

## MITIGATION MEASURES MASTER LIST

This section provides a master list of mitigation measures recommended in the EIR. These measures will be used by the County to identify revisions to the Proposed General Plan and as conditions for approval for subsequent activities taken to implement the General Plan.

### GEOLOGY AND SOILS

#### Scott Creek

##### 30-Vehicle Parking Lot and Trail

Mitigation of geologic hazards at the parking lot site would involve setting the edge of the parking lot back 30 feet from the present edge of the terrace surface along the coastal side, and constructing a fence around the parking lot.<sup>1</sup> Several signs should display the imminent hazard of cliff instability and undermining on the ocean side of the proposed parking lot fence. Examples of similar signs can be found along West Cliff Drive in the City of Santa Cruz where numerous people have been washed into the ocean while standing too close to the edge of the coastal bluff.

A reinforced concrete stairway founded on bedrock would be required to withstand wave forces, beach scour, creek flooding, and rip-rap instability at the end of the trail from the parking lot to the beach. During some portions of the year, this stairway may terminate in the flow channel of Scott Creek.

Mitigation of the potential runoff problem should involve: (1) repair of the berm along the west side of Highway 1 and installing a new drop box-culvert pipe on Highway 1 south of the parking area, and (2) controlling runoff from the proposed parking lot. The asphalt berm along the west side of Highway 1 should be repaired so that road runoff flows past the proposed parking area. A new drop box-culvert pipe system must be constructed south of the parking lot and a culvert pipe extended to Scott Creek at the base of the Highway 1 fillslope to mitigate erosion of the highway fillslope.

Future runoff from the proposed parking lot would have to be controlled to mitigate erosion of the trail to the beach. A dropbox-culvert pipe drain system should be installed at the top of the trail where the trail meets the parking lot. The culvert pipe should be extended downslope to Scott Creek and discharge to the rip-rap. A silt and grease trap should be installed at the parking lot to minimize potential contamination of Scott Creek. Extending the pipe downslope to the beach would mean either running it down the trail underground, or supporting the pipe along the

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<sup>1</sup> The LCP recommends in general a 50-foot setback for all new development proposals on a coastal bluff but in no case shall the setback be reduced to less than 25 feet.

west side of the trail. Supporting the pipe along the west side of the trail will require the services of a drainage or structural engineer. Locating the pipe underground would, however, have less visual impact and is more desirable.

Mitigation of the Scott Creek, Highway 1, and parking lot drainage problem would require calculation of the expected runoff and proper sizing of the culvert pipes.

Although implementation of these mitigation measures would reduce the environmental impacts they would not reduce the impacts to levels of less than a significant impact. Elimination of the proposed 30-vehicle parking lot and stairway would eliminate the impact.

#### Pedestrian Bridge over Scott Creek

The potential geologic hazards of coastal erosion and flooding at the proposed bridge site can be mitigated by structurally anchoring the proposed boardwalk bridge to the existing concrete bridge. A structural engineer should prepare this design.

If another option is chosen, a soils engineer should evaluate and design the necessary foundation elements for the pedestrian bridge in a manner that would prevent them from being undermined or damaged by flooding from the creek or the ocean.

#### 110-Vehicle Parking Lot and Trail

The proposed cutslope on the east side of the 110-vehicle parking lot should be reclined to a 1:1 gradient. If a steeper gradient is necessary (the southern end of the proposed lot comes close to the edge of Highway 1), then a soils engineer should examine the earth materials and provide grading criteria prior to initiation of earth moving.

In light of the fact that the existing trail appears to have been in its present location for many years without showing signs of failure or deterioration, use of the existing trail would be a better option than disturbing the slopes to create a new trail.

Seepage from the closed depression south of the proposed access road to the parking lot would cause excessive saturation of the materials under the access road. To mitigate this adverse situation, the existing earth materials in this area should be excavated to the level of the parking lot and replaced with an engineered fill designed by a registered soils engineer. A subdrain should be installed under the fill to provide drainage for subsurface flow and seepage from the closed depression. This subdrain should discharge into the surface drainage system that will have to be established in the parking lot.

A positive drainage system must be constructed in the parking lot to prevent flooding. The lot presently drains to the north east corner of the existing railroad cut, and this is the best location to direct surface drainage from the proposed parking lot. Proper grading of the parking lot will be required so that runoff can be collected at the north end of the lot. Here, a drop box-culvert pipe system should be installed to collect parking lot runoff and convey it down to the base of the vegetated slopes north of the lot.

### Davenport Landing Beach

#### Proposed 70 Parking Spaces

Mitigation of the falling rock hazard can be accomplished by establishing parking only on the inland side of Davenport Landing Road rather than along the coastal side as proposed. The existing cutslope can be graded back to widen the road and eliminate the overhung sections. The roadbed should be moved towards the coast, and diagonal (side-by-side) parking installed along the inland side of Davenport Landing Road. This would be a much safer option than trying to park cars along the high, steep cutslope present there today.

If it is decided that it is necessary to park cars along the coast side of Davenport Landing Road north of the beach access, then a detailed study of the stability of this cutslope should be conducted with emphasis placed on evaluation of measures to mitigate falling blocks of mudstone.

#### Drainage from Davenport Landing Road

To mitigate failure of Davenport Landing Road at the culvert crossing, engineered fill designed and inspected by a registered soils engineer must be placed on the coast side of the road way to reestablish the fill embankment eroded by uncontrolled flow from Davenport Landing Road.

Mitigation of continued erosion of road fill at the culvert crossing must involve the installation of a drop box-drain pipe system to collect road runoff from Davenport Landing Road north of the culvert location and convey it in a culvert pipe to the natural drainage course which is located about 30 feet below the roadbed. It would be possible to bury this culvert pipe under new fill which must be placed on the coast side of the road to reestablish support for the road bed.

To mitigate plugging of the discharge end of the 42-inch culvert pipe, the culvert pipe should be extended beyond the base of the fill that must be replaced here. The project soils engineer should evaluate the necessary length of this pipe extension, and it should be installed before any new fill is installed on the coast side of the road at the culvert crossing.

#### Proposed Fire Rings

As discussed in the General Plan the fire rings would need to be removed from the beach each fall and replaced each spring.

### Panther Beach

At least the lower 30 feet of the proposed staircase should be constructed of reinforced concrete to mitigate the hazards of ocean wave runup damaging the stairs.

### Bonny Doon Beach

#### Blowing Sand in Parking Lot

The impact of blowing sand can be reduced if the fences that are proposed on the coast side of the railroad tracks are constructed of wood slats in chain link type fencing (for example "snow fencing"). This type of fencing "catches" blowing sand and should reduce the migration of sand across the railroad tracks. Contingency plans must be made to either raise the fencing as sand builds up on the coast side or add new fencing as the fencing is buried by the sand accumulating against its coastal side.

#### Grading

To prevent possible damage to parked vehicles from falling rocks, a fence should be installed along the base of the cut and be designed to prevent falling rocks from hitting parked cars. An engineer with experience in such designs should be involved in the design phase of this proposed cutslope.

#### Stairways from Parking Lot to Railroad

Three stairways, in place of the two proposed stairways, should be constructed from the parking lot to the railroad tracks to mitigate future erosion hazards at the site. The parking lot is about 900 feet long. If stairways are located only at each end of the lot, people may choose to continue to use the existing pathways because of the long walk from the center of the lot. It is recommended that the third stairway be constructed approximately midway between the other two proposed stairways.

#### Structural Stairway to the Beach

Design and construction of the structural stairway to the beach should take into account the highly fractured nature of the bedrock. The bedrock is highly fractured with major fracture planes generally spaced between four and 12 inches apart, but there are areas where the bedrock is shattered into small pieces. Spalling (the breaking off of the shattered surficial bedrock) of the bedrock will remove support for any footings placed on top of the bedrock, so the footings for the stairway must be carefully excavated into the bedrock and not simply placed on the bedrock. Maintenance of this stairway must involve a periodic inspection program to identify and repair footings that become undermined.

Mitigation of the ponding water on the railroad alignment can be accomplished by minor grading in this area to create gravity flow to the southeast. Surface flow should be directed down the natural drainage path in this area.

The base of the lower most section of the stairway should be founded into mudstone bedrock below sand level to mitigate undermining of the stairway foundation by extreme winter storms that cause erosion of the sand.

### Widening of Highway 1

All vegetation must be removed prior to the emplacement of fill on the east side of Highway 1 south of Bonny Doon Road.

Because the existing slope here is composed of fill, a registered soils engineer should: 1) test this material to determine its ability to accept the additional load of new fill, and 2) provide design criteria for the new fill and inspect its installation.

When fill is placed along the east side of Highway 1 to widen the road, the fill must not be allowed to cascade over the tunnel abutment because it could partially block the entrance. The tunnel must be extended through the new fill.

A registered soils engineer must provide design criteria and oversee the installation of fill that will be placed in the swale at the north end of Bonny Doon Beach parking lot.

The existing concrete drop box in the bottom of this swale must be extended upward to rise out of the fill which will be placed in this swale. Steel ladder rungs must be installed in the dropbox to allow access to the bottom of the drop box for removal of debris that will collect and obstruct the culvert opening. A locking steel grate must be installed on this drop box to prevent access by unauthorized personnel because this drop box will be about 20 vertical feet deep.

### Yellowbank Beach

#### Parking Lot Drainage

Mitigation of parking lot drainage should involve grading of the lot to establish a central, asphalt lined ditch that discharges at the north end of the parking lot. At the discharge point, drainage could be allowed to flow over the well vegetated slope, but adverse erosion may occur as a result of concentrated flow. Installation of a drop box-culvert pipe system to collect runoff and convey it to the natural drainage basin north of the parking lot would mitigate potential erosion on this slope.

At the discharge point, adverse erosion will probably occur as a result of concentrated flow, installation of a rock energy dissipater at the discharge point would mitigate the potential for increased erosion in the natural drainage.

### Railroad Grade Erosion Gully

In its present form, the erosional gully that has been generated by this uncontrolled runoff can be used to correct the erosion problem. A drop box culvert pipe system could easily be installed here. The culvert pipe could be extended inside the gully to the base of the steep slope at the back beach. Then, the culvert pipe could be buried and the gully filled in. This would both remove the unsightly gully and provide earth to support vegetation. The lower 50 feet of the culvert pipe should be curved to the north so that the runoff discharges onto the naturally vegetated back beach where there is a small depression which could act as a holding area for the runoff.

Water discharging from this culvert pipe will have much more erosive energy than the runoff that presently flows down the gully, so it is imperative that an effective energy dissipater be constructed at the discharge point to mitigate erosion of vegetation and sand on the back beach. The energy dissipater should consist of large rocks placed at the discharge point on the back beach. A drainage engineer should design and oversee the installation of this culvert system and energy dissipater. It is possible that these rocks may settle if they are not founded on bedrock, therefore, they should either be founded on bedrock or maintenance plans should be prepared to periodically check the energy dissipater and repair it as needed.

### Structural Stairway to the Beach

A solution to the potential erosion condition here would be to construct a wooden stairway supported with piles that would allow runoff to flow under the stairway.

The stairway should terminate on soil and colluvium at a point that is well back from the sandy beach to mitigate possible damage to the stairway from large winter storm waves.

### Laguna Creek Beach

#### Parking Lot Expansion

The proposed cutslope of the hillside behind the parking lot should be laid back at a gradient of about 1-1/2:1 to mitigate raveling of mudstone boulders.

A civil engineer should determine whether the existing 20-inch diameter culvert located at the corner of Highway 1 and Laguna Road is properly sized to accommodate the increased runoff from the expanded parking lot.

#### Structural Stairway to the Beach

The proposed structural staircase to Laguna Creek Beach should be deleted from the proposed improvements.

Signs must be posted at the head of the beach trails at Highway 1 that clearly state that conditions at Laguna Creek Beach can be extremely severe and hazardous at times, particularly during storms and periods of high surf. These signs must be printed in both English and Spanish.

## VEGETATION AND WILDLIFE

### Vegetation

Prior to the initiation of those activities proposed in the General Plan for vegetation enhancement and restoration studies should be conducted. These studies should be designed to determine precisely the types of modifications, their timing and extent, and to evaluate shifts in vegetation structure and composition that might result from their implementation.

Test plots should be established in those areas designated for dune restoration to define the planting techniques most likely to give positive, long-term results. The monitoring program should include quantitative measurement of plant cover and composition and should continue for a period of five years following the last planting effort.

Methods of eradication and control of exotic plant species should be experimentally evaluated prior to full scale implementation. The general use of herbicides should be avoided, when possible, in native habitats. No broad scale application of herbicides should be permitted at any time.

### Scott Creek Beach

The proposed 110-vehicle parking lot can not be mitigated to a less than significant impact level as presently proposed.

All cut slopes should be revegetated with native coastal scrub species as specified in the General Plan.

All fencing and barriers should be constructed of non-combustible material to prevent their removal for firewood or access to the beach.

Site specific studies should be conducted to determine environmental site characteristics of the dune habitat prior to initiation of large scale restoration activities.

### Bonny Doon Beach

Eliminate proposed parking expansion area from the General Plan.

Use metal fence barriers along the entire length of the upper dune on the railroad grade to prevent ORV access to the beach area.

### Yellowbank Beach

Divert runoff away from the east-facing slope below the railroad right-of-way. Install flash boards at the head of the existing erosion gully on that slope. Place water bars at selected intervals down slope and fill to grade. Revegetate fill material with native coastal plant species.

Install a culvert below the proposed staircase to the beach to divert runoff off the slope below the proposed staircase. Install fenced barriers to the trails through the coastal scrub vegetation south of the staircase prior to initiation of trail revegetation.

### Laguna Creek Beach

Install a pipe fence barrier, constructed of non-combustible material, along the entire length of the railroad right-of-way above the existing marsh area. Close and revegetate the old farm road down to the marsh preserve area, if it is no longer being used for farm access, or place a gate at the top of the road to prevent ORV access to the marsh and beach.

### Sensitive Plant Species

Prior to the initiation of any proposed improvements or modifications at each individual beach a field survey should be conducted, during the appropriate flowering season, to determine the existence or absence of sensitive plant species with potential to occur in the program area (see Exhibit 10 in DEIR). Sensitive plant occurrences should be marked and protected with fencing if necessary to prevent direct impacts during the prescribed restoration and development programs. When possible these species should be included in the revegetation mix proposed for their specific habitats. Sensitive plant surveys should be conducted in the marsh/lagoon preserve areas, especially prior to the implementation of hydrologic modifications.

### Wildlife

Prior to the initiation of any proposed improvements or modifications at each individual beach field surveys should be conducted to determine the existence or absence of animal species of special concern with potential to occur in the program area (see Exhibit 11 in DEIR).

### Scott Creek Beach

The recommendation in the General Plan that detailed studies be conducted in this wetland area before any hydrological modifications are implemented should be undertaken. This study should address all sensitive fish and wildlife species possibly occurring at Scott Creek.



### Laguna Creek Beach

The natural preserve plan for Laguna Creek Beach calls for the closure of the existing trail through the riparian area in the northeast corner of the wetland area. Another existing prominent trail into the wetland from along the railroad tracks should also be permanently closed.

The proposed seasonal fencing of the snowy plovers nesting area should be made continuous along the creek so there are no available entrances into the sanctuary zone.

Additional, detailed studies of the hydrodynamics of this wetland should be undertaken before any plans to alter stream flow regimes are designed. A basic inventory of this wetland should also be conducted to determine the existence or absence of any sensitive species, especially the tidewater goby.

### LAND USE

The policy to remove flashboard dams and similar diversion structures should be modified to include detailed analysis of impacts on farmers' water supply and agricultural capability, in addition to studying the effects of removing the dams on habitat values.

Although implementation of this mitigation measure would reduce environmental impacts the impacts could not be reduced to a less than significant level without deleting the policy from the General Plan.

The policy to eliminate any existing water diversion from Scott Creek or Laguna Creek should be modified. The upstream applicability of the policy should be defined in the General Plan to ensure that the City of Santa Cruz's water supply diversion would be maintained. Impacts of this policy on agricultural land uses could not be mitigated short of deleting the policy from the General Plan.

The location of the coastal access trails should be reviewed in light of the following criteria:

- Coastal access trails should be sited in such a manner so as to minimize possible conflicts with agriculture in the area.
- Where coastal access trails are located adjacent to agricultural lands there should be a 50-foot buffer setback with fencing or vegetative screening, as appropriate.

Consistent with the above measures, the trail at Laguna Creek beach and the trail between Bonny Doon and Panther beaches should be revised. Consideration should be given to relocating the trail between Bonny Doon and Panther beaches adjacent to the railroad.

The County Agricultural Commissioner should work together with the local farmers to minimize conflicts of pesticide use and public access to the beaches.

## ARCHAEOLOGY AND CULTURAL RESOURCES

No direct adverse impacts to archaeological or historical resources are anticipated as a result of the proposed improvements at the North Coast beaches. The one exception could be at Laguna Creek beach (CA-SCr-58), where direct impacts could occur if trail improvements are ever considered. In the event that such improvements are proposed, steps should be taken to mitigate impacts that would likely occur from land disturbance activities. Mitigation should be preceded by the subsurface testing of the site to determine the horizontal and vertical boundaries, depositional integrity and significance of the cultural deposits. Mitigation alternatives would likely include preservation of the resource in its present condition by rerouting trails and avoiding the site; "capping" or covering the site with a fill material so that trail work does not disturb the cultural deposits; or conducting a program of data retrieval through excavation of those portions of the site which would be disturbed as a result of trail work.

In the event of archaeological testing or excavation, all such work should be conducted within the context of regional research consideration by a fully qualified archaeologist familiar with the prehistory of the region and in consultation with local Native American representatives.

Archival review and field survey efforts have identified the known cultural resources for the six beaches. It is, however, noted that because of the shifting sand dunes, there is a high potential for buried archaeological deposits that could be discovered during land alteration activities associated with the proposed improvements. In the event that archaeological remains are discovered, land alteration work in the general vicinity of the find should be halted and a qualified archaeologist should be consulted. Prompt evaluations could then be made regarding the finds and a course of action acceptable to all concerned parties could then be adopted. If prehistoric archaeological deposits are discovered, local Native American organizations should be consulted and involved in making resource management decisions.

## VISUAL AND AESTHETIC CONSIDERATIONS

Implementation of the mitigation measures contained in sections 4.3 (Geology and Soils) and 4.6 (Vegetation and Wildlife) of the DEIR would reduce the adverse visual impacts associated with vegetation removal and grading.

The only additional mitigation measure necessary would be the preparation of a specific program to visually screen the 30-vehicle parking lot at Scott Creek Beach from Highway 1. Prior to the approval of this parking lot a grading and landscaping plan shall be prepared. The intent of this plan shall be to maximize the amount of visual screening of the parked vehicles to motorists on Highway 1. Although implementation of this mitigation measure would reduce the visual impact of the parking lot it would not reduce the impact to a level of less than a significant impact.

## TRAFFIC AND CIRCULATION

The General Plan improvements are not expected to result in significant adverse traffic conditions in the program area. In fact, the traffic and circulation improvements would improve

program area traffic safety. However, additional improvements could be made to further increase traffic safety. The mitigation measures described below fall into this category.

As discussed in section 3.4 of the DEIR, Caltrans has jurisdiction over any improvements proposed within its right-of-way. In order to make any improvement with a Caltrans owned right-of-way, an encroachment permit is required. In the encroachment permit process legitimate safety concerns, such as those used to define the improvements discussed below, and Caltrans standards, may be applied by Caltrans to require implementation of the improvements suggested below. This would be the case even if the proposed project's specific transportation impacts do not justify the need for the improvement.

#### Scott Creek Beach

The final improvement plan for Scott Creek Beach should include some provision for buses to drop off passengers at the beach. The beach is currently served by bus service and this service could be expanded to increase recreation possibilities for Santa Cruz citizens and reduce negative environmental impacts of driving. While identifying bus stops for all beaches is part of the General Plan, programs to increase the use of transit service must be encouraged. Bus stops should be provided at each beach as it is improved. The bus stops should include complete bus turnouts constructed according to State standards, should include provisions for wheelchair passengers and should have information showing a route map, schedule, and a shelter if possible.

An analysis of bicycle needs should be performed to determine whether the narrow bridge can safely accommodate bicyclists.

The shoulder parking restrictions must be diligently enforced. Without them, people would continue to park on Highway 1 shoulders negating any positive impact of the improvements.

#### Davenport Landing Beach

The same mitigation measures are recommended for Davenport Landing Beach as for Scott Creek Beach. Additional mitigation measures are as follows:

Future recreational rail service on the Davenport Branch Line of the SP Railroad should be considered (see section 5.3.5 of the DEIR for a further discussion of this mitigation measure). A trail or bikeway from the end of that track should be considered as well.

The northern intersection of Davenport Landing Road with Highway 1 should be improved. Currently, sight distances are somewhat limited to the north and Davenport Landing Road slopes steeply down towards the intersection. Furthermore, Swanton Road intersects Highway 1 a slight distance to the north of the Davenport Landing intersection. A plan for reorienting these two "T" intersections into one four-leg intersection should also be considered.

### Panther Beach

Mitigation measures suggested include making provisions to encourage use of existing bus service and investigation of future rail service on the SP branch rail line (which passes directly by the site).

### Bonny Doon Beach

The same general mitigation measures should be considered for Bonny Doon Beach as for the other beaches. These measures include provisions to encourage use of existing bus service and investigation of future rail service on the SP branch rail line.

If parking on the shoulder of Bonny Doon Road is to be prohibited such restrictions must be strictly enforced. If parking is to be permitted, provisions for increasing safety should be added to the plan. These provisions include warning signs for Highway 1 motorists indicating pedestrian crossing, painting a crossing area across Highway 1, consideration of widening and grading Bonny Doon Road shoulders, as well as other safety improvements.

If the future parking expansion area is to be considered further a specific parking layout should be prepared and an analysis of the safety of the access from Highway 1 should be completed.

### Yellowbank Beach

The same mitigation measures are suggested for Yellowbank Beach as for the other beaches. These measures include provisions to encourage use of existing bus service and investigation of future rail service on the SP branch rail line.

### Laguna Creek Beach

The same mitigation measures are suggested for Laguna Creek Beach as for the other beaches. These measures include provisions to encourage use of existing bus service and investigation of future rail service on the SP branch rail line.

In addition to the above mitigation measures it is recommended that some safer means of crossing Highway 1 be investigated. An overpass or underpass should be considered. Since the trail to the beach on the west side of Highway 1 is located on a bluff, an overpass might be feasible and attractive to pedestrians. It is acknowledged, however, that construction of an overpass or underpass at this location would likely have environmental impacts which would need to be further studied.