industry such as heavy equipment operators, maintenance personnel, and support staff.

3.6 UTILITIES AND WATER SUPPLY

Electric power into the Project Site is provided by Liberty Energy - CalPeco (as of January 1, 2011). No back-up generating system is required. The Applicant has recently permitted and installed an on-site septic system to meet sewage disposal needs. Bottled water is provided for employees to meet drinking water needs. An existing on-site developed and permitted spring provides water for dust control, with estimated consumption of 25 to 35 gallons per minute (gpm). Flow rate of the spring varies from an annual peak flow of about 220 gpm, gradually decreasing to a minimum of 80 gpm in October, and is therefore adequate to provide for dust control use. The spring is developed at present (no additional permit required for proposed use by the quarry),

and the California State Water Resources Control Board has expressed the opinion in writing that no appropriative water right is need for use of the spring water.

Water is used by the quarry only for dust control, and not for on-site aggregate processing operations.

3.7 MINE WASTE MANAGEMENT

This operation will not generate waste material requiring any special tailings or mine waste management procedures. As previously described, overburden and noncommercial rock materials will be used as backfill in mining pits.

3.8 CLOSURE OF SURFACE OPENINGS

The Boca Quarry is a surface mine without any underground shafts or adits. Any drill holes, water wells, and monitoring wells will be abandoned in accordance with applicable state and local ordinances.

3.9 RECLAMATION

Mine reclamation is required by the Surface Mining and Reclamation Act (SMARA). SMARA requires mines to be reclaimed to a usable condition that is readily adaptable for a productive alternative land use that creates no danger to public health or safety. A Reclamation Plan modification has been submitted as part of the application materials in compliance with SMARA regulations. The Reclamation Plan modification document provides specific details with regard to proposed reclamation procedures. The following paragraphs provide a brief overview of these procedures.

Proposed reclamation is shown on Figure 7 (Reclamation Plan) and Figure 8 (Reclamation Plan Cross Sections). The plan provides for the site to be returned to open space and related uses as allowed under the Nevada County General Plan and Zoning Ordinance.

The reclaimed quarry will consist of multiple benches of variable width, portions of which may be partially backfilled, separated by highwall cut slopes that have been reduced to varying (stable) angles according to the nature of the material. The removal, handling, and replacement of soil to be used in reclamation will be accomplished in accordance with SMARA guidelines. Inactive topsoil and growth media stockpiles will be protected from inadvertent destruction and erosion.

Resoiling will occur on both the wide Phase II pit floors (once backfilling is complete) and the narrower benches separating the Phase III highwalls of the West Pit. As previously noted in Section 4.1, additional clean backfill from construction excavation outside the Project Site may be brought in to supplement backfill operations and to provide a suitable plant growth medium to supplement the salvaged topsoil. Along with Teichert's Martis Plant, the Project will provide the only local opportunity for disposal of clean fill in the greater Truckee/Lake Tahoe region.

Following soil placement, native grasses and shrubs will be broadcast seeded. Revegetation of the final surfaces is intended to consist of vegetation types and species similar to the vegetation currently existing on the Project Site. Monitoring and reporting on revegetation success will be required for five years after seeding to ensure that performance standards are met and adequate vegetative cover is reestablished.

Following completion of mining and reclamation activities, mobile equipment associated with mining will be removed from the site, as well as stationary equipment including, but not limited to, the office building, scale, screens, and conveyors.

SMARA requires surface mining operators to obtain lead agency approved financial assurance for the reclamation of mined lands, so the public will not bear the cost of reclaiming abandoned operations. In the event of financial incapability by the Operator, the financial assurance funds would be used by the lead agency (or the Department of Conservation) to reclaim the mined site and to ensure that mine operations comply with the approved reclamation plan. A financial assurance is in place for the existing operation and would continue to be annually reviewed in accordance with SMARA requirements. A financial assurance estimate (FAE) for the expanded operations is included as Appendix E to the Reclamation Plan.

SECTION 4 | Reclamation Practices and Actions

4.1 SUBSEQUENT USE AND IMPACT ON FUTURE MINING

The site will be reclaimed to an open space condition as allowed under the existing County Zoning Code designation of Forest (FR) which provides for production, protection, and management of timber (and support uses), equipment storage, temporary offices, low intensity recreational uses, and open space. The revegetation concept is not directed toward any specific wildlife or plant species habitat goal; rather, it is intended to reinitiate ecological succession into a generally similar vegetation composition to that which occurs presently. Therefore, it will serve to re-create a range of wildlife habitat conditions and resources similar to the present range of conditions and, consequently, can be expected to support the current wildlife uses.

The Project is intended to remove most of the available aggregate from the mined area, leaving little for potential future extraction. Reclamation will not make it more difficult to mine any remaining aggregate than it is under existing conditions (with the natural soil profile overlying the competent rock). The final slopes that are stable as final reclamation surfaces could be rended less geotechnically stable if regraded to create new exploration or mining haul roads. To the extent that this might be the case, it would be addressed in any future applications (as slope stability is addressed in the present one). Therefore, the Project will have little if any effect on the potential for future mining at this location.

4.2 RECLAMATION STANDARDS AND GOALS

The primary post-mining reclamation goals for the Project are the stabilization of soils and re-establishment of vegetation that is in keeping with the end use as specified above. Specifically, reclamation is intended to establish native vegetation that is compatible with forest production and open space.

Specialized biological goals are not part of this reclamation plan for the following reasons:

- No wetlands or aquatic-dependent species exist within the Ultimate Disturbed Area.
- No special-status plant or wildlife species occurrences or critical habitat will be affected by the mining activities, therefore no reclamation actions are necessary for the protection or re-creation of special-status species habitat.

The vegetation that will be established by mine reclamation will include native species that are utilized by general wildlife and game species (mule deer), although creation or re-creation of wildlife habitat is not a primary reclamation goal.

4.3 RECLAMATION PHASING

Mine Phasing is discussed in Section 3.1. To reiterate, mining for the overall Project will occur in three phases, beginning with the Phase I East Pit (largely complete). The second and third phases will involve mining of the West Pit. During Phase II, the lower (southern) portion of the West Pit will be mined to its maximum width and depth. The upper ridge of the West Pit will then be mined (Phase III), and the overburden from the ridge will be moved down to the lower area to be used as backfill in the lower pit, facilitating partially concurrent reclamation of the lowest (Phase II) bench.

4.4 DEMOBILIZATION AND OVERVIEW OF RECLAMATION TOPOGRAPHY

Removal of Buildings, Structures and Equipment

No post-reclamation storage of supplies or other mining related equipment or materials is expected. Following completion of mining and reclamation activities, mobile mining equipment and stationary structures at the processing plant will be removed and disposed of according to applicable law and standards.

Roads

As noted in Section 3, the current access road to the Project Site will be relocated and converted into a paved County road, which will remain to provide access to private lands (including the Project site) located to the east of the Project. At the conclusion of reclamation, no mining roads will remain within the Project site, although the maintenance road for the cellular phone tower and a road or roads for the private use of the property owner may remain in the Project vicinity.

Geologic Unit	Overall Slope Stability Angle
Basalt flows	45 degrees (1:1)
Basalt boulders, cobbles, and rubble	25 degrees (approximately 2.1:1)
Weathered tuff and ash	26 degrees (approximately 2:1)
Fresh tuff and ash	40 degrees (approximately 1.2:1)

Table 4-1. Geologic Unit Reclaimed Slope Stability Angle for 40 Foot Bench Height and 1.3 Factor of Safety.

Highwall Topography

The active mine consists of the existing East Pit, which has a single wide bench and a highwall above, and the West Pit, which is presently planned to consist of three wide benches (the lowest of which will initially form a pit, but may be backfilled following recovery of product), separated by series of narrow benches and highwalls. However, mining plans may vary somewhat over the Project lifetime, depending upon the nature of the material encountered at depth.

Generally, the reclaimed quarry will have wide benches reclaimed by placement of a minimum of 0.5 foot of topsoil or other clean fill that is suitable to support native vegetation, separated by stable highwall cut slopes. The lowest bench (pit) will remain at something less than its maximum excavated depth, which will be reduced to an undetermined extent by placement of backfill and placement of clean construction fill and salvaged topsoil as plant growth medium. Active cut slopes (highwalls) will be reduced to angles that are consistent with the angle prescribed for the particular geologic unit, as outlined in the subsection Cut Slope Stability, below, and Appendix C (Boca Quarry Preliminary Stability Evaluation, Golder 2007).

In this process, the lower portions of the reduced highwalls will become covered with a variable depth of broken rock, some of which will be amenable to resoiling and revegetation. Approximately 114 acres of the Ultimate Disturbed Area will be revegetated with an anticipated post-mining native shrub density and cover similar to that listed in Table 2-1. The remaining pit slopes will be relatively steep and rocky with limited vegetation, similar to the extensive fields of talus and exposed bedrock that occur within and immediately outside of the Project Site and support essentially zero plant cover.

Non-commercial (waste) rock and ash, waste fines from processing, and stockpiled growth media will be used for backfill and as reclamation topsoil, to be placed over the pit floor and benches to provide a suitable substrate for revegetation with grasses, shrubs, and pines that are native to the project region. Additional details of these steps are provided in the following section. Figure 7, Reclamation Plan and Figure 8, Reclamation Cross Sections, provide schematic details on proposed contours and slopes.

Cut Slope Stability

Hardrock cut slopes have been planned and developed in accordance with anticipated slope stability requirements for the geologic conditions to be encountered in the quarry (see Table 4-1, Geologic Unit Reclaimed Slope Stability Angles). Existing cut slopes are stable at angles of 70 degrees currently, and the normal talus slopes within the Project Site are stable at 33 to 37 degrees. Final cut slopes will be reclaimed to the standards and procedures outlined in Golder (2010), a site-specific stability evaluation of the West Pit (included in this Plan as Appendix C). Because available information indicates that groundwater is not present within the proposed depth of

mining, the evaluation was carried out assuming that slopes would not be saturated. Table 4-1 presents the slope angles necessary to achieve a factor of safety of 1.3 (which Golder considered to be suitable for the undeveloped open space end use) on slopes of the design height of 40 feet.

Cut slopes will be monitored on a daily basis by Teichert personnel to ensure stable operating conditions are maintained and potentially hazardous geologic conditions are identified immediately. In the event that operations encounter geologic conditions that differ significantly from the conclusions in Golder (2010, Appendix C), or if slopes show indications of instability that could affect the final overall slope angles identified in Table 4-1, below, a qualified geotechnical engineer will be retained to perform an inspection and recommend the proper course of action.

Drainage, Diversion Structures, and Erosion Control

The Boca Quarry will be operated so as to retain all surface water within the Project Site, both throughout operations and after reclamation (see Appendix D). During operations, all runoff from disturbed surfaces will be collected by temporary diversion ditches and conducted to sediment/infiltration basins (see proposed location of these basins on Figures 5 and 7). The pattern of drainage management will be modified as the quarry's configuration changes, so as to minimize the concentration of surface runoff on erodible surfaces, and to detain it for sediment removal. Sediment basins will be cleaned periodically to maintain sufficient capacity, and the extracted fines will be used either as backfill or deposited in the soil stockpile. When no longer operational, temporary sediment basins will be backfilled and reclaimed.

The final reclamation topography of the largest pit benches will be designed with large back-sloped surfaces that will form permanent infiltration basins. No wetlands, surface waters, or other seasonal streams or ephemeral tributaries exist within the mining area, but concave (ravine-shaped) topography does exist, into which all present precipitation and runoff percolates without creating significant surface flow. This same principle will be applied to the post-reclamation topography, which will be coordinated with placement of coarse rock substrates that will allow precipitation falling on the site to infiltrate into the reclaimed pits and rocky, porous talus slopes.

4.5 SURFACE PREPARATION AND RESOILING

Backfilling or Other Subsurface Preparation

An unknown proportion of the material encountered during mining and processing operations will be non-commercial overburden material. During Phase II (the first phase of West Pit mining), this material will be stockpiled within the quarry until the lowest pit bench reaches its maximum design width and depth; accumulated overburden will then be used to partially backfill the pit. Fines from processing activities may also be either incorporated into material to be used as

reclamation topsoil or used as backfill. Any residual overburden materials not used for reclamation backfill will be regraded, resoiled, and revegetated.

Prior to application of reclamation soil/growth media, any areas that are not backfilled will be deep-ripped to a depth of two feet (unless the presence of resistant, unweathered rock precludes ripping). In particular, if any highly compacted areas such as the pit floor are to be reclaimed with less than three feet of backfill, they will be deep-ripped prior to soil application.

Topsoil Salvage and Stockpiling

As part of mining, soil material would be removed and separately stockpiled within the mine area for concurrent and post-mining reclamation of the quarry. The soils that occur within the mining area are highly variable and distributed in a complex mosaic (see Figure 4 and Section 2.1.2). Therefore, it is not feasible to provide a simple summary of the location and/or depth of soil salvage. However, according to the soil survey, A horizons varying from about 6 to 12 inches are present over much of the site, and the upper B horizons of some common soils types are also suitable for use as a plant growth medium. Salvageable soil is probably somewhat thicker in the lower portions of the West Pit area than it is on the steeper, rocky slopes above, where significant areas of talus and rock outcrop (with no salvageable soil) occur. Both the soil survey details and on-site plant ecology studies show that roots are present throughout the solum and even into the C horizon, so some of the overburden will help support plant growth if a small amount of soil is present to support initial establishment.

Application of 0.5+ foot of soil prior to revegetation will require a minimum of 86,300 cu yd of material. To the extent possible, soil for placement on backfilled and mine benches will be obtained from the uppermost portion of the undisturbed soil as each new area is cleared before mining. However, deeper portions of the soil will be salvaged as necessary, and as noted in Section 3.1, clean fill material from outside the Project site may be brought in to supplement backfill operations and to provide a suitable plant growth medium to supplement the salvaged topsoil. The existing soils contain significant proportions of gravel and stones (typically 20 percent or more, even in the A horizon). These stones are valuable in contributing to erosion control and even to the biological function of the soil.

Stockpiles will be compacted to the minimum degree possible as they are formed to maximize the long-term value of soil for later reclamation. However, due to the long storage period that is likely, substantial loss of biological activity will occur. Nonetheless, some important soil microbes retain viability indefinitely, and the small but extremely important fraction of the soil organic matter that is present in the form of humic substances is stable for at least hundreds (if not thousands) of years. Thus, salvaged A/B horizon soil remains valuable for reclamation, even after prolonged storage.

Stockpiles will be revegetated with native species, specifically including mycorrhizal and nitrogen-fixing species such as lupine and ceanothus, to maximize the inoculum level of the soil prior to reclamation use. To the extent that is operationally feasible and permissible under applicable air quality regulations, slash and brush derived from clearing and grubbing of new mining areas will be burned on top of topsoil stockpiles, to incorporate mineral nutrients into the material and to stimulate the germination of desirable native species.

Common Name	**Scientific Name**	**Seeding Rate** (PLS lbs/acre)
Grasses		
squirreltail	*Elymus elymoides (Sitanion hystrix)*	5.0
mountain brome	*Bromus carinatus*	3.0
slender wheatgrass	*Elymus trachycaulus*	3.0
blue wildrye	*Elymus glaucus*	3.0
western needlgrass	*Achnatherum occidentalis*	3.0
one-sided bluegrass	*Poa secunda*	2.0
Forbs		
naked buckwheat	*Eriogonum nudum*	0.5
sulfur buckwheat	*Eriogonum umbellatum*	0.5
yarrow	*Achillea millefolium*	0.25
silver lupine	*Lupinus argenteus*	2.0
penstemon	*Penstemon speciosus/deustus*	0.5
Shrubs		
mountain sagebrush	*Artemisia tridentata ssp. vaseyana*	0.5
bitterbrush	*Purshia tridentata*	5.0
rubber rabbitbrush	*Chrysothamnus nauseosus*	1.0
tobacco brush	*Ceanothus velutinus*	1.0
Sierra (bitter) cherry	*Prunus emarginata*	0.5
greenleaf manzanita	*Arctostaphylos patula*	0.25
wax current	*Ribes cereum*	0.5
sierra gooseberry	*Ribes roezlii*	0.25
curl-leaf mountain-mahogany	*Cercocarpus ledifolius*	2.0
squaw carpet	*Ceanothus prostratus*	0.25
TOTAL		**34.0 lbs/acre**

Table 4-2. Reclamation seed mix for Boca Quarry.

Stockpiles will be protected from erosion by several means:

- outslopes with a maximum gradient of 4:1;
- diversion of any potential run-on; and
- protection by organic mulches such as pine needles and/or tub-ground wood and bark.

4.6 RESOILING AND REVEGETATION

Reclamation topsoil will be placed to a minimum depth of six inches (0.5 ft) over all areas where it can reasonably be expected to remain in place on the surface or to fall into the gaps between shallow layers of broken rock at the base of reduced-angle highwalls. If the reclamation soil has a low rock fragment content (lower than about 25 percent), it will also be protected by the application of coarse organic mulch such as tub ground wood. Alternatively, crimped straw may be used for protection against wind and water erosion where the physical setting permits (relatively gentle slopes with low rock content).

Approximately 114 acres of the mining area will be resoiled and revegetated as a mountain shrubland community, with potential to eventually support one or another of the three main plant communities found on the site. Backfilling of mined surfaces could include a mix of ash, cinder, and/or other overburden material. All level and gently sloping areas (backfilled or not) will be covered with topsoil to a minimum depth of 0.5 foot prior to seeding.

Areas that are too steep (>3:1 angle) or rocky to retain soil will remain as exposed rock slopes with limited vegetation, similar to the rock outcrops and steeper talus slopes that currently exist at the site.

Vegetation will be established by broadcast seeding all areas with a variety of shrubland species presently known to occur at the site. Although the biomass of the mature plant communities found on the site is almost entirely comprised of woody species, the native plant communities that constitute the early stage of ecological succession following fire or landslides include grasses and forbs as well as shrubs known to be "fire followers" (e.g., ceanothus). Accordingly, native perennial grasses and forbs are also included in the seed mix to promote species diversity, provide soil stability, increase organic matter, minimize noxious weed establishment, and provide interim cover. These colonizing, early successional species will be typical of those occurring on nearby areas and included in the monitoring performance objectives for the site. The specific seed mix and seeding rates for reclamation are shown in Table 4-2.

Species, Planting Densities and Schedule

Seed mixes are currently being grown in test plots at Boca Quarry, as specified in Table 4-2. Based on the results of these test plots, it is anticipated the same or a similar seed mix will be utilized for reclamation purposes. Seeding will be carried out in the late summer or fall, consistent with the known biology of the species in the seed mix and long successful experience with seeding in the Sierra Nevada.

All seed shall have a minimum purity of 80 percent and weed seed will not exceed 0.5 percent. Because native species of the target habitats have highly variable viability from the outset, no minimum live seed standard is proposed; rather, the seeding rate will be adjusted to achieve the desired germination and cover goals. Notwithstanding any other provision, seed of rubber rabbitbrush and mountain sagebrush shall be collected during the same growing season that it is to be planted (that is, collected in summer and planted that autumn). If one or more of the species listed is not available at the time of revegetation, seeding rates of other species may be increased or a comparable species may be substituted. Other modifications of the currently proposed seed mixture could be made based on cost, improved seed success rates, or other factors. However, only species native to the area will be considered as substitutes.

At least two of the proposed seed mixture (tobacco brush and manzanita) germinate at much better rates if pretreated. The best methods for pretreatment of seeds of shrub species of the project region are only beginning to be systematically studied in the field. As these results become available during the next several years, they will be incorporated into standard reclamation practice at the Boca Quarry.

Seed will be applied using an ATV and broadcast seeder-spreader on accessible slopes. Where access is difficult (i.e., areas backfilled with coarse material and broken rock), seeding will be by hand and the seeds will be allowed to fall between the rocks and into crevices. Where possible, seeded areas will be lightly harrowed to ensure good contact with the soil and to minimize seed loss due to runoff.

Woody Plantings

In addition to seeding, containerized seedlings of Jeffrey pines and/or ponderosa pines will be planted on the resoiled areas to facilitate the establishment of an overstory layer of vegetation. A total of 5.9 pine seedlings per 200 m^2 (120 seedlings per acre) will be planted following application of reclamation soil. The preferred fall planting period is from September 15 through October 15, though planting may occur as early as September 1 or as late as October 31. Springtime planting should occur immediately following snow melt, but in any case no later than May 30.

Seedlings will be grown in suitable containers (tall and narrow) from locally collected seeds, or purchased from a local plant nursery shortly before planting. Small container stock (e.g., tube-lings)

is preferred in unirrigated California settings such as mine reclamation, as it has been shown to result in larger pine and oak saplings than those that grow from larger stock. Plants shall be collected and grown locally. Planting holes for seedlings will be dug at least twice as big in diameter and depth and the seedling root wad, and backfill will be minimally compacted so as to encourage downward root growth and water percolation. 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 mixed with the backfill material. Plants will be installed so that the top of the root wad is level with the grade of the surrounding soil.

To protect containerized plantings from herbivores, plant protector tubes or tree shelters may be necessary. Tubes used for small mammal protection will be approximately two feet tall, pushed 2 to 4 inches into the ground and supported as necessary (depending upon soil texture and

Parameter	Monitoring	Performance Standards
Native Plant Density	In each monitoring year, a summer survey will be conducted to determine native shrub and tree densities. Specific survey methods and sample sizes will be sufficient to produce at least an 80 percent confidence level with a confidence interval width within 20 percent of the mean.	1) Establish a minimum density of 90 target plants (shrub and tree species identified in Table 2-1) per 200 m^2 (1,821 plants per acre). 2) Establish a minimum density of 3 Jeffrey or ponderosa pine seedlings per 200 m^2 (60 pine trees per acre).
Native Plant Cover	In each monitoring year, a summer survey will be conducted to determine native plant cover. Specific survey methods and sample sizes will be sufficient to produce at least an 80 percent confidence level with a confidence interval width within 20 percent of the mean.	1) Establish a minimum 40 percent absolute cover of native plant species. 2) Establish a minimum 10 percent absolute canopy cover of the targeted woody vegetation identified in Table 2-1.
Native Plant Species Richness	In each monitoring year, a summer survey will be conducted to determine species richness of native plants. Specific survey methods and sample sizes will be sufficient to produce at least an 80 percent confidence level with a confidence interval width within 20 percent of the mean.	1) Successfully establish a minimum of 5 target species/200 m2. Target species will include trees and shrubs such as those identified in Table 2-1.
Noxious Weeds	In each monitoring year, surveys will be conducted to identify vegetative cover of all noxious weeds. Field survey methods and sample sizes will be sufficient to produce at least an 80 percent confidence level with a confidence interval width within 20 percent of the mean.	1) Noxious weeds shall not exceed 5 percent absolute cover.

Table 4-3. Monitoring and performance standards for resoiled reclamation areas.

cohesiveness) by small stakes or rocks wedged against the base. Protective tubes will be left in place until the seedlings are of sufficient size to be unattractive or to withstand minor herbivory (typically about three years). Alternatively, if deer browsing on the conifer seedlings cause significant seedling loss, wire cylinders may be installed, at least four feet high and with sufficient diameter to allow for branch growth (1-2 feet).

Should adequate natural regeneration of pine seedlings be observed on resoiled benches and slopes, the seedling planting program may be discontinued. This would require observation and documentation adequate natural recruitment seedling density in concert with the monitoring program described in Section 4.7.

Irrigation

Irrigation is not necessary to establish the desired vegetation community and is not proposed.

Weed Abatement

The Boca Quarry is potentially vulnerable to several different non-native species. Potentially invasive species that have been found in the Project vicinity include cheatgrass (*Bromus tectorum)*, which is widely present even in completely undisturbed vegetation), bull thistle (*Cirsium vulgare*), and musk thistle (*Carduus nutans*). Invasive species can inhibit the establishment of native scrub habitat and reduce the site's overall species diversity.

Noxious weeds will be managed annually throughout each of the reclamation areas in which monitoring is required. Management may include hand-pulling, flame-wilting, chemical controls (e.g., glyphosate), or a combination of methods; above all, weed management will be carried out when the plants have grown to an easily detected size but prior to seed set. Best management practices to minimize weed establishment will be determined based upon the species, extent of infestation, and latest scientific information available. Areas within the Project site but outside the Project disturbance area will also be managed for invasive species to avoid seed rain either from these areas into reclamation areas, or vice versa. Weed monitoring and management will not be limited to the few species that have hitherto been found within the property, but will include all species with an overall rating of "high" on the current list of invasive plant species in California (IPC, 2006) or its future functional equivalent.

4.7 MONITORING AND PERFORMANCE STANDARDS

The primary goal of the monitoring program will be to document the success or failure in attaining designated objective and performance standards; secondarily, monitoring often provides guidance on remedial actions in the event that criteria are not met.

For the Boca Quarry project, the revegetation objective is the establishment of native plant communities. A botanist or revegetation specialist with field experience in upper montane Sierra Nevada and eastside plant communities and qualifications acceptable to Nevada County will conduct all monitoring and reporting requirements for the project. Each reclamation area and phase will be monitored annually for a period of five years following seeding/planting. Areas that are not amenable to resoiling will also be monitored to document the revegetation potential of such areas; however, they are not subject to vegetation performance standards.

The performance standards (see Table 4-3, Monitoring and performance standards for resoiled reclamation areas) are based in part on the baseline data reported in Table 2-1: for example, the criterion for density of native plant individuals is the same as that measured on the site. However, other standards take into account that the vast majority of the plant cover observed on the site is in the form of woody plants with relatively slow growth. For example, the minimum absolute cover criterion to be attained by the main woody species after five years is only one quarter of that of the mature vegetation as documented in Table 2-1.

A minimum of four permanent photo stations will be selected for each reclamation phase to qualitatively document vegetation establishment and changes in development over successive monitoring periods. All photos will be taken in the summer while live vegetative cover is at its peak. Photos will include permanent features (e.g., existing mature trees, hillsides, transmission towers, etc.) to provide a consistent reference against which yearly comparisons can be made.

A written report, presenting and summarizing all of the above data, shall be prepared in each of the monitoring years. Maps, photographs, maintenance logs, and appendices of raw data will be included. Existing and potential threats shall be addressed along with future recommendations. Reports will be provided by October 31st of each calendar year in which monitoring is required. All reports shall be submitted to the Nevada County Planning Department until all performance standards are met.

As reclamation is completed and all performance standards are met, monitoring and reporting for that particular area will end. If any of the performance standards are not met in the resoiled areas, remedial measures and/or further monitoring may be necessary. Since revegetation rates of sites may vary due to climatic variations, soil characteristics, and other factors, monitoring time periods may be extended in order to meet established performance standards. Additional soil analysis shall be conducted to determine the presence or absence of elements essential for plant growth, compaction, etc. if revegetation efforts are not meeting performance standards. If it is determined that corrective actions are necessary, representatives from Teichert, consulting biologists, and regulatory agency personnel will evaluate and agree upon the most appropriate remediation method(s).

SECTION 5 | Financial Assurance

5.1 PURPOSE

SMARA requires surface mining operators to obtain lead agency approved financial assurance for reclamation of mined lands so the public does not bear the cost of reclaiming abandoned operations. In the event of financial incapability by the operator, financial assurance funds are used by the lead agency (or the Department of Conservation) to reclaim the mined site.

The cost estimate for the financial assurance is included as Appendix E and the statement of financial responsibility is included as Appendix F.

5.2 BASIS FOR COSTS TO COMPLETE RECLAMATION ACTIONS

Financial assurance estimates for the initiation of the operation are based on (1) an analysis of the physical activities necessary to implement the approved reclamation plan; (2) the lead agency's (or third party contract) unit costs for each of these activities; (3) the number of units of each of these activities; (4) actual lead agency administrative costs; and (5) an amount to cover contingency costs, (not to exceed 10 percent of the above calculated reclamation cost).

The cost estimate for the financial assurance (Appendix E) includes the following elements of site demobilization and reclamation:

- Removal of equipment, structures, and supplies
- Grading of surfaces to final stable configuration
- Management of soil and backfill stockpiles
- Placement of backfill and soil
- Seeding and planting
- Monitoring of revegetation performance
- Invasive plant control
- Monitoring reporting
- Replanting contingency

SECTION 6 | References

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California Invasive Plant Council (Cal-IPC). 2006. California Invasive Plant Inventory.

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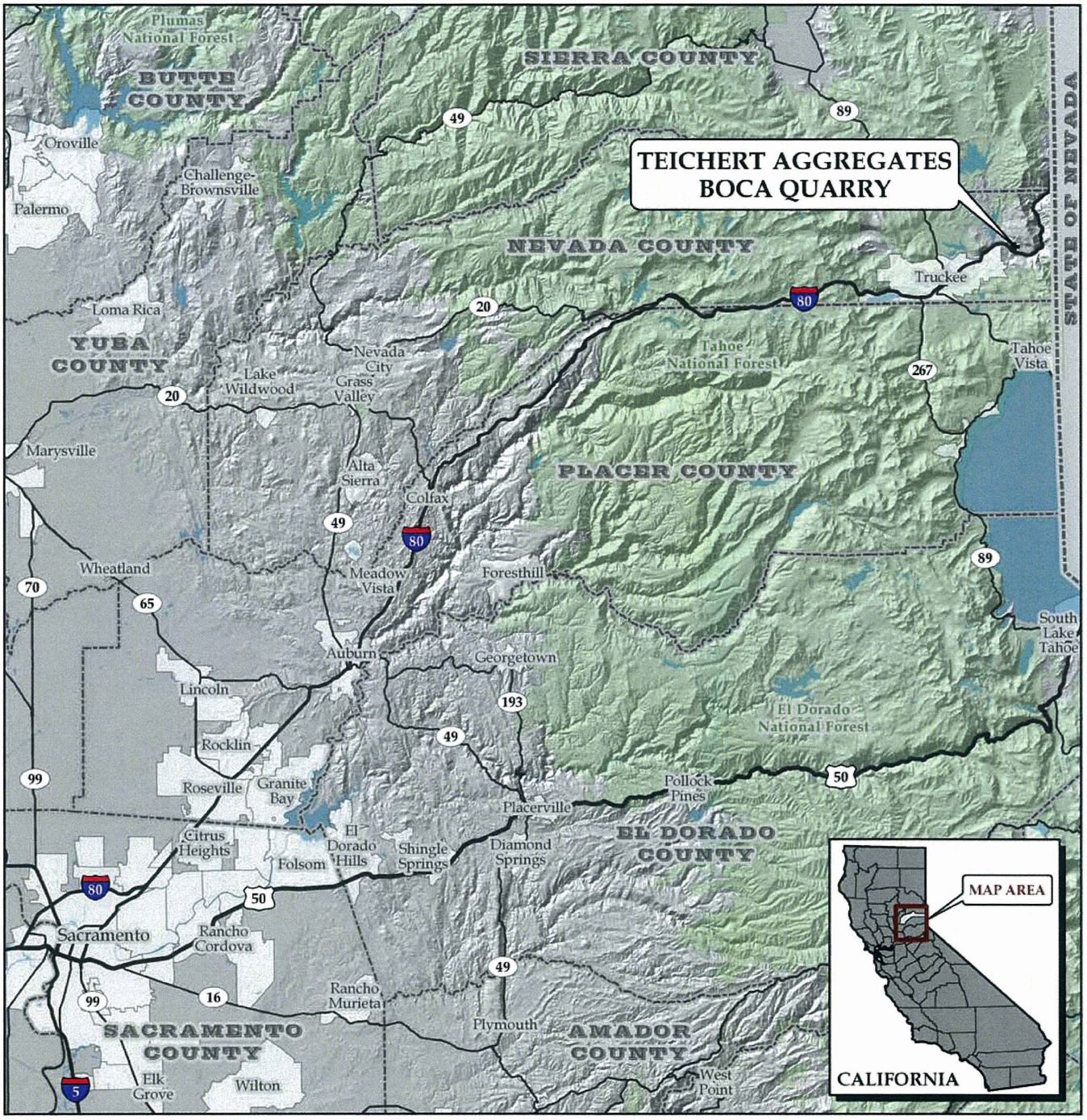
Western Regional Climate Center (WRCC). 2009. Climate data for Boca, California, downloaded from http://www.wrcc.dri.edu/CLIMATEDATA.html.

Teichert Boca Quarry Reclamation Plan Figures

July 2011



SCALE:
0 6 12 Miles

SOURCE:
Background:
USGS 30 Meter Hillshade

MAP CREATED BY: C. Cornejo DATE: 07/27/2011

BOQ_WestPit_Fig1RegionalLoc_201107.mxd

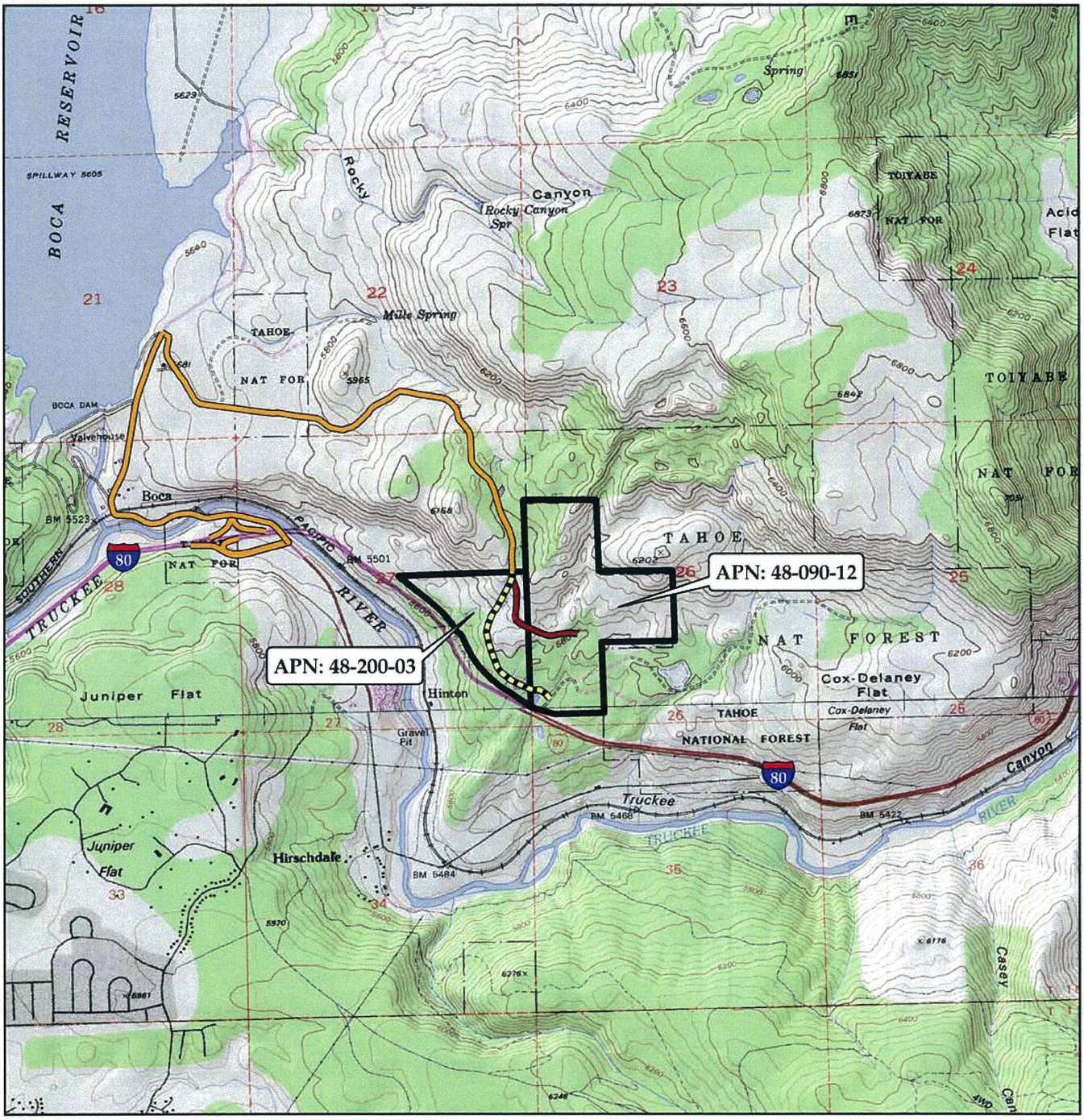
FIGURE 1
REGIONAL LOCATION
BOCA QUARRY
TEICHERT AGGREGATES
NEVADA COUNTY, CALIFORNIA

LEGEND:
- Highways
- County Boundaries
- City & Community Boundaries
- Lakes & Reservoirs
- US Parks

DISCLAIMER:
The data was mapped for assessment purposes only. No liability is assumed for the accuracy of the data shown.

TEICHERT AGGREGATES
GIS DEPARTMENT

TEICHERT



SCALE:

0 0.25 0.5 Miles

SOURCE:

USGS 7.5' Topographic Quads: Boca & Martis Peak

MAP CREATED BY: DATE:

C. Cornejo 07/27/2011

BOQ_WestPit_Fig2SiteLocation_201107.mxd

FIGURE 2
SITE LOCATION
BOCA QUARRY
TEICHERT AGGREGATES
NEVADA COUNTY, CALIFORNIA

LEGEND:

- Existing Access Road
- Existing Haul Road
- Proposed County Access Road (Approx. Location- To Be Built)
- Boca Quarry Parcel Boundaries

DISCLAIMER:

The data was mapped for assessment purposes only. No liability is assumed for the accuracy of the data shown.

TEICHERT AGGREGATES
GIS DEPARTMENT

TEICHERT

N
W E
S

SCALE:

0 400 800 Feet

1 inch = 800 feet

SOURCE:	DATE:
Original Topography Provided by TSI	04/2005
Orthophoto Provided by PointCo	05/2009

MAP CREATED BY:	DATE:
C. Cornejo	07/27/2011

BOQ_WestPit_Fig3ExistingCond_20110727.dwg

FIGURE 3

EXISTING CONDITIONS: AERIAL PHOTOGRAPH/ TOPOGRAPHY

BOCA QUARRY

TEICHERT AGGREGATES

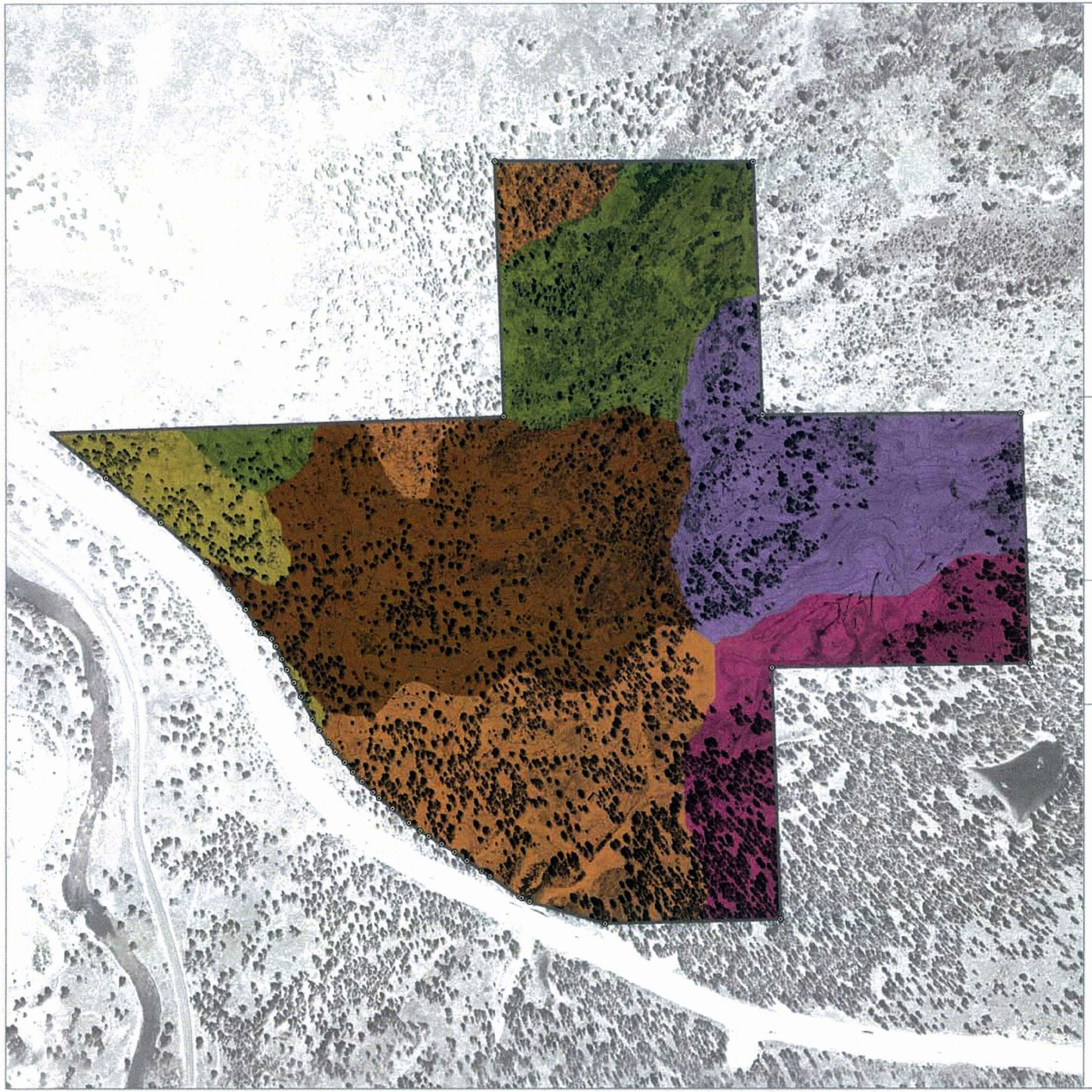
NEVADA COUNTY, CALIFORNIA

LEGEND:

Index Contour — Intermediate Contour — Parcel Boundary

TEICHERT AGGREGATES
GIS DEPARTMENT

TEICHERT



EcoSynthesis
SCIENTIFIC & REGULATORY SERVICES INC

Teichert Boca Quarry Reclamation Plan

Figure 4. Soils

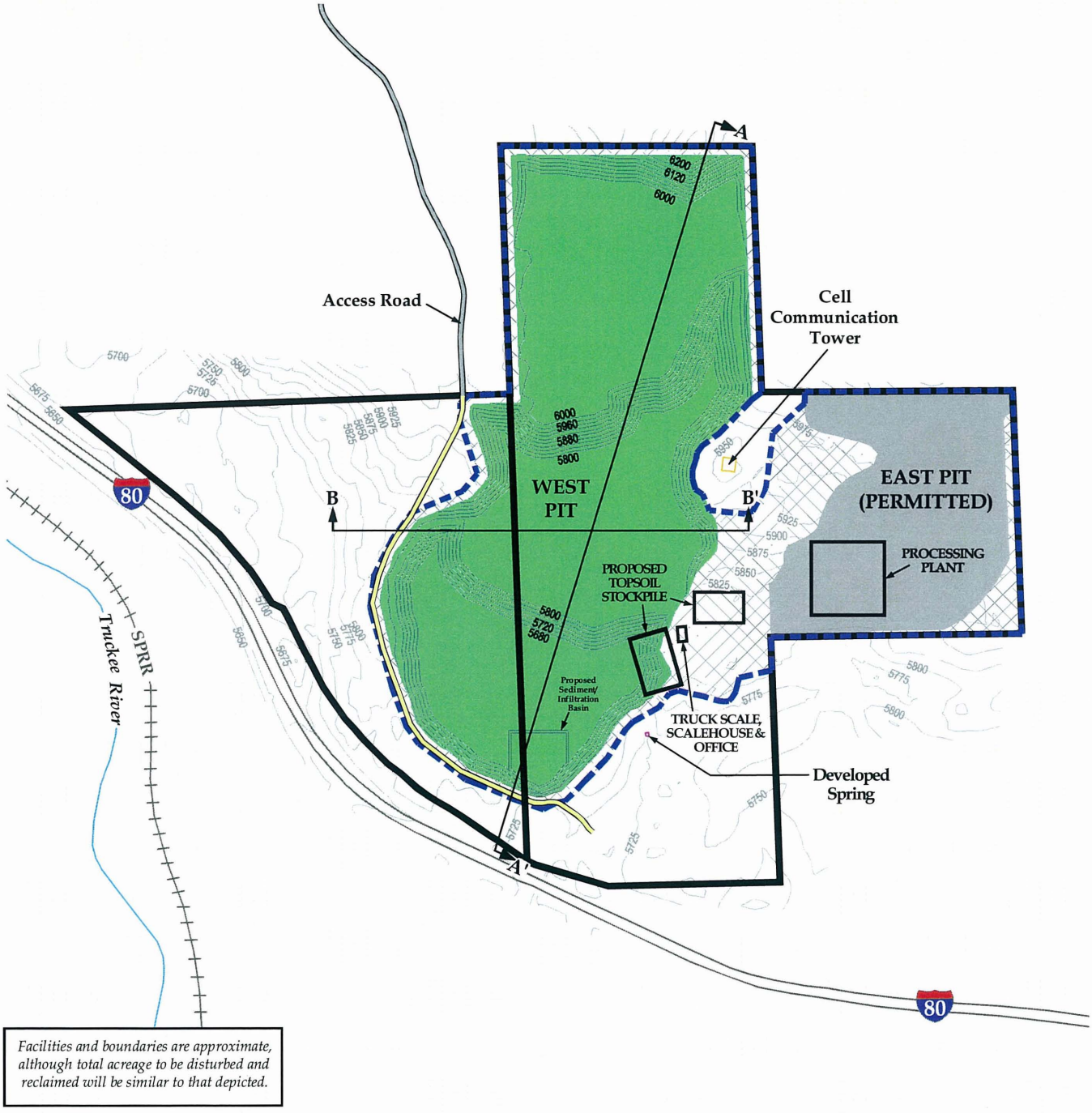
N

0 400 800 1200 1600

Scale 1 : 9,600 (1 in = 800 ft)

Legend

- Kyburz-Rock Outcrop-Trojan Complex, 2-30 percent slopes
- Kyburz-Rock Outcrop-Trojan Complex, 30-50 percent slopes
- Sierraville-Trojan-Kyburz Complex, 2-30 percent slopes
- Cinder land-Sierraville-Kyburz Complex, 30-50 percent slopes
- Rubble land-Jorge Complex, 30 to 75 percent slopes
- Kyburz-Aldi variant-Jorge Complex, 30 to 50 percent slopes



Facilities and boundaries are approximate, although total acreage to be disturbed and reclaimed will be similar to that depicted.

SCALE:
0 400 800 Feet
1 inch = 800 feet

SOURCE:	DATE:
Mine Plan Provided by Teichert Mine Planning Dept.	08/2009
Original Topography Provided by TSI	04/2005

MAP CREATED BY: C. Cornejo DATE: 07/27/2011

BOQ_WestPit_Fig5MinePlan_201107.dwg

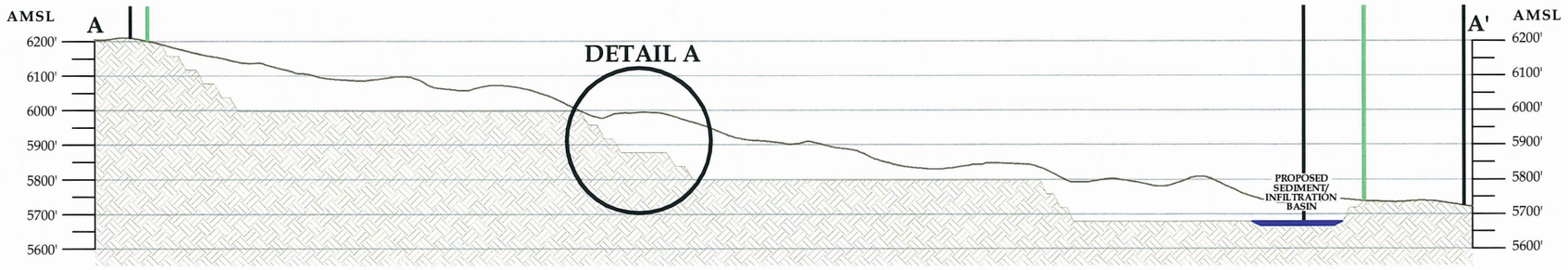
FIGURE 5
MINE PLAN
BOCA QUARRY
TEICHERT AGGREGATES
NEVADA COUNTY, CALIFORNIA

LEGEND:

- Existing Access Road
- Proposed County Access Road (Approx. Location- To Be Built)
- Index Contour
- Parcel Boundary
- Ultimate Disturbed Area
- West Pit Mining Area
- East Pit (Permitted)
- Disturbed Area

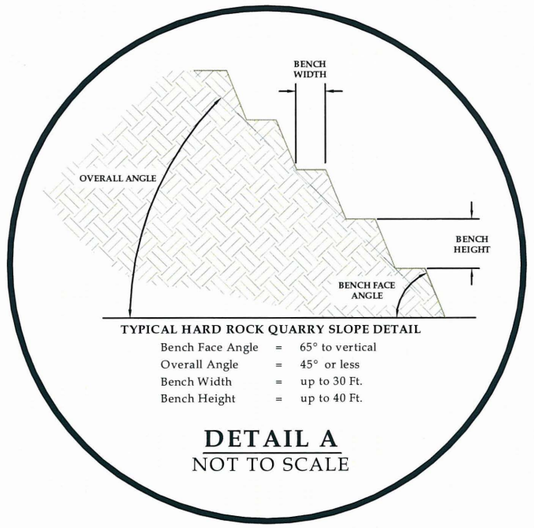
TEICHERT AGGREGATES
GIS DEPARTMENT

TEICHERT



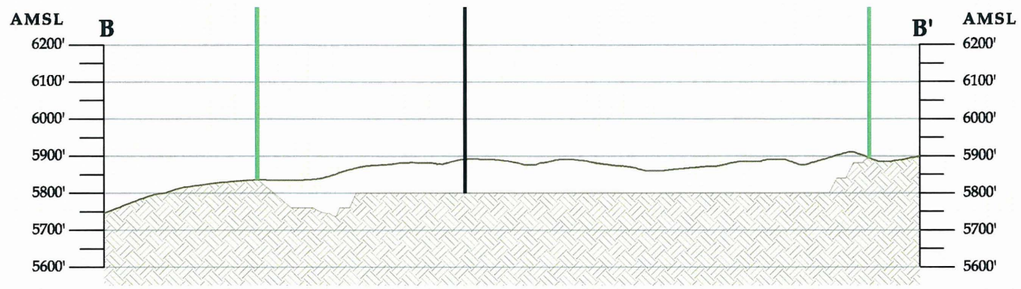
CROSS SECTION A - A'

SCALE: 1" = 400'



DETAIL A

NOT TO SCALE



CROSS SECTION B - B'

SCALE: 1" = 400'

FIGURE 6
MINE PLAN CROSS SECTIONS
BOCA QUARRY
TEICHERT AGGREGATES
NEVADA COUNTY, CALIFORNIA

LEGEND:

- Existing Surface
- Final Grade
- Edge of Pit
- Proposed Sediment/ Infiltration Basin
- Parcel Boundary

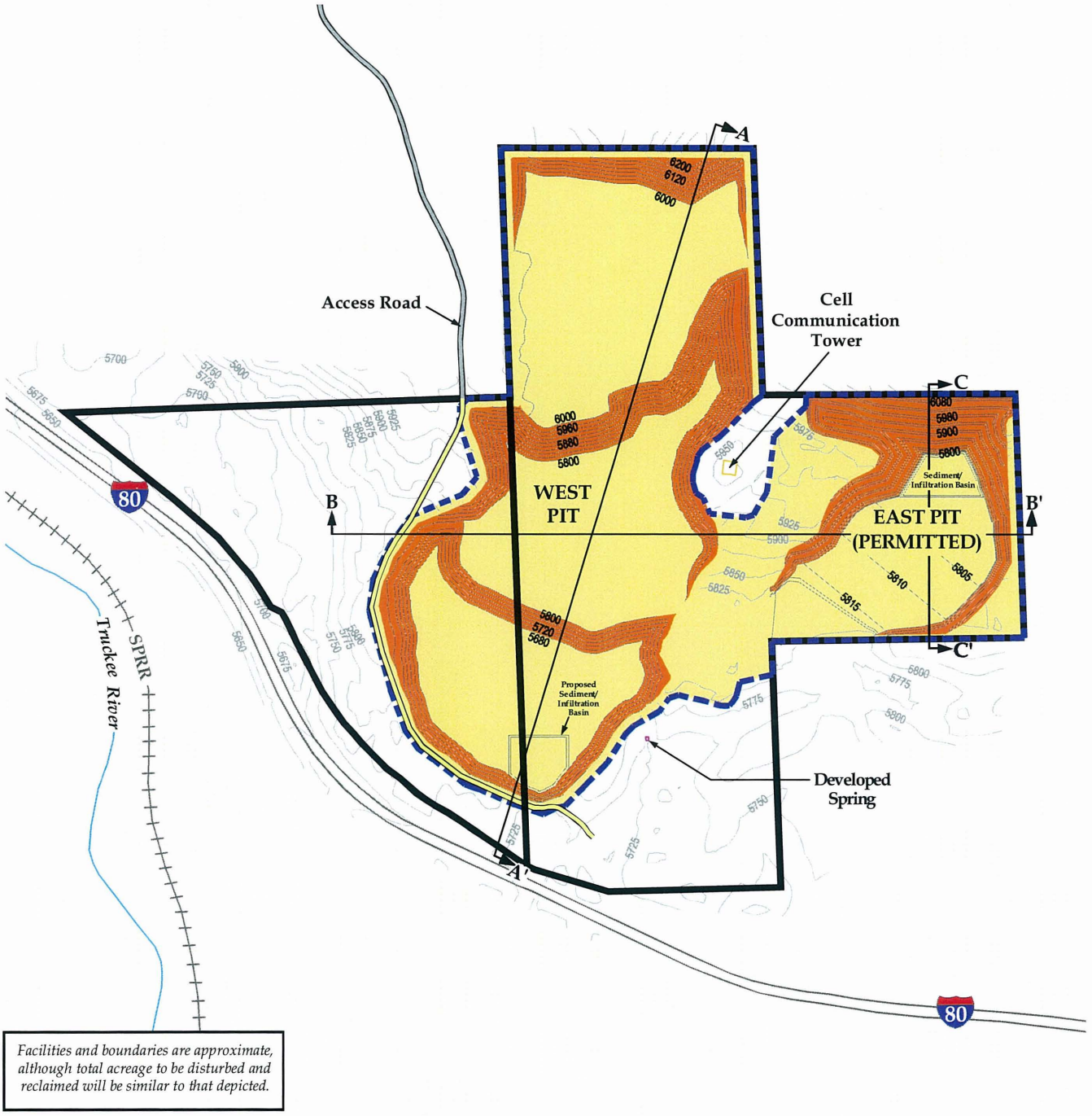
SOURCE:	DATE:
Cross Sections Provided by Teichert Mine Planning	09/2009
Cross Section A Updated by Teichert Mine Planning	07/2011

MAP CREATED BY:	DATE:
C. Cornejo	07/27/2011

BOQ_WestPit_Fig6MinePlanXSections_201107.dwg

TEICHERT AGGREGATES
GIS DEPARTMENT

TEICHERT



Facilities and boundaries are approximate, although total acreage to be disturbed and reclaimed will be similar to that depicted.

SCALE:
0 400 800 Feet
1 inch = 800 feet

SOURCE:	DATE:
Rec Plan Provided by Teichert (West Pit) & Resource Design (East Pit)	08/2009
	12/2006
Original Topography Provided by TSI	04/2005

MAP CREATED BY: C. Cornejo **DATE:** 07/27/2011

BOQ_WestPit_Fig7RecPlan_201107.dwg

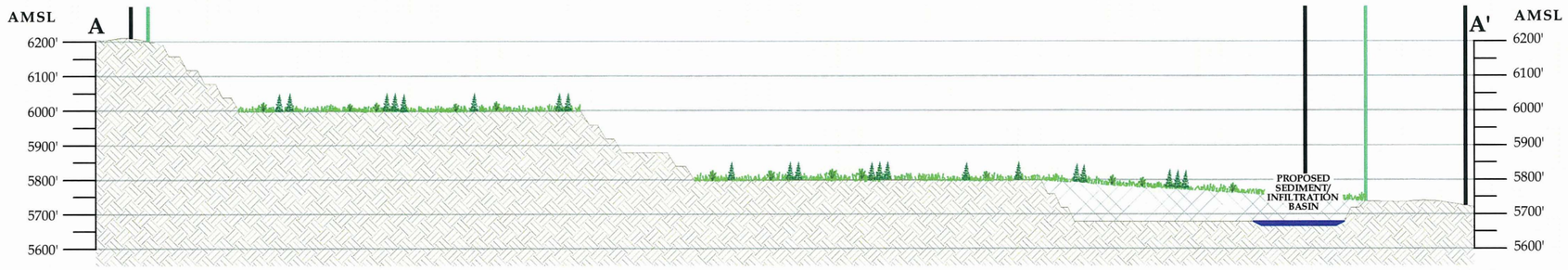
FIGURE 7
RECLAMATION PLAN
BOCA QUARRY
TEICHERT AGGREGATES
NEVADA COUNTY, CALIFORNIA

LEGEND:

- Existing Access Road
- Proposed County Access Road (Approx. Location To Be Built)
- Index Contour
- Parcel Boundary
- Ultimate Disturbed Area
- Quarry Highwall Slopes
- Resoiled and Revegetated Surfaces

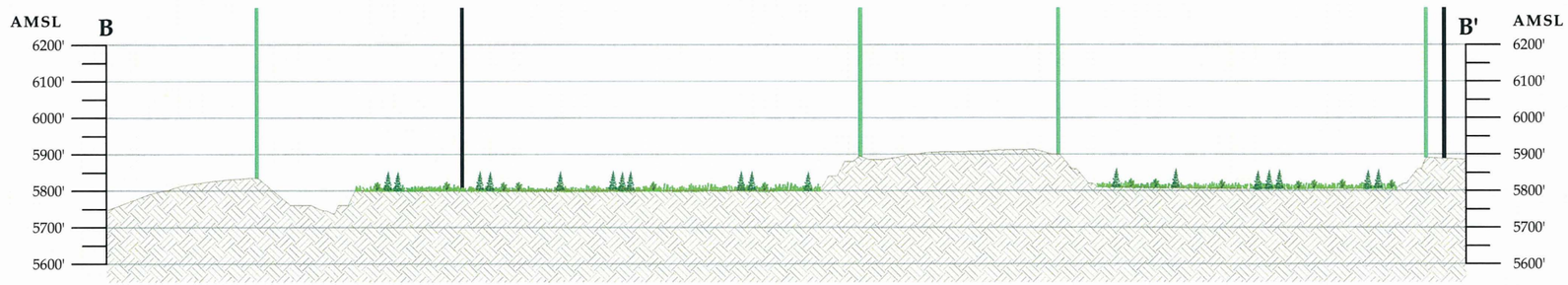
TEICHERT AGGREGATES
GIS DEPARTMENT

TEICHERT



CROSS SECTION A - A'

SCALE: 1" = 400'



CROSS SECTION B - B'

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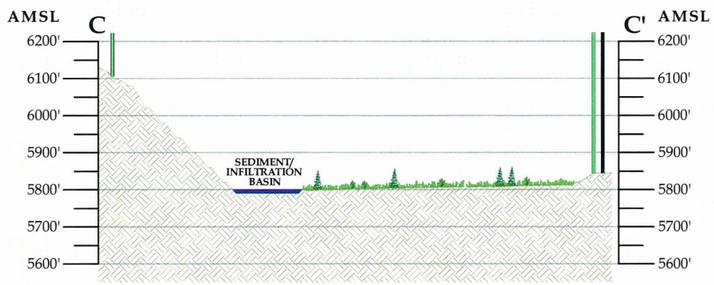

CROSS SECTION C - C'

SCALE: 1" = 400'

FIGURE 8
RECLAMATION PLAN CROSS SECTIONS
BOCA QUARRY
TEICHERT AGGREGATES
NEVADA COUNTY, CALIFORNIA

LEGEND:

- Final Grade
- Edge of Pit
- Proposed Sediment/ Infiltration Basin
- Parcel Boundary
- Proposed Backfill Area Final Elevation TBD

SOURCE:	DATE:
Cross Sections Provided by Teichert Mine Planning	09/2009
Cross Section A Updated by Teichert Mine Planning	07/2011

MAP CREATED BY:	DATE:
C. Cornejo	07/27/2011

BOQ_WestPit_Fig8RecPlanXSections_201107.dwg

TEICHERT AGGREGATES
GIS DEPARTMENT

TEICHERT