MINING AND RECLAMATION PLAN

LAKE HERMAN QUARRY

885 Lake Herman Road
Vallejo, California

SOLANO COUNTY USE PERMIT APPLICATION

SYAR INDUSTRIES, INC.
October 28, 2014

TABLE OF CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

1.1 AUTHORITY, PURPOSE, AND OBJECTIVE

This Mining and Reclamation Plan (The Plan) has been prepared pursuant to the State Surface Mining and Reclamation Act of 1975 (SMARA), as amended, and Solano County Code Chapter 29. The purpose of this Plan is to describe an expansion of an existing quarry operation, concurrent reclamation, and the ultimate reclamation of all areas disturbed by mining. Syar Industries, Inc. is requesting a new 35-year permit term. While the initial approval in 1979 granted a 35-year mining period (expiring in 2014), previous plans acknowledged intent to seek extensions to continue mining until the resource is depleted.

The total project area encompasses 468 acres, of which the existing quarry facility consists of 321 acres. About 113 acres of the quarry site is comprised of slopes being quarried, while the surrounding land (approximately 208 acres) is utilized for related operations, including rock processing, stockpiling, sediment ponds, storage of overburden material, roads and manufacturing of asphalt paving materials and ready-mix concrete. This Plan describes expansion of the quarry site from 113 acres to approximately 211 acres.

The Plan describes the operation of the quarry, with revisions to the lateral extent and depth of the excavation, ongoing operational procedures, storage of overburden and final reclamation tasks to be performed at the end of mining. The mining operation will continue to produce aggregate used in the manufacture of asphaltic concrete and Portland Cement Concrete, and a variety of other rock products. The quarry will continue to recycle asphalt and concrete.

Interim reclamation will be accomplished as mining proceeds. Ultimate reclamation will leave the site as open space. Interim reclamation involves revegetation of portions of the excavation area where final slopes have been reached. Benches will be established on the mined slopes. Runoff flowing over disturbed areas will be diverted to the pit, or to settling ponds to remove sediment before water leaves the site. Final reclamation includes the removal of equipment and structures, final slope grading, drainage, resoiling, and revegetation. While the Plan provides for reclamation of the site, it is anticipated that there will be an application to continue mining at this location prior to the end of the 35 year permit being requested.

The Lake Herman Quarry is part of the Sulphur Springs Mountain mineral resource (Sectors G-1, G-2, and G-3) that has been designated by the State of California as a Mineral Resource of Regional Significance, pursuant to SMARA. The designation process is intended to identify and assist in the protection of mineral resources. The mapped resource (shown on Figure 9) extends easterly beyond the limits of Syar's presently permitted quarry to the westerly edge of Sulphur Springs Creek, and is located entirely within property owned by Syar or which Syar is authorized to mine.

SMARA defines an area of regional significance as one which "...contains a deposit of minerals, the extraction of which is judged to be of prime importance in meeting future needs for minerals in a particular region of the State within which the minerals are located and which, if prematurely developed for alternative incompatible land use, could result in the permanent loss of minerals that are of more than local significance" (Public Resources Code Section 2726).

SMARA requires that lead agencies with active mining operations in their jurisdictions adopt a Mining and Reclamation Ordinance to regulate mining in accordance with State policy. SMARA further requires that local agencies with a designated mineral resource adopt policies in their General Plan to manage the resource. Mineral resource management policies should address the following issues:

- Recognize the State mineral designation.
- Assist in the management of land uses which affect mineral areas of statewide or regional significance.
- Emphasize conservation and development of identified mineral deposits.

Solano County is the agency with jurisdiction over the Lake Herman Quarry. The County General Plan contains policies aimed at protecting significant mineral resources by preventing residential, commercial, and industrial development which would be incompatible with proper mining practices. An objective of the Land Use and Circulation Element is to "provide for managed production of Solano County's mineral resources in a manner which does not adversely affect the environment and is compatible with surrounding land use". The General Plan further states that "areas with significant mineral resources should be protected from the encroachment of conflicting land uses".

The City of Vallejo, whose jurisdictional boundary extends to the western edge of the quarry parcel, does not permit residential development to encroach closer than one-half mile to the quarry. This regulation has been designed to minimize complaints about the quarry operation. The City of Benicia's sphere of influence extends to the eastern edge of the existing quarry parcel, and the proposed Plan will result in approximately 54 acres of new project area in the sphere of influence.

The basalt deposit that Syar is mining is extremely valuable for several reasons: (1) it provides hard rock that exceeds State and local specifications for Portland Cement Concrete, (2) its geographic location is in an urbanizing market with close proximity to a extensive transportation network including highway, rail, inland waterways, and coastal access, and (3) it is an existing ongoing quarry operation with substantial remaining reserves. The Sulphur Springs Mountain deposit is one of the few remaining locations in the North San Francisco Bay Production/Consumption Region with a large concentration of construction grade aggregate. The proposed expansion would provide an ongoing supply of aggregate to meet the projected demand from an existing, well-

established mine. Since there are no other local sources for this material, any other sources would result in environmental, economic, and infrastructural costs associated with long-distance shipping of such materials.

2 OWNER, OPERATOR, AND OPERATOR'S AGENT

Syar Industries, Inc. is the quarry operator and applicant for approval of the Mining and Reclamation Plan and associated permits. The operator's Statement of Responsibility to reclaim the property is contained in Appendix A. Syar Industries, Inc. is a part owner of Assessor's Parcel Number 181-190-060 and sole owner of Assessor's Parcel Numbers 181-200-010, 181-210-030, and 181-220-040. All of the property owners of the quarry property and all surrounding parcels within 500 feet of the quarry are listed in Table 1, and the respective parcels are shown on Figure 8.

Applicant:	Syar Industries, Inc. 2301 Napa-Vallejo Highway P.O. Box 2540 Napa, CA 94558 (707) 252-8711
Name of Mineral Property:	Lake Herman Quarry (State Mine I.D. # 91-48-0002)
Owner of Surface Rights:	See Table 1
Owner of Mineral Rights:	See Table 1
Operator:	Syar Industries, Inc.
Agent of Process:	Jennifer Gomez Permits Manager Syar Industries, Inc. 2301 Napa-Vallejo Highway Napa, CA 94558 (707) 259-5728
Site Address:	885 Lake Herman Road Vallejo, CA 94950
Location:	Latitude 38° 6' 50", Longitude 122° 11' 00" SE 1/4 of Section 10 and NE 1/4 of Section 15, Township 3N, Range 3W, Mount Diablo

TABLE 1: PROPERTY OWNERSHIP

APN	OWNER AND ADDRESS	EXISTING LAND USE	ACREAGE
Project Location			
0181-190-060	Private and Syar Industries, Inc. 2301 Napa-Vallejo Highway P.O. Box 2540 Napa, CA 94558	Quarry	407.31
0181-200-010	Syar Industries, Inc.	Rangeland	547.37
0181-210-030	Syar Industries, Inc.	Rangeland	298.55
0181-220-040	Syar Industries, Inc.	Rangeland	243.42
Surrounding Parcels			
0081-040-110	City of Vallejo 555 Santa Clara Street Vallejo, CA 94590	Golf Course	34.38
0082-010-030	Private and Syar Industries Inc.	Rangeland	63.07
0082-010-040	City of Vallejo	Open Space	39.00
0082-010-160	Syar Industries, Inc.	Rangeland	91.23
0082-010-180	Syar Industries, Inc.	Rangeland	29.68
0082-020-120	City of Vallejo	Rangeland	51.46
0083-220-010	Carl Zocchi 1033 Detroit Avenue Concord, CA 94518	Rangeland	250.09
0181-180-010	City of Vallejo	Golf Course	0.86
0181-180-020	City of Vallejo	Golf Course	0.83
0181-180-030	Leonard & Yolanda Creek 163 Greenfield Avenue Vallejo, CA 94590	Manufacturing	2.00
0181-180-040	Leonard & Yolanda Creek	Manufacturing	0.53
0181-180-050	James & Donna Mettling 825 Lake Herman Rd. Vallejo, CA 94591	Residential	0.63
0181-180-060	Syar Industries, Inc.	Residential	0.70
0181-180-070	Leonard & Yolanda Creek	Vacant	0.03
0181-190-010	City of Vallejo	Golf Course	82.71
0181-190-030	AT&T	Communications.	0.02
0181-190-040	Pacific Gas & Electric Co. PO Box 7700 San Francisco, CA 94177	Open Space	0.02
0181-190-070	City of Vallejo	Golf Course	9.97
0181-210-020	William and C.F. Sinclair 2 Lake Herman Rd. Benicia, CA 94510	Rangeland	70.10
0181-200-030	William and C.F. Sinclair	Rangeland	202.05
0181-210-050	William and C.F. Sinclair	Rangeland	9.92
0181-210-060	William and C.F. Sinclair	Rangeland	0.18

0181-220-010	Syar Industries, Inc.	Rangeland	1.50
0181-220-020	Syar Industries, Inc.	Rangeland	1.50
0181-220-030	Syar Industries, Inc.	Rangeland	10.00
0181-220-070	Syar Industries, Inc.	Rangeland	45.31
0181-220-080	Syar Industries, Inc.	Rangeland	96.57
0181-220-090	Kerry Borges 1 Lake Herman Road Benicia, CA 94510	Rangeland	233.58
0181-220-100	Carl Zocchi	Rangeland	123.88
0181-220-060	Carl Zocchi	Rangeland	0.96
0182-040-080	City of Vallejo	Golf Course	19.89
0182-040-110	Solano Land Trust 1001 Texas Street Fairfield, CA 94591	Open Space	437.68
0182-050-040	Solano Land Trust	Open Space	210.00
0182-050-070	City of Vallejo	Rangeland	13.24
0182-050-080	City of Vallejo	Rangeland	5.83
0182-050-090	City of Vallejo	Open Space	8.03
0182-050-100	City of Vallejo	Rangeland	3.03
0182-080-020	Solano Land Trust	Open Space	147.43

3 PROJECT DESCRIPTION

3.1 LOCATION

Lake Herman Quarry is located in Solano County on the slopes of Sulphur Springs Mountain east of the City of Vallejo, northeast of Lake Herman Road. The main quarry entrance is located on Lake Herman Road approximately 0.6 miles east of its intersection with Columbus Parkway. For reference purposes, the term "quarry site" is used throughout the Plan to refer to the portions of the site involved in active mining operations and those proposed for expanded mining operations. The term “mining property” is used to refer to the total contiguous land area controlled by Syar being utilized for any quarry purpose. The term “quarry site,” therefore, includes the slopes of the mountain where extraction activity is centered, the relatively flat land at the base of the mountain where rock processing and materials stockpiling is located, and the access roads connecting the various portions of the site. Mining property includes the surrounding rangelands controlled by Syar Industries, Inc. that are not proposed for mining at this time. See Figure 1 for the regional location of the quarry. Refer to Figure 2 for the locations of extraction, stockpiling, and processing areas.

3.1.1 Area of Operations

The disturbed area of the quarry site currently measures about 321 acres, including all lands affected by active quarrying and related operations, including overburden storage, rock processing, stockpiling, asphalt paving materials production, ready-mix concrete production, and other related activities. Concurrent reclamation is currently underway with approximately 32 acres within the quarry site having been planted in 2006-2007. The proposed expansion of mining will increase the total mined area (quarry pit) from 113 acres to 211 acres.

Mining and reclamation activities proposed by this Plan are located in portions of Assessor Parcel Numbers: 0181-190-060, 0181-200-010, 0181-210-030, and 0181-220-040. The parcels that will be affected by mining and reclamation activities, as well as surrounding parcels within 500 feet, are listed in Table 1. The current locations of the various mining and processing activities are shown on Figure 2.

3.2 SITE HISTORY

The Lake Herman Quarry is part of the Sulphur Springs Mountain mineral resource that has been designated by the State of California as a Mineral Resource of Regional Significance, pursuant to the State Surface Mining and Reclamation Act of 1975.

The Lake Herman Quarry has been mined since the early 1870’s. Commercial operations began in the early 1940’s and continued on a small scale until the mid-1960’s. Syar Industries, Inc. acquired the quarry in 1965 and installed a rock crusher with screens to manufacture specific rock sizes. Around 1968, an asphaltic concrete

(asphalt paving material) batch plant was added to the operation, as well as additional screening capacity in the rock plant.

In 1979, Solano County approved a 35-year quarry Use Permit and Reclamation Plan for the site, as well as a Variance to the County Grading Ordinance so that Syar could construct slope gradients steeper than 2:1. The County permit references for these initial permits are U-78-09, RP-78-03, and V-78-01. These permits were issued following certification of an Environmental Impact Report (EIR). The EIR described existing and anticipated activities on the site including future equipment upgrades and the addition of a Portland Cement Concrete (ready-mix) batch plant.

A separate Use Permit (UP-93-29) to operate a plant to recycle broken asphalt paving and concrete materials was approved by Solano County in 1994. An amended Use Permit (U-97-01) and Reclamation Plan (RP-97-01) were approved in 2001 to reflect a revised depth of mining down to an elevation of 200 feet above mean sea level (msl) and to add an overburden storage area across Lake Herman Road from the quarry. The amended Reclamation Plan also included an updated site plan showing the location of processing equipment, accessory asphalt and concrete batch plants, drainage and sediment control facilities, and other features of the operation. A Mitigated Negative Declaration was adopted for the project components included in the amended Use Permit and Reclamation Plan.

Current operations at the quarry are set to expire May 1, 2014 per U-78-09, RP-78-03, and V-78-01. In April 2008 a Use Permit Application and Mining and Reclamation Plan was submitted to the County to expand and extend the existing quarry operations. The Project evaluated in this EIR encompasses the proposed expansion as well as the current permitted uses at the Lake Herman Quarry under the various use permits, including the asphalt plants, the Portland cement concrete plant, the asphalt and concrete recycling plant.

3.3 EXECUTIVE SUMMARY

3.3.1 Sales Volumes

Extraction rates and sales of rock products are influenced by market demand. The project will have a sales rate of 3 million tons.

Based on historic sales data, Syar estimates average annual sales of 2.5 million tons of aggregate products, which includes rock products, as well as, asphalt paving materials, ready-mix concrete, and recycled asphalt and concrete.

3.3.2 Type of Material Being Mined

Lake Herman Quarry is located over a deposit of upper cretaceous marine sedimentary rock. The primary resource material being mined is a type of basalt that produces

Portland Cement Concrete quality aggregate. The mining surface is irregular due to the presence of intermittent streaks of volcanic ash running through the basalt.

3.3.3 Estimated Life of the Operation

Syar Industries, Inc. is requesting a new permit with a term of 35 years. While the initial permits issued in 1979 granted a 35-year mining operation (expiring in 2014), previous Plans acknowledged an intent to continue mining beyond this 35-year term until the resource is depleted. Because there will be extractable resource remaining at the end the of requested 35-year permit term, it is anticipated that there will be an application to continue mining at this location prior to the end of the 35 year permit being requested.

3.3.4 Mining and Reclamation

This Mining and Reclamation Plan consists of text and graphic descriptions of excavation and rock processing, in addition to the reclamation activities (interim reclamation) to be accomplished during the permit period. Interim reclamation includes the revegetation of quarried slopes where their final graded configurations have been reached. Final reclamation (following the completion of mining activities) is also discussed in this Plan. The property will be reclaimed as open space following mining.

Mining would expand beyond the boundaries of the existing mining area and excavate down to elevation zero mean sea level (msl). The upper slopes at the northern end of the existing mining area will be excavated first to create the more gradual final slope and to allow reclamation of this more visible portion of the site at the earliest possible time. Excavation will then proceed eastward and downward. Overburden generated by the excavation that is not sold as an aggregate product will be stored in existing overburden storage areas or on the property located at the bottom of the pit.

The mining operation will continue to produce aggregate used in the manufacture of a variety of aggregate products, including asphaltic concrete and Portland Cement Concrete, rip-rap, drain rock, road base and sub-base material, trench backfill, and general fill. Final reclamation of the quarry will be completed concurrently with mining for those areas where the final ground configuration is reached. Final reclamation would take place at the end of the permit and includes removal of equipment, rough grading to eliminate any remaining aggregate stockpiles and to fill in sediment ponds, installation of intercept drainage, and resoiling and erosion control seeding of graded areas.

3.3.5 Ultimate Site Condition

Syar Industries, Inc. intends to grade the quarry site to be utilized as open space. Relatively flat areas bordering the west edge of the pit will be rough graded, resoiled, seeded, and made ready for various open space uses. Slopes in the quarry will be benched, resoiled, and revegetated.

4 CHARACTERISTICS OF THE MINING OPERATION

4.1 AREA AFFECTED BY MINING

Lake Herman Quarry is located on the west side of Sulphur Springs Mountain in Solano County just east of the City of Vallejo (See Figure 1). Extraction activities are located on the west facing slopes of the mountain between two PG&E transmission line easements and a PG&E gas line easement. Processing equipment, storage of quarried and processed rock products, manufacture of asphalt paving materials and ready-mix concrete, and customer truck loading activities currently take place in the processing area at the toe of the slopes. Overburden is currently stored in a location on the hill located to the north of the extraction area, to the south of the quarry pit, or within the pit. Overburden for this project will be stored in the pit. The expansion described by this Plan will deepen the existing floor of the pit to zero elevation, and will expand the horizontal extent of mining by about 1,200 feet to the east.

TABLE 2: AREAS TO BE AFFECTED BY MINING (IN ACRES)

ACTIVITY	EXISTING	PROPOSED
Active Mining (quarry pit)	113	211
Processing Plant Area and Topsoil/Overburden Storage	385	257
TOTAL	**498**	**468**

4.1.1 Setbacks

Mining operations will straddle property boundaries owned by Syar Industries, Inc. but are designed so that no excavation begins closer than 25 feet to a surrounding property line not owned by Syar. No structure is located closer than 25 feet to a surrounding property line under separate ownership.

4.2 ACCESS TO THE MINING SITE AND WORK AREA

Lake Herman Quarry is accessed from Lake Herman Road. Trucks continue northwest from the quarry to Columbus Parkway, and then either north to Highway I-80, or south to Highway I-780.

4.2.1 Starting Date and Estimated Life of Quarry

4.2.1.1 Starting Date

Lake Herman Quarry is an existing, ongoing quarry operation. Syar anticipates that the use permit will be granted to Syar on December 4, 2014. With the 35 year use permit term the termination of mining would occur on December 4, 2049.

4.2.1.2 Estimated Life of the Operation

The State Designated Mineral Resource in Sulphur Springs Mountain will last beyond this Plan's 35 year permit term at the average saleable rate of 2.5 million tons of construction grade aggregate per year with maximum sales amount of 3 million tons. Mining operations described in this Plan depict active quarrying and processing on a 552 acre quarry site. The requested 35 year permit will not exhaust the available aggregate resource. However, as stated before the termination date will be December 4, 2049.

4.2.2 Operation Schedule and State of Readiness

4.2.2.1 Hours of Operation

Hours of operation vary based on product demand. Work on transportation infrastructure projects for Caltrans and other government agencies often takes place at night, to avoid the traffic impacts at the project location that would result from daytime operations. PG&E contracts also require off-peak operation of aggregate processing and other high electricity demand operations when electrical demand is high in the summer months. Weekend hours are sometimes necessary to maintain critical project schedules, particularly as the rainy season approaches in the fall. In addition, large scale disasters, such as widespread flooding, earthquakes, or landslides, may create short-term extraordinary market demand for aggregate products which can only be satisfied by extended operational hours. Below are the regular hours of operation for the Lake Herman Quarry facility.

Regular Hours of Operation

Regular Aggregate Sales Hours		
	Construction Season	Monday through Friday, 5:30 a.m. to 4:00 p.m.
	Off Season	Monday through Friday, 6:00 a.m. to 4:00 p.m.
Regular Concrete Plant Sales Hours		
	Year Around	Monday through Friday, 5:30 a.m. to 4:00 p.m.
Regular Asphalt Plant Operation Hours		
	Year Around	Monday through Friday, 7:00 a.m. to 3:30 p.m.
Regular Aggregate Processing Operation Hours		
	Construction Season	Monday through Saturday, 6:00 a.m. to 10:30 p.m.

	Off Season	Monday through Friday, 6:00 a.m. to 10:30 p.m.
Regular Aggregate Mining Operation Hours		
	Construction Season	Monday through Saturday, 6:00 a.m. to 10:30 p.m.
	Off Season	Monday through Friday, 6:00 a.m. to 2:30 p.m.

In addition, the quarry processing and sales would continue to operate outside the regular hours of operation approximately 60 days per year, and asphalt plant operations approximately 90 days per year, depending on customer requirements and market conditions.

4.2.2.2 State of Readiness

This is an existing, ongoing mining operation. The expansion of the quarry described by this Plan would begin after receiving the necessary approvals.

4.2.3 Description of Quarried Material and Level of Production

4.2.3.1 Geology of the Site

The general geology of the area is described as upper cretaceous marine sedimentary rock.

4.2.3.2 Mineral Commodity Being Mined

The primary resource being mined is basalt. Resources include metamorphosed greywacke and greenstone of the Franciscan Complex, with some shale and chert. These rocks produce concrete aggregate, asphalt aggregate, road base rock, drain rock, rip-rap, decorative stone, and other building materials.

4.2.3.3 Anticipated Quantity of Materials to be Mined

It is estimated that approximately 140 million tons of aggregate will be extracted during the 35-year permit term. It is estimated that around 75 percent of this extraction will be comprised of construction grade aggregate (approximately 105 million tons). The remainder of the extraction (35 million tons) is either overburden (which overlies the primary mineral deposit), or material that is intermixed with deposits of higher quality rock. This material will either be sold for use as general fill material, or will be stored in the approved overburden areas.

4.2.3.4 Composition of Mined Materials

The primary mineral extracted at the quarry is basalt, which is dark grey in color and has a puffy appearance due to its volcanic origin. It is sometimes referred to as pillow basalt. Intermixed with the basalt is volcanic ash which has no value for construction aggregate. Adjoining the basalt is metamorphosed sandstone which varies from brown to grey blue and has a blocky appearance in the field. Intermixed with the sandstone is raveling stone and shale, which has a crumbly appearance in the field.

4.2.3.5 Production Level

Average rate of gross extraction is estimated to range from 3.3 to 4 million tons per year. Approximately 75 percent of the gross extraction will produce construction grade aggregate, and so the average saleable amount of construction grade aggregate will be in the range of 2.5 million to 3.0 million tons.

4.2.3.6 Anticipated Quantity of Overburden

Overburden consists of two main types of materials: soil and weathered rock which overlies the commercial grade mineral deposits, and weathered rock, shale, and volcanic ash that is intermixed with the commercial quality aggregate. Overburden cannot be used for commercial grade aggregate products, but in some cases it can be used for general fill uses. The amount of these materials is variable throughout the site, so it is difficult to precisely determine the amount of overburden that will be generated during the permit term. Based on previous mining and various geologic studies of the expansion area, it is estimated that 25% of the 140 million tons of material in the planned mining area, or 35 million tons, is overburden and/or topsoil. This Plan provides for placement of all of this material in the pit. However, it is anticipated that a significant amount of overburden will be sold as fill, which will reduce the amount of overburden placed in the quarry.

4.2.3.7 Topsoil Salvage

The topsoil from previously mined areas was used to face the earth berms constructed at the site perimeter. A layer of topsoil soil varying from about six to thirty inches (18 inches average) overlies the mineral resource in areas that have not previously been mined. As mining proceeds into these areas, the topsoil will be stockpiled separately from other overburden. This topsoil will be used for final reclamation of the quarry site. The top soil piles will be identified with appropriate signage as to ensure that the top soil is not used for an authorized purpose.

4.2.4 Description of Mining Methods and On-Site Processing

4.2.4.1 Summary of the Mining Operation

Aggregate materials are extracted primarily by mechanical excavation equipment, with some use of explosives. Prior to mining within an undisturbed area, topsoil is stripped to an average depth of 18 inches and stockpiled on-site for future use during reclamation. Overburden encountered during mining is also removed in order to reach the mineral deposit below. Next, a rock drill is brought to the work area and a matrix of holes is drilled. A blasting cap is placed in each hole, explosives are placed above the blasting cap, and the upper portion of each hole is capped with granular material. The explosives are controlled electronically or through a timed fusing system so that the charge in each hole is detonated milliseconds apart from that in other holes in the matrix. The energy of the blast is directed into the rock causing it to fracture. Once the rock has been fractured, it can be harvested using mechanical excavators. As work progresses, the working terrace is lowered, and 25-foot wide benches are cut into the slope at 50-foot intervals to create a stable slope, intercept falling rock, and to provide controlled slope drainage. The extraction continues outward from the uppermost bench

and downward until a prescribed depth is reached. Overall slope ratios average 0.5:1 gradient, while the slopes between terraces are nearly vertical. A water truck is used to wet work areas and haul roads for dust control.

Fractured rock is collected by loaders and loaded into large-capacity, off-road haul trucks or conveyors and transported to the main crusher at the rock plant, except for some material which is taken directly by the loader to a scalper where oversized rocks are diverted to a temporary stockpile. After the rock is crushed, it is screened by size and conveyed to storage piles (this is discussed in further detail below under On-Site Processing). Some of the processed rock is also stockpiled at the asphalt paving materials and ready-mix concrete batch plants where it is fed into the respective plants according to the desired mix.

The loaded trucks are weighed to measure the material being sold and to avoid overloads. Materials can be sprayed with water before leaving the site to minimize dust. Exit from the site to Lake Herman Road is controlled by stop signs. Travel beyond the quarry property is currently limited to the approved truck route west along Lake Herman Road to Columbus Parkway, an approved truck route in the City of Vallejo, which accesses Interstate Highway 780 to the south and Interstate Highway 80 to the north.

4.2.4.2 Depth of Maximum Excavation

During the 35 year permit term, the benched, cut face will extend from approximately elevation 925 down to elevation zero. See the typical section views of the excavation, Figures 4 and 6.

4.2.4.3 Excavation Plan

Figure 3 is the Grading Plan for the excavation described in this Plan. The lateral boundary, slope configuration, and depth of mining on the quarry site are shown. Figure 5 is the Grading Plan for placement of overburden in the pit.

4.2.4.4 On-Site Processing

On-site processing activities include aggregate processing, recycled material processing (includes crushing and blending with other materials to make recycled asphalt, aggregate or concrete products), and the manufacture of asphalt paving materials and ready-mix concrete. Raw materials are stockpiled adjacent to each processing unit.

Rock processing typically begins with the freshly excavated rock being brought to a primary crusher. Large sized rock, usually larger than six inches, is separated for use as rip-rap and gabion rock[1]. The remaining rock is transported to the primary jaw crusher and secondary cone crusher where it is crushed. After crushing, the rock is conveyed to a series of screens where it is separated by size and then conveyed to separate stockpiles according to size specifications. A water spray system with jets at transfer points on the conveyor system is used to suppress dust during rock processing

[1] *Riprap is rock or other material used to armor shorelines, streambeds, bridge abutments, piling and other shoreline structures against scour, water or erosion. Gabions are cages, cylinders, or boxes filled with aggregate that are used in civil engineering, road building, and military application.*

activities. Some of the rock, depending on the specification needed, is washed in a sand screw to remove fine sediments. The fine sediments are conveyed in a water slurry to settling ponds located at the northwest edge of the Quarry site. Recycle processing is similar to rock processing, except that all materials are crushed and screened using a separate plant.

Two asphaltic concrete manufacturing plants and a Portland cement concrete batch plant are located at the Lake Herman Quarry. Rock from the mining operation is the primary component in the final, manufactured products from these plants and is stockpiled at each plant. Other components of the products are imported into the site by truck, including asphalt oil, Portland cement, sand, and various other materials and additives.

Asphalt paving materials are manufactured by mixing rock, sand and fine sediments together with asphalt oil which is trucked to the site and stored in tanks at the plant. The rock and sand are first superheated in a revolving drum in order to drive out moisture and then the asphalt oil is added. Dust is removed during the drying process and is trapped in an enclosed vacuum system known as a bag house. The trapped dust is then piped into a water slurry from the bag house to settling ponds located at the northwest edge of the quarry site. The hot paving material is conveyed from the pug-mill or drum to either a truck or a silo and then loaded from the silo into customer trucks. Rock and sand comprise about 95% of the mix.

Ready-mix concrete is manufactured by mixing rock and sand together with Portland cement and water. Sand, Portland cement and some rock are trucked from other Syar facilities to the site and stored in silos. The rock, sand, and cement are loaded from the plant into ready-mix concrete trucks which are fitted with a revolving drum. Water and additives are then added according to mix specifications. Rock and sand comprise about 89% of the mix.

4.2.4.5 Topsoil Salvage

Before mining proceeds into unmined areas, topsoil will be stripped to an average depth of 18 inches. This topsoil will be stockpiled to the northeast of the settling ponds located at the northerly edge of the quarry site, east of the recycle operation located at the south edge of the quarry site. The stockpiles will be seeded for erosion control and to maintain soil viability for later reuse. Signs will be posted marking the stockpile and reading: "Notice, This Area Contains Stockpiled Topsoil; Do Not Remove; Contact Landowner for Instructions".

Located in the northeastern portion of the project area is an existing area that was once used for topsoil storage. In 2005 this area slipped down the adjacent slope. At the time this area was immediately re-graded to stabilize the material, following a review of the area by Pacific Watershed Associates. The final slope configuration has been stable over the last 9 years following the slide.

4.2.4.6 Storage of Overburden

Overburden encountered during mining will be stored in the pit. If slope stability is required, earthmoving equipment will place the material, and then compact it to achieve a 90 percent relative compaction level for slope stability. The slope configuration shown in Figures 3 and 5 would accommodate 35 million tons of overburden material. Some of this material may be sold as general fill, reducing the amount of storage that would need to be accommodated in the pit.

4.2.4.7 Water Use/Dust Control

Both recycled water and fresh water are used in the quarry operation. Drinking water is provided in bottles. Rain water accumulates in the quarry pit, and is used for dust suppression in the rock plant. Water from the pit is also used in the water truck for dust suppression to be used on internal haul roads, and for irrigation of the vegetation plantings.

Recycled water from sediment ponds is used for rock washing and to convey fine sediments from the asphalt plant bag house. Water is recycled for these purposes in a closed system connecting to the large settling ponds at the northwest edge of the quarry site. Makeup water is obtained from the retention basin in the quarry pit. The quarry operator also has an agreement with the City of Vallejo allowing use of water from Lake A located in the adjacent Blue Rock Springs Golf Course. This source would be available if drought conditions limit the availability of fresh water from the retention basin.

4.2.4.8 Ongoing Maintenance Procedures

An integral part of the mining operation is the routine maintenance of benches, drainage and sediment facilities, repair to the access road, and cleanup of spills. Mechanical excavation equipment is used to clear loose rock from benches to facilitate drainage, and to clean out the sediment ponds, depending on pond size and desired pond depth. Sediment ponds are inspected after each storm and cleaned out on a regular basis. The sediments are treated as overburden and will be stored in the pit or sold. A road grader is used to smooth the haul road and unpaved internal roads so they can be safely and easily traversed by haul trucks and so runoff does not erode the travel surface. Spills and loose materials tracked onto Lake Herman Road are cleaned up whenever necessary. Lake Herman Road is cleaned by a road sweeper as needed (up to several times a day).

4.2.5 Operating Conditions

4.2.5.1 Off-Street Parking

Parking for all customer and employee vehicles is located in the vicinity of the office and scale house. Equipment operators and maintenance personnel normally park their vehicles near their work area or at the equipment yard located at the southwest edge of the quarry site.

4.2.5.2 Access Roads

Two paved driveways lead directly from Lake Herman Road into the quarry. Paving on the main quarry access drive extends up to the quarry office and scale house. The remainder of the work area is served by compacted earth roads or gravel surfaced roads allowing flexibility in the relocation of equipment, as needed, for operational efficiency. A continuous perimeter road that is 75 feet in width will be installed as final slope configurations are reached. The road will be located approximately at elevation 450 msl, and will be left in place during and after reclamation to allow maintenance access.

4.2.5.3 Dust Control

To control dust at the site best management practices (BMPs) are implemented daily to deter any potential dust generation at the Lake Herman Quarry. The following bullets are BMPs used at the site:

- Using a watering truck to wet roads and working areas;
- Using a water spray system in the rock processing plant;
- Using a water spray bar to moisten materials on loaded trucks;
- Maintaining a 15 mph speed limit within the quarry;
- Conducting excavations on the upper slopes only when the wind speed is below 20 mph; and
- Maintaining permits and ensuring that the quarry is in compliance with the Bay Area Air Quality Management District.

4.2.5.4 Runoff and Water Quality

Most runoff that flows over the active quarry slopes is captured in the pit and does not leave the site. All surface drainage from the active mining area is processed through a sediment pond and stored in a retention basin in the quarry pit. Water is pumped from the basin to the water truck and rock processing plant for use in dust suppression. Surface drainage from the rock processing plant and rock storage stockpiles is directed in swales to a series of sediments ponds located at the site perimeter where it is detained while sediment settles out. This water is also used for dust suppression except during large storms when stormwater accumulates faster than it is used. Excess water is then drained from the site along existing drainage ditches. Drainage and sediment control facilities are shown on Figure 7.

Rock processing does not produce chemical contaminants; however fuels and lubricants associated with the operating equipment could spill and, if not properly handled, could enter surface runoff. Spills are cleaned up in accordance with the Spill Prevention Plan included as Appendix D. Equipment maintenance is performed at a paved maintenance yard located at the west edge of the quarry site. Runoff from the yard flows to a sediment pond. The collected water is then run through an oil separator before the clean water is recycled for dust suppression.

Prior to the onset of the rainy season in November each year, any fill material will be seeded to control erosion and maintain slope stability. Any incidental erosion that occurs from this material will be entirely contained within the pit, and would not present a hazard to off-site drainage.

Proper mitigation of potential water pollutants is an ongoing part of the quarry operation. Additional mitigation will be provided by implementation of Best Management Practices as outlined in the quarry's approved Storm Water Pollution Prevention Plan (Appendix E).

4.2.5.5 Explosives, Noise and Vibration Control

Explosives are used in the mining operation to fracture rock so it can be removed from the deposit. Use of explosives is controlled electronically or through a timed delay system so that each delay is detonated milliseconds apart from others in the matrix.

Noise and vibration generated by processing equipment, blasting, and trucks are controlled by the following measures:

- Locating processing equipment behind or below an earth berm or topographic barriers to buffer noise;
- Limiting haul trucks to a designated truck route;
- Limiting excavation and blasting activities on the upper slopes to times when the wind speed is below 20 mph;
- Concentrating topsoil removal into a short time period;
- Ensure that the current weather does not increase noise or vibration to the surrounding areas;
- Lowering the Sulphur Springs Mountain ridgeline incrementally while maintaining an east facing slope as a shield, while extracting rock materials in an east to west direction; and
- Maintaining a setback from the quarry site to prevent encroachment by incompatible land uses.

4.2.5.6 Fencing, Posting and Security

Lake Herman Quarry in its entirety is fenced along its perimeter. New fencing will be installed to enclose the expanded quarry site. Signs are posted identifying the area as private property and as a danger zone. Only those people with legitimate business in the mining area are allowed into the quarry. During non-working hours the property is patrolled by Syar personnel. Principal access is controlled by a lockable gate.

4.2.5.7 Finished Slopes

The final excavated slopes will be constructed to a maximum overall slope ratio of 0.5:1. These slopes will include a 25-foot wide bench each 50 vertical feet. The intervening slopes between the benches will be nearly vertical. The overburden

generated by the expansion of the quarry will be placed in the designated areas, with a maximum slope ratio of 2:1.

Concurrent with mining activities, Syar will have a professional engineer conduct slope stability inspections annually in the areas where active mining has occurred over the last 12 months. Inspections will be completed on an annual basis, at a minimum, as well as after major storm events or earthquakes. Inspections will include mapping and movement monitoring of the slopes to assess the potential for project excavation, grading, and overburden storage to trigger movement of debris flow and landslides. If a slope condition presents risk to safety or the potential for mass movement, repair measures will be recommended and implemented. A memorandum summarizing the findings of the inspections and any recommendations will be prepared and submitted to Solano County and to OMR if the recommendations change the approved reclamation plan.

4.2.5.8 Air Quality

Particulates generated by quarry operations are mitigated by use of water and bag houses on the processing equipment and by use of water spray on haul roads, work areas, and the overburden conveyor. The quarry has Bay Area Air Quality Management District (BAAQMD) permits for its processing equipment. In addition the processing equipment emissions are regulated by the Mine Safety and Health Administration. To limit the amount of dust particles dispersed by air movement, blasting and extraction activities on the higher slopes will not occur on windy days.

4.2.5.9 Vector Control

Sediment ponds are designed to empty so that standing water is not left long enough to propagate mosquitoes. The pumping of water into and out of the pit retention pond results in surface disturbance preventing mosquito propagation.

5 DESCRIPTION OF THE QUARRY SITE AND ENVIRONS

5.1 SITE AREA AND AREA SUBJECT TO MINING

The Lake Herman Quarry property is located in Solano County adjacent to the City of Vallejo, within the USGS 7.5 minute Benicia Quadrangle. Mining and reclamation activities proposed by this Plan are located in portions of Assessor Parcel Numbers: 0181-190-060, 0181-200-010, 0181-210-030, and 0181-220-040. The proposed quarry site, which includes active mining, processing, and reclamation activities, will affect approximately 552 acres.

5.2 TOPOGRAPHY

The quarry site is located on Sulphur Springs Mountain, and the overall quarry property includes some of the surrounding hills and rangelands. The elevations on the current mining property range from about 200 feet at the bottom of the quarry pit to about 965 feet at the peak of Sulphur Springs Mountain. Proposed future operations will lower the pit elevation to zero.

The mountain is deeply dissected by short drainages and slopes varying from very steep (1.5:1 or steeper) to relatively gradual (5:1 or flatter). The large valley east of Sulphur Springs Mountain is known as Sky Valley. Drainage from the east side of Sulphur Springs Mountain flows to Sulphur Springs Creek, eventually draining into Lake Herman to the south. Figure 1 shows the location of the quarry site relative to the surrounding topography. The combination of existing natural topography and man-made berms constructed around the perimeter of the process area visually screens much of the quarry site from surrounding properties.

5.3 GEOLOGY, SEISMICITY, AND SOILS

5.3.1 Geology

Lake Herman Quarry is located in an area shown on USGS Map I - 909 titled "Mineral Resources of the San Francisco Bay Region, California - Present Availability and Planning for the Future" (Bailey and Harden, 1975). Mineral resources in the area include sandstone and mudstone with minor conglomerates, volcanic rock with intrusive ash and various metamorphic rock types. This is corroborated by the Preliminary Geologic Map of Solano County and by the California Division of Mines and Geology Data Map No. 2 titled "Geologic Map of California" (Charles Jennings, 1977). Jennings describes the material as "Franciscan Complex: Cretaceous and Jurassic Sandstone with smaller amounts of shale, chert, limestone and conglomerates". Site geology is depicted on Figure 9.

The primary mineral resource being mined is a rock of volcanic origin known as pillow basalt, due to its rounded pillow-like appearance in the field. The mining surface is irregular and uneven due to the intermittent streaks of volcanic ash running through the basalt.

The deposit on Sulphur Springs Mountain has been designated by the State Mining and Geology Board as a mineral resource of regional significance pursuant to SMARA. The Sulphur Springs Mountain deposit (shown on Figure 9) is one of the few remaining locations in the North San Francisco Bay Production/Consumption Region with a large concentration of construction grade aggregate.

The eastern slopes of Sulphur Springs Mountain contain numerous debris and mud flow landslides. These landslide deposits are typically shallow and involve just the soil zone on the steeper slopes (creep).

5.3.2 Faults and Seismicity

No active or potentially active fault has been mapped on or in the immediate vicinity of Lake Herman Quarry. An inactive thrust fault, known as the Sulphur Springs Valley Fault, lies on the eastern slope of Sulphur Springs Mountain. It has a branch which parallels Lake Herman Road on the westerly side of the quarry. The nearest active fault to the Project site is the Concord-Green Valley fault, located approximately 3 miles east of the main quarry and 2.7 miles east of the proposed bridge site. Other nearby regional faults include the West Napa fault to the northwest, and the Hayward fault to the west-southwest. The shortest distances from the site to the mapped surface expression of these faults are shown on Table 3.

TABLE 3
ACTIVE FAULT PROXIMITY TO PROJECT SITE

FAULT	DIRECTION	APPROXIMATE DISTANCE FROM PROJECT SITE (MILES)
Concord-Green Valley	East	3
West Napa	Northwest	4.5
Hayward	West	12

The four major hazards that could occur at the project site that are associated with earthquakes are summarized below:

- *Ground Shaking*. Ground shaking can be described in terms of peak acceleration, peak velocity, and displacement of the ground. It is controlled by the magnitude and intensity of an earthquake, a site's distance from the epicenter, and local geologic conditions.
- *Surface Fault Rupture*. Surface fault rupture, displacement at the earth's surface resulting from fault movement, is typically observed close to or on the active fault trace.
- *Liquefaction and Ground Failure*. Liquefaction is the process by which water-saturated soil materials lose strength and fail during strong seismic ground shaking. The shaking causes the pore-water pressure in the soil to increase, thus transforming the soil from a solid to a liquid. Lateral spreading occurs when a continuous layer of potentially liquefiable soil extends to a free face, such as a creek. Densification is the settlement of loose, granular soils above the groundwater level due to earthquake shaking. Liquefaction has been responsible for ground failures during almost all of California's major earthquakes.
- *Earthquake-induced Landslides.* Seismically induced landsliding is typical of upland areas with slopes greater than 25 percent. Earthquake ground shaking can trigger slope movements such as earth flows and rotational landslides, or dislodge fractured bedrock material resulting in a rock fall.

5.3.3 Soils

The average depth of topsoil overlying the mineral resource to be extracted in the expansion area is anticipated to be 18 inches deep, but would vary from 6 inches to 30 inches. Underneath the topsoil is a layer consisting of weathered rock, shale, and volcanic ash that is intermixed with the commercial quality aggregate and other materials that do not meet the specifications for construction grade aggregate. These materials are considered overburden.

Soils in the expansion area consists of Altamont clay (AcF2), a dark grayish brown clay over siltstone, Hambright loam (HaF), a brown colored cobbley loam over hard, fractured basic igneous rock, and, Toomes stony loam (ToG2), a light brownish grey and light grey loam over light-colored tuffaceous rock.

In the northern part of the Project site, soil types include Trimmer loam (TrE) and Hambright loam (HaF). Approximately 5 years ago, a landslide occurred in the far northern portion of the Project area.

Soils in the southern portion of the Project site, east of Lake Herman Road, include Altamont clay (AcE) and Hambright loam (HaF). Soils in the southern Project site, west

of Lake Herman Road, include Clear Lake clay (CeB), Hambright loam (HaF), and Dibble-Los Osos clay loams (DlF2).

5.4 CURRENT LAND USE

The existing quarry pit is a 113 acre portion of the overall quarry property which measures 498 acres. The 113 acre quarry pit is comprised of slopes being actively quarried while the surrounding land (about 385 acres) is utilized for rock processing, stockpiling, sediment ponds, storage of overburden, and manufacturing of asphalt paving materials and ready-mix concrete. This updated Plan describes expansion of the quarry site to approximately 468 acres. This acreage is a decrease due to the currently permitted overburden areas (across Lake Herman Road) that were never used will no longer be permitted for use.

Much of the rural land surrounding the quarry site is also open rangeland providing watershed easterly to Lake Herman in Benicia and runoff westerly to Lake Chabot in Vallejo. North of the quarry site is the Blue Rock Springs Golf Course, owned by the City of Vallejo. Two PG&E transmission tower easements traverse the quarry site in an east-west direction north and south of the present quarry operation. A PG&E high pressure gas line crosses south of the quarry site south of the current excavation and, along with the transmission lines, constrains quarry expansion to the south. A small AT&T relay station site, less than one acre in size, is located at the Sulphur Springs Mountain summit south of the area proposed for mining.

5.5 GENERAL PLAN AND ZONING REGULATIONS

5.5.1 General Plan

All of the mining property is designated as "Agriculture" in the Solano County General Plan. “Agricultural areas within Solano County are identified within one of ten geographic regions. Within these regions, uses include both irrigated and dry land farming and grazing activities.” Lake Herman Quarry is located in the “Western Hills” agricultural region (Figure AG-4 – Solano County General Plan). The Western Hills region is characterized by “…grasslands, oak woodland, and mountain plateaus. The steep slopes and soil types currently limit the productive use of the land primarily to grazing”.

Solano County's General Plan Resources Chapter recognizes the need to "preserve for future use, areas with significant mineral resources by preventing residential, commercial and industrial development" which would be incompatible with proper mining practices.
The Solano County General Plan Resources Chapter identifies the Lake Herman Quarry as an Active Mine and Mineral Processing Plant for crushed stone (Figure RS-4 Mineral Resources). Figure RS-4 also indicates the Lake Herman Quarry Area as a

Mineral Resource Zone-2 (MRZ-2): areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their present exists.

5.5.2 Zoning

The Lake Herman Quarry is zoned A-20 ("Exclusive Agricultural District"). According to County policy this zoning district should be used exclusively for agriculture or other uses subject to a Use Permit. Conditionally permitted uses include "surface mining operations."

5.5.3 Spheres of Influence – City of Vallejo and City of Benicia

Portions of the quarry site are located in the spheres of influence of the cities of Vallejo and Benicia. The proposed 53 acre expansion area (portion of the 87 acre total quarry pit expansion) is within the sphere of influence of the City of Benicia.

5.6 ACCESS AND TRAFFIC CONSIDERATIONS

5.6.1 Access

Access to the quarry site is taken from Lake Herman Road which connects to Columbus Parkway on the west and I-680 on the east. Two entrances are provided to the quarry site along a long, relatively flat, straight segment of Lake Herman Road. One entrance, located 0.6 of a mile southeast from Columbus Parkway, is identified on official quarry maps as "The Quarry Entry". The original site entrance, located about 1,200 feet to the northwest, is used primarily to access the concrete batch plant.

Quarry trucks are not presently allowed to travel east from the quarry along Lake Herman Road through Benicia, except for local deliveries. Truck traffic to the quarry generally travels along Lake Herman Road northwest west to Columbus Parkway, and then south along Columbus Parkway to I-780 or north along Columbus Parkway to I-80. The intersection at Lake Herman Road and Columbus Parkway is controlled by a stop light. The speed limit along these roads is generally 35 miles per hour. Columbus Parkway has both two lane and four lane segments. Columbus Parkway has been widened to four lanes between I-80 to Springs Road.

5.6.2 Traffic

Future operations at the Lake Herman Quarry will be a continuation of the existing extraction and manufacturing operations. Based on a maximum total sales volume between 2004 and 2008 of 3 million tons per year, the quarry operation and its accessory uses generated an average of 732 truck loads per day. Traffic is generally concentrated in the morning hours because of its relationship to the normal scheduling of construction projects. The normal distribution of traffic results in twelve percent

(12%) during the A.M. peak hours, eight percent (8%) during the P.M. peak hours and eighty percent (80%) spread out over the rest of the day.

5.7 UTILITY AND SERVICE REQUIREMENTS

Lake Herman Quarry is located in a part of the County that is relatively close to developed urban centers. For the most part, however, no regular urban services are required for mining operations. Emergency response and fire protection is provided by the East Vallejo Fire Department. The Department, in contact with the City of Vallejo, provides fire protection to unincorporated Southeast Vallejo. Police services, if required, are provided by the Solano County Sheriff's Department. The quarry operators maintain fire extinguishers and first aid provisions for incidental emergencies.

Quarry vehicles are diesel powered and fueled from supplies brought by truck to storage tanks located at the site. Fuel storage tanks are kept in containment areas to contain any inadvertent spills. The asphalt plant is currently powered by natural gas though the air permits allow the use of other fuels. Quarry crushers, screens, and conveyors are electrically operated from power brought to the site via PG&E overhead power lines. AT&T and Shoretel Communications provide telephone service. Incidental solid waste is collected by Norcal Waste System. Syar Industries, Inc. arranges for recycling of metal, wood scrap, oil, and other recyclables and disposal of all other wastes from operations. No public water or sewer system is utilized. Toilet facilities for employees consist of portable toilet units placed throughout the site. Drinking water is provided in bottles. Water for dust control and ready-mix concrete batching is provided by recycling captured runoff on-site. If drought conditions occur water could be supplemented by untreated water acquired from the City of Vallejo. Daily water use, including water utilized in the ready-mix concrete batch plant, ranges from about 125,000 gallons in the winter to about 180,000 gallons in the summer.

5.8 CLIMATE AND AIR QUALITY

5.8.1 Climate

Weather in the Vallejo-Benicia area is influenced by the moderating effects of coastal fog and localized effects of air drainage through the Vallejo-Benicia hills. The wind in this area has distinct seasonal patterns. The summer and early fall winds are from the west and southwest and the average wind speed in the area ranges from 8 to 11 miles per hour (mph). In the winter the wind speed and directions are more variable. The prevailing wind direction in the winter months is from the north. Winter storms can occasionally have higher wind speeds, but there can also be long periods of calm.

Weather records indicate an average summer high and low temperature range from 50-90° Fahrenheit (F) with average summer temperatures from the mid-60s to 70s, and average winter high and lows from the 40s to the 50s. Freezing temperatures are

recorded as early as October and as late as April. Rainfall occurs primarily between November and March. The annual average rainfall at the Fairfield Fire Station, north of site, is 20.94 inches.

5.8.2 Air Quality

Lake Herman Quarry is located within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD) which has 26 air monitoring stations. The closest air monitoring station to the quarry is 4.6 miles away, in Vallejo, on Tuolumne Street. The BAAQMD regulates particulate matter generated by rock processing activities, and various gaseous pollutants emitted by motorized equipment such as that used in the manufacturing of asphaltic concrete. The quarry has BAAQMD permits for all of its rock processing and manufacturing equipment at the quarry. The BAAQMD monitors these sources to ensure that their standards are met.

Dust from the mining operation has no discernible effect on non-mining properties. Dust can be generated by the action of earth moving equipment, by movement of aggregate through crushers, screens and along conveyers, by loading from storage to haul trucks, and by the movement of vehicles over the unpaved surfaces in the quarry floor. In addition to these sources, dust can be blown by wind action on storage piles. To deter these potential problems, water sprayers are installed in the crushing, screening and conveyor assemblies at transfer points. In addition water is sprayed from a water truck on ground surfaces, on storage piles and on exiting loads (by spray bar). All operations are regulated by permits from the BAAQMD.

5.9 DRAINAGE

5.9.1 Stormwater Management

Most of the stormwater runoff that flows over the excavated slopes is directed into the quarry pit and does not leave the property. Surface drainage from the processing area and other disturbed areas of the site is either directed to the pit or is conveyed through drainage swales to existing sediment ponds at several locations on the site (see Figure 7). Sediments are allowed to settle out of the runoff within these ponds before the water is discharged from the site. Syar maintains and implements a Storm Water Pollution Prevention Plan (Appendix E) pursuant to state and federal standards.

The mining property can generally be characterized as having well drained soil. Runoff that flows over the excavated slopes is directed into the quarry pit and does not leave the property. During normal periods of rain, the runoff that is not captured in the pit is absorbed into the soil. Runoff flows over the ground surface only during periods of heavy rainfall. Excess stormwater runoff from the undisturbed northwestern and western slopes of Sulphur Springs Mountain, as well as stormwater runoff from the processing area, eventually flows to Lake Chabot near the County fairgrounds. Excess stormwater runoff from the undisturbed eastern and southern slopes flows

southeasterly to Lake Herman in Benicia. Surface drainage from the site is conveyed through drainage swales to existing sediment ponds at several locations on the site (see Figure 7). Sediments are allowed to settle out of the runoff within these ponds before the water is discharged from the site. Silt fencing and straw wattles are installed as needed, to control erosion on slopes. Straw bales are placed along roadside drainage ditches to slow runoff velocity and to capture silt.

5.9.2 Process Water Management

Water used in the processing and washing of aggregate is kept entirely separate from stormwater.

5.9.3 Water Quality and Sediment Control

Rock processing does not result in the chemical contamination of water. Contamination from a fuel spill is possible, however water contamination from a spill of petroleum products used on-site is unlikely. The quarry complies with the State and Federal government regulations which ensure the proper use, storage and cleanup of chemical materials. Pursuant to these regulations, the quarry maintains and implements the following: Hazardous Materials Business Plan, Spill Prevention Control and Counter Measure Plan, Emergency Response Plan, Storm Water Pollution Prevention Plan, and an employee training program focusing on the proper use, storage, handling and cleanup of each chemical.

Contamination of water by the release of naturally occurring minerals is possible. Syar is aware that the Hastings Mercury Mine was operated on the eastern slopes of Sulphur Springs Mountain between 1900 and 1930. The operation extracted cinnabar, a mercury-containing ore. Some remnants of the operation remain, including ruins of several structures, tunnels, and tailings piles. Samples of the tailings were analyzed as part of the Draft Environmental Impact Report (DEIR) for the Sky Valley Specific Plan (1991). The analysis concluded that the mercury in the tailings is not highly soluble or extractable, and would not tend to leach into surface runoff or ground water. There is a potential, however, for contaminated sediment to be moved through erosion and discharged into Lake Herman via Sulphur Springs Creek.

5.10 BIOTIC RESOURCES

5.10.1 Vegetation and Wildlife

The existing quarry floor and slopes were excavated previously. Surface soils on the undisturbed land surrounding the excavation support a moderate growth of range grasses but minimal woody vegetation. Non-native grassland species dominate the cover. Included are brome (*Bromus spp.*), wild oat (*Avena fatua*), barley (*Hordeum, spp.*), burr clover (*Medicago hispada*), red-stemmed filaree (*Erodium cicutarium*), yellow star thistle (*Centaurea solstitiallis*) and chickweed (*Stellar media*). Typical native species include California poppy (*Eschscholzia californica*), purple needlegrass (*Stipa*

pulchra) and wild hyacinth (*Dichelostemma pulchellum*). Some Coast Live Oak Woodland species exist in the area including poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), Pacific blackberry (*Rubus vitifolius*) and Coast live oak (*Quercus agrifolia*). An area of Coast live oak woodland habitat, including Coast live oak trees and associated species, exists at the northeast of the existing quarry site. The habitat value of this stand was compromised by the landslide in 2005. The overburden storage locations are primarily characterized by similar grassland cover.

Wildlife species associated with the grassland habitat include resident birds such as mourning doves (*Zenaida macrocoura*), California quail (*Callipepla californica*), American goldfinch (*Spinus tristis*) and western meadowlark (*Sturnella neglecta*). Raptors associated with the grassland and rocky slopes include the red-tailed hawk (*Buteo jamaicencis*), black-shouldered kite (*Elanua caeruleus*), Cooper's hawk (*Accipter cooperi*) and the golden eagle (*Aquila chrysaetos*). Rodent species found in the grasslands include the California ground squirrel (*Citellus beecheyi*), deer mouse (*Peromyscus maniculatis*), California vole (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), and the valley pocket gopher (*Thomomys bottae*). Mammalian species include the gray fox (*Urocyon cineroargenteus*) and the bobcat (*Felis rufus*).

5.10.2 Sensitive Species

Three sensitive animal species, the golden eagle, the California red-legged frog, and the Callippe silverspot butterfly have been seen in the area in the past. Below are descriptions of the three species:

- *Golden Eagle (Aquila chrysaetos) - CDFG Fully Protected Species CDFG Species of Special Concern, Bird of Conservation Concern.* Golden eagles occur in a variety of habitats throughout the San Francisco Bay region. Golden eagles frequent rolling foothill and mountain areas, grasslands, sage-juniper flats, and desert habitats. They forage over large areas, feeding primarily on ground squirrels, rabbits, large birds, and carrion. Cliff-walled canyons provide nesting habitat in most parts of the range. This species was observed foraging in the project area. Highly suitable prey and foraging habitat is present and golden eagles have been documented in the vicinity. Typical nesting habitat was not observed during site visits.

- *Callippe Silverspot Butterfly (Speyeria callippe callippe) - Federal Endangered.* The Callippe silverspot butterfly (CSB) is a subspecies of the more common Callippe fritillary butterfly (*Speyeria callippe*). This subspecies occurs in grassland habitats characterized by shallow rocky soils or numerous rock outcrops, often with a significant component of native grasses. For grasslands to be considered habitat, the larval host plant, California golden violet (*Viola pedunculata*) must be present in sufficient density to support a population of butterflies. Suitable grassland habitat also includes ridgelines and hilltops, where CSB congregate during the flight season. The USFWS typically

considers grasslands that support the larval host plant and nectar sources that are within the known range of the butterfly as occupied habitat.

The Project site supports 16.6 acres that meet the definition of Core Habitat (greater than one acre at ten percent density). An additional seven acres of Core Habitat were observed just outside of the project boundary to the east but within property owned by the quarry. California golden violet occurs in smaller scattered patches over an additional 1.7 acres within the Project site.

- *California Red-legged Frog (Rana draytonii) - Federal Threatened, CDFG Species of Special Concern.* California red-legged frog (CRLF) is a medium-sized frog with reddish-colored legs that is generally restricted to riparian and lakeside habitats in California and northern Baja California. It was listed as threatened in 1996 in response to a significant decrease in its historic range. CRLF prefer deep, quiet pools in creeks, rivers, or lakes below 4,500 feet in elevation. Habitat requirements include freshwater emergent or dense riparian vegetation, especially willows adjacent to shorelines. They can survive in seasonal bodies of water that dry for short periods, if a permanent water body or dense vegetation stand is nearby. When permanent water is absent, rodent burrows and grasslands provide upland aestivation habitat. CRLF also require upland foraging and dispersal habitat. These are upland areas within a mile of aquatic breeding habitat that the frogs use for feeding and dispersing to other water bodies. Moist areas including seasonal wetlands and seeps within upland areas that do not provide breeding habitat provide hydration habitat for the frog.

  The expansion area does not contain any suitable breeding habitat, but may provide upland dispersal habitat. The easternmost portion of the expansion area intersects with 12.7 acres of CRLF Critical Habitat unit SOL-1 in non-native annual grassland (USFWS 2010). This area represents potential CRLF upland dispersal habitat.

5.10.3 Best Management Practices

Much of the area subject to mining has been disturbed and therefore offers minimal wildlife value. Wildlife habitat will be improved when these areas are reclaimed as grassland.

Some golden violet plants will be disturbed by expansion of the quarry. Syar will consult with the U. S. Fish and Wildlife Service (USFWS) on appropriate mitigation measures for the loss of these plants. Such measures may include replanting new golden violet plants outside of the quarry area, or acquisition of off-site habitat.

In additional to the CSB, Syar will consult with the USFWS concerning impacts to the CRLF. Syar will implement the following measures to avoid harming CRLF that may be present in dispersal habitat near the quarry site, if required:

- Work areas shall be inspected for the presence of red-legged frogs prior to the expansion of the quarry into undisturbed areas. If frogs are found to be present, all work is to cease and a qualified biologist contacted;
- All grading activity shall be at least 100 meters away from the edge of any riparian corridor identified as red-legged frog habitat; and
- All workers shall undergo a training program prior to expansion into undisturbed areas. This training program shall be created with the consultation of a qualified biologist.

5.11 VISUAL EFFECTS

Lake Herman Road is designated as a scenic road in the Resources Chapter of the Solano County General Plan and is identified as a "minor thoroughfare". County area and specific plans contain language aimed at preserving, conserving, and enhancing visual resource values within the target planning area. The plans identify viewsheds or general scenic resources to be protected or improved. Plans that discuss visual resource protection explicitly include the Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation.

One of the primary objectives of the Tri-City and County Cooperative Plan is to conserve and enhance visual resources within the plan area. The plan contains policies and measures that restrict development and the extension of infrastructure into the area of valued open space between Vallejo, Benicia and Fairfield. The policies under this plan include the following:

- Protect the unique scenic features of Solano County, particularly hills, ridgelines, wetlands, and water bodies.
- Support and encourage practices that reduce light pollution and preserve views of the night sky.
- Protect the visual character of designated scenic roadways.

Lake Herman Quarry is visually screened from Lake Herman Road by a large vegetated, man-made earth berm. The quarry and Sulphur Springs Mountain are visible at a distance from some stretches of Interstate 80 and from some streets in Vallejo. As mining continues on the upper slopes, the operation will continue to be visible from distant areas to the west in the future. When the excavated slopes have been vegetated as part of quarry reclamation, the visual contrast with the surrounding hills will be reduced.

Viewed from distant areas to the east and southeast, the expansion of the existing quarry site will result in a lowering of the ridgeline of Sulphur Springs Mountain. Quarrying will continue to occur on the west facing slopes, therefore, exposed ground or slope faces will not be evident from the east and southeast.

5.12 NOISE

Both stationary and moving noise sources are associated with the mining operation. The four primary sources of noise associated with the quarry are: 1) stationary processing equipment, 2) mobile heavy earth moving equipment, 3) trucks transporting material to and from the quarry, and 4) use of explosives.

Overall noise levels from expanded operations at Lake Herman Quarry would not exceed the noise level limits established in the Solano County General Plan, City of Vallejo General Plan, or City of Vallejo Municipal Code at most affected receptor locations west or east of Lake Herman Quarry. Operational noise levels would also be in compliance with the established noise level limits at receptors located to the north, northwest, southwest, southeast, and northeast because of increased distance from the source and/or shielding provided by intervening terrain.

5.12.1 Best Management Practices

A noise study conducted by Fitzroy/Dobbs, Noise Control Consultants, confirmed that the existing quarry operation is in compliance with the Solano County Noise standards.

The processing area, where most equipment is located, is set in a bowl which serves to buffer the noise emanating from the quarry operations. The bowl is created by the excavated northwestern slope of Sulphur Springs Mountain in combination with adjacent hills and the earth berm constructed at the quarry perimeter. These slopes also serve to shield the air pressure change resulting from blasting. As the site is excavated, the location, configuration and elevation of the mining area will change. The elevation of the quarry pit will be lowered from its present level to elevation zero, thus the mining area will always be shielded acoustically by Sulphur Springs Mountain and the existing earth berm.

While excavation is occurring on the exposed upper slopes of the quarry area, the following measures will be utilized:

- Blasting in the quarry is done using a sequential blasting technique.
- The amount of time taken to remove overburden from upper slopes is concentrated into the shortest possible time.

5.13 VIBRATION

Rock is loosened from the quarry face by blasting. Blasting generates airborne noise and ground borne vibration. With the project, blasting would continue to occur based on the demand for material. Noise and vibration levels generated by blasting would be expected to be similar to existing conditions. The nearest sensitive residences would be located over 3,000 feet east of the area of the quarry where blasting would occur.

The nearest residential receptors to the north, west, and south are over 4,000 feet from proposed quarry blasting areas.

While residents may be able to occasionally hear sounds from blasting events, these sounds would continue to occur on a fairly infrequent basis. Audible sounds from blasting events would not exceed typical maximum noise levels from other area noise sources, and these brief intermittent events would not be expected to substantially increase hourly average or daily average noise levels.

Future blasting events would not be expected to result in ground borne vibration levels substantially above 0.02 in/sec PPV (maximum vibration level measured at V-2, approximately 3,100 feet west of the quarry blast zone near Blue Rock Springs Golf Course). This level is below the 0.03 in/sec PPV human threshold for perceptibility, and well below the 0.2 in/sec PPV limit established by the Federal Transit Administration as a safe limit to avoid damage to non-engineered timber and masonry buildings.

5.14 CULTURAL RESOURCES

A cultural resources study of the 462-acre project site was conducted in late 2009 by the archaeologists and historians from the Anthropological Study Center (ASC), Sonoma State University. The study also included the bridge located about ½ mile to the southeast of the quarry. The purpose of the study was to identify and record any prehistoric or historic-era cultural resources within the Project site, and included background research and a pedestrian field survey. The study also included contacting the Native American Heritage Commission and Native American individuals and organizations to obtain information about any known sacred sites and other traditional cultural resources.

As a result of the study, 13 historic-era archaeological sites and one historic bridge were identified and recorded. Following completion of the field survey, the 13 archaeological sites were evaluated for eligibility for listing in the California Register of Historical Resources.

6 RECLAMATION PLAN

6.1 AREAS COVERED BY RECLAMATION

Reclamation is planned for all mined slopes and all portions of the processing area affected by mining activities when the mineral resource is depleted and final slopes have been achieved. Reclamation is also planned for overburden storage areas. Some interim reclamation has been implemented to date, including construction of vegetated earth berms at the quarry site boundary, and planting of approximately 32 acres at the edges of the quarry site.

This Plan describes reclamation procedures that would be undertaken if mining is discontinued at the end of the proposed new permit term. The slope benching, grading of the processing area, drainage provisions, and vegetation that would be done at any point in time are similar treatments as would be done when the final site configuration is reached. The overall objective is to leave the site in a safe, stable condition readily adaptable to open space. Since there will be additional rock resource on the site at the conclusion of this new permit term, it is likely that there will be an application to continue quarrying prior to the end of the new permit term.

6.2 ULTIMATE PHYSICAL CONDITION OF THE SITE

The overall objective of reclamation is to leave the site in a safe, stable condition used as open space. At the completion of mining and reclamation, all mining equipment will be removed. Excavated slopes will reach a maximum top elevation of approximately 900 feet, with the bottom of the quarry pit at elevation zero. At the widest point, the excavation area will measure approximately 3,000 feet across (from NE to SW). The slopes of the excavation area will remain in a benched condition, and the benches will be scarified, resoiled, and vegetated. Some of the overburden material will be used to fill the process water sediment ponds and the remainder will be placed in a fill slope along the northern portion of the pit. Any remaining stockpiles of aggregate will be graded out over the quarry floor or placed as fill into the pit. The water in the pit will be dewatered as appropriate to create a stable slope. It is unknown if groundwater will be reached after excavation activities reach elevation zero. At this time groundwater has not been encountered and dewatering activities could be conducted. If groundwater is breeched during the use permit term a revision to the reclamation will be proposed by Syar and will require approval by Solano County and OMR.

For the area located between the edge of the excavation and Lake Herman Road, including the filled process water sediment ponds, will be ripped to a depth of 18 inches to loosen the compacted ground surface. It will then be resoiled to a depth of six to twelve inches using stockpiled topsoil and then vegetated with an erosion control seed mix.

Once vegetation has been established and runoff no longer shows signs of erosion, all stormwater sediment ponds will be filled and vegetated as part of final reclamation. Runoff which flows over the excavated slopes will be captured on the benches and directed to culverts which will carry runoff to the quarry pit. These are permanent improvements that will remain following reclamation. Grading of the quarry floor and processing areas will create a gently sloping surface. Storm runoff will be directed as sheet flow across the surface to the site perimeter and into existing drainage ditches. Until vegetation has been established, erosion control will be provided by installation of straw wattles perpendicular to the direction of sheet flow and by the installation of straw bales perpendicular to the flow line along the drainage ditches.

6.3 FUTURE USES FOLLOWING MINING

6.3.1 Open Space

Open Space consistent with the current zoning will be the end use following reclamation. Land between the excavation area and Lake Herman Road will be relatively flat. Once vegetated, these areas will make suitable open space areas.

6.4 PROPERTY OWNER STATEMENT OF RESPONSIBILITY

See Appendix A.

6.5 RECLAMATION PROCEDURES AND SEQUENCES

Reclamation will be done as soon as final site configurations have been constructed in accordance with Figures 3 and 5. A detailed description of reclamation activities is presented in the following sections.

6.5.1 Backfilling and Grading

Mined slopes are left in a benched configuration (slopes walls will be a maximum of 50 feet high and the benches will be 25 feet wide) when the final configuration is reached. Backfilling and grading work involves topsoil placement on the final benches to facilitate revegetation. It also includes filling the process water sediment ponds, and ripping and grading of the processing area, following equipment and stockpile removal, to facilitate positive drainage and vegetation. A portion of the pit will be filled with overburden. Dewatering of the pit will occur to ensure that the proposed sloping in the pit is stable. The stability of the pit fill will be assessed by a professional engineer at the time of construction to ensure that the water in the pit does not impact overall stability.

Stormwater sediment ponds would be filled once vegetation has established, and the ponds are no longer needed to remove sediments from runoff. Final benches will be

resoiled and planted as soon as the final configuration is achieved and the benches are no longer needed for haul routes or access. However, it is not contemplated that grading and resoiling would be done on the processing area until the final mining phase has been concluded. Grading and resoiling of the interim benches and processing area would be done if the quarry is discontinued prematurely prior to the end of the permit term.

6.5.2 Reclamation of Final Quarried Slopes

Mined slopes are left in a benched configuration when the final configuration is reached. Benches are typically 25 feet in width; however a maintenance access bench 75 feet wide will be constructed at the pit perimeter. Benches are typically sloped a minimum of two percent toward the back of the bench and laterally to promote positive drainage. The vertical distance between benches is typically 50 feet. Benching is used throughout the various mining phases but reclamation is planned only when the final slope configuration has been reached.

Reclamation of final benches involves ripping the bench surface if it has been compacted due to use as a haul road, placement of stockpiled soil to a depth of six to twelve inches on the bench surface, and reseeding using a seed mix specified below.

In addition, the slide area located in the northeastern corner of the site will also be reviewed by a professional geotechnical engineer to ensure that the sloping is appropriate for the designated end use. If corrections to the sloping need to be made, Syar will complete the grading activities and include the area in the replanting plan.

6.5.3 Reclamation of the Processing Area

Reclamation of the processing area involves the removal of processing equipment, buildings, foundations and other structures, filling process water sediment ponds, ripping the compacted ground surface, grading to achieve a smooth surface having positive drainage, resoiling areas where soil has been removed, and hydroseeding of the ground area for erosion control. Range fencing will be installed to keep people and animals from entering into the quarry pit.

6.5.4 Reclamation of the Fill Material in the Pit

The overburden material in the pit will be compacted to 90% on an ongoing basis, as it is placed during mining operations. Keyways will be installed along the toe of the slope to ensure slope stability. The fill slope will not exceed a 2:1 ratio, and benches will be created if necessary to promote slope stability and capture any incidental debris. Prior to the onset of the rainy season each year, the slope will be seeded and winterized for erosion control. Any incidental erosion from this slope would be captured in the pit, and would not be discharged to any existing drainage courses off-site. Because the overburden will be contoured and compacted on an ongoing basis, final reclamation will entail minor finish grading and final reseeding of any miscellaneous disturbed areas.

It is anticipated that groundwater will not be encountered in the pit. Dewatering activities will occur during the construction of the slope within the pit area to ensure stability.

6.5.5 Topsoil Reuse and Test Planting

The Hambright Loam (HaF), Toomes Stoney Loam (ToG2) and Altamont Clay (AcF2, AcE) soils found on the quarry site are rated Class IV through VIII by the U.S. Department of Agriculture. These ratings indicate that the soils have severe limitations due to fine texture, erodability, shallow depth and occurrence on steep slopes that make them generally unsuitable for cultivation.

Syar has typically utilized surface soil taken from areas subject to mining along with the residue from surface grasses and forbs when applying soil to the earth berms constructed at the quarry perimeter. Use of this soil on the perimeter berms has provided test planting results. When final benches are constructed this soil resource will be placed to a depth of six to twelve inches to resoil the benches and overburden fill areas.

6.5.6 Topsoil Reuse and Test Plots

Monitoring plots and test plots will be used to monitor the success of the revegetation program. Syar will initially install twelve (12) test planting plots at the quarry property to determine the viability and survival rate of the grasses, herbaceous plants, trees and shrubs (Figure 10). Over time the test plots will determine which plants do not thrive or fail to survive. This data will be used to modify the plant lists so the success of the planting program is improved before or during the initial stages of revegetating large areas of the site. The success of the revegetation program will be determined by the quantified vegetation success criteria described in Section 7.2.2.

There will be twelve (12) test planting plots with one plot for each plant community at a minimum: valley floors or flat open areas, fill slopes, and quarry benches. Generally, there should be a monitoring plot for each plant community and for each site condition. The monitoring plots will measure 0.5 by 150 meters and each test plot should measure 6 meters square. The test plots will be located on the top soil to be used during the final revegetation activities. Once a quarry benching area is completed and final reclamation can occur. Test plots will be constructed in one area prior to planting the whole area. If needed, the topsoil will be mixed with overburden, pond fines, and/or amendments. Syar will experiment with the topsoil to ensure successful plantings. It should be noted that Syar was required to plant berms surrounding the property as part of mitigations from a previous permit. These berms were test plotted prior to planting. The information formerly gathered will also be utilized with the new information. The success of revegetating the test planting plots will be evaluated annually to determine if success criteria will be or has been achieved.

6.5.7 Revegetation

Revegetation consists of seeding the quarried benches and the processing area. Benches considered inaccessible by seeding equipment would be seeded by broadcast seeding. Seed and fertilizer applications would typically be done in fall to take advantage of the seasonal rainfall. Soil analysis (test plots) will be constructed prior to planting so that the fertilizer can be adjusted if necessary.

6.5.7.1 Plant Selection

Plant materials for reclamation were selected to match the native trees, shrubs, naturalized grasses, annuals, perennials and forbs found on the surrounding hillsides, valleys and ridges. The identified communities that Syar will replant on site are oak woodlands and grasslands. An erosion control seed mix will be used for stockpiles during mining activities. No stockpiles will be left after the cessation of mining.

One-gallon native trees and D pot sized native shrubs will be acquired from nursery stock and when possible from local stock. All tree and shrub plantings will be conducted between the months of October and February. Since hydroseeding and/or broadcast seeding will occur first, a lot of the preparation for planting will be done before seeding activities to avoid degradation of the seeded surface. Hydroseeding and/or broadcast seeding will be completed following the three-step straw treatment outlined in Table 4. The trees and shrubs will be planted in clusters according to the spacing shown on Table 4, in the areas shown on Figure 13.

Soil analysis will be conducted on soil samples taken from the stockpiled topsoil, overburden and soil fines. The analysis will determine which, if any, supplemental nutrients should be added to the soil used in the planting holes to support plant growth. The topsoil will also be used in the test plot program to experiment with different growth media to ensure successful revegetation at the site (Section 6.5.6). Each planting hole will be backfilled using: local soil or potting soil (one part), mulch (one part), and soil amendments (one part). Fertilizer tablets (Agriform or equal) will be placed in each planting hole about 6 inches from the bottom of the planting hole (2 tablets for trees and 1 tablet for shrubs). The planting medium will be tamped down around the plant so that the crown of the plant is at ground surface, and a shallow watering basin will be formed around each tree and shrub. A two-inch layer of mulch will be placed in each watering basin to help conserve moisture. Plants will be thoroughly watered after planting.

TABLE 4
RECLAMATION PLANTING LIST FOR OAK WOODLANDS

BOTANICAL NAME	COMMON NAME	MINIMUM PLANT SPACING[2] (feet)	PLANTING ZONES[1]
TREES			
Aesculus californica	California Buckeye	50	1
Arbutus menziesii	Pacific Madrone	50	1
Quercus agrifolia	Coast Live Oak	50	1
Umbellularia californica	California Bay	50	1
TREE/SHRUB			
Quercus kelloggii	California Black Oak	50	1
Rhamnus californica	Coffeeberry	4.5	1
SHRUBS			
Arbutus menziesii	Pacific Madrone	50	1
Symphoricarpos albus var. laevigatus	Common Snowberry	4.5	1
Symphoricarpos mollis	Creeping Snowberry	4.5	1
BOTANICAL NAME	**COMMON NAME**	**PLS***	
GRASSLANDS			
Nasella pulchra	Purple needlegrass	5	
Bromus carinatus	California brome	5	
Festuca californica	California fescue	5	
Lotus scoparius	Deerweed	4	
Baccharis pilularis	Coyote bush	1	
Eriogonum fasciculatum	California buckwheat	5	
Artemisia californica	California sagebrush	5	
Viola pedunculata	Johnny jump-up	1	
	TOTAL	**31**	
EROSION CONTROL			
Vicia faba	Bell beans	3	
Pisum sativum	Magnus peas	3	
Vica dsycarpa	Lana vetch	3	
Vicia atropurpurea	Purple vetch	3	
Bromus hordeaceous	Blando brome	5	
	TOTAL	**17**	

Notes:
[1] Oak Woodlands occur on the northern portion of the project site.
***** *Pounds per Live Seed per acre.*

TABLE 4 (Continued)
SEED MIX FOR EACH PLANT COMMUNITY AND SITE CONDITION

SEED SPECIFICATIONS Three-Step Straw Treatment		
Step 1	**Pounds/Acre**	**Seed Mix**
	500	Cellulose Fiber Mulch
	As Specified	Seed Mix
	150	BioSol Mix 7-2-3 (1)
	60	Mycorrhizal Inoculant – AM 120
Step 2	**Pounds/Acre**	**Blown Straw**
	4,000	Rice or Clean Cereal Grain Straw
Step 3	**Pounds/Acre**	**Tackifier**
	500	Cellulose Fiber Mulch
	150	M-Binder

(1) Syar will be applying different fertilizers to different test plots to see what is the best for use at the quarry, if any. BioSol is just an example of a fertilizer used. Syar has also been successful using 16-2-10 fertilizer at 100 pounds per acre. The test plots will also test to see if fertilizer is necessary or not. Syar will construct a no fertilizer test plot as well.

6.5.8 Rehabilitation of Drainage

The stormwater sediment ponds will be filled and vegetated as part of final reclamation. Runoff which flows over the excavated slopes will be captured in the pit at the bottom of the excavation area. Runoff which flows over the processing area will be directed into existing off-site channels. The proposed final drainage configuration is shown on Figure 11.

6.5.9 Equipment Removal

Final reclamation includes the removal of the rock processing, asphalt paving and ready-mix concrete plants, removal of buildings and sheds, removal of concrete foundations and pads, and the removal of vehicles. Syar Industries, Inc. would normally relocate the processing plants, reusable buildings, equipment and machinery to another active quarry. If an upset condition were to occur, these items would be auctioned and the buyer would remove them from the site. A salvage company would remove residual metal, machinery and wood.

6.6 CONTROL OF RESIDUAL HAZARDS

6.6.1 Control of Contaminants

The only potential mineral contaminant that may be associated with the type of rock being mined is mercury. Syar Industries, Inc. has entered into an agreement with the City of Benicia to sample and test runoff flowing from the quarry and fill sites eastward toward Lake Herman. That testing has shown that the quarry operation does not appear to raise mercury levels above background amounts. Potential contamination from petroleum products and chemicals is controlled in a variety of ways. Equipment fuel tanks are located within a containment area to prevent spills from reaching drainage courses. Used oil is collected in drums and hauled from the site for recycling. Used batteries are recycled. Sewage facilities consist of portable chemical units which are regularly serviced. Emergency spill kits are scattered throughout site to provide rapid initial response to any petroleum or chemical spill. Absorbent booms are available to place in the sediment ponds, if needed, to remove oil or fuel spills from the water. Areas around the equipment maintenance facility are graded and runoff is directed to a sediment pond.

6.6.2 Access Control

Fencing will be maintained at the perimeter of the quarry site to minimize unauthorized access. "No Trespassing" signs are posted along the fence. Field fencing will be installed at the pit perimeter during final reclamation to prevent trespassers and animals from entering the pit and sloped areas.

6.7 CONTINUED MAINTENANCE OF RECLAIMED LAND

Reclamation improvements will be maintained by the mining operator for a period of five years following completion or until such time that all performance criteria have been meet and/or Solano County has deemed the site reclaimed. Vegetation will be maintained without reliance on irrigation for the final three years of the five year monitoring period.

6.8 EFFECTS OF RECLAMATION ON FUTURE MINING POTENTIAL

Mining at the Lake Herman Quarry involves extraction of rock from a State Designated Mineral Resource existing on the quarry site. The designated resource will not be depleted at the end of the new permit term, and so it is expected that there will be additional applications for mining at this location. Any interim reclamation performed on quarried slopes would be subject to removal if mining were to continue beyond the final ground configurations.

6.9 MEANS TO GUARANTEE RECLAMATION AND ESTIMATED COST

The existing 35-year permit provides for a surety bond to ensure performance of reclamation. Syar proposes no change to this provision. Costs of reclamation were last estimated in July 30, 2014 at $1,434,650.36. This estimate reflected physical site conditions at the quarry. The estimate is updated annually to reflect changes in site conditions, or rates for equipment rental, labor, and materials. The July 30, 2014 cost estimate is included as Appendix C.

7 MONITORING AND MAINTENANCE PROGRAM

7.1 POST-MINING MAINTENANCE AND MONITORING PROGRAM

Syar as the property owner will continue to maintain the reclaimed areas for a 5-year period after mining ceases and all reclamation activities are completed, or until Solano County deems the area reclaimed. During the 5-year post mining period, the operator will conduct routine maintenance on the irrigation systems, drainage facilities and erosion and sediment control system.

In addition, the property owner will conduct inspections for the noxious weed control program and the plant monitoring program. Maintenance and repair work will be completed prior to October 15th of each year. If there is any human involvement with reclamation plantings during this post reclamation period then the 5-year period for that area will start over for the area requiring repair. The post reclamation period will continue until the 5-year period is up or until the planting success criteria in Section 7.2.2 are satisfied, whichever occurs last. After completion of the post mining maintenance and monitoring period on-going maintenance at the property will be the responsibility of the property owner.

Routine site maintenance and inspection will occur twice a year during the post mining period. Workers will evaluate the progress of revegetation and will reseed any areas where vegetation has failed to establish and will selectively apply herbicide to any area with observable noxious weeds. Workers will also inspect the slopes and drainages for evidence of significant erosion and will implement erosion control measures as appropriate. Accumulated sediment will be removed from the sediment ponds and drainage ditches at least once per year prior to the rainy season for a period of 5-years. At the end of the 5-year maintenance and monitoring period, if vegetation has properly established and sediment is no longer evident in site drainage, some of the sediment ponds may be backfilled, resoiled and revegetated.

7.2 REVEGETATION MONITORING AND CRITERIA

Revegetation consists of hydroseeding or broadcast seeding the applicable grassland seed mix and hand planting of trees and shrubs. Revegetation monitoring will include visually observing and recording the survival rates of newly planted areas for a 2-year period. The remaining 3-year of the 5-year post mining monitoring period will include quantifiable inspections and assessment of the observable plantings against that of the planting success criteria required. When an entire mining area has achieved the planting success criteria, Syar may ask the County and OMR to inspect the area and determine that the vegetative success criteria in Table 5 have been achieved. When the area is approved, reaching the approved planting success criteria, the reclamation costs associated for its particular area may be removed from the financial assurance

mechanism and the monitoring inspections for revegetation in that specific area will cease.

The inspections will continue for the duration of the mining and maintenance program. The inspections will quantify the success of revegetation over time using the following planting success criteria: 1) coverage; 2) density and 3) species-richness (diversity).

The planting success criteria for vegetative coverage, density and species-richness are identified and described for the Oak Woodlands and Grassland. Only native and naturalized grasses, annual, perennials, forbs and woody plants will be counted when evaluating the monitoring plots. The revegetation monitoring program will evaluate the on-going success and failures of the reclamation program based on the planting success criteria. Modifications to the planting program will be made based on the on-going findings. This will ensure that the planting success criteria are achieved. The monitoring program will continue for 5-years after mining ceases and two years after all human intervention with planting has ended; and until all of the planting success criteria has been satisfied, whichever is last.

While on-going revegetation and reclamation efforts have indicated that the viability of plants can be determined within 2-years of their installation. It is anticipated that it will take a minimum of 5-years to achieve the planting success criteria. Failed plantings will be replaced as required.

7.2.1 Revegetation Monitoring Program

The revegetation monitoring program will include the following tasks:

- ***Visual Inspections:*** To provide an overview of the planting program, the newly planted areas will be visually inspection twice a year during the first 2-years after planting and annual thereafter for 3 additional years. The newly planted area will be visually inspected to evaluate for survival rate and dieback rate of woody plant materials, and general overview of vegetative coverage. The inspections will occur between May and June and again between October and November of each year.
- ***Noxious Weed Management:*** Noxious weeds will be managed as described in Section 7.2.3.
- ***Replanting:*** Replanting will be required if there is less than 25% survival rate of the trees and shrubs.
- ***Reporting:*** An annual reporting document will be submitted to Solano County describing the visual inspection results as well as any replanting that may have taken place. Recommendations may also be included at this time if there is a large amount of failure in one area or that an area is successful and needs to be expanded into areas not so successful.

7.2.2 Planting Success Criteria

The quantifiable planting success criteria that will be used to evaluate the revegetation program (Table 5).

TABLE 5
PLANTING SUCCESS CRITERIA

No.	SITE LOCATION	TREE/SHRUB COVERAGE[3]	TREE/SHRUB DENSITY[2]	TREE and SHRUB / GRASSLAND SPECIES RICHNESS[1]
1	Oak Woodland (northern portion of site)	47%	20 / 222	75% / 80%
2	Grassland (fill slopes and benched slopes)	80%	Not Applicable	80%

Note: *Table 4 identifies the tree/shrub/grassland types to be used for each community. In addition the grassland seed mix will also be used in the Oak Woodland areas.*

1 Species richness % is derived from the tree and seed mix identified on Table 4. Communities with trees and/or shrubs the % does not include the grassland. The grassland is shown as its own %.

2 The plant density on are for one acre. The density does not include the grassland mixes for the respective areas. The densities given are (tree # / shrub #) derived from Table 4.

3 For plantings % is for one acre coverage. Baseline coverage for the Oak Woodland is 95% and grassland is 100%. The coverage % given in Table 5 is an anticipated successful coverage % after revegetation. For the grassland the 80% is the coverage of the grasses no trees or shrubs are proposed.

7.2.2.1 Plant Coverage

Plant coverage, is defined as the vertical projection of the plant over the ground surface, and varies in different areas of the quarry. The criteria for vegetative coverage are shown in Table 5.

7.2.2.2 Plant Density

Plant density, is defined as the number of the individual plants or stems of each native or naturalized plants per a unit area. The criteria for plant density are shown in Table 5. Areas with grasses, such as the seeded slopes and large flat areas are not included in this criterion because the density criterion “is best used on shrub and trees and is almost impossible to use on grassland” (Office of Mine Reclamation, Department of Conservation, and Quarterly Newsletter, April-June 1997). However, since there are some forbs in the seed mix, these plants will be counted as part of the plant density criteria.

7.2.2.3 Plant Species - Richness

Plant species – richness criteria, is defined as the number of different plant species in a given area. The plant species included on the plant lists and the seed mixes are representative of the communities found on-site and adjacent properties. This calculation only includes native perennial plants, naturalized grasses and does not include exotic plant species. The vegetative species-richness criteria are shown on

Table 5. The species richness will be at a minimum 5 species from the each seed mix per 50 square meters.

7.2.3 Noxious Weed Monitoring

The goal of the noxious weed removal program is to keep the targeted noxious weed species from extending beyond 5% of the overall cover. The targeted noxious weed list will be derived by a biologist at the time of interim or final reclamation. Noxious weed species complete with the native and naturalized plant species that will be planted as part of the revegetation activities. The noxious weed removal program will be incorporated when the overall weed coverage expends beyond 5% of the overall planting area.

The noxious weed removal activities will be done as part of the routine maintenance of the former mining areas undergoing reclamation activities (end of use permit). Revegetation activities will require planting of trees, shrubs and grasslands. Ongoing weed removal will continue annually until the end of the post mining 5-year maintenance period or when the planting success criteria have been achieved.

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