SECTION 4.7

HYDROLOGY AND WATER QUALITY

This section evaluates the potential impacts of the project on the local hydrology and water quality. Hydrology, as defined in this EIR, refers to the surface and subsurface water features in an area. These include streams and rivers, lakes and ponds, and groundwater aquifers. The impact analysis is based upon a review of special studies and documents, including a peer review by Norman S. Braithwaite, Inc. (See Appendix E and G)

4.7.1 SETTING

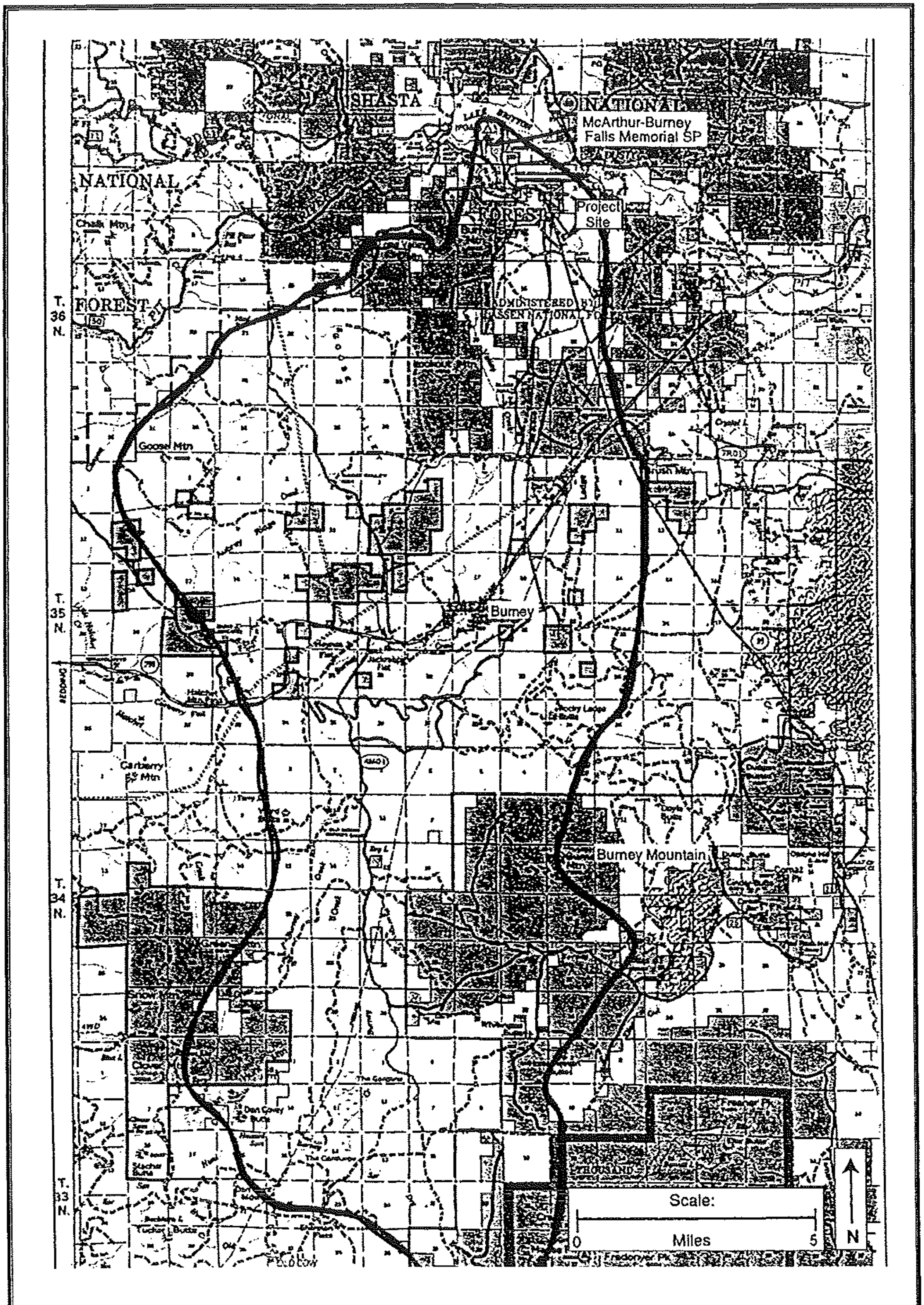
The proposed Reclamation Plan for the project indicates that the average annual rainfall at the project site is approximately 31.67 inches, as stated by the Department of Water Resources office in Red Bluff. Approximately 75 percent of the precipitation occurs from October to May. Snow is a common form of precipitation during the winter months.

SURFACE DRAINAGE

There are no streams located on the project site. Overall surface drainage in the Reclamation Plan area, which includes the proposed quarry and plants, flows from the south to the northwest. Within the proposed commercial-light industrial zone, drainage generally flows in a south to north direction. However, this flow is intercepted at the northern end of the zone by a drainage ditch, which sends flows it receives eastward.

Within the Reclamation Plan area, there is a log pond site located in the northern end, now dry. There is also a pond located adjacent to and south of the log pond site, and two seasonal wetlands at the base of the bluff to the east. The log pond site is surrounded on three sides by earthen dikes and on the fourth side by higher ground. Minimal runoff enters the log pond site, mainly from the slab areas of the former plywood mill and plywood shed. Most of the runoff within the Reclamation Plan area flows to the existing pond in the form of sheet flow.

The project site is within the Burney Creek watershed (**Figure 4.7-1**). The nearest stream to the project site is Burney Creek, approximately one mile to the west. Overflows from Burney Creek entered the project site during flood events in 1995 and 1997. In the flood of 1997, water accumulated a few feet deep along the north side of the former log pond and between the pond dike and the slope to the east. The water eventually exited the site to the northeast going back to Burney Creek under SR 89. Based upon flow records from stream gaging stations on Burney Creek and others in the region, overflow from Burney Creek reaches the project site in flood events of 10-year recurrence intervals. One study determined that the source of these floodwaters was an abandoned irrigation ditch located just north of the Hat Creek Construction entrance from SR 89 (Humphrey, 1999). However, a review of that study indicated that the ditch was ineffective in carrying flood flows, and that the topography in the vicinity may be more responsible (Braithwaite, 2000).



PMC

PACIFIC MUNICIPAL CONSULTANTS

FIGURE 4.7-1
BURNEY CREEK WATERSHED

GROUNDWATER

The project site is part of the Hat Creek Basin, a portion of the southernmost Cascade mountain range that includes Hat Creek and Burney Creek. Most of the surface water in the Hat Creek Basin originates from five large-volume springs that discharge from volcanic rocks. The total volume of discharge from these five springs is approximately 700 cubic feet per second (cfs). The springs represent approximately 10 percent of the total volume of water flowing into Shasta Lake (Rose et al, 1996).

One of these springs is the primary source of water at Burney Falls. The Burney Falls spring has a discharge of approximately 148.3 cfs. In 1993-94, a study of the hydrology of the Hat Creek Basin determined the origin of water for this spring by testing samples of water from Burney Falls, Burney Creek and other areas. It was presumed that Burney Creek, which disappears south of Burney Falls in the drier season, is a main source. However, the results of the study indicated that a main recharge area for Burney Falls spring is an area approximately 5,890-6,833 feet in elevation, which would correspond with Burney Mountain and/or the northern Crater Peak area, approximately 12 to 20 miles south of the project site (Rose et al, 1996). More recent studies indicate that up to possibly 39 percent of the flow from Burney Falls may come from inflows from the Hat Creek groundwater basin, east of the project site (Bond, 2000).

In 1996, the RWQCB identified the existence of a shallow, fast-moving groundwater aquifer beneath the project site. The project site is underlain by a sequence of late Pleistocene weathered, jointed and vesicular basaltic lava flows. Above the basalt lies a thin surface layer of reddish-brown silty loam. Because of the many interconnected pore spaces occurring as shrinkage cracks or joints, fractures from mechanical forces and cavities between lava flows, the basalt has a very high ability to transmit water (hydraulic conductivity). Groundwater pumped from wells on the site is considered an excellent source of drinking water because of the high volume and low total dissolved solids (Carlson, 1986).

Based upon a hydrogeologic investigation report for the then-Louisiana Pacific lumber mill on the project site, the groundwater levels vary from approximately 7½ to 24 feet below the ground surface, with an average depth of approximately 14 feet. Groundwater beneath the project site flows in a northwesterly direction toward Burney Falls. The hydraulic gradient, or slope of the water table, is approximately 0.0012 feet per foot. Groundwater velocity at the site was calculated to be approximately 23 feet per day (Carlson, 1986).

WATER QUALITY

Due to past activities on the project site, groundwater contamination has been an issue of concern. Prior to 1986, the Environmental Protection Agency (EPA) spill control center received a complaint about 55-gallon drums containing toxic chemicals being buried at the site, which was then owned by Louisiana Pacific. Subsequent testing revealed soil contamination, and samples taken from the mill pond showed low levels of benzene, toluene, xylene, ethyl benzene, acetone, tannin and lignin.

Because contamination was discovered on the site, the Regional Water Quality Control Board (RWQCB) issued Cleanup and Abatement Order 85-1R in October 1985. In response, a hydrogeologic investigation of the Louisiana Pacific mill site was conducted the following year. As part of the investigation, two rounds of groundwater sampling were conducted. Samples were taken from five monitoring wells and from the production wells on the site. One set of samples was analyzed for general minerals, mercury, copper, tannin and lignin, methanol, acetone EPA Methods 601 and 602 chemicals, base-neutral extractables, and phenols. A second set of samples was analyzed for acetone, tannin and lignin, methanol, and EPA Methods 601 and 602 chemicals only. Results of the analyses indicated that the concentrations of tested contaminants in the groundwater were below permissible EPA levels, with the possible exception of acetone. However, the validity of the acetone data was questionable; thus, only further monitoring of the groundwater was recommended (Carlson, 1986).

As a result of this investigation and other reports, the RWQCB issued Order Number 87-177 on October 1987. It set new discharge requirements for activities on the site, established a monitoring and reporting program for discharges, and required the owner of the site at the time to submit plans for the closure of specific areas on the site. The owner of the site complied with the provisions of the order, and on November 1991, the RWQCB issued another order rescinding Order Number 87-177, effectively closing the case. No reports about water quality problems at the project site have been submitted to the RWQCB since that time.

4.7.2 REGULATORY FRAMEWORK

CLEAN WATER ACT, SECTION 404

The discharge of dredged or fill material into waters of the United States is regulated under Section 404 of the federal Clean Water Act. Section 404 regulation is jointly shared by the Environmental Protection Agency (EPA) and by the U.S. Army Corps of Engineers (ACOE). The intent of Section 404 regulation is to limit degradation of water quality.

The ACOE has the authority under Section 404 to issue permits for the discharge of dredged or fill material in waters under its jurisdiction. Permits are issued only if it is shown that there are no practicable alternatives to discharge. Usually, ACOE permits have conditions attached to them that are designed to minimize the environmental impacts of the permitted activity. Construction activities that impact designated jurisdictional areas generally fall under Section 404 regulation.

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM

During the re-authorization of the Clean Water Act, Sections 402(P) through 405 were added to the Water Quality Act of 1987, providing for a program to eliminate pollution from non-point municipal and industrial sources. Land development and construction activities of five or more acres are also included under this legislation. The addition of stormwater discharges to the National Pollution Discharge Elimination System (NPDES), the primary federal water quality permit system administrated by the EPA, was completed on October 31, 1990, when the final regulations were signed by EPA. On November 16, 1990, the final rules and regulations for the NPDES Permit Application for Storm Water Discharges were published in the Federal Register [40 Code of Federal Regulations (CFR) 122-124]. Included in these regulations are requirements that specific categories of industrial facilities which discharge stormwater obtain NPDES permits and implement Best Available Technology Economically Feasible (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate industrial stormwater pollution. Among the facilities affected by these requirements are crushed and broken stone operations and asphalt paving mixtures and blocks operations (Zaitz, 2000).

The State Water Resources Control Board has the authority to issue NPDES permits, but it generally delegates this responsibility to the Regional Water Quality Control Board (RWQCB). Site development within the Project Area would fall under the general construction activity stormwater discharge permit process. The general construction permit authorizes the discharge of stormwater and prohibits the discharge of materials other than stormwater and all discharges which contain a hazardous substance in excess of reportable quantities established in 40 CFR 117.3 or 40 CFR 302.4, unless a separate NPDES permit has been issued to regulate those discharges.

A general construction permit would require discharges associated with construction activity to:

- eliminate or reduce non-stormwater discharges to stormwater systems and other waters of the nation;
- develop and implement a stormwater pollution prevention plan (SWPPP); and
- perform inspections of stormwater control structures and pollution prevention measures.

In addition, general construction permits require adherence to Best Management Practices (BMPs) for the control of erosion and other potential water quality pollutants associated with construction activity. These BMPs consist of the following:

- "Site Planning Considerations" such as preservation of existing vegetation.
- "Vegetation Stabilization" through methods such as seeding and planting.
- "Physical Stabilization" through use of dust control and stabilization measures.
- "Diversion of Runoff" by utilizing earth dikes and temporary drains and swales.
- "Velocity Reduction" through measures such as slope roughening/terracing.
- "Sediment Trapping/Filtering" through use of silt fences, straw bale and sand bag filters, and sediment traps and basins.

On November 1, 1999, the EPA issued rules regarding the forthcoming implementation of Phase II of the NPDES regulations. Phase II of the program will include more than 5,000 local governments previously not regulated by Federal stormwater rules, and these governments will be required to implement NPDES-permitted stormwater management programs by February 2002. Stormwater Phase II regulations will require cities, counties, regional authorities and other units of local government with municipal separate storm sewer systems located in urbanized areas to design, finance and implement a comprehensive stormwater quality management program. Urbanized areas are defined by the U.S. Census Bureau as containing a cumulative population of 50,000 or more and a minimum average population density of 1,000 people per square mile. Coverage under these rules will be determined by the 2000 U.S. Census.

REGIONAL WATER QUALITY REGULATION

The project area is within the jurisdictional boundaries of the Central Valley Regional Water Quality Control Board (RWQCB), one of nine regional boards in the state. The Central Valley RWQCB, with an office in Redding, develops and enforces water quality objectives and implementation plans that safeguard the quality of water resources in its region. Its duties include developing "basin plans" for its hydrologic area and monitoring water quality. In addition, the RWQCB has duties concerning hazardous material spills and spill prevention that are related to protecting water quality. These are discussed in Section 4.6, Hazards and Hazardous Materials.

RWQCB policy requires Waste Discharge requirements for mining operations that wash gravel. In order to obtain Waste Discharge Requirements for the proposed operation, a Report of Waste Discharge (form 200) must be completed and returned to the local RWQCB office (in this case the Redding office) along with an annual filing fee corresponding to the facility rating. A facility rating would be assigned after review of the Report of Waste Discharge.

SHASTA COUNTY GENERAL PLAN

The County General Plan contains the following objectives and policies concerning hydrology and water quality that pertain to the project:

Water Resources and Water Quality

<u>Objectives</u>

W-1 Protection of the surface and groundwater resources so that all County residents, both now and in the future, have reasonable assurances that an adequate quantity and quality of water exists.

<u>Policies</u>

W-a Sedimentation and erosion from development shall be minimized through grading and hillside development ordinances and other implementation mechanisms as adopted by the County.

W-b Septic systems, waste disposal sites and other sources of hazardous and polluting materials shall be designed to prevent contamination to streams, creeks, rivers, reservoirs or groundwater basins in accordance with standards adopted by the

County.

W-c All proposed land divisions and developments in Shasta County shall have an adequate water supply, from a quantity and quality standpoint, for the planned uses. Furthermore, the potential adverse impacts on the existing reasonable and beneficial uses of utilizing that same water supply should not be significant. Project proponents shall submit data and reports, when requested, which demonstrate that these criteria can be met. In the case of land divisions, the reports shall be submitted to the County for review and acceptance prior to a completeness determination of a tentative map. This policy will not apply in special districts which have committed and documented, in writing, the ability to provide the needed water supply.

Flood Protection

Objectives

FL-1 Protection of public health and safety, both on-site and downstream, from flooding through floodplain management which regulates the types of land uses which may locate in the floodplain, prescribes construction designs for floodplain development, and requires mitigation measures for development which would impact the floodplain by increasing runoff quantities.

Policies

FL-f Known flood hazard information shall be reported as part of every General Plan amendment, zone change, use permit, variance building site approval or other land development applications subject to environmental assessment.

FL-h The impacts of new development on the floodplain or other downstream areas due to increased runoff from that development shall be mitigated. In the case of the urban or suburban areas, and in the urban and town centers, the County may require urban or suburban development to pay fees which would be used to make improvements on downstream drainage facilities in order to mitigate the impacts of upstream development.

4.7.3 IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines indicates that a project may have significant impacts on hydrology and water quality if it does any of the following:

1) Violates any water quality standards or waste discharge requirements.

2) Substantially depletes groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volumes or a lowering of the local groundwater table level.

3) Substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

4) Substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increases the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

5) Creates or contributes runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or otherwise substantially degrades water quality.

6) Places housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

7) Places within a 100-year flood hazard area structures which would impede or redirect flood flows.

8) Exposes people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

9) Exposes people or structures to a hazard of inundation by seiche, tsunami or mudflow.

METHODOLOGY

PMC reviewed all documents pertaining to hydrology and water quality on the project site for currency and comprehensiveness. As part of this review, Norman S. Braithwaite, Inc. conducted a peer review of the documents related to hydrology that were cited in the Initial Study for the project.

PROJECT IMPACTS AND MITIGATION MEASURES

Impact 4.7.1 Project operations could introduce contaminants to surface and groundwater resources at the project site. [SM]

The project proposes the discharge of wash water from the crushing and screening operation into a retention basin located within the former log pond site. The wash water would contain mostly sediments from the processed rock, although trace amounts of other contaminants such as hydrocarbons could possibly be present. Sediments within the wash water would most likely settle in the retention basin and not reach the groundwater. Similar washing operations have been conducted at other aggregate mining operations, and no degradation of groundwater quality has been detected. Therefore, wash water from the proposed crushing and screening operation would not have a significant impact on groundwater quality.

The spillage of fuel, oil, antifreeze, solvents and other substances may occur during equipment fueling, maintenance, repair and storage. These substances could penetrate the soil and reach the aquifer. This impact is ***significant and subject to mitigation***.

<u>Mitigation Measures</u>

Potential impacts and mitigation measures related to storage and handling of hazardous materials associated with the proposed project are described in Section 4.6, Hazards and Hazardous Materials. In addition, the following mitigation measure was proposed by the Initial Study:

MM 4.7.1a At least once every year, each employee on the site shall be informed in writing that there is a shallow, fast-moving aquifer under the site, and that the groundwater in the aquifer flows in the direction of Burney Falls and Lake Britton. Employees shall be made aware that any spillage of fuel, oil, antifreeze, solvents, trailer sewage and other materials during equipment fueling, maintenance repair and/or storage may penetrate the soil and contaminate the aquifer. Employees shall be advised to avoid any spillage and to immediately report any spillage to their employer so that it can be immediately cleaned up and removed to an appropriate disposal site. All new employees shall receive the above information.

Timing/Implementation: Upon commencement of project operations. Monitoring to be conducted as part of annual mine inspection program. Enforcement/Monitoring: Shasta County Department of Resource Management - Planning Division.

Implementation of the mitigation measure would minimize potential spillage impacts on the water quality of the aquifer beneath the project site. Impacts after mitigation would be ***less than significant***.

Impact 4.7.2 The project may expose structures to a potential flood hazard. [PSM]

Flood events in 1995 and 1997impacted the project site. It is estimated that flood overflows would continue to reach the project site during major flood events on Burney Creek that are greater than a 10-year recurrence. One study indicated that the magnitude of flood flows reaching the site are hydraulically limited by the limited area of flow over the fill blockage at the beginning of the diversion ditch east of the site. Larger flood events on Burney Creek would increase the flow reaching the diversion ditch, but the flow would still be below the capacity of the ditch. Since the project site drains to the north, overflow accumulations would be limited to those observed during the two flooding events, even for a 100-year flood event (Humphrey, 1999).

A peer review of the Humphrey study and a field reconnaissance was conducted for this project (see Appendix G). Based on observation of the historic diversion structure, the diversion ditch and topography between Burney Creek and SR 89, it appears that the diversion ditch is completely ineffective for conveying flood flows to the SR 89 culvert. Historic alternate flow channels and drainage swales, however, were observed and believed very capable of conveying flood water to the SR 89 culvert as has most likely occurred during infrequent floods prior to construction of the diversion structure and ditch. Filling the first 20- to 30- feet of the ditch, as proposed, is not likely to be effective in reducing the opportunity for flood water to reach the SR 89 culvert. This is because overflow is most likely related to topography rather than the presence of the ditch and because a portion of the flood water reaching the culvert is from local drainage from a basin of approximately 4-square miles (between Burney Creek, SR 89 and SR 299). Building a levee or berm type structure set back from the east bank of Burney Creek may be effective in reducing the opportunity for overflow from Burney Creek during infrequent flood events but will not prevent local drainage from reaching the culvert. Given the limited flows entering the project property in the vicinity of the SR 89 culvert a more prudent approach may be to accommodate these flows on the project property than try to reduce the opportunity for these flows to reach the project site (Braithwaite, 2000). This impact is considered ***potentially significant and subject to mitigation***.

The project as proposed includes retention basins to accommodate all runoff expected from the developed project site during a 100-year storm. The retention is not proposed to accommodate potential runoff from approximately 2 square miles of basin on upstream properties (south of proposed protect to SR 299). There are no obvious natural drainage channels from the upstream properties but according to the Reclamation Plan, soil types have "moderately slow permeability and slow to medium surface runoff" and runoff from upstream properties may occur as sheet flow during infrequent storms. The potential for this runoff should be evaluated and, if significant, conveyed to the north by drainage facilities or accommodated in the design of the retention basins. This impact is considered ***potentially significant and subject to mitigation***.

Removal of the historic diversion structure and/or placement of an embankment set back from the east bank of Burney Creek could have impacts on downstream areas. Structures west of SR 89 and north of the project are not downstream of the project site. Therefore, unless modifications to the historic diversion structure or along the east overbank of Burney Creek are included in the project, the existing flood risk at these structures will not be changed by the proposed project.

Mitigation Measures

There is some uncertainty surrounding the cause of flooding on the project site. One possible cause is an abandoned irrigation ditch that extends from Burney Creek to the site. Assuming the ditch is the cause of the flooding, one proposed mitigation measure is to backfill the ditch. However, this measure may not stop the flooding on the site. Furthermore, this measure could alter the drainage characteristics at downstream reaches of Burney Creek. Flows downstream in Burney Creek may increase, which could increase flooding hazards for structures located in the downstream area.

Given the uncertainty of the effectiveness of backfilling the ditch, and because recorded floods on the site have not reached the area where structures are proposed, the following mitigation measure is recommended:

MM 4.7.2a The project applicant shall construct drainage improvements to accommodate flows entering the site from Burney Creek during 10-year or greater storm events and local drainage from the approximately two square miles of basin south of the project site. The drainage improvement plans shall be based upon recommendations contained in a drainage study addressing the aforementioned flows, to be prepared by the project applicant. Recommended improvements may include, but are not limited to, additional retention basin space in the log pond area, new conveyance features or new retention basins. No offsite improvements shall be included as part of the drainage improvements proposed for the project. The drainage improvement plans shall be reviewed and approved by the County Department of Public Works prior to project construction.

Timing/Implementation: Study to be conducted prior to approval of site plan. Improvements to be made prior to October 15 of the year project operations commence.
Enforcement/Monitoring: Shasta County Department of Resource Management - Planning Division.

Implementation of the mitigation measure would reduce the potential flooding hazard to both structures on site and structures downstream on Burney Creek. Impacts after mitigation would be ***less than significant***.

Impact 4.7.3 **The project would require the use of groundwater for proposed activities. [LS]**

Several components of the projects would require the use of water, which would be provided by existing wells on the project site. The most significant water user would be the crushing and screening operation, which would use water to wash processed material. As stated in Section 3.0, Project Description, the operation would use approximately 900,000 gallons of water per year on average. Water would also be required for dust control activities at the plant sites and on unpaved portions of the site. There would be a minor increase in domestic demand associated with on-site workers and operation of the Truck Repair Shop. The majority of water demand would occur between April and October. Wash water would be conveyed via pipeline to the retention basins. It is assumed that a portion of this water would infiltrate back to the groundwater basin, reducing the effective demand of the project. Existing wells on the project site have more than enough capacity to serve project demands.

The project site was once the location of a sawmill and a planing mill. A log pond, now empty, remains on the project site from these former operations. The pond is 21.93 acres in size. Assuming that three feet of water was maintained in the log pond, this would mean that the log pond held approximately 21.4 million gallons of water. The source of this water was from wells on the site. Not only was groundwater used to fill the log pond, but it was used to replenish pond water lost by evaporation and by percolation. In addition, groundwater was used to fill the former plywood pond south of the log pond. The plywood pond was approximately nine acres in size. Finally, water was consumed by lumber processing operations, although the amount consumed is not known.

Concern has been raised regarding project impacts on flows at Burney Falls, the water for which is supplied principally by underground springs. Previous sawmill operations, with its large consumption of groundwater, have apparently not affected flows at the falls.. Moreover, the main source of Burney Falls water appears to be the Burney Mountain-Crater Peak area, which would not be affected by the project. Given the relatively low demand for the project compared to historic uses, impacts on groundwater supplies are considered ***less than significant.***

Impact 4.7.4 Blasting from quarry operations could alter the flow characteristics of the aquifer beneath the project site. [LS]

Concern has been expressed about the potential impact that blasting of the bluff would have on the flow of the aquifer identified beneath the project site. This concern is apparently based upon the similarity between ground vibrations caused by explosions and earthquakes. Earthquakes have been documented to have caused changes in both surface and groundwater flows. There are examples of increases in stream and spring discharges following earthquakes, as well as those of springs going dry. Earthquakes have also been observed to cause changes in groundwater levels and to alter eruption characteristics of geysers. However, most of the documented instances of earthquake-induced changes in hydrology have occurred during strong earthquake events, those with a magnitude of at least 6.0 on the Richter scale (Ingebritsen and Sanford, 1998). It is not anticipated that ground vibrations induced by blasting at the quarry would have that great a magnitude.

The potential impacts of blasting on local groundwater were evaluated in a previous Initial Study dated March 14, 1997, prepared for a previous application for a use permit for a quarry on the project site (Use Permit Number 14-96 and Reclamation Plan Number 1-96). This Initial Study cited a memorandum prepared by William J. Falconi, P.E., a licensed civil engineer. As quoted in the Initial Study, Mr. Falconi's comments are as follows:

"Our understanding is that the ore body is about 80 feet thick and rises above the valley floor and that the ore body is dry but the area below the valley floor contains ground water."

"A basic rule is that explosives take the path of least resistance, and because of this theory the explosives tend to escape out of the top of the boreholes, no energy is transferred down. The bottom of the borehole is the finished floor. Fragmentation does not occur below the bottom of the borehole. There is no possibility that the proposed blasting could disrupt the ground water that is below the valley floor and below the ore body that exists above the valley floor."

In its review of previous geologic and hydrologic studies, Kleinfelder, Inc. evaluated the potential impact of blasting on groundwater flows. Based upon its experience with hard rock mining operations and its review of previous studies, it concluded that the zone around the blast holes with energy sufficient to fracture the rock is localized to within a few feet of the charge. Since the depth to groundwater is approximately 15 feet as determined by the CH2M Hill study, it is highly unlikely that blasting would influence fracture densities or aperture widths at depths sufficient to affect groundwater flow. Should any influences occur, they would be highly localized along the quarry face (Kleinfelder, Inc., 2000).

Based upon the conclusions reached by the two studies, the characteristics of the aquifer running through the underlying geology are ~~likewise~~ not expected to be significantly affected by blasting on the project site. Therefore, the impacts of blasting on the underlying aquifer are considered ***less than significant.***

Impact 4.7.5 The project is not likely to affect water flows through Burney Falls. [LS]

As discussed earlier, the primary sources of water for Burney Falls is a recharge area located in the Burney Mountain/Crater Peak area, and inflows from the Hat Creek Basin. Burney Creek and springs located at the top of the falls are other significant sources. The shallow aquifer located beneath the project site flows toward Burney Falls. However, its contribution to the total water flow over the falls, while not precisely known, is minimal compared to the other sources. As discussed in Impact 4.7.4, blasting at the quarry is expected to have at most a minimal effect on aquifer flows, and would not significantly alter the characteristics of the aquifer. Therefore, the contributions of the aquifer to the flow over Burney Falls would not significantly change. Also, as discussed earlier, water usage by the project is not likely to be greater than that of previous uses on the project site, most notably the sawmill. Thus, the water volume of the aquifer would not decrease significantly. Impacts on Burney Falls flows are ***less than significant.***

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Impact 4.7.6 The cumulative impacts of the project on water supply in the Burney Creek watershed would be minimal. [LS]

In assessing the cumulative impacts of a project, CEQA Guidelines Section 15130(b) recommends that factors to be considered in the analysis include the nature of the environmental resource being examined, the location of the project, and its type. As an example, Section 15130(b) states that location may be important when water quality impacts are at issue, since projects outside the watershed probably would not contribute to a cumulative effect. The project is located in the Burney Creek watershed; thus, the discussion of cumulative impacts is limited to the watershed area.

CEQA Guidelines Section 15130(b) suggests that one element of an adequate discussion of significant cumulative impacts may be a list of past, present and probable future projects producing related or cumulative impacts. "Probable future projects," as defined by CEQA Guidelines Section

15130(b)(1)(B), may be limited to those projects requiring agency approval for an application which has been received at the time the Notice of Preparation is released, among others. For this analysis, the following projects within the Burney Creek watershed are included in the assessment of cumulative impacts:

- Sierra Pacific Industries lumber mill
- Burney Forest Products facility
- Burney Mountain Power plant
- Three Mountain Power Plant (proposed)

The first three projects are current land uses, some of which have been established for a considerable period of time in one form or another. Thus, any additional contribution of these projects to cumulative effects on water supply are expected to be insignificant. The fourth project has submitted an Application for Certification with the California Energy Commission, which is currently under review.

In analyzing the Three Mountain project, California Energy Commission staff prepared a preliminary water supply assessment. The assessment noted that the Burney Basin aquifer, located within the Burney Creek watershed, is primarily composed of fractured basalt, and that groundwater is stored and transmitted through a system of irregular fractures. This characteristic of the aquifer makes it difficult to predict the behavior of the groundwater system. The variability of fractures makes predicting the productivity of a proposed well or its drawdown impact on nearby existing wells highly uncertain. Moreover, recent isotopic studies indicate that the Burney Basin receives some inflows from the adjacent Hat Creek Basin to the east, further increasing the complexity of the groundwater system (Bond, 2000).

The preliminary water assessment estimated the total inflow, outflow and consumption of water within the Burney Basin. **Table 4.7-1** presents the "water budget" for the basin. The assessment emphasized that the figures in **Table 4.7-1** are rough estimates, with uncertainty over basin flow boundaries and lack of measured data introducing uncertainty in the figures (Bond, 2000). As the table indicates, approximately 20,000 acre-feet of water per year are consumed by human activities. The proposed Three Mountain Power Plant would consume an estimated 3,000 acre-feet per year, as compared with the 150,000-250,000 acre feet of water that discharges from the basin during average years. During drought years, if outflows from Burney Basin are similar to those measured in the Hat Creek Basin during the 1988-1992 drought, discharges may decrease up to 50 percent. Using the low end of the average range, water consumption by the proposed power plant would reduce outflows at most by approximately 4 percent (Bond, 2000).

The Eastside Aggregates project is expected to consume less water than the proposed Three Mountain power plant. The project component that would likely use the most water would be the crushing and screening operation, mainly for washing processed material. As mentioned in Section 3.0, Project Description, it is estimated that approximately 900,000 gallons of water per year would be used by the operation for washing, or approximately 2.76 acre-feet per year. Assuming that the quarry, the concrete plant, the asphalt plant and the repair shop used the same amount of water as the crushing and screening operation, the total amount of water that would be consumed by the project per year would be approximately 13.8 acre-feet (Water consumption by the outdoor sales area would be insignificant). Assuming the same drought conditions that were assumed for the Three Mountain scenario described earlier, the project would at most divert approximately 0.0046 percent of total outflows. Realistically, the other activities associated with the project would individually consume less water than the crushing and screening operation. Thus, the actual percentage of water consumed would be smaller. The project, therefore, would have a minimal affect on total water supplies in the Burney Basin, even in drought years. Cumulative impacts on water supplies are ***less than significant***.

TABLE 4.7-1
WATER BUDGET FOR BURNEY BASIN

Category	Acre-Feet per Year
Inflow	
Precipitation for Burney Basin	417,000
Hat Creek (39% Of Burney Falls flow)	51,500
Hat Creek (50% of Salmon Springs flow)	8,500
Total	477,000
Consumption	
Snowfall Sublimation (approx. 5% of precipitation)	19,000
Unirrigated Vegetation	189,000
Domestic, Industrial, Agricultural	20,000
Total	228,000
Outflow	
Burney Falls	132,000
Salmon Springs	17,000
Unaccounted Outflow	100,000
Total	249,000

Source: Bond, 2000.

Impact 4.7.7 The cumulative impacts of the project on water quality in the vicinity would be minimal. [LS]

Most of the land surrounding the project site is National Forest land or State park land. The project site is one of the few areas in the vicinity designated for land use activities that could require handling and storage of significant amounts of hazardous materials. The resorts and residential areas may contribute to an incremental degradation of water quality, but the degradation would not be significant. It is not expected that there will be a significant amount of future development in the area, which would potentially contribute to water quality degradation. Therefore, the cumulative impacts of the project on water quality are ***less than significant.***

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