

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND SITE DESCRIPTION

CEMEX (RMC Pacific Materials, dba CEMEX) operates the Bonny Doon Shale and Limestone Quarries in Santa Cruz County for the production of Portland cement at its cement plant facility in Davenport. CEMEX has submitted an application to the County of Santa Cruz to expand its current mining boundary within its vested or legal mining limit as defined by the Legal Mining Limit. The project proposal also includes revising the revegetation plan component of the Bonny Doon Quarries 1996 Reclamation Plan for both the Shale and Limestone Quarries. No mining plan changes are proposed for the Shale Quarry. These actions require an amendment to the current Use Permit (#3236-U), amendment to the COC for Use Permit 3236-U, a Coastal Development Permit, and an amendment to the 1996 Reclamation Plan (89-0492).

The Shale and Limestone Quarries are located in the rural community of Bonny Doon approximately 1.5 miles east of Davenport in the coastal mountains of Santa Cruz County, California (Figure 1, Regional Location). Access to the quarry site is provided by a gravel road off Bonny Doon Road (Figure 2, Project Vicinity). Both of the parcels are designated Mountain Residential with a Quarry Overlay in the County General Plan. The zoning district for the limestone quarry parcels is M-3 Mineral Extraction.

The region surrounding the Bonny Doon Quarry is characterized by the rugged topography and incised drainages of the Santa Cruz Mountains. Drainages near the Limestone Quarry include the East Branch and Middle Branch of Liddell Creek. The Limestone Quarry is located within a known ground water recharge area. A spring on Liddell Creek (Liddell Spring #1) serves as a water source for the City of Santa Cruz. A second spring serves the quarry.

Scattered residences to the north and east of the Limestone Quarry make up the rural community of Bonny Doon. Residential parcels adjoining the quarry boundary to the north are owned by CEMEX and used for employee housing. Other land uses in the vicinity of the quarries include limited agriculture (cattle and horse grazing), timber harvest, and open space preserves.

The entire Limestone Quarry parcel is 272 acres and comprises the quarry pit, disposal areas for overburden and off-spec rock, settlement basins, and native vegetation on unmined areas (Figure 3, Limestone Quarry Facilities). A portion of this is vested mining limit. CEMEX also has the right to place overburden and off-spec rock on property immediately south of the Limestone Quarry parcel.

The Limestone Quarry has 26.5 acres included within its legal mining limit, but not included in the current mining plan boundary approved by the County of Santa Cruz. The proposed project would extend mining onto approximately 17.1 acres of that unmined land. The proposed 17.1 acre Limestone Quarry Boundary Expansion is east of the existing quarry pit and would terminate at the quarry Legal Mining Limit as shown as the proposed Boundary Expansion Area on the quarry site map (Figure 5, Limestone Quarry Mining Plan Amendment

Area). Boundary expansion into the remaining 9.4 acres is not proposed at this time and is not addressed in this EIR except as it relates to cumulative impacts. The proposed Boundary Expansion Area is a hillside between elevations 1,100 and 1,250 feet above mean sea level with moderately steep slopes covered by mixed evergreen forest, north coast redwood forest and northern coastal scrub vegetation.

The Shale Quarry parcel is 183 acres and is located on property leased by CEMEX (Figure 4, Shale Quarry Facilities). The proposed project would make no changes to the Shale Quarry mining plan perimeter or operations. Because the project would extend the Limestone Quarry life, it would in effect extend the period of mining at the Shale Quarry. The proposed 1996 Reclamation Plan Amendment also includes modifying the revegetation plan for the Shale Quarry.

2.2 PROJECT GOALS AND OBJECTIVES

The Bonny Doon Limestone Quarry has 26.5 acres of unmined land remaining within its vested Legal Mining Limit. The primary goal of the proposed project is to expand the working mining boundary by 17.1 acres within the limits of the Legal Mining Limit.

The first objective of the proposed project is to expand the mining boundary by approximately 17.1 acres onto the northern two-thirds of the unmined land within the Legal Mining Limit (Figure 5). This would provide additional mining acreage and extend mining operations in the present quarry pit by approximately three years based on current production rates.

Prior to mining of the remaining 9.4-acre area, the mining operator would be required to submit an application to the County, undergo environmental (CEQA) review, amend the COC and Reclamation Plan, and acquire a Coastal Development Permit (see Figure 5). The mining plan for the Boundary Expansion Area does not require future action in the remaining area; and therefore, these projects can be considered independently. The potential mining of the remaining 9.4-acre area is analyzed in Section 10.5 (Cumulative Impacts) of this EIR.

The second objective of the proposed project is to revise the revegetation plan that is a component of the approved 1996 Reclamation Plan for both the Bonny Doon Shale and Limestone Quarries, which specifies a planting scheme more suitable to post-mining soil conditions to improve the success of reclamation efforts.

2.3 OVERVIEW OF QUARRY OPERATIONS

2.3.1 Material Extraction and Processing

CEMEX operates the Bonny Doon Limestone and Shale Quarries in conjunction with its cement manufacturing plant located in Davenport. Raw materials from the quarries are crushed and conveyed to the cement plant via an overland conveyor. The site plans of the quarries are shown in Figures 3 and 4. A description of each quarry operation is presented below.

Quarrying activities at the Bonny Doon Quarries are allowed to operate Monday through Friday from 7:30 a.m. to 5:00 p.m. Conveyor belt operations are permitted between the hours of 7:30 a.m. and 11:30 p.m. Monday through Friday.

2.3.1.1 Limestone Quarry

Since 1968, the County has regulated the Limestone Quarry in accordance with approved use permits as well as various maps and diagrams, all of which show the location of the approved mining plan area that is currently being mined (“quarry boundary”). These maps and diagrams also identify the perimeter of the “mining limit,” which encompasses the proposed Boundary Expansion Area. The Limestone Quarry pit occupies approximately 80 acres of terrain ranging from 750-foot elevation at the quarry floor up to 1,250 feet at the northeast corner. Existing overburden and disposal areas and settlement basins are situated at lower elevations that extend south of the quarry pit to about the 400-foot elevation.

The Limestone Quarry is typical of hard rock, open pit mining operations. Prior to the start of mining operations, the desired ore is naturally covered with soil and rock called overburden. The overburden must first be stripped off using bulldozers and scrapers or loaders with trucks. Overburden is placed in designated fill disposal areas. The exposed ore is then released by blasting. Permit conditions for the Bonny Doon Limestone Quarry restrict blasting to twice a week, which generally occurs during the noon hour when quarry workers are at lunch. Typical blasting uses an ammonium nitrate and fuel oil mixture as the primary blasting agent with non-electrical initiation of the blast. Shot hole diameter is usually 6.5 inches, typical shot hole depth is 42 feet, typical shot hole spacing is generally 15 feet and burden (distance between the shot hole and quarry face) is typically no more than 16 feet. A typical blast uses four to five tons of explosive, however in certain situations as much as fifteen tons may be used. The ammonium nitrate storage area is located on a road southeast of the quarry pit.

In the Limestone Quarry, mining occurs by lowering the elevation of existing benches. The quality of the limestone varies throughout the quarry due to faulting, fracturing and the intrusion of inherent impurities into the limestone ore body. Due to the heterogeneous nature of the limestone ore body, cement plant operational requirements are based on blending high and low grades of rock to achieve a consistent quality. In order to use all of the ore reserves, the grade of the rock mined on a day-to-day basis must be kept close to the average grade of the entire deposit. The quarry pit is developed in a manner that preserves access to as much of the ore body as possible. Limestone is often extracted from different areas of the quarry to achieve a blend with the desired chemical characteristics.

Shovels or front-end loaders scoop up the blasted rock and load it into trucks that haul the ore to the crusher. Multiple benches are developed to form work platforms at various levels in the ore body. The blast hole drill works from the top of the benches and the shot rock (rock loosened and felled by blasting) is loaded from the level below it. This drill-blast-load cycle is repeated on each level as the mine deepens and the benches move outward. Large boulders are pushed over the benches to a rock breaker prior to being hauled to the crusher.

The rock is crushed in a Jeffrey Impact Crusher and conveyed to a 3,000-ton capacity concrete storage silo that feeds the belt conveyor to the cement plant. Generally, the grade of ore requires that the fines be removed from the material because of undesirable alkali impurities in

order to meet quality control requirements. In that case, material is bypassed around the crusher and run over a screening system which removes particles less than one inch in diameter and conveys them back to the quarry floor where they are used in berms, road construction, or hauled to the disposal areas.

Current production levels for limestone range from 1.1 to 1.3 million tons/year. This corresponds to the raw product demand required to meet the current maximum cement production limit of 980,000 tons per year set by the County permit. Under the approved mining plan, the Limestone Quarry has approximately five years worth of further supply based on current production rates (Robert Walker, CEMEX, pers. comm.).

2.3.1.2 Shale Quarry

Shale is required in much smaller quantities to make Portland cement; hence the Shale Quarry is a smaller operation than the Limestone Quarry. Shale is typically mined zero to two days per week. As mining progresses into new areas, vegetation is cleared and overburden removed prior to shale extraction. Topsoil is removed by bulldozers and stockpiled for future use in reclamation.

After overburden is removed, the bulldozers rip the usable mudstone strata. Blasting is not required. This ripped shale is scooped up with front-end loaders and loaded into haul trucks for transport to the shale crusher. The crusher used is a Jeffrey Impact Crusher, rated at 550 tons per hour. It reduces the mined shale to a diameter of less than four inches. This material is transported on a conveyor belt to a 1,900-ton capacity concrete storage silo. From there, the shale is fed to the main belt conveyor system and transported to the cement plant.

The approved 1996 Reclamation Plan for the Shale Quarry covers approximately 94 acres. However, substantial portions of the 94-acre area, including the drainage area in the central portion of the site, would not be mined. Extraction at the Shale Quarry progresses from the northwest to the southern and eastern portions of the quarry as the ore is mined in each area. In order to properly blend the resource, three or four areas may be active at one time.

2.3.2 Disposal Areas

The Limestone Quarry contains three overburden and off-spec rock disposal areas as shown on the quarry site plan (Figure 3). Disposal Area A has not been used since the 1970's and supports vegetation. Disposal Area B has reached its final contour level and is being revegetated in accordance with the currently approved 1996 Reclamation Plan. Disposal Area C is the active overburden and off-spec rock disposal area for the quarry. Area C was expanded in 1997 to receive an additional 5 million cubic yards of overburden and off-spec rock. Based on historical average fill rates and the estimated in-place off-spec rock in the quarry, Disposal Area C is expected to reach its final contours in approximately 7 years (by 2014). Lower sections of this disposal area have been completed and revegetated. The upper section of Disposal Area C is actively being filled. Native grass hay mulch is used as the interim cover for erosion control. Full reclamation with prescribed revegetation would occur after the final configuration is reached.

2.3.3 Drainage Controls

The Limestone Quarry is divided into three tributary areas. Storm runoff from Disposal Areas B and C is directed toward Settlement Basins 1 and 2X respectively which drain into the Middle Branch of Liddell Creek. Settlement Basin 1 has a storage capacity of 435,000 cubic feet and a surface area of 71,600 square feet. Settlement Basin 2X was constructed below the Disposal Area C extension and has a storage capacity of 154,546 cubic feet and a surface area of 11,467 square feet.

Storm water runoff from the quarry pit area is directed toward Settlement Basins 3 and 4, which drain into the East Branch of Liddell Creek below Liddell Spring #1 (Figure 3). Settlement Basin 3 has a storage capacity of 690,000 cubic feet and a surface area of 47,000 square feet. Settlement Basin 4 has a storage capacity of 115,000 cubic feet and a surface area of 15,000 square feet.

2.3.4 Water Requirements

CEMEX diverts water at Liddell Spring #2 (Plant Spring) for use in quarry operations. The water source is located in the southeast corner of the Limestone Quarry property (Figure 3). Water use ranges from approximately 550,000 gallons per month in winter to approximately 900,000 gallons per month in summer. The water is used at the quarry to cool the limestone crusher bearings, for dust control, and minor personnel use. Most of the summer water use increase is attributable to the 25,000 gallons per day used for dust control in both quarries during dry, dusty periods.

2.3.5 Site Reclamation

Reclamation of all land disturbed by mining operations is required by state law under the Surface Mining and Reclamation Act (SMARA). Each mining operation must have reclamation plan approved by the local permitting agency. The purpose of a reclamation plan is to address the return of property disturbed by mining operations to a safe and stable condition upon the cessation of mining activities. The current Reclamation Plan for the Bonny Doon Quarries (October 1996), as augmented by the 1996 Final EIR mitigation monitoring program, was approved by the State Mining and Geology Board on November 14, 1996.

The 1996 Reclamation Plan for the Bonny Doon Quarries addresses final bench configuration, slope stability, erosion and drainage controls, and site revegetation. The COC and 1996 Reclamation Plan Conditions of Approval (1997) are contained in Appendix B, Part 3).

2.4 LIMESTONE QUARRY BOUNDARY EXPANSION

CEMEX proposes to expand the mining plan boundary of the Limestone Quarry to include 17.1 acres of unmined land on the east side of the quarry pit (Figure 5). This Boundary Expansion Area is within the Legal Mining Limit established for the quarry and is subject to vested rights. The expanded mining area would open up approximately three years of additional resources, effectively extending the useful life of the Limestone Quarry from approximately 2012 to 2015 based on current production rates and reserve estimates (Robert Walker, CEMEX, pers. comm.). In order to meet product quality needs and to efficiently use the resource in the

existing mining area, the extended mining area would be developed upon permit approval and would be mined in conjunction with the existing area.

The currently approved final mining configuration for the Limestone Quarry is shown in Figure 6 (Currently Approved Limestone Quarry Final Development). This would be changed by the proposed expansion and mining plan amendment. Interim configurations are shown in Figures 7 and 8. The final mining configuration of the proposed project is shown in Figure 9 (Limestone Quarry Proposed Amendment to Mining Plan -- Final Development).

Quarry floor elevation is approximately at 750 feet, which is the permitted mining limit depth. Under the proposed boundary expansion, the quarry floor would be extended eastward at the 750-foot elevation. Although high grade limestone does extend below the 750-foot level, no change to the mining depth limit is proposed by the proposed expansion. The proposed mining plan amendment would only extend the mining plan boundary and final contours as discussed below.

Under the proposed expansion, the bench configuration and pit development would continue in the same manner as presently occurring under the existing operation. Benches would still be constructed with lift heights of 40 feet and bench widths of 16 feet. No operational changes in mining methods, equipment used, production rates, or hours of operation are proposed. No changes in permit conditions are proposed.

Primary development of the existing quarry pit consists of working the benches back into a steeper configuration. Most of the pit is in the schist and limestone units with high slope stability. There, final contours show slopes averaging 60 degrees (0.58:1 horizontal to vertical), having 40-foot, 80-degree bench heights, with bench widths of 16 to 20 feet sloped inboard 1.5 to 2 percent. In the upper portions of the northern end of the quarry in the Lompico Sandstone, the final slopes would be less steep at 1.5:1 horizontal to vertical for greater long-term stability.

2.4.1 Vegetation, Topsoil and Overburden Removal

Land preparation of the 17.1 acre Boundary Expansion Area would occur in two stages. It is currently anticipated that land clearing would be conducted during the late spring and summer months in each of the first two years of operation. Approximately one-half of the acreage would be cleared each year. The initial removal is planned for the highest elevations that are closest to the existing operation. Newly developed areas would generally be mined from the top down.

For proper utilization of natural resources, the California Department of Forestry (CDF) would require a Timberland Conversion Permit under Public Resources Code Section 4621-4628 and an approved Timber Harvest Plan (Rich Sampson, CDF, pers. Comm.). Marketable timber would then be trucked to a local mill.

Slash and other remaining vegetation would be blended with the topsoil that would be removed to add structure and possible nutrients to the topsoil. This topsoil would be stored at the top of Disposal Area C for use in reclamation/revegetation at the Limestone and Shale Quarries. Redwood stumps may also be stored for future use in riparian restoration projects throughout the

area (CEMEX has donated redwood stumps to County agencies for such projects over the past few years).

Based on exploratory drilling, the depth of overburden is estimated to range from 0 to 80 feet. The overburden is primarily mudstone and sandstone. Based on current data, CEMEX estimates about 580,000 cubic yards of overburden material would need to be removed from the Boundary Expansion Area.

The actual approach to overburden stripping would depend on factors such as the locations of existing access and haul roads, the number of trucks/scrapers available to the stripping crew, location of overburden dumping, weather, etc. Based on recent contracts, the applicant estimates overburden stripping to require a total of 9 to 12 months, possibly spread over a period of two years.

CEMEX would initially strip the uppermost elevation and proceed downward in 20-foot deep passes. Removal would involve the use of an excavator, approximately four haul trucks, and four scrapers assisted by a D9 or D10 dozer. Blasting within overburden would only occur if rock pinnacles protruding into the overburden are encountered (Robert C. Walker, Quarry Manager, Davenport, pers. comm.) A water truck would be used to control dust.

2.4.2 Overburden and Off-spec Rock Disposal

Overburden and off-spec rock from the Boundary Expansion Area would be disposed of in Disposal Area C until it reaches its final contours (estimated to occur by 2014). Overburden would also be placed in a new disposal area developed on the west side of the quarry pit. Overburden would be placed as construction fill in compacted lifts. The final contours and cross-sections of the new disposal area are depicted in Figure 9 (2017 Estimated Contours).

Although Figure 9 shows that approximately 4,627,000 cubic yards of material would be placed on the west side of the quarry pit, it would be considerably less. The original calculation assumed that the remaining quarry material would be used in the same fashion as it was at the time it was estimated (2001). Therefore the amount of off-spec rock generated into the future (through 2017) would be at the same annual rate. Subsequent to the submittal the application to the County Planning Department, operational changes have allowed CEMEX to be more efficient in their use of the mineral resource. Through added analytical methods, changes in blending methodology, cement raw material mix design changes, and the use of imported limestone, CEMEX is now utilizing a higher portion of the materials that previously were categorized as off-spec rock (Pers. Comm. Robert C. Walker, CEMEX, June 6, 2007). A result of these improvements, less material would now be used as fill inside the quarry than what is shown on Figure 9. Based on current practices, it is estimated that approximately 1,100,000 to 1,300,000 cubic yards would be placed in the new disposal area proposed on the west side of the quarry pit. About half of the material would likely be overburden from the amended area and the remainder being "internal waste" (non-cement raw materials that are interbedded or interstitial within the marble). (Pers. Comm. Robert C. Walker, CEMEX, June 6, 2007).

2.4.3 Drainage Controls

Benches in the Boundary Expansion Area would be drained in the same manner as existing benches. Benches are sloped inward so that surface water drains to the back of each bench. Surface flow is conveyed down the face of the quarry benches in 18- to 24-inch diameter drainage pipes to the quarry floor. The drainage gradient above the top bench is sloped back away from the quarry pit so that surface drainage does not flow from outlying areas onto the quarry slopes. The drainage plan for the Limestone Quarry is presented in Figure 10. Currently, storm water from the quarry pit is allowed to pond on the quarry floor. The storm water either evaporates in the atmosphere, filters through the limestone rock beneath the quarry floor, or is conveyed to settlement Basin 3 in accordance with the approved drainage plan for the Limestone Quarry. The new disposal area on the west side of the Limestone Quarry pit would also have drainage controls similar to the quarry benches.

No expansion of the existing settlement basin system is proposed under the project. Engineering calculations reviewed and approved by the County engineer and geologist indicate that the quarry settlement basin system has adequate capacity to handle the additional runoff projected from the Boundary Expansion Area.

2.4.4 Water Requirements

The proposed project does not require an increase in water use, or a change in the way water is used at the site. Existing levels of water use would continue for the life of the project. Quarrying activities would continue at the same extraction and processing rates for approximately three additional years. An expansion in equipment use or the amount of area mined in a day is not proposed.

2.4.5 Site Reclamation

Reclamation includes establishing proper gradients, drainage controls, and vegetation cover on the new benches. The bench configurations and drainage controls are described above. The revegetation program for the Limestone Quarry including the 17.1-acre Boundary Expansion Area is described in the 1996 Reclamation Plan Amendment with Proposed 2001 Revisions discussion below (Section 2.5). Revegetation of the Boundary Expansion Area would not begin until limestone removal is complete and all mining activity ceases. The methods of revegetation (e.g. planting methods, control of exotic species, soil amendments, use of topsoil, phasing schedule, monitoring, etc.) that have been established by the approved 1996 Reclamation Plan would continue in the Boundary Expansion Area. In addition, reclamation of the Boundary Expansion Area benches and new disposal area in the quarry pit would proceed according to standards specified in the approved 1996 Reclamation Plan. No changes to the reclamation plan are proposed other than those described for the planting plan (see Section 2.5 below). Final contours of the quarry benches and pit disposal area are specified in the mining plan (Figure 9).

2.5 RECLAMATION PLAN AMENDMENT

2.5.1 Background

In 1990, RMC Lonestar (the quarry operator at that time) appealed to the SMGB for approval of their Reclamation Plan. The SMGB accepted jurisdiction based on the County's alleged failure to act within a reasonable period of time following submittal of a completed reclamation plan application (Application 89-0492). In November 1996, the SMGB approved the Reclamation Plan dated October 1996 as supplemented by the Mitigation Monitoring and Reporting Program from the Final EIR dated October 1996. In 1997, the County certified the EIR and approved the Certificate of Compliance for Use Permit 3236-U, the Reclamation Plan and a Coastal Development Permit subject to Conditions of Approval that incorporated the EIR mitigation measures (see Appendix B, Part 3).

In 1999, RMC Pacific Materials (the quarry operator at that time) proposed a substantially revised Revegetation Plan (McGuirk, Steve and Paul Kephart, 1999) to address the changes required by the conditions of approval adopted by the County and the SMGB during the COC and Reclamation Plan approval process. The revised Revegetation Plan incorporated mitigation measures from the 1996 project EIR that included:

- an exotic plant species removal program;
- specification of improved planting techniques;
- replacement of lost native vegetation communities;
- a test plot program;
- revegetation of settlement basins;
- a revegetation map and salvage program for Disposal Area C;
- a phasing map of concurrent reclamation efforts; and
- a maintenance and monitoring program.

A revised draft Revegetation Plan (1999) was submitted to the SMGB for review. The planting plans for the Shale and Limestone Quarries specified establishing the required vegetation communities beyond the 1:1 replacement acreages specified in the 1996 project EIR mitigation.

During SMGB review of the revised draft Revegetation Plan (1999), an independent study using test plots was prepared to evaluate the feasibility of reestablishing the impacted native vegetation communities on disturbed quarry soils (Hart, December 2000). By evaluating test plots and soil tests, the study concluded that two of the eight targeted vegetation communities, needlegrass grassland and the maritime chaparral, could not be successfully re-established (McGuirk, Kephart and Hart, 2001). The direct replacement of these native vegetation communities was determined to be unrealistic given the harsh soil conditions of the quarried areas.

2.5.2 Proposed 1996 Reclamation Plan Amendment

In response to the results of the test plot studies, the quarry operator again revised the Revegetation Plan in 2001 for incorporation into the 1996 Reclamation Plan (i.e., 1996 Reclamation Plan Amendment). The 1996 Reclamation Plan Amendment proposes 2001

Revegetation Plan modifications that include a planting scheme more suitable to post-mining soil conditions. The proposed 1996 Reclamation Plan Amendment is a component of the project under consideration in this EIR because it significantly departs from the 1996 Reclamation Plan that was subject to environmental review under CEQA in 1996. Whereas, the 1996 plan proposed the re-establishment of climax vegetation communities, the proposed 1996 Reclamation Plan Amendment would establish an early successional vegetation community and abandon attempts to directly replace the lost acreages of specific climax vegetation communities. Under the proposed approach, climax vegetation would eventually establish naturally as soil conditions improve over time as a result of the early successional plant community having been established. A comparison of the revegetation components of the approved 1996 Reclamation Plan and the proposed 1996 Reclamation Plan Amendment are presented in Table 2-1. The revegetation plans evaluated in the approved 1996 Reclamation Plan are shown in Figures 11 and 12. The revegetation plans proposed under the 1996 Reclamation Plan Amendment are shown in Figures 13 and 14. Table 2-2 provides an overview to the changes made in the revegetation plans. The proposed 1996 Reclamation Plan Amendment substantially modifies the approved Revegetation Plan and is therefore subject to environmental review under CEQA.

The proposed 1996 Reclamation Plan Amendment specifies shifting revegetation efforts away from late successional vegetation communities, which have been difficult to re-establish, towards early successional communities. Native species more tolerant of post-mining soil conditions would be planted to increase the success rate of establishing vegetative cover on the reclaimed areas. An early successional shrub mix is proposed for the Shale Quarry (Figure 14) and both an early successional shrub mix combined with a mid-successional forest mix is proposed for the Limestone Quarry (Figure 13). A list of species proposed for planting in each community is presented in Table 2-3. Table 2-3 is composed of early successional native species that have established through natural recruitment in disturbed areas of the quarry site.

The proposed change to an early successional approach to revegetation eliminates direct replacement of most climax vegetation communities identified in the approved 1996 Reclamation Plan. A comparison of the approved and the proposed reclamation plan revegetation plans by vegetation community in acres is presented in Table 2-2. The proposed 1996 Reclamation Plan Amendment would eliminate the direct replacement of three native vegetation communities to include: maritime chaparral (4.5 acres), needlegrass grassland (4.0 acres), and diverse native grassland (12 acres). These vegetation communities are required by the 1996 Certificate of Compliance and Reclamation Plan EIR as mitigation for significant biological impact of the mining operation. Rather than in-kind replacement, the 1996 Reclamation Plan Amendment would establish early and mid-successional vegetation communities that would ultimately climax into mixed evergreen forest. The proposal would preserve two of the native vegetation communities (redwood forest and riparian) and fully replace one community (northern coastal scrub).

Table 2-1		
Overview of Proposed Amendment to Bonny Doon Quarries 1996 Reclamation Plan		
Approved 1996 Reclamation Plan with EIR Mitigation Conditions (Existing Requirement of Use Permit 3236-U)	Proposed under the 1996 Reclamation Plan Amendment (Component of Current Application Under County Review)	Purpose of Proposed Amendment to the 1996 Reclamation Plan
<p>Revegetation Program to include 1:1 replacement of seven vegetation communities affected by the mining operation (see Table 2-2), and the replacement of one vegetation community (riparian) at a 3:1 replacement ratio as required by CDFG.</p> <p>(1996 EIR Measure VEG-2)</p> <p>Requirement to directly replant sensitive vegetation communities to mitigate loss of native vegetation communities from mining operations. In addition, a Mt. Diablo cottonweed re-establishment component is to be specified.</p> <p>(1996 EIR Measure VEG-5)</p>	<p>Revegetation Program would preserve two existing communities and establish an early successional shrub and mid-successional mixed evergreen forest community (see Table 2-2).</p> <p>Required planting of climax vegetation communities specified in 1996 EIR Measure VEG-5 would not occur. Reclaimed areas to recruit sustainable vegetation types based on natural succession</p>	<p>A third party study requested by Department of Conservation (Hart, October 2000) concluded that Reclamation Plan species are poorly adapted to the highly altered soils and recommended species adapted to early successional environments. Department of Conservation concurred with the revegetation recommendations (December 22, 2000).</p>
<p>Establish a test plot program to determine best methods and materials for establishing permanent native vegetation communities on the quarry benches and disposal areas.</p> <p>(1996 EIR Measure VEG-6)</p>	<p>Proposed program does not identify a test plot program. Plant selection would be based on early successional species, which have shown natural recruitment to the reclaimed areas and success in initial plantings. No further testing proposed.</p>	<p>Test plots were established under the draft 1999 program. Test plot results were that vegetation types of three of the targeted communities (maritime chaparral, needlegrass grassland and mixed grassland) could not be established given existing soil conditions (Table 2-2).</p>

*The 1996 Reclamation Plan Amendment incorporates all remaining revegetation requirements of 1996 EIR including Measures VEG-3, VEG-4, VEG-7, VEG-8, VEG-9 and VEG-10.
Source: TRA Environmental Sciences, Inc., 2007

Table 2-2 Comparison of the Approved and Proposed Reclamation Plans by Vegetation Community (Acres)				
Vegetation Community¹	1996 Reclamation Plan (Approved)²		1996 Reclamation Plan Amendment (Proposed Project)²	
	Shale Quarry	Limestone Quarry	Shale Quarry	Limestone Quarry
Needlegrass Grassland & Northern Maritime Chaparral	59.8	50.0	--	--
Needlegrass Grassland, Northern Maritime Chaparral & Mixed Evergreen Forest	19.1	--	--	--
Needlegrass Grassland	7.4	--	--	--
Diverse Native Grassland	--	--	--	--
Mixed Evergreen Forest & Northern Maritime Chaparral	8.3	--	--	--
Mixed Evergreen Forest	--	34.8	--	7.0
Redwood Forest	--	11.2	--	--
Redwood Forest & Northern Maritime Chaparral	--	9.6	--	--
Northern Maritime Chaparral	--	7.1	--	--
Northern Coastal Scrub	--	--	96.8	--
Northern Coastal Scrub & Mixed Evergreen Forest	--	--	--	211.4
Redwood Forest	--	--	1.5	--
Riparian	--	--	0.85	4.6
Coast Live Oak Forest	--	--	--	--
Limestone Pit ³	--	56.0	--	--
Other Area ⁴	--	18.0	--	--
Area C Expansion ⁵	--	20.0	--	--
Subtotal in Acres	94.6	206.7	99.2	223.0
Total Acres	301.3		322.2⁶	

Notes:

1. For consistency, community groupings adapted from revegetation plan maps and community names adapted from: Holland, Robert F., 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Prepared for the California Department of Fish and Game, Sacramento, California.
 2. Mitigation Measure VEG-5 from 1996 EIR specifies minimum acreages for specific vegetation communities: Needlegrass Grassland (4), Diverse Native Grassland (12), Mixed Evergreen Forest (46), Northern Maritime Chaparral (4.5), Northern Coastal Scrub (2.5), Riparian (0.5), Redwood Forest (1.5). A subsequent revegetation plan incorporating the 1996 EIR mitigation was never approved by the Planning Department. However, the entire 71 acres of mitigation required by Measure VEG-5 is contained in the total acreage.
 3. Vegetation community(s) not specified in 1996 Reclamation Plan.
 4. Estimate of mapping margin of error in 1996 Reclamation Plan for Limestone Quarry.
 5. Estimate of additional area represented by expansion of Disposal Area C in Limestone Quarry in 1996 Reclamation Plan.
 6. Total acreage incorporates mitigation for 17.1 acres of impacts associated with the proposed Boundary Expansion Project. The remaining difference is attributed to advances in mapping accuracy since 1996.
- Source: County of Santa Cruz, 2007.

Table 2-3 Comparison of Vegetation Communities and Species Specified in Revegetation Plans	
1996 Reclamation Plan (approved by County and amended with 1996 EIR mitigation)	1996 Reclamation Plan Amendment
<p>Limestone Quarry (Figure 11) Shale Quarry (Figure 12)</p> <p><u>Early Successional Shrubs:</u> California sage Coyote brush Toyon Sticky monkey flower Blue summer lupine Yellow tree lupine Blue blossom Lizard tail California poppy California buckwheat Purple vetch Yarrow Coastal buckwheat Deerweed Brome grass Tidy tips</p> <p><u>Mid-successional Mixed Evergreen Forest:</u> Coast live oak Interior live oak Cascara berry Madrone Knobcone pine California Wax myrtle Elderberry Wild blackberry Coast redwood Douglas fir</p> <p>Species required by the approved 1996 Reclamation Plan:</p> <p><u>Needlegrass grassland:</u> purple needlegrass, bush lupine, Davy's bush lupine, coast tarplant, checkerbloom, yarrow, gum plant, soaproot, blue dicks <u>Mixed grassland:</u> purple needlegrass, native wildflowers <u>Central coast sage scrub:</u> California sage, sticky monkey flower, bracken fern <u>Northern maritime chaparral:</u> knobcone pine, brittle-leaved manzanita, chamise, warty ceanothus, deer-tongue lotus.</p>	<p>Limestone Quarry (Figure 13) Shale Quarry (Figure 14)</p> <p><u>Early Successional Shrubs*:</u> California sage Coyote brush Coffeeberry Sticky monkey flower Bush lupine Blue blossom Lizard tail</p> <p><u>Mid-Successional Mixed Evergreen Forest:</u> Douglas fir Tan oak Coast live oak Bush lupine Madrone Sticky monkey flower Lizard tail</p> <p>* The Early Successional Shrub planting mix would be used at both quarry sites. With sufficient time and natural weathering processes, the shrub community in the Limestone Quarry would trend toward Mid-Successional Mixed Evergreen forest. In the Shale Quarry, the soil conditions are drier than the Limestone Quarry site. Natural successional processes are not anticipated and a Coastal Sage Scrub is expected to climax at the Shale Quarry.</p>

Source: TRA Environmental Sciences, Inc., 2007.

2.6 MEASURES INCORPORATED THROUGH PROJECT DESIGN

CEMEX has incorporated the following measures into the project design:

- Continued monitoring of Liddell Spring by the City of Santa Cruz and CEMEX.
- For each complete blasting round, two additional holes would be drilled 20 feet deeper than the bench elevation. These holes would be drilled to intercept any potential ground water in the new areas to be mined. If water is encountered in these holes, a pump test would be conducted according to the protocols outlined in Section 15e of the revised mining plan application to determine the significance of the encountered water. If pumping of the boring suggests that the water encountered in the boring may be connected to the marble aquifer, then mining would be limited in that area to the elevation 20 vertical feet above the peak ground water level.
- Compliance with existing mining conditions of approval set forth by Use Permit 3236-U, and COC, and Reclamation Plan Approval 89-0492.

2.7 ISSUES OF PUBLIC CONCERN

An Initial Study was prepared for the Bonny Doon Limestone Quarry Boundary Expansion Project by Santa Cruz County planning staff in November 2001 and is attached as Appendix A. In response to the Notice of Preparation for the EIR, several issues of concern were raised by the public or public agencies concerning the potential environmental impacts of the quarry expansion project. The letters received in response to the Notice of Preparation are also attached in Appendix A.

Water Quality and Quantity. The City of Santa Cruz Water Department expressed concern that there is inadequate understanding of the hydrogeologic conditions that exist beneath the quarry and the proposed Boundary Expansion Area which supply Liddell Spring – an important water source for the City of Santa Cruz. The concerns are that expansion of the mining pit could adversely affect the quantity and/or quality of Liddell Spring water thus impacting this municipal water source, and that the expansion project could trigger landslides that would impact Liddell Spring.

Fisheries. Steelhead trout and coho salmon are listed as threatened species under the federal Endangered Species Act. The National Oceanic and Atmospheric Administration (NOAA) Fisheries expressed concern that lack of adequate flows in Liddell Creek and San Vicente Creek are likely impairing listed anadromous salmonid species, and that the current level of water use at the quarry may be adversely affecting these species.

Air Quality. The Monterey Bay Unified Air Pollution Control District noted that mining operations in the Boundary Expansion Area would generate emissions of fine particulate matter (PM10). The impact of these emissions upon nearby sensitive receptors and project consistency with the 2000 Air Quality Management plan for the Monterey Bay Region must be assessed.