

**AMENDED
MINE AND RECLAMATION PLAN**

FOR

**OMYA CALIFORNIA
WHITE KNOB - WHITE RIDGE
LIMESTONE QUARRIES
CA MINE ID# 91-36-0067**

Submitted to:

COUNTY OF SAN BERNARDINO
Land Use Services Department
Planning Division
385 N. Arrowhead Avenue
San Bernardino, CA 92415

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OMYA CALIFORNIA
7225 Crystal Creek Road
Lucerne Valley, CA 92356

February 2013

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AMENDED MINE and RECLAMATION PLAN

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B1 - *Proposed Omya California Inc. White Knob Quarry: General Biological Resources Assessment and Focused Rare Plant Survey* by Scott D. White Bioservices – February 16, 2007

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Appendix E Erosion and Sedimentation Plans

White Knob Haul Road Drainage Study and Plan of Development – Stantec Consulting, Inc. – August 2011

Appendix F Air Quality

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Appendix G Slope Stability Study - CHJ Consultants, January 2013

Appendix H Cultural Resources (available upon request by permission only)

- *Class III Cultural Resources Survey, White Knob Quarry Revision Project* by CRM Tech. – November 14, 2008
- *Paleontological Resources Assessment Report, White Knob Quarry Revision Project* by CRM Tech. – November 20, 2008

Appendix I *Annual Reclamation Report 2011*- JJ Restoration Specialists, 2012

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Sheet 3	Amended Reclamation Plan
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OMYA CALIFORNIA
AMENDED MINE and RECLAMATION PLAN
WHITE KNOB - WHITE RIDGE LIMESTONE QUARRIES

EXECUTIVE SUMMARY

Omya Inc.'s ("Omya") (formerly known as Pluess-Staufer (California) Inc.) existing permitted White Knob - White Ridge Limestone Quarries is located in the Lucerne Valley area on the north slope of the San Bernardino Mountains in San Bernardino County, California (see Figure 1 in text of the Amended Plan). The approved quarry site consists of 145 acres of mining facilities within 353 acres of patented fee land portions of which are leased and owned by Omya. The San Bernardino County Planning Commission certified an Environmental Impact Report (EIR) and approved the White Knob-White Ridge Limestone Mine Site Approval and Reclamation Plan in 1986 (RP # 86M-04) with an expiration date of December 31, 2031. The CA mine ID# is 91-36-0067.

This Amended Mine and Reclamation Plan (Amended Plan) has been prepared to incorporate supplemental data and modifications to mining and reclamation plans since the original plan was approved in 1986. The planned quarry activities propose to disturb approximately an additional 190 acres on a total fee area of 423.1 acres (see Table 1). Note, approximately 70 acres of an unpatented mining claim on Bureau of Land Management (BLM) managed federal lands are in the process of being transferred to Omya ownership through a direct land sale. Through the remainder of the Amended Plan, it is assumed that this area is owned by Omya. The total existing and proposed quarry areas will be approximately 335 acres on private land (see Figures 2 and 3 in the text of the Amended Plan). This Amended Plan is prepared to satisfy the requirements of the San Bernardino County mining ordinance and the State Mining and Reclamation Act (SMARA) as overseen by the California Office of Mine Reclamation (OMR).

In addition, BLM requirements for haul road right-of-way final reclamation on approximately 40 acres of the total 83.5 acres of federal public land is included in the Amended Plan (refer to Figure 2). The off-site haul road is within a recently amended BLM right-of-way (CAC 16644) incorporating the first 4.4 miles of the haul road starting at the boundary of the Lucerne Valley processing plant and ending at the fee land boundary at the quarry site.

The Amended Plan and an associated new EIR to be prepared pursuant to the California Environmental Quality Act (CEQA) will be the background documents for subsequent permitting, including the California Department of Fish and Wildlife's (CDFW) Streambed Alteration notification process (Section 1602).

The White Knob-White Ridge Quarry discussed in this Amended Plan includes the active mining area consisting of the White Knob and Annex quarries and the approved White Ridge Quarry, existing and planned overburden sites, crusher plant site, internal haul roads, erosion control facilities, and the existing access haul road to the Lucerne Valley processing plant.

Table 1
Existing and Planned Operational Areas
White Knob – White Ridge Quarries

Quarry or Area	Existing 1986 Plan Approved Areas (approx. acres)	Proposed New Areas (acres)	Total Amended Project Areas (acres)
White Knob Quarry	35	6.1	41.1
White Knob Annex Quarry	7	5.5	12.5
White Ridge Quarry	18	15.1	33.1
Overburden Site #1	15 ¹	16.9	31.9
Overburden Site #2	--- ¹	13.0	13.0
Overburden Site #3	--- ¹	3.0	3.0
Ancillary Disturbance Limits ² (outside of above)	70	130.5	200.5
Totals	145	190.1	335.1

Note: Areas in 1986 Plan estimated to whole acres; proposed areas rounded to nearest tenth of an acre. Totals may be slightly different due to rounding.

¹ – Combined waste areas; not individually estimated in 1986 Plan.

² – Ancillary disturbance limits include haul/access roads to quarries and overburden sites, sediment basins and other erosion control features, storage pads, crusher location, west slope impacts, and incidental impacts from boulder roll down.

In April 2011, Settlement Agreements were entered into by and between the BLM, California Department of Fish and Game, regarding activities at the White Knob Quarry. Six separate remediation components in the April 20, 2011 Settlement Agreement (Agreement) with the BLM are discussed in Section 1. This Amended Plan includes:

- increased excavations, ore and overburden production,
- crushing and hauling of ore,
- potential hauling of overburden or non-spec rock and fines to the Lucerne Valley processing plant for off-site sales,
- expansion of the existing overburden site (OB-1),
- construction of two additional overburden sites (OB-2 and OB-3),
- backfilling part of the White Knob Quarry to reduce additional overburden areas,
- construction of new haulage roads within the mining area to access the White Ridge deposit,
- changes in mining plans for the White Ridge deposit,
- changes to the final ultimate outer disturbance limits to account for possible boulder roll down of the project on a total of 335 acres, and
- reclamation of half width of access road within the BLM ROW on approx. 40 acres.

These changes allow for substantial optimization of the Quarry's future operational activities.

Onsite sedimentation controls and mitigations for California Department of Fish and Wildlife (CDFW) jurisdictional drainages are included in the Amended Plan. Other aspects of the operation, including mining methods, phases, crushing, screening, and hauling of the ore to the plant in Lucerne Valley will not substantially change.

Quarry and overburden stockpile development and expansion will be phased per the existing phasing plan. Included in the phased expansion is concurrent reclamation of equipment-accessible mined out portions of the White Knob Quarry. Once the final outer limit and bottom of the ore is reached, this quarry will be partially backfilled up to the approximately 5,575-foot elevation. The Amended Plan allows for substantial backfill to be placed in the mined out portions of the quarry, and also allows an efficient mining plan, minimum disturbance of new ground, phased incremental disturbance of new ground, and concurrent reclamation of the quarries and overburden stockpiles.

The carbonate soils, including limestone, in the northern San Bernardino Mountains, provide a unique habitat and there are five federally listed threatened or endangered plant species endemic to carbonate soils. An intensive collaborative effort led to the development of the Carbonate Habitat Management Strategy (CHMS) in 2003. The strategy is designed to provide long-term protection for the carbonate endemic plants and also provide for long-term continued mining in the San Bernardino Mountains. Portions of the carbonate habitat are protected from mining impacts in perpetuity within the carbonate habitat reserves dedicated and managed as described in the CHMS. A Memorandum of Understandings and Agreement was signed in 2003 by Omya, the Forest Service, Bureau of Land Management (BLM), San Bernardino County, Specialty Minerals, Mitsubishi Cement Company, California Native Plant Society, and the Cushenbury Mine Trust stipulating that the signatories will implement the CHMS for the dual purpose of conserving threatened and endangered carbonate plants and streamlining the permitting of mining operations.

The listed carbonate-endemic plants are managed by the Forest Service, San Bernardino County, and other public agencies under the CHMS. “Take” of listed carbonate-endemic plants is permitted under the strategy, and mitigated by permanently relinquishing unpatented mining claims or transferring private property into the public domain, and by management of off-site plant occurrences as outlined in the CHMS.

Three Federally listed threatened or endangered plant species occur near or on the project site; Cushenbury buckwheat, Cushenbury oxytheca, and the Parish's daisy. Omya intends to develop the quarry site consistent with the CHMS Plan and guidelines and will mitigate impacts to these listed species in consultation with the County and the Forest Service. The EIR document that will be prepared by the County for this Amended Plan will assess biological resources, potential impacts, and consistency with the CHMS.

Numerous project designs, conditions of approval and mitigation measures from the existing approved 1986 Plan have already been incorporated into the existing White Knob – White Ridge Quarry operations. This Amended Plan includes the following avoidance/minimization and environmental protection measures to reduce potential environmental impacts:

1. Implement mining methods along ridges and cliffs to minimize future boulder roll down;
2. Future overburden to be placed into existing overburden areas and/or backfilled into completed quarries as much as feasible to reduce additional land and visual impacts;
3. Design and implement drainage control improvements to comply with CDFW regulations including a number of sediment basins within the project area for overburden stockpiles and along roads;
4. Utilize some overburden and fines for off-site use reducing volume of overburden stockpiles;
5. As areas become available, implement concurrent reclamation/revegetation of completed quarries and overburden stockpiles to reduce visual impacts through backfilling, recontouring and slope reduction, growth media placement, revegetation with native plant species, and colorization as applicable;
6. Salvage and relocate Joshua trees, Mojave yuccas, and specific cacti species suitable for transplanting;
7. Develop the quarry site consistent with the CHMS Plan and guidelines and mitigate impacts to these listed species through permanent conservation easements on mining claims in consultation with the County and the Forest Service.
8. Design overburden sites to avoid known or potential carbonate habitat to the degree possible. As most of the overburden and waste rock is carbonate rock, additional habitat will be created during reclamation, minimizing the overall loss of plant habitat.
9. Continue support of CDFW Bighorn sheep studies during the mining project; and
10. Implement and monitor erosion control facilities along the access road on BLM managed lands per the approved right-of-way conditions;

The Amended Reclamation Plan includes a site-specific revegetation plan that identifies growth media and organics salvage and placement, seeding and revegetation, seed collection and propagation, irrigation, site cleanup, public safety, rock and fill slope stability, drainage and erosion controls, a monitoring and maintenance plan, and bond release criteria.

**OMYA CALIFORNIA
AMENDED MINE AND RECLAMATION PLAN
FOR THE WHITE KNOB – WHITE RIDGE QUARRIES**

1.0 MINE PLAN

Introduction

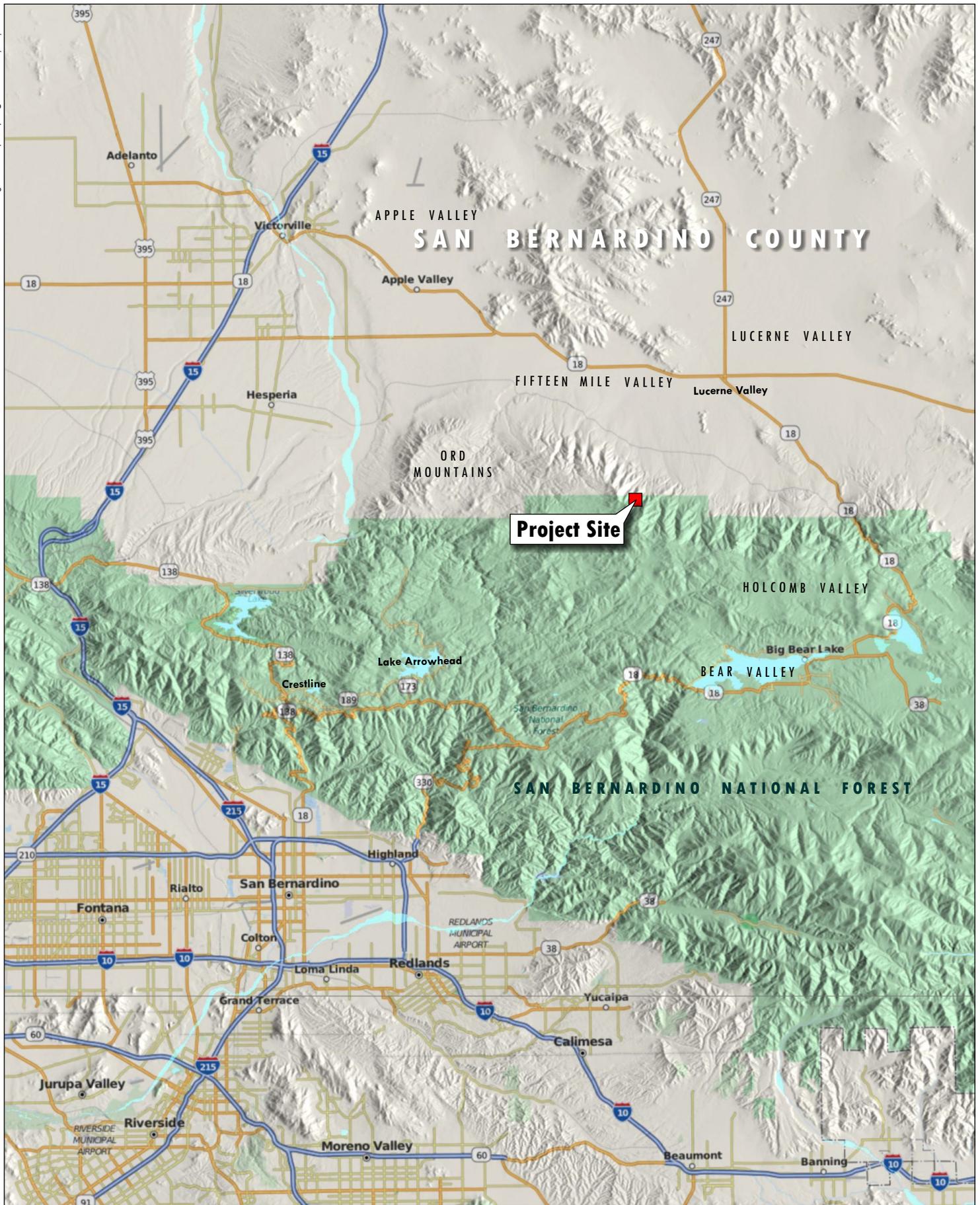
Omya is submitting to San Bernardino County (County) an Amended Mine and Reclamation Plan for the existing approved White Knob – White Ridge Limestone Quarries. The project site is located approximately 6 miles southwest of the community of Lucerne Valley and 8 miles northwest of Big Bear Lake within San Bernardino County, California (see Figures 1 and 2). The project area is within portions of Sections 5, 6, 7, and 8, Township 3 North, Range 1 West, San Bernardino Base Meridian (SBBM). This Amended Plan combines the existing and permitted mining activities with the Proposed Project amendments. The Amended Plan includes quarry design amendments, overburden stockpile expansions, increased operational years and production, additional haul roads, proposed backfilling of a portion of the White Knob Quarry, changes in land ownership, reclamation of the off-site haul road, and adjustments to existing disturbance and permitted site boundaries. The total existing permitted operational area is approximately 145 acres within a 353-acre project site. This Amended Plan will add approximately 190 acres of mining disturbance for a total project area of approximately 335 acres on 423 acres of private land (refer to Table 1 and see Figure 3).

Mine and reclamation plan permitting will require compliance with the California Surface Mining and Reclamation Act (SMARA) implemented by the County of San Bernardino (Development Code, Chapter 88.03). Obtaining the necessary County approvals will require compliance with the California Environmental Quality Act (CEQA) and an EIR will be prepared through the County.

Existing Mine Site Approval and Reclamation Plan and Haul Road Right-of-Way

Omya received approval from San Bernardino County Planning Commission for the White Knob - White Ridge Limestone Mine Site Approval and Reclamation Plan in 1986 (RP # 86M-04) with an expiration date of December 31, 2031. The CA mine ID# is 91-36-0067. In addition, the Planning Commission certified the project EIR in 1986 with mitigation measures and adopted a Statement of Overriding Considerations for significant impacts in the following three areas:

1. The direct loss of rare plants and plant habitats;
2. Visual impacts from some areas in Lucerne Valley and dust generation from the preferred crusher site; and
3. Visual disruption of the White Mountain viewshed from some vantage points in Lucerne valley.



Project Site

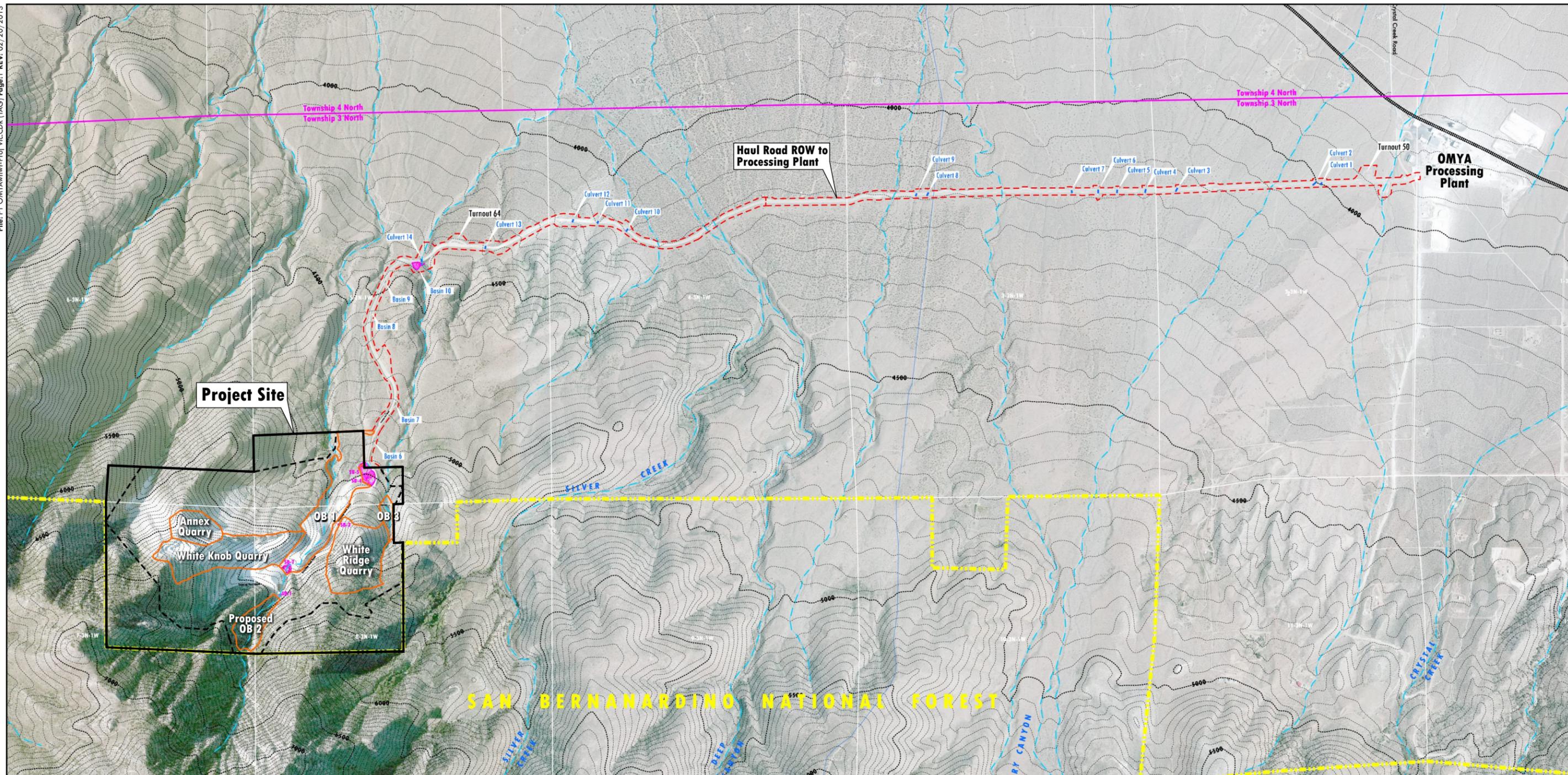
LEGEND

- Project Site Location (Geographic Location)
California Zone 5 (FIPS 405): 6859727.90 1956210.48
Lat/Lon: 34° 21' 49.3863" N, 117° 00' 44.3577" W

REGIONAL LOCATION

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California





LILBURN
CORPORATION

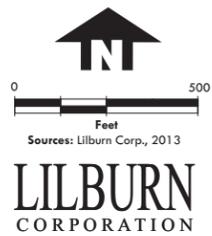
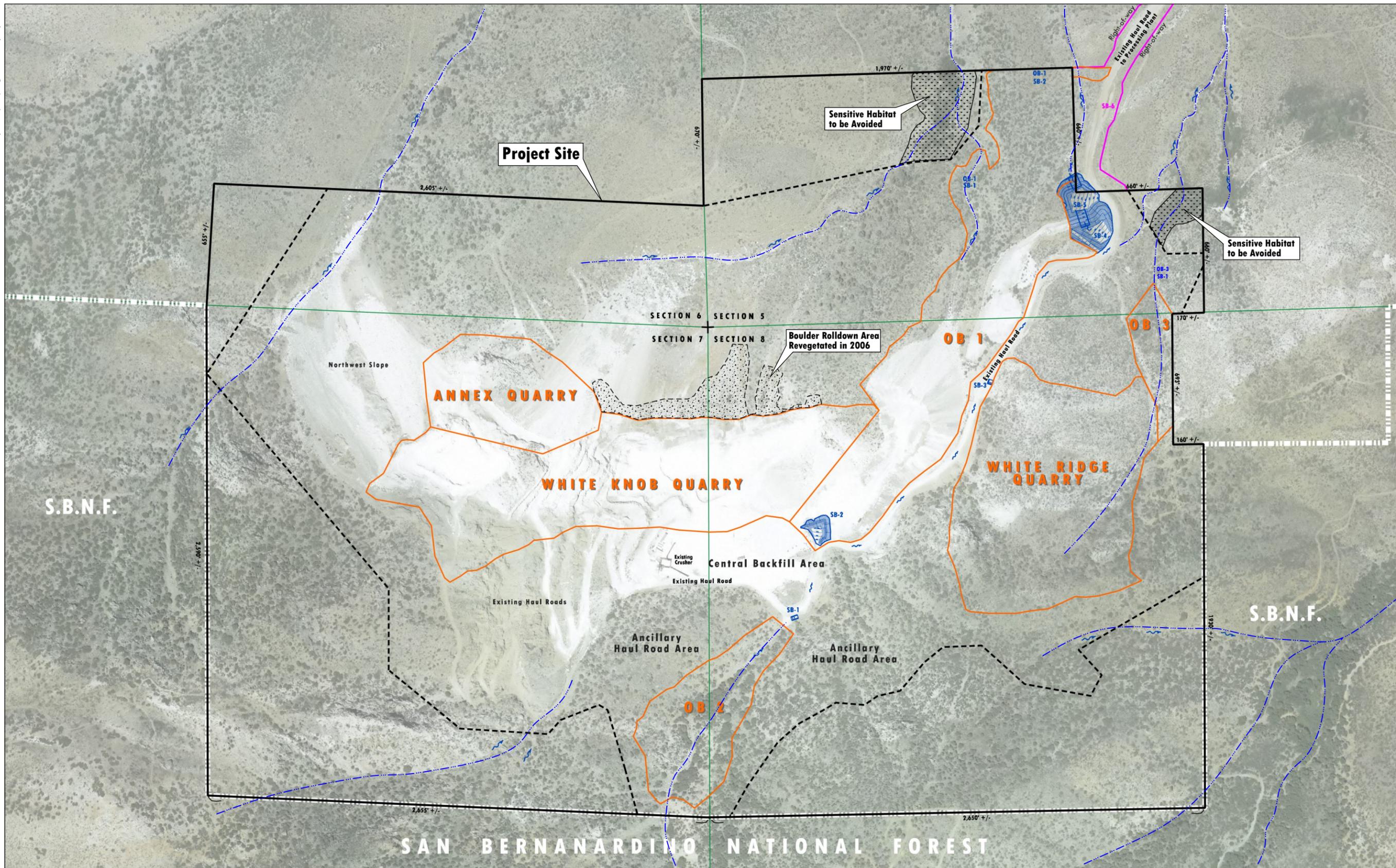
LEGEND

- Project Boundary Private Lands
- Limits of Planned Disturbance
- Major Facilities
- Haul Road Right-of-way on BLM Land CACA 16644
- OB** Overburden Stockpile
- SB** Sediment Basin
- Proposed / Improved SB
- Existing Major Contour
- Existing Minor Contour
- Existing Drainages
- San Bernardino National Forest Boundary

PROJECT VICINITY

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

FIGURE 2



LEGEND

- Project Boundary Private Lands
- Limits of Planned Disturbance
- Major Facilities
- Haul Road Right-of-way on BLM Land CACA 16644

- OB** Overburden Stockpile
- SB** Sediment Basin
- Proposed / Improved SB
- Existing Drainages

EXISTING QUARRIES and PLANNED OPERATIONS

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

FIGURE 3

The haul road to the White Knob – White Ridge Quarries from the processing plant is approximately 5.1 miles long, going westerly from the processing plant for approximately 3.5 miles then turning southerly to climb at a 14% grade up to the quarry site (see Figure 2). The first 4.4 miles of the haul road crosses land managed by the BLM. Use and occupation of the haul road on 67 acres was authorized under a Federal Land Policy Management Act (FLPMA) right-of-way (CACA 16644) approved by the BLM Barstow Resource Office in July 1988.

On April 20, 2011 a Settlement Agreement (Agreement) was entered into by and between BLM and Omya relating to activities at the White Knob Quarry. There are six separate components (Parts A-F) within the Agreement. Part B of the Agreement is entitled: “Repair, Remediate, and Monitor Improvements to the White Knob Quarry Right-Of-Way Access Road and Associated Facilities to Protect Drainages.”

In August 2011, Stantec Consulting Inc. (Stantec) prepared the *White Knob Quarry Haul Road Drainage Report and Plan of Development* to analyze the existing drainage conditions at the quarry and along the haul road, and to provide recommendations for facilities to control storm water and sediment runoff and provide protection to surrounding drainages. Omya subsequently submitted an amended right-of-way application to the BLM to make improvements to the haul road and drainages as recommended in the Stantec Plan of Development. In order to accommodate the improvements required to adequately repair and remediate the right-of-way access road and drainage facilities, the existing right-of-way will be extended from the existing 67 acres to 83.5 acres. The BLM prepared an EA and issued a Record of Decision in support of the haul road right-of-way amendment (see Appendix K). Conditions for the final reclamation of this haul road are incorporated into the Amended Mine and Reclamation Plan.

The components (Parts A through F) within the Agreement include the following:

- Part A - Omya has agreed to study and monitor Ruby Springs, located to the north of the quarry. Ongoing monitoring through 2014 is being undertaken and reported to the BLM and no substantial impacts to the drainage or springs have been observed (see Appendix C1 – Sedimentation and Erosion Monitoring 2010-2011 Reporting Period, Ruby Springs Area; DCI 2012).
- Part B, as discussed above, requires Omya to repair, remediate and monitor measures to control run-off and sedimentation along the 4.4 miles of haul road on BLM managed land.
- Part C requires that the former explosives storage facility located on BLM land to be removed and reclaimed. The facility has been removed and area is part of the 70-acre area purchased by Omya and its future use and reclamation are part of this Amended Plan.
- Part D requires haul road improvements and reclamation to be incorporated into the overall reclamation plan (incorporated herein).
- Part E requires Omya to apply to the BLM for the direct sale of 70 acres on which overburden material is proposed to be placed in the future.
- Part F is the recovery of costs for BLM.

Proposed Amended Mine and Reclamation Plan

To meet current and future product demand, Omya requires high quality limestone ore. This has been achieved through the development of three unique limestone deposits, the White Knob Quarry to the west of the processing plant and the Butterfield and Sentinel quarries located to the south. Amounts of limestone from these quarries vary for a number of reasons including: product demand, ore quality, quarry phasing, weather, and crusher and equipment maintenance.

The White Knob – White Ridge Quarries are currently permitted to operate through the year 2031. Known limestone resources will accommodate an increase to approximately 8.9 million tons of ore to the plant for a proposed additional 40 years of operations (2016 through 2055). Depending on market demand, the White Knob – White Ridge Quarries average ore to plant production rates may slightly decrease to approximately 222,500 tons per year compared to the 2004 through 2006 baseline average of 275,400 tons/year of ore to the plant per year (see Table 2). In order to assure that the processing plant has sufficient limestone for production, a maximum amount of 680,000 tons/year is listed to show the White Knob – White Ridge Quarries solely supplying the Lucerne Valley processing plant in the event that production from the Butterfield – Sentinel Quarries was unavailable.

Table 2
White Knob – White Ridge Quarries
Three Year Average and Amended Plan Proposed Throughputs
(Tons/Year)

	Material Excavated (ore and overburden)	Ore to Crusher	Overburden & Non-Spec Rock to Onsite Overburden Stockpile	Overburden & Non-Spec Rock for Aggregate (to Processing Plant)	Crushed Ore to Processing Plant (Production)	Crusher Fines to Stockpile (Est. 17% of Ore to Crusher)
3-Year Average ¹ (Baseline) (2004-2006)	512,000	324,000	188,000	0	275,400	48,600
Proposed Amended Plan (Average) ¹	662,500	270,000 ³	392,500 (242,500) ⁴	150,000 ³	222,500	47,500
Proposed Amended Plan (Maximum) ²	1,950,000	800,000 ³	1,150,000 (850,000) ⁴	Up to 300,000 ³	680,000	120,000

Sources: 3-year average from 2004 – 2006 White Knob Quarry Annual Production

Notes:

1. 3-year amounts are average actual production levels from 2004 through 2006 and the Amended Plan amounts are listed as both average and maximum proposed amounts. Percentages of ore, overburden and non-spec rock, and crusher waste (fines) vary with excavation phase and quality of limestone. The “material excavated” is the amount that includes the ore and overburden.
2. Maximum amounts are listed to show the White Knob Quarries solely supplying the Lucerne Valley processing plant in the event that production from the Butterfield – Sentinel Quarries was unavailable.
3. Per Amended Plan, varying amounts of Quarry overburden and non-spec rock will be crushed and transported to the processing plant (along with fines) for aggregate sales depending on demand. Table lists potential overburden crushed and transported to the processing plant area.
4. Amounts of overburden including fines sold for aggregate would be subtracted from the amounts deposited on the overburden stockpiles.

The Amended Plan includes an option of crushing varying amounts of overburden and non-spec rock and transporting this material to the processing plant (along with fines) for sales depending on demand. These amounts would be subtracted from the amounts deposited on the overburden stockpiles. Table 1 lists potential overburden crushed and transported to the processing plant as an average of 150,000 tons/year with a maximum of 300,000 tons/year. The combination of all material transported to the processing plant would not exceed 680,000 tons/year.

Quarry and overburden stockpile development and expansion will be phased. Included in the phasing is concurrent quarry development and reclamation of equipment-accessible mined out portions of the quarries.

The quarries are multi-bench open pit mines. Several working levels are operated at any one time within the quarries to supply the quota of ore needed to meet production demands. The multi working level concept allows for greater selectivity and blending of rock qualities to meet stringent quality standards of customers, and allows maximum utilization of the resource. Four grades of ore are selectively mined. The ore is drilled and blasted, loaded into haul trucks and crushed at the quarry. Crushed ore is loaded into off-road haul trucks and transported on the existing haul road as described previously to the processing plant in Lucerne Valley.

Once the final outer limit and bottom of the ore is reached in the White Knob Quarry, the quarry and the areas to its south (Central Area) will be partly backfilled to approximately the 5,575-foot level. The Plan allows for substantial backfill to be placed in the mined out portions of the White Knob Quarry, and also allows for an efficient mining plan, minimum disturbance of new ground, and concurrent reclamation of the quarries and overburden stockpiles.

At the conclusion of excavations, ten years of reclamation and revegetation activities will be implemented, followed by monitoring and remediation until revegetation goals are achieved. The previously approved SMARA reclamation plan includes a site specific approved reclamation and revegetation plan, including growth media salvage, seeding and revegetation, seed collection and propagation, irrigation, site cleanup, public safety, rock and fill slope stability, drainage and erosion controls, monitoring and maintenance plan and bond release criteria. No changes in the approved revegetation plan are proposed other than increased acres and timing.

Project Objectives

The phased mining, overburden development, and reclamation are depicted on the attached Mine Reclamation Plan sheets. The Amended Plan was developed with the following objectives:

1. To continue the mining and recovery of a unique high calcium limestone resource to supply the Lucerne Valley Processing Plant for the production of a wide range of calcium carbonate products;
2. To minimize additional land disturbance through the expansion of contiguous existing and previously approved quarries and minimal expansion of existing overburden stockpiles and haul roads;
3. To place overburden within completed portions of the White Knob Quarry to limit the area of disturbance to the degree possible;

4. To meet the requirements of SMARA and the County surface mining ordinance;
5. To minimize impacts to sensitive plants and wildlife through quarry design and ongoing Bighorn sheep programs;
6. To reclaim the site for post-mining uses which will include open space habitat;
7. To reduce the slopes on overburden fill areas to an overall maximum slope of 2H:1V and revegetate disturbed areas to minimize aesthetic and erosion impacts;
8. Mitigate for lost, threatened and endangered species habitat in accordance with the CHMS requirements by relinquishing unpatented mining claims or transfer of private property as determined adequate by CHMS and regulatory agencies; and
9. To reclaim and maintain the site as necessary to eliminate hazards to public safety.

Project Information Summary

Operator: Omya California, a division of Omya Inc.
Peter Sutherland, Plant Manager
7225 Crystal Creek Road
Lucerne Valley, CA 92356

Representative: Lilburn Corporation
1905 Business Center Drive
San Bernardino, California 92408

Location: Approximately 6 miles southwest of the community of Lucerne Valley and 8 miles northwest of Big Bear Lake in San Bernardino County, CA. The project area is within portions of Sections 5, 6, 7, and 8 Township 3 North, Range 1 West, SBBM.

County General Plan Designation: Resource Conservation (RC)

Estimated Operating Life: 24 additional years from existing permit expiration date of December 31, 2031 for White Knob – White Ridge Quarries (86M-04) (January 1, 2032 through December 31, 2055)

Planned Production: Average of 222,500 tons/year - maximum of 680,000 tons/year of limestone ore hauled to plant; overburden or waste rock averages 392,500 tons/year and crusher fines average 47,500 tons/year; and overburden crushed and transported to the processing plant at an average of 150,000 tons/year with a maximum of 300,000 tons/year.

Estimated Mining Termination Date: December 31, 2055

Estimated Reclamation Completion: December 31, 2065

Reclaimed End Use: Open space wildlife habitat with native vegetation

Project Need

Omya's Lucerne Valley Plant operations require high brightness, high purity limestone ore (calcium carbonate) of specific quantities and qualities to produce fine ground calcium carbonate for numerous consumer and industrial products discussed below. To meet current and future product demand, Omya requires reliable and economic resources of high quality limestone ore. This has been achieved through the development of unique limestone deposits including the White Knob Quarry, the subject of this Amendment. This Amended Plan will assure Omya that its Lucerne Valley processing plant will have the raw limestone resources needed to not only continue producing existing products, but also to be able to respond to future product demand and to invest in future expansion of its plant as necessary to meet this future demand.

Calcium Carbonate (Limestone) Resources

Limestone is one of the fundamental building blocks of our society. Carbonate rocks are a major mineral commodity used in the construction, cement, metallurgical, chemical, paper, and plastics industries. Limestone is utilized in thousands of consumer products which are encountered every day.

Within the United States, productive deposits of white, high purity limestone are restricted to only a few areas. The San Bernardino Mountains and Lucerne Valley area of southern California is one of the major producing areas in North America. The White Knob limestone deposit is composed of white limestone of the Mississippian Monte Cristo Limestone Bullion Member. The rock has been metamorphosed and recrystallized to very white coarse grained white calcite marble. The rock is generally very pure, white calcium carbonate.

The unique characteristics of high purity and high brightness allow the limestone to be processed into a large number of locatable mineral products including whiting grade fillers and extenders. Whiting is used in the form of nontoxic fillers and extenders in a large number of products ranging from paper products to environmental cleanup, carpet backing, plastics, PVC, paint, paper, and other building products. Limestone mining provides numerous environmental benefits including fewer trees harvested for paper making, less petroleum products utilized, and less greenhouse gasses produced. Other environmental impacts may be reduced by utilizing limestone as a substitute for other components in industrial processes and the manufacture of consumer products.

Several grades of ore are selectively mined, crushed, and separated into piles by quality grades. The separate ores are blended together at the plant in the final processing into the various finished ground calcium carbonate products below.

Products Made from Limestone Mined by Omya

Omya produces a full range of coarse to fine grind, high brightness, high purity calcium carbonate products. Plant facilities in Lucerne Valley accommodate both bulk and bagged material for transportation by rail or truck. The operation is one of the largest producers of high quality ground limestone products in the Western United States.

Omya California produces quality grades of fillers/extenders for use in paints, paper making, rubber, wire cable, plastic pipe, building products, polyurethane, adhesives and carpet latex systems. Some of the most common consumer products which are made from Omya limestone mined from the San Bernardino Mountains are shown on Table 3.

Table 3
Common Consumer Products
Made from Limestone Mined by Omya California

ENVIRONMENTAL	CONSTRUCTION	CONSUMER PRODUCTS	SOME OTHER USES
Water filtration	Dry wall mud	Crayons	Athletic field line marker
Acid water neutralization	Paint	Glue	Wire coating insulation
Acid sewage neutralization	Plastics	Fabrics	Carpet backing
Acid rain neutralization	Stucco	Polyester	Sugar refining
Air emission control	Roofing paper	Latex compounds	Vinyl floor covering
Acid soil treatment	Synthetic marble	Household cleanser	Linoleum floor covering
	Caulking compound	PVC pipe	Glass
	Tile grout	Shoe polish	Fiberglass
	Roofing shingles		
	Highway paint		

Source: Omya 2012

Economic Benefits

Long-term cumulative economic benefits of limestone mining along the north range front of the San Bernardino Mountains have added to the County economy for decades including tax payments and jobs. The limestone mining industry provides stable high paying jobs and professional careers for many people. Omya helps support the southern California manufacturing industry by supplying quality grades of fillers/extenders used in the products shown in Table 3 above. The proposed Amended Plan will allow 24 additional years of mining of the resource and provide long-term employment for many employees.

Omya helps support federal, State and local governments and schools through payment of property taxes, excise, fuel and other taxes for the long term. Omya supports local economies through direct purchases of equipment, materials, supplies, and services, and indirect turnover of these expenditures in the economy. Omya also supports local communities through charitable contributions, and employee involvement in various community affairs.

Land Holdings

Omya leases or owns three patented claims and owns a 70-acre parcel on the northeast recently purchased from the BLM that make up the project site (refer to Figures 3 and 4; Sheets 1 and 2). Table 4 shows the patented claim holdings, including name, location and owners of the claims.

Table 4
Omya Land Holdings within Project Boundary
White Knob – White Ridge Quarries

CLAIM NAME	ACREAGE LEASED OR OWNED BY OMYA & APN	LEGAL DESCRIPTION AND CAMC#	NAME AND ADDRESS
White Ridge Placer #1	157.5 acres Patented APN 0446-021-35	NW1/4 Sec 8, T3N, R1W SBBM Patent #1186488	Owned by: Omya Inc. 7225 Crystal Creek Road Lucerne Valley, CA
White Knob Placer #1	160 acres APN 0446-011-06	NE1/4 Sec 7, T3N, R1W, SBBM Patent #04-83-0104	Leased from: Don Fife P.O. Box 1054 Tustin CA 92681
White Knob Annex Placer Claim	40 acres APN 0446-011-04	SE ¼ Sec 6, S1/2, S1/2 T3N , R1W SBBM Patent #04-83-0104	Leased from: Don Fife P.O. Box 1054 Tustin CA 92681
Silver Creek Placer #4 (portion)	70 acres APN 0446-021-11	SW ¼ Sec 5, S1/2, T3N, R1W Land Sale with BLM	Owned by: Omya Inc. 7225 Crystal Creek Road Lucerne Valley, CA 92356

Mineral Resource Zoning

Omya has received Mineral Resource Zone 2 status (MRZ-2) for the limestone deposits on the Omya White Knob limestone area. Core drilling, detailed geologic mapping and assay data prove the deposits are significant mineral resources (MRZ-2) and easily exceeded the criteria established by the California Department of Conservation Division of Mines and Geology. Figure 5 shows the MRZ zoning of the White Knob claim area.

The White Knob Quarry limestone deposit is given MRZ-2 rating, which indicates it is recognized by the state as a valuable proven mineral resource with substantial reserves. MRZ-2 status is significant as it recognizes the significance and importance of mineral resources and mining in land use planning. For proven mineral resources, mining may be the best use of the land.

1.1 MINING OPERATIONS

History

Proximity to the large manufacturing and industrial center of Los Angeles prompted development of the large limestone deposits in the San Bernardino Mountains during the latter

Mine Plan Notes

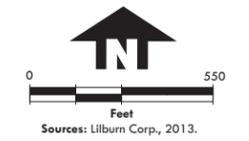
- Name: White Knob - White Ridge Quarries
- Mineral Mined: Limestone
- Mine Operator:
OMYA California
7225 Crystal Creek Road
Lucerne Valley, CA 92356
Peter Sutherland, Plant Manager
(760) 248-5233
- Land Owner:
OMYA Inc.
7225 Crystal Creek Road
Lucerne Valley, CA 92356
Peter Sutherland, Plant Manager
(760) 248-5233
- Applicant: Same as (3) OMYA California
- Representative:
Lilburn Corporation
1905 Business Center Drive
San Bernardino, CA 92408
(909) 890-1818
- Owner of Mineral Rights:
White Knob - White Ridge Quarries

CLAIM NAME	ACREAGE LEASED OR OWNED BY OMYA & APN	LEGAL DESCRIPTION AND CANCER	NAME AND ADDRESS
White Ridge Placer #1	157.5 acres APN 0446-021-35	NW 1/4 Sec. 8, T3N, R1W S88M Patent #1186488 Leased from Don File F.O. Box 1034 Tustin, CA 92681	Owned by Omya Inc. 7225 Crystal Creek Road Lucerne Valley, CA
White Knob Placer #1	160 acres APN 0446-011-06	NE 1/4 Sec. 7, T3N, R1W, S88M Patent #1186488 Leased from Don File F.O. Box 1034 Tustin, CA 92681	Owned by Omya Inc. 7225 Crystal Creek Road Lucerne Valley, CA
White Knob Annex Placer Claim	40 acres APN 0446-011-04	SE 1/4 Sec. 6, S1/2, S1/2 T3N, R1W S88M Patent #04-83-0104	Leased from Don File F.O. Box 1034 Tustin, CA 92681
Silver Creek Placer #4	70 acres APN 0446-021-11	SW 1/4 Sec. 5, S1/2, T3N, R1W Land Sale with BLM	Owned by Omya Inc. 7225 Crystal Creek Road Lucerne Valley, CA 92356

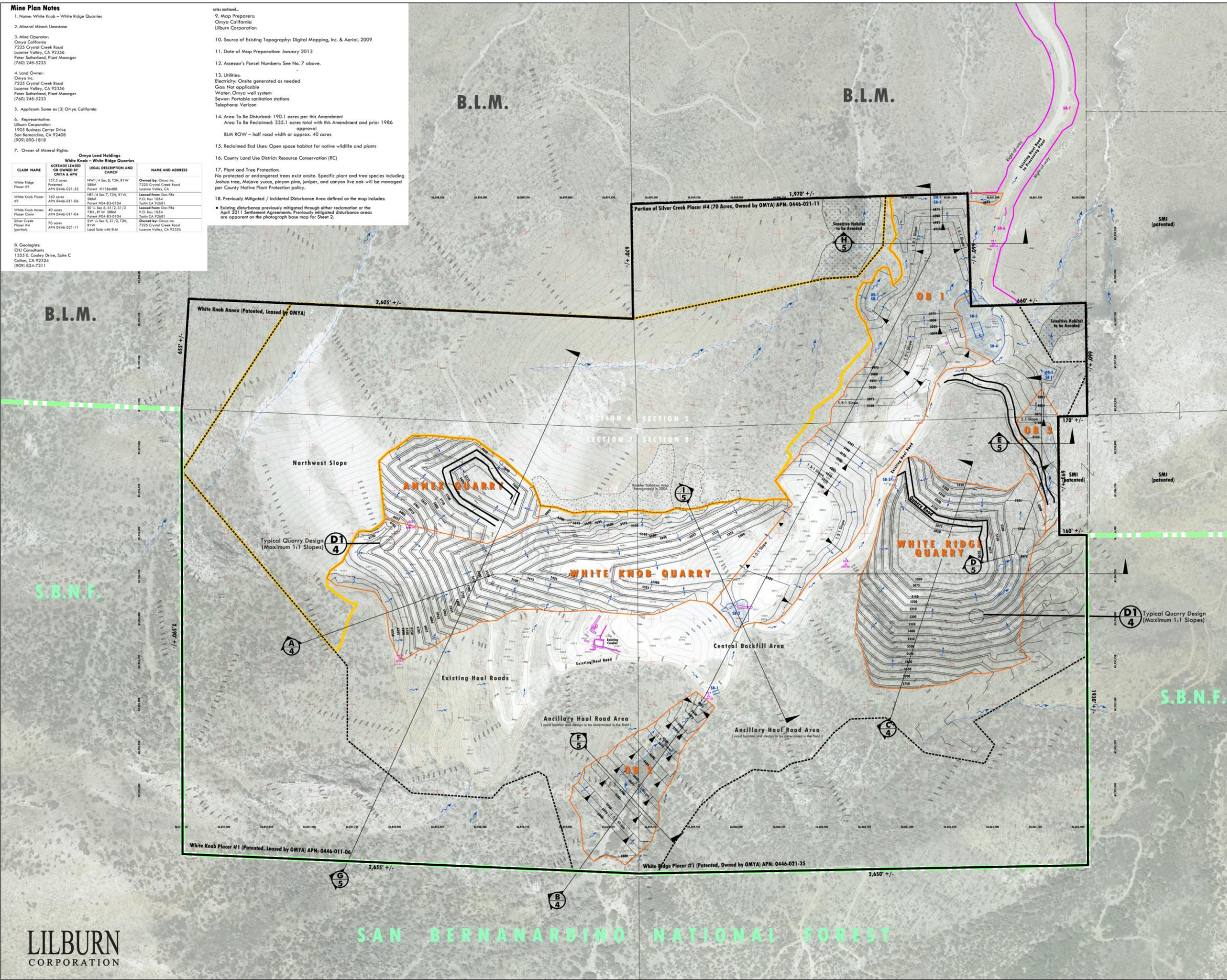
9. Map Preparers:
OMYA California
Lilburn Corporation
10. Source of Existing Topography: Digital Mapping, Inc. & Aerial, 2009
11. Date of Map Preparation: January 2013
12. Assessor's Parcel Numbers: See No. 7 above.
13. Utilities:
Electricity: Onsite generated as needed
Gas: Not applicable
Water: Omya well system
Sewer: Portable sanitation stations
Telephone: Verizon
14. Area To Be Disturbed: 190.1 acres per this Amendment
Area To Be Reclaimed: 335.1 acres total with this Amendment and prior 1986 approval
BLM ROW - half road width or approx. 40 acres
15. Reclaimed End Uses: Open space habitat for native wildlife and plants
16. County Land Use District: Resource Conservation (RC)
17. Plant and Tree Protection:
No protected or endangered trees exist onsite. Specific plant and tree species including Joshua tree, Mojave yucca, piñon pine, juniper, and canyon live oak will be managed per County Native Plant Protection policy.
18. Previously Mitigated / Incidental Disturbance Area defined on the map includes:
Existing disturbance previously mitigated through either reclamation or the April 2011 Settlement Agreements. Previously mitigated disturbance areas are apparent on the photograph base map for Sheet 2.

LEGEND

- Amended Project Boundary
- Private Land
- Limits of Planned Disturbance
- Major Facilities
- Previously Mitigated April 2011 Incidental Disturbance Area
- OB Overburden
- SB Sediment Basin
- Proposed/improved SB
- Operating Major Contour
- Operating Minor Contour
- Haul Road
- Slope Indicator
Top of slope
- Toe of slope
- Design Drainage
- Existing Major Contour
- Existing Minor Contour
- Existing Drainages
- San Bernardino National Forest Boundary
- Sensitive Habitat to be Avoided
- USGS Survey Section
- Claim / Parcel Line



NOTE:
This is a reduced 200 scale sheet. To review details, see attached Sheet 2 in Mine and Reclamation Plan.

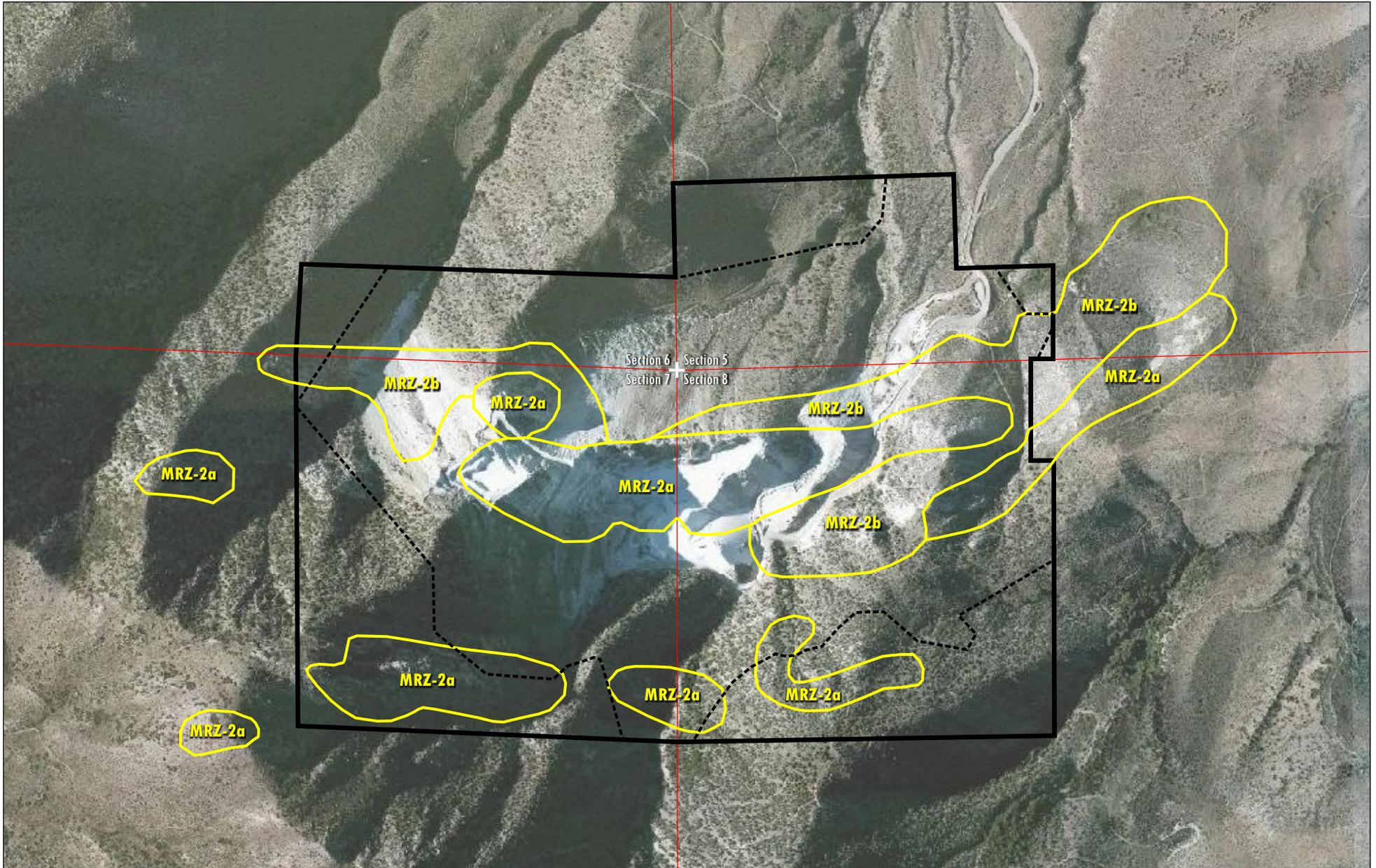


AMENDED MINE PLAN

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

FIGURE 4





17

MINERAL LAND CLASSIFICATION MAP

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

FIGURE 5

LEGEND

-  Amended Project Boundary
-  Private Land
-  Limits of Planned Disturbance
-  MRZ-2a
-  MRZ-2b
-  Mineral Resource Zone Boundary and Designation


 0 900
 Feet
Base Map: Lilburn Corp., 2013.
Geology: Division of Mines and Geology, California; 1995.
LILBURN
 CORPORATION

half of the 1950s. At that time, a "limestone rush" occurred, and nearly all outcrops of limestone were claimed. Currently, there are three major producing companies of limestone products.

Mining began on the properties now controlled by Omya during the late 1950s and has been more or less continuous since 1958. The White Knob and White Ridge claims were staked in the 1950s by the Fife family, and later patented. Small scale mining, road building and core drilling occurred during the 1960s - 1970s. During the early 1980s, the White Knob deposit was leased by Omya and the deposit was expanded by core drilling and detailed geologic investigations. In 1985, the decision to open and permit the White Knob - White Ridge deposit was made.

Mining at the White Knob Quarry started in 1987 after County permitting was completed. Permitting included County land use and reclamation permits as discussed above and numerous 1603 streambed alteration agreements from CDFW for the haulage road from the plant and the overburden sites at the quarry. Once the road was constructed to the quarry, development of the quarry started. For logistical reasons, mining started between the elevations of 5,500 feet and 5,900 feet and nine ore production levels (benches) were established. Ore from those levels met production requirements for 10 years while a haul road was being constructed to the top of the knob at 6,200 feet. Mining will continue to be from multiple working benches, incorporating the adjacent Annex Quarry and the separate White Ridge Quarry to the east.

Topography in the area of the quarry is extremely steep and rugged. Several 100-foot high cliffs were originally present before mining began, and the deposit forms a steep cliff sided east to west trending ridge about 1,500 feet long. The limestone deposit outcropped over a 1,000-foot vertical interval. Access to the various levels is via a series of switchback roads cut into the adjacent granite rock mountain side. The quarry forms a side hill quarry with more than 10 benches mined. At the present time production comes from both lower levels (5,500-foot level) and upper levels (6,200-foot level) of the quarry.

Existing and Planned Quarry Operations

Table 5 lists the proposed average and maximum production of ore to crusher and to the processing plant, overburden to stockpiles and for possible aggregate sales, and fines. An average of approximately 150,000 tons/year up to approximately 300,000 tons/year of waste and non-spec rock may be crushed on the quarry site and transported along with fines to the processing plant for aggregate sale. Maximum amounts are listed to show the White Knob Quarries solely supplying the Lucerne Valley processing plant in the unlikely event that production from the other quarries is unavailable.

Phased Future Quarry Development

Although mining is more or less continuous, the ultimate development of the quarry is phased. Four phases were previously identified and development of the middle benches during Phases 1 and 2 has been completed. Phase 3 is in progress and includes full development of the existing White Knob and White Knob Annex Quarries with mining expected to be completed around 2045. Phase 4 includes development of the White Ridge Quarry deposits to the east and is scheduled to begin around 2015 and last until 2055. Phase 5 is reclamation of the mine site

generally after completion of mining. The backfilling of portions of the White Knob Quarry and the Central Area will be initiated during the last 20 years of operations (approx. after year 2035).

**Table 5
Planned Quarries' Average and Maximum Production
White Knob – White Ridge Quarries**

Quarry	Area (acres)	Total Excavated (millions of tons)	Ore Reserves (into crusher) (millions of tons)	Annual Average Excavated (tons)	Annual Average Waste Rock¹ & Fines² (tons)	Annual Average Production (ore to plant) (tons)	Total Waste Rock & Fines (millions of tons)	Total Ore to Plant (millions of tons)	Max. Height (feet)
White Knob	41.1	8.5	3.5	212,500	140,000	72,500	5.6	2.9	900 - 625 ³
Annex	12.5	4.0	1.3	100,000	72,500	27,500	2.9	1.1	525
White Ridge	33.1	14.0	6.0	350,000	227,500	122,500	9.1	4.9	750
Totals	86.7	26.5	10.8	662,500	440,000	222,500	17.6	8.9	900
Annual Maximum Totals⁴				Annual Max. 1,950,000	Annual Max. 1,270,000	Annual Max. 680,000			

Notes:

Source: Omya, 2012

Volumes are estimated based on drilling data and computer modeling.

Areas rounded to nearest acre. Totals may be slightly different due to rounding.

Annual average production based on future product demand.

Ore and waste rock excavated will vary annually depending on area being excavated.

1 – An average of approximately 150,000 tons/year up to approx. 300,000 tons/year of waste and non-spec rock may be crushed at the quarry site and transported along with fines to the processing plant for aggregate sale.

2 - Fines produced from primary onsite crushing estimated at 17.5% of ore crushed.

3 – White Knob Quarry to be partially backfilled by overburden to approx. elevation of 5,575 feet reducing height of quarry face to about 625 feet.

4 - Maximum amounts are listed to show the White Knob Quarries solely supplying the Lucerne Valley processing plant in the unlikely event that production from the other quarries is unavailable.

Phased Future Quarry Development

Although mining is more or less continuous, the ultimate development of the quarry is phased and is linked to operational parameters and product demands. Four phases were previously identified and development of the middle benches during Phases 1 and 2 has been completed. Phase 3 is in progress and includes full development of the existing White Knob and White Knob Annex Quarries with mining expected to be completed around 2045. Phase 4 includes development of the White Ridge Quarry deposits to the east and is scheduled to begin around 2015 and last until 2055. Phase 5 is reclamation of the mine site generally after completion of mining. The backfilling of portions of the White Knob Quarry and the Central Area will be initiated during the last 20 years of operations (approx. after year 2035).

Phasing is described in Table 6. Note that mining operations may experience unscheduled phasing changes due to unforeseen market/economic demands and variation in material quality since the natural deposit is not of uniform quality. The County will be updated in the annual monitoring report on the status of operational phases.

Table 6
Approved and Amended Phased Development
White Knob - White Ridge Quarries

Mining Phase	Duration Total Mine Life from 1988-2031 and Cumulative Years	Currently Permitted 1986 Plan & Location	Proposed Amendment Changes
1986 Approved Mine and Reclamation Plan			
Phase 1	Years 1-5, 5 years 1988-1993	Yes / Completed White Knob development	No
Phase 2	Years 5-12, 7 years 1993-2000	Yes / Completed White Knob development	No
Phase 3	Years 12-40, 28 years 2000-2031	Yes / in Progress White Knob/Annex mining	Yes
Phase 4	Years 18-32, 14 years 2007-2020	Yes / not yet started White Ridge development	Yes
Phase 5	2032 - 2037	Yes / not yet started Final reclamation	Yes
2012 Proposed Amended Mine and Reclamation Plan			
<i>Timespans below per this Amended Plan starting in year 2015 (year 1)</i>			
Phase	Duration	Location/Description	
Phase 3 Amended	Years 1 – 30, 30 years Ongoing 2015 - 2045	White Knob-Annex mining; placement of waste rock into OB-1 & 2	
Phase 4 Amended	Years 1 - 40, 40 years 2015 - 2055	White Ridge mining; placement of waste rock into OB-1, 2, & 3	
Phase 5 Amended	Years 20 -50, 30 years 2035 - 2065	Backfilling of WKQ and Central Area; Final reclamation & revegetation	

Pre-Mining Activities of Undisturbed Lands

The following activities will be conducted prior to mining and overburden and waste rock stockpile development in order to limit disturbed areas to the mine plan boundaries and to facilitate ongoing and future reclamation and revegetation:

- Excavation and development limits will be located and marked in the field;
- Specified plants that can tolerate transplant will be salvaged to the degree possible and stored in a nursery and will be replanted on reclaimed land as areas become available for revegetation;

- To the degree possible, seeds of specified plants will be collected and either used for revegetation or stored appropriately for maximum future viability; and
- Salvageable soils and/or growth media will be placed in separate identified stockpiles for use as a seed bank and seedbed during reclamation. Soil stockpiles will be clearly marked and managed to limit wind and water erosion.

White Knob Quarry Operations

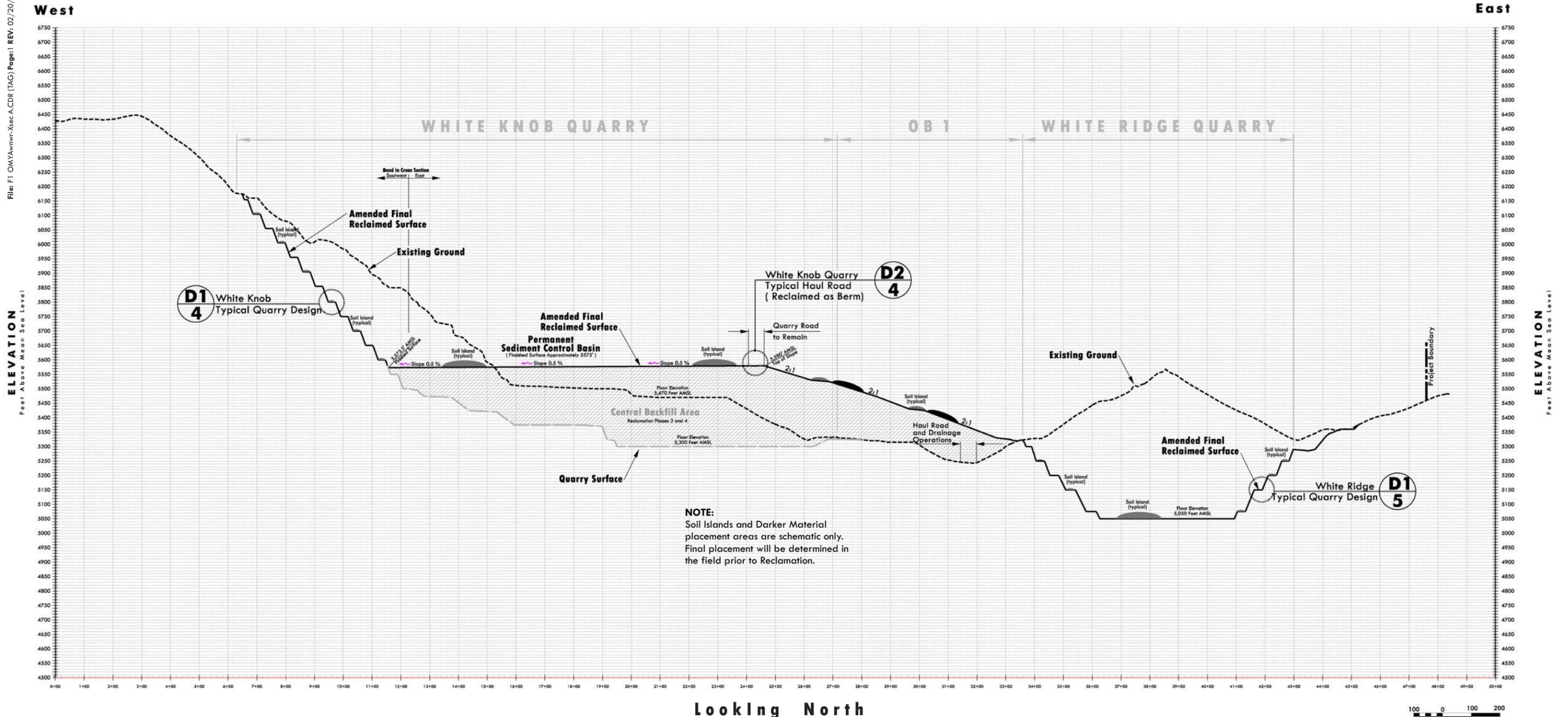
The White Knob Quarry is an existing side hill quarry but will develop into a narrow V-shaped quarry daylighting to the east once the footwall of the deposit is reached. Two or three working levels are operated at any one time to supply the quota of ore needed to meet production demands. The multi working level concept allows for greater selectivity and blending of rock qualities to meet stringent quality standards of customers, and allow maximum utilization of the resource.

The ore is drilled and blasted, loaded with a front end loader into haul trucks and hauled to the crusher at the 5,500-foot level. Overburden is deposited in the OB-1 stockpile. At the crusher, the rock is reduced in size, screened and separated into the various quality grades. Fines are screened out and fines that are not sold are placed in the overburden stockpiles. Crushed ore is loaded into haul trucks and transported on the White Knob haul road to the existing processing plant in Lucerne Valley.

The proposed White Knob Quarry expansion consists of approximately 6.1 acres for a total disturbance area of approximately 41.1 acres. (Please refer to Figure 4 and Sheet 2.) Estimated ore reserves are approximately 3.5 million tons with approximately 5 million tons of waste rock. The haul road to the top of White Knob has been established and mining will continue from the top down to the footwall of the deposit. Benches established previously will be pushed back to the south, west and north as far as economic limits will allow.

The elongated quarry will be approximately 2,500 feet west to east and 600 feet wide and will reach a maximum elevation of 6,200 feet amsl on the west to a floor elevation of 5,300 feet daylighting on the east (see Figure 6 – Cross Section A). Typical slopes will be 45 to 50 feet vertical with a slope face angle averaging 70 degrees. Bench width is typically 25 feet, but is greater if wall height is over 50 feet. Generally, bench width is ½ wall height. Pit ramps are 25 to 35 feet wide and grade is 12 to 18% depending on conditions. Bench height has been determined as a result of detailed studies of the geologic structure, over 15 years of mining experience in this specific mine site, and consultations with various slope stability experts including government and private sector.

The operating plan is designed with overall quarry slopes of approximately 1H:1V (horizontal:vertical) pursuant to the January 2013 “Slope Stability Investigation” prepared by CHJ (see Appendix G and Section 2.9 below). CHJ concluded that the proposed mine excavation and reclamation (partial backfilling) of the quarries are suitably stable against gross failure for the anticipated long –term conditions including the effects of seismic shaking and meet the factor of safety criteria for static and seismic conditions. CHJ recommended measures to be implemented during mining and these are listed in Section 2.9.



Looking North

LEGEND

- Existing Ground Profile
- Amended Mine Plan Profile
- Amended Reclamation Plan Profile
- Overburden Backfill
- Soil Island
- Darker Material
- AMSL Above Mean Sea Level

Horizontal Scale: 1 inch = 200 feet
Vertical Scale: 1 inch = 200 feet

CROSS SECTION "A"
White Knob and White Ridge Quarries - West to East

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

During the last 20 years of operations, the quarry floor will be utilized for stormwater and sediment retention. The quarry will be partially backfilled with overburden to create a floor elevation at approximately the 5,575-foot level and sloped towards the highwall with a perimeter berm to maintain a permanent sediment basin for future sediment control.

White Knob Annex Quarry

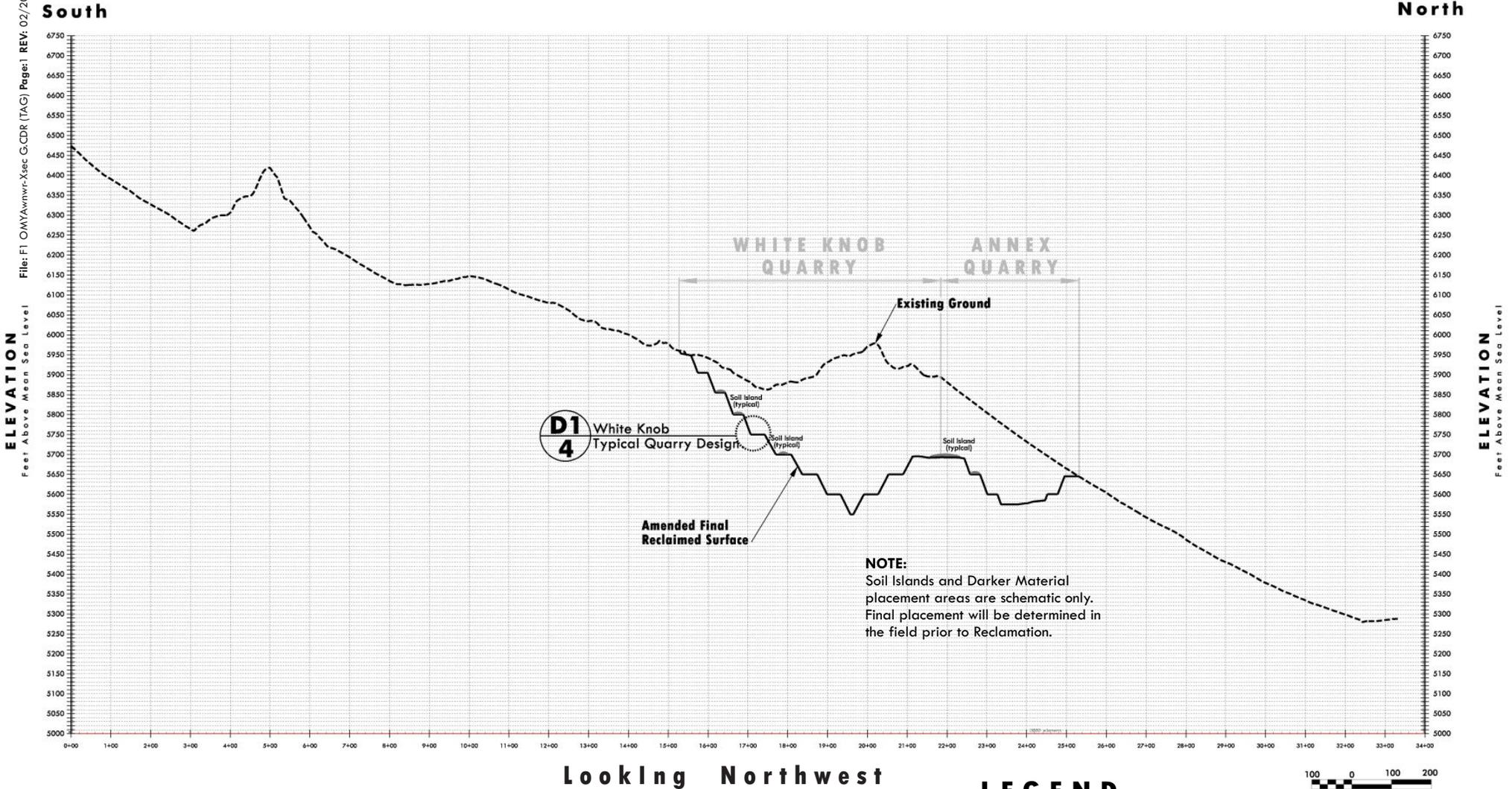
The White Knob Annex Quarry area is a 12.5-acre area contiguous to the northwest of the White Knob Quarry. The Annex Quarry will be mined concurrently with the White Knob Quarry from the top down based on mining logistics and specific ore grades in demand. The oval shaped quarry will be approximately 900 feet west to east and 550 feet wide and will reach a maximum elevation of 6,075 feet on the southwest to a floor elevation of 5,575 feet (see Figure 7 – Cross Section G). Estimated ore reserves are approximately 1.3 million tons with approximately 2.7 million tons of waste rock.

Typical slopes will be 50 feet vertical with a slope face angle averaging 70 degrees. Bench width is typically 25 feet, but is greater if wall height is over 50 feet. Generally, bench width is ½ wall height. Pit ramps are 25 to 35 feet wide and grade is 12 to 18% depending on conditions. Bench height has been determined as a result of detailed studies of the geologic structure, over 15 years of mining experience in this specific mine site, and consultations with various slope stability experts. Overall quarry slopes are designed at approximately 1H:1V pursuant to the January 2013 Slope Stability Investigation prepared by CHJ (see Appendix G). CHJ concluded that the proposed mine excavation of the quarries are suitably stable against gross failure for the anticipated long –term conditions including the effects of seismic shaking and meet the factor of safety criteria for static and seismic conditions. CHJ recommended measures to be implemented during mining and these are listed in Section 2.9.

During and after completion of mining in this quarry, the quarry will be utilized for stormwater and sediment retention for precipitation that falls on the quarry area.

White Ridge Quarry

The White Ridge Quarry area consists of about 33 acres on the east side of the site. The White Ridge deposit is the eastward continuation of the White Knob ore body. The box-shaped quarry will be approximately 1,200 feet north to south and 900 feet west to east and will reach a maximum elevation of 5,750 feet on the south to a floor elevation of 5,050 feet (see Figure 8 – Cross Section C). Estimated ore reserves are approximately 6 million tons with approximately 8 million tons of waste rock. Typical slopes will be 50 feet vertical with a slope face angle averaging 70 degrees. Bench width is typically 25 feet, but is greater if wall height is over 50 feet. Generally, bench width is ½ wall height. Pit ramps are 25 to 35 feet wide and grade is 12 to 18% depending on conditions. Overall pit slopes are designed at approximately 1H:1V pursuant to the January 2013 Slope Stability Investigation prepared by CHJ (see Appendix G). CHJ concluded that the proposed mine excavation of the quarries are suitably stable against gross failure for the anticipated long –term conditions including the effects of seismic shaking and meet the factor of safety criteria for static and seismic conditions. CHJ recommended measures to be implemented during mining and these are listed in Section 2.9.



Looking Northwest

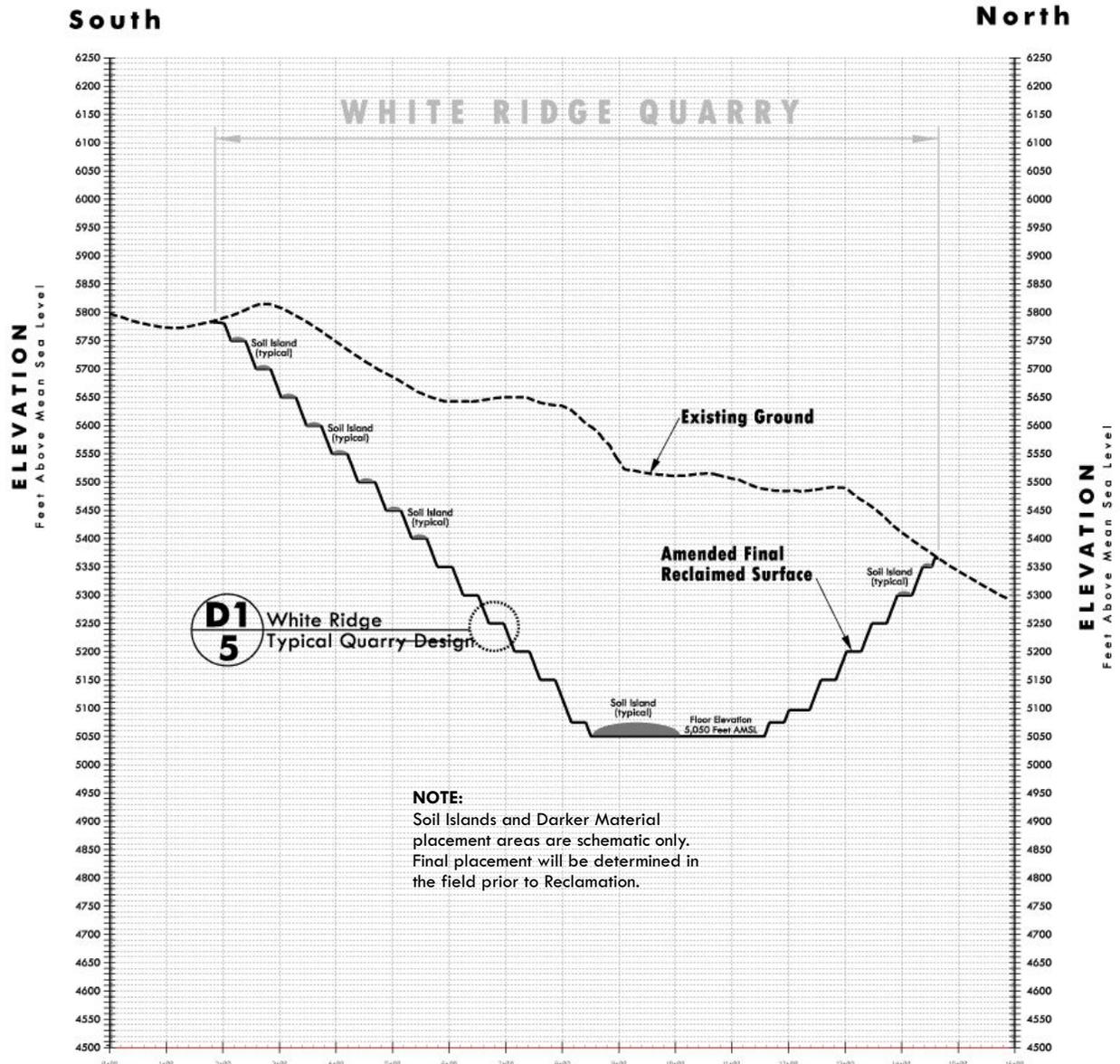
LEGEND

-  Existing Ground Profile
-  Amended Mine Plan Profile
-  Amended Reclamation Plan Profile
-  Overburden Backfill
-  Soil Island
-  Darker Material
- AMSL Above Mean Sea Level

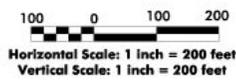
CROSS SECTION "G"
 White Knob and Annex Quarries - North to South

White Knob and White Ridge Quarries - OMYA California
 Amended Mine and Reclamation Plan
 County of San Bernardino, California

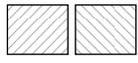
FIGURE 7



Looking West



LEG

-  Existing Ground Profile
-  Amended Mine Plan Profile
-  Amended Reclamation Plan Profile
-  Overburden Backfill
-  Soil Island
-  Darker Material
- AMSL Above Mean Sea Level

CROSS SECTION "C"
White Ridge Quarry - North to South

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

Access to the White Ridge deposit is to be constructed from the crusher eastward directly to the upper level of approximately 5,750 feet. The ore will be hauled to the crusher and overburden and waste rock will be deposited in the proposed overburden Site 2 (OB-2) in the canyon to the west and at the existing OB-1. The new access roads will access the top of the deposit, and the site will be mined from the top down.

The White Ridge Quarry design leaves a 300-foot high ridge from elevation 5,350 to 5,050 feet of undisturbed hillside facing Lucerne Valley. This will reduce views of a quarry face and reduce visual impacts of the lower southern portion of this quarry. A small 3-acre overburden site (OB-3) and an associated access road are planned on the southeast side of the White Ridge Quarry to handle waste rock for the northern portion of the quarry.

During and after completion of mining in this quarry, the quarry floor at approximately 5,050 feet will be utilized for stormwater and sediment retention for precipitation that falls on the quarry area and for a portion of the haul road drainage on the west.

Non-Spec Material Production

The Amended Plan includes an option of crushing varying amounts of overburden and non-spec rock and transporting this material to the processing plant (along with fines) for sales depending on demand. These amounts would be subtracted from the amounts deposited on the overburden stockpiles. Table 1 lists potential overburden crushed and transported to the processing plant as an average of 150,000 tons/year with a maximum of 300,000 tons/year. The combination of all material transported to the processing plant would not exceed 680,000 tons/year.

Depending on the amounts of non-spec material transported offsite, a like volume of material would be eliminated from being deposited in the overburden stockpiles. It is anticipated that some of the overburden stockpiles may be a level or two lower than shown on the reclamation plot plan depending on the amount of non-spec material removed.

Hours of Operation

The quarry operates all year. Mining of ore grade limestone in White Knob Quarry may occur throughout the year, but usually occurs about 8 months a year. Overburden removal and quarry development may occur throughout the year, but usually occurs for about 4 months per year. Ore production requirements are the major determining factor for scheduling of ore and waste mining phases.

Equipment Used

The major equipment listed in Table 7 is currently and will be used in mining at the White Knob – White Ridge Quarries in the future. No changes in equipment numbers are planned. As operations progress, alternate equipment may be required to optimize operations and these are also listed in the table below. The alternate equipment would not substantively change the process described above. Required compliance with air quality regulations and permits would be obtained prior to placing equipment into operation.

**Table 7
Typical Quarry Equipment
White Knob – White Ridge Quarries**

Equipment	Typical Number	Increase in Equipment	Purpose
Dozer	1	0	Removal of topsoil and waste rock. Construction and maintenance of the haul road , and quarry bench grading
Off-Road Haul Trucks	4 40 to100 ton trucks	0	Transportation of excavated material to the primary crusher and to overburden stockpiles onsite and transportation of crushed sized ore to the Lucerne Valley Processing Plant.
Drill Rig	1	0	Drill holes for placement of explosives.
Water Truck	1	0	Water spray haul roads, active quarry areas, overburden stockpiles, and general dust control onsite.
Front-End Loaders	2	0	Loading of excavated materials into haul trucks at quarry and at the primary crusher.
Crusher/Screening System	1	0	Existing stationary crusher or mobile crusher system
Excavator	1	0	Currently limited use for special projects, and boulder breaking. Potential future replacement to be used in place of front-end loader
Grader	1	0	Limited use for road development and maintenance
Ancillary Equipment	Varies	Varies	Maintenance vehicles, bobcats, backhoe, pick-ups, etc

Source: Omya 2012

Note that similar equipment may be used during the life of the project.

Sanitation

Portable toilets are supplied for use by employees and are located at the crusher site.

Public Access and Safety

Access to the White Knob – White Ridge quarries (and any other portion of the Omya California operation) is limited to employees and authorized personnel. Access is controlled during the workweek by operating personnel. During off hours, access is restricted by warning signs and fences, and all legal access roads have locked gates and signs informing the public the roads are closed to public access. Warning signs notify the public that the mining area has restricted access and that the roads are not public access roads. During non-operating hours the gates are closed and locked.

1.2 OVERBURDEN AND WASTE ROCK

Overburden and waste rock at the White Knob - White Ridge Quarries are composed of grey impure limestone and granite intrusive rock and granite dikes. Overburden and waste rock are nontoxic, naturally occurring rock material, but which are of insufficient quality (purity and

brightness) to process for ore. The vast majority (60%) of the overburden and waste rock is dominantly impure calcium carbonate. Most of the remainder (40%) is granitic rock (monzonite).

Limestone waste rock/overburden does not have the chemical composition to create acid mine drainage.

The Amended Plan proposes to expand the existing overburden site (OB-1) by approximately 17 acres northward from its current site limits. Portions of the proposed expanded site include ground which is already disturbed by existing stockpile areas. Expanding OB-1, development of two other overburden sites, and backfilling portions of the White Knob Quarry and Central Area were designed and located for the following reasons:

- Existing overburden site expansion.
- Location centrally located or within close proximity to the quarries to reduce haul distance and fuel usage.
- Downhill haul for loaded trucks.
- Area underlain by non-carbonate rocks (no potential ore).
- Sites not habitat for endangered plants.
- Minimize visual impact.
- Economic operational analysis.
- Adequate storage capacity for long-term mining.

Overburden or Waste Rock Stockpile Areas

Currently overburden and fines which are not sold are deposited into the OB-1 stockpile. Material placed into this area includes both waste rock and material stockpiled for potential future use. Material stockpiling will continue throughout the life of the operation. Waste rock is also planned to be backfilled into the White Knob Quarry and the area to its south defined as the Central Area. Sediment basins will be developed and/or upgraded for all three overburden stockpiles. In addition, rip rap, smaller catchment basins, drainage channels, and various energy dissipaters have been or will be placed along the toe of fills and in the drainage below the fill slopes to trap sediment and minimize the potential for off-site transport. These drainage controls are and will be periodically inspected and maintained as necessary.

This Amendment proposes the revisions shown in Table 8 to handle the estimated overburden from the planned expansion of mining.

Table 8
Planned Waste Rock, Overburden, & Fines Storage Areas
White Knob – White Ridge Quarries

Storage Area	Existing Areas (approx. acres)	Planned Additional Areas (acres)	Total Area (acres)
OB-1	15	16.9	31.9
OB-2	0	13.0	13.0
OB-3	0	3.0	3.0
Total OB Stockpiles	15	32.9	47.9
White Knob Quarry Backfill	Within planned quarry	(15) ¹	15
Central Area Backfill	To be disturbed by crusher site and quarry haul roads	(11) ²	11

Notes:

Areas rounded to nearest tenth of an acre. Totals may be slightly different due to rounding.

1 – White Knob Quarry to be partially backfilled by overburden to approximate elevation of 5,575 feet reducing height of quarry face to 625 feet.

2 - Central Area to be backfilled up to approximate elevation of 5,575 feet as feasible.

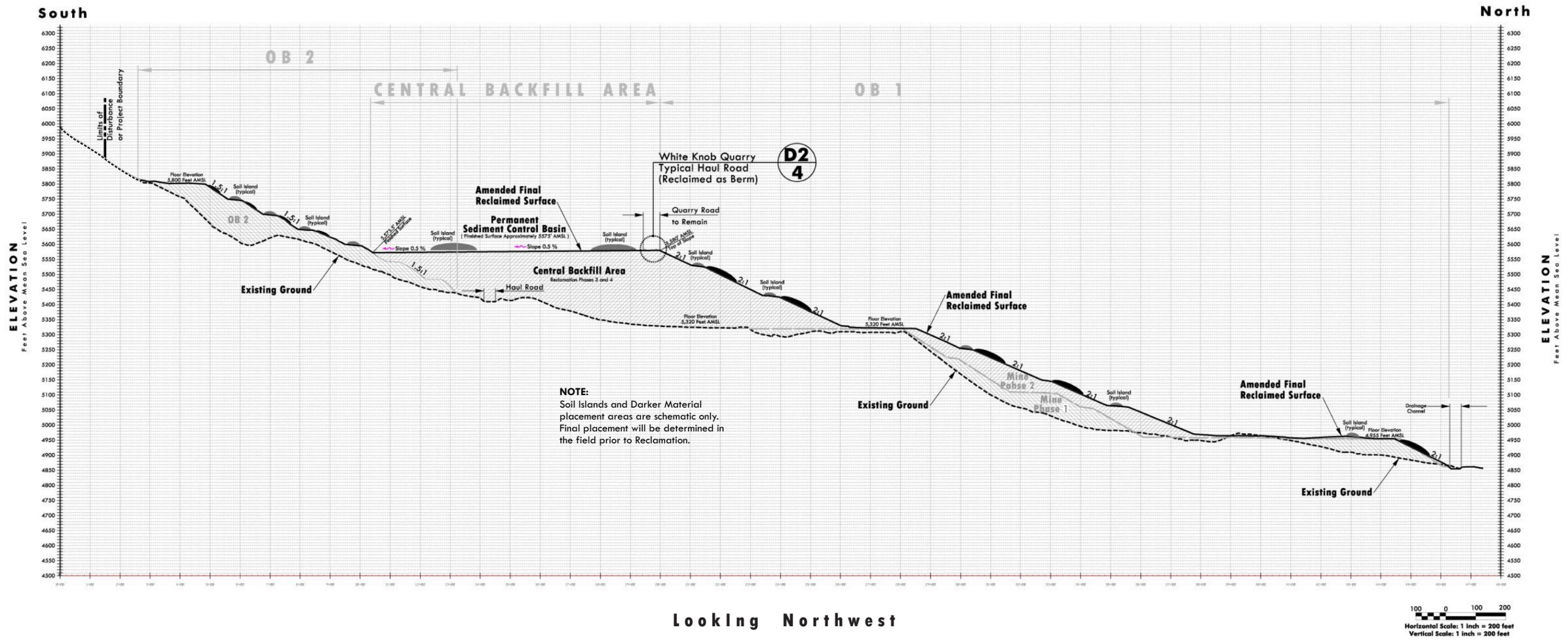
OB-1 (Overburden Stockpile-1)

The existing approved OB-1 stockpile of approximately 15 acres will be progressively extended to the south into the White Knob Quarry and north by about 1,300 feet onto an additional 17 acres into former BLM land west of the haul road (see Figures 4 and 9 – Cross Section B). As overburden removal progresses, the pad will be incrementally built southward to a planned elevation of 5,325 feet. OB-1 will be developed as a series of three benches of varied widths per the existing grade reclaimed to 2H:1V. Sediment Basins 4 and 5 will be improved per the updated sedimentation control plan and secondary sediment basins will be constructed to its northwest and north to prevent sediment from leaving the site. Backfilling of the eastern portion of the White Knob Quarry during about the last 20 years of operations will occur to minimize OB-1 expansion and to minimize disturbance of new ground.

Reclamation and revegetation will occur concurrently where operationally feasible and the final slopes will be designed per the CHJ slope stability report.

OB-2 (Overburden Stockpile-2)

OB-2 will be developed on approximately 13 acres in a canyon area south of the crusher and west of the White Ridge Quarry in Phase 4. Overburden from the White Ridge Quarry will be transported on haul roads along level alignments along the contour. Overburden and waste rock



- LEGEND**
- Existing Ground Profile
 - Amended Mine Plan Profile
 - Amended Reclamation Plan Profile
 - Overburden Backfill
 - Soil Island
 - Darker Material
 - AMSL Above Mean Sea Level

CROSS SECTION "B"
OB-1, OB-2 and Central Backfill Area - North to South

White Knob and White Ridge Quarries - OMYA California
 Amended Mine and Reclamation Plan
 County of San Bernardino, California

FIGURE 9

will be placed at OB-2 between the elevations of 5,800 feet and 5,425 feet located at OB-2's toe (refer to Figure 9). Sediment Basin 1 located at OB-2's toe will be improved per the updated sedimentation control plan. OB-2 will be approximately 1,150 feet southwest to northeast and approximately 550 feet wide at its widest and will be developed as a series of approximately six 50-foot wide benches. The overall slope of OB-2 will be no greater than approximately 2H:1V.

Backfilling of the Central Area during about the last 20 years of operations will backfill the lower 150 vertical feet of OB-2 decreasing the remaining slope height to 225 feet. All slopes will be designed per the CHJ slope stability report. Reclamation and revegetation of this area will occur concurrently where operationally feasible and be completed during Phase 5 when backfilling is completed. Runoff from the reclaimed site will be controlled in the permanent sediment basin in the White Knob Quarry discussed below.

OB-3 (Overburden Stockpile)

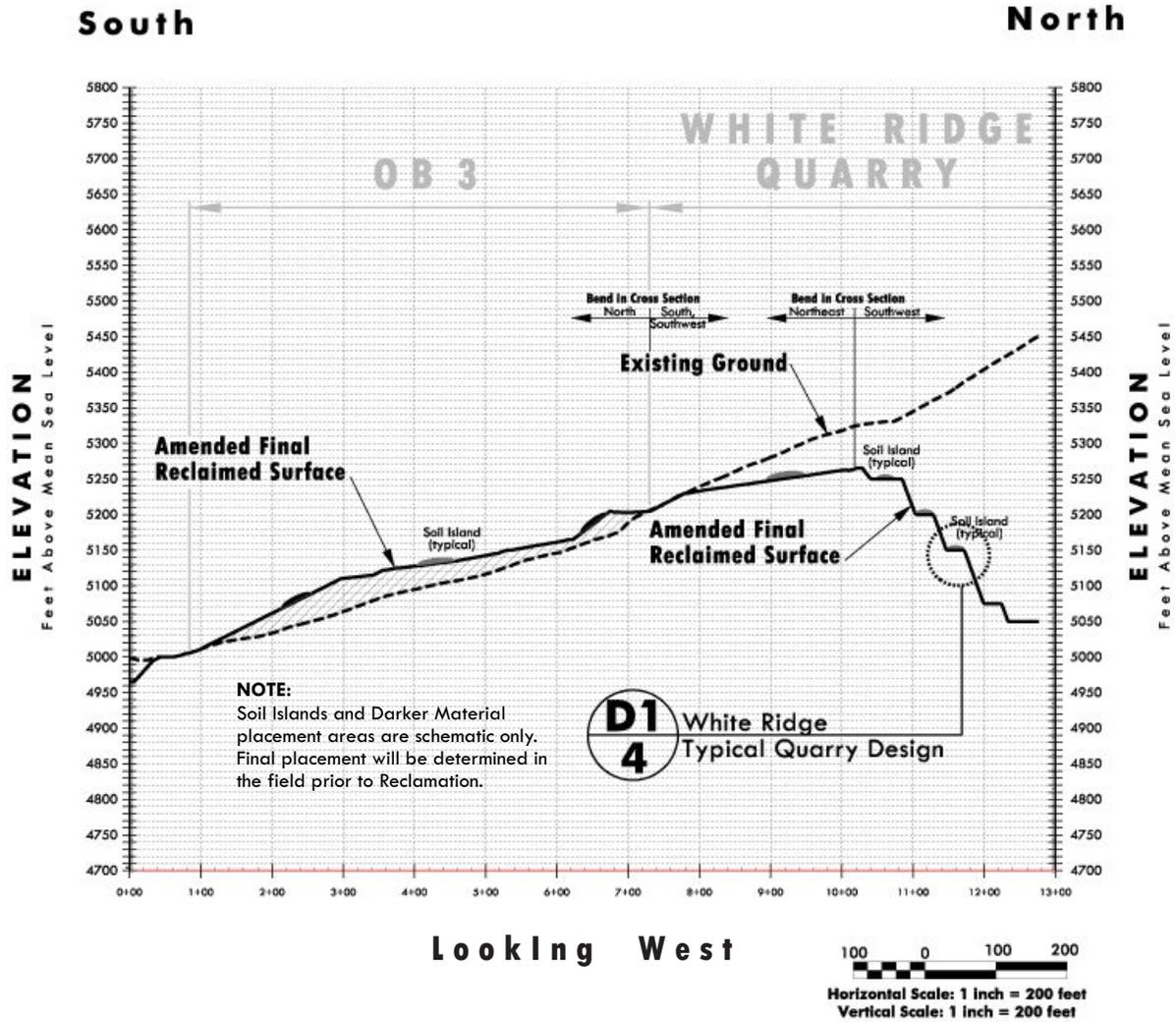
OB-3 will be developed on approximately three acres to the northeast of the White Ridge Quarry in Phase 4. Overburden from the White Ridge Quarry will be placed at OB-3 between approximate elevations of 5,200 and 5,025 feet (see Figure 10 – Cross Sections D and E). Sediment Basin OB-3 will be constructed at the toe to collect sediment from the stockpile. OB-3 will be approximately 750 feet north to south and approximately 200 feet wide at its widest and developed as a series of benches with reclaimed slopes no greater than 2H:1V. All slopes will be designed per the CHJ slope stability report. Reclamation and revegetation of this area will occur concurrently where operationally feasible and completed during Phase 5.

White Knob Quarry and Central Area Backfill

After completion of mining in the White Knob Quarry likely during the last 20 years of operations, the eastern portion of the quarry will be partially backfilled with overburden to create a floor elevation at approximately the 5,575-foot level. The backfilling would reduce the overall 900-foot quarry slope to 625 feet (refer to Figure 5). The final backfill will be designed to act as a permanent sediment basin for future sediment control through sloping the drainage towards the west into the quarry walls with sufficient capacity to handle potential run-off for a 20-year/1-hour precipitation event per SMARA. A small berm of approximately 15 feet in height may also be constructed along the 5,575-foot contour if needed.

This area is lower than the remaining ridges to the north and will be minimally visible from the valley. Backfilling greatly reduces the size of potential new overburden sites limiting additional impacts to undisturbed lands and to biological and visual resources.

Approximately 11 acres in the Central Area of the site including the crusher area, haul roads to the White Ridge Quarry, and the lower half of OB-2 will also be utilized for deposition of overburden. This area will be backfilled up to approximate elevation of 5,575 feet as feasible and merge into the White Knob Quarry backfill.



LEGEND

-  Existing Ground Profile
-  Amended Mine Plan Profile
-  Amended Reclamation Plan Profile
-  Overburden Backfill
-  Soil Island
-  Darker Material
- AMSL Above Mean Sea Level

CROSS SECTION "D"
OB-3 - North to South

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
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1.3 ORE CRUSHING

The primary crushing area is currently centrally located at the 5,500 level immediately adjacent and to the south of the White Knob Quarry. In the future, the stationary-type crusher or a mobile-type crusher may be relocated to proximity with active mining to reduce hauling from the quarry to the crusher. The following discussion applies to a stationary or mobile at varied locations. No changes in the crushing process are planned, only moving the crusher to another disturbed site within the mining area.

Ore from the White Knob Quarry is hauled to the crusher and screens for size reduction, sorting of ore grades and then it is transported to the processing plant in Lucerne Valley. The screen arrangement separates fines from the load. Stockpiles of ore, separated as to grade, are made by the conveyor at the crusher. From these stockpiles, haul trucks are loaded and transport the crushed ore to the processing plant in Lucerne Valley.

The existing crusher has approved air quality permits to operate which are renewed annually by the MDAQMD (see Appendix F for copies of current permit). The permits outline specific conditions which must be met to maintain air quality standards and limits on daily and hourly production rates. The existing permits allow for a maximum of 4,000 tons per day and 400 tons/hour of ore processed which is sufficient to accommodate the increased excavation rate proposed in this Amended Plan. Therefore, no change in the existing crusher air quality permits will be necessary.

Existing dust control measures are in compliance with MDAQMD Rules 401 (limiting visible emissions from exhaust); 402 (avoid nuisance emissions to people or businesses or property); 403 (prohibits visible dust from crossing property lines); and 403.2 (requirements for controlling fugitive dust) and meet the required air quality regulations. The dust control measures are required to be in place and operative and regular monitoring by agency personnel insures that the regulatory standards are met. Haul trucks and diesel equipment must meet all requirements of the California Air Resources Board's (CARB) off-road diesel vehicles regulation to reduce diesel pollutants.

The following is a listing of the equipment and support facilities for the ore crushing system:

- Truck dump hopper and vibrating feeder
- Primary screen
- Jaw crusher
- Belt conveyors and radial stacker
- One 50-foot railroad boxcar containing spare parts, tools, and lunchroom
- Portable toilets
- One 10,000 gallon diesel fuel tank (double-walled) for mobile equipment
- One 10,000 gallon skid mounted non-potable water tank

Fuel for mobile equipment is stored at the quarry site in an approved double-walled tank with a spill control berm. Mine equipment is fueled at the fuel storage site. Scheduled equipment maintenance occurs at the main plant site. Minor or emergency repairs may be conducted at the

quarry. Any waste oil generated at the mine site is collected and transported for offsite disposal by approved methods and by properly trained and licensed personnel.

As operations progress, alternate equipment may be required to optimize operations and these were previously listed in Table 7. These may include the utilization of a mobile crusher which would be capable of being set up near the face of the quarry to reduce handling of the ore. A mobile crusher could also be moved within the quarry area as needed. The alternate equipment would not substantively change the process described above. Required compliance with air quality regulations and permits would be obtained prior to placing equipment into operation.

No processing chemicals are used and no wastewater is produced from the mining and crushing operations.

1.4 PRODUCTION WATER

A relatively small amount of water is used in the White Knob – White Ridge quarries operations. Approximately 2.75 acre-foot of water is used annually for dust suppression at the quarries, overburden placement areas, haul roads, and at the crusher. With the increase in production, water usage is expected to double to approximately five acre-feet per year. No substantial changes are proposed and adequate dust control will be maintained. Note that the use of magnesium chloride on roads and other active mine areas and the occurrence of typically wet winter weather can all contribute to reducing the amount of water needed to control dust.

Water used to control dust is obtained from two previously permitted sources, a well located at the plant site in Lucerne Valley, and a well located in Crystal Creek Canyon near Turnout 5 on the Crystal Creek Haul Road. No substantial changes in overall water use are proposed. Both existing wells are permitted by the State of California Water Resources Control Board and County of San Bernardino Department of Environmental Health Services (Permit #06259026). The plant well has been assigned recordation number 36011 by the California State Water Resources Control Board (see Appendices C2 and C3 for copies of permits). Bottled drinking water for employees at the mining area is brought to the site as necessary. No surface water is used in the operation. There will be no added diversions or storage for water supply.

No treatment facilities will be needed. Water will continue to be hauled in a water truck and sprayed on the haul roads and active mining and overburden areas to minimize fugitive dust. The water truck will work during active quarry operations as needed to control visible dust. This water will evaporate and therefore, the project will not produce any wastewater or run-off.

The Mojave Water Agency (MWA) is a State Water Project contractor, a regional groundwater management agency, and serves as Watermaster for the adjudicated Mojave Basin in which Omya's wells are located. Omya has a verified base annual production allocation of 23 acre-feet (af)/year for its two wells and water production over the past 5 years (2007 through 2011) has been 19, 14, 14, 14, and 14 af/year, respectively (18th Annual Report, MWA 2012). The expected water usage for the Proposed Project of 5 af/year is not expected to exceed Omya's base allocation.

1.5 EROSION AND SEDIMENTATION CONTROL

Omya has been working with San Bernardino County, the BLM, CDFW, OMR and private consultants to design and implement drainage control improvements along roads and other facilities. Existing erosion and sedimentation controls are inspected by both Omya California and government agency personnel, and maintained as necessary. The objective of all drainage control measures is to limit runoff to minimize or prevent erosion and to promote settling of suspended solids before the runoff leaves the site.

The Settlement Agreement as discussed previously includes as Part B a section entitled: “Repair, Remediate, and Monitor Improvements to the White Knob Quarry Right-Of-Way Access Road and Associated Facilities to Protect Drainages.” Stantec prepared the *White Knob Quarry Haul Road Drainage Report and Plan of Development* (Plan of Development) to analyze the existing drainage conditions at the quarry and along the haul road, and to provide recommendations for facilities to control storm water and sediment runoff and provide protection to surrounding drainages (see Appendix E). Detailed discussion on the drainage conditions, hydrology calculations, and debris production calculations are included in Appendix E. Recommendations from the Stantec Plan of Development are summarized below.

On-Site Haul Road

The on-site haul road within the quarry area from the crusher area to the northeast corner of the project site east of OB-1 carries stormwater from the southern areas northward. The area where the haul road is located does not have the width to design a separate drainage channel. The hydrology study determined that the required 4-foot berms on each side (or a hillside slope or eventually the side slope of OB-1) as required for truck safety per the Mine Safety and Health Administration (MSHA), are adequate to contain the 10-year design flow and the 100-year flow within the roadway with over two feet of freeboard. The haul road will be graded with a 2% cross fall and berm openings for the sediment catchment basins discussed below. Omya is aware that roadway damage may occur during heavy storms but has adequate onsite equipment and aggregate materials to quickly make repairs.

Sediment Catchment Basins

There are currently four sediment catchment basins on the quarry site [Sediment Basins (SB) 1, 3, 4, and 5] along the road and two just downstream offsite (SB-6 and 7) (refer to Figure 4 and Sheet 2). The sediment debris production calculations determined that the four onsite basins have a volume of less than half of the predicted volumes needed and recommended improvements are discussed below. Details of these improvements are included on Sheet 4 and Appendix E. The two basins just offsite to the northeast have adequate capacity and spillway protection and no additional improvements are required.

Sediment basins will be monitored, maintained, and excavated as necessary and sediment removed from the sites to an overburden site at the quarry. The basins and captured sediment would be maintained for the life of the quarry. Each basin site requires access which will support loading and haulage equipment and would meet required federal MSHA safety standards. Access

roads and the sedimentation basins would be reclaimed as part of the long term reclamation plan for the mine site.

Sediment Basin 1 is located at the base of the proposed OB-2 in a confined area with little room for expansion. A concrete spillway is recommended to allow overflow of the 10-year design storm without failure of the basin embankment.

Sediment Basin 2 is a new basin located in the upper drainage area about 400 feet north of SB-1 with a designed volume of 960 cubic yards. Note that SB-1 and SB-2 will eventually be covered over with overburden during the last 10 years of operations or so and stormflow and sediment would be captured by the permanent sediment basin to be designed on the former White Knob Quarry floor.

Sediment Basin 3 is an existing basin along the haul road near the northwest end of the planned White Ridge Quarry. This basin is not able to be expanded, however a concrete spillway is recommended.

Sediment Basins 4 and 5 are adjacent to each other and located to the east of the proposed OB-1 expansion area (see Figure 4 and Sheets 2 and 5). These two basins will be combined into one basin with a concrete spillway from SB-4 into SB-5 and a concrete spillway and a 50-foot rip rap apron from SB-5 to the natural drainage to the north. Per Stantec's design, the bottoms of the basins will have a maximum grade of 10% and a total volume capacity of 6,380 cubic yards.

Sediment Basins OB-1A and OB-1B will be constructed on the northeast and north side of OB-1 to control potential runoff and sediment off of OB-1. Both will have riprap spillways discharging into the natural drainages.

Sediment Basin OB-3 will be constructed at the toe of OB-3 to handle potential runoff and sediment and will have riprap spillway discharging into the natural drainage.

The overburden stockpiles will be constructed with berms near the crest of the fill benches to prevent runoff over the fill slope. Typically due to the porosity of the overburden little runoff occurs. Drainage will be directed away from the rims. Rip rap, catchment basins, and various energy dissipaters will be placed along the toe of fills as needed to trap sediment and minimize the potential for off-site transport. These drainage controls will be periodically inspected and maintained as necessary.

Quarries

Existing and future mining activities at the three onsite quarries area will create and deepen their pit floors. Future runoff down slopes, benches, roads and ramps and any sediment will be directed into the mined out portion of the quarry, or into sediment sumps located down the road in the vicinity of OB-1. For the White Knob Quarry, the final backfill will be designed to act as a permanent sediment basin for future sediment control through sloping the drainage towards the west into the quarry walls with sufficient capacity to handle potential run-off for a 20-year/1-hour precipitation event. A small berm of approximately 15 feet in height may also be

constructed along the 5,575-foot contour if needed. The drainage controls will minimize the potential for off-site transport and will eliminate any potential adverse effect on downstream property.

A large number of energy dissipaters, sediment capture basins, rip rap, hay bales, and/or silt fences trap sediment and minimize the potential for off-site transport. Operations also limit surface disturbance to minimum areas and concurrent reclamation and revegetation will stabilize disturbed pads and slopes.

Storm Water Pollution Prevention Plan (SWPPP)

Omya has an existing Storm Water Pollution Prevention Plan (SWPPP) which has been approved by the California State Water Resources Control Board, and will continue to have one until mining ceases. The storm water plan includes: specific prohibitions, effluent limitations, storm water pollution prevention plans, including source identification, practice to reduce pollutants, assessment of pollutant sources, materials inventory, preventative maintenance program, spill prevention and response procedures, general storm water management practices, training, record keeping, sampling procedures and monitoring program. The SWPPP will be updated to account for the modification of storm water control and conveyance features contemplated in the Amended Reclamation Plan.

All operations on-site comply with a National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges associated with industrial activities and employ storm water BMPs during construction, operations, and temporary cessation of operations. NPDES goals are to eliminate unauthorized non-storm water discharges and to monitor storm water discharges requirements. Omya prepares and submits annual storm water discharge reports, which contain the results of sampling and or other runoff monitoring which occur during any given year. These records and the requirements included in the Federal Clean water Act insure that water quality is maintained. See Appendix J for the cover sheet of Omya's current SWPPP.

Incidental Boulder Roll

All operations on-site comply with a National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges associated with industrial activities and employ storm water BMPs during construction, operations, and temporary cessation of operations. NPDES goals are to eliminate unauthorized non-storm water discharges and to monitor storm water discharges requirements. Omya prepares and submits annual storm water discharge reports, which contain the results of sampling and or other runoff monitoring which occur during any given year. These records and the requirements included in the Federal Clean water Act insure that water quality is maintained. See Appendix J for the cover sheet of Omya's current SWPPP.

Incidental Boulder Roll Down

During the original permitting of the White Knob Quarry in 1986, it was recognized that there would be visual impacts from the quarry development that could not be mitigated to a level below significance (refer to discussion in the 1986 County's Statement of Overriding Considerations in Appendix A). The White Knob deposit occurs in an area of extremely rugged topography along narrow ridges with cliffs up to 100 feet on three sides. Natural landslide and talus deposits composed of white and off color marble are present on both the north and west slopes of the ridge.

During mining of the rock in the deposit at the top of the ridge and along the crest, boulders of white limestone have inadvertently rolled down the slope to the north and to the west into the West Canyon. The incidental boulder roll down partly has covered the older natural talus and landslide deposits, and is visible from Lucerne Valley.

Precautions have been taken and new mining procedures have been implemented to minimize future roll down. However, because of remaining cliffs, some roll down will be unavoidable, as it is necessary to continue to mine the ridge down and daylight in order to safely recover the ore. Once the limit of the ore is reached, no additional roll down or visible changes will occur. Procedures which were implemented in late 2003 and will continue for the life of the project to minimize boulder roll down include:

- A. Precision drilling and buffer blasting when the outside edge is approached.
- B. Drilling lifters on the edge to undercut the remaining slope and let it fall into the pit (like directional falling of a tree).
- C. Excavator to pull down and pull in toward the pit blasted rock away from the edge.
- D. Use of alternatives to blasting along the outside such as rock breakers, surface miners, cutting heads, and excavators
- E. Loader to pull back material from the edge
- F. Loader to dig at an angle to the edge or parallel to the edge when possible.
- G. Manually scaling boulders from the high walls where they may be above a haulage road.

Additional measures to reduce the visual impacts include concurrent colorization and revegetation of the visible north-facing slopes below the quarry where mining has been completed and downhill migration of the material has sufficiently slowed.

Where mining related visual impacts have been completed on the north facing slope, Permeon was applied (January 2006) to approximately 5 acres. The visual contrast has been substantially reduced as the brown colored stain on the boulders blends with the natural hill side color. Revegetation of the upper slopes was also undertaken, utilizing native species, slow release fertilizer, and commercial mycoriza inoculations. Irrigation occurred for two years to allow a higher proportion of germination. Although far less visible from a distance, the revegetation helps stabilize the upper slopes and to reduce erosion and sediment transport.

Reclamation will be a concurrent effort in which colorization by the use of Permeon, permanent rock colorization method which colors the rocks brown to blend in with the natural colors of the mountainsides, and revegetation will occur on the benches where mining is completed and no additional roll down would occur. Concurrent and final reclamation will include colorization (if feasible due to surface material suitability) and revegetation to blend with the natural colored slopes.

1.6 BLASTING

Drilling and blasting operations will be conducted by licensed individuals in such a manner as to meet or exceed Federal Mine Safety and Health Administration (MSHA) and California Occupational Safety and Health Administration (Cal-OSHA) requirements. Blasting will typically be conducted about once each week during daylight hours. Blasting operations will involve drilling, placement of charges, and detonation of the charges by a blaster with all required licenses and permits for handling explosives. All explosives and detonators shall be transported, handled, and stored in accordance with all federal, State, and local regulations.

The current blasting agent ammonium nitrate and fuel oil (ANFO) explosives used at the quarries are currently stored separately in magazines located at designated locations at Omya's Lucerne Valley operations per all federal, State, and local regulations. The explosives are only transported to the quarry site by a licensed contractor as necessary.

Blasts are relatively small to maximize selectivity. The active quarry is located near the base of the range in the central portion of the mountain range. There are no residences for over 2 miles north from the quarry and one or more major mountain ridges are present in between quarries and residences to the south. Blasting has occurred for over 25 years with no adverse impact on people, structures, or wildlife. The blasts cannot be seen, heard or felt by any sensitive receptors.

2.0 RECLAMATION PLAN

Omya considers reclamation of disturbed lands to be an integral part of ongoing operations. Consistent with this operating philosophy, site preparation activities such as recovery of growth media and vegetative materials for use in reclamation are considered part of the reclamation process. Where possible, reclamation activities are integrated as part of the mining process, with reclamation concurrent with quarry activity, or if concurrent reclamation is not possible, it will occur immediately following ultimate completion of active quarry operations.

Preparation for reclamation begins even before mining starts. Top soil, growth media and vegetative materials salvaging to the extent possible begin during the first phase of quarry and haul road development. Once mining has reached the final outer quarry limits, phased reclamation of the quarry can begin. Reclamation of overburden placement sites can also begin once they have reached final limits. Reclamation of the site will include removal of all equipment, site cleanup, recontouring and ripping, placement of growth media, revegetation with local native species, irrigation if necessary, colorization, reclamation of drainage controls and access roads on BLM lands, and monitoring, remediation, and maintenance of revegetation until performance standards are met. Monitoring, realistic achievable reclamation goals, and established financial assurances will be maintained to insure that reclamation and the established goals are met.

2.1 LAND USE

The site is located in the San Bernardino Mountains southwest of Lucerne Valley in southwestern San Bernardino County. The project site is located entirely on private lands with the exception of the haul road which is within an approved ROW on BLM managed lands (refer to Figure 3). The existing mine and planned expansions are bounded on the south by mountainous undeveloped National Forest lands and to the west, north, and east by unpatented placer mining claims on public lands managed by the BLM, and patented open space to the northeast. The White Knob Quarry is within the larger San Bernardino Mountains-Lucerne Valley Mining District, in which several large scale limestone mines are present along the north slope over a distance of about 10 miles. Large scale limestone mining began in the area over 60 years ago in the 1950s. Open space natural habitat is the major non-human land use.

The County land use designation for the site is RC – Resource Conservation.

2.2 VISIBILITY

The Proposed Project site is located on the north side of the San Bernardino Mountains approximately 6 miles southwest of the community of Lucerne Valley (junction of SR 18 and SR 247) and 8 miles northwest of Big Bear Lake. The existing views of the project area are currently affected by the White Knob Quarry, OB-1, haul roads, and boulder roll down on the north and west facing slopes. The Proposed Project is the expansion of the existing approved quarries and overburden stockpiles utilizing the existing processing equipment and haul road for site access over a 40-year period through the year 2055. There are no newly proposed quarries in

the Amended Plan, and no changes to mining phases, and crushing and hauling of the ore. The Amended Plan will not introduce a new use in the area.

Due to topography and the orientation of the quarry sites, views are and will be limited to those from the north, northwest, and northeast within Lucerne Valley. The project is not and will not be visible from any developed/populated areas to the south within the San Bernardino National Forest including the City of Big Bear Lake (and from the lake itself), Fawnskin, and Big Bear City due to the intervening ridges located north of the lake and the relatively lower elevations of the lake itself.

The existing natural landscape character of the project area consists of steep mountain slopes, rock outcrops, ridges, vertical cliffs over 100 feet in height, and canyons. Vegetation is characterized Mojave or open desert shrubland and semi-desert chaparral at lower elevations transitioning to pinyon-juniper-mountain mahogany woodland at higher elevations where the quarries are located. Vegetation tends to be denser on north slopes and gullies, and more open on south slopes and along ridges. Most of the project site and areas south and west of the site were burned in wildfires in 2007 and appear sparsely vegetated to barren from a distance. Mining features have been part of the landscape for over 50 years and are an integral part of the north slope of the mountains visible from Lucerne Valley.

Visual mining related features from Lucerne Valley looking south and southwest include the existing active White Knob Quarry, overburden site, and boulder roll down on the north and west facing slopes. These features consist of altered disturbed slopes and stockpiles with a lighter color that contrasts with the existing natural areas. From viewpoints more distant, the existing mine areas are less evident as the altered areas make-up a smaller portion of the panoramic views that includes a number of other mine operations.

During the original permitting of the White Knob Quarry in 1986, it was recognized that there would be significant visual impacts from the quarry development. It was determined that the impacts, although visible, are consistent with the general visual character of the Lucerne Valley Limestone Mining area which includes numerous quarries, overburden sites, haul roads and limestone processing plants. A Statement of Overriding Consideration regarding environmental effects of the White Knob Quarry was prepared and accepted by the San Bernardino County Planning Commission, in which the impacts of the quarry development that could not be mitigated to a level below significance were recognized.

The Amended Plan includes expansion of the existing OB-1 and the addition of OB-2 and OB-3 on existing and proposed mine areas that would be visible as additional white slopes or small mounds. The white tones of mined limestone and the overburden areas will increase with project development but will be similar in nature to the existing conditions and other quarries to the east. The White Knob Quarry is already being mined and the proposed amendments would not result in a significant change in the physical characteristics of the mine that would create a substantial change to the viewers. Phased, concurrent and final reclamation will colorize and revegetate the roll down slopes, overburden areas, and quarry benches to blend with the natural colored slopes. Rock staining and vegetation on the existing north slopes have demonstrated a marked reduction in the contrasting tones and reduced visual contrasts.

The Amended Reclamation Plan will meet State and local mining and reclamation requirements. The regulatory standards, monitoring and enforcement, insure that reclamation will be successful, and meet the standards. The Amended Plan includes designs and reclamation to reduce existing and future visual impacts from the quarries, overburden sites, and roll down areas. These measures include the following:

- Implement measures to minimize boulder roll down as discussed under 1.5 above;
- Maintain the existing crusher site at the White Knob Quarry or use a portable plant within an active quarry to reduce its visibility from Lucerne Valley;
- Deposit waste rock within the White Knob Quarry footprint, as described in this Amended Plan to reduce the area of disturbance for overburden stockpiles and visual impact outside the quarry;
- Design and phased mining of the White Ridge Quarry, which allows for concurrent reclamation and leaves an approximately 300-foot high ridge of undisturbed hillside facing Lucerne Valley to minimize visual impacts.
- Implement reclamation and revegetation on completed equipment accessible quarry benches and on overburden stockpiles concurrent with mining where feasible;
- Utilize approved color-staining product to darken the visible quarry and roll down slopes where not subject to raveling to reduce visual impacts;
- Deposit darker waste rock on overburden sites where available to reduce color contrast;
- Design adequate erosion control features along the haul and access roads and quarry to control and limit erosion and sediment transport;
- Where feasible construct catchment berms at foot of stockpiles to reduce rock roll down and sediment flow;
- Limit surface disturbances to areas identified in the Plan; and
- Implement appropriate dust controls to reduce visible dust.

Potential impacts to scenic values will be fully assessed in the EIR.

2.3 VEGETATION

Several biological studies on the project site have been completed during the past three decades that have evaluated the biological resources on the mining areas. The White Knob area was surveyed by Michael Brandman and Associates in 1986 for the White Knob EIR. More recently the area was surveyed by White and Leatherman (see “General Biological Resources Assessment and Focused Rare Plant Survey,” Scott White Biological Consulting, October 2007 in Appendix B1 for a detailed biological assessment and species lists). Lilburn Corporation conducted biological surveys in the 70-acre parcel purchased from the BLM on the northeast side of the project site in May 2012 (see Appendix B2). The biological resources will be updated and potential impacts and mitigation will be fully assessed in the EIR.

General Vegetation Description

The following is a brief description of the biological resources occurring in the proposed White Knob – White Ridge Quarry expansion areas.

The project site is located on the north range front of the San Bernardino Mountains, and includes local topographic relief of about 2,000 feet from approximately 4,900 to 6,900 feet amsl. Two principal biogeographic realms are present; Mojave or open desert shrubland and semi-desert chaparral at lower elevations transitioning at higher elevations to Mojavean pinyon woodland or pinyon-juniper vegetation (see Figure 11). Typical plant species are shrubby in stature and adapted to xeric conditions. Conditions are moderated by cooler temperatures and greater moisture at higher elevations where pinion woodland predominates.

Most of the lower slopes support an open desert shrubland and a yucca-juniper scrub plant community which is transitional between the lower elevation alluvial desert scrub and the mid-elevation pinyon-juniper woodland. The plant community is characterized by the presence of California juniper (*Juniperus californica*), and several yucca species: the Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schidigera*), and Spanish bayonet (*Yucca whipplei*). Other characteristic species found commonly in the yucca-juniper scrub plant community are narrow leaved goldenbush (*Ericameria linearifolia*), yerba santa (*Eriodictyon tricocalyx*), California buckwheat (*Erigonum fasciculatum*), waxy bitterbrush (*Purshia glandulosa*) and needle and thread grass (*Stipa comata*).

The quarry area is located in the desert montane pinyon-juniper woodland plant community. Geologically the area is characterized by abundant rock outcrops, and rocks in the area are composed of limestone carbonate rock which possess little or no topsoil, and granitic rocks in which soil is generally better developed. At higher elevations, the dominant plant community is pinyon-juniper woodland. Characterized by stands of California juniper and single leaf pinyon (*pinus monophylla*), the community has a distinctly wooded aspect in comparison to the lower scrub communities. Higher elevation contributes cooler temperatures and more moisture, than at lower elevations. Bigberry manzanita (*Arctostaphylos glauca*) and Grinnel's penstemon (*Penstemon grinnellii*) are frequently found in this community including shrubby canyon oak (*Quercus chrysolepis* var. *nana*) on northern slopes, as are many plant species more common at lower elevations.

The area is subject to occasional wildfires. The Coyote fire of 1976, a lightning caused fire in 1999, and the large Willow fire of 2007 burned significant portions of the area around the quarry, resulting in removal of trees and shrubs in some parts of the area.

The limestone outcrops at the site possess little or no soil, and support sparse vegetation of only those species that can tolerate an exposed xeric habitat. Some of these species are commonly found in the area and include California juniper, singleleaf pinyon, green ephedra (*Ephedra viridis*), manzanita, and desert mountain-mahogany (*Cercocarpus ledifolius*). A few plant species are restricted to the limestone substrate, and are uncommon and localized because of their specialized habitat requirements. Three listed limestone endemics were located during the surveys and are discussed below.

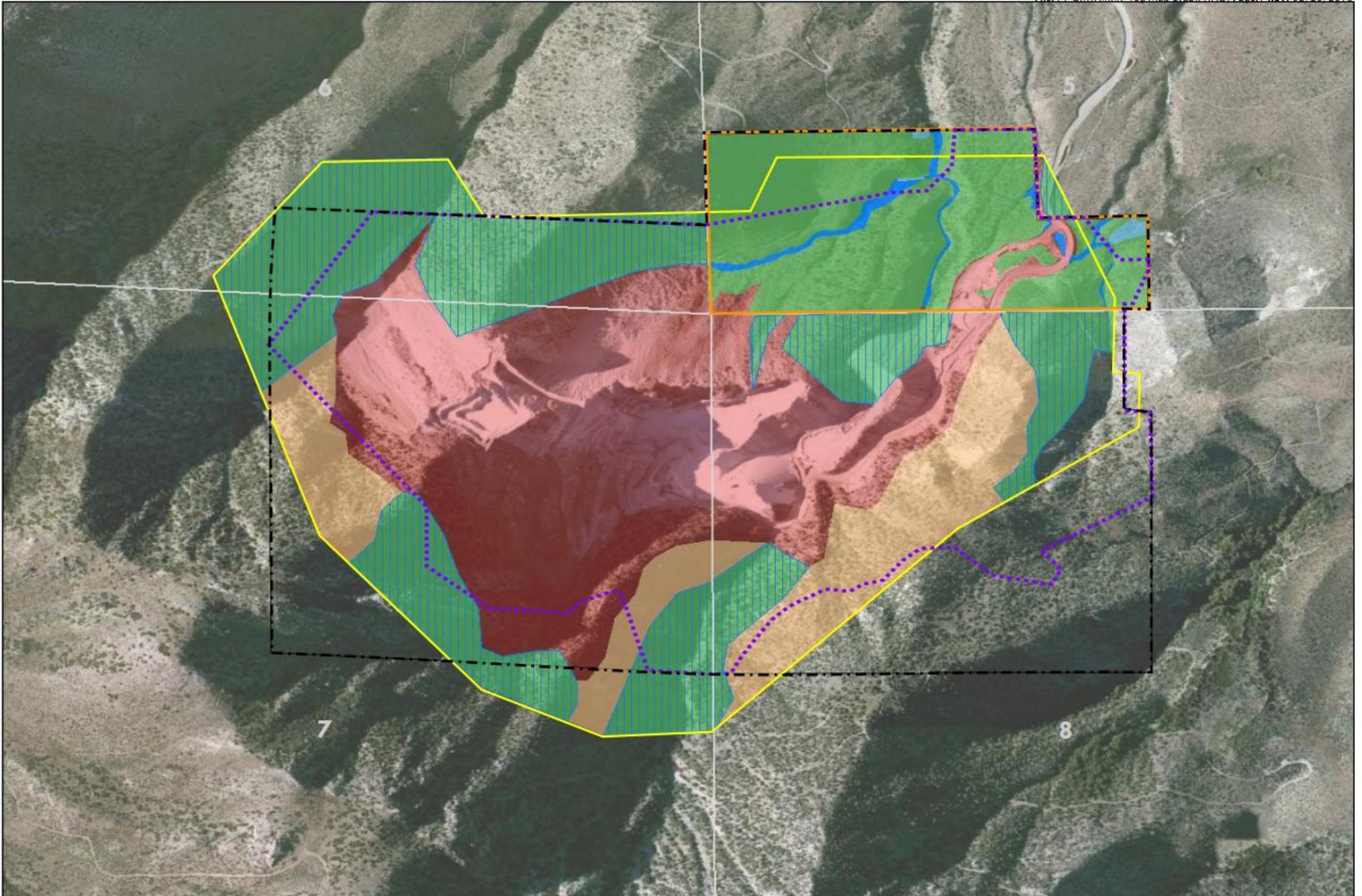
Threatened, Endangered and Sensitive Plant Species

The carbonate soils provide a unique habitat and there are five federally listed threatened or endangered plant species endemic to carbonate soils. The Proposed Project site is not located within designated critical habitat for these carbonate-endemic plants (USDI Fish and Wildlife Service 2002). An intensive collaborative effort led to the development of the Carbonate Habitat Management Strategy (CHMS) in 2003. The strategy is designed to provide long-term protection for the carbonate endemic plants and also provide for continued long-term mining in the San Bernardino Mountains. A portion of the carbonate habitats are protected from mining impacts in perpetuity within the carbonate habitat reserves dedicated and managed as described in the CHMS. "Take" of listed carbonate-endemic plants is permitted under the strategy, and mitigated by permanent mining claim or private property set-aside and through management of off-site plant occurrences as outlined in the CHMS.

Three Federally listed threatened or endangered plant species occur near or on the project site (see Figure 11); Cushenbury buckwheat, Cushenbury oxytheca, and the Parish's daisy. White observed a small patch of Cushenbury oxytheca plants offsite in sandy soils at the toe of a natural talus rockslide located west of the site and an area of Cushenbury buckwheat in the east central area, east of the White Ridge Quarry within the project boundary.

Lilburn observed Cushenbury buckwheat and Parish's daisy in an area starting around Turn-out 72 north and east of the mine. According to Omya personnel, as part of the White Knob Quarry permitting in 1988, the mine operator was required to work with Rancho Santa Ana botanic gardens to establish a mitigation plot of Cushenbury Buckwheat and Parish's daisy. The plants were propagated from seeds and planted as seedlings. Originally there were about 100 of each species. They were irrigated by drip irrigation for about two or three years, and have been on their own for the last 20 years. The last monitoring was several years ago, and indicated that there are about 300% more plants than were planted, and it had become a self-sustaining population producing its own seeds and seedlings. A number of buckwheat plants are growing in decomposing granite with no carbonate input.

Several special status plants also occur on either the proposed White Ridge deposit access road alignment or in the potential roll-down area: bluish spike-moss, Coville's dwarf abronia, San Bernardino Mountains dudleya, Parish's alumroot, and an unidentified jewelflower (either San Bernardino jewelflower or southern jewelflower). Other plants that may occur with high or moderate probabilities but were not seen during field surveys are: Parish's onion, pinyon rock-cress, Parish's rock-cress, Shockly's rock-cress, crested milk vetch, Big Bear Valley milk vetch, Bear Valley woollypod, Heckard's paintbrush, Parry's sunflower, chickweed oxytheca, Mojave phacelia, Tehachapi ragwort, pine-green gentian, and gray-leaved violet. None are listed, or proposed for listing, or a candidate for listing under state or federal Endangered Species Acts.



Source: Scott Wite Biological Consulting, General BRA and Focused Rare Plant Survey, 2007; BRA for Direct Land Sale, Lilburn Corp., 2013.

EXISTING VEGETATION MAP

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

FIGURE 11

- | | | |
|--|---|--|
|  Lilburn 2012 Survey |  Disturbed (Existing Quarry) |  Pinyon Pine Woodland |
|  White 2007 Survey |  CA Juniper Series |  Stream |
|  Proposed Quarry Boundary |  CA Juniper Series* ("shrublands" in White 2007) |  Wetland |
|  USGS Survey Section |  Limits of Planned Disturbance | |



Compliance with CHMS Requirements

Omya intends to develop the quarry site consistent with the CHMS Plan and guidelines and will mitigate impacts to these listed species through permanent relinquishment of mining claims or transfer of private property in accordance with the CHMS requirements and consultation with the County and the Forest Service. The EIR document that will be prepared by the County for this Amended Plan will assess biological resources, potential impacts, and consistency with the CHMS.

2.4 WILDLIFE

White and Leatherman completed biologic surveys of the project area (“General Biological Resources Assessment and Focused Rare Plant Survey,” Scott White Biological Consulting, October 2007) in Appendix B1. Lilburn Corporation conducted biological surveys in the 70-acre parcel purchased from the BLM on the northeast side of the project site in May 2012 (see Appendix B2). Fauna in the project area is typical of the alluvial scrub and desert montane plant communities in the Mojave Desert and San Bernardino Mountain transitional region. A general description of the commonly occurring species and species lists are found in Appendix B1 and summarized below. The EIR prepared by the County will assess biological resources, potential impacts, and recommend mitigation as applicable for impacts to wildlife.

Threatened, Endangered and Sensitive Wildlife Species

No wildlife species currently listed on the Federal List of Threatened or Endangered species are known to inhabit the expansion areas. The following is a brief discussion of sensitive wildlife that could occur in the project area.

Reptiles

Desert tortoise: The desert tortoise is listed as threatened under both California and federal Endangered Species Acts. It has not been reported from any of the four USGS quads (Butler Peak, Fawnskin, Fifteen Mile Valley, and Lucerne Valley; CNDDDB 2007) reviewed for the 2007 report; habitat on the quarry property is not suitable, and there is no potential for occurrence of desert tortoise. Lilburn (2012) also did not observe any desert tortoise sign in the 70-acre parcel purchased from the BLM on the northeast side of the site. Tortoises generally occur on gently sloping terrain with soils ranging from sand to sandy gravel with sufficient space between for herbaceous plants. Although reliable sources have reported tortoises up to 7,300 feet elevation in Death Valley National Monument, desert tortoise populations generally do not occur above about 4,000 feet. Habitat on the site is very steep, and much of it is made up of bedrock outcrops, talus, or actively eroding sandy soil which would not permit burrowing. No tortoise sign (e.g., burrows, pallates, scat, live tortoises, or tortoise remains) were recorded during field surveys.

Southern rubber boa: There is a moderate probability that this species could occur in shaded woodlands in the proposed expansion area. The rubber boa is state-listed as a threatened species.

Birds

Several special status birds reported from the area nest exclusively in riparian habitat (e.g., southwestern willow flycatcher, yellow warbler); the small patches of riparian vegetation in the proposed expansion area are not large enough to provide a suitable nest sites for them. Two (LeConte's thrasher, Bendire's thrasher) are desert shrubland birds; both likely occur to the north and east, but are unlikely at the Omya site due to marginal habitat. The site is within the burrowing owl's geographic range, but it does not occur on the slopes, soil, and vegetation types present on the project site. The site is at the extreme western margin of hepatic tanager's geographic range. Birds more likely to occur on the site are discussed briefly below. These species are addressed in Appendix B1.

Gray vireo: Gray vireos were not observed during field surveys but they occur in similar habitats in the general area. Most of the project site supports suitable nesting habitat (arid shrublands or woodlands). During breeding season, gray vireo could occur in woodlands at the upper elevations on the site; they are migratory and would not be present during winter.

Loggerhead shrike: Loggerhead shrikes were not seen during surveys, but suitable habitat occurs in open shrublands throughout most of the site. They are widespread in North America, generally occurring in open grassland or shrubland habitat with scattered perch sites. Loggerhead shrike is a California species of special concern and anecdotal reports among local biologists suggest a decline in California, but CDFW considers them "apparently secure" in the state.

Raptors: Several special status raptors could forage over the site, particularly during winter or migration seasons. These include golden eagle, ferruginous hawk, sharp-shinned hawk, Cooper's hawk, merlin, prairie falcon, and California spotted owl. Most of these raptors nest in large trees or on cliffs; based on habitat and field surveys, we conclude that they do not nest on the site. Two of them (sharp-shinned hawk and Cooper's hawk) could nest in wooded areas in or around the proposed expansion area, though habitat there is marginal for both species, and the San Bernardino Mountains are at the extreme southern margin of the sharp-shinned hawk's breeding range.

None of the birds potentially occurring on the site is listed, proposed for listing, or a candidate for listing threatened or endangered. Golden eagles are fully protected by the CDFW.

State and federal law prohibits take of native birds under the federal Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. Golden eagles are fully protected by California law and have special federal protection under the Bald and Golden Eagle Protection Act. To avoid incidental killing of birds protected under the MBTA, two measures would be implemented: (1) Complete all vegetation removal or initial grading outside the breeding season (*i.e.*, do not remove potential nesting habitat from February 1 through August 31, or appropriate dates based on on-site nesting phenology determined by a qualified biologist), or (2) confirm prior to beginning vegetation removal but after survey flagging is in place showing the limits of grading, that no birds are nesting in areas to be disturbed.

Mammals

Bats: Several sensitive bat species (pallid bat, Townsend's big-eared bat, spotted bat, long-eared myotis, fringed myotis, small-footed myotis, long-legged myotis, and western mastiff bat) could use the site for foraging or roosting. Most sensitive bats roost primarily in caves, abandoned mine shafts, or old buildings. Others may roost in rock crevices or tree foliage. None were noted on the site, and none is listed, proposed for listing, or a candidate for listing under state or federal endangered species acts. Occurrence potential for all is addressed more fully in Appendix B1.

Mojave ground squirrel: Mojave ground squirrel is the only mammal from the region listed as threatened or endangered. The site is several miles southeast of the Mojave ground squirrel's known range (BLM draft range map). The nearest known occurrence is near Rabbit Springs, about 6 miles north of the site, at about 2,900 feet elevation. This Rabbit Springs location is the easternmost occurrence in the southern part of the species range. Based on elevation and geographic range, the Mojave ground squirrel does not occur on the site.

Lodgepole chipmunk, San Bernardino Mountain flying squirrel, and white-eared pocket mouse: These three special status rodents are unlikely to occur due to habitat requirements. All three occur in montane forests of higher elevations and are not known from the arid pinyon woodlands at the uppermost portions of the Omya project site. We conclude that all three are absent.

Nelson's bighorn sheep: Sign (scat, tracks, beds) of Nelson's bighorn sheep was noted uncommonly during field surveys just west of the West Slope and east of the existing mine area. Sightings occur regularly around limestone quarries to the east. Nelson's bighorn (*Ovis canadensis nelsoni*) is one of three bighorn subspecies occurring in California. Nelson's bighorn occurs in substantial numbers in several mountain ranges and is not listed, proposed for listing, or a candidate for listing as threatened or endangered. It is managed as a protected species by CDFW.

American badger: American badger could occasionally occur on the site, though habitat is generally poor because soils are difficult for digging and do not support large populations of burrowing mammals (its primary prey).

The EIR prepared by the County will assess biological resources, potential impacts, and recommend mitigation as applicable for impacts to wildlife.

2.5 RECLAMATION

The County approved the White Knob Quarry Reclamation Plan in 1986. The approved Plan includes a revegetation plan that was updated by Scott White Biological Consulting in 2008 and included as Appendix D1. No substantial changes to the approved reclamation and revegetation methods are proposed for this Amended Plan. The timing and some specific details of reclamation are affected by the expanded quarries and overburden sites.

Article 9, Section 3700 of SMARA states the following: “Reclamation of mined lands shall be implemented in conformance with standards in this Article (Reclamation Standards). The standards shall apply to each surface mining operation to the extent that:

- (1) they are consistent with required mitigation identified in conformance with CEQA; and
- (2) they are consistent with the planned or actual subsequent use or uses of the mining site.”

Omya considers reclamation of disturbed lands to be an integral part of ongoing operations and proposes to reclaim the site to meet SMARA as implemented by the County that will minimize impacts to the surrounding environment. The objectives of this Amended Reclamation Plan are to:

- Eliminate or reduce environmental impacts from mining operations;
- Reclaim in a usable condition for post-mining end uses which will include open space/habitat;
- Reshape mining features and revegetate disturbed areas to return biological productivity and to minimize aesthetic impacts;
- Conform to CHMS plan and guidelines; and
- Reclaim the site as necessary to eliminate hazards to public health and safety.

Because of the phased nature of the mining development, reclamation concurrent with mining only can occur to a limited degree for safety and logistical reasons. Concurrent reclamation starts with the initiation of mining and includes the following:

- Salvaging and stockpiling of grubbed organics, soils, growth media, seeds, and re-locatable plants and cuttings for propagation and direct deposition and/or re-planting to available reclamation areas during clearing of areas to be developed;
- Ongoing seed collection onsite and/or adjacent to the site and propagation of seeds, salvaged plants and cuttings at local nursery by a contracted revegetation contractor;
- Backfilling of the eastern half of the White Knob Quarry to approximately 5,575-foot level;
- Sloping and grading of completed quarry and stockpile slopes for safety, slope stability, and erosion control;
- Placement of darker materials, as available, on outside of more visible slopes and colorization if shown successful for slopes not susceptible to raveling to reduce color contrast;
- Ripping of compacted areas prior to revegetation;
- Covering approximately 30% of equipment accessible horizontal areas with growth media, utilizing the island revegetation concept;
- Phasing reclamation of onsite roads to begin after reclamation of quarries and overburden sites are completed, as determined by County, to allow access to reclamation areas;
- Reclamation of White Knob Quarry access road to half width by ripping and seeding;

- Revegetation – hand seeding and direct seeding followed by imprinting; seedling planting; and hydroseeding on steep slopes impacted by roll down as deemed most effective;
- Irrigation may be conducted on newly seeded and planted areas for 2 to 3 years to maximize establishment; and
- Monitoring and remediation of revegetated areas until success criteria achieved.

Although mining is more or less continuous, the development of the quarries and their ultimate timing for reclamation are linked to operational parameters and product demand needs. Mining operations may experience unscheduled phasing changes due to various market/economic demands and variation in material quality since the natural deposit is not of uniform quality. The County will be updated in the annual monitoring report on the status of operational and reclamation phases.

The Reclamation Plot Plan is included as Figure 12 and attached as Sheet 3 of 4. Reclamation will consist of sloping excavated cuts and benches to meet the designed approximate 1H:1V overall slope. The individual benches will be approximately 50 feet vertical at 70° and 25 to 30 feet wide as shown on Sheets 2, 3 and 4. Bench heights also will vary with material encountered and have been determined as a result of detailed studies of the geologic structure, over 30 years of mining experience in this specific mine site, and consultations with various experts including government and private sector. A summary of the general phased reclamation is listed in Table 9.

Final Reclamation

Final reclamation will take place within the 10 years after termination of mining. All remaining equipment, stockpiles, and internal roads not needed for site access, reclamation, and revegetation and general site monitoring will be reclaimed. Final sloping of quarry walls, backfilled areas, and overburden stockpiles; erosion control; and revegetation of any unreclaimed areas and waste rock stockpiles will be conducted. Some haul roads may be left onsite for use in the revegetation and monitoring activities and for overall site public safety. Ongoing maintenance of fencing, signs, and erosion control will be conducted. Roads not needed for site and quarry access will be ripped, covered with available growth media, and revegetated. Other onsite roads needed for quarry and pad access will be reclaimed after reclamation of quarries and pads are certified complete as determined by Forest Service in order to allow access to all reclamation areas.

The offsite White Knob Quarry access road is needed for access from Lucerne Valley to the quarries during the mining and reclamation phases. After receiving certification from the County that reclamation and revegetation of the quarries have achieved success criteria, this road will be reclaimed to half width through ripping and revegetation.

Reclamation and Backfilling of White Knob - Annex Quarries

During mining of the White Knob – Annex Quarries, concurrent reclamation of the completed slopes and upper haul roads will occur but only after those portions of the pit have reached their

Reclamation Plan Notes

- Name: White Knob - White Ridge Quarries
- Mineral: Limestone
- Mine Operator: Omya California, 7225 Crystal Creek Road, Lucerne Valley, CA 92356, Peter Sutherland, Plant Manager, (760) 248-5233
- Land Owner: Omya Inc., 7225 Crystal Creek Road, Lucerne Valley, CA 92356, Peter Sutherland, Plant Manager, (760) 248-5233
- Applicant: Same as (3)
- Representative: Liburn Corporation, 1905 Business Center Drive, San Bernardino, CA 92408, (909) 890-1818
- Owner of Mineral Rights: Omya Land Holdings, White Knob - White Ridge Quarries
- Geologists: OMI Consultants, 1355 E. Colony Drive, Suite C, Colton, CA 92324, (909) 824-7311

notes continued...

- Map Prepared: Omya California, Liburn Corporation
- Source of Existing Topography: Digital Mapping, Inc. & Aerial 2009
- Date of Map Preparation: January 2013
- Assessor's Parcel Numbers: See No. 7 above
- Utilities: Electricity - Onsite generated as needed; Gas - Not applicable; Water - Omya well system; Sewer - Portable sanitation stations; Telephone - Verizon
- Area to Be Disturbed: 190.1 acres per this Amendment; Area To Be Reclaimed: 333.1 acres total with this Amendment and prior 1986 approval; BLM ROW - half road width or approx. 40 acres
- Reclaimed End Uses: Open space habitat for native wildlife and plants
- County Land Use District Resource Conservation (RC)
- Reclamation starts with the initiation of mining and includes the following:
 - Solvidging and stockpiling of grubbed organics, soils, growth media, seeds, and re-locatable plants and cuttings for propagation and direct deposition and/or replanting to available reclamation areas during clearing of areas to be developed;
 - Ongoing seed collection onsite and/or adjacent to the site and propagation of seeds, salvaged plants and cuttings at local nursery by a revegetation contractor;
 - Sloping and grading of completed quarry and stockpile slopes for safety, slope stability, and erosion control;
 - Backfilling of the eastern half of the White Knob Quarry after about year 20;
 - Placement of darker materials as available on outside of more visible slopes and colorization if shown successful for slopes not susceptible to raveling to reduce color contrast;
 - Stippling of compacted areas prior to revegetation;
 - Covering approximately 30% of equipment accessible horizontal areas with growth media to begin utilizing the island concept;
 - Phasing of onsite roads after reclamation of quarries and overburden stockpiles certified complete as determined by the County Service in order to allow access to all reclamation areas; and

notes continued...

- Reclamation of half width of the BLM ROW haul road (approx. 40 acres) including removal of road surface material as needed, ripping compacted areas and seeding.
- Revegetation is summarized below (See Amended Reclamation Plan text for details):
 - Ripping the surface to a depth of 2 feet for moisture and seed collection;
 - Placement of available growth media to islands to cover approximately 30% of equipment accessible horizontal surfaces to 1.5' to 2 feet thick;
 - Seeding with locally native species and revegetation per methods described in Reclamation Plan and table below;
 - Staking or flagging reclaimed areas to eliminate additional disturbances;
 - Irrigation maximum of 2 years as recommended;
 - Monitoring and maintenance is required for 2 years after reclamation and
 - Application of remedial activities as necessary, including but not limited to additional seeding and planting, plant protection, irrigation, and change of seed and plant mix.

Table 11
Recommended Plant Species for Revegetation

Parental Grasses for application as seed and mycorrhizal nursery stock. Bold species required.	Common Name	Latin Name	Units/acre (PLS)
Indian ricegrass	Arctostaphylos	<i>Arctostaphylos (Oryzopsis) h.</i>	10
Parish's needlegrass	Arctostaphylos	<i>Arctostaphylos (Sipho canalis) dipogonoides</i>	10
Desert needlegrass	Sipho	<i>Sipho species (<6,000 feet)</i>	10
Squirreltail	Elymus	<i>Elymus strigosus (Stemum hystrix)</i>	2
3-tines grama	Arctostaphylos	<i>Arctostaphylos purpurea</i>	2
Nodding bluegrass	Poa	<i>Poa secunda</i>	2

Shrubs for application as potted nursery stock: greenhouse propagation from seed or cuttings; outplanted on "steep pull" stock.

Common Name	Latin Name	Approx. 100 per acre
Blackbrush	<i>Colocephalus rotundifolius</i>	Approx. 100 per acre

Shrubs for application as seed. Bold species required. Remainder should be added depending on availability.

Common Name	Latin Name	Units/acre (PLS)	
Bigberry manzanita	Arctostaphylos	<i>Arctostaphylos glauca</i>	5
Great basin sagebrush	Artemisia	<i>Artemisia tridentata</i>	5
Capital cholla	Cylindropuntia	<i>Cylindropuntia grandis</i>	5
Curlew mountain mahogany	Cercocarpus	<i>Cercocarpus lewisii (<4,000' - 2 Bu) (>4,000' - 10 Bu)</i>	5
Common rabbitbrush	Chrysothamnus	<i>Chrysothamnus nevadensis</i>	5
Green sagebrush	Salvia	<i>Salvia spaldingii</i>	5
California Fremontia	Fremontodendron	<i>Fremontodendron californicum</i>	5

notes continued...

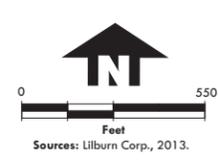
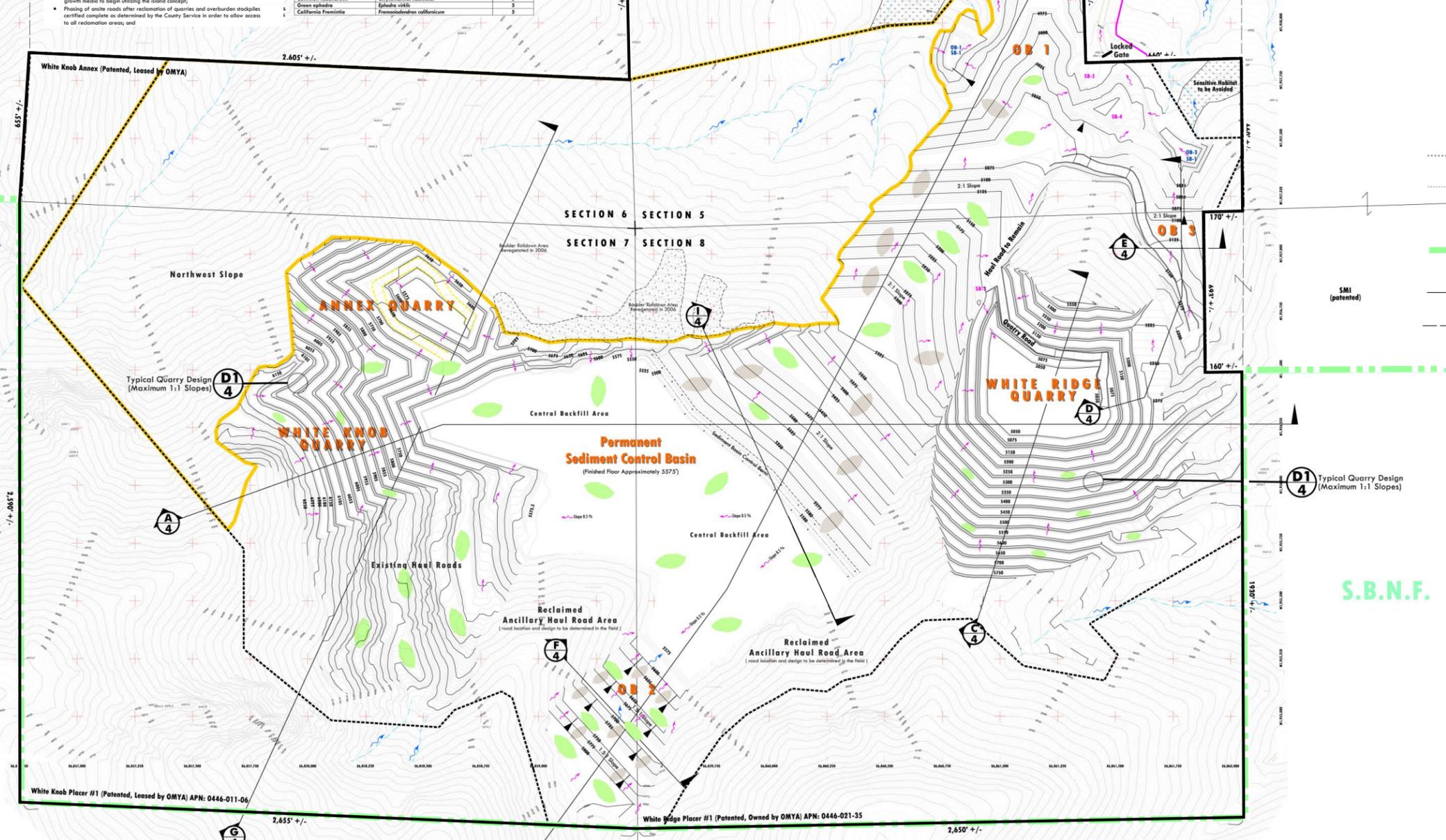
- Previously Mitigated / Incidental Disturbance Area defined on the map includes:
 - Existing disturbance previously mitigated through either reclamation or the April 2011 Settlement Agreement. Previously mitigated disturbance areas are apparent on the photograph base map for Sheet 2.
 - Reclamation of future incidental disturbance to be defined in conjunction with the lead agency during final reclamation phase.

Common Name	Latin Name
California buckwheat	<i>Eriogonum fasciculatum</i>
Curlew rabbitbrush	<i>Chrysothamnus viscidiflorus</i>
Dracopis catclaw	<i>Dracopis thurberi</i>
Greenside manzanita	<i>Arctostaphylos patula</i>
San Bernardino Mt buckwheat	<i>Eriogonum microthecum var. corymbosoides</i>
Soldierweed	<i>Castilleja spaldingii</i>
Grimmell's pansy	<i>Pentstemon grimmellii</i>
Purple mist	<i>Penstemon subulnoides</i>
Blazing star	<i>Monticola laevicaulis</i>

Trees for application as nursery stock: greenhouse propagation from seed, outplanted as "deep pull" stock. Density determined by slope aspect and elevation.

Common Name	Latin Name
Pinon pine	<i>Pinus monophylla</i>
Canyon live oak	<i>Quercus chrysolepis</i>

Source: "Vegetation Map" Omya Mining Corporation on USFS Forest Service Land San Bernardino National Forest, Terra Moxa Consultants 1995.



LEGEND

- Amended Project Boundary
- Private Land
- Limits of Planned Disturbance
- Previously Mitigated April 2011 Incidental Disturbance Area
- Operating Major Contour
- Operating Minor Contour
- Haul Road
- Slope Indicator
- Top of slope
- Toe of slope
- Design Drainage
- Existing Major Contour
- Existing Minor Contour
- Existing Drainages
- San Bernardino National Forest Boundary
- USGS Survey Section
- Claim / Parcel Line
- Revegetation**
 - Soil Islands
 - Darker Material

NOTE:
Soil Islands and Darker Material placement areas are schematic only. Final placement will be determined in the field prior to Reclamation.

This is a reduced 200 scale sheet. To review details, see attached Sheet 2 in Mine and Reclamation Plan.

AMENDED RECLAMATION PLAN

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

FIGURE 12



**Table 9
Reclamation Phasing
White Knob – White Ridge Quarries**

PHASE	YEARS OF OPERATION (estimated*)	PLANNED RECLAMATION ACTIVITIES
1	1 - 10	<p><u>Newly developed areas</u> - Salvage and stockpile plants and cuttings, organics, seeds, and soil.</p> <p><u>North-facing slopes</u> - Concurrent colorization and revegetation below the quarry where mining has been completed and downhill migration of the material has sufficiently slowed.</p>
2	11 - 20	<p><u>Newly developed areas</u> - Salvage and stockpile plants and cuttings, organics, seeds, and soil.</p> <p><u>North-facing slopes</u> - Concurrent colorization and revegetation below the quarry where mining has been completed and downhill migration of the material has sufficiently slowed.</p> <p><u>White Knob – Annex Quarry</u> - Initiate revegetation on completed upper benches as become available.</p>
3	21 -30	<p><u>White Knob - Annex Quarry</u> – Complete slope contouring and initiate backfilling on eastern half developing final sediment basin; revegetation on completed areas.</p> <p><u>Central Area</u> –Initiate backfilling and revegetation as areas become available.</p>
4 (Final Mining Phase)	31 - 40	<p><u>White Knob - Annex Quarry</u> – Complete slope contouring and initiate backfilling on eastern half developing final sediment basin; revegetation on completed areas.</p> <p><u>White Ridge Quarry</u> - Initiate revegetation on 30% of completed upper benches as become available.</p> <p><u>Central Area</u> –Initiate backfilling and revegetation as areas become available.</p> <p><u>OB – 1 & 2</u> – Complete deposition and sloping of overburden, initiate revegetation on completed areas.</p>
5 Final Reclamation	41 - 50	<p><u>Remove crusher</u> and other plant equipment within one year after completion of mining.</p> <p><u>White Knob - Annex Quarry</u> – Finish sloping of backfill; revegetate 30% of all areas not previously revegetated; maintain erosion control; monitor revegetation progress and conduct remediation as necessary until success criteria achieved.</p> <p><u>White Ridge Quarry</u>- Finish sloping of quarry; revegetate 30% of benches; maintain erosion control; monitor revegetation progress and conduct remediation as necessary until success criteria achieved.</p> <p><u>Central Area</u> - Finish sloping; revegetate 30% of area; maintain erosion control; monitor revegetation progress; and conduct remediation as necessary until success criteria achieved.</p> <p><u>OB 1, 2, & 3</u> – Finish sloping; maintain erosion control facilities; revegetate; monitoring and remediation as necessary until success criteria achieved.</p> <p><u>Onsite Roads</u> - Reclaimed after reclamation of quarries and pads certified complete as determined by County in order to allow access to all reclamation areas.</p>

final outer limit and the ore has been mined. During Phases 3 and 4, the White Knob Quarry will be mined from top to bottom from approximately 6,200 to 5,300 feet and the Annex from 6,075 to 5,575 feet. After completion of mining, likely during the last 20 years of operations, the eastern portion of the White Knob Quarry and the adjacent Central Area to its south will be partially backfilled with overburden to create a floor elevation at approximately the 5,575-foot level and graded to maintain a permanent sediment basin for future sediment control. The final backfilled floor will be graded to drain towards the highwall on the south and west and will have capacity to retain all quarry runoff for a 20-year/1 hour precipitation event. A small berm of approximately 15 feet in height may also be constructed along the 5,575-foot contour if needed.

Concurrent and final reclamation will include final slope stabilization, placement of growth media, revegetation, colorization where needed and feasible, maintenance of erosion controls, monitoring of revegetation progress, and remediation as necessary until success criteria achieved.

Reclamation of White Ridge Quarry

At the White Ridge Quarry, mining will start with a small quarry centering on the upper portion of the southern deposit then expanding to eventually include the northern deposit, and deeper portions of the southern deposit. A 300-foot high ridge from elevation 5,350 to 5,050 feet north of the planned quarry will remain undisturbed. The undisturbed ridge will provide a visual barrier between the quarry and vantage points in the valley. In the latter expansions the upper north facing benches will be visible above the ridge, and will be mitigated through concurrent reclamation as mining progresses from the top down during the last expansion.

During and after completion of mining in this quarry, the quarry floor at approximately 5,050 feet will be utilized for stormwater and sediment retention for precipitation that falls on the quarry area and for a portion of the haul road drainage on the west. Final reclamation will include final slope stabilization, haul road removal, placement of growth media, revegetation, colorization where needed and feasible, maintenance of erosion controls, monitoring of revegetation progress, and remediation as necessary until success criteria achieved.

Reclamation of Overburden Sites

The three overburden sites will be concurrently reclaimed, as possible. As the final build-out design and overburden placement for each site is completed, the stockpile surface and slopes can be reclaimed. Reclamation of the surface will include slope reduction, drainage controls, placement of growth media, revegetation with native species, irrigation, and monitoring, and remediation as necessary until success criteria achieved. Reclamation of the slopes will include slope reduction to no steeper than an overall 2H:1V per CHJ slope stability report.

2.6 REVEGETATION

The “Omya White Knob Quarry Revegetation Plan” was prepared by Scott White Biological Consulting in 2008 and is included as Appendix D1. Detailed discussion on the planned

revegetation is included in the revegetation plan and this section includes a summary of the Revegetation Plan.

Reclamation of the disturbed areas will include site cleanup and removal of any buildings and equipment, recontouring of slopes as necessary, backfilling, and construction and maintenance of drainage controls. Revegetation will include ripping, placement of growth media and organics (logs), and revegetation during the fall planting season. The island concept will be utilized and will cover approximately 30% of the equipment-accessible horizontal surface in a manner which will allow maximum visual enhancement and revegetation success. The islands will trap windblown seeds and attract wildlife to aid in seed dispersal. Irrigation will occur for 2 years as needed, followed by monitoring for 10 years or until success criteria are met.

Growth Media Salvage and Storage

Growth media to be used in reclamation will include top soil, crusher fines, decomposed granite and limestone regolith with tree stumps and roots. Soil will be salvaged from quarry and overburden site development activities to the degree feasible. Soils are poorly developed in the rocky and rugged mountain terrain (see Section 2.11 below).

Due to rocky outcrops and paucity of soil, the quantity of soil and vegetative material is expected to be low, but will be salvaged, where feasible. The following methods are proposed as new areas are opened up for development:

- Tree and shrub cutting and removal to storage site;
- Clearing and grubbing with stumps and remaining vegetation removed to storage site; and
- Available growth media to be stockpiled separately from overburden and clearly identified.

Salvaged soil, growth media and organic material may be distributed directly to active reclamation sites in order to minimize the storage period and reduce seed mortality, which is preferred. Growth media will be stored in areas designated as Material/Growth Media Storage Areas and may also be temporarily stored on other available areas on the overburden stockpile areas during the course of operations. Permanent and temporary material/growth media stockpiles will be stockpiled separate from overburden and clearly identified. Soil and growth media piles will have berms around the perimeter to retain growth media and prevent soil loss and downstream sedimentation. Seasonal rain and snow provide some dampening, and spontaneous revegetation by contained and windblown seeds will provide stability and reduce erosion of the existing piles. In addition, wetting and drying will produce a crust which minimizes wind erosion.

Projected future growth media inventory indicates there is not enough to cover 100% of the surface area to a viable depth. Based on previous experience, islands of 1.5 to 2 feet of soil and growth media cover is deposited over the ripped surface to allow root penetration to sustain growth. Therefore the island concept is utilized in which islands of growth media of adequate thickness are placed to allow root development and penetration during revegetation. The island

concept is in fact close to the natural state, as some areas of the mine site were sparsely vegetated while others more densely vegetated. The island concept will allow growth media coverage of about thirty percent (30%) of the equipment-accessible horizontal surface to be reclaimed.

The existing woodlands onsite are characterized by slow-growing tree species (pinyon pine, juniper, and Jeffrey pine). The revegetation plan objective is to establish “islands” with salvaged topsoil and organics to create conditions favorable for the early-successional plants such as perennial grasses, rabbit brush, fremontia, and sage brush. Nursery-grown pinyon pine, canyon live oak, and blackbrush will be planted when the sites are deemed favorable for planting and seeding of “climax” trees and shrubs. Revegetation sites below 5,400 feet will be revegetated as shrublands; those areas between 5,400 and 6,000 feet will also be revegetated as shrublands except for north-facing aspects which will be revegetated as woodlands; and above 6,000 feet all areas will be revegetated as woodlands except for south-facing areas. Revegetation is summarized below:

1. Ripping the surface to a depth of 2 feet for moisture and seed collection;
2. Placement of available growth media utilizing the island concept to cover approximately 30% of equipment accessible horizontal surfaces, 1.5' to 2' thick;
3. Placement of harvested organics (logs) as available;
4. Seeding with locally native species and revegetation per methods described and as listed in Table 10;
5. Staking or flagging reclaimed areas to eliminate additional disturbance;
6. Irrigation in accessible areas for a maximum of 2 years as recommended;
7. Monitoring and maintenance as required and access allows; and
8. Application of remedial activities, if necessary, including but not limited to additional seeding and planting, plant protection, irrigation, and change of seed and plant mix.

Existing Vegetation Data

Within the site’s elevation and geographic area, the northern San Bernardino Mountains support a pinyon pine woodland, blackbrush scrub, and semi-desert chaparral. Most of the pinyon pine woodland is relatively open, characterized by scattered pinyon pine with chaparral shrubs. Above 6,000 feet and on north-facing slope aspects tree cover is higher with shrubby canyon coast oak.

The pinyon woodland is typical of woodlands on carbonate soils, which tend to be less productive than other soil types. The woodland generally matches Neel's (2000) descriptions of vegetation in the region, based on her extensive sampling on limestone soils throughout the northern San Bernardino Mountains. Neel's previous work is directly applicable to the local vegetation, soils, and flora, and provides even more detailed vegetation descriptions than recommended in SMARA guidelines for project site data collection. In Neel's (2000) description, Singleleaf Pinyon Series is dominated in the overstory by singleleaf pinyon pine and several characteristic shrub species, including Great Basin sagebrush (*Artemisia tridentata*), green ephedra (*Ephedra viridis*), narrowleaf goldenbush (*Ericameria linearifolia*), and antelope brush. Average overstory (tree canopy) cover was about 25% and average shrub cover was about 49%, which is comparable to the pinyon woodlands on the proposed sites (see Table 10).

These data are used to establish the cover and diversity of each species per unit area per SMARA guidelines and to determine success criteria for future revegetation. Estimates of plant cover based on these plots are percent, density is plants/acre, and species richness or diversity is number of different species per 0.1-acre plot.

Table 10
Vegetation Characteristics of Pinyon Woodlands
on Limestone Soils in the Northern San Bernardino Mountains

Vegetation Type	Tree Cover	Shrub Cover	Shrub & Tree Cover	Shrub & Tree Species Richness	Shrub & Tree Density
Pinyon woodland (including mixed stands with Canyon live oak and early-successional shrub-dominated stands) (generally above 6,000 feet)	25%	49%	74%	10 spp. / 0.1 acre plot	84 / acre
Blackbrush scrub (including Mojave desert scrub) generally below 5,400 feet	3%	52%	55%	13 spp. / 0.1 acre plot	15 / acre

Source: (From M. C. Neel 2000)

Plant Salvage

Where possible, cacti, Mojave yucca, chaparral yucca, and Joshua trees, perennial grasses and other shrubs likely to survive transplantation should be salvaged for storage and propagation at a nursery. For grasses, whole plants can be salvaged and then can be cut into multiple clumps rather than the taking of cuttings. Cuttings from manzanita and other shrubs as recommended should be collected.

Seed Collection

Effective revegetation requires a dependable seed supply. Omya has arranged for ongoing collection and storage of species utilized in revegetation, and other additional species as they become available. Some seed is used for nursery propagation, but most is sown onto revegetation sites to maximize cover and diversity of native species. Seed originates from on or near the site where it is planted. Many species included in this revegetation plan occur commonly throughout the project area (e.g., pines, junipers, fremontia, and mountain mahogany). Others are especially common in disturbed areas. Seed will be collected directly from areas prior to development and from other adjacent sources.

Seed are collected, cleaned, and stored by various techniques. Available seed will vary from year to year, and collecting adequate quantities will necessitate regular monitoring throughout summer to identify sites where various species are in seed. Records of seed sources, including substrate (carbonate or granitic) and elevation, are maintained so that seed will be reintroduced

into appropriate environments. Omya has also propagated native plants in a nursery through its revegetation contractor.

At planting, seed is either mixed or raked into the top layer of replaced soil, or applied during surface imprinting or use of a sheep's foot attachment. In some cases, application is tripled and cages placed to allow for loss to granivores.

Plant Propagation

On-site collection of seed and cuttings is also recommended because of their availability and the likelihood of local ecotypes adapted to elevation and soils. The revegetation plan recommended that revegetation rely on a combination of greenhouse-grown stock, seeding, natural seed banks, and natural dispersal. Additional seeding will be used as a remedial measure if monitoring indicates that diversity is insufficient to meet success criteria. Seed collection has been ongoing at the Omya sites since 1995.

Omya has contracted with local restoration specialists (JJ Restoration Service, Lucerne Valley, CA) to store and propagate plant materials. Plants are grown with minimal fertilization and watering, in containers designed to maximize root/shoot ratios. All nursery-grown plants destined for out planting onto carbonate soil are raised in similar soil. Planting is coordinated with revegetation planning to assure an adequate supply of the necessary species as they are needed for planting.

Shrubs and grasses are propagated in advance and outplanted as established stock. They provide (1) vertical structure, including shade and shelter from elements, and (2) a source of mycorrhizae for seeds germinating on the site. A mix of shrubs and native perennial grasses is used. Nursery stock is inoculated with mycorrhizae suitable to the area.

Site Preparation

The site will be sloped per the reclamation plan and graded for slope stability and erosion control. Compacted areas will be ripped to depth of 2 feet if feasible due to the rock material to relieve compaction and to create an uneven surface. This will aid in collecting wind borne seeds and moisture and create more favorable microhabitats.

After final grading and contouring, salvaged growth media will be placed to a depth of 1.5 to 2 feet on areas to be revegetated in islands totaling approximately 30% of equipment accessible, horizontal disturbed areas to create islands.

Growth media and salvaged woody plants will be placed upon areas to be seeded to create "islands" where seeds can fall out of the wind and where moisture can be retained through the creation of shaded microhabitats. These "islands" will serve as nursery areas within the larger area to be revegetated. In addition to growth media, organics (trees and logs salvaged) will be spread on the site at a rate based on observations of the area to be reclaimed. The logs serve a useful purpose as they provide shade and animal habitat, but also ultimately decompose adding organic matter and thus enrich the soil.

Slash salvaged from vegetation removal will also be utilized in reclamation. The slash material adds organic matter to the revegetation sites. The mulch decays more quickly than the logs, and thus organic material will be added to the soil in both short and long term time frame.

Seeding

Broadcast seeding, direct seeding, seedling planting and/or hydroseeding will be utilized and usually occurs during the fall season. Irrigation, if recommended, will continue for a maximum of two years. At planting, seed is either mixed or raked into the top layer of replaced soil, or applied during surface imprinting or use of a sheep's foot attachment to increase seed germination, moisture infiltration and reduce erosion. In some cases, application is tripled and cages placed to allow for loss to granivores.

The specific seed mixture and revegetation methods are detailed in the revegetation plan (see Appendix D1) and are listed in Table 11.

Nursery Stock

After shrub and perennial grasses are established (about five years following seeding), accessible revegetation sites will be planted with characteristic "climax" species. Pinyon pine will be planted above at densities determined by slope aspect and elevation. Canyon live oaks will be planted on northern aspects and blackbrush at elevations below 5,400 feet. Other salvaged plants such as cacti and yucca will be re-planted during initial seeding.

Irrigation

Irrigation will be conducted in accessible areas as needed (up to 2 years) to allow the revegetated areas to receive adequate moisture to become established but to not create a dependence on artificial irrigation.

Weed or Non-Native Invasive Species Control

The purpose of the weed or non-native invasive species control plan is to reduce or eliminate the occurrence of non-native invasive plant species deemed harmful, that may invade the site where mining activities have removed the native plant cover and where active and natural revegetation is taking place. Non-native invasive species (weeds) can compete with native plant species for available moisture and nutrients and consequently interfere with revegetation of the site.

The occurrence of weeds on-site shall be monitored by visual inspection. The goal is to prevent weeds from becoming established and depositing seeds in areas to be revegetated at a later date. No areas will be allowed to have more than 10 percent of the ground cover provided by non-native invasive plant species. If inspections reveal that non-native invasive weeds are becoming or have established on-site, then removal will be initiated in accessible areas. Inspections shall be made in conjunction with revegetation monitoring.

**Table 11
Recommended Plant Species for Revegetation**

Perennial Grasses for application as seed and mycorrhizal nursery stock. Bold species required.		
Common Name	Latin Name	Lbs/acre (PLS)
Indian ricegrass	<i>Achnaltherwn hymenoides (Oryzopsis h.)</i>	10
Parish's needlegrass	<i>Achnaltherum parishii (Stipa coronala depauperala)</i>	10
Desert needlegrass	<i>Stipa speciosa (<6,000 feet)</i>	10
Squirreltail	<i>Elymus elymoides (Sitanion hystrix)</i>	2
3-awn grass	<i>Aristida purpurea</i>	2
Nodding bluegrass	<i>Poa secunda</i>	2
Shrubs for application as potted nursery stock: greenhouse propagation by seed or cuttings; outplanted as "deep pot" stock.		
Common Name	Latin Name	
Blackbrush	<i>Coleogyne ramosissima</i>	Approx. 100 per acre
Shrubs for application as seed. Bold species required. Remainder should be added depending on availability.		
Common Name	Latin Name	Lbs/acre (PLS)
Bigberry manzanita	<i>Arctostaphylos glauca</i>	2
Great basin sagebrush	<i>Artemisia tridentala</i>	5
Cupleaf ceonothus	<i>Ceonothus greggii</i>	2
Curleaf mountain mahogany	<i>Cercocarpus Ledifolius (<6,000' – 2 lbs) (>6,000' – 10 lbs)</i>	
Common rabbitbrush	<i>Chrysothamnus nauseosus</i>	5
Green ephedra	<i>Ephedra virklis</i>	5
California Fremintia	<i>Fremoniodendron californicum</i>	5
California buckwheat	<i>Eriogonum fasciculatum</i>	5
Curleaf rabbitbrush	<i>Chrysothamnus viscidiflorus</i>	2
Douglas rattleweed	<i>Astragalus douglassii</i>	2
Greenleaf manzanita	<i>Arctostaphylos patula</i>	2
San Bernardino Mtn buckwheat	<i>Eriogonum microthecum var. corymbosoides</i>	2
Snakeweed	<i>Guitierrezia sarothre</i>	2
Grinnells penstemon	<i>Penstemon grinneuii</i>	2
Purple mat	<i>Nemophila rothrockii</i>	2
Blazing star	<i>Mentzelia laevicaulis</i>	2
Trees for application as nursery stock: greenhouse propagation from seed, outplanted as "deep pot" stock. Densities determined by slope aspect and elevation.		
Common Name	Latin Name	
Pinyon pine	<i>Pinus monophylla</i>	
Canyon live oak	<i>Quercus chysolepis</i>	

Source: "Revegetation Plan" Omya Mining Operations on USDA Forest Service Land San Bernardino National Forest, Tierra Madre Consultants 1996

Weed removal will be accomplished through manual, mechanical or chemical methods depending on the specific circumstances. For example, solitary or limited numbers of tree and tree-like species will be manually removed (chopped) and the stumps sprayed with an approved weed killer such as Round-Up. Smaller plants (wild oats and bromes) that cover more area may be sprayed, scraped with a tractor, or chopped by hand, depending upon the size of the area of infestation and the number of desired native plants in proximity or mixed in with the weeds.

Reports of inspections and weed control implementation shall be part of the annual monitoring report and kept on file by the operator.

Herbivore Exclusion

Deer, sheep, burros and rabbits all can do serious damage to revegetation areas. If a problem develops on revegetation sites, Tubex, TreePees and hardware cloth cages can be placed around individual plants to allow them to establish.

Success Criteria

Success criteria are based on the overall quality of the revegetation results compared to the recorded baseline vegetation data from Neel's description of vegetation in the region based on her extensive sampling on limestone soils throughout the northern San Bernardino Mountains. From completion of the revegetation for a specific area, the surviving perennial plant species shall be evaluated annually by the consulting botanist for relative growth as determined by diversity, cover, and density. Individual specimens or areas shall receive appropriate remedial attention as necessary. Remedial actions may include removing invasive weed species, reseeding, adding soil amendments, and protection from herbivory.

SMARA requires that reclaimed sites provide wildlife habitat "at least as good as that which existed before mining," and that reclaimed sites must be "similar to naturally occurring habitats in the surrounding area." SMARA also requires the operator to demonstrate that vegetation on reclaimed sites has been self-sustaining without irrigation, fertilization, or weeding for a minimum of two years prior to release of performance bond.

The three required measures are plant cover (vertical projection of the plant canopy over the ground surface), density (number of individual plants per unit area) and species richness (total number of plant species) as listed in Table 12. Success will be a measure of the native shrub and tree cover, species density, and species diversity based on achieving 50% of the baseline data areas. Based on these guidelines, the following quantitative success criteria for revegetation sites at the White Knob Quarry are planned based on Table 12 baseline data:

**Table 12
Recommended Success Criteria**

	Baseline Mean	Standard Success Percentage	Success Criteria
Pinyon Woodlands			
Cover	74%	50%	37% cover of native trees/shrubs
Shrub Density	10/0.1 acre	50%	5 native trees/shrubs per 0.1 acre
Species Richness	84/acre	50%	42 native trees/shrubs per acre
Blackbrush Scrub			
Cover	55%	50%	28% cover of native perennials
Shrub Density	13/0.1 acre	50%	3 native perennials per 0.1 acre
Species Richness	15/acre	50%	8 native perennial per acre

Source: "Omya White Knob Quarry Revegetation Plan" Scott White Biological Consulting, 2008

Test Plots

Omya has been conducting revegetation with shrubs and grasses onsite and at similar sites for up to 20 years. These revegetation sites included the Butterfield, Sentinel, Cloudy and Claudia quarries, and two sites at the White Knob Quarry, the north slope and Marker 50. Omya utilizes JJ Restoration in Lucerne Valley to conduct revegetation, test plots, monitoring, and remediation. JJ Restoration prepares an Annual Reclamation Report for all the Omya sites and the 2011 report is included as Appendix I.

In addition, due to the low volume of salvageable soil available, Omya will mix crusher fines (sandy limestone material), and decomposed granite with varying amounts of organic mulch and/or Mycorrhizal, and seed mixes to determine if this method will aid in the revegetation effort. This is discussed in Appendix D1.

Monitoring

Monitoring will be conducted annually to monitor and assess completed revegetated areas and areas where revegetation is being planned or just beginning and the need for remediation. The Annual Reclamation Report will be prepared to summarize revegetation and monitoring efforts over the past year and to assess the results of revegetation on the disturbed areas of the site. JJ Restoration Service has been preparing the Annual Reclamation Report for all the Omya sites for the past 5 years. Revegetated areas will be assessed utilizing success criteria with successful methods being implemented for future revegetation.

Reclamation efforts will be monitored annually for ten years after seeding and planting or until success criteria are met and vegetation is self-sustaining. Data on plant species diversity, cover, survival and vigor will be collected on revegetated sites and compared to baseline data from undisturbed sites to evaluate Project success. This schedule may be revised depending on the results of the revegetation effort and the meeting of the success criteria. Monitoring data will be reviewed and verified by the County.

2.7 CLEANUP

All clean-up operations will be conducted within one year of the final termination of mining. Scrap material, refuse, residual equipment, and surplus materials will be removed, recycled, and/or disposed of at an appropriate landfill site. Excess material piles and disturbed areas will be regraded for positive drainage, scarified, and revegetated. Any spillage of fuel, oil, grease, or hazardous materials will be cleaned up in a proper and legally acceptable manner.

2.8 POST RECLAMATION AND FUTURE MINING

Once mining has reached the final economic limit, the majority of the high quality white limestone will have been removed. However, a substantial limestone resource will remain after the present mining plan is completed.

A directive of SMARA and the County General Plan is the conservation of mineral resources. Because natural resources, particularly high grade limestone resources, are finite and limited, an effort will be made in the reclamation to conserve remaining limestone resources which may have some conceivable future resource value. Limestone resources will be left in benches within the quarries. Reclamation on the patented land will not preclude mining of the potentially economic limestone resources which may remain after mining is completed.

The planned land use subsequent to mining is open space and wildlife habitat compatible with surrounding BLM and Forest Service lands. The quarry excavation and reclamation will result in a series of reclaimed benches 25 to 30 feet wide and 50 feet high within the quarries. The eastern portion of the White Knob Quarry will be backfilled with waste rock to approximately the 5,575-foot elevation and graded to maintain a permanent sediment basin for future sediment control and revegetated. The overburden sites will be contoured no greater than 2H:1V or less steep slopes and revegetated on up to 30% of the equipment accessible horizontal surfaces.

The project area is bounded by SBNF lands to the south, by BLM lands on the west and north, and privately held land to the east (patented claims). The area is known to have additional limestone resources and mining could be undertaken in the vicinity of the site in the future with additional entitlements.

2.9 SLOPE AND SLOPE TREATMENT

A “Slope Stability Investigation” was prepared by CHJ Consultants in January 2013 (see Appendix G). CHJ concluded that the proposed mine excavation and reclamation (backfilling) of the quarries are suitably stable against gross failure for the anticipated long –term conditions including the effects of seismic shaking and meet the factor of safety criteria for static and seismic conditions. CHJ recommended measures to be implemented during mining and these are listed below.

As shown in Table 13, sufficient static factors of safety in excess of 1.5 and seismic factors of safety in excess of 1.1 were calculated for the remaining slope configurations presented and satisfy San Bernardino County Guidelines. Based on the global stability analysis and

observations of existing quarry and overburden stockpile slopes, it is anticipated that current and future mining practices will produce final mining and reclaimed quarry and overburden stockpile slopes that are suitably stable with regard to large-scale or deep-seated slope failure.

**Table 13
Slope Stability Summary**

Cross Section	Material Static	Static Factor of Safety.	Seismic F.S. (k=0.2)
A-A'	Rock slope (White Knob Quarry)	2.33	1.73
B-B'	Fill-over-rock slope (overburden site1)	1.93	1.27
C-C'	Rock slope (White Ridge Quarry)	2.37	1.83

Source: CHJ, January 2013

CHJ recommended measures to be implemented during mining and these are listed below.

- Overall final cut slopes in the granite and calcite marble should be no steeper than approximately 1H:1V up to the maximum heights proposed in the mining and reclamation plans.
- If encountered during future mining, geologic structures that exhibit exceptional continuity and adverse geometry with regard to planned slope aspects or contain significant clay linings, water seepage or other potentially deleterious conditions shall be evaluated for potential impacts to reclaimed slopes. Slope design may require adjustment of bench geometry to mitigate potential instability if such features are encountered.
- Large, unstable boulders on mine slopes should be removed or stabilized prior to the end of reclamation.
- Final reclaimed fill slopes composed of overburden materials and proposed as OB-1, OB-2, and OB-3, should be no steeper than 2H:1V to the maximum proposed heights.
- Slopes should be protected with berms and/or levees as necessary to prevent slope erosion in the areas where natural slopes drain onto the reclaimed slopes.

A final slope stability assessment report will be prepared for the County to assess the final slopes as part of the site closure.

2.10 PONDS, WASTE STOCKPILES

No operational ponds, reservoirs or tailings are utilized or produced at the project site. Rock waste and overburden have been and will be deposited in overburden placement sites. Overburden placement areas will be reclaimed with overall slopes no greater than 2H:1V slopes and revegetated as discussed under Sections 2.6 and 2.7 above.

2.11 SOILS

The site's soil resources were assessed in the report "Soil Resources at White Knob Quarry" Paul Kielhold, and included in Appendix D3. Information in this report are mainly from the San Bernardino National Forest. The soil mapping units from the more recent survey (CA777) are:

Wapi-Pacifico families, dry - Rock outcrop complex, 30 to 50 percent slopes
Wapi-Pacifico families, dry - Rock outcrop complex, 50 to 75 percent slopes
Yermo gravelly sandy loam, 30 to 50 percent slopes.

The Map Unit Description contains the follow explanations: "A "complex" consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. Some surveys include "miscellaneous areas." Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example."

Due to the rugged mountainous nature of the area and arid climate, limestone, often forms rocky ridges devoid of soil, or with only a thin rocky regolith developed. Generally, soil or growth medium is rarely more than 6 to 12 inches thick. Tree roots may extend only several feet down into fractures in the bedrock. Soil may be 2 feet thick or more near or within ravines and may be up to 3 feet Yermo gravelly sandy loam in the northeast area along the haul road onsite.

Forest Service studies (USFS EA 1988) have determined that much of the soil found in the limestone mining area is classified as low to very low in productivity. The soils are predominantly shallow, moderate to excessively drained coarse textured with low moisture holding capacity. Bedrock outcroppings and substantial rock fragments are present throughout the soil. Vegetation response on these soils varies greatly due to low moisture conditions.

The rugged mountainous steep terrain, rocky outcrops, and paucity of soil, severely limit the amount of soil which may be recoverable through standard industry practices. This is particularly true at the project site where virtually no soil is present on the limestone deposits, and there is minimal vegetative material to be salvaged. Trees and vegetation that do exist will be grubbed and stored in growth media stockpiles on the overburden pads. Growth media salvaged will be composed of small amounts of top soil, brown colored fine textured waste and or white colored crusher fines, and will be stored at the overburden site pads, or distributed directly at active reclamation sites. Permanent and temporary material/growth media stockpiles will be stockpiled separately from overburden, fines and waste rock, clearly identified, and covered with larger material to control erosion if needed.

Because there is not enough soil and fine textured waste material to cover all disturbed ground, the island concept is the most effective means of assuring adequate growth media coverage. The soil thickness and distribution vary naturally and thus the island approach approximates reality. Based on previous experiences 1.5 to 2 feet thick growth media cover over ripped surface will provide adequate thickness and allow root penetration to sustain growth.

The growth media that is salvaged generally contains very little organic content due to minimal included vegetative matter. Some plant seeds are incorporated, and we have found that some growth media storage areas spontaneously revegetate. Therefore, slow release fertilizer applied during the planting phase may be sufficient to encourage plant growth.

The chemical composition of soils developed from Paleozoic limestone formations on the Omya California claims was analyzed by Burke (1981), and found to be ph neutral ranging from 7.2 to 7.8. Chemical analysis is shown on Table 14 is similar to the soils in the project areas. Several samples of the various growth media piles have also been analyzed. Soil ph of less than 8.3 is not considered to represent an overly alkaline condition for most native plant species of the arid southwest and the reclamation sites will not require chemical treatments to control ph.

**Table 14
Soil Properties from Samples from the Burk Experimental Revegetation Plots**

Soil Property	Mean	Standard Deviation
Ph	7.5	0.2
Electrical Conductance (x 1,000)	0.4	0.1
Nitrate Nitrogen	3.6	1.2
Sulfate Sulphur	5.0	---
Potassium	109.5	64.3
Phosphate Phosphorus	6.1	1.9
Iron	6.1	3.1
Zinc	4.4	1.2
Copper	1.4	0.4
Manganese	5.9	3.4
Sodium*	7.6	10.1
Calcium*	111.3	77.4
Magnesium	15.0	4.7

Mean = Nutrient values are in parts per million air dry soil or (*) saturation extract. Source: Burk 1981

2.12 DRAINAGE AND EROSION CONTROLS

Section 1.5 above describes the planned operational and reclamation drainage and erosion controls proposed. Numerous erosion and sedimentation controls have been and are planned to be implemented in the quarries and stockpile areas to control, minimize and prevent off site sedimentation. Runoff is directed into the quarries, and many sediment basins, culverts, dips, or drains direct water off roads. A number of energy dissipaters, rip rap, hay bales, catch basins, and/or silt fences trap sediment and prevent it from traveling off site. Long-term stabilization, or reclamation, will generally involve grading or reshaping disturbed areas, establishing effective drainage, placement of plant growth media, and revegetation. Following reclamation, the majority of surface runoff from quarry areas will be retained in the quarry limits where it will either infiltrate or evaporate.

2.13 PUBLIC SAFETY

To reduce the risk of injury to the general public and employees, several safety measures have been incorporated and will be ongoing as part of mining and reclamation activities.

Vehicular access to the mining area is provided only on restricted access/haul roads. The roads have multiple highly visible warning signs directing the public away from the active mining area. In addition, the haul roads are watched by company personnel during operating hours. During non-operating times, locked steel gates are installed on all haul roads accessing both active and inactive quarries to restrict vehicle access. Safety berms are placed on jeep and ORV trails to restrict ORV access and will be maintained as necessary.

Signs are located around the perimeter of the mining area directing vehicles or foot traffic away from the mining or reclamation areas.

Active mining areas comply with all federal (MSHA) and state (Cal-OSHA) mine safety regulations. Workers, including contractor labor, are trained in mine safety and first aid. Elevated roads have safety berms, quarries have safety benches with berms and inactive ramps and roads in mining areas are blocked to prevent access.

Prior to blasting activities, employees working in the area are notified, and a visual search of the area is done prior to blasts to verify that no one is present in the area. Standard horn signals are used to notify personnel before and after blasts (all clear). No smoking signs are placed on all storage containers which contain flammable materials. Storage containers are labeled indicating contents, and hazardous or poisonous materials are identified. Buildings or storage facilities are locked.

Once mining has been completed, the quarry rims will have a fence or other type of access restriction erected along dangerous highwalls with warning signs to prevent anyone from entering into the quarry area.

2.14 MONITORING AND MAINTENANCE

SMARA requires annual reporting of Mining and Reclamation activities. The reports are filed with the Department of Conservation, Office of Mine Reclamation and the County. Revegetated areas will be monitored over a 10-year period or until success criteria is achieved following initial seeding and/or planting. Data on plant species diversity, cover, survival and vigor will be collected on revegetated sites and compared to baseline data from undisturbed sites to evaluate project success.

Monitoring and maintenance of reclamation is an ongoing responsibility of Omya. The project site will be inspected as needed, at least annually by the County. As reclamation efforts increase through establishment of native species, the frequency of monitoring by Omya will increase commensurate with the activities being conducted. The individual monitor(s) shall be qualified revegetation specialists approved by the County.

In addition, CEQA also requires adoption of a reporting and monitoring program for the conditions of approval of a project that are intended to mitigate or avoid adverse environmental effects. The Lead Agency-adopted program is intended to ensure compliance with mitigation measures throughout the life of the approved Project. The program will identify the conditions of approval that act as impact mitigation measures and for each measure, outline who is responsible for implementation and verification of the measure.

2.15 RECLAMATION ASSURANCE

Omya will post an updated reclamation assurance annually in an amount sufficient to pay for the cost of reclamation for existing disturbance as outlined in this Amended Plan. The County will annually review the updated reclamation financial assurance cost estimate (FACE); as annual updates are required by SMARA. San Bernardino County is the lead agency for SMARA, which also requires the reclamation assurance to be reviewed and approved by the California Office of Mine Reclamation (OMR).

Omya most recently submitted its annually updated FACE to the County in June 2012. As of July 2012, Omya currently has an approved Financial Assurance Mechanism in the form of a letter of credit on file payable to the County and the DOC-OMR.

3.0 GEOLOGY

3.1 REGIONAL GEOLOGIC SETTING

The San Bernardino Mountains are one of the major ranges in the east-west-trending Transverse Ranges province of southern California. The north slope of the range rises abruptly from the desert floor in Lucerne Valley, with elevations along the north range crest reaching 8,400 feet amsl. The San Bernardino Mountains contain the largest high brightness, high purity limestone mining operations in North America (see Figure 13).

A variety of rocks of Precambrian to recent age are exposed within the San Bernardino Mountains and the White Knob Quarry area. The Late Precambrian and Paleozoic metasedimentary rocks unconformably overlie earlier Precambrian basement (see Figure 14). Paleozoic sequences in the San Bernardino Mountains contain elements of both cratonal and miogeoclinal affinity (see Figure 15). A major unconformity is present between Upper Cambrian and Devonian strata throughout the Mojave region. In the San Bernardino Mountains, Upper Precambrian and Lower Cambrian rocks are of miogeoclinal aspect, middle Cambrian strata are of cratonal aspect, and upper Paleozoic rocks are identical to inner miogeoclinal facies of the central and eastern Mojave region (Brown 1984) (see Table 15).

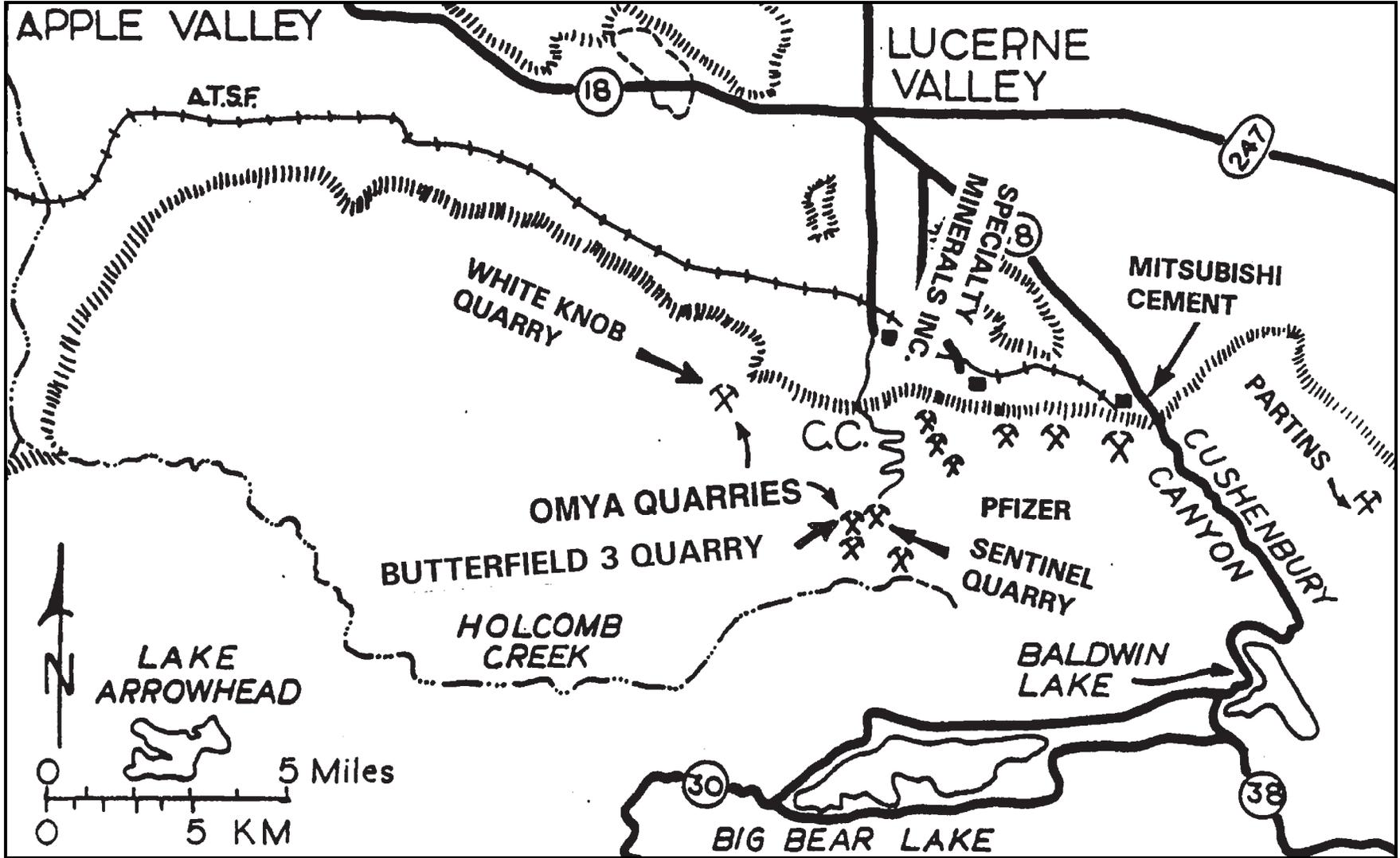
Several major tectonic events have been recognized in various parts the San Bernardino Mountains. These include complex Mesozoic age multiphase folding and thrust faulting, contact and regional metamorphism, and intrusive events. Cenozoic activity includes high and low-angle faults, and mild folding. The San Bernardino Mountains area continues to be seismically active as evidenced by the significant earthquakes in the area during the last 15 years (see Appendix G, Enclosure A-4).

The complex geologic history of the San Bernardino Mountains has allowed the formation of several large high brightness, high purity crystalline limestone deposits in the upper Paleozoic miogeoclinal limestone formations in the San Bernardino Mountains and at White Knob Quarry, which are currently being mined or will be mined in the future.

3.2 GENESIS OF WHITE HIGH CALCIUM LIMESTONE DEPOSITS IN THE WHITE KNOB QUARRY AREA

Carbonate rocks are found extensively on all continents, but high purity, high brightness (white) limestone deposits are relatively uncommon in nature because their formation is dependent on the superposition of several independent geologic processes, acting over a long period of time. Among the processes are:

- 1) Deposition of originally pure limestone in high energy agitated, shallow marine environment;
- 2) Post depositional changes including metamorphism and/or magmatic processes to bleach and recrystallize the rock, and disperse any impurities which may have been present;
- 3) Structural controls including folding, faulting and orogenic processes to place the rocks in desirable structural settings;
- 4) Uplift and erosion; and
- 5) Preservation through geologic time.

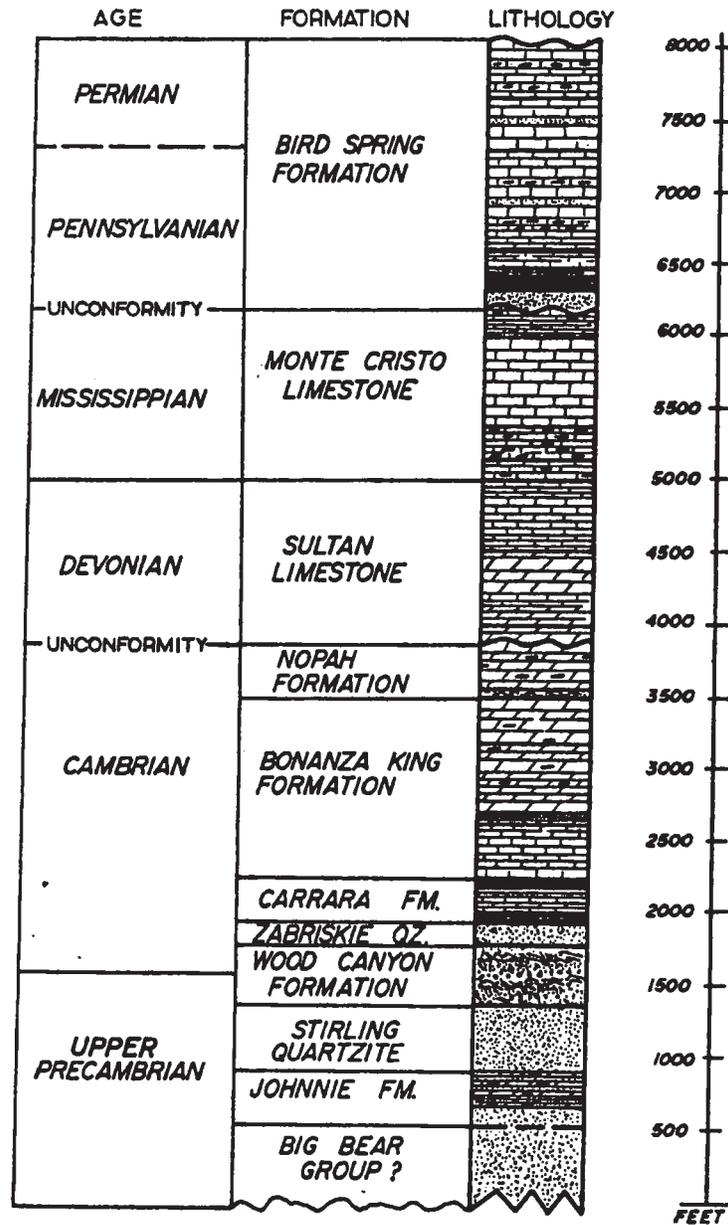


LUCERNE VALLEY LIMESTONE DISTRICT

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

FIGURE 13

COMPOSITE STRATIGRAPHIC COLUMN PALEOZOIC ROCKS WESTERN SAN BERNARDINO MOUNTAINS



ALL UNITS METAMORPHOSED

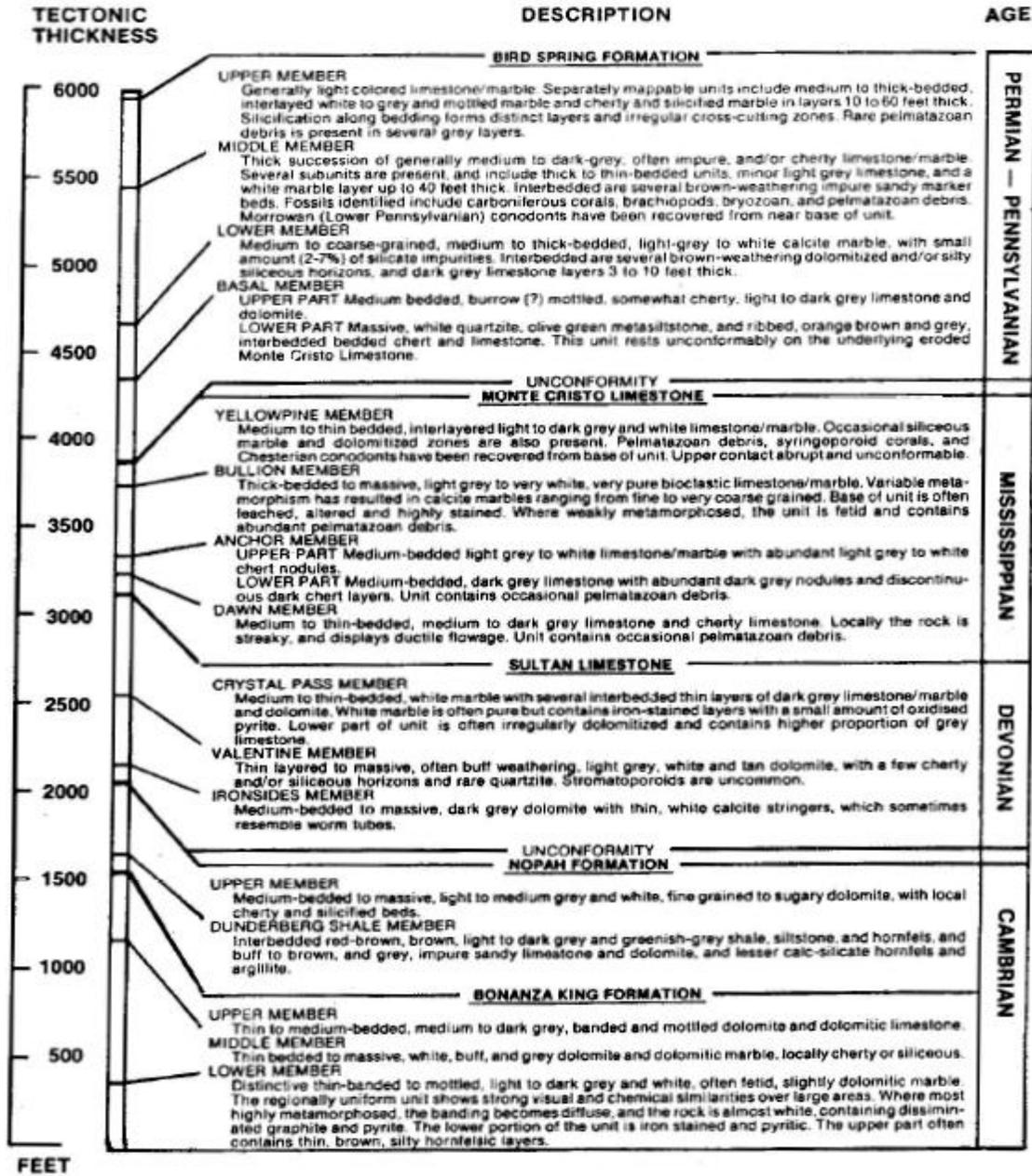
TECTONIC THICKNESS

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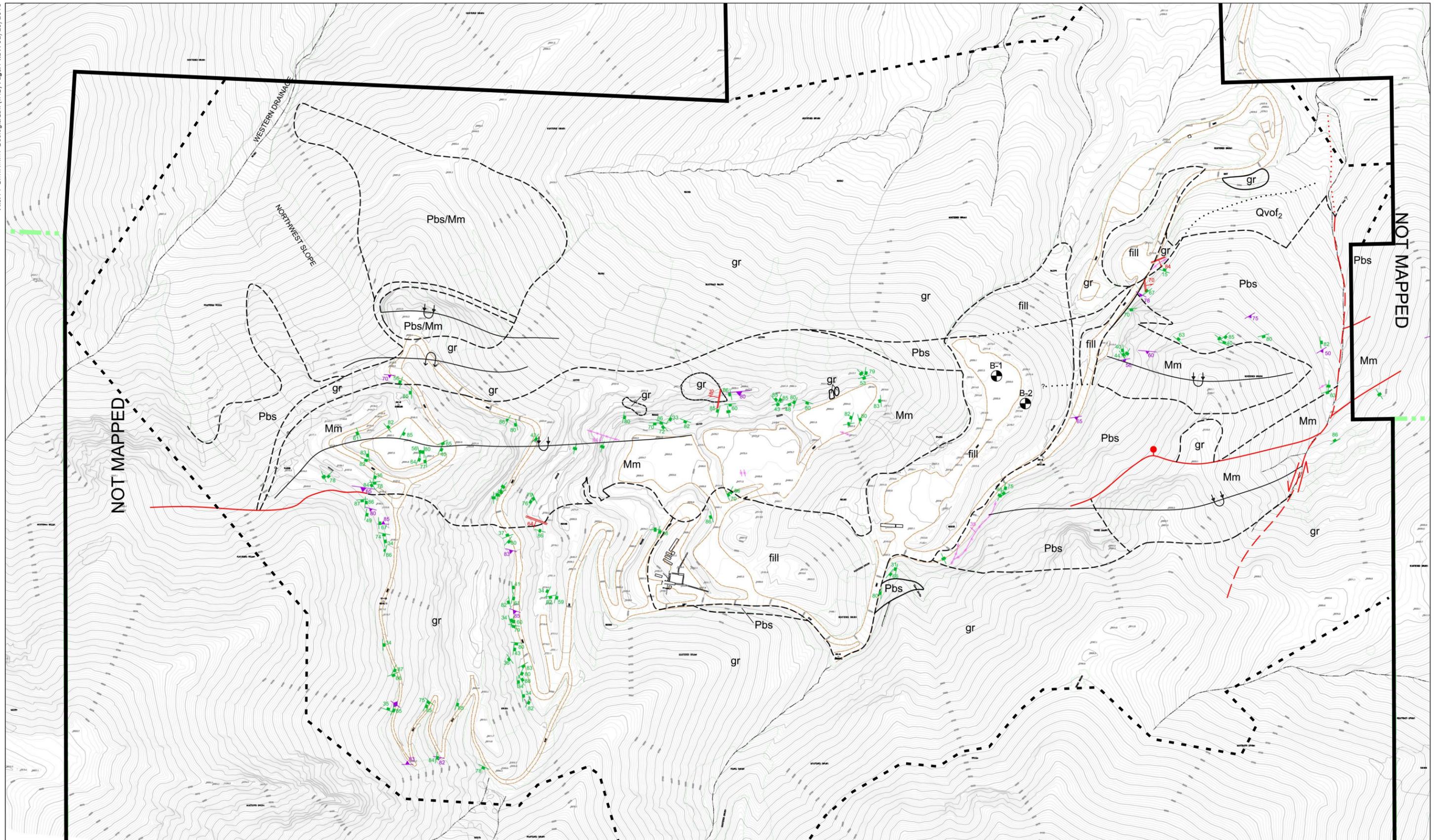
STRATIGRAPHIC COLUMN PALEOZOIC ROCKS

White Knob and White Ridge Quarries - OMYA California
Amended Mine and Reclamation Plan
County of San Bernardino, California

Table 15
Description of Paleozoic Carbonate Rocks



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Source: CHJ Consultants, 01/2013.

GEOLOGIC UNITS:

- f - fill
- Qvof - very old alluvial fan deposits (Holocene)
- gr - undifferentiated granitic rocks (Mesozoic)
- Pbs - Bird Spring Formation (Pennsylvanian)
- Mm - Monte Cristo Limestone (Mississippian)

B-2
 Location of exploratory boring

- overturned synform/antiform
- fault
- approximate geologic contact - modified from Miller et al. (2000) based on field mapping
- mafic dike

- strike of vertical foliation
- strike and dip of foliation
- strike and dip of joint
- strike and dip of vertical joint
- strike and dip of shear zone

- Amended Project Boundary
- Private Land
- Limits of Planned Disturbance

GEOLOGIC MAP

White Knob and White Ridge Quarries - OMYA California
 Amended Mine and Reclamation Plan
 County of San Bernardino, California

Because all the geologic processes are required, deposits of high calcium white crystalline limestone are relatively uncommon in nature, and are vastly different from common limestone. Deposits of high purity, high brightness crystalline limestone suitable for high quality filler and extender applications are limited and only occur in restricted areas.

Environment of Deposition

Environment of deposition is important because it determines the size, shape, purity, and other economically significant characteristics of the carbonate rock deposit. Limestones that form in high energy environments generally contain only minor non-carbonate impurities, and are the source of high purity limestone. Limestones which form in low energy environments contain mud, clay, silica, and other impurities. Turbulent or agitated water will winnow mud from the sediments. Calm water allows mud to settle to the bottom and remain there.

Limestone formed in strongly agitated environments are characterized as being medium to coarse grained. The predominant sand sized grains are crinoid columnals, and lesser fragments of brachiopods and ostracods. Crinoids need well aerated water of relatively high salinity. Sediments of this type accumulated in a shallow marine environment where vigorous winnowing currents were common.

A direct relationship exists between depositional environment and carbonate chemistry. Limestones which form in high energy environments contain more CaCO₃, and less MgO, Fe₂O₃, SiO₂, and Al₂O₃ impurities than muddy low energy limestones. In addition, a relationship exists between type of allochem present and chemical composition. Limestones containing abundant crinoidal debris generally have high CaCO₃ and low Al₂O₃ and MgO values. Crinoidal limestones which form in high energy shallow environments are the most economically favorable type of carbonate rocks.

Metamorphism

Metamorphism is of great importance in the formation of many high purity, high brightness (white) limestone deposits. Metamorphism of limestones in proximity to igneous intrusions often results in bleaching of susceptible rock, and coarsening of grain size. Regional metamorphism caused by pressure and heat at depth also cause the limestone to recrystallize, resulting in coarsening of grain size, dispersion of impurities (if present), and bleaching or whitening of the rock.

Pure limestones formed in agitated water, when subjected to metamorphism may form very white, coarse grained, very pure calcite marble deposits of premium quality. Within most areas of the San Bernardino Mountains and Mojave Desert area the Paleozoic rocks have been subjected to regional and or contact metamorphism (Brown 1987). Formations or Members which have been recrystallized and bleached to white calcite marble include Devonian Sultan Limestone, Crystal Pass Member, Mississippian Monte Cristo Limestone Bullion Member, Mississippian Redwall Limestone Middle Member (cratonal facies), and portions of the Bird Spring Formation of Pennsylvanian-Permian age.

Cretaceous Age regional metamorphism is variable in the San Bernardino Mountains but ranges from lower greenschist facies upper amphibolite facies and granulite facies in the White Knob area (Brown 1991).

Intrusion of several varieties of plutonic and batholithic rocks ranging from Permo-Triassic thru Late Cretaceous Age has resulted in both regional and contact metamorphism at White Knob, and the limestone deposit has been affected by multiple metamorphic events and has been bleached and recrystallized to exceedingly coarse grained, very white calcite marble.

Structural Controls

Structural controls of carbonate deposits have an important influence on the formation of a deposit. Folding can strongly influence a deposit. Thickness may be increased in the core of folds, while the limbs may be significantly thinned. Faulting may also exercise strong influence on a deposit. Faults can truncate a deposit at shallow depth, or hide a vast deposit under shallow cover. Other faults may cause repetition or omission of a deposit.

As noted previously, Paleozoic rocks in the San Bernardino Mountains have undergone a complex deformational history which includes multiphase folding and faulting. Deposits therefore are often complexly folded and faulted. White Knob deposit is no exception.

Uplift, Erosion, and Preservation through Geologic Time

Uplift and erosion has strong influence upon the preservation and mining of a deposit. Prolonged erosion may completely remove a deposit, while more recent uplift and erosion may remove the overburden.

Paleozoic rocks in the Mojave area originally covered the region. Uplift during Tertiary time, and erosion have largely removed most of the Paleozoic rocks in the Mojave, leaving islands (remnants) of Paleozoic rocks in a sea of granite and alluvium. Within some of the ranges are white marble deposits, several of which are quite extensive.

The San Bernardino Mountains were not uplifted until more recent (Plio-Pleistocene) time (May and Repenning 1982), thus the root pendants are more extensive, and several large deposits of white, crystalline limestone are present.

At White Knob erosion has removed the overburden and overlying rocks revealing the large white deposit at the surface and forming a long narrow ridge. Several recent landslide deposits are present in the quarry area, and are a function of the rapid and recent uplift of the area.

3.3 SPECIFICATIONS OF HIGH BRIGHTNESS, HIGH PURITY LIMESTONE

High purity white crystalline limestones have a large number of uses and are classified as white fillers and extenders with value added characteristics. The products are finely ground, high brightness, high purity limestone, and are the whitest, purest, and most valuable per ton of all

limestone products. For most uses, white fillers and extenders require not only the most pure limestone, but also the whitest color of all limestones.

Desirable characteristics are high brightness (white color), low tint, uniform fine particle size, freedom from grit, and chemical purity. Color and purity are of utmost importance in virtually all applications.

3.4 GEOLOGY AT THE WHITE KNOB QUARRY

Rocks at the White Knob Quarry include Paleozoic metamorphosed sedimentary rocks, Mesozoic granitic rocks and younger landslide, talus and alluvial deposits.

Paleozoic Rocks and Limestone Deposit

Ore grade limestone at the White Knob Quarry is mined from the Bullion Member of the Monte Cristo limestone of Mississippian Age. The stratigraphic section of Monte Cristo limestone at the White Knob Quarry is developed in an isoclinally folded and overturned section. The full thickness of the Bullion Member is up to 400 feet thick. The White Knob Quarry deposit occurs in the core of a tight fold and the thickness of the Bullion Member has been increased. In the quarry area, the rocks strike nearly east-west and dip to the south. Dips range from about 45 degrees up to vertical.

At the White Knob Quarry, rocks have been multiply metamorphosed to granulite facies, forming exceedingly coarse grained, very white translucent calcite marble. Individual calcite rhombs are commonly over 1 inch across.

Mesozoic Rocks

Mesozoic rocks at the quarry include a variety of Granitic rocks which have intruded the deposit to the south, and younger thin granite dikes have intruded the deposit in several places. The rocks can be differentiated as to older plutonic rocks which are non-fluorescent, and younger thin more siliceous dikes in which feldspars are highly fluorescent. The granitic rocks have created both regional and contact metamorphism of the adjacent carbonate rocks, and have allowed the coarse grained marbles to form.

Other Metamorphic and Mineralized Rocks

Contact metamorphism in the general area of the quarry has formed several small skarn zones, some of which contain small amounts of metallic minerals. In the surrounding area are several small zones that have been prospected in the past for a variety of metallic minerals including gold, copper and zinc. The known showings are small and non-economic. Within the quarry a small contact sulfide zone has been encountered. This zone is up to 2 feet thick, and is dominated by pyrite, pyrrhotite, sphalerite, and magnetite. The material is volumetrically insignificant as an ore deposit, and contaminates the adjacent limestone, and is waste rock. The sulfide bearing rock which is less than 0.005% of the waste rock is placed in the overburden site where it is

encapsulated by the carbonate dominated waste rock, and thus no acid mine drainage can form from the material.

Younger Rocks and Alluvial Deposits

Younger rocks at the quarry area are derived from the older sedimentary, metamorphic and igneous rocks and include landslide, talus and alluvial deposits.

Landslide deposits are located along the north slope of the deposit and within a drainage to the south of the deposit. The landslide deposit to the north includes numerous very large boulders of white marble. Early attempts at mining at the deposit were in the landslide material and tried to recover the white boulders.

Talus deposits are present along the east slope of the west canyon. Early road building in the 1970s, constructed several roads in the talus deposit material. It is estimated that the natural talus material is up to 30 feet thick and forms a mantle on the steep slopes. The talus formed in Pleistocene and Holocene time by erosion of the very steep canyon slopes. Alluvial deposits include several generations of Pleistocene and Holocene and recent alluvium derived from exposed bedrock by fluvial processes.

3.5 GEOLOGIC CONDITIONS AT WHITE KNOB QUARRY

No geologic conditions have been identified which would adversely affect the White Knob Quarry mining operation. No active faults are located in the area of the quarry (refer to Figure 15). The area has also been mapped in detail (Brown, various references) and no adverse geologic conditions have been identified.

Possible Adverse Geologic Conditions at the White Knob Quarry

No adverse geological conditions have been identified in the White Knob Quarry area. Upper Paleozoic limestones in the White Knob Quarry area are moderate to steeply dipping and are natural cliff formers. Several high angle faults are present. Most faults are perpendicular to the long axis of the quarry (cross faults). Mesozoic granite forms the major ridge line to the south of the quarry. The granitic rocks form steep resistant outcrops, with several ribs of even more resistant granitic rock.

Bedding of the upper Paleozoic limestones is moderate to steeply dipping ranging from 45 to 90 degrees. Although joints and fractures are present, they are generally tight. There are no micaceous, or shale interbeds or as joint or fracture filling. No clay beds or interbeds are present. Most prominent joints are discontinuous and parallel major fault trends. Spacing ranges from 12 inches to more than 3 feet. Overall the limestone is solid, stable, and is a natural cliff former.

Some of the haulage roads have been constructed through Mesozoic granitic rock. Although generally competent, the granitic rock does have a natural eroded slope angle of 45 degrees, and a prominent joint system which strikes parallel to the roads and dips out of the road at 57 degrees. This joint system exerted much control over the design of the roads in the granite.

The cut slopes are a maximum of 57 degrees to avoid undercutting of the slopes. The slopes are not undercut and are considered stable.

Younger rocks at the quarry area are derived from the older sedimentary, metamorphic and igneous rocks and include landslide, talus and alluvial deposits.

Landslide deposits are located along the north slope of the deposit and within a drainage to the west of the deposit. The landslide deposit to the north includes numerous very large boulders of white marble. Early attempts at mining at the deposit were in the landslide material and tried to recover the white boulders. Older erosion during Pleistocene and quaternary time formed an oversteep slope on the north face of the ridge. Possible fault activity coupled with a wetter climate during Pleistocene or Quaternary time may have caused the material to break away forming a landslide deposit on the lower north slope of the ridge.

A "Slope Stability Investigation" was prepared by CHJ Consultants in January 2013 (see Appendix G and Section 2.9 above). CHJ concluded that the proposed mine excavation and reclamation (backfilling) of the quarries and development of the overburden stockpiles are suitably stable against gross failure for the anticipated long-term conditions including the effects of seismic shaking and meet the factor of safety criteria for static and seismic conditions.

Possible Adverse Geologic Conditions at the Overburden Sites

No adverse geological conditions have been identified which would have an adverse impact on the Overburden sites. The dumps are free draining and the ground water table at least 300 feet below the base of the dump. Overburden materials (limestone, dolomite and granite) are not subject to liquefaction or acid runoff.

During reclamation fill slopes at the overburden sites will be designed with overall slopes less steep than 2H:1V to meet SMARA stability requirements. This will insure long term stability. Recontouring and drainage controls as previously discussed under separate headings will insure that erosion and off site sedimentation are minimized to acceptable levels. A slope stability study is recommended at final reclamation to insure that long term stable slopes will be present.

Geochemistry of the Limestone Ore

As noted in previous sections the limestone ore is high brightness high purity calcium carbonate. The ore is composed of >98% calcium carbonate. The remaining combined <2% is composed of Magnesium bearing carbonate, and insoluble material. The small amount of insoluble material is composed of silicate minerals including in order of quantity trace amounts of clay, mica, and silicate minerals. Minerals have been identified by X-ray diffraction, and polarized light microscopy. No pyrite or any acid mine drainage forming minerals or constituents are present in the limestone ore, and it is physically and chemically impossible for acid mine drainage to form from the calcium carbonate.

Geochemistry of the Waste Rock

As noted above, the vast majority of the overburden and waste rock at the White Knob Quarry is composed of off color and grey limestone and granitic (monzonite) intrusive rock and granite dikes. Water runoff samples collected after storms from drainages at the quarry have a PH ranging from 8.1-8.9, and thus are slightly alkaline, which is to be expected in the carbonate dominated environment. Thus it is physically and chemically impossible for acid mine drainage to form in the calcium carbonate dominated environment at the quarry. Additional tests for toxic substances in the runoff are negative for samples collected during the last decade.

3.6 GEOLOGIC CONCLUSIONS

The San Bernardino Mountains contain the largest high brightness, high purity limestone mining operations in North America. One of the largest is the White Knob Quarry. The White Knob deposit formed in positionally pure upper Paleozoic limestone, which has undergone multiphase Mesozoic deformation including intrusive events, and both contact and regional metamorphism. Structural history is complex, and the area continues to be seismically active. The complex geologic history of the region has allowed the formation of several large high brightness, high purity limestone deposits.

Detailed geologic mapping, intimate knowledge of stratigraphy, and recognition of complex structural relationships have proven to be invaluable tools in the exploration for, and discovery of high-quality limestone deposits in the San Bernardino Mountains and Mojave Desert region. Rotary and core drilling, and abundant lab testing of surface, bulk and drill samples have proven effective in delineating ore continuity.

No adverse geological conditions have been identified which would have an adverse impact on existing and future White Knob Quarry operations. Nevertheless, a slope stability study is recommended to be completed for the quarry and overburden sites prior to final reclamation of the quarry to assure long term stability of the reclaimed site.

The San Bernardino Mountains and the White Knob Quarry has been, and will continue to be one of the largest sources of high brightness, high purity calcium carbonate products in North America.

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4.0 HYDROLOGY

4.1 SITE SETTING

The Omya White Knob Quarry is located on the northeast side of the White Mountains, which form a portion of the northern San Bernardino Mountains, approximately 6 miles south-southwest from the town of Lucerne Valley. Elevations within the White Knob area range between 4980 and 7146 feet above mean sea level.

4.2 METEOROLOGY

Historic temperature extremes for the Lucerne Valley range between 0° F in the winter and 114° F in the summer, with an annual average temperature of 60.7° F (WRCC, 2006). Annual precipitation for the Lucerne Valley area typically ranges between 5 and 10 inches per year (NWS, 2006). Precipitation typically occurs in the form of periodic heavy showers, but the area does experience heavy winter snowfall at times along the top of the White Mountains.

4.3 SURFACE WATER

Onsite surface water flow occurs in response to precipitation only (ephemeral flow), flowing northeastward from the crest of the White Mountains downward through the White Knob Quarry area into the nearby Rabbit (dry) Lake-Lucerne Valley depression. No springs or perennial streams occur within the White Knob Quarry area (USGS, 1971a, 1971b, 1996a, 1996b). Several watersheds drain surface water away from or through the White Knob Quarry area. Drainage at higher elevations occurs mainly by steep, deeply incised drainages that have been eroded into the bedrock to be replaced by gentler, relatively shallow drainages that have been eroded into the alluvium at lower elevations.

Several small sedimentation basins have been constructed along the White Knob Quarry haul road and other sedimentation basins are planned for construction in the near future along the haul road (Stantec 2011) to control offsite runoff.

Surface water flow from the White Knob Quarry area generally occurs through three (3) separate drainages. The western sector of the White Knob Quarry area drains into the Western Drainage and courses downstream through Ruby Springs (Section 7.4 – Western Canyon Area Drainage). The eastern portion of the White Knob Quarry area initially drains through the Eastern Drainage down to. The central, largest portion of the White Knob Quarry area drains via the Central Drainage.

The White Knob Quarry area is not located within any recognized floodways or 100-year floodplains, but is occasionally subject to ephemeral flash flooding. When constructed, the basins could lessen the potential effects of flash flooding, including reducing the offsite transportation of mining-derived sediments.

4.4 GROUNDWATER

Groundwater within the hardrock that underlies the vicinity of the White Knob Quarry area is expected to be under fracture-flow conditions (Bulot, 2004; Deane, 2006a, 2007a, 2007c, 2008d). An alignment of several springs extending southeastward from Ruby Springs to Quail Spring (west of Dry Canyon) indicates that a southeast-trending fault system (CDMG, 1966; Morton and Miller, 2003) intercepts groundwater flowing downward from the higher elevations of the White Mountains toward Rabbit (dry) Lake. As the groundwater flows within the faults and joints, it is forced upward to the ground surface via the barrier effects that this fault system creates. Surface flow at the springs is typically over a relatively short distance, only to disappear by percolating into the underlying sediments and, to a lesser degree, by evapotranspiration.

The White Knob Quarry area is located south of the southern border of the Upper Mojave River Valley Groundwater Basin, where alluvial groundwater occurs. The majority of this groundwater basin underlies the north-south elongate Mojave River Valley to the west. However, a smaller portion of this basin (the Este Subarea, managed by the Mojave Water Agency) extends southeast into Fifteenmile Valley, north of the White Knob Quarry area. Locally, this basin is bound on the south by the contact between Quaternary sediment deposits and unconsolidated basement rocks of the San Bernardino Mountains (including the White Mountains), on the southeast by the Helendale Fault, and on the north by the basement exposures of the mountains that surround Apple Valley (the Granite Mountains) (CDWR, 2004).

Water-bearing formations of the basin consist of regional Pliocene and younger alluvial fan deposits (the fan unit), overlain by Pleistocene and younger river channel and floodplain deposits (the floodplain unit). Water generally occurs under unconfined conditions. The fan unit typically occurs within one mile of the active Mojave River channel, indicating that the basin portion that underlies Fifteenmile Valley is comprised of the younger floodplain unit. This unit occurs in thicknesses up to 1,000 feet, with permeability decreasing with depth. Specific yields for this unit range between 4 and 25 percent, with an estimated average of 10 percent (CDWR, 2004). It is expected that the specific yield decreases significantly in the vicinity of Rabbit (dry) Lake, which indicates that the deeper sediments underlying this feature may have been syndepositionally replaced by finer-grained sediments (silts, clays).

Groundwater underlying nearby Apple Valley is sodium-chloride in nature, with calcium bicarbonate groundwater located near the San Bernardino Mountains. The Helendale Fault to the east functions as a groundwater barrier in the floodplain unit, causing groundwater to flow northwest toward the Mojave River instead of northeast into the adjacent Lucerne Valley Basin. Natural recharge occurs primarily from direct precipitation, ephemeral stream flow, and subsurface flow from the San Bernardino Mountains. Man-made recharge occurs primarily via septic tank effluent discharge and irrigation waters (CDWR, 2004).

Although development within the Rabbit (dry) Lake area has not been significant, it is reasonable to expect groundwater levels to decrease over time due to the combined effects of significant development within nearby Apple Valley and expected development within the area surrounding Rabbit (dry) Lake. A visual presentation prepared by the United States Geological

Survey on behalf of the Mojave Water Agency indicates that groundwater levels have decreased slightly in the Rabbit (dry) Lake area (USGS, 2001).

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REFERENCES, ACRONYMS, and GLOSSARY

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ACRONYMS

af	acre-feet
amsl	above mean sea level
ANFO	ammonium nitrate and fuel oil
AQMP	Air Quality Management Plan
BATF&E	Bureau of Alcohol, Tobacco, Firearms and Explosives (federal agency)
BLM	Bureau of Land Management
BMP	Best Management Practices
Cal-OSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife (as of January 1, 2013)
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHMS	Carbonate Habitat Management Strategy
CNPS	California Native Plant Society
CUP	Conditional use permit
CUPA	Certified Unified Program Agency (Hazardous Materials Division of the San Bernardino County Fire Department is designated as the "CUPA.")
CY	Cubic yards
DOC	Department of Conservation
EIR	Environmental Impact Report
FESA	Federal Endangered Species Act
H:V	horizontal to vertical; typically in feet (slope inclination)
MBTA	Migratory Bird Treaty Act
MCY	million cubic yards
MSHA	Mining Safety and Health Administration
MT	million tons
MDAQMD	Mojave Desert Air Quality Management District
MWA	Mojave Water Agency
NPDES	National Pollutant Discharge Elimination System
OMR	Office of Mine Reclamation
PLS	Pure Live Seed
PM₁₀	10-micron or less particulate matter
RWQCB	Regional Water Quality Control Board
SBNF	San Bernardino National Forest
SMARA	Surface Mining and Reclamation Act
SPCC	Spill Prevention, Control, and Counter-measure
SWPPP	Storm Water Pollution Prevention Program
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

GLOSSARY OF TERMS

BACT: Best Available Control Technology – Air quality term used to describe air pollutant control equipment for equipment and facilities that produce air emissions.

Bedrock: The solid rock that underlies soil and unconsolidated material.

Bench: Terrace or leveled area breaking the continuity of a slope. For the South Quarry, the bench will be 25 feet wide every 45 feet vertical feet.

Berm: An elongated earthen structure which acts as a barrier; e.g., to make it difficult for a vehicle or ORV to cross, or to redirect the flow of water.

California Endangered Species Act (CESA): California state legislation enacted in 1984, with the intent to protect floral (plant) and faunal (animal) species by listing them as “rare,” “threatened” “endangered,” or “candidate.” The Act also provides a consultation process for the determination and resolution of potential adverse impacts to the species.

California Environmental Quality Act (CEQA): Policies enacted in 1970, and subsequently amended, the intent of which is the maintenance of a quality environment for the people of California now and in the future.

Carbonate Habitat Management Strategy (CHMS): An intensive collaborative effort led to the development of the Carbonate Habitat Management Strategy (CHMS) in 2003. The strategy is designed to provide long-term protection for the carbonate endemic plants and also provide for continued long-term mining. Some carbonate habitats are protected from mining impacts in perpetuity within the carbonate habitat reserves dedicated and managed as described in the CHMS. A Memorandum of Understanding and agreement was signed in 2003 by the USDA Forest Service, SBNF, Bureau of Land Management (BLM), San Bernardino County, Omya, Specialty Minerals, MCC, California Native Plant Society, and the Cushenbury Mine Trust stipulating that the signatories will implement the CHMS for the dual purpose of conserving threatened and endangered carbonate plants and streamlining mining operations.

Endangered species: A species whose prospects of survival and reproduction in the wild are in immediate jeopardy from one or more causes.

Environmental Impact Report (EIR): “Detailed statement or report prepared under CEQA describing and analyzing the significant effects of a project and discussing ways to mitigate or avoid the effects” (CEQA Guidelines §15362).

Factor of safety: Ratio of forces resisting slope or foundation failure over forces driving slope or foundation failure.

Fine Particulate Matter: Extremely small air pollutants less than 2.5 microns in diameter and that form primarily from engine combustion sources, not from fugitive dust sources (PM_{2.5}).

Growth media: Surface material which contains nutrients, micro flora, and plant seeds.

Hazardous material: Substance, which may cause injury to persons or damage to property because of its potential for corrosivity, toxicity, ignitability, chemical reactivity, or explosiveness.

Haul road: A road used by haul trucks to haul ore and waste rock from the open pit to other locations usually to the crusher feed or to the waste rock stockpiles.

Hazardous material: Substance which, because of its potential for corrosivity, toxicity, ignitability, chemical reactivity, or explosiveness, may cause injury to persons or damage to property.

Hazardous waste: Defined in Section 1004(5) of the federal Resource Conservation and Recovery Act (RCRA) as, "...a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may: (a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Hydrogeology: The study of surface and subsurface water.

Ore body: A generally continuous mass of ore distinct from the surrounding rock.

Phasing: Planned stages of project development.

Rare species: A species, which, although not presently threatened with extinction, is in such small numbers throughout its range that it may become endangered if its present environment worsens.

Reclamation: The combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion, and other adverse effects from surface mining operations (SMARA 2007).

Reclamation Plan: A restoration plan for the stabilization and recovery of a mine site after cessation of mining operations for another use; generally open space or other low intensity use.

Regolith: a layer of loose, heterogeneous material covering solid rock. It includes dust, soil, broken rock, and other related materials.

Revegetation: Establishment of native vegetation on lands that have been disturbed.

Regional Water Quality Control Board (RWQCB): Agency which administers the requirements of the California Administrative Code, Title 23, Division 3, Chapter 15 (Section 2595,g,7) to ensure the highest possible water quality consistent with all demands.

Sensitive species: A plant or animal species, which is recognized by the government or by a conservation group, as being depleted, rare, threatened, or endangered.

Threatened species: Species, which, although not presently threatened with extinction, are likely to become endangered in the foreseeable future in the absence of special protection and management efforts.

Waste rock: Limestone which does not meet quality specifications and other rock types encountered during excavations which will be hauled directly to waste rock stockpiles.

Water table: The upper water level of a body of groundwater.