

APPENDIX A
Master Plan



Moonridge Animal Park Relocation

Master Plan

July 2011



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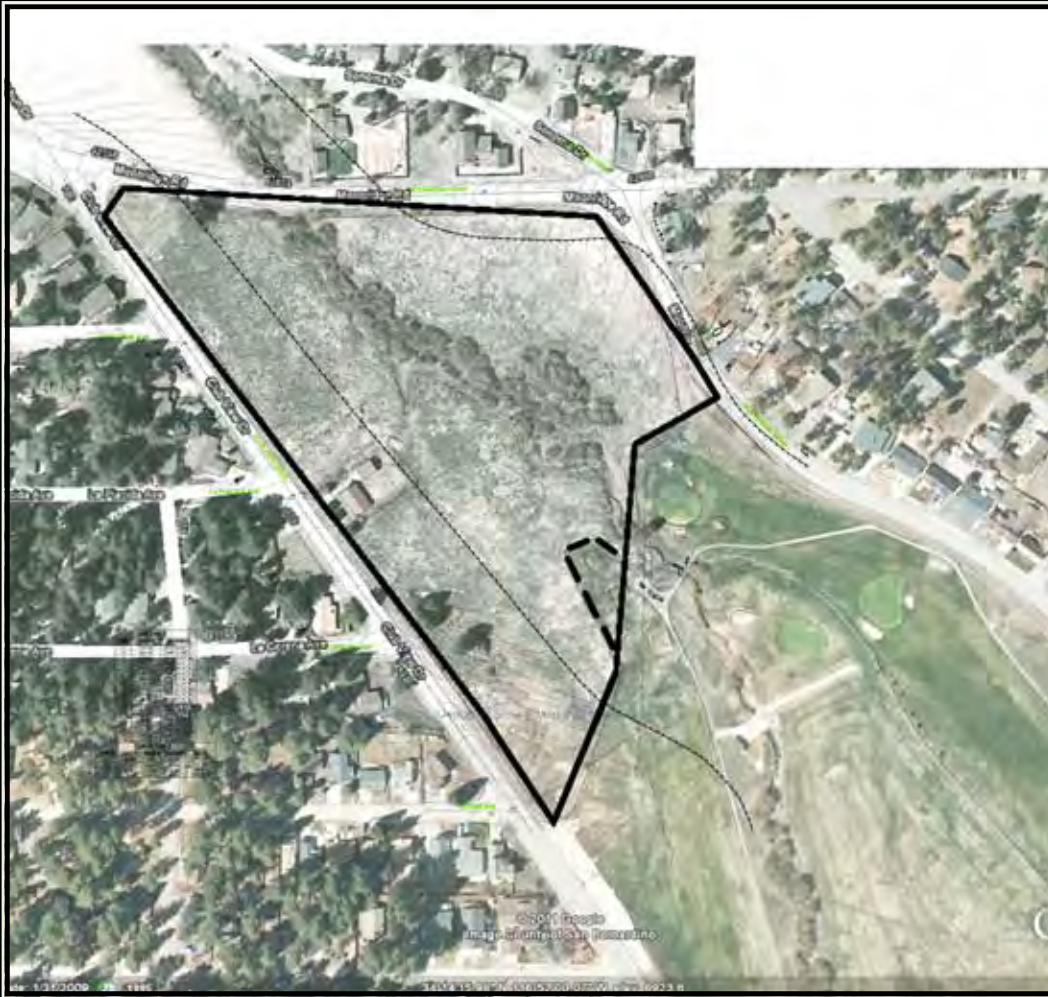
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Description of Project



The Moonridge Animal Park (MAP or zoo) is currently located on a leased 2.5-acre site in the Moonridge area of Big Bear Valley within the city of Big Bear Lake, CA. The zoo is adjacent to the Bear Mountain Ski Resort, Big Bear Mountain Golf Course, and is within an otherwise primarily residential neighborhood. Founded in 1959, MAP is San Bernardino County's only zoo and is one of only two alpine zoos in the nation. The MAP provides for the care, rehabilitation, and when possible, the release of injured, orphaned, or confiscated animals back into the wild. Animals come from the general public, other zoos, and State, County or federal agencies.

MAP's mission is to promote an understanding of alpine forest wildlife to produce harmony between humans and nature. There are approximately 150 animals, representing 85 different species of alpine and sub-alpine species native to California presently living at the MAP. The Moonridge Animal Park offers hundreds of educational programs for school children, youth organizations, families, and visitors from around the world. Educational programs are provided both on-site and off-site. Primarily a zoological facility, MAP is also a fully licensed, designated care and rehabilitation facility for injured or confiscated animals. Annually, at least 200 injured wild birds and animals are treated there; the majority have been rehabilitated and released.

The MAP is operated by the Big Bear Valley Recreation and Park District. The District is part of the San Bernardino County Special Districts Department and receives funding for the facility through property tax revenues. Additional funding of the zoo comes from gate admission, program fees, and the fundraising activities of the Friends of the Moonridge Zoo (FOMZ), a non-profit organization.

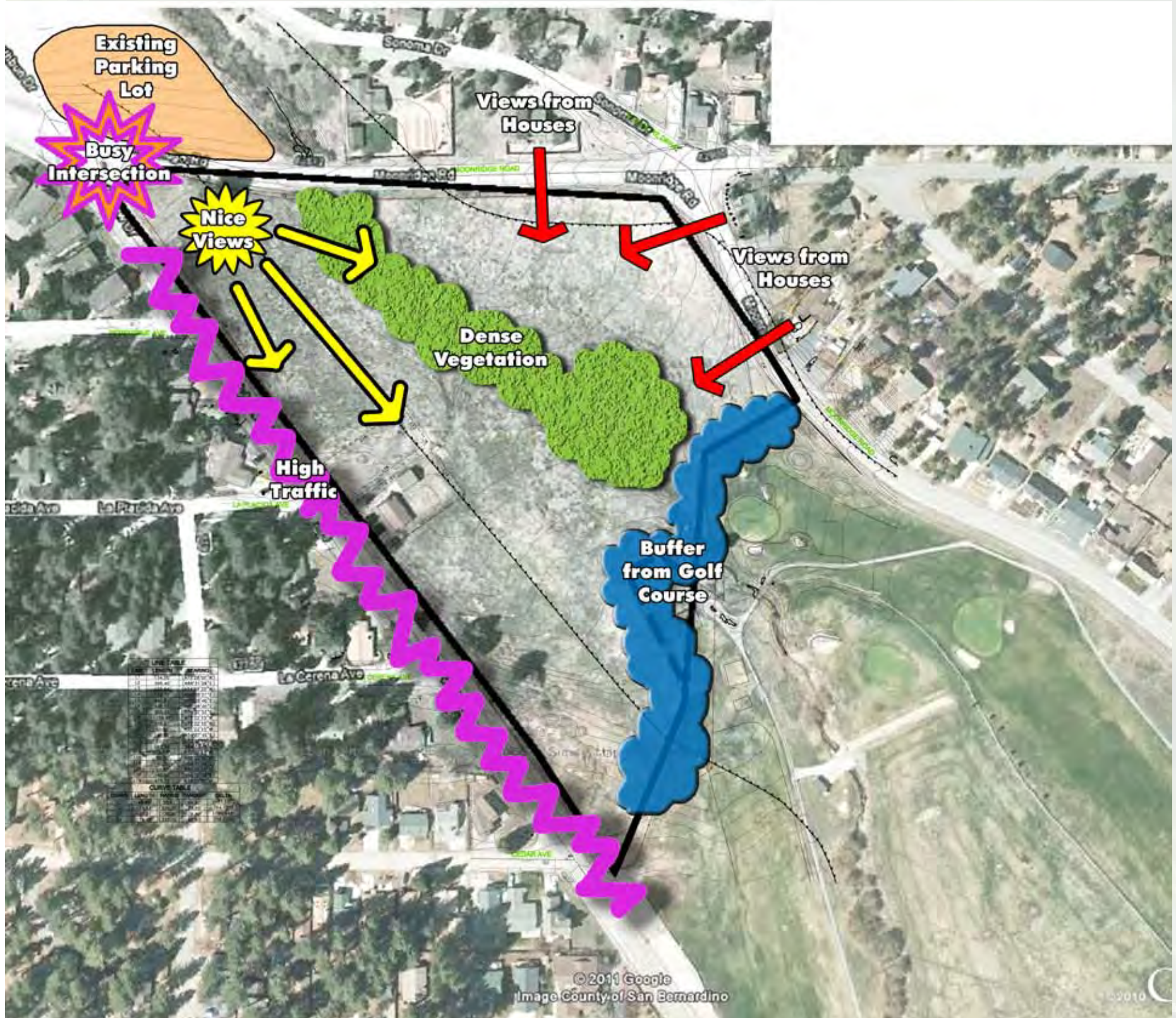
The long-term lease agreement between the County and the owners of the 2.5-acre site expired in February 2009 and a month-to-month lease arrangement has since been in place. A new site for the MAP has been sought since the early 1990's with over a dozen sites in the Big Bear Valley having been evaluated and rejected for various reasons. The County is now proposing to relocate the MAP to a 10.4-acre property adjacent to the Big Bear Mountain Golf Course.

The intent of the proposed project is to relocate the existing zoo to a new and expanded site, with the goal of enhancing the facility's image and visibility, upgrading the animal care facilities and providing a self-sustaining, educational, and entertaining environment.

Planning for the relocation involves:

- Animal care, exhibit and holding facilities
- Conservation of existing natural resources
- Public facilities including, but not limited to: ticketing, education, gifts, circulation, toilets, food and beverage, and parking
- Employee and facility services, maintenance, circulation and parking
- Emergency egress
- Accessibility for persons with disabilities (ADA)

Site Factors



Experience

The proposed MAP relocation site is an approximately 10.4-acre vacant parcel located within the city of Big Bear Lake, CA at the south corner of Moonridge Road and Club View Drive, less than one mile north of its current location. Surrounding land uses at the proposed relocation site are commercial and residential to the north, residential to the east and west, and the golf course to the south. This new location is similar to that of the existing facility, which is currently located in a residential/commercial neighborhood directly across the street from the Bear Mountain Ski Resort.

The relocation site is located at the terminus of the Moonridge Business Corridor and along the primary tourist route to Bear Mountain, and therefore may serve to increase zoo attendance.

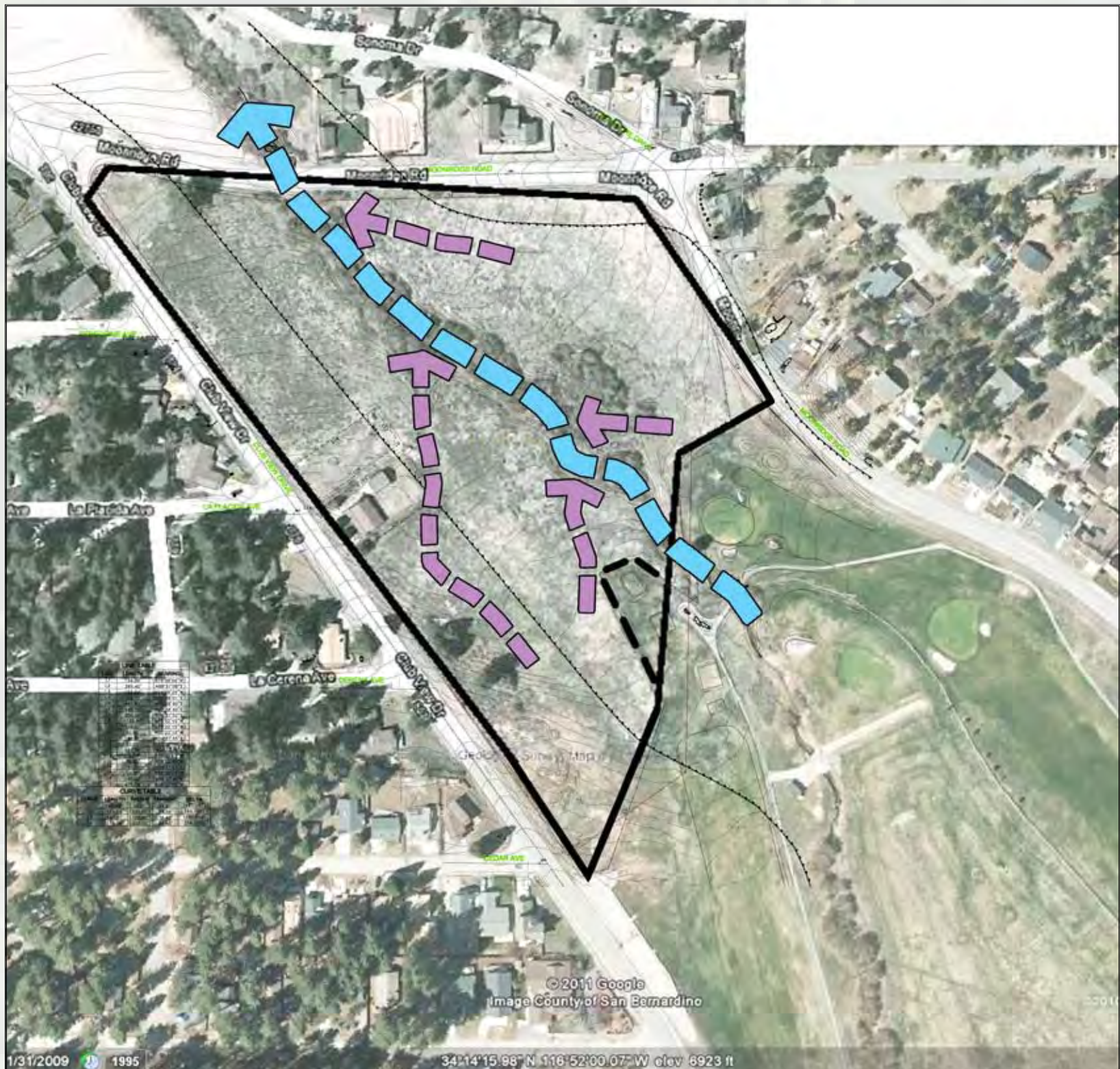
The property is relatively flat with areas of big sage scrub on the north portion and meadows on the south. It is transected by Rathbun Creek, an intermittent stream, which flows south to north through the center of the property and is a tributary to Big Bear Lake.

The adjacent golf course is located directly along the southern property line of the proposed relocation site. This is viewed as a potential hazard to both the animals and the general public. Current property delineation also defines the site to include a tee box from the adjacent golf course property, which will need to be remedied.

Club View Drive is the preferred access road to the nearby Bear Mountain Ski Resort. Traffic along this road can be high and congested on busy ski days. The Y intersection at the northwestern point of the zoo site is also a high traffic area. This will both create hazardous conditions for pedestrian traffic, as well as serve to increase the visibility of the zoo.

Due to the vistas seen from the northern and eastern edges of the zoo, the residences sited along Moonridge Road will be sensitive to new development within the project site. Additionally, the best views from within the site exist along the northwestern edge looking to the southern mountain ridges.

Site Factors



Hydrology

The site grades allow natural flow of water generally from the outer perimeter inward toward the intermittent stream, Rathbun Creek. This creek flows from the adjacent mountains, through the adjacent golf course, through the project site, and continues through the city of Big Bear Lake until it reaches the collector of Big Bear Lake.

Sheet flow occurs across the northeastern quadrant of the site into Rathbun, whereas small intermittent streams divert storm water across the southern half of the site.

Rathbun Creek, aside from its intrinsic value as an intermittent stream, provides rich habitat for local native wildlife and is home to several valuable conservation botanicals.



Goals and Strategies

As part of the master planning process, project Goals and Strategies were created with the team.

Goal

To ensure the long term success of the Moonridge Animal Park as an attraction for visitors to Big Bear Lake, California.

Strategies

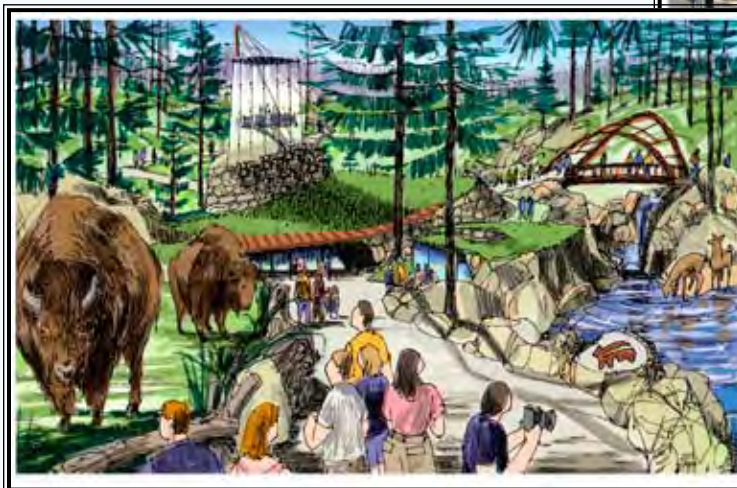
1. Create big, achievable ideas.
2. Employ impactful and sustainable methodologies.
3. Encourage smart growth of attendance to support the Zoo's mission.
 - a. Pursue the existing tourism base of Big Bear Lake to more highly penetrate the market.
 - b. Increase awareness of the Zoo in San Bernardino County residents.
 - c. Create products that appeal to regional and national tourists to Southern California.
4. Differentiate the Animal Park from other local attractions.
5. Create an unparalleled educational venue.



Conclusions from Data Collection and Analysis

After review of the site, we recommend the following in regards to the development of Moonridge Animal Park relocation project:

- Due to high visibility, vehicle accessibility, and impactful vistas, the entrance to the zoo should be located on the northwest portion of the site.
- Careful planning needs to be undertaken to ensure minimal disturbance of the important and densely vegetated intermittent stream, Rathbun Creek.
- When laying out the Zoo, areas of minimal development should be sited along the eastern edge to provide minimal visual disturbance to surrounding residential neighbors.
- When laying out the Zoo, exhibits that need full mesh enclosure and species that are not easily startled should be located along the southern border of the site to help provide protection and buffer from the golf course.
- Bus and visitor parking should be located along Club View Drive as this road already sees heavy traffic and is the least likely to cause new disruption within the community.



Concept Design

Four Thematic and Educational Zones:

The MAP relocation project will provide approximately 35 exhibits holding 60+ species of animals. All animals currently housed at the existing Moonridge Animal Park will be relocated to the new site. Several species are planned to be added after relocation. Also new to the facility would be zoological and botanical gardens, an 1,800 square-foot education center with classrooms, a 700 square-foot amphitheater, a 7,600 square-foot animal hospital with a 1,500 square-foot rehabilitation center, a 2,000 square-foot administration building, approximately 3,500 square feet of retail and concessions buildings, an approximately 1,800 square-foot maintenance area, restrooms and miscellaneous support buildings, and paved parking for visitors and staff. Night lighting and a perimeter fence would be installed for security purposes. All exhibits will exceed the minimum requirements of the U.S. Department of Agriculture and the recommendations of the Association of Zoos and Aquariums.

The proposed overall educational and thematic message includes designing the exhibits into four distinct areas: 20th Century, Gold Rush, Serrano, and Organic Future. Each zone will be defined by its architectural style, graphic communication, and educational messaging. Each animal within each of the zones will relate to the story of the area through its natural history or its relationship with humans. For example, the red fox exhibit occurs within the 20th Century zone as its largest population decline resulted from the Fur Trade of that time.

The educational messaging of the zones will be focused on human-animal interaction throughout history and into the future, which will provide the opportunity to incorporate cultural history as a means to enrich the experience.

Zone 1



20th Century

Soon after the rivers of the valley were dammed to create Big Bear Lake, the surrounding area boomed as it grew into a tourist destination. The 1930s Big Bear zone of the zoo is inspired by the many stores, restaurants, lodges, and homes built at that time. Architecture here will reflect the chalet style of that time, using natural materials such as heavy timber and stone. Because of the influx of population and visitors to the area at the turn of the century, many native species were negatively affected. Within this zone of the zoo, several of the displayed species' stories relate to this decline. Others, such as beavers, illustrate a more positive relationship between human and animal (in the beavers' case, inspiration for innovation from nature).

Entry area

Building on the strategies of increasing attendance and utilizing big, achievable ideas, the entry of the Animal Park should reflect the era of the 1930's in Big Bear. The buildings and designs will exude a highly recognizable image of "Big Bear the Way It Oughta Be." The lodge buildings of the Great American West is the architectural paradigm ... rich in the sense that most people have a deep emotional connection to the era.

Materials

Buildings will have natural wood siding with full-width porches and deep overhangs. Structures will be made (or appear to be made) from locally felled, bark-stripped trees. Earthy dark browns on the exterior walls, field stone foundations, and green metal or green shingle roofs.



Zone 2



Gold Rush Mining Town

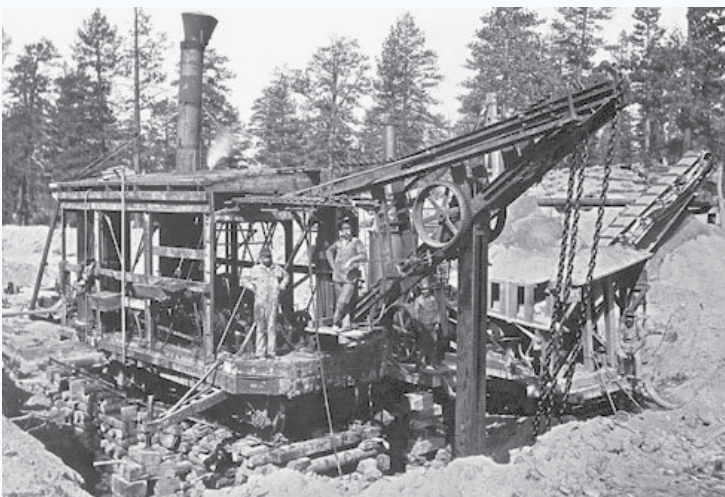
The initial non-native settlement of the Big Bear Valley was due to exploration for gold. The Gold Rush settlements are the inspiration for the Gold Rush Mining Town zone of the zoo. Here, the architecture will reflect mining shafts, miner's shacks, and a general store. Mining equipment will be used as props to add to the theme. The animals here will be some of the important species the miners may have encountered, many for the first time. Some of the mining techniques affected the species by habitat contamination and disruption, and these stories will also be told.

Buildings

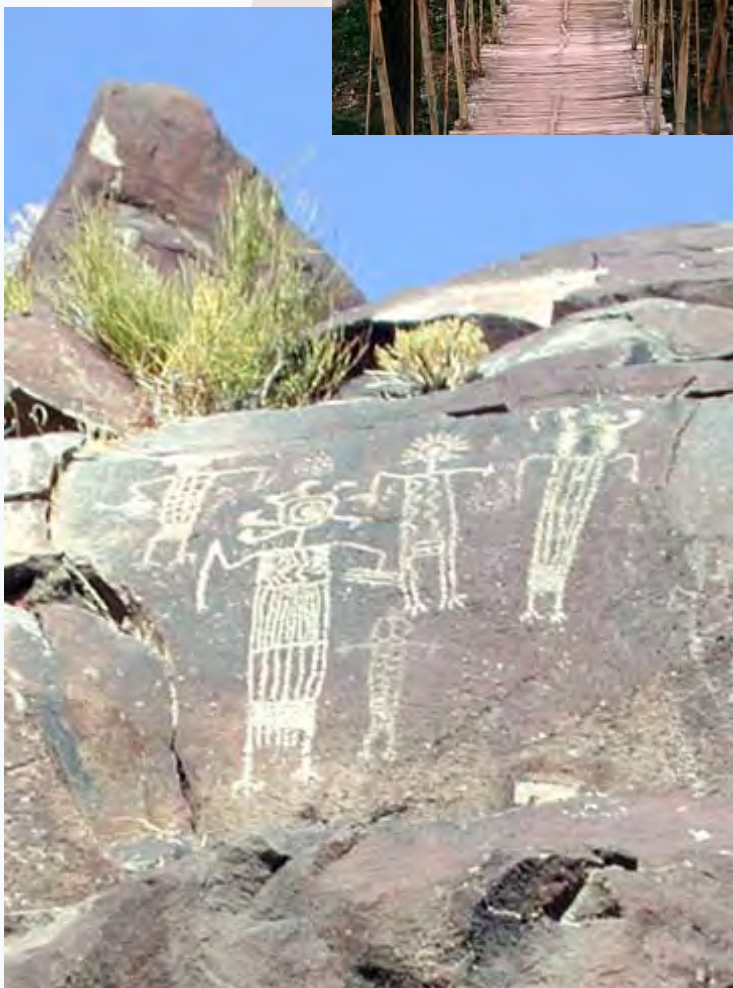
This zone will have several buildings visible and accessible to the public, including a nocturnal house and a toilet building. They will be themed as buildings typically seen in a mining town, such as a mine shaft and gold processing building, a general store, or an assay office. Props and other accoutrements will not only support the overall theme, but also provide interesting climbing and nesting opportunities to animals in adjacent exhibits.

Materials

The buildings here will appear to have been hand-made by amateurs, using rough sawn wood. The 1.5 story buildings will have mining theming and appurtenances throughout.



Zone 3



Serrano Village

The earliest people that lived in the valley were Native Americans called the Serrano. The area of the zoo known as the Serrano Village is inspired by the traditions of these people. Because the Serrano had ephemeral settlements, the zone will have minimal architecture, focusing on natural elements. Small thatch huts, like the Serrano's structures, will be incorporated into the thematic zone, both for use by animals within exhibits as well as for educational exhibits on the visitor side. The Serrano had great respect for nature and animals, and all the animals in this zone have figured strongly in Serrano legend.

Special Events Area

Near the entry plaza, a small clearing of grass will be maintained as a special events lawn. This area is located so that it can be isolated from the majority of the zoo by gates if needed after hours.

The special events area is particularly pertinent to the Serrano zone because this space will be functional for Native American cultural events as well as other demonstrations.

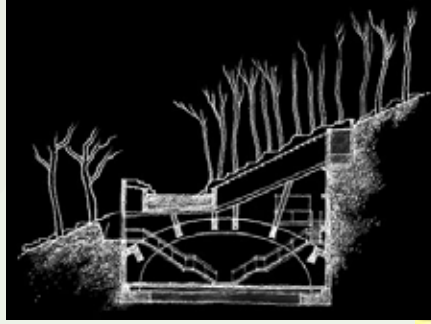
Serrano Cultural Center Exhibit

Adjacent to the special events area, a reconstructed Serrano hut will house artifacts and serve as a viewing shelter for the wolf exhibit. This exhibit will be accessible to both the zoo guests and the special events patrons.

Materials

The limited structures will appear to have been made by hand, from stretched animal skins, natural thatch, and branches. Fencing will appear to be hand woven branches, and paths will look like compacted earth.

Zone 4



Organic Future

Our society has the ability to reconnect with nature, restoring a balance between our built environment and the environment around us. This zone of the zoo will address possible methods and philosophies to adopt in order for us to achieve this goal. The architecture will incorporate many green methodologies and materials which will be on display as educational exhibits within the zone. The animals here represent the results of inappropriate or irresponsible human-animal interactions, illustrate the zoo's leadership in helping, not hurting, animals, and teach the visitors respectful relationships between humans and wildlife.

Animal Care Building

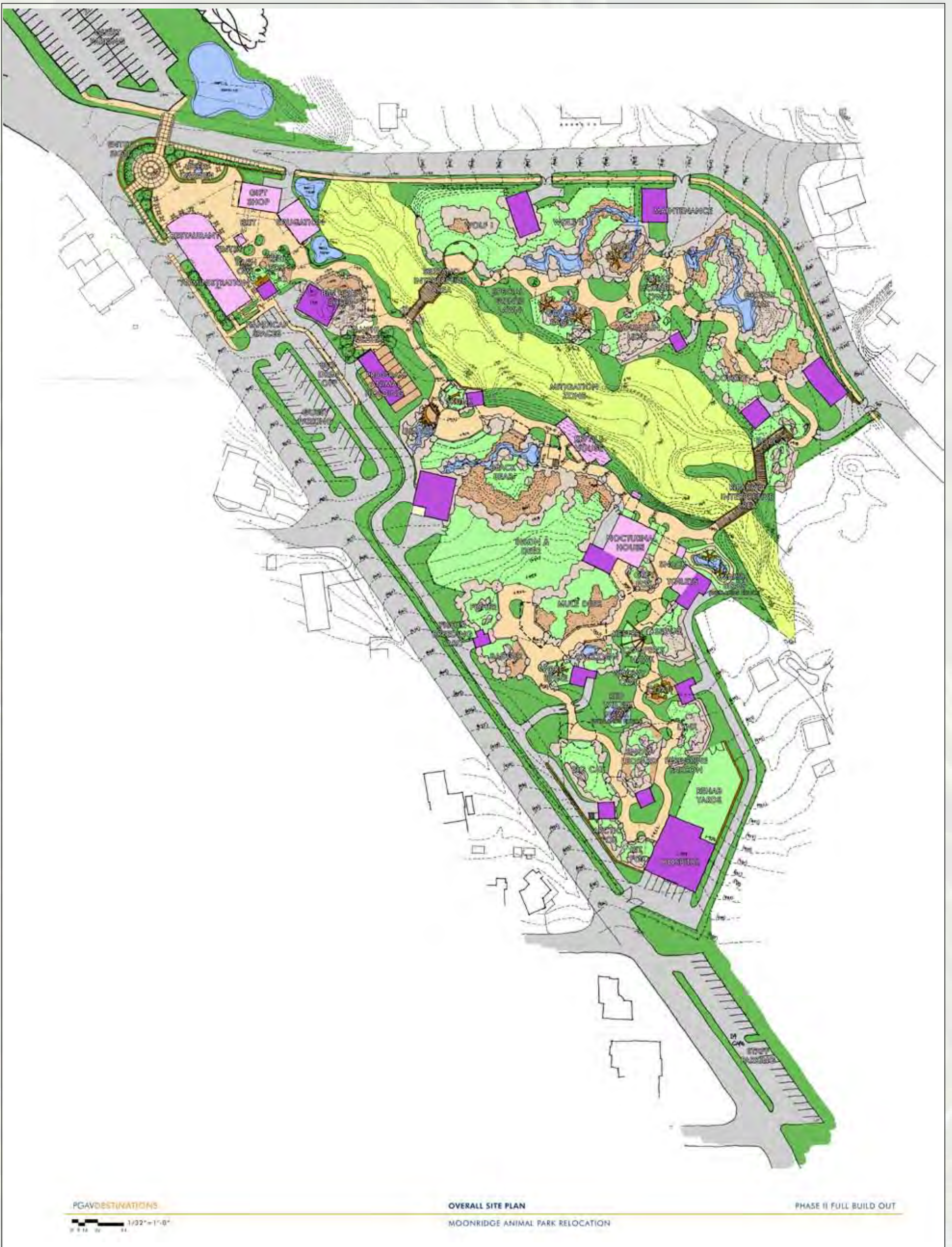
The Animal Care building will reflect the idea of the Zoo as a champion of the organic future. Some of the back-of-the-house will be on exhibit allowing the guest to see the rescue nature of the facility.

Natural conservation and habitat protection messaging will combine with the Animal Park's overall message of wise use of natural resources.

Materials

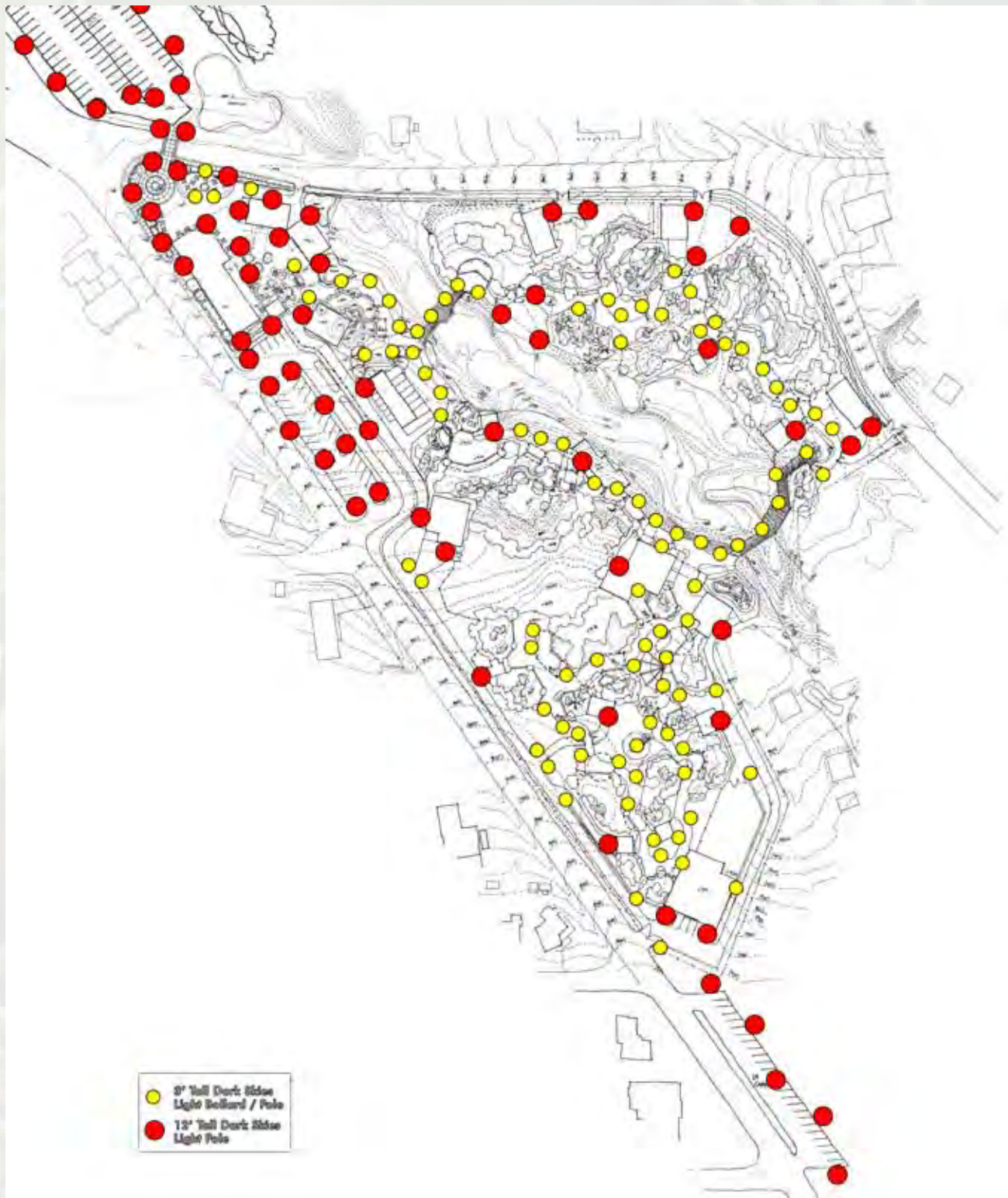
Walls will be made of curving, spiraling field stone. Any large areas of glass will be oriented to take advantage of the sun and seem bright and open. Sod roofs will be considered to the extent they are practical. When utilized, the material for these roofs will employ indigenous grasses and sages as opposed to "green turf."





Master Illustrative Site Plan

Site



Lighting Plan

For safety reasons, the Zoo will need lighting throughout. Lighting will occur along paths with low bollards, and in large plaza areas with tall poles. Service areas will also be lit. All light fixtures will be dark skies compliant, but also appropriate to the thematic setting. See Appendix D for sample fixtures.

Site



Snow Control

The Moonridge Animal Park will be planned in order to ensure efficient snow control in winter months. Ten foot minimum widths of paths to allow for snow removal vehicles, areas designated for snow collection, and radiant heating beneath paths will allow for efficient snow removal. These measures will allow faster snow removal, and therefore make available more hours of operation for guest visitation.

Storm Flow

Storm water on MAP is directed to one of two locations. In the first, from naturally occurring intermittent streams, water moves through natural swales that are untouched by the relocation project. In the second, from parking lots, roofs, paving, and animal exhibits, water moves through sanitary and storm sewer piping to detention ponds and eventually through a water treatment facility before either being reused throughout the site or being directed into the City's system.

Site Accessibility

The natural grades of the site are fairly gradual and will not impede the creation of paths throughout the zoo that meet or exceed the accessibility standards set forth by the ADA. Use of ramps will be minimal at the zoo, but when needed, will not exceed 8%. The same standards will be applied to all back of house paths and walkways.

Site



Green Approach

In order to teach and lead by example, the MAP will incorporate green approaches to construction and operations. The project will take advantage of green building techniques on a day-to-day basis as well as in its construction, using as many low-impact, low-tech construction methods as possible. Other green aspects of the project will be:

- The buildings will incorporate local and recycled materials as often as possible, including locally harvested timber and stone, and architectural salvage.
- Buildings will take advantage of daylight by use of skylights and site location.
- Solid waste from animal exhibits will be manually collected for the production of compost.
- Solar power will be utilized whenever possible, especially for lighting and use with interactive exhibits.
- Run-off from parking and roofs will be directed into detention ponds for reuse within the site when applicable.
- The zoo will actively recycle both in-park and back of house.

Animal Exhibits



Animal Exhibits

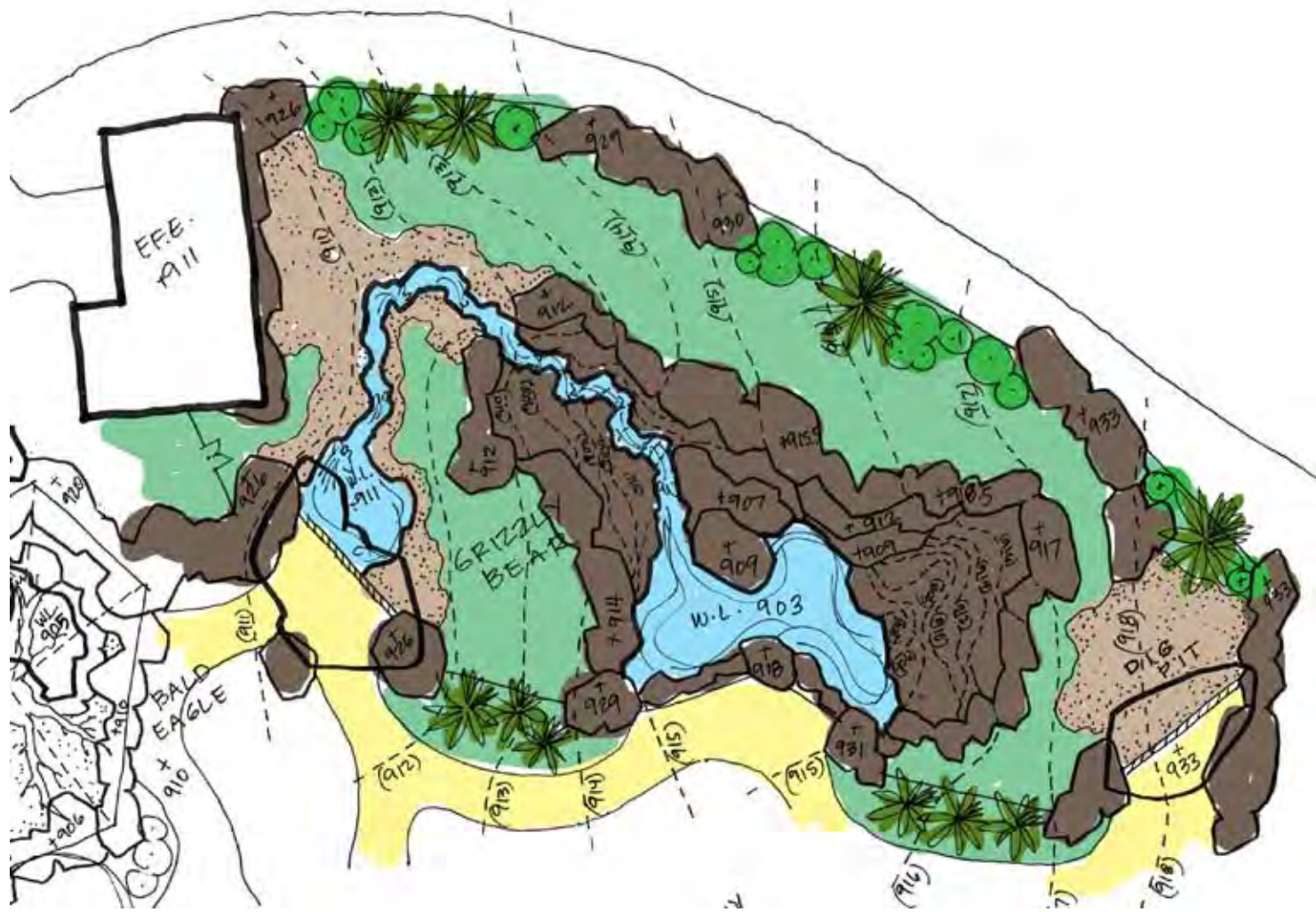
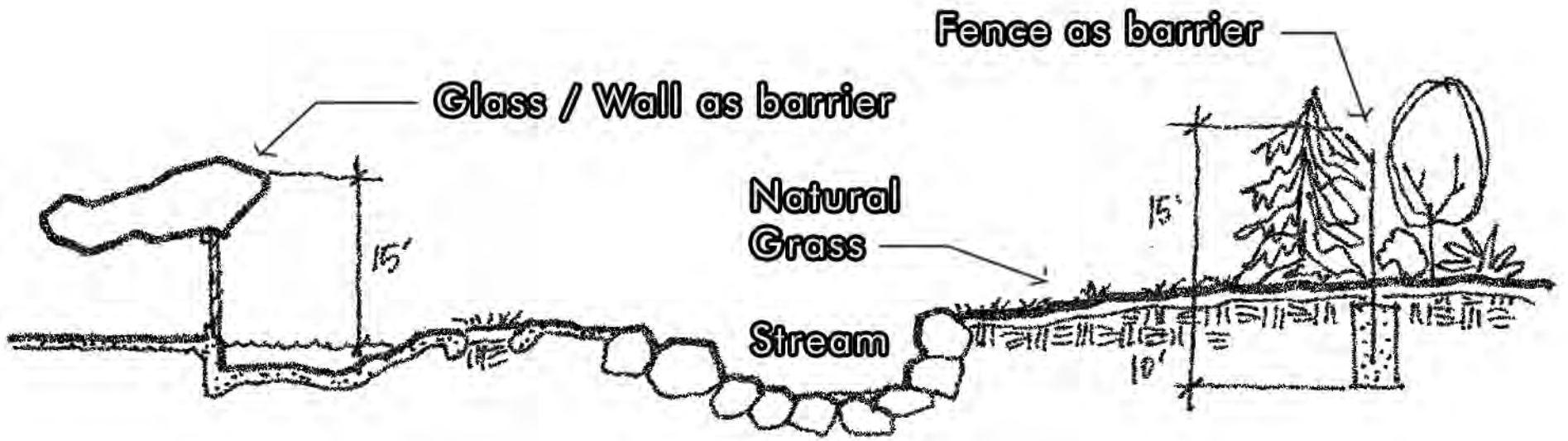
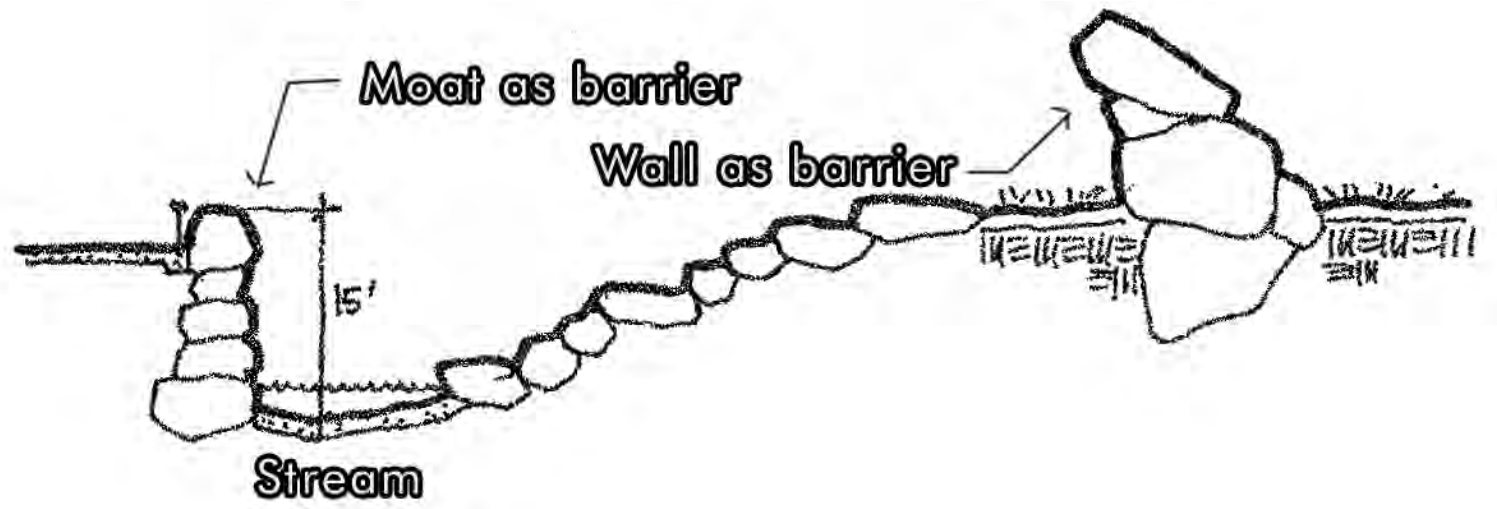
Animal exhibits at the Animal Park will be designed with consideration to the animals and staff, as well as to the guest.

The exhibit sizes will be based on number of animals living within each habitat, social structure and behavior of the animals, American Zoo and Aquarium Association husbandry standards, International Wildlife Rehabilitation Council standards, and keeper staff experience.

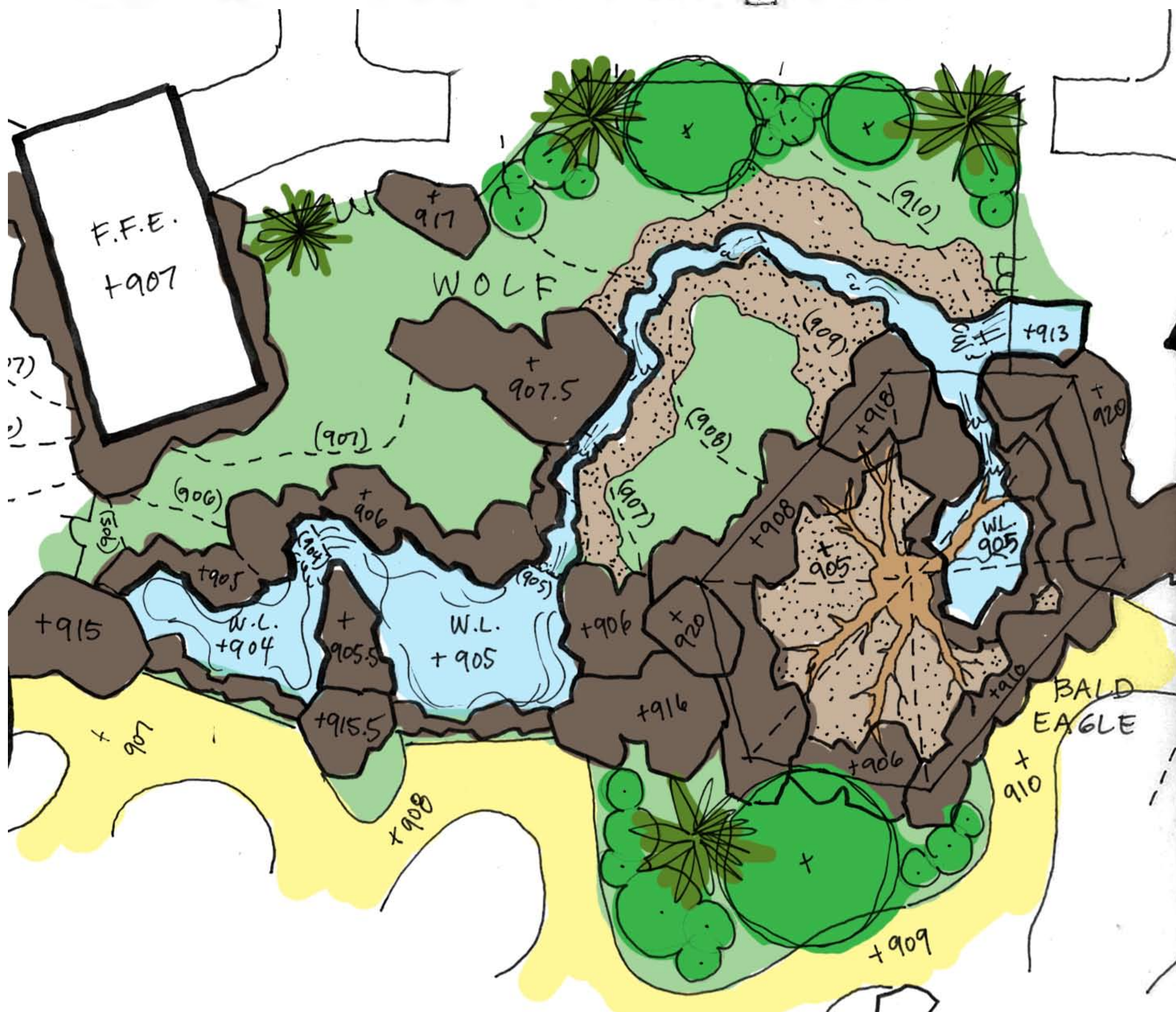
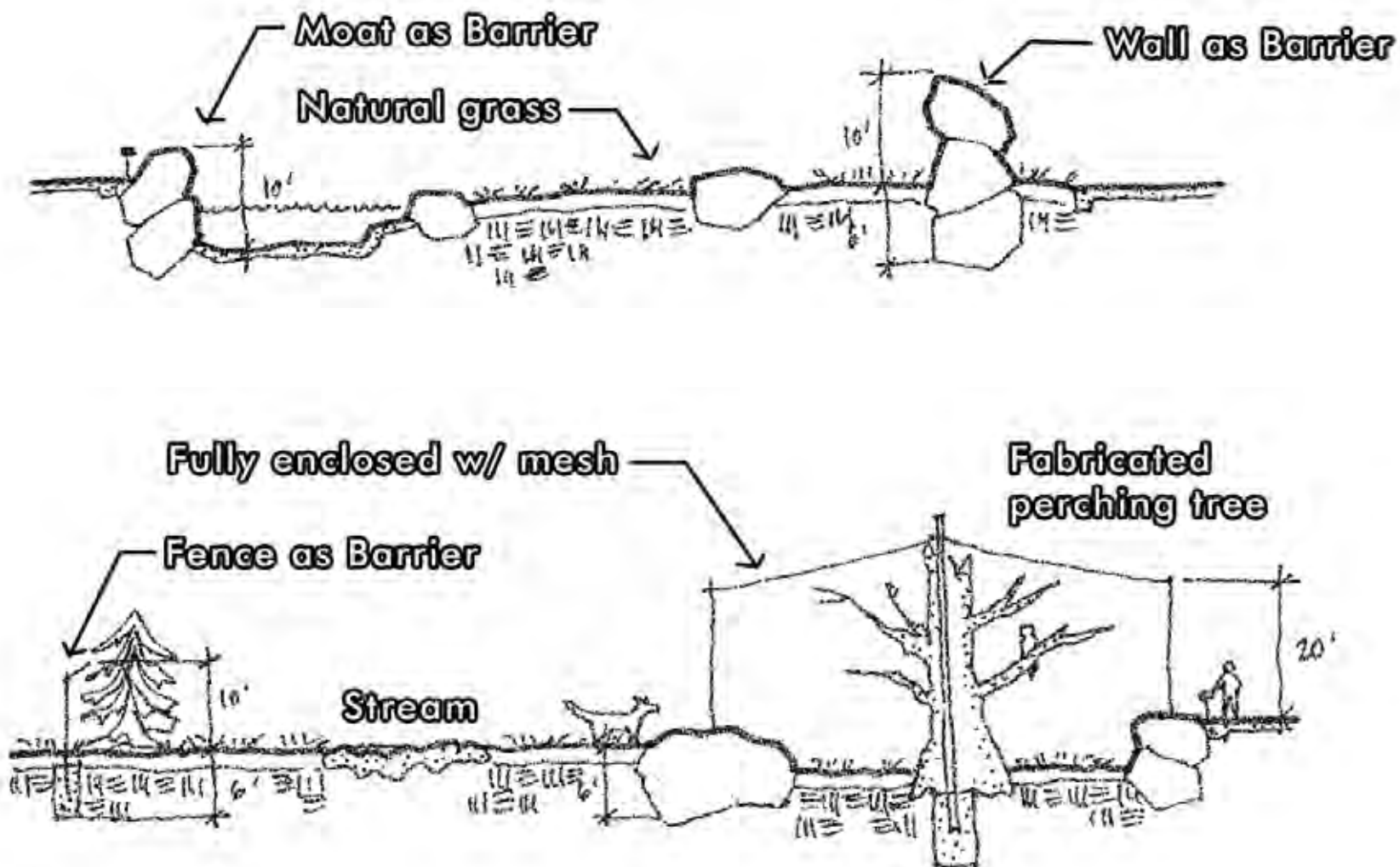
Most of the animal species in the MAPR collection are native to the site. This means very little theming will need to be added in order to “take” the visitor to the animals’ native habitat. Rocks, trees, and deadfall will occur naturally on site, and will be relocated to maximize exhibit variability for the animals. Native trees and shrubs will be protected from animal destruction through dedicated planting beds with hot wire and tree protection.

The following pages contain examples of animal enclosures for a variety of animals on-site. These examples illustrate methods that will be employed at the new animal park.

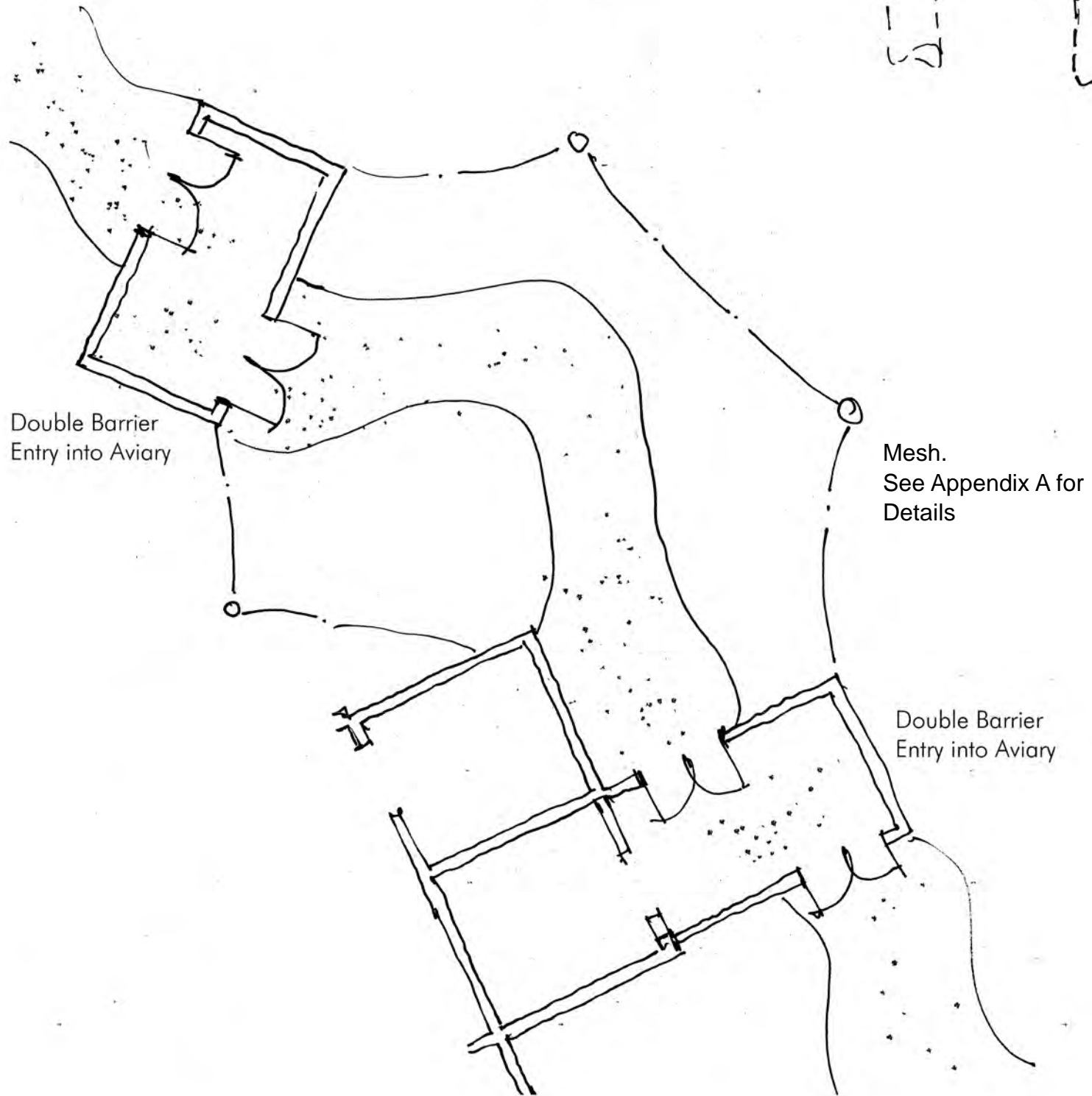
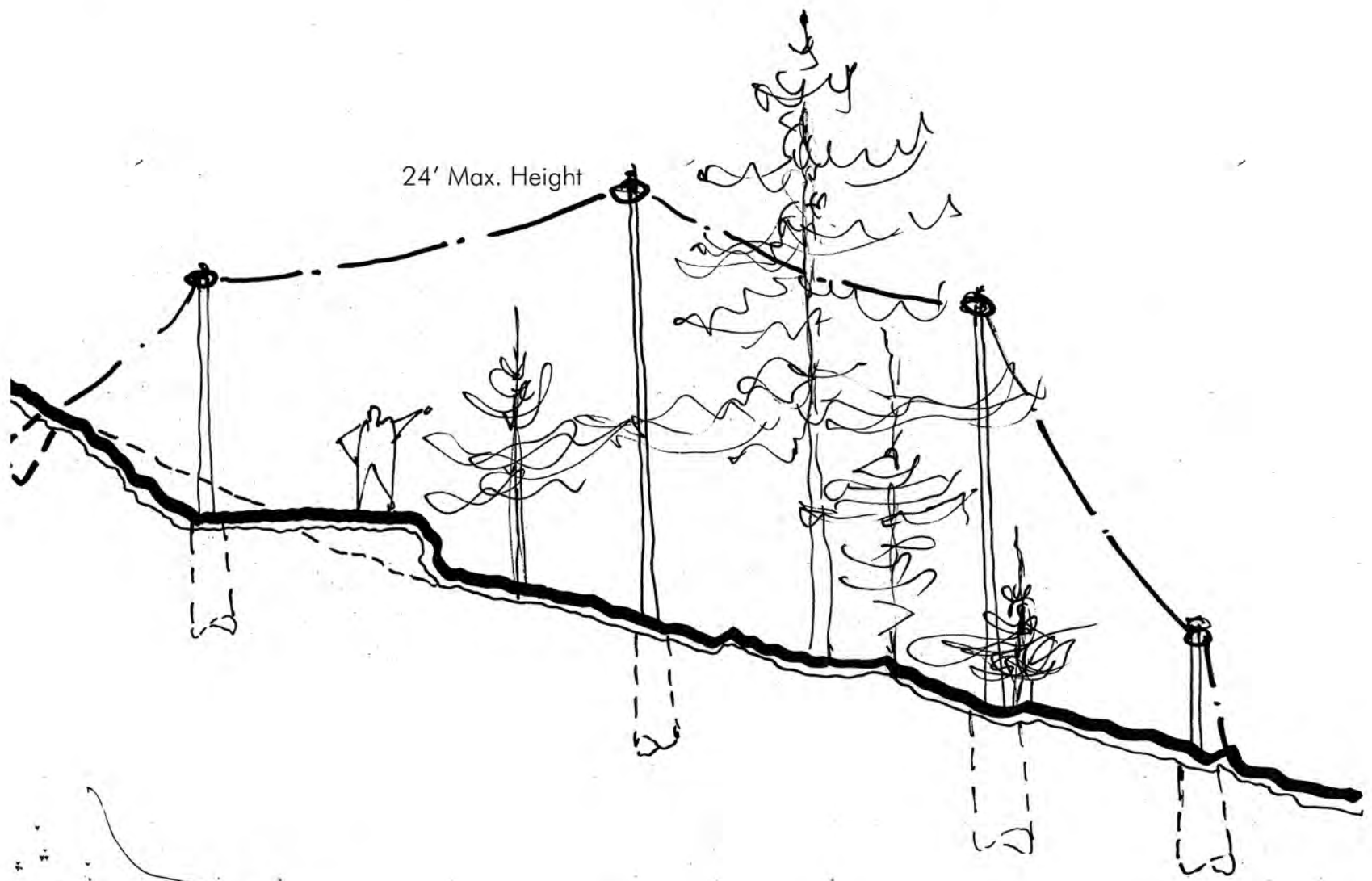
Animal Exhibits



Animal Exhibits

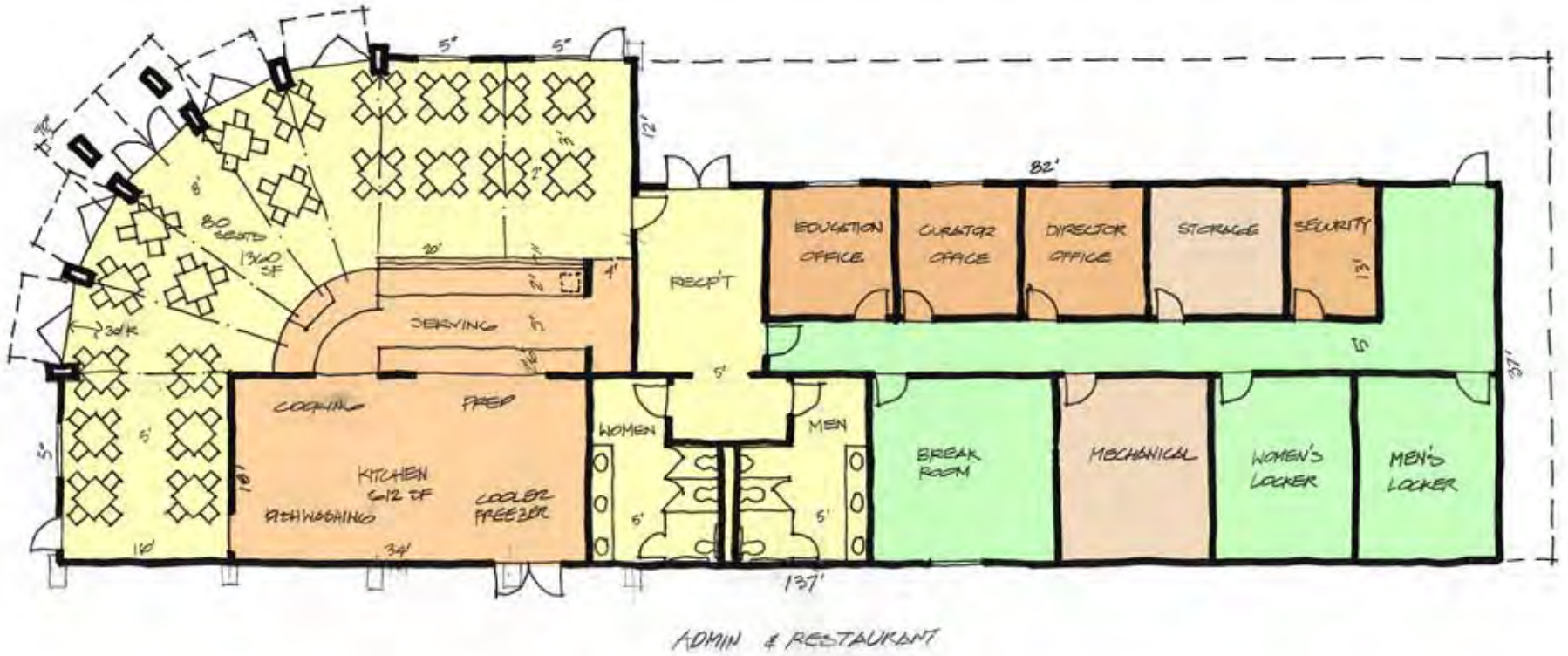


Animal Exhibits

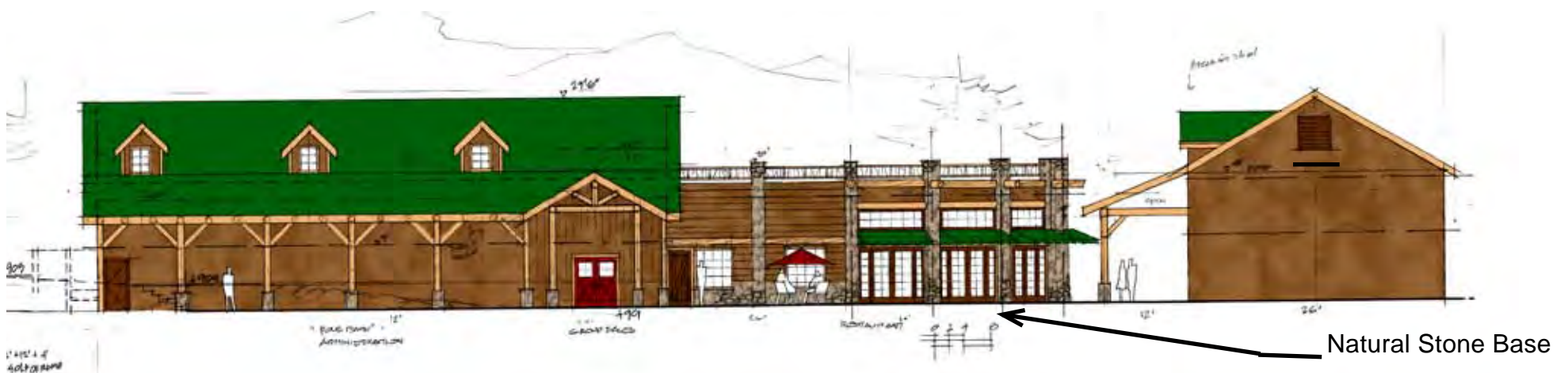


Typical Walk-thru Aviary
Plan and Section
1/16" = 1' - 0"

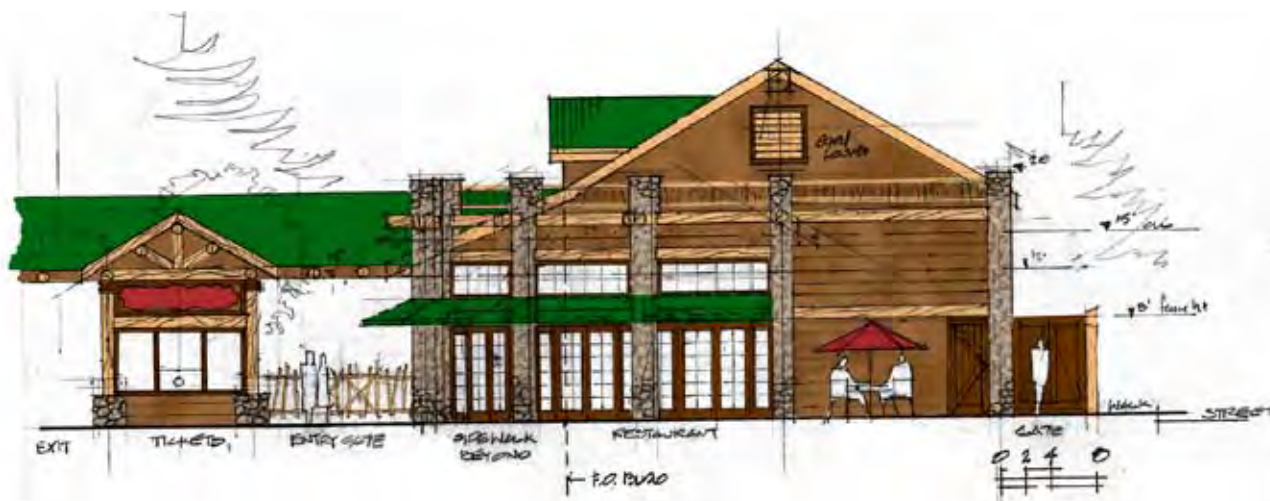
Sample Avian Enclosure



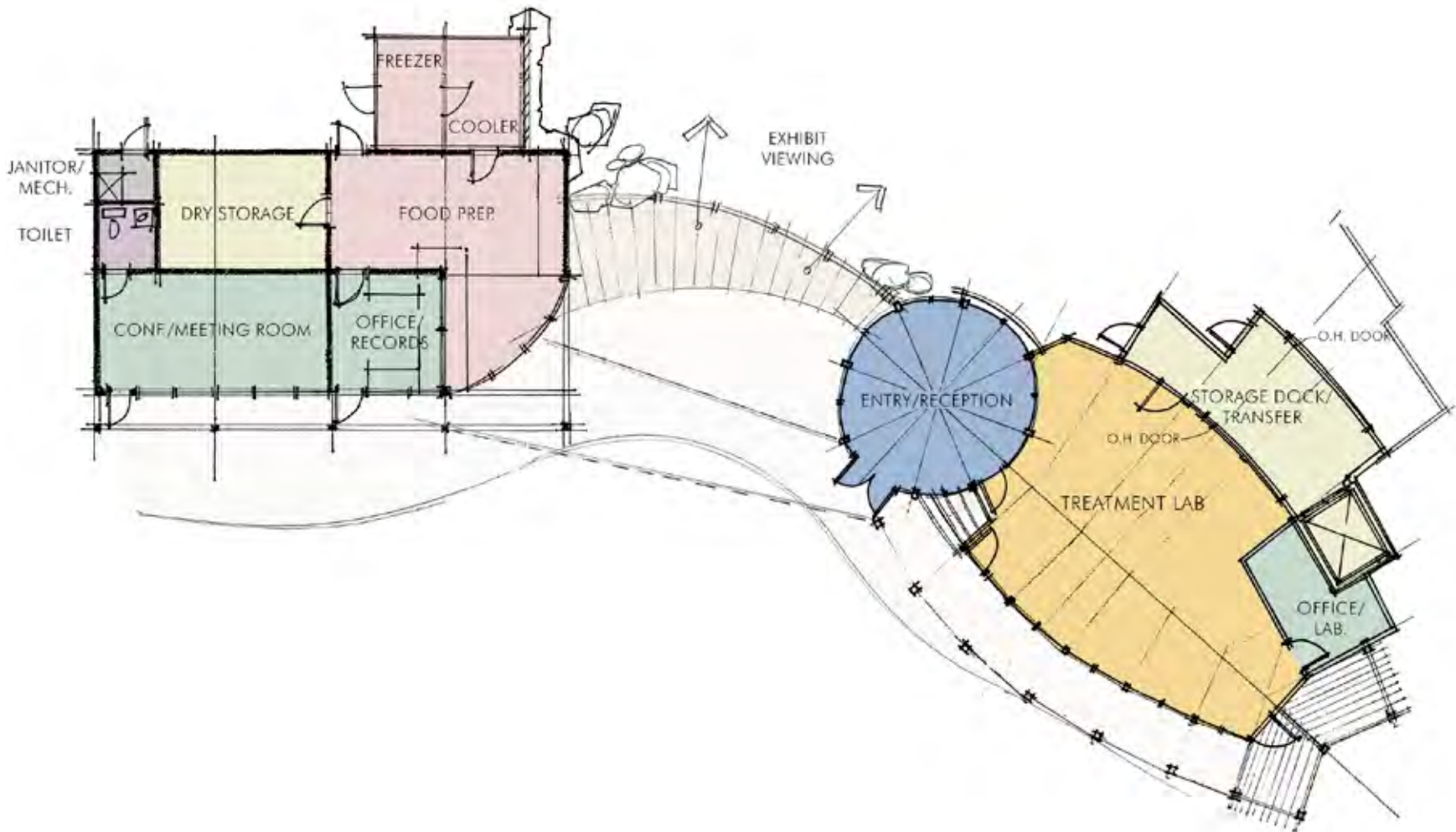
SAMPLE FLOOR PLAN AT RESTAURANT AND ADMINISTRATION



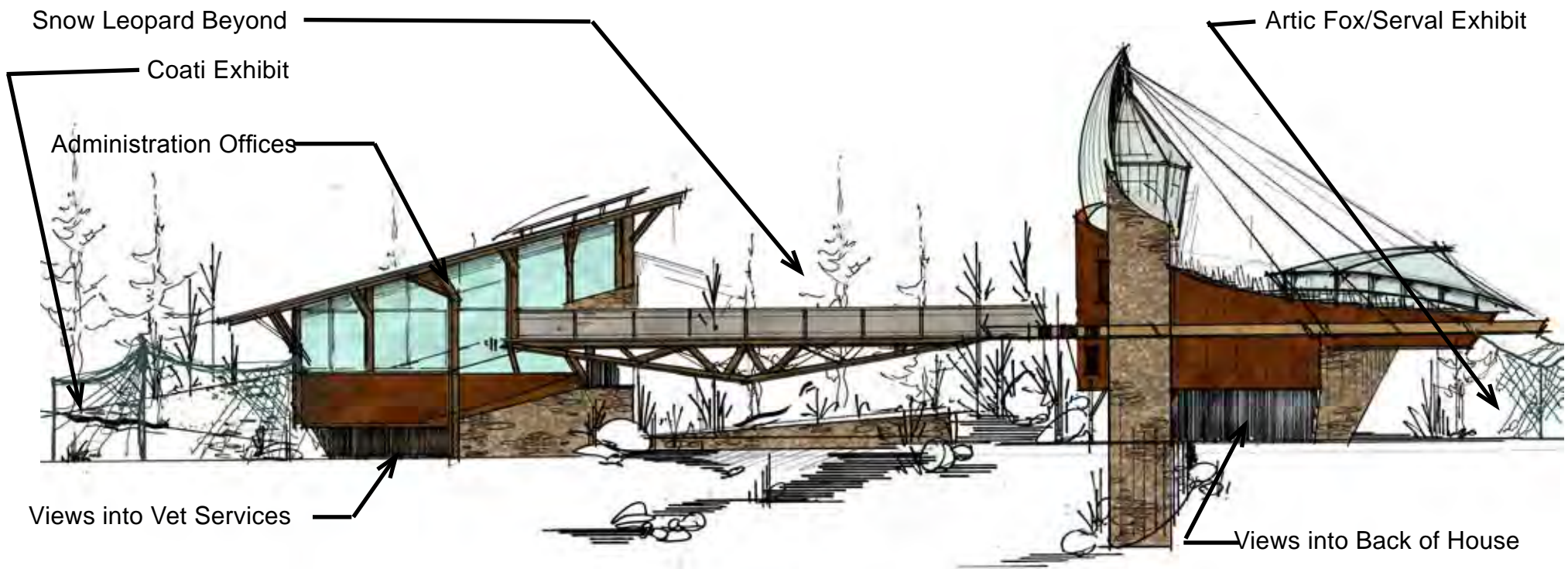
ADMINISTRATION, RESTAURANT, AND GIFT SHOP



TICKET BOOTH AND RESTAURANT

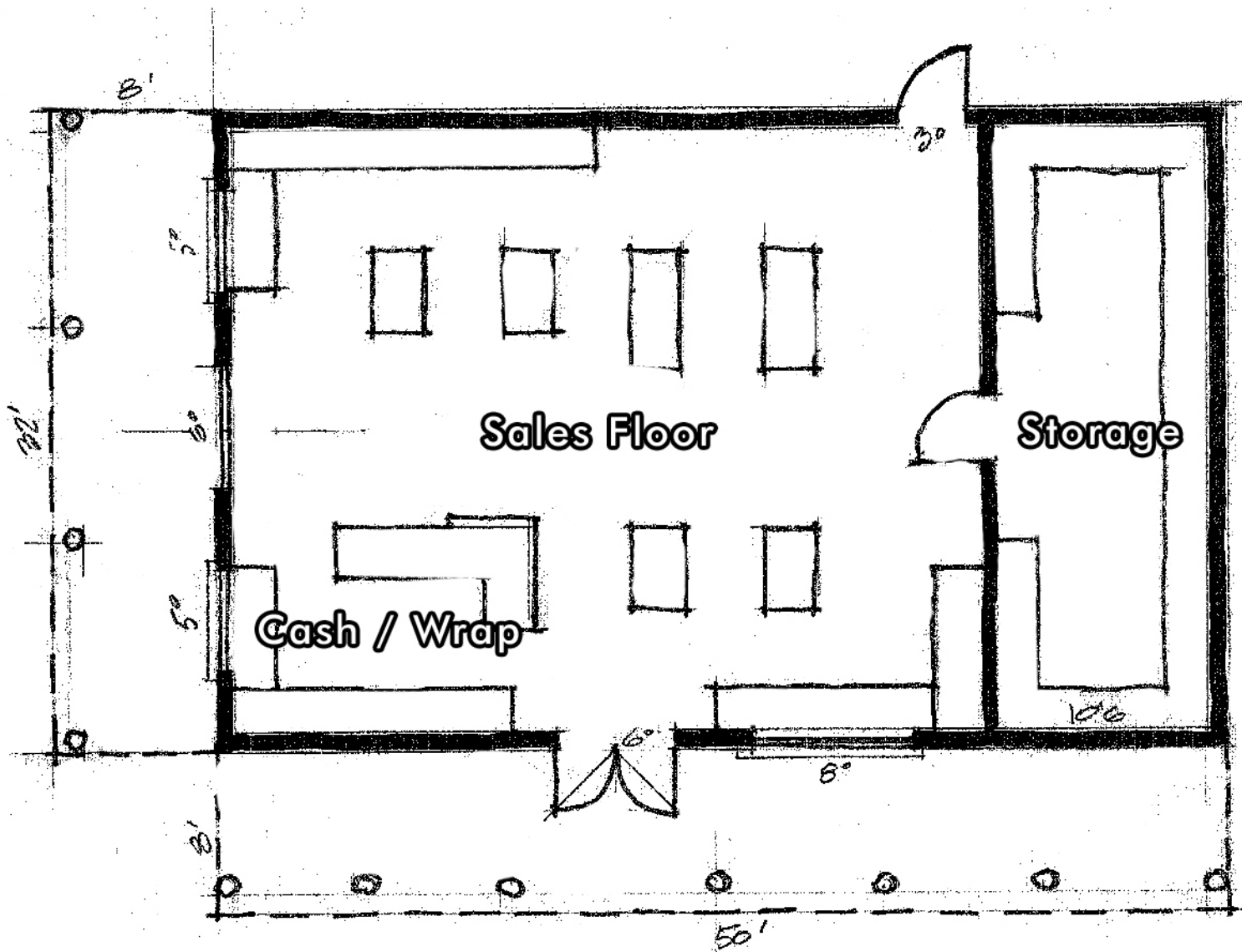


SAMPLE FLOOR PLAN ANIMAL CARE BUILDING

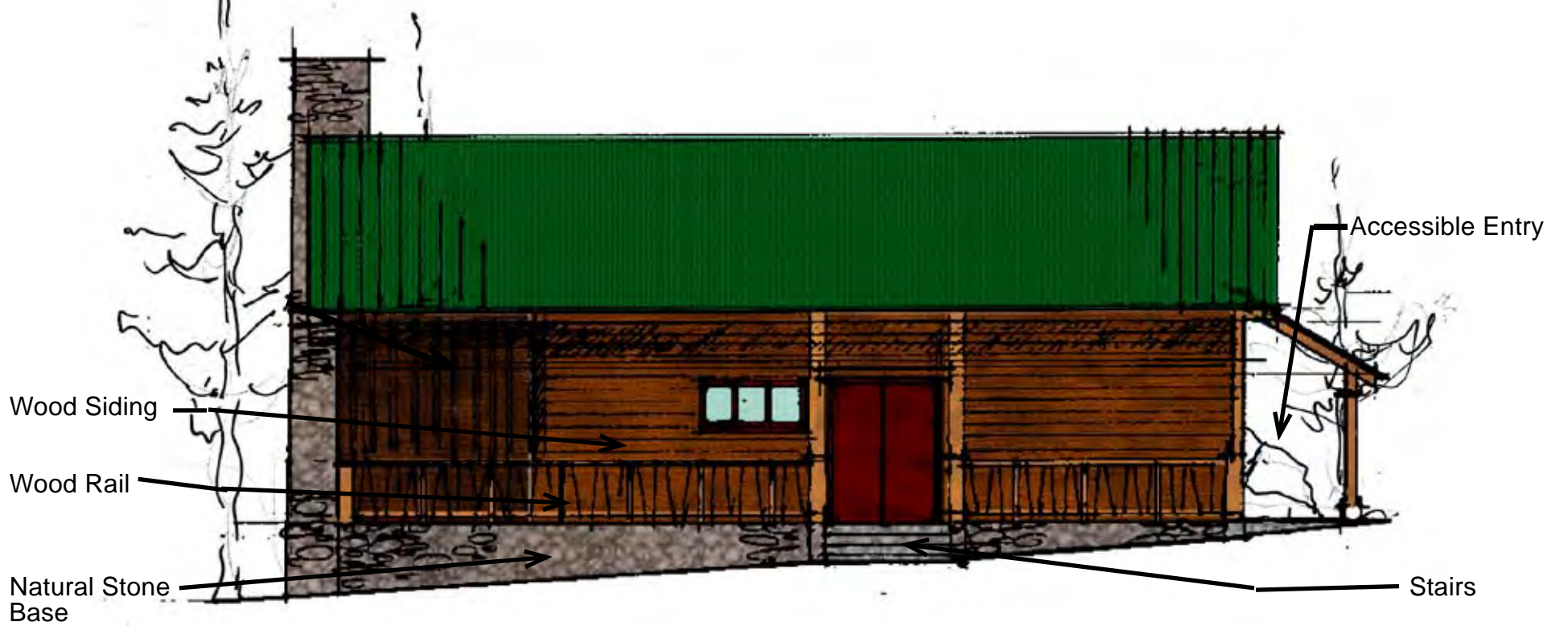


ELEVATION A : ANIMAL CARE BUILDING

Buildings



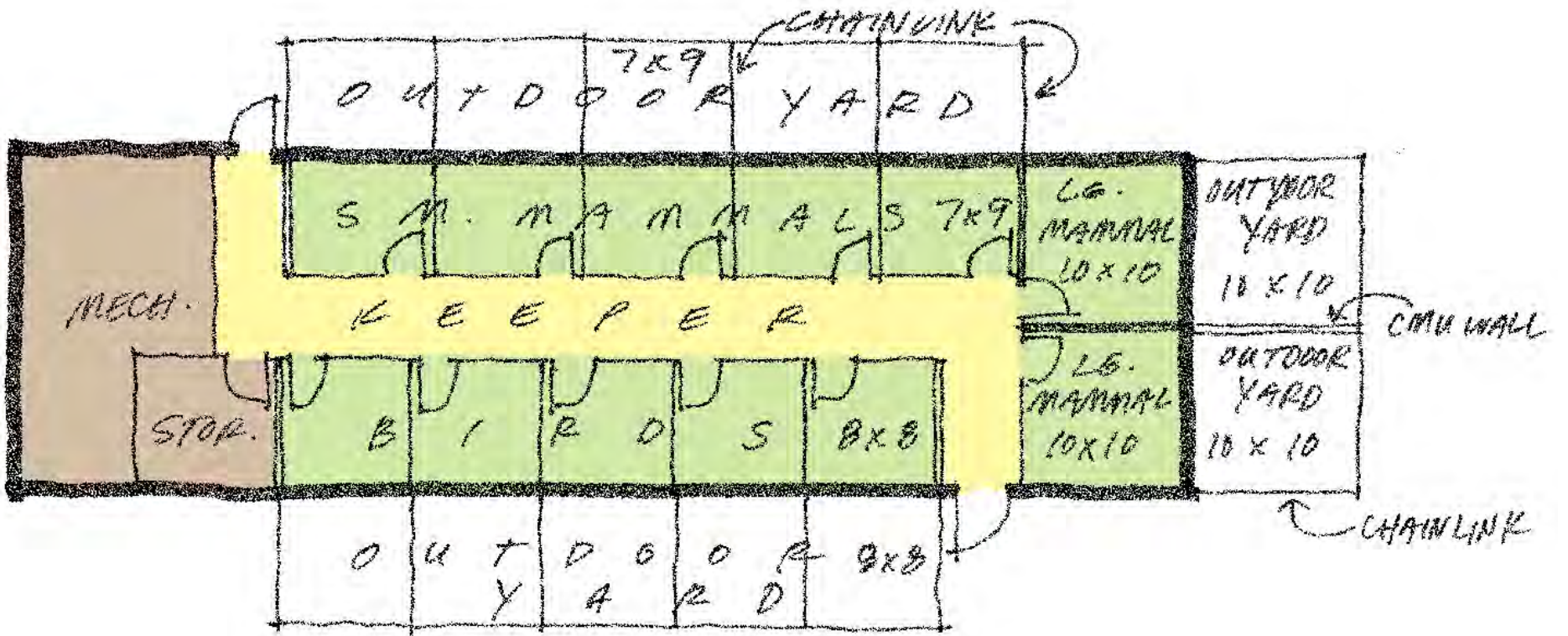
FLOOR PLAN GIFT SHOP BUILDING



ELEVATION A : GIFT SHOP BUILDING



ELEVATION B: GIFT SHOP BUILDING



SAMPLE FLOOR PLAN ANIMAL HOLDING BUILDING



SAMPLE ELEVATION OF TYPICAL ANIMAL HOLDING BUILDING

Site Phasing



Construction Phasing

Due to financing constraints, the proposed project is currently planned to be constructed in three phases:

Phase 1 will provide housing for all of the animals currently in the zoo collection. Most of the exhibits will be fully built out to the highest quality and spatial standards. However, all of the species within the Organic Future zone and the majority of the species within the Gold Rush zone will be housed in temporary, non-thematic exhibits similar in size and nature to the current zoo. The animals within these zones are relatively small species, and the zones' location within the site allow for easy by-pass by guests in Phase 1.

Also included in Phase 1 are the entry plaza, amphitheater, program animal holding building, restaurant, gift shop, administration building, toilets, maintenance building and yard, and all holding buildings to support exhibits.

Phase 2 will provide permanent, fully built out exhibits of the highest quality and spatial standards for the species housed in temporary exhibits in Phase 1. Additionally, several other new species will be added to the collection at this time.

Also included in Phase 2 are the education building, the reptile house, and the permanent nocturnal house.

Because the proposed hospital is a capital intensive project, it is being considered as its own phase to be completed when the park is able to acquire funding, and may occur at any time.

Parking



Year	Attendance	Projected Growth	Design Day	Peak in Park	Standard Parking	Handicap Parking
2007	78,000		936	393	110	3
2008	79,560	2%	955	401	112	3
2009	81,151	2%	974	409	114	3
2010	82,774	2%	993	417	116	3
2011	84,430	2%	1,013	425	119	3
2012	86,118	2%	1,033	434	121	3
2013	114,537	33%	1,374	577	161	4
2014	116,828	2%	1,402	589	164	4
2015	119,165	2%	1,430	600	167	4
2016	121,548	2%	1,459	612	171	4
2017	123,979	2%	1,488	625	174	4
2018	126,458	2%	1,518	637	177	5
2019	128,988	2%	1,548	650	181	5
2020	141,886	10%	1,703	715	199	5
2021	144,724	2%	1,737	729	203	5
2022	147,619	2%	1,771	744	207	5
2023	150,571	2%	1,807	759	211	5

Parking

Parking needs have been estimated by utilizing the projected attendances provided by the Business Plan. This plan estimated a 2% attendance growth from 2006 until opening year at which point the zoo would experience a 33% increase. The attendance was projected to continue with a 2% growth rate until the secondary phase of the zoo is opened when an additional 10% increase will be experienced. Based on these attendance projections, parking needs for the zoo have been estimated using a peak design day and an assumption of 3.5 people per vehicle.

These calculations have indicated that the zoo will need a minimum of 161 standard parking spaces plus 4 handicapped spaces at Phase I opening. Additionally, ten years after opening, assuming the completion of the second phase in that time, the zoo will see an increased demand to a total of 211 standard parking spaces and 5 handicapped.

The relocation project will include on-site parking for 30 standard cars, 5 handicapped spaces as well as a dedicated bus drop-off lane accommodating 2 buses. Buses will then drive off-site to park remotely. Because the zoo will create sufficient demand for more than the 30 on-site guest parking spots and because the zoo will need a remote bus parking location, the MAP will require an off-site parking option.

A partnership with the owners of Bear Mountain Resort will allow shared use of an unpaved parking lot located directly across Moonridge Road from the site. Since the relocation project will also include an out-of-park accessible restaurant located at the zoo entry, available at night for ski resort guests and Big Bear Lake tourists, the proposed site design includes a pedestrian crosswalk between the parking and the zoo entry. The crosswalk will include a new traffic light and change of paving for greater visibility of the pedestrian path.

Employees will park in a designated lot to the south in partnership with the golf course.

Capital Cost Estimate

Moonridge Animal Park Relocation Project

Summary Estimate

Total Build Out		\$37,413,729
Phase I	\$15,766,871	
Phase II	\$14,765,833	
Parking	\$1,922,500	
Hospital	\$4,958,525	

Total Build Out without Hospital		\$32,455,204
Phase I	\$15,766,871	
Phase II	\$14,765,833	
Parking	\$1,922,500	

Total Phase I without Hospital		\$17,689,371
Phase I	\$15,766,871	
Parking	\$1,922,500	

Exhibit Breakdown (at Full Build Out)		
1930s Big Bear		\$2,699,495
Black Bear	\$854,550	
Red Fox	\$195,210	
Skunk	\$48,710	
Barn Owl	\$140,000	
Beaver	\$300,000	
Reptile House	\$700,000	
Big Horn Sheep	\$461,025	
Gold Rush		\$2,426,255
Raccoon	\$352,985	
Porcupine	\$176,000	
Grey Fox	\$245,000	
Badger	\$107,770	
Wood Bison / Deer	\$760,000	
Mule Deer	\$175,000	
Fisher	\$109,500	
Marsh Bird Free Flight Aviary	\$500,000	
Organic Future		\$2,805,400
Red Tailed / Shouldered Hawk	\$140,000	
Great Horned Owl	\$140,000	
Peregrine Falcon	\$90,000	
Snowy Owl	\$90,000	
Cooper's Hawk	\$60,000	
Kestrel	\$45,000	
Snow Leopard	\$658,950	
Coatimundi	\$231,140	
Serval	\$529,480	
Kit Fox	\$70,500	
Big Cat	\$206,775	
Lynx	\$500,000	
Arctic Fox	\$43,555	
Serrano		\$7,893,810
Coyote	\$245,820	
Bobcat	\$600,000	
Wolf	\$1,956,840	
Grizzly Bear	\$3,060,800	
Golden Eagle	\$790,000	
Bald Eagle	\$600,000	
Mt. Lion	\$640,350	

Programming

Moonridge Animal Park Relocation Project Building Program (Full Build Out)

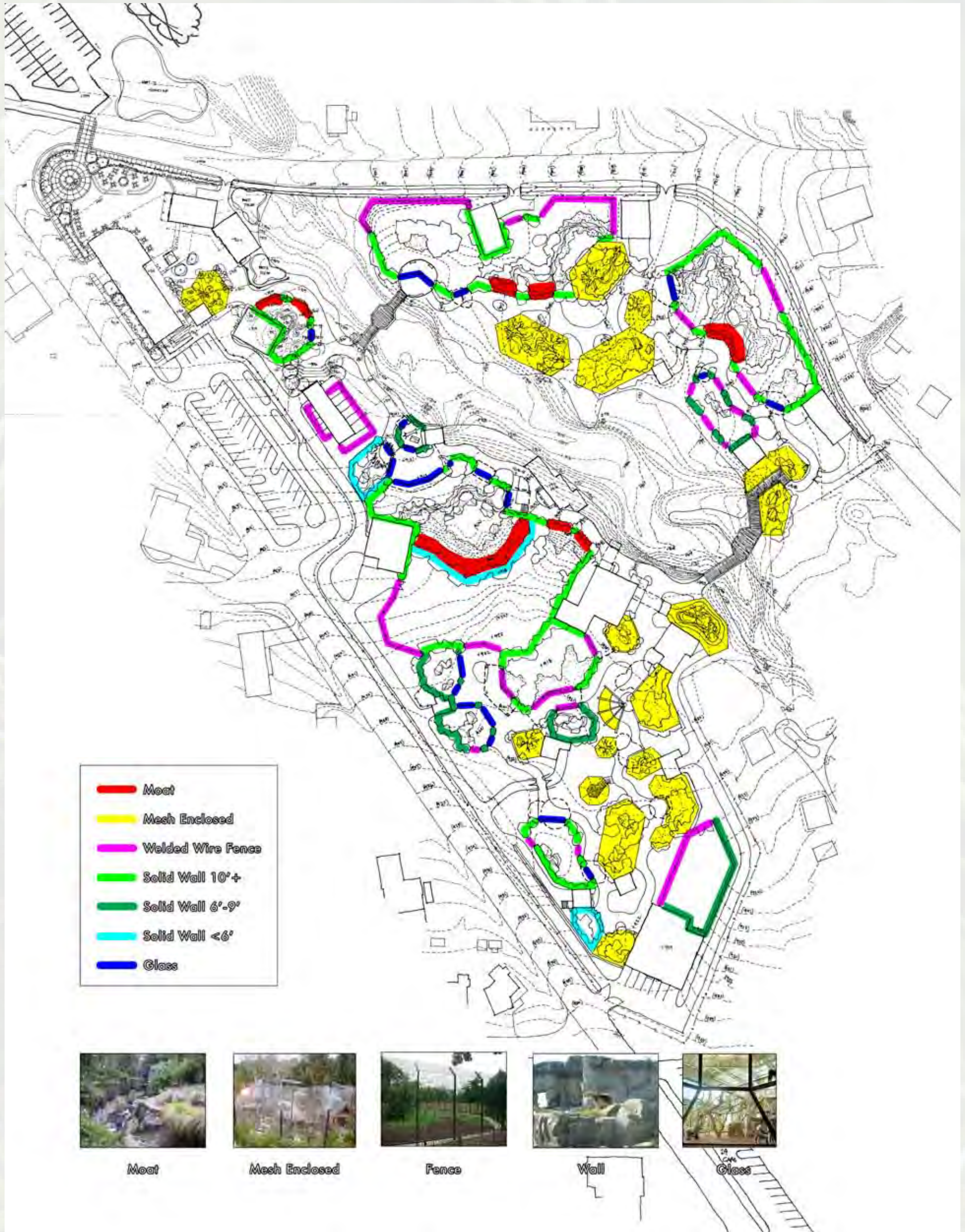
Denotes Phase II addition

Element No.	Building Name	Total Area (sf)	Height (approx. at peak)	Type	Access	Notes
01 20th Century						
01.301	Gift Shop	1,092	20'	Thematic	Guest	
01.302	Tickets	100	15'	Thematic	Guest	
01.303	Restaurant & Administration	2,954	30'	Thematic	Guest	
01.304	Red Fox & Barn Owl Holding	304	12'	Utility	Staff Only	
01.305	Black Bear & Bison / Deer Holding	2,036	12'	Utility	Staff Only	
01.306	Skunk Holding	274	10'	Utility	Staff Only	
01.307	Program Animal Holding	1,418	12'	Utility	Staff Only	
01.308	Amphitheater	700	10'	Thematic	Staff Only	Uncovered seating; Bldg for temp housing of animals / props
01.309	Education Building	1,800	20'	Thematic	Guest	
01.310	Reptile House	1,104	15'	Thematic	Guest	
01.311	Big Horn Sheep Holding	371	20'	Utility	Staff Only	
Zone Total		8,179				
02 Gold Rush						
02.301	Nocturnal House & Grey Fox Holding	860	15'	Utility	Guest	BOH Quality Building in Phase 1
02.302	Raccoon, Porcupine & Raptor Holding	300	12'	Utility	Staff Only	
02.303	Badger & Fisher Holding	155	10'	Utility	Staff Only	
02.304	Toilets, Serval & Marsh Bird Holding	1,295	15'	Thematic	Guest	
02.305	Mule Deer Holding	342	10'	Utility	Staff Only	BOH Quality Building in Phase 1
02.301	Nocturnal House & G. Fox / M. Deer Holding	708	25'	Thematic	Guest	Addition in Phase 2 to include thematic façade
Zone Total		1,315				
03 Organic Future						
03.301	Snow Leopard & Kit Fox Holding	472	10'	Thematic	Staff Only	
03.302	Coatimundi & Lynx Holding	383	12'	Utility	Staff Only	
03.303	Hospital	7,629	30'	Thematic	Guest	
03.305	Arctic Fox	72	10'	Utility	Staff Only	
03.306	African Lion	184	10'	Utility	Staff Only	
Zone Total		8,483				
04 Serrano						
04.301	Coyote & Bobcat Holding	416	12'	Utility	Staff Only	
04.302	Wolf Holding	1,637	10'	Utility	Staff Only	
04.303	Grizzly Holding	1,716	15'	Utility	Staff Only	
04.303	Mt. Lion	323	12'	Utility	Staff Only	
04.304	Maintenance and Grounds	1,764	15'	Utility	Staff Only	
Zone Total		5,856				
Park Total Buildings		23,833				

Moonridge Animal Park Relocation Project Animal Planning Standards

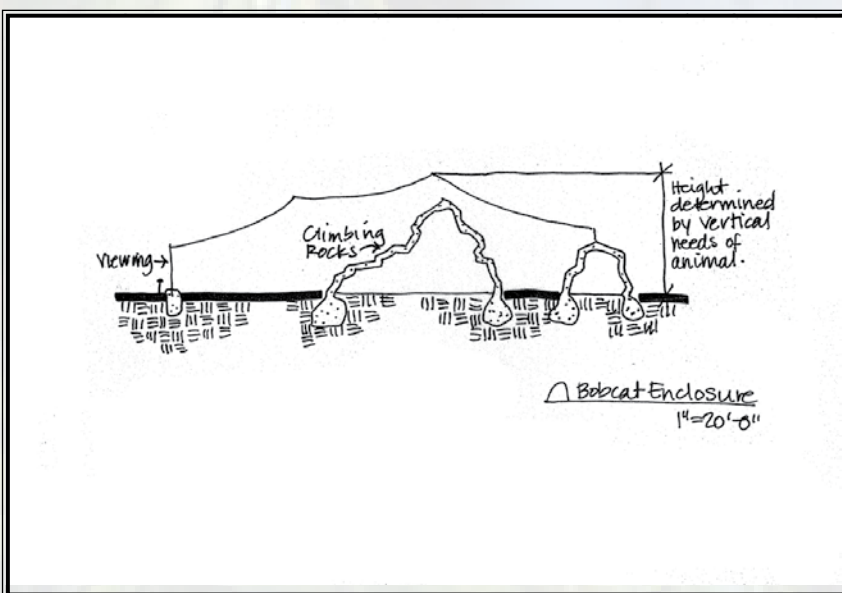
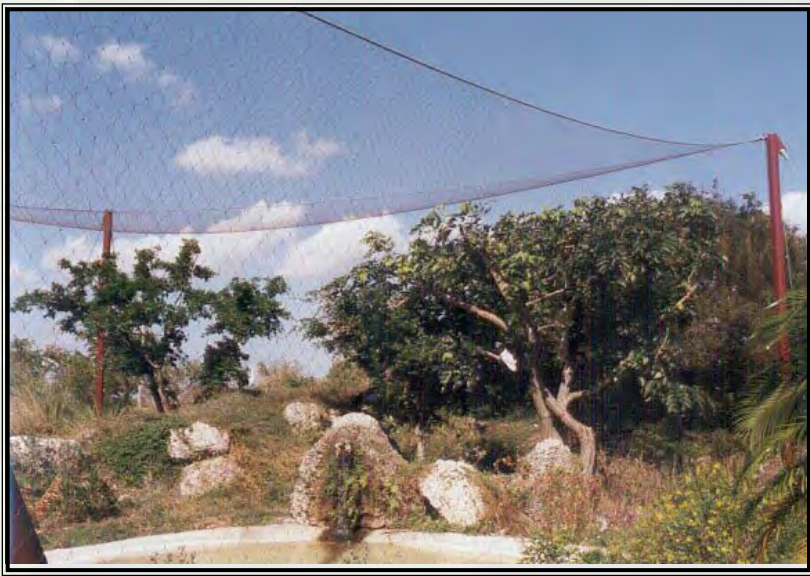
Species	AZA Standard Min.	PGAV Recommended Min.	General Comments
Raptors	N/A		Enclosed aviary for flight, if possible.
American Kestrel			Perches and manipulative objects.
Bald Eagle			Nesting area on exhibit.
Red Tailed Hawk			Small off-exhibit holding.
Golden Eagle			
Turkey Vulture			
Owls	N/A		Nocturnal setting.
Barn Owl			Same as Raptors.
Horned Owl			
Large Felids			Prefer lots of verticality;
Mountain Lion	200 sf / cat; 50% incr / add'l cat	Approx. 600 sf / 1 cat; 25% incr / add'l cat	Complexity of space is key.
Snow Leopard	200 sf / cat; 50% incr / add'l cat	Approx. 600 sf / 1 cat; 25% incr / add'l cat	Rotation is suggested.
Small Felids	Access to 75% of vert. space;		Same as Large Felids
Bobcat	6.5' x 6.5' x 8' per cat; 50% incr / add'l cat	Approx. 400 sf / 1 cat; 25% incr / add'l cat	
Serval	13' x 6.5' x 8' per cat; 50% incr / add'l cat	Approx. 400 sf / 1 cat; 25% incr / add'l cat	
Bear	Dry rest, social area, pool, den required.		12' vertical walls as barriers.
Black Bear	Dry: 300 sf / bear; 50% incr / add'l bear	Dry: Approx. 800 sf / 1 bear; 50% incr / add'l bear	
	Pool: MHD 6', 64 sf / 2 bears; 30 sf / add'l bear	Pool: 150 sf / 2 bears; 50% incr / add'l bear	
	3' min. depth	Running stream of 6" to 12" recommended.	
Grizzly	Dry: 400 sf / bear; 40 sf / add'l bear	Approx. 1000 sf dry / 1 bear; 50% incr / add'l bear	
	Pool: MHD 8', 96 sf / 2 bears; 40 sf / add'l bear	Pool: 300 sf / 2 bears; 50% incr. / add'l bear	
	3' min. depth	Running stream of 12" to 18" recommended.	
Procyonids	Must provide climbing structure, fully enclosed, nest box		Lots of climbing opportunities and manipulative objects. Natural substrates for digging. Concrete edges to prevent escape.
Coatimundi	Min. 81 sf floor / procyonid; 20% incr. / add'l		
Raccoon	Min. 81 sf floor / procyonid; 20% incr. / add'l		
Ringtail	Min. 81 sf floor / procyonid; 20% incr. / add'l		
Canids			8' barrier with concrete mat around perimeter
Coyote	150 sf / canid; 50% incr / add'l canid	800 sf / canid; 50% incr / add'l canid	Social animals, need groups.
Timber Wolf	150 sf / canid; 50% incr / add'l canid	800 sf / canid; 50% incr / add'l canid	Natural substrate for digging. Complexity is key!
Red Fox	6.5' x 6.5' x 5' / canid or pair; 50% incr / add'l canid	400 sf / canid or pair; 50% incr / add'l canid	Gray fox enjoys climbing. Provide vertical.
Grey Fox	6.5' x 6.5' x 5' / canid or pair; 50% incr / add'l canid	400 sf / canid or pair; 50% incr / add'l canid	
Ungulate	Shelter required.		
Mule Deer	1800 sf / small group; larger groups require more space	AZA should be adequate	Attempts at mixed species, free range exhibits should be made.
Wood Bison	N/A		
Mustelids	Must provide shelter to hide.		Provide w/ pool, natural substrate, complexity
Fisher	14' x 7' / mustelid; 50% incr / mustelid	300 sf / mustelid; 25% incr / mustelid	Fishers are excellent climbers/jumpers.
Skunk	10' x 5' / mustelid; 50% incr / mustelid	200 sf / mustelid; 50% incr / mustelid	Terrestrial hunters; generally social.
Badger	10' x 5' / mustelid; 50% incr / mustelid	200 sf / mustelid; 50% incr / mustelid	Diggers; Provide concrete barrier around base
Rodents			3' barrier
Beaver	35.3 cu ft / rodent; 100% incr / rodent	Dry: 200 sf / rodent; 50% incr / rodent	
	Must provide small shelter (lodge) to hide, breed.	Pool: 200 sf / rodent @ min. 3' deep; 100% incr.	
		/ rodent; recommend 12" deep running stream	
Porcupine	3' x 3' x 5' enclosure; 10% incr / rodent	200 sf / rodent; 50% incr. / rodent	Fully enclosed; Provide verticality; Sleep in view
Other Birds	N/A		
Great Blue Heron			Shallow water for wading.
Raven			Interactive exhibit for demonstration of intell.
White Pelican			Deep water for diving and swimming.

Animal Barriers



Animal Barriers

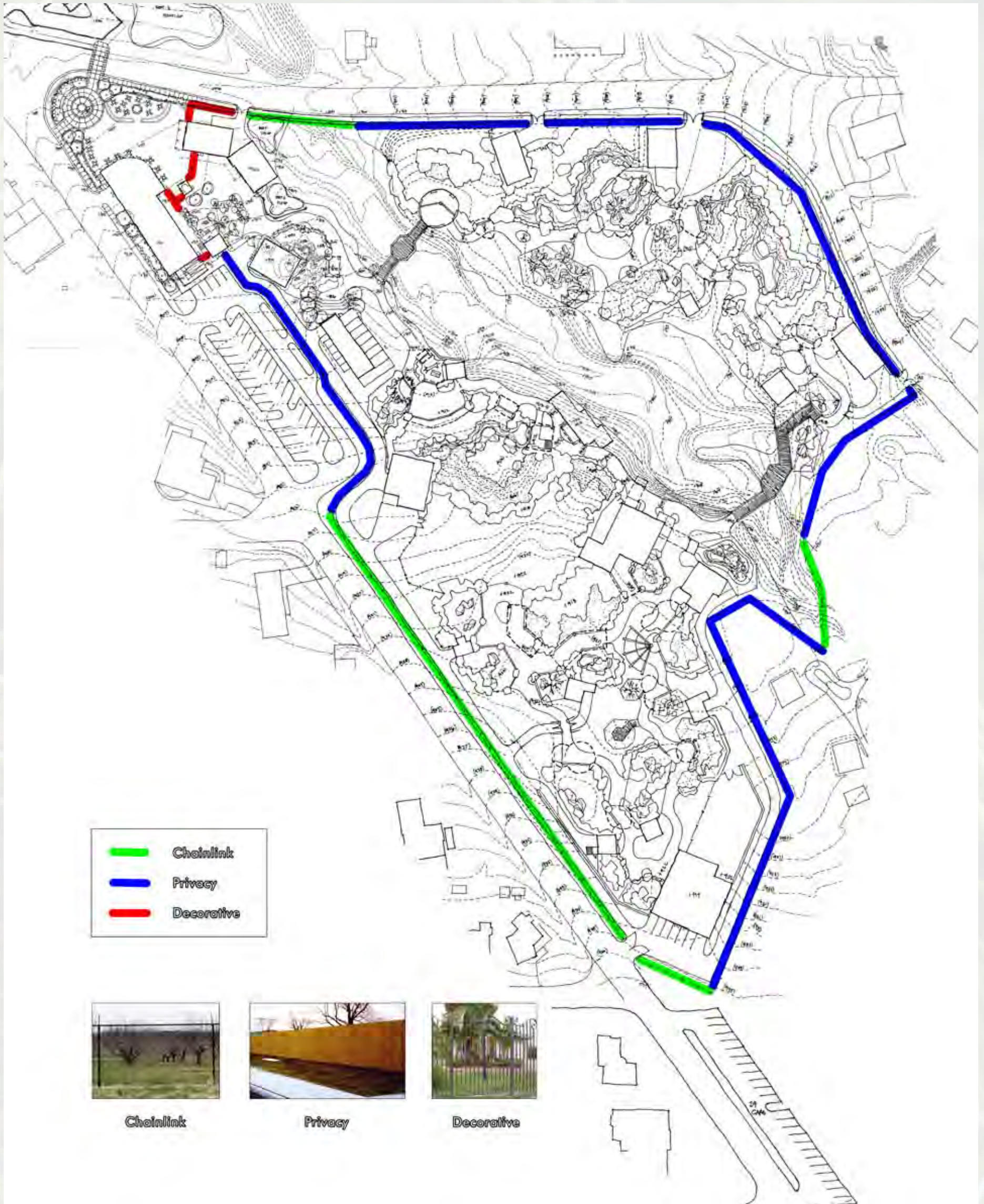
Animal Barriers



Animal Enclosure Mesh

Exhibits for birds and climbing mammals require complete enclosure. Moonridge Animal Park Relocation will utilize woven wire fabric as the barrier. Phantom Mesh, Zoo Mesh, Carlos Mesh and Invisi-Net are several brands of woven wire fabric. Each brand offers various gages, strengths, and opening sizes dependent on the type of animal enclosed. Woven wire fabric is economic, virtually invisible, lightweight, and durable. Most exhibits using this mesh will be no higher than 30' in height at the apex, with the average being 15-20' high. Support poles can be either steel or wood, and will be natural in color to blend with the wooded surroundings. Please see <http://www.pwrconcepts.com/> for further details.

Fencing



Fencing Types

Sample Lighting Fixtures

982 SERIES

Exterior Bollard Luminaire
Architectural Wedge Bollard

SPECIFICATIONS

Description
The 982 Bollard features an architectural wedge in a one or two fixture configuration. The fixture(s) provide a direct, glare free symmetrical distribution with either compact fluorescent or incandescent lamp technology.

Material
Post: 4" Square aluminum post with an aluminum base plate.
U: 8" W x 1 1/2" D aluminum post with an aluminum base plate.
W: 5 1/2" W x 3 1/2" D Select tight-knotted cedar direct burial wood post.
Fixture: One (1) or two (2) 7" H x 8" W x 7" D formed natural bronze housing with either a clear refractive glass lens (INC) or frosted acrylic lens (CFL). Optional clear tempered lens to achieve full cut-off. Aluminum components are used with a painted finish.

Finish
Natural bronze or two component polyurethane paint, 2.5 mil nominal thickness for superior protection against fade or wear.
Post Standard: Black (BK), White (WH).
Post Premium: Plated Satin Zinc (SZ), Grey (GY), Dark Platinum (DP), Graphite Metallic (GRM), Silver Metallic (SM), Gold Metallic (GM), Bronze Metallic (BM) or Custom Color (CC) or Cedar (W). The tight-knotted cedar post will naturally weather over time to a dark gray-brown appearance.
Fixture Standard: Natural Bronze (NBZ).
Fixture Premium: Plated Satin Zinc (SZ), Black (BK), Grey (GY), White (WH), Dark Platinum (DP), Graphite Metallic (GRM), Silver Metallic (SM), Gold Metallic (GM), Bronze Metallic (BM), Verdigris (VG) or Custom Color (CC).

Reflector/Optics
Full cut-off (with optional clear lens), formed white painted aluminum. Refer to www.shaperlighting.com for complete photometrics.

Ballast
One (1) low temperature (0°F, -18°C) AC electronic CFL multi-volt 120/277V (347V-Canada) ballast.

Lamp/Socket
One (1) or two (2) 26W quad (GX24q-3 base), 32W triple (GX24q-3 base) or one (1) 42W triple (GX24q-4 base) 4-pin CFL lamp(s), or one (1) 75W A-19 incandescent lamp. CFL socket injection molded plastic. INC socket fired ceramic rated for 4KV. Lamps furnished by others.

Installation/Electrical
AP and U posts are mounted on base plate with four 3/8" x 6" J-bolts. Three conduit feeds through the center of the base. Supplied with base plate, bolts, mounting hardware and template. W post is direct burial and is supplied with a waterproof J-Box which is mounted at the rear of the wood post.

Options
Photocell (PH), Blunt Nose (BN) (for walking hazard locations), Clear Tempered Glass Lens to achieve full cut-off (TGL).¹

Labels
U.L. and C.U.L. listed for wet location.

Modifications
Contact the factory regarding scale options, unique finishes, mounting, additional materials/colors, or decorative detailing.

ORDERING EXAMPLE 982-W-1-CFL/2-120V-NBZ-NBZ-30-BN

SERIES	POST	FIXTURE#	LAMP	VOLTAGE	FINISH	OVERALL HEIGHT	OPTIONS
982	AP	1	INC/1/75	120V	Post: SZ, BK, GY,	36" Standard	PH, BN
	U	2	CFL/1 (26/32/42W - Triple)	277V (CFL only)	WH, DP, GRM, SM,	or specify other	TGL
	W		CFL/2 (26/32/42W - Triple)	347V (CFL only)	GM, BM or CC (U and AL only)		

Shaper
shaperlighting.com

Dark Skies 3' Light Bollard

Monterey Architectural Lighting

Dimensional Drawings

Fixture	A	B	Max. Watt
MON-1	20"	17.6"	175w
MON-2	30"	24"	400w
MON-3	33.8"	29.3"	1000w

ARCHITECTURAL

The **Monterey** blends decorative architectural styling with high performance optics. The unique design captures the rustic look and feel of the southwest with a bell shape reflector shade and choice of elegant mounting arms. Provides the designer and owner the freedom to create a distinctive theme or signature look.

The advanced optical system provides highly efficient, **vertical lamp, flat lens full cut-off** illumination for neighborhood friendly, Dark Sky approved outdoor lighting.

Available in three enclosure sizes with five distribution patterns. A wide selection of light sources from 70 through 1000 watts are offered, including Pulse Start lamps for superior efficiency, lumen maintenance and color stability.

Applications include shopping centers, parking lots, auto dealerships, and virtually any general outdoor area lighting. For economical street beautification projects, Monterey easily replaces ordinary cobra head fixtures using the optional MAP-01 mast arm fitter.

Model No.	Optics	Wattage	Source	Voltage	Mounting	Finish	Options
MON							
Model No.	Optics	Wattage	Source	Voltage	Mounting	Finish	Options
□ MON-1	□ Type I (T1)	□ 70 (70) □ 100 (100) □ 150 (150) □ 175 (175)	PS, HPS PS, HPS MH, PS (M), (P), (S)	□ 120 (1) □ 208 (2) □ 240 (3)	□ Arm Mount (AM) □ Mast Arm Fitter (MAP-01)	□ Bronze (BZ) □ Black (BK) □ White (WH) □ Green (GN) □ Gray (GY) □ Silver Metallic (SL) □ Custom (CC)	□ Convex Glass Lens (VLGG) *Option Available for Mon-2 and Mon-3 FUSING *Single In-Line Fuse *Specify voltage □ (SF120) □ (SF277) *Double In-Line Fuse *Specify voltage □ (DF208) □ (DF240) □ (DF480) PHOTO CELL *Specify voltage □ (PC120) □ (PC208) □ (PC240) □ (PC277) PHOTO RECEPTACLE *With Shorting Cap □ (PER)
□ MON-2	□ Type II (T2)	□ 250 (250) □ 320 (320) □ 400 (400)	MH PS, HPS PS MH PS, HPS (M), (P), (S)	□ 277 (4) □ 480 (5) □ M.Tap (6)	Multi-Tap ballast factory wired at 277v unless otherwise specified. □ 5-Tap (7) Standard for 400 & 1000w MH only. factory wired at 480v unless otherwise specified. *MAP-01 for Mon-2 and Mon-3 only *See Decorative Arm Section of Catalog for (AM)(WM) Options		
□ MON-3	□ Type III (T3)	*Reduced Envelope Lamp on 400w	PS MH PS, HPS (M), (P), (S)				
	□ Type IV (T4) □ Type V (T5)	□ 750 (750) □ 1000 (1000) *Reduced Envelope Lamp on 1000w	PS MH PS, HPS (M), (P), (S)				

For more detailed information on mounting, wiring, or installation instructions, please consult factory. Note that if Poles are not ordered with fixtures, please specify the mounting requirements. This document contains proprietary information of Visionaire Lighting, LLC. Any use of this information requires the written approval of Visionaire Lighting, LLC. In keeping with our TQM policy of continuous improvement, Visionaire reserves the right to change any specifications contained herein without prior notice.

VISIONAIRE LIGHTING 19645 Rancho Way • Rancho Dominguez, CA • 90220
Tel: (310) 512-6480 • Fax: (310) 512-6486
www.visionairelighting.com

Dark Skies 12' Light Pole

APPENDIX B.1
Air Quality Assessment

Air Quality Assessment For The
BIG BEAR ALPINE ZOO
City of Big Bear Lake

Prepared For:

The Altum Group

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Palm Desert, CA 92260

Submitted By:

Mestre Greve Associates

Division of Landrum & Brown

Fred Greve P.E.

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February 29, 2012

(Revised October 31, 2012)

Project #526302

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1.0 Existing Air Quality

1.1 Project Description

The proposed Big Bear Alpine Zoo project would relocate and expand the existing animal zoo currently located on a 2.5-acre site at 43285 Gold Mine Drive in the City of Big Bear Lake. The zoo will be relocated to an approximate 10.4-acre site at the southeast corner of Moonridge Road and Club View Drive, approximately 1 mile north of its existing location. In addition to the animal exhibits, the proposed animal park would include related buildings such as administration, retail and concession, amphitheater, other support buildings, as well as a 2,500 square foot restaurant. The animal park is being developed by San Bernardino County Special Districts Department (SDD) and construction is anticipated to be completed by 2013. The project includes the demolition of the existing facilities at the current location. A vicinity map showing the project location is presented in Exhibit 1 and the site plan is illustrated in Exhibit 2.

This report analyzes the potential air quality impacts associated with this project. Regional air quality impacts from construction and operation of the proposed project are analyzed, as are potential local air quality impacts.

1.2 Local, State, and Federal Air Quality Agencies

The proposed project is located in the South Coast Air Basin (SCAB). The SCAB is comprised of parts of Los Angeles, Riverside and San Bernardino counties and all of Orange County. The primary agencies responsible for regulations to improve air quality in the SCAB are the South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (CARB). The Southern California Association of Governments (SCAG) is an important partner to the SCAQMD, as it is the designated metropolitan planning authority for the area and produces estimates of anticipated future growth and vehicular travel in the basin which are used for air quality planning. The SCAQMD sets and enforces regulations for non-vehicular sources of air pollution in the basin and works with SCAG to develop and implement Transportation Control Measures (TCM). TCM measures are intended to reduce and improve vehicular travel and associated pollutant emissions.

CARB was established in 1967 by the California Legislature to attain and maintain healthy air quality, conduct research into the causes and solutions to air pollution, and systematically attack the serious problem caused by motor vehicles, which are the major causes of air pollution in the State. CARB sets and enforces emission standards for motor vehicles, fuels, and consumer products. It sets the health based California Ambient Air Quality Standards (CAAQS) and monitors air quality levels throughout the state. The board identifies and sets control measures for toxic air contaminants.

PROJECT SITE

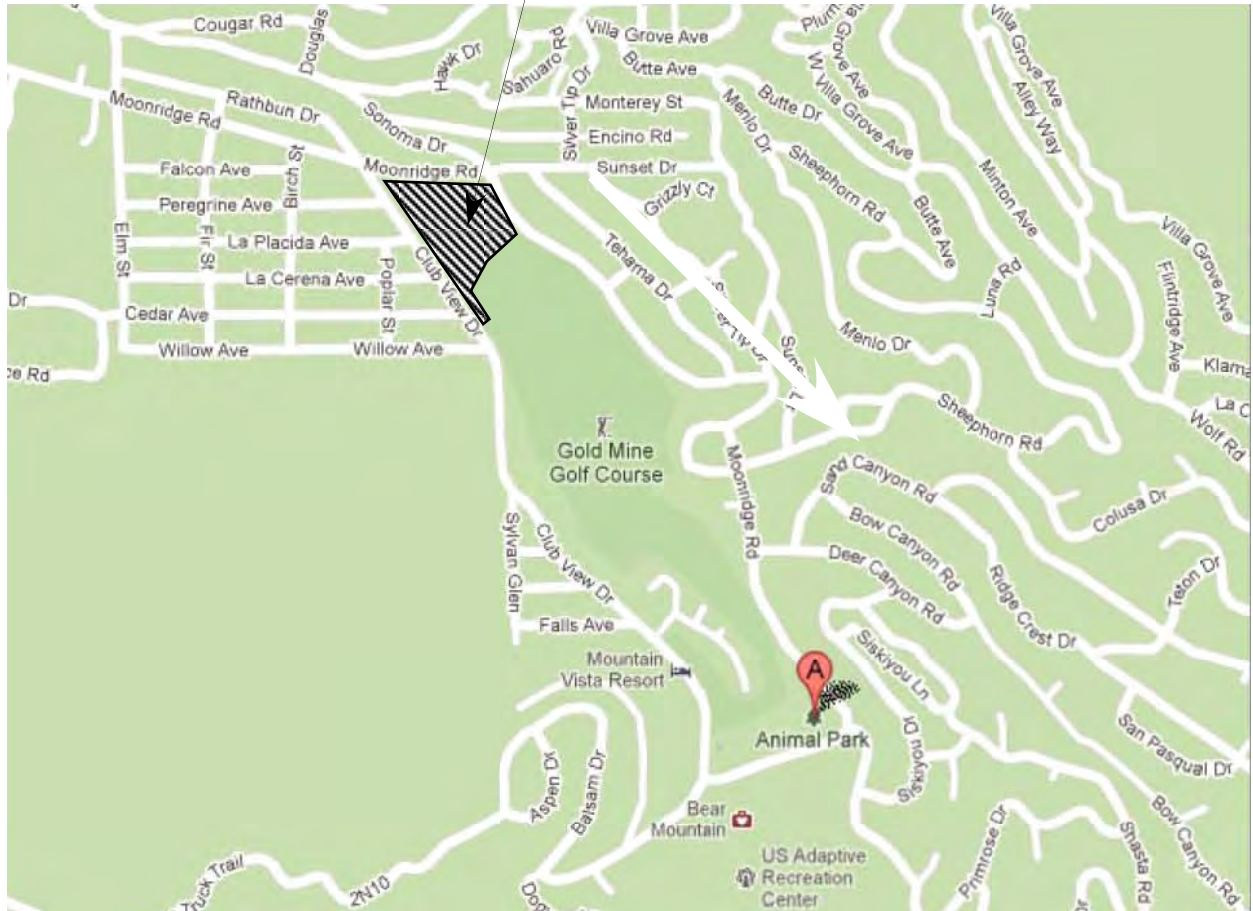




Exhibit 2 Site Plan

The U.S. Environmental Protection Agency (U.S. EPA) is the primary federal agency for regulating air quality. The EPA implements the provisions of the Federal Clean Air Act (FCAA). This Act establishes national ambient air quality standards (NAAQS) that are applicable nationwide. The EPA designates areas with pollutant concentrations that do not meet the NAAQS as non-attainment areas for each criteria pollutant. States are required by the FCAA to prepare State Implementation Plans (SIP) for designated non-attainment areas. The SIP is required to demonstrate how the areas will attain the NAAQS by the prescribed deadlines and what measures will be required to attain the standards. The EPA also oversees implementation of the prescribed measures. Areas that achieve the NAAQS after a non-attainment designation are redesignated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the NAAQS.

The CCAA required all air pollution control districts in the state to prepare a plan prior to December 31, 1994 to reduce pollutant concentrations exceeding the CAAQS and ultimately achieve the CAAQS. The districts are required to review and revise these plans every three years. The SCAQMD satisfies this requirement through the publication of an Air Quality Management Plan (AQMP). The AQMP is developed by SCAQMD and SCAG in coordination with local governments and the private sector. The AQMP is incorporated into the SIP by CARB to satisfy the FCAA requirements discussed above. The AQMP is discussed further in Section 1.5.

1.3 Criteria Pollutants, Health Effects, and Standards

Under the Federal Clean Air Act (FCAA), the U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for six major pollutants; ozone (O_3), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. These six air pollutants are often referred to as the criteria pollutants.

Under the California Clean Air Act (CCAA), the California Air Resources Board has established California Ambient Air Quality Standards (CAAQS) to protect the health and welfare of Californians. State standards have been established for the six criteria pollutants as well as four additional pollutants; visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

Table 1 presents the state and national ambient air quality standards. A brief explanation of each pollutant and their health effects is presented follows.

**Table 1
 Ambient Air Quality Standards**

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards ¹		Federal Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Ozone (O ₃)	1 Hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m ³)		0.075 ppm (147 µg/m ³)		
Respirable Particulate Matter (PM ₁₀)	24 Hour	50 µg/m ³	Gravimetric or Beta Attenuation	150 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m ³		—		
Fine Particulate Matter (PM _{2.5})	24 Hour	No Separate State Standard		35 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ³	Gravimetric or Beta Attenuation	15.0 µg/m ³		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m ³)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m ³)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m ³)		35 ppm (40 mg/m ³)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)		—		
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)	Gas Phase Chemiluminescence	53 ppb (100 µg/m ³) (see footnote 8)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m ³)		100 ppb (188 µg/m ³) (see footnote 8)	None	
Sulfur Dioxide (SO ₂)	24 Hour	0.04 ppm (105 µg/m ³)	Ultraviolet Fluorescence	—	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method) ⁹
	3 Hour	—		—	0.5 ppm (1300 µg/m ³) (see footnote 9)	
	1 Hour	0.25 ppm (655 µg/m ³)		75 ppb (196 µg/m ³) (see footnote 9)	—	
Lead ¹⁰	30 Day Average	1.5 µg/m ³	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m ³	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average ¹¹	—		0.15 µg/m ³		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m ³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence			
Vinyl Chloride ¹⁰	24 Hour	0.01 ppm (26 µg/m ³)	Gas Chromatography			

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990

California Air Resources Board (09/08/10)

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM₁₀, PM_{2.5}, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
 2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM₁₀, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.
 3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
 4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
 5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
 6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
 7. Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.
 8. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the EPA standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.
 9. On June 2, 2010, the U.S. EPA established a new 1-hour SO₂ standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. EPA also proposed a new automated Federal Reference Method (FRM) using ultraviolet technology, but will retain the older parosanaline methods until the new FRM have adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO₂ standard of 0.14 ppm and the annual primary SO₂ standard of 0.030 ppm, effective August 23, 2010.

The secondary SO₂ standard was not revised at that time; however, the secondary standard is undergoing a separate review by EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
 10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
 11. National lead standard, rolling 3-month average: final rule signed October 15, 2008.
-

1.3.1 Ozone (O₃)

Ozone is a secondary pollutant; it is not directly emitted. Ozone is the result of chemical reactions between volatile organic compounds (VOC) (also referred to as reactive organic gasses (ROG)) and nitrogen oxides (NO_x), which occur only in the presence of bright sunlight. Sunlight and hot weather cause ground-level ozone to form in the air. As a result, it is known as a summertime air pollutant. Ground-level ozone is the primary constituent of smog. Because ozone is formed in the atmosphere, high concentrations can occur in areas well away from sources of its constituent pollutants.

People with lung disease, children, older adults, and people who are active can be affected when ozone levels are unhealthy. Numerous scientific studies have linked ground-level ozone exposure to a variety of problems, including lung irritation, breathing difficulties, permanent lung damage, aggravated asthma, and increased susceptibility to pneumonia and bronchitis. Ground-level ozone can have detrimental effects on plants and ecosystems. These effects

include interfering with the ability of sensitive plants to produce and store food, making them more susceptible, damaging the leaves of trees and other plants, and reducing crop yields and forest growth.

1.3.2 Particulate Matter (PM_{10} & $PM_{2.5}$)

Particulate matter includes both aerosols and solid particles of a wide range of size and composition. Of particular concern are those particles smaller than 10 microns in size (PM_{10}) and smaller than or equal to 2.5 microns ($PM_{2.5}$). The size of the particulate matter is referenced to the aerodynamic diameter of the particulate. Smaller particulates are of greater concern because they can penetrate deeper into the lungs than large particles.

The principal health effect of airborne particulate matter is on the respiratory system. Short-term exposures to high $PM_{2.5}$ levels are associated with premature mortality and increased hospital admissions and emergency room visits. Long-term exposures to high $PM_{2.5}$ levels are associated with premature mortality and development of chronic respiratory disease. Short-term exposures to high PM_{10} levels are associated with hospital admissions for cardiopulmonary diseases, increased respiratory symptoms and possible premature mortality. According to a 2010 California Air Resources Board study, $PM_{2.5}$ exposure leads to 9,200 premature deaths annually in CA.

$PM_{2.5}$ is directly emitted in combustion exhaust and formed from atmospheric reactions between of various gaseous pollutants including nitrogen oxides (NO_x) sulfur oxides (SO_x) and volatile organic compounds (VOC). PM_{10} is generally emitted directly as a result of mechanical processes that crush or grind larger particles or the re suspension of dusts most typically through construction activities and vehicular travels. $PM_{2.5}$ can remain suspended in the atmosphere for days and weeks and can be transported long distances. PM_{10} generally settles out of the atmosphere rapidly and are not readily transported over large distances.

1.3.3 Carbon Monoxide (CO)

Carbon monoxide is a colorless and odorless gas, which in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Carbon monoxide combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High carbon monoxide concentrations can lead to headaches, aggravation of cardiovascular disease, and impairment of central nervous system functions. Carbon monoxide concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded intersections, along heavily used roadways carrying slow-moving traffic, and at or near ground level. Even under the most severe meteorological and traffic conditions, high concentrations of carbon monoxide are limited to locations within a relatively short distance (i.e., up to 600 feet or 185 meters) of heavily traveled roadways. Overall carbon monoxide emissions are decreasing as a result of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

1.3.4 Nitrogen Dioxide (NO_2)

Nitrogen gas, normally relatively inert (unreactive), comprises about 80% of the air. Nitrogen dioxide is toxic to various animals as well as to humans. Its toxicity relates to its ability to form nitric acid with water in the eye, lung, mucus membrane and skin. In animals, long-term

exposure to nitrogen oxides increases susceptibility to respiratory infections lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and potentially, lung damage. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

1.3.5 Sulfur Dioxide (SO_2)

Sulfur oxides (SO_x) constitute a class of compounds of which sulfur dioxide (SO_2) and sulfur trioxide (SO_3) are of greatest importance. Combustion of fossil fuels for generation of electric power is the primary contributor of SO_x emissions. Industrial processes, such as nonferrous metal smelting, also contribute to SO_x emissions. SO_x is also formed during combustion of motor fuels. However, most of the sulfur has been removed from fuels greatly reducing SO_x emissions from vehicles.

SO_2 combines easily with water vapor, forming aerosols of sulfurous acid (H_2SO_3), a colorless, mildly corrosive liquid. Peak levels of SO_2 in the air can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposures to high levels of SO_2 gas and particles cause respiratory illness and aggravate existing heart disease. SO_2 reacts with other chemicals in the air to form tiny sulfate particles which are measured as $\text{PM}_{2.5}$. The health effects of $\text{PM}_{2.5}$ are discussed in Section 1.3.2.

1.3.6 Lead (Pb)

Lead is a stable compound, which persists and accumulates both in the environment and in animals. In humans, it affects the blood-forming or hematopoietic, the nervous, and the renal systems. In addition, lead has been shown to affect the normal functions of the reproductive, endocrine, hepatic, cardiovascular, immunological, and gastrointestinal systems, although there is significant individual variability in response to lead exposure. Since 1975, lead emissions have been in decline due in part to the introduction of catalyst-equipped vehicles, and decline in production of leaded gasoline. In general, an analysis of lead is limited to projects that emit significant quantities of the pollutant (i.e. lead smelters) and are not applied to transportation projects.

1.3.7 Visibility Reducing Particulates

Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The Statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

1.3.8 Sulfates (SO_4^{2-})

Sulfates are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and / or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur.

The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

1.3.9 Hydrogen Sulfide (H_2S)

Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. It can also be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard will result in exposure to a very disagreeable odor. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

1.3.10 Vinyl Chloride (Chloroethene)

Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes in liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans.

1.4 South Coast Air Basin Air Quality Attainment Designations

Based on monitored air pollutant concentrations, the U.S. EPA and CARB designate areas relative to their status in attaining the NAAQS and CAAQS respectively. Table 2 lists the current attainment designations for the SCAB. For the Federal standards, the required attainment date is also shown. The Unclassified designation indicates that the air quality data for the area does not support a designation of attainment or nonattainment.

Table 2
Designations of Criteria Pollutants for the SCAB

Pollutant	Federal	State
Ozone (O ₃)	Severe-17 Nonattainment	Nonattainment
8-Hour Ozone	Extreme Nonattainment	
Respirable Particulate Matter (PM ₁₀)	Serious Nonattainment (2006)	Nonattainment
Fine Particulate Matter (PM _{2.5})	Nonattainment (2015)	Nonattainment
Carbon Monoxide (CO)	Attainment/Maintenance (2000)	Attainment
Nitrogen Dioxide (NO ₂)	Attainment/Maintenance (1995)	Attainment
Sulfur Dioxide (SO ₂)	Attainment	Attainment
Lead	Attainment	Attainment
Visibility Reducing Particles	n/a	Unclassified
Sulfates	n/a	Unclassified
Hydrogen Sulfide	n/a	Attainment
Vinyl Chloride	n/a	Attainment

Table 2 shows that the U.S. EPA has designated SCAB as Severe-17 non-attainment for ozone, serious non-attainment for PM₁₀, non-attainment for PM_{2.5}, and attainment/maintenance for CO and NO₂. Additionally, the basin has been designated by the state as non-attainment for ozone, PM₁₀, and PM_{2.5}. The basin is in attainment for federal SO₂ and lead NAAQS as well as the state CO, NO₂, SO₂, lead, hydrogen sulfide, and vinyl chloride CAAQS.

Attainment/non-attainment designations for the new 8-hour ozone standard were issued on April 15, 2004 and became effective, but the 1-hour ozone standard was revoked by the EPA around that same time. California has retained the 1-hour concentration standard of 0.09 ppm. The 8-hour ozone standard has been redesignated from severe-17 non-attainment to extreme with the attainment deadline of 2024. On March 12, 2008, U.S. EPA announced that it was lowering the 8-hour average NAAQS for ozone to 0.075 ppm. To be redesignated as attainment by the state, the basin will need to achieve both the 1-hour and 8-hour ozone standards.

As of 2006, the Basin had met the federal PM₁₀ standards at all monitoring stations except the western Riverside where the annual PM₁₀ standard had not been met. With this change, the basin is technically in attainment of the federal PM₁₀ standards although the redesignation process has not yet begun. However, on September 21, 2006, the U.S. EPA announced that it was revoking the annual PM₁₀ standard.

In July 1997, U.S. EPA issued NAAQS for fine particulate matter (PM_{2.5}). The PM_{2.5} standards include an annual standard set at 15 micrograms per cubic meter (µg/m³), and a 24-hour standard

of $65 \mu\text{g}/\text{m}^3$. In early 2005, EPA took final action to designate attainment and nonattainment areas under the NAAQS for $\text{PM}_{2.5}$ effective April 5, 2005. On September 21, 2006, the U.S. EPA announced that the 24-hour $\text{PM}_{2.5}$ standard was lowered to $35 \mu\text{g}/\text{m}^3$. As of June 29, 2011, the U.S. EPA is proposing to approve California's air quality plans for fine particles - also known as $\text{PM}_{2.5}$ - in the South Coast and San Joaquin Valley. These plans will reduce pollution to the level required by the health based 1997 $\text{PM}_{2.5}$ standard by 2015.

The South Coast AQMD adopted a CO Redesignation Request and Maintenance Plan, with the U.S. EPA's approval in 2007. Effective June 11, 2007, the SCAB was re-designated as attainment/maintenance for the federal CO NAAQS. The plan provides for maintenance of the federal CO air quality standard until at least 2015 and commits to revising the Plan in 2013 to ensure maintenance through 2025.

The federal annual NO_2 standard was met for the first time in 1992 and has not been exceeded since. The SCAB was redesignated as attainment for NO_2 in 1998. On January 24, 2011, the ARB submitted area designation recommendations for the new federal 100 ppb 1 hour NO_2 standard to EPA. They recommended that all of California be designated attainment or unclassified.

Table 2 shows that SCAB is designated as in attainment of the SO_2 and lead NAAQS as well as the state CO, NO_2 , SO_2 , lead, hydrogen sulfide, and vinyl chloride CAAQS. Generally, these pollutants are not considered a concern in the SCAB.

1.5 Air Quality Management Plan (AQMP)

As discussed above, the CAA requires plans to demonstrate attainment of the NAAQS for which an area is designated as nonattainment. Further, the CCAA requires SCAQMD to revise its plan to reduce pollutant concentrations exceeding the CAAQS every three years. The SCAB, SCAQMD and SCAG, in coordination with local governments and the private sector, develop the Air Quality Management Plan (AQMP) for the air basin to satisfy these requirements. The AQMP is the most important air management document for the basin because it provides the blueprint for meeting state and federal ambient air quality standards.

The 2007 AQMP was prepared in response to the implementation of the federal $\text{PM}_{2.5}$ and 8-hour ozone NAAQS. The implementation of the new standards required completion of plan addressing attainment of the 8-hour ozone standard by June of 2007 and completion of a plan addressing the $\text{PM}_{2.5}$ standard one year later, in April of 2008. SCAQMD determined that it was most prudent to prepare an integrated plan to address both pollutants. The attainment date for the $\text{PM}_{2.5}$ NAAQS is earlier (i.e., 2015) than the attainment date for the ozone NAAQS (i.e., 2021) and the district felt that delaying a plan for $\text{PM}_{2.5}$ by a year could jeopardize the basin's ability to attain the standard. Further, development of a plan for ozone would have likely focused on lowering VOC emissions, which would have no effect on $\text{PM}_{2.5}$ levels. Reductions in NO_x emissions result in reductions in both ozone and $\text{PM}_{2.5}$ levels.

The 2007 AQMP demonstrates attainment of the $65 \mu\text{g}/\text{m}^3$ 24-hour average and $15 \mu\text{g}/\text{m}^3$ annual average $\text{PM}_{2.5}$ standard by the 2015 deadline. However, it should be noted that in September of 2006, the U.S. EPA lowered the 24-hour $\text{PM}_{2.5}$ NAAQS to $35 \mu\text{g}/\text{m}^3$. An attainment plan for the revised standard will need to be completed by 2013. The deadline for meeting the revised

standard will not change (i.e., April 2015) but five year extensions to attain the standard may be granted by the U.S. EPA.

It should be noted that on March 12, 2008, the U.S. EPA lowered the 8-hour ozone standard to 0.075 ppm. This effectively lowers the standard 0.009 ppm as 0.084 ppm is considered meeting the 0.08 ppm standard. A plan to attain the revised standard will need to be completed by 2013. Attainment deadlines for the revised standard have not been established and may vary depending on the severity of the exceedances.

1.6 Climate

The climate in and around Southern California, is controlled largely by the strength and position of the subtropical high pressure cell over the Pacific Ocean. It maintains moderate temperatures and comfortable humidity, and limits precipitation to a few storms during the winter "wet" season. Temperatures are normally mild, excepting the summer months, which commonly bring substantially higher temperatures. In all portions of the basin, temperatures well above 100 degrees F. have been recorded in recent years. The annual average temperature in the basin is approximately 62 degrees Fahrenheit.

Winds in the Southern California Area are usually driven by the dominant land/sea breeze circulation system. Regional wind patterns are dominated by daytime onshore sea breezes. At night, the wind generally slows and reverses direction traveling towards the sea. Wind direction will be altered by local canyons, with wind tending to flow parallel to the canyons. During the transition period from one wind pattern to the other, the dominant wind direction rotates into the south and causes a minor wind direction maximum from the south. The frequency of calm winds (less than 2 miles per hour) is less than 10 percent. Therefore, there is little stagnation in the project vicinity, especially during busy daytime traffic hours.

Southern California frequently has temperature inversions, which inhibit the dispersion of pollutants. Inversions may be either ground based or elevated. Ground based inversions, sometimes referred to as radiation inversions, are most severe during clear, cold, early winter mornings. Under conditions of a ground-based inversion, very little mixing or turbulence occurs, and high concentrations of primary pollutants may occur local to major roadways. Elevated inversions can be generated by a variety of meteorological phenomena. Elevated inversions act as a lid or upper boundary and restrict vertical mixing. Below the elevated inversion, dispersion is not restricted. Mixing heights for elevated inversions are lower in the summer and more persistent. This low summer inversion puts a lid over the South Coast Air Basin (SCAB) and is responsible for the high levels of ozone observed during summer months in the air basin.

Pollutant concentrations in the project area are influenced by regional weather patterns discussed above. Considerable ozone levels are experienced in the area due to the inversions and on-shore wind pattern blowing pollutants generated in the developed portions of the SCAB to the project area. However, the high elevation of the project area (nearly 7,000 feet above sea level) results in considerable differences in climate around the project than the lower lying areas of the SCAB. Precipitation is greater in the mountains with an average of 21.2 inches year and measurable precipitation occurring approximately 45 days per year. The area is subject to mountain thunderstorms producing heavy rainfall, even in midsummer when lower elevations are quite dry.

The project area regularly receives snow due to its high elevation. At lake level average snowfall is 61.8 inches per year with measurable snow 17 days per year. Freezing temperatures occur on average 193 days per year and have occurred in every month. January represents the coldest month with an average high of 47° F and an average low of 21° F. July represents the warmest month with an average high of 81° F and an average low of 47° F. The temperature exceeds 90° F only 1.2 days per year on average.

1.7 Monitored Air Quality

Air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates for the SCAB have been made for existing emissions ("2007 Air Quality Management Plan", June 2007). The data indicate that on-road (e.g.; automobiles, busses and trucks) and off-road (e.g.; trains, ships, and construction equipment) mobile sources are the major source of current emissions in the SCAB. Mobile sources account for approximately 64% of VOC emissions, 92% of NO_x emissions, 39% of direct PM_{2.5} emissions, 59% of SO_x emissions and 98% of CO emissions. Area sources (e.g., architectural coatings, residential water heaters, and consumer products) account for approximately 30% of VOC emissions and 32% of direct PM_{2.5} emissions. Point sources (e.g., chemical manufacturing, petroleum production, and electric utilities) account for approximately 38% of SO_x emissions. Entrained road dust account for approximately 20% of direct PM_{2.5} emissions.

The SCAQMD has divided the SCAB into 38 air-monitoring areas with a designated ambient air monitoring station in most areas. The project is in the City of Big Bear Lake. The Crestline monitoring station is the facility identified for this area, located approximately 17 miles west of Big Bear Lake. The data collected at this station is considered representative of the air quality experienced in the vicinity of the project. The air pollutants measured at the Crestline station is available for ozone. Carbon monoxide (CO), nitrogen dioxide, PM₁₀ and PM_{2.5} data are monitored at the next nearest station, the San Bernardino -4th Street station. The air quality data monitored from 2008 to 2010 are presented in Table 3.

The monitoring data presented in Table 3 were obtained from the CARB air quality data website (www.arb.ca.gov/adam/). Federal and State air quality standards are also presented in Table 3.

Table 3
Air Quality Levels Measured at the Crestline/San Bernardino Monitoring Station

Pollutant	California Standard	National Standard	Year	% Msrd. ¹	Max. Level	Days State Standard Exceeded ²	Days National Standard Exceeded ²
Ozone 1 Hour Average	0.09 ppm	None	2010	99	0.142	54	8
			2009	98	0.149	70	7
			2008	99	0.176	78	16
Ozone 8 Hour Average	0.070 ppm	0.08 ppm	2010	99	0.123	98	74
			2009	98	0.117	106	92
			2008	99	0.126	115	97
CO 8 Hour Average	9.0 ppm	9 ppm	2010	88	0.070	0	0
			2009	93	0.065	0	0
			2008	97	0.081	0	0

Table 3 (Continued)
Air Quality Levels Measured at the Crestline/San Bernardino Monitoring Stations

Pollutant	California Standard	National Standard	Year	% Msrd. ¹	Max. Level	Days State Standard Exceeded ²	Days National Standard Exceeded ²
NO ₂ 1 Hour Average	0.18 ppm	100 ppb ⁶	2009	78	0.069	0	--
			2008	98	0.084	0	--
			2007	97	0.091	0	--
NO ₂ AAM ³	0.030 ppm	0.053 ppm	2009	78	0.019	No	No
			2008	98	0.020	No	No
			2007	97	0.022	No	No
Respirable Particulates PM ₁₀ 24 Hour Average	50 µg/m ³	150 µg/m ³	2010	98	63.0	2/13	0
			2009	100	89.0	10/--	0
			2008	100	144.2	17/104	0
Respirable Particulates PM ₁₀ ⁵ AAM ³	20 µg/m ³	50 µg/m ³	2010	98	32.4	--	--
			2009	100	32.7	--	--
			2008	100	37.3	--	--
Fine Particulates PM _{2.5} ⁵ 24 Hour Average	None	65 µg/m ³	2010	97	39.3	n/a	6
			2009	91	37.8	n/a	6
			2008	95	43.5	n/a	10
Fine Particulates PM _{2.5} AAM ³	12 µg/m ³	15 µg/m ³	2010	97	11.1	No	No
			2009	91	12.9	Yes	No
			2008	95	13.3	Yes	No

1. Percent of year where high pollutant levels were expected that measurements were made
2. For annual averaging times a yes or no response is given if the annual average concentration exceeded the applicable standard. For the PM₁₀24 hour standard, daily monitoring is not performed. The first number shown in Days State Standard Exceeded column is the actual number of days measured that State standard was exceeded. The second number shows the number of days the standard would be expected to be exceeded if measurements were taken every day.
3. Annual Arithmetic Mean
4. With the implementation of the federal 8-hour ozone standard, the 1-hour standard was revoked as of June 15, 2005. The previous standard is provided for informational purposes.
5. On September 21, 2006 U.S. EPA announced that it was revoking the annual average PM₁₀ standard and lowering the 24-hour PM_{2.5} standard to 35 µg/m³. The previous standards are presented as the new standards are not fully implemented at this time.
-- Data Not Reported
n/a – no applicable standard
Source: CARB Air Quality Data Statistics web site www.arb.ca.gov/adam/ accessed December 20, 2011.

The monitoring data presented in Table 3 show that ozone and particulate matter (PM₁₀ and PM_{2.5}) are the air pollutants of primary concern in the project area.

The state 1-hour ozone standard was exceeded 54 days in 2010, 92 days in 2009, and 97 days in 2008. The state 8-hour ozone standard was exceeded 98 days in 2010, 106 days in 2009, and 115 days in 2008 at the Crestline station. The federal 8-hour standard has been exceeded between 8 and 16 days in each of the past three years. There does not appear to be a distinct trend in the ozone concentrations.

The federal 24-hour standard has not been exceeded in the last three year at the San Bernardino station. The State 24-hour and annual average PM_{10} data were not reported in the last three years.

The federal 24-hour $PM_{2.5}$ standard was exceeded 6 days in 2009 and 2010, and 10 days in 2008 at the San Bernardino station. The federal 24-hour standard has been exceeded in 2008 and 2009, but not in 2010. The State annual average $PM_{2.5}$ data was not exceeded in the last three years. There does not appear to be a distinct trend in the PM_{10} and $PM_{2.5}$ concentrations.

Carbon monoxide (CO) is another important pollutant that is due mainly to motor vehicles. Currently, CO levels in the project region are in compliance with the state and federal 1-hour and 8-hour standards. CO levels are anticipated to remain in compliance with the ambient air quality standards.

The monitored data shown in Table 3 show that other than ozone, PM_{10} and $PM_{2.5}$ exceedances, no State or Federal standards were exceeded for the remaining criteria pollutants.

2.0 Potential Air Quality Impacts

Air quality impacts are usually divided into short term and long term. Short-term impacts are usually the result of construction operations. Long-term impacts are associated with the built out condition of the proposed project.

2.1 Thresholds of Significance

2.1.1 Regional Air Quality

In their "1993 CEQA Air Quality Handbook", the SCAQMD has established significance thresholds to assess the impact of project related air pollutant emissions. Table 4 presents these significance thresholds. There are separate thresholds for short-term construction and long-term operational emissions. A project with daily emission rates below these thresholds is considered to have a less than significant effect on air quality. It should be noted the thresholds recommended by the SCAQMD are very low and subject to controversy. Per the SCAQMD (and CEQA law), it is up to the individual lead agencies to determine if the SCAQMD thresholds are appropriate for their projects.

Table 4
SCAQMD Regional Pollutant Emission Thresholds of Significance

	Pollutant Emissions (lbs./day)					
	CO	NO _x	VOC	PM ₁₀	PM _{2.5}	SO _x
<i>Construction</i>	550	100	75	150	55	150
<i>Operation</i>	550	55	55	150	55	150

2.1.2 Localized Significance Thresholds

As part of the SCAQMD's environmental justice program, attention was focused on localized effects of air quality. In accordance with Governing Board direction, SCAQMD staff developed localized significance threshold (LST) methodology and mass rate look-up tables by Source Receptor Area (SRA) that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area. The LST methodology is described in "Final Localized Significance Threshold Methodology" updated in 2009 by the SCAQMD and is available at the SCAQMD website (<http://aqmd.gov/ceqa/handbook/LST/LST.html>).

The LST mass rate look-up tables provided by the SCAQMD allow one to determine if the daily emissions for proposed construction or operational activities could result in significant localized air quality impacts. If the calculated on-site emissions for the proposed construction or operational activities are below the LST emission levels found on the LST mass rate look-up tables and no potentially significant impacts are found to be associated with other environmental issues, then the proposed construction or operation activity is not significant for air quality.

The LST mass rate look-up tables are applicable to the following pollutants only: oxides of nitrogen (NO_x), carbon monoxide (CO), particulate matter less than 10 microns in aerodynamic diameter (PM₁₀), and particulate matter less than 2.5 microns (PM_{2.5}). LSTs are derived based on

the location of the activity (i.e., the source/receptor area); the emission rates of NO_x, CO, PM_{2.5} and PM₁₀; and the distance to the nearest exposed individual.

The LST methodology presents mass emission rates for each SRA, project sizes of 1, 2, and 5 acres, and nearest receptor distances of 25, 50, 100, 200, and 500 meters. For project sizes between the values given, or with receptors at distances between the given receptors, the methodology uses linear interpolation to determine the thresholds. If receptors are within 25 meters of the site, the methodology document says that the threshold for the 25-meter distance should be used.

The project site is located in SRA 38. There are surrounding residential areas to the north, east and west. The project site is located approximately 50 feet from the nearest residences. Table 5 summarizes the LSTs for construction.

Table 5 also lists the thresholds to determine if operation of the project results in a significant local air quality impact. The project consists of approximately 10.6 acres; however, the 5 acres is the largest parcel available in the LST methodology. The threshold for operation listed in Table 5 is based on a 5 acre site and the 50 foot distance. A project with daily emission rates below the thresholds during operation is considered to have a less than significant effect on local air quality.

Table 5
Localized Significance Thresholds at the Nearest Receptors

	Localized Significance Threshold (lbs./day)			
	CO	NO _x	PM ₁₀	PM _{2.5}
Construction	2,075	270	14	9
Operation	2,075	270	4	3

2.2 Short-Term Impacts

Temporary impacts will result from project construction activities. Air pollutants will be emitted by construction equipment and fugitive dust will be generated during demolition of the existing building as well as during fine grading and site preparation of the site.

2.2.1 Construction Emission Calculation Methodology

The project site comprises of approximately 10.4 acres. At this time, the construction specific information regarding schedule, type and number of equipment used is not known. The project will involve demolition, site preparation, grading, and construction of the animal park exhibits, buildings and 2,500 square foot restaurant. It is anticipated that the construction of the project would be completed by 2013

Typical emission rates for construction equipment were obtained from CalEEMod (California Emissions Estimator Model) which was released by the SCAQMD in 2011. CalEEMod is a computer program that can be used to estimate emissions including operation (vehicle and area) sources, as well as construction projects associated with land development projects in California.

CalEEMod considers the following phases in its calculation of construction emissions: demolition, site preparation, grading, building construction, paving, and architectural coating (painting). The primary activities would be demolition, site preparation, construction, and painting. The project acres, duration of each construction phase, and other key elements of the project were input into the CalEEMod to generate the estimate of emissions. CalEEMod printouts are included in the Appendix.

Fugitive dust associated with construction activities for large development projects are estimated by the U.S. Environmental Protection Agency (USEPA). If water or other soil stabilizers are used to control dust as required by SCAQMD Rule 403, the emissions can be substantially reduced (i.e., by 50+ percent depending on dust control application type and frequency). For the project, the particulate matter calculations include a 61% reduction from watering exposed areas three times daily (refer to Appendices for CalEEMod assumptions and output).

2.2.2 Construction Activities

Construction of the proposed Big Bear Alpine Zoo is anticipated to take approximately 18 months and be completed by 2014. Construction activities include demolition of the existing structures on the project site, site preparation, grading which includes the import of an estimated 25,000 cubic yards (CY) of fill material, and the construction of buildings and exhibits which includes painting and paving. After the new Animal Park is opened the existing Animal Park will be demolished.

The project also includes construction of an animal hospital in the future based on funding. Activity levels and emissions from construction of the animal hospital would be less than those from the construction of the project reported below. Therefore, if the project emissions do not exceed the significance thresholds then the construction of the animal hospital portion of the project will also be less than the thresholds.

Using CalEEMod, the emissions from construction for the proposed project were calculated and are presented in Table 6. The activities for which emissions have been calculated and the activity levels during each of these activities are described in the following paragraphs. Output files from CalEEMod showing the detailed data used to calculate the emissions are presented in the appendix. Since little information is available regarding the equipment that will be used for construction, the CalEEMod defaults have been used as the basis for this analysis with adjustments applicable to represent the project site and proposed construction.

Demolition is the removal of the existing buildings at the current zoo site. It is assumed that demolition could take approximately 10 days to complete.

Site preparation includes the removal of existing foliage and the preparation of the project site for grading. Site preparation could take approximately 10 days

Grading is the grading of the project site including the import of an estimated 25,000 CY of fill material. Grading is assumed to take at least 75 days. A major component of the grading emissions is particulate matter generated by grading activities. The particulate matter emission estimates include reduction from watering exposed areas three times daily. Additionally, NO_x emissions would be generated by the construction equipment.

Building Construction involves the construction of all proposed buildings and exhibits. Simultaneous construction of all buildings in the project will result in the highest construction emission estimates. However, it is more likely that a number of the animal exhibits and the 2,500 square foot restaurant may be constructed in one phase, while the rest of zoo related buildings be constructed in a different phase. Building construction emissions were calculated for the portion of construction with the greatest amount of activity that will result in the highest emissions. CalEEMod assumed that the building construction phase would take approximately 14 months. The asphalt paving and Architectural Coating construction activities discussed below will occur concurrently with the Building Construction.

Asphalt Paving generates diesel engine exhaust emissions from the paving equipment and asphalt material haul trucks, as well as fugitive ROG emissions from the asphalt itself. CalEEMod assumed that paving would take approximately 20 days.

Architectural Coatings include painting exterior and interior walls as well as coatings applied to windows and window casings. ROGs are emitted from these coatings as well as the solvents used in cleanup of the coatings. The amount of ROGs that are emitted is dependent on the specific coating being used and its VOC content. For this project, only low-VOC paint is assumed to be utilized. It is assumed that the architectural coating occurred for approximately 20 days, based on CalEEMod default assumptions.

Existing MAP Demolition is the demolition of the current animal park facilities. This demolition is anticipated to take six months to complete.

2.2.3 Construction Emissions

Table 6 presents the results of the total emissions calculations for the construction activities discussed above. These emissions represent the highest level of emissions during construction. The projected emissions are compared to the Significance Thresholds described in Section 2.1.1. A worksheet showing the specific data used to calculate the construction emissions is presented in the appendix.

Table 6
Peak Construction Emissions

Activity	Pollutant Emissions (lbs./day)					
	CO	NO _x	VOC	PM ₁₀	PM _{2.5}	SO _x
Demolition	43.9	71.4	9.0	4.3	3.6	0.07
Site Preparation	46.7	80.1	10.0	23.4	13.9	0.07
Grading	38.6	62.9	7.7	52.5	6.7	0.07
Construction	25.1	35.8	5.4	2.6	2.3	0.04
Paving	21.7	32.2	5.3	3.0	2.8	0.03
Painting	2.1	2.8	44.0	0.3	0.2	0.00
Exist. Facil. Demolition	42.1	66.4	8.5	4.2	3.2	0.07
<i>Concurrent Activity Emissions:</i>						
<i>Construct/Paint/Pave</i>	<i>43.9</i>	<i>71.4</i>	<i>9.0</i>	<i>4.3</i>	<i>3.6</i>	<i>0.07</i>
SCQAMD Thresholds	550	100	75	150	55	150
Exceed Threshold?	No	No	No	No	No	No

NOTE: Construction emissions include standard mitigation as required by SCAQMD rules. Particulate (PM₁₀ and PM_{2.5}) emissions includes 61% reduction from watering exposed areas three times daily.

Table 6 shows that the construction emissions are not projected to exceed the significance thresholds established by the SCAQMD. Construction of the project is not projected to result in a significant regional air quality impact. Note that the calculations include a 61% reduction in fugitive dust emissions from watering exposed areas three times daily as required by SCAQMD Rules.

2.2.4 On-Site Construction Emissions – LST Analysis

The on-site emissions were calculated utilizing CalEEMod. The emissions presented in Table 7 are those that would be emitted from activity within the project site. The total on-site construction emissions are compared to the Localized Significance Thresholds (LSTs) described in Section 2.1.2. The output of the CalEEMod emission calculations are presented in the appendix.

Table 7
On-Site Emissions by Construction Activity

Activity	Daily Emissions (lbs./day)			
	CO	NO _x	PM ₁₀	PM _{2.5}
Demolition	42.6	70.7	3.8	3.5
Site Preparation	45.4	80.0	23.1	13.9
Grading	31.0	48.8	6.2	6.1
Construction	23.5	34.7	2.3	2.3
Paving	20.7	32.1	2.7	2.7
Painting	1.9	2.8	0.2	0.2
Exist. Facil. Demolition	41.0	66.2	3.3	3.2
<i>Concurrent Activity Emissions</i>				
<i>Construct/Paint/Pave</i>	<i>46.1</i>	<i>69.5</i>	<i>5.3</i>	<i>5.3</i>
LST Thresholds	2,075	270	14	9
Exceed Threshold?	No	No	No	No

Table 7 shows that the on-site construction related emissions are projected to be less than the LST significance thresholds. Construction of the project is not projected to result in a significant local air quality impact. Note that the calculations include a 61% reduction in fugitive dust emissions from watering exposed areas three times daily as required by SCAQMD Rules.

2.2.5 Diesel Particulate Matter Emissions During Construction

In 1998, the California Air Resources Board (ARB) identified particulate matter from diesel-fueled engines (Diesel Particulate Matter or DPM) as a Toxic Air Contaminant (TAC). It is assumed that the majority of the heavy construction equipment utilized during construction would be diesel fueled and emit DPM. Impacts from toxic substances are related to cumulative exposure and are assessed over a 70-year period. Cancer risk is expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer-causing substance over a 70-year lifetime (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Guide to Health Risk Assessment.) Grading for the project, when the peak diesel exhaust emissions would occur, is expected to occur over an 18-month period with the majority of the construction expected to occur in 2013. Because of the relatively short duration of construction compared to a 70-year lifespan, diesel emissions resulting from the construction of the project are not expected to result in a significant impact.

2.3 Long-Term Impacts

2.3.1 Air Quality Impacts Near Intersections Affected by Traffic

To assess local air quality impacts, the significance thresholds are compared relative to the State Ambient Air Quality Standards. Because the area is in attainment of the CO state standards, exceedances of these standards, 20 ppm for 1-hour carbon monoxide (CO) concentration levels, and 9 ppm for 8-hour CO concentration levels, result in a significant local air quality impact.

Since the air basin has reached attainment of the CO air quality standards, CO analysis is no longer required by the SCAQMD.

In the past, local air quality around intersections is considered a potential issue at intersections with a Level of Service (LOS) of D or worse. The air basin is now in attainment for the CO standards and exceedances of the CO standards should not be expected, even from local intersections with LOS worse than D. Local air pollutant concentrations would not be expected to approach the ambient air quality concentration standards due to local traffic, and therefore, the project site is not anticipated to create a significant impact.

2.3.2 Project Emissions Calculation Methodology

Air pollutant emissions due to the project were calculated using the CalEEMod modeling. Default CalEEMod variables were used for the calculations except the trip generation rate. The project's land uses, daily trip generation, and trip rates were obtained from the study titled "Traffic Impact Analysis Moonridge Animal Park" prepared by Albert A. Webb Associates, Inc., March 2012. The project proposes the development of 10.4 acre animal park, related buildings such as administration, retail and concession, amphitheater, other support buildings, and a 2,500 square foot restaurant. The traffic study concluded that the animal park use would generate 748 external trips. The CalEEMod trip generation rates were modified to match the trip generation estimates from the traffic study.

The project only includes 35 parking spaces in the paved parking lot. Assuming an average stay of half a day at the park this parking lot can only accommodate 70 vehicle trips. The traffic study produced for the project estimates as many as 378 vehicles would visit the site on a peak day. Overflow parking for the additional 308 vehicles will be provided in the Bear Mountain overflow parking lot just northwest of the project. This is an unpaved gravel covered parking lot. Vehicles traveling on unpaved roads kick up considerable amounts of fugitive dust. The amount of fugitive dust generated was calculated using the emission rate suggested by the U.S. E.P.A. Compendium of Emission Factors, AP-42. It was assumed that each vehicle traveled an average of 0.4 miles within the unpaved parking lot.

2.3.3 Operational Emissions

The primary source of regional emissions generated by the proposed project will be from motor vehicles. Other emissions from the project site will be generated from the combustion of natural gas, the use of landscaping equipment, and architectural coatings during maintenance.

CalEEMod calculates maximum daily emissions for the summer periods (June, July and August), and winter periods (December, January and February). The results presented below are the highest daily emissions from either season. In general emissions are the same for both seasons but vehicular CO emissions are somewhat higher in summer and vehicular PM and NO_x emissions are slightly higher in winter. Output files from the CalEEMod program are presented in the appendix and provide the emissions for each season. Table 8 presents the results of the CalEEMod model showing the maximum daily air pollutant emissions for year 2013.

**Table 8
 Project Emissions**

Source	Daily Emissions (lbs./day)					
	CO	VOC	NO _x	PM ₁₀	PM _{2.5}	SO _x
Vehicular Emissions	43.7	4.5	12.3	8.5	0.8	0.07
Natural Gas Combustion	0.2	0.02	0.2	0.02	0.02	0
Landscaping	0	0	0	0	0	0
Consumer Products	0	0.74	0	0	0	0
Architectural Coatings	0	0.24	0	0	0	0
Overflow Parking Lot	0	0	0	72.6	7.2	0
Total Emissions	43.9	5.5	12.5	81.2	8.0	0.07
<i>Significance Threshold</i>	<i>550</i>	<i>55</i>	<i>55</i>	<i>150</i>	<i>55</i>	<i>150</i>
Exceed Threshold?	No	No	No	No	No	No

Table 8 shows that the project emissions are below the SCAQMD Thresholds of Significance, for all criterion pollutants. Therefore, the project is not anticipated to result in a significant air quality impact and long-term mitigation measures are not required.

Table 9 compares the project emissions to the projected basin wide emissions from the 2007 AQMP. This comparison shows that the project represents a very small fraction of the total regional emissions. The project emissions represent, a little more than five thousandths of a percent of the total regional emissions.

**Table 9
 Comparison of Project Emissions with SCAB Emissions**

	Pollutant Emissions (tons/day)					
	CO	VOC	NO _x	PM ₁₀	PM _{2.5}	SO _x
Project Emissions	0.022	0.0028	0.0062	0.041	0.0040	0.000035
2023 South Coast Air Basin*	2,147	95	539	508	318	102
Project as Percent of Basin	0.0010%	0.0029%	0.0012%	0.0080%	0.0013%	0.0000%

* Source: 2007 AQMP Table 3-5A except PM₁₀ from 2003 AQMP Tables 3-5A and 3-5B

2.3.4 Animal Park Odors

The proposed animal enclosures and associated animal waste disposal have the potential to generate objectionable odors. However, with proper care, cleaning, and disposal, considerable odor issues are avoided. We are not aware of any odor related complaints lodged against According to Ms. Debra Richardson, Curator of the current Moonridge Zoo, the animal enclosures are cleaned every day, and all fecal and food matter is removed daily. The animal enclosures are raked if they are dirt or hosed down if they are concrete. Fecal matter is collected and put into dumpsters with lids, and the dumpsters are emptied up three times per week. Six inches of fresh topsoil is brought into enclosures each year or more often as needed in part for odor control. The enclosures of proposed project will be cleaned and sanitized daily in a similar manner to the existing procedures to ensure that disagreeable would not be detected outside the

project boundary. In fact, it is in the best interest of the project to minimize disagreeable odors within the project boundaries for the convenience of its guests.

The existing Moonridge Zoo is accredited by the Zoological Association of America (ZAA). The ZAA accreditation requires, “Fecal and food waste shall be removed from inside, under, and around cages and stored or disposed of in a manner which prevents noxious odors or pests. Cages and enclosures shall be ventilated to prevent noxious odors.” It is the intent of the applicant to obtain ZAA accreditation for the proposed project, which requires inspection of the facility to ensure it is compliant with the accreditation standards.

SCAQMD Rule 402, Nuisance, requires that, “A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.” Any detectable odors outside of the boundary of the proposed animal park would be a violation of this rule and the project would be subject to enforcement actions by the SCAQMD, which regularly and dutifully attends to such complaints.

2.3.5 Operation of the existing Moonridge Zoo has not resulted in any odor issues and the applicant intends to operate the proposed project in the same manner, with the ZAA accreditation, which would be expected to minimize any odor related impacts. If considerable odors are detected outside the facility it will be subject to enforcement of Rule 402 by the SCAQMD. Therefore, the project is not expected to result in a significant odor impact. Potential Health Issues Associated With Project Air Emissions

As shown in previously in Section 2.3, this project would add to long-term emission levels but are below thresholds set by the SCAQMD. As a result, the project's long term emissions would not contribute to the adverse health impacts.

The project represents a very small percentage of the total criteria pollutant emissions in the South Coast Air Basin. Therefore, the increased risk of adverse health effects from project construction and operations air emissions would be relatively small.

2.4 Compliance with Air Quality Planning

The following sections deal with the major air planning requirements for this project. Specifically, consistency of the project with the AQMP is addressed. As discussed below, consistency with the AQMP is a requirement of the California Environmental Quality Act (CEQA).

2.4.1 Consistency with AQMP

An EIR must discuss any inconsistencies between the proposed project and applicable GPs and regional plans (California Environmental Quality Act (CEQA) guidelines (Section 15125)). Regional plans that apply to the proposed project include the South Coast Air Quality Management Plan (AQMP). In this regard, this section will discuss any inconsistencies between the proposed project and the AQMP.

The purpose of the consistency discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the project would interfere with the region's ability to comply with Federal and State air quality standards. If the decision-maker determines that the project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD's CEQA Handbook states that "New or amended GP Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the plan is usually not required. A proposed project should be considered to be consistent with the plan if it furthers one or more policies and does not obstruct other policies. The Handbook identifies two key indicators of consistency:

- (1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP (except as provided for CO in Section 9.4 for relocating CO hot spots).
- (2) Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

Criterion 1 - Increase in the Frequency or Severity of Violations?

Based on the air quality modeling analysis contained in this report, there will not be a significant short-term construction due to the project based on the SCAQMD thresholds of significance. Emissions generated during construction would be below SCAQMD's threshold criteria. It is unlikely that short-term construction activities would increase the frequency or severity of existing air quality violations due to required compliance with SCAQMD Rules and Regulations.

The proposed project will increase regional emissions, and will increase regional emissions by an amount less than the SCAQMD thresholds (Refer to Section 2.1). However, the consistency criteria pertains to local air quality impacts, rather than regional emissions, as defined by the SCAQMD. The SCAQMD has identified CO as the best indicator pollutant for determining whether air quality violations would occur, as CO hot-spot is most directly related to increase in traffic. Nevertheless, the air basin is now in attainment for the CO standards and exceedances of the CO standards are not expected, and local air quality impact modeling is no longer performed (refer to Section 2.3.1). Local air pollutant concentrations would not be expected to exceed the ambient air quality concentration standards due to local traffic, with or without the project. Because the project is not projected to impact the local air quality, the project is found to be consistent with the AQMP for the first criterion.

Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the project with the assumptions in the AQMP. Thus, the emphasis of this criterion is to insure that the analyses conducted for the project are based on the same forecasts as the AQMP. The Regional Comprehensive Plan and Guide (RCP&G) consists of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality,

Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA.

Since the SCAG forecasts are not detailed, the test for consistency of this project is not specific. The traffic modeling methodologies upon which much of the air quality assessment are based on traffic derived from the current Moonridge Zoo daily trips, the report titled “Business Plan for Moonridge Animal Park”, and the ITE Trip Generation, 8th Edition. The AQMP assumptions are based upon projections from local general plans. The AQMP assumptions are based upon projections from local general plans. Projects that are consistent with the local general plan are consistent with the AQMP assumptions. The project is included in the traffic volumes opening year 2013 forecast including regional growth. It appears that the growth forecasts for the proposed project are consistent with the SCAG growth forecasts. Therefore, the second criterion is met for consistency with the AQMP.

3.0 Mitigation Measures

3.1 Short-Term Impacts

The analysis presented in Section 2.2 demonstrates that the project will not result in a significant short-term air quality impact and no mitigation is required. It should be noted that watering is recommended at least three times daily to minimize dust fugitive impacts during the grading. Watering is a standard procedure that is required by SCAQMD rules.

3.2 Long-Term Impacts

The analysis presented in Section 2.3 demonstrates that no significant long-term air quality impacts are anticipated. Therefore, no mitigation measures are necessary.

4.0 Unavoidable Significant Impacts

As discussed above, the project is not projected to result in any unavoidable significant air quality impacts.

Appendix

CalEEMod Output Files

Big Bear Alpine Zoo
San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Parking Lot	35	Space
High Turnover (Sit Down Restaurant)	2.5	1000sqft
User Defined Recreational	169	User Defined Unit

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)		Utility Company	Southern California Edison
Climate Zone	10		2.2		
		Precipitation Freq (Days)			
			32		

1.3 User Entered Comments

- Project Characteristics -
- Land Use - User Defined Recreational is Animal Park and Size Metric is Thousand Guests Per Year-Per Traffic Study. SF is proposed total building area minus restaurant
- Construction Phase - Durations changed to mach project schedule
- Off-road Equipment - Modified to match Appdx D Table 3.2 >=10 acres
- Trips and VMT - Grading haul trips changed to match CalEEMod manual stated default of 16 tons per load and 1.2641662 tons/CY
- Grading - Total Acres changed to site size from questionable CalEEMod
- Vehicle Trips - Trip rates changed to match traffic study. User defined use trip% based on CalEEMod and traffic study.
- Landscape Equipment - Snow days based on NOAA data
- Energy Use - User defined rates based on CalEEMod Retail defaults
- Water And Wastewater - User defined use based on CalEEMod Retail uses for interior and City Park for exterior.
- Solid Waste - User defined based on CalEEMod City Park
- Construction Off-road Equipment Mitigation -
- Energy Mitigation -

Off-road Equipment - .

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	10.01	80.10	46.68	0.08	52.49	3.94	55.82	9.94	3.94	13.88	0.00	8,217.31	0.00	0.90	0.00	8,236.26
2014	43.98	66.38	42.09	0.07	0.98	3.22	4.20	0.01	3.22	3.23	0.00	7,709.42	0.00	0.76	0.00	7,725.38
2015	7.99	61.16	40.60	0.07	0.98	2.93	3.91	0.01	2.93	2.94	0.00	7,705.44	0.00	0.72	0.00	7,720.49
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	10.01	80.10	46.68	0.08	48.70	3.94	52.04	3.88	3.94	7.83	0.00	8,217.31	0.00	0.90	0.00	8,236.26
2014	43.98	66.38	42.09	0.07	0.95	3.22	4.17	0.01	3.22	3.23	0.00	7,709.42	0.00	0.76	0.00	7,725.38
2015	7.99	61.16	40.60	0.07	0.95	2.93	3.88	0.01	2.93	2.94	0.00	7,705.44	0.00	0.72	0.00	7,720.49
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.98	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.02	0.20	0.17	0.00		0.00	0.02		0.00	0.02		239.38		0.00	0.00	240.84

Mobile	4.50	12.25	43.73	0.07	8.05	0.48	8.53	0.28	0.48	0.76		7,662.84		0.29		7,668.92
Total	5.50	12.45	43.90	0.07	8.05	0.48	8.55	0.28	0.48	0.78		7,902.22		0.29	0.00	7,909.76

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.98	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Energy	0.02	0.20	0.17	0.00		0.00	0.02		0.00	0.02		239.38		0.00	0.00	240.84
Mobile	4.50	12.25	43.73	0.07	8.05	0.48	8.53	0.28	0.48	0.76		7,662.84		0.29		7,668.92
Total	5.50	12.45	43.90	0.07	8.05	0.48	8.55	0.28	0.48	0.78		7,902.22		0.29	0.00	7,909.76

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	lb/day										lb/day					
Fugitive Dust					0.25	0.00	0.25	0.00	0.00	0.00						0.00
Off-Road	8.86	70.71	42.55	0.07		3.50	3.50		3.50	3.50		7,510.81		0.80		7,527.57
Total	8.86	70.71	42.55	0.07	0.25	3.50	3.75	0.00	3.50	3.50		7,510.81		0.80		7,527.57

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.05	0.58	0.27	0.00	0.26	0.02	0.28	0.00	0.02	0.03		89.94		0.00		89.99
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.10	0.10	1.11	0.00	0.23	0.01	0.24	0.01	0.01	0.02		183.02		0.01		183.23
Total	0.15	0.68	1.38	0.00	0.49	0.03	0.52	0.01	0.03	0.05		272.96		0.01		273.22

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.10	0.00	0.10	0.00	0.00	0.00						0.00
Off-Road	8.86	70.71	42.55	0.07		3.50	3.50		3.50	3.50	0.00	7,510.81		0.80		7,527.57
Total	8.86	70.71	42.55	0.07	0.10	3.50	3.60	0.00	3.50	3.50	0.00	7,510.81		0.80		7,527.57

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.05	0.58	0.27	0.00	0.26	0.02	0.28	0.00	0.02	0.03		89.94		0.00		89.99
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.10	0.10	1.11	0.00	0.23	0.01	0.24	0.01	0.01	0.02		183.02		0.01		183.23

Total	0.15	0.68	1.38	0.00	0.49	0.03	0.52	0.01	0.03	0.05		272.96		0.01		273.22
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3.3 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.17	0.00	19.17	9.93	0.00	9.93						0.00
Off-Road	9.90	79.99	45.35	0.07		3.93	3.93		3.93	3.93		7,997.69		0.89		8,016.38
Total	9.90	79.99	45.35	0.07	19.17	3.93	23.10	9.93	3.93	13.86		7,997.69		0.89		8,016.38

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.12	0.12	1.33	0.00	0.28	0.01	0.28	0.01	0.01	0.02		219.63		0.01		219.88
Total	0.12	0.12	1.33	0.00	0.28	0.01	0.28	0.01	0.01	0.02		219.63		0.01		219.88

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.48	0.00	7.48	3.87	0.00	3.87						0.00
Off-Road	9.90	79.99	45.35	0.07		3.93	3.93		3.93	3.93	0.00	7,997.69		0.89		8,016.38
Total	9.90	79.99	45.35	0.07	7.48	3.93	11.41	3.87	3.93	7.80	0.00	7,997.69		0.89		8,016.38

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.12	0.12	1.33	0.00	0.28	0.01	0.28	0.01	0.01	0.02		219.63		0.01		219.88
Total	0.12	0.12	1.33	0.00	0.28	0.01	0.28	0.01	0.01	0.02		219.63		0.01		219.88

3.4 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.21	0.00	6.21	3.32	0.00	3.32						0.00
Off-Road	6.36	48.81	31.00	0.05		2.73	2.73		2.73	2.73		5,240.06		0.57		5,252.04
Total	6.36	48.81	31.00	0.05	6.21	2.73	8.94	3.32	2.73	6.05		5,240.06		0.57		5,252.04

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.21	13.98	6.47	0.02	46.05	0.60	46.65	0.07	0.60	0.67		2,154.15		0.06		2,155.38
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.10	0.10	1.11	0.00	0.23	0.01	0.24	0.01	0.01	0.02		183.02		0.01		183.23
Total	1.31	14.08	7.58	0.02	46.28	0.61	46.89	0.08	0.61	0.69		2,337.17		0.07		2,338.61

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.42	0.00	2.42	1.29	0.00	1.29						0.00

Off-Road	6.36	48.81	31.00	0.05		2.73	2.73		2.73	2.73	0.00	5,240.06		0.57		5,252.04
Total	6.36	48.81	31.00	0.05	2.42	2.73	5.15	1.29	2.73	4.02	0.00	5,240.06		0.57		5,252.04

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.21	13.98	6.47	0.02	46.05	0.60	46.65	0.07	0.60	0.67		2,154.15		0.06		2,155.38
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.10	0.10	1.11	0.00	0.23	0.01	0.24	0.01	0.01	0.02		183.02		0.01		183.23
Total	1.31	14.08	7.58	0.02	46.28	0.61	46.89	0.08	0.61	0.69		2,337.17		0.07		2,338.61

3.5 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.17	34.66	23.45	0.04		2.28	2.28		2.28	2.28		4,040.62		0.46		4,050.31
Total	5.17	34.66	23.45	0.04		2.28	2.28		2.28	2.28		4,040.62		0.46		4,050.31

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.08	0.99	0.50	0.00	0.06	0.03	0.09	0.00	0.03	0.04		164.63		0.00		164.71
Worker	0.10	0.10	1.18	0.00	0.25	0.01	0.25	0.01	0.01	0.02		195.22		0.01		195.45
Total	0.18	1.09	1.68	0.00	0.31	0.04	0.34	0.01	0.04	0.06		359.85		0.01		360.16

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.17	34.66	23.45	0.04		2.28	2.28		2.28	2.28	0.00	4,040.62		0.46		4,050.31
Total	5.17	34.66	23.45	0.04		2.28	2.28		2.28	2.28	0.00	4,040.62		0.46		4,050.31

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.08	0.99	0.50	0.00	0.06	0.03	0.09	0.00	0.03	0.04		164.63		0.00		164.71
Worker	0.10	0.10	1.18	0.00	0.25	0.01	0.25	0.01	0.01	0.02		195.22		0.01		195.45
Total	0.18	1.09	1.68	0.00	0.31	0.04	0.34	0.01	0.04	0.06		359.85		0.01		360.16

3.5 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.74	32.06	23.20	0.04		2.02	2.02		2.02	2.02		4,040.61		0.42		4,049.51
Total	4.74	32.06	23.20	0.04		2.02	2.02		2.02	2.02		4,040.61		0.42		4,049.51

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00

Vendor	0.07	0.90	0.46	0.00	0.06	0.03	0.09	0.00	0.03	0.03		164.97		0.00		165.04
Worker	0.09	0.09	1.09	0.00	0.25	0.01	0.25	0.01	0.01	0.02		191.64		0.01		191.85
Total	0.16	0.99	1.55	0.00	0.31	0.04	0.34	0.01	0.04	0.05		356.61		0.01		356.89

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.74	32.06	23.20	0.04		2.02	2.02		2.02	2.02	0.00	4,040.61		0.42		4,049.51
Total	4.74	32.06	23.20	0.04		2.02	2.02		2.02	2.02	0.00	4,040.61		0.42		4,049.51

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.07	0.90	0.46	0.00	0.06	0.03	0.09	0.00	0.03	0.03		164.97		0.00		165.04
Worker	0.09	0.09	1.09	0.00	0.25	0.01	0.25	0.01	0.01	0.02		191.64		0.01		191.85
Total	0.16	0.99	1.55	0.00	0.31	0.04	0.34	0.01	0.04	0.05		356.61		0.01		356.89

3.6 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.20	32.09	20.70	0.03		2.74	2.74		2.74	2.74		2,917.65		0.47		2,927.48
Paving	0.04					0.00	0.00		0.00	0.00						0.00
Total	5.24	32.09	20.70	0.03		2.74	2.74		2.74	2.74		2,917.65		0.47		2,927.48

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.09	0.09	1.02	0.00	0.23	0.01	0.24	0.01	0.01	0.02		179.67		0.01		179.86
Total	0.09	0.09	1.02	0.00	0.23	0.01	0.24	0.01	0.01	0.02		179.67		0.01		179.86

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.20	32.09	20.70	0.03		2.74	2.74		2.74	2.74	0.00	2,917.65		0.47		2,927.48
Paving	0.04					0.00	0.00		0.00	0.00						0.00
Total	5.24	32.09	20.70	0.03		2.74	2.74		2.74	2.74	0.00	2,917.65		0.47		2,927.48

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.09	0.09	1.02	0.00	0.23	0.01	0.24	0.01	0.01	0.02		179.67		0.01		179.86
Total	0.09	0.09	1.02	0.00	0.23	0.01	0.24	0.01	0.01	0.02		179.67		0.01		179.86

3.7 Architectural Coating - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	lb/day										lb/day					
Archit. Coating	43.51					0.00	0.00		0.00	0.00						0.00
Off-Road	0.45	2.77	1.92	0.00		0.24	0.24		0.24	0.24		281.19		0.04		282.03
Total	43.96	2.77	1.92	0.00		0.24	0.24		0.24	0.24		281.19		0.04		282.03

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.02	0.02	0.20	0.00	0.05	0.00	0.05	0.00	0.00	0.00		35.93		0.00		35.97
Total	0.02	0.02	0.20	0.00	0.05	0.00	0.05	0.00	0.00	0.00		35.93		0.00		35.97

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	43.51					0.00	0.00		0.00	0.00						0.00
Off-Road	0.45	2.77	1.92	0.00		0.24	0.24		0.24	0.24	0.00	281.19		0.04		282.03
Total	43.96	2.77	1.92	0.00		0.24	0.24		0.24	0.24	0.00	281.19		0.04		282.03

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.02	0.02	0.20	0.00	0.05	0.00	0.05	0.00	0.00	0.00		35.93		0.00		35.97

Total	0.02	0.02	0.20	0.00	0.05	0.00	0.05	0.00	0.00	0.00		35.93		0.00		35.97
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3.8 Existing MAP Demolition - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.05	0.00	0.05	0.00	0.00	0.00						0.00
Off-Road	8.39	66.18	41.03	0.07		3.21	3.21		3.21	3.21		7,510.81		0.75		7,526.57
Total	8.39	66.18	41.03	0.07	0.05	3.21	3.26	0.00	3.21	3.21		7,510.81		0.75		7,526.57

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.01	0.11	0.05	0.00	0.70	0.00	0.70	0.00	0.00	0.01		18.94		0.00		18.95
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.09	0.09	1.02	0.00	0.23	0.01	0.24	0.01	0.01	0.02		179.67		0.01		179.86
Total	0.10	0.20	1.07	0.00	0.93	0.01	0.94	0.01	0.01	0.03		198.61		0.01		198.81

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.02	0.00	0.02	0.00	0.00	0.00						0.00
Off-Road	8.39	66.18	41.03	0.07		3.21	3.21		3.21	3.21	0.00	7,510.81		0.75		7,526.57
Total	8.39	66.18	41.03	0.07	0.02	3.21	3.23	0.00	3.21	3.21	0.00	7,510.81		0.75		7,526.57

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.01	0.11	0.05	0.00	0.70	0.00	0.70	0.00	0.00	0.01		18.94		0.00		18.95
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.09	0.09	1.02	0.00	0.23	0.01	0.24	0.01	0.01	0.02		179.67		0.01		179.86
Total	0.10	0.20	1.07	0.00	0.93	0.01	0.94	0.01	0.01	0.03		198.61		0.01		198.81

3.8 Existing MAP Demolition - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.05	0.00	0.05	0.00	0.00	0.00						0.00
Off-Road	7.90	60.98	39.63	0.07		2.92	2.92		2.92	2.92		7,510.81		0.71		7,525.67
Total	7.90	60.98	39.63	0.07	0.05	2.92	2.97	0.00	2.92	2.92		7,510.81		0.71		7,525.67

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.01	0.10	0.05	0.00	0.70	0.00	0.70	0.00	0.00	0.00		18.97		0.00		18.98
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.08	0.08	0.93	0.00	0.23	0.01	0.24	0.01	0.01	0.02		175.65		0.01		175.83
Total	0.09	0.18	0.98	0.00	0.93	0.01	0.94	0.01	0.01	0.02		194.62		0.01		194.81

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.02	0.00	0.02	0.00	0.00	0.00						0.00

Off-Road	7.90	60.98	39.63	0.07		2.92	2.92		2.92	2.92	0.00	7,510.81		0.71		7,525.67
Total	7.90	60.98	39.63	0.07	0.02	2.92	2.94	0.00	2.92	2.92	0.00	7,510.81		0.71		7,525.67

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.01	0.10	0.05	0.00	0.70	0.00	0.70	0.00	0.00	0.00		18.97		0.00		18.98
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.08	0.08	0.93	0.00	0.23	0.01	0.24	0.01	0.01	0.02		175.65		0.01		175.83
Total	0.09	0.18	0.98	0.00	0.93	0.01	0.94	0.01	0.01	0.02		194.62		0.01		194.81

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.50	12.25	43.73	0.07	8.05	0.48	8.53	0.28	0.48	0.76		7,662.84		0.29		7,668.92
Unmitigated	4.50	12.25	43.73	0.07	8.05	0.48	8.53	0.28	0.48	0.76		7,662.84		0.29		7,668.92
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

4.2 Trip Summary Information

	Average Daily Trip Rate	Unmitigated	Mitigated
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Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
High Turnover (Sit Down Restaurant)	282.53	282.53	282.53	995,801	995,801
Parking Lot	0.00	0.00	0.00		
User Defined Recreational	464.75	464.75	464.75	1,433,594	1,433,594
Total	747.28	747.28	747.28	2,429,395	2,429,395

4.3 Trip Type Information

Land Use	Miles			Trip %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
High Turnover (Sit Down Restaurant)	8.90	13.30	7.40	8.50	72.50	19.00
Parking Lot	8.90	13.30	7.40	0.00	0.00	0.00
User Defined Recreational	8.90	13.30	7.40	33.00	48.00	19.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.02	0.20	0.17	0.00		0.00	0.02		0.00	0.02		239.38		0.00	0.00	240.84
NaturalGas Unmitigated	0.02	0.20	0.17	0.00		0.00	0.02		0.00	0.02		239.38		0.00	0.00	240.84
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
High Turnover (Sit Down Restaurant)	1900.75	0.02	0.19	0.16	0.00		0.00	0.01		0.00	0.01		223.62		0.00	0.00	224.98

Parking Lot	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
User Defined Recreational	134.007	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.77		0.00	0.00	15.86
Total		0.02	0.20	0.17	0.00		0.00	0.01		0.00	0.01		239.39		0.00	0.00	240.84

Mitigated

	Natural Gas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kB1U	lb/day										lb/day					
High Turnover (Sit Down Restaurant)	1.90075	0.02	0.19	0.16	0.00		0.00	0.01		0.00	0.01		223.62		0.00	0.00	224.98
Parking Lot	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
User Defined Recreational	0.134007	0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00		15.77		0.00	0.00	15.86
Total		0.02	0.20	0.17	0.00		0.00	0.01		0.00	0.01		239.39		0.00	0.00	240.84

6.0 Area Detail

6.1 Mitigation Measures Area

- Use Low VOC Paint - Residential Interior
- Use Low VOC Paint - Residential Exterior
- Use Low VOC Paint - Non-Residential Interior
- Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.98	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Unmitigated	0.98	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.24					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.74					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	0.98	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.24					0.00	0.00		0.00	0.00						0.00
Consumer Products	0.74					0.00	0.00		0.00	0.00						0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	0.98	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

APPENDIX B.2 Greenhouse Gasses Assessment

Greenhouse Gas Assessment For The
BIG BEAR ALPINE ZOO
City of Big Bear Lake

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Project #526302

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1.0 Background Information

1.1 Project Description

The Big Bear Alpine Zoo project would relocate and expand the existing animal park. The project site encompasses approximately 10.4 acres. In addition to the animal exhibits, the proposed animal park would include related buildings such as administration, retail and concession, amphitheater, other support buildings, and the 2,500 square foot restaurant.

The proposed zoo is being relocated near the golf course, on the southeast corner of Moonridge Road and Sunset Drive, less than one mile north of its current location, in the City of Big Bear Lake sphere-of-influence. The zoo animal park is being developed by San Bernardino County Special Districts Department (SDD). The project is anticipated to be completed by 2013. The project includes the demolition of the existing 2.5 acre zoo facilities at the current location. The conceptual site plan is illustrated in Exhibit 1.

This report analyzes the potential climate change impacts associated with this project. Both the greenhouse gas emissions generated by construction and operation of the project are assessed.

1.2 Greenhouse Gases and Climate Change

Impact of Climate Change. The Earth's climate has always been in the process of changing, due to many different natural factors. These factors have included changes in the Earth's orbit, volcanic eruptions, and varying amounts of energy released from the sun. Differences such as these have caused fluctuations in the temperature of the climate, ranging from ice ages to long periods of warmth. However, since the late 18th century, humans have had an increasing impact of the rate of climate change, beginning with the Industrial Revolution.

Many human activities have augmented the amount of "greenhouse gases" ("GHGs") being released into our atmosphere, specifically the burning of fossil fuels, such as coal and oil, and deforestation. The gases increase the efficiency of the greenhouse effect, which is the process of trapping and recycling energy (in the form of heat) that the Earth emits naturally, resulting in higher temperatures worldwide. The Intergovernmental Panel on Climate Change stated in February 2007 that warming is unequivocal, expressing very high confidence (expressed as a nine out of ten chance of being correct) that the net effect of human activities since 1750 has been one of warming. According to the National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) data, the average surface temperature of the Earth has increased by about 1.2 to 1.4 °F in the last 100 years. The eight warmest years on record (since 1850) have all occurred since 1998, with the warmest year being 2005. [EPA, 2011, epa.gov/climatechange/basicinfo.html].



Exhibit 1
Conceptual Site Plan

This process of heating is often referred to as ‘global warming,’ although the National Academy of Sciences prefers the terms ‘climate change’ as an umbrella phrase which includes global warming as well as other environmental changes, in addition to the increasing temperatures. Some of these effects include changes to rainfall, wind, and current weather patterns, as well as snow and ice cover, and sea level.

If greenhouse gases continue to increase, climate models predict that the average temperature at the Earth's surface could increase from 3.2 to 7.2°F above 1990 levels by the end of this century. The degree of change is influenced by the assumed amount of GHG emissions, and how quickly atmospheric GHG levels are stabilized. At this point, however, the climate change models are not capable of predicting local impacts, but rather, can only predict global trends. [EPA, 2011, epa.gov/climatechange/basicinfo.html].

Global GHG emissions are measured in million metric tons of carbon dioxide equivalent (“MMT CO₂EQ”) units. A metric ton is approximately 2,205 lbs. Some GHGs emitted into the atmosphere are naturally occurring, while others are caused solely by human activities. The principal GHGs that enter the atmosphere because of human activities are:

- **Carbon dioxide (CO₂)** enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), agriculture, irrigation, and deforestation, as well as the manufacturing of cement.
- **Methane (CH₄)** is emitted through the production and transportation of coal, natural gas, and oil, as well as from livestock. Other agricultural activities influence methane emissions as well as the decay of waste in landfills.
- **Nitrous oxide (N₂O)** is released most often during the burning of fuel at high temperatures. This greenhouse gas is caused mostly by motor vehicles, which also include non-road vehicles, such as those used for agriculture.
- **Fluorinated Gases** are emitted primarily from industrial sources, which often include hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF₆). Though they are often released in smaller quantities, they are referred to as High Global Warming Potential Gases because of their ability to cause global warming. Fluorinated gases are often used as substitutes for ozone depleting substances.

These gases have different potentials for trapping heat in the atmosphere, called global warming potential (“GWP”). For example, one pound of methane has 21 times more heat capturing potential than one pound of carbon dioxide. When dealing with an array of emissions, the gases are converted to carbon dioxide equivalents for comparison purposes. The GWPs for common greenhouse gases are shown in Table 1.

Table 1
Global Warming Potentials (GWP)

Gas	Global Warming Potential
Carbon Dioxide	1
Methane	21
Nitrous Oxide	310
HFC-23	11,700
HFC-134a	1,300
HFC-152a	140
PFC: Tetrafluoromethane (CF ₄)	6,500
PFC: Hexafluoroethane (C ₂ F ₆)	9,200
Sulfur Hexafluoride (SF ₆)	23,900

Source: EPA 2011. "Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009," February 15, 2011.

Impact of Climate Change on California and Human Health. The long-term environmental impacts of global warming may include sea level rise that could cause devastating erosion and flooding of coastal cities and villages, as well as more intense hurricanes and typhoons worldwide. In the United States, Chicago is projected to experience 25 percent more frequent heat waves and Los Angeles a four-to-eight-fold increase in heat wave days by the end of the century (IPCC, 2007: Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge).

Locally, global warming could cause changing weather patterns with increased storm and drought severity in California. Changes to local and regional ecosystems include the potential loss of species and a significant reduction in winter snow pack (e.g., estimates include a 30 to 90% reduction in snow pack in the Sierra Nevada mountain range). Current data suggest that in the next 25 years, in every season of the year, California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods. The California Climate Change Center (2006) predicted that California could witness the following events:

- Temperature rises between 3 and 10.5 °F
- 6 to 20 inches or more increase in sea level
- 2 to 4 times as many heat-wave days in major urban centers
- 2 to 6 times as many heat-related deaths in major urban centers
- 1 to 1.5 times more critically dry years
- 10 to 55% increase in the risk of wildfires

An increase in the frequency of extreme events may result in more event-related deaths, injuries, infectious diseases, and stress-related disorders. Particular segments of the population such as those with heart problems, asthma, the elderly, the very young and the homeless can be especially vulnerable to extreme heat. Also, climate change may increase the risk of some infectious diseases; particularly those diseases that appear in warm areas and are spread by

mosquitoes and other insects. These "vector-borne" diseases include malaria, dengue fever, yellow fever, and encephalitis. Also, algal blooms could occur more frequently as temperatures warm — particularly in areas with polluted waters — in which case diseases (such as cholera) that tend to accompany algal blooms could become more frequent.

Adaptation Impact. Adaptation refers to potential climate change impacts on the project. Global warming is already having a profound impact on water resources. Climate change already altered the weather patterns and water supply in California leading to increased water shortages (i.e., a dwindling snowpack, bigger flood flows, rising sea levels, longer and harsher droughts). Water supplies are also at risk from rising sea levels. Risks may include degradation of California's estuaries, wetlands, and groundwater aquifers which would threaten the quality and reliability of the major California fresh water supply (Climate Change Adaptation Strategies for California's Water, State of California Department of Water Resources, October 2008).

Higher temperatures will also likely increase electricity demand due to higher air conditioning use. Even if the population remained unchanged, toward the end of the century annual electricity demand could increase by as much as 20 percent if temperatures rise into the higher warming range. (Implementing aggressive efficiency measures could lower this estimate).

Higher temperatures may require that the project consume more electricity for cooling. Additionally, more water may be needed for the landscaping. However, sea level rise will not impact the project because it is so far and high relative to the ocean.

Adaptation includes the responses to the changing climate and policies to minimize the predicted impacts (e.g., building better coastal defenses to sea level rise). Adaptation is not included in this report. It should be note that adaptation is not mitigation. Mitigation includes intervention or policies to reduce GHG emissions or to enhance the sinks of GHGs.

1.3 Emission Inventories

To put perspective on the emissions generated by a project and to better understand the sources of GHGs, it is important to look at emission inventories. The United Nations has taken the lead in quantifying GHG emissions and compiling the literature on climate change. The United Nations estimate for CO₂ emissions for the world and for the top ten CO₂ producing countries is presented in Table 2.

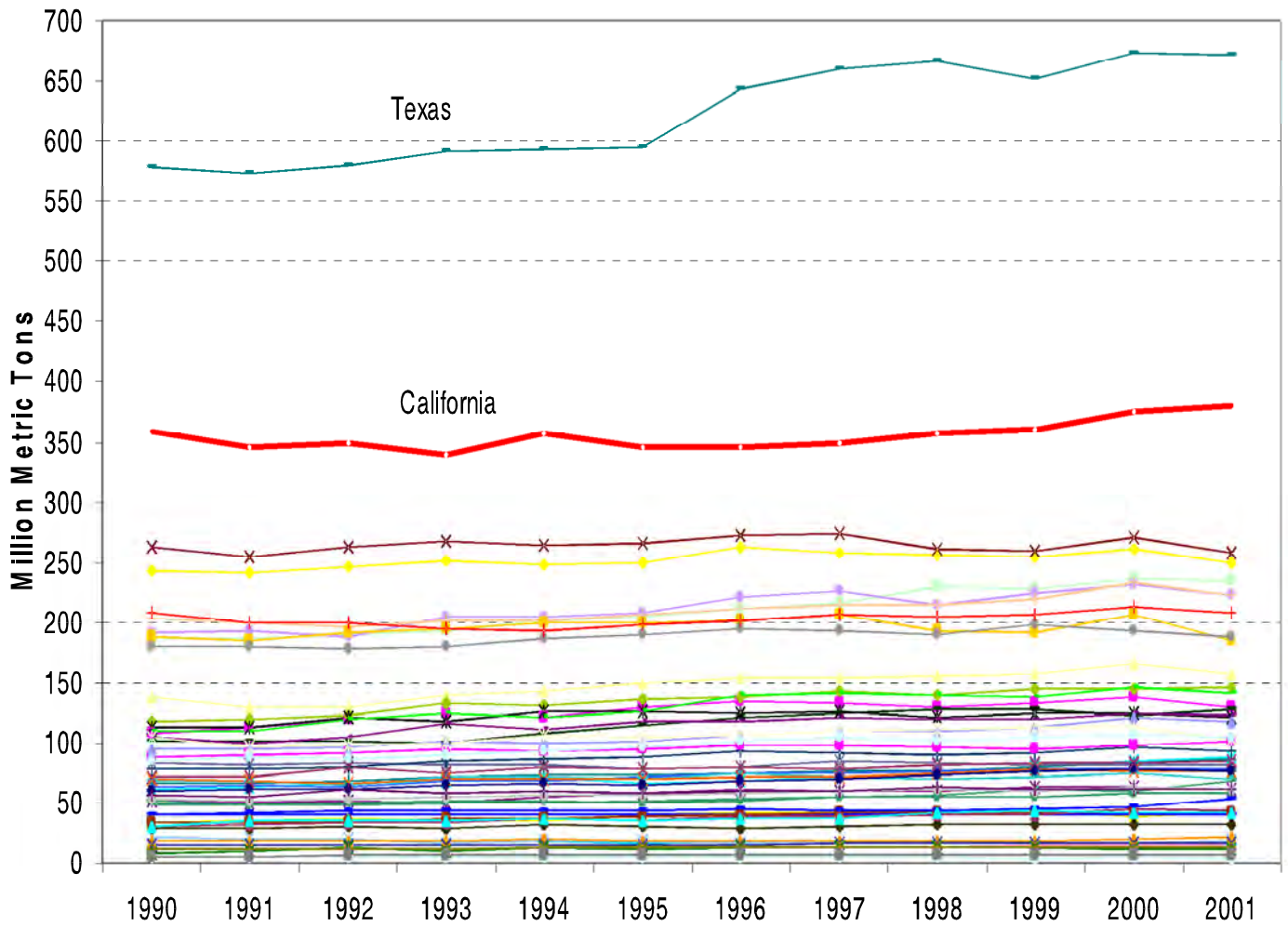
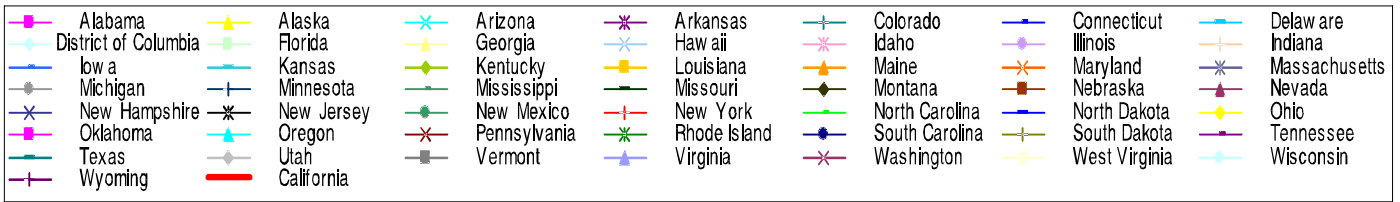
Table 2
Top Ten CO₂ Producing Nations in 2007
(Emissions in Million Metric Tons (MMT) CO₂)

Country	Emissions	Percent of Global
1. China	6,538	22%
2. United States	6,094	20%
3. India	1,610	5%
4. Russian Federation	1,580	5%
5. Japan	1,304	4%
6. Germany	841	3%
7. Canada	590	2%
8. United Kingdom	546	2%
9. Korea, Republic of	503	2%
10. Iran (Islamic Republic of)	496	2%
<i>Remaining Countries</i>	<i>10,010</i>	<i>33%</i>
Total Global	30,114	100%

Source: United Nations, 2011,
http://unstats.un.org/unsd/environment/air_co2_emissions.htm

Global CO₂ emissions totaled about 30,114 MMT CO₂ in 2007. China released the most CO₂ emissions. The United States was second and released 6,094 MMT CO₂ in 2007, which is approximately 20% of the earth's total emissions. The data in Table 2 emphasize the major role that the United States and China play in climate change with the emissions of the two countries accounting for 42% of the emissions.

Within the United States, California has the second highest level of GHG production with Texas having the highest. In 2001, the burning of fossil fuels produced over 81% of total GHG emissions. In relation to other states, California is the second highest producer of CO₂ by fossil fuels, as shown in Exhibit 2.



Source: California Energy Commission, "Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004," December 2006

Exhibit 2

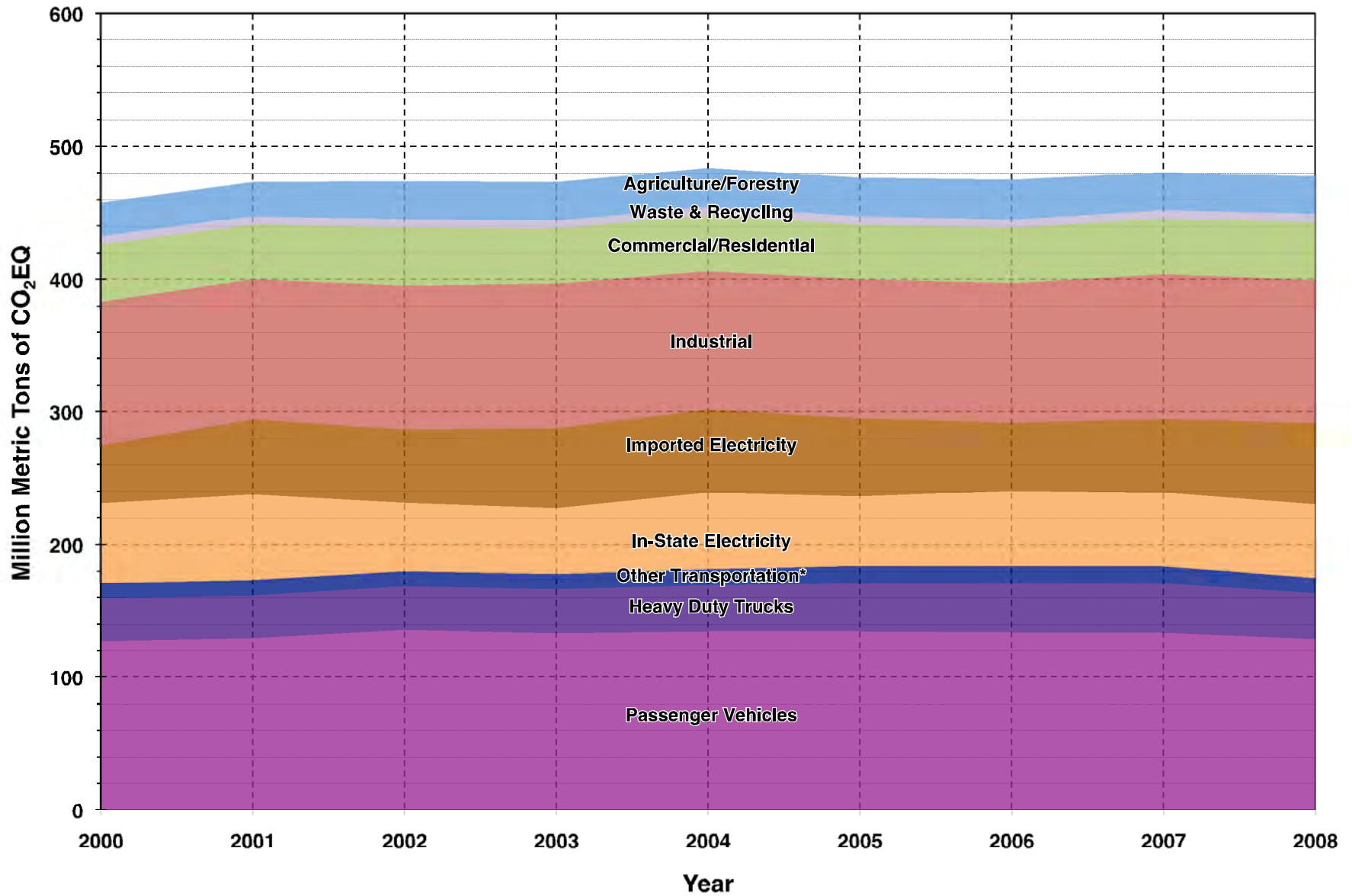
Fossil Fuel CO₂ Production by State

Sources of Greenhouse Gases in California

The California Energy Commission (“CEC”) categorizes GHG generation by source into five broad categories. The categories are:

- **Transportation** includes the combustion of gasoline and diesel in automobiles and trucks. Transportation also includes jet fuel consumption and bunker fuel for ships.
- **Agriculture and forestry** GHG emissions are composed mostly of nitrous oxide from agricultural soil management, CO₂ from forestry practice changes, methane from enteric fermentation, and methane and nitrous oxide from manure management.
- **Commercial and residential** uses generate GHG emissions primarily from the combustion of natural gas for space and water heating.
- **Industrial** GHG emissions are produced from many industrial activities. Major contributors include oil and natural gas extraction; crude oil refining; food processing; stone, clay, glass, and cement manufacturing; chemical manufacturing; and cement production. Wastewater treatment plants are also significant contributors to this category.
- **Electric generation** includes both emissions from power plants in California as well as power plants located outside of the state that supply electricity to the state.

The amount of GHGs released from each of these categories in California from 2000 to 2008 is shown in Exhibit 3.

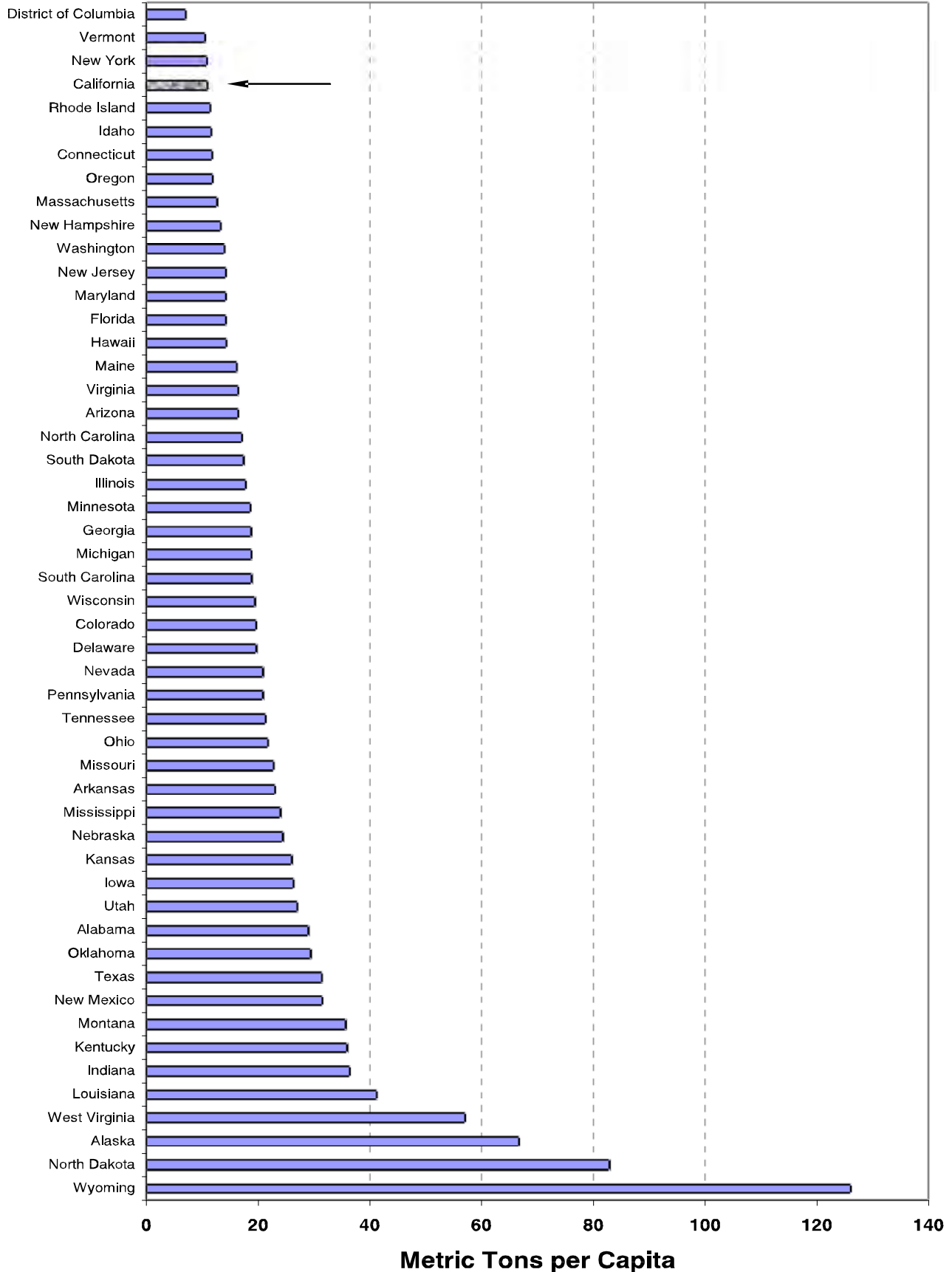


*Includes Rail, Ships & Commercial Boats, Intrastate Aviation, and Unspecified Transportation Sources

Source: CARB Greenhouse Gas Inventory Website
<http://www.arb.ca.gov/cc/inventory/inventory.htm>, data last updated 5/12/10

Examination of Exhibit 3 indicates that most of California's GHGs are emitted by transportation sources, such as automobiles, trucks, and airplanes. (The transportation sector is labeled as Passenger Vehicles, Heavy Duty Trucks, and Other Transportation in Exhibit 3.) Combustion of fossil fuels in the transportation sector contributed approximately 38% of the California GHG. This category was followed by the electric power sector (including both in-state and out-of-state sources) (24%) and the industrial sector (23%). Residential and commercial activity accounted for approximately 9% of the emissions. The smallest GHG contributors are the waste and recycling sector and the agricultural and forestry sector, which accounted for about 1% and 6%, respectively.

While California has the second highest rate of GHG production in the nation, it should also be noted that California has one of the lowest per capita rates of GHG emissions, as shown in Exhibit 4. According to Exhibit 4, California had the fourth lowest per capita rate of CO₂ production from fossil fuels in the United States. Wyoming produced the most CO₂ per capita, while the District of Columbia produced lowest.



Source: California Energy Commission, "Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004," December 2006

Exhibit 4 CO₂ Emissions From Fossil Fuels Per Capita (2001)

2.0 Regulatory Framework

Federal Plans, Policies, Regulations, and Laws. The federal government began studying the phenomenon of global warming as early as 1978 with the National Climate Protection Act, 92 Stat. 601, which required the President to establish a program to “assist the Nation and the world to understand and respond to natural and man-induced climate processes and their implications.” The 1987 Global Climate Protection Act, Title XI of Pub. L. 100-204, directed the U.S. EPA to propose a “coordinated national policy on global climate change,” and ordered the Secretary of State to work “through the channels of multilateral diplomacy” to coordinate efforts to address global warming. Further, in 1992, the United States ratified a nonbinding agreement among 154 nations to reduce atmospheric GHGs.

More recently, in *Massachusetts v. EPA* (April 2, 2007), the United State Supreme Court held that GHGs fall within the Clean Air Act’s definition of an “air pollutant,” and directed the EPA to consider whether GHGs are causing climate change. If so, the EPA must regulate GHG emissions from automobiles under the Clean Air Act.

While EPA has not finalized a regulation, it did issue a proposed rule on April 17, 2009. The rule declared that GHGs endanger human health and is the first step to regulation through the federal Clean Air Act. If it becomes final, the EPA would define air pollution to include the six key GHGs – CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆.

In addition, Congress has increased the corporate average fuel economy (CAFE) of the U.S. automotive fleet. In December 2007, President Bush signed a bill raising the minimum average miles per gallon for cars, sport utility vehicles, and light trucks to 35 miles per gallon by 2020. This increase in CAFE standard will create a substantial reduction in GHG emissions from automobiles, which is the largest single emitting GHG sector in California.

As of this writing, however, there are no adopted federal plans, policies, regulations or laws setting a mandatory limit on GHG emissions. Further, the EPA has not finalized its evaluation in the wake of *Massachusetts v. EPA*.

California State Plans, Policies, Regulations, and Laws. In recent years, California has distinguished itself as a national leader in efforts to address global climate change by enacting several major pieces of legislation, engaging in multi-national and multi-state collaborative efforts, and preparing a wealth of information on the impacts associated with global climate change.

In November 2008, the Governor issued Executive Order S-13-08 directing state agencies to plan for sea level rise and other climate change impacts. There are four key actions in the Executive Order: (1) initiation of a climate change adaptation strategy that will assess the state’s expected climate change impacts where the state is most vulnerable, with recommendations by early 2009; (2) an expert panel on sea level rise will inform state planning and development efforts; (3) interim guidance to state agencies on planning for sea level rise in coastal and floodplain areas for new projects; and (4) initiation of a report on critical existing and planned infrastructure projects vulnerable to sea level rise. (<http://gov.ca.gov/executive-order/11036/>)

Pursuant to AB 32, the California Air Resources Board (“CARB”) has adopted a number of relevant policies and directives. In December 2008, the Scoping Plan was adopted. The Plan is a central requirement of the statute. In addition, it has adopted a number of protocols for industry and government sectors, including one for local government (<http://www.arb.ca.gov/cc/protocols/localgov/localgov.htm>). (See also, the Local Government Toolkit (<http://www.coolcalifornia.org/local-government>)).

In response to SB 97, the Office of Planning and Research (“OPR”) issued a Technical Advisory on CEQA and Climate Change in June 2008. The Advisory provides an outline of what should be included in a GHG analysis under CEQA (<http://www.opr.ca.gov/ceqa/pdfs/june08-ceqa.pdf>). In January 2009, OPR issued draft amendments to the CEQA Guidelines that address GHGs. Among the amendments are the following:

- Determining the Significance of Impacts from Greenhouse Gas Emissions (Guidelines § 15064.4);
- Thresholds of Significance (Guidelines § 15064.7(c));
- Discussion of Cumulative Impacts (Guidelines § 15130(a)(1)(B) and Guidelines § 15130(f));
- Tiering and Streamlining the Analysis of Greenhouse Gas Emissions (Guidelines § 15183.5);

Assembly Bill 32, the California Global Warming Solutions Act of 2006 (Health and Safety Code § 38500 et seq.). In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. In general, AB 32 directs the California Air Resources Board (“CARB”) to do the following:

- On or before June 30, 2007, CARB shall publish a list of discrete early action measures for reducing GHG emissions that can be implemented by January 1, 2010;
- By January 1, 2008, establish the statewide GHG emissions cap for 2020, based on CARB’s calculation of statewide GHG emissions in 1990 (an approximately 25 percent reduction in existing statewide GHG emissions);
- Also by January 1, 2008, adopt mandatory reporting rules for GHG emissions sources that “contribute the most to statewide emissions” (Health & Safety Code § 38530);
- By January 1, 2009, adopt a scoping plan that indicates how GHG emission reductions will be achieved from significant GHG sources through regulations, market mechanisms, and other strategies;
- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures;

- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020; and
- On January 1, 2012, CARB's GHG emissions regulations become operative.
- On January 1, 2020, achieve 1990 levels of GHG emissions.

In a December 2006 report, CARB estimated that California emitted between 425 and 468 million metric tons of CO₂ in 1990. In December 2007, CARB finalized 1990 emissions at 427 million metric tons of CO₂. In the August 2007 draft report, CARB estimated California emitted approximately 480 million metric tons of CO₂ in 2004. Based on the U.S. Census Bureau California 2007 population of 36,553,215, this would result in about 13 metric tons of CO₂ per capita.

AB 32 takes into account the relative contribution of each source or source category to protect adverse impacts on small businesses and others by requiring CARB to recommend a *de minimis* (minimal importance) threshold of GHG emissions below which emissions reduction requirements would not apply. AB 32 also allows the Governor to adjust the deadlines mentioned above for individual regulations or the entire state to the earliest feasible date in the event of extraordinary circumstances, catastrophic events, or threat of significant economic harm.

CARB "Early Action Measures" (June 30, 2007). On June 21, 2007, CARB approved its early action measures to address climate change, as required by AB 32. The three measures include: (1) a low carbon fuel standard, which will reduce the carbon-intensity in California fuels, thereby reducing total CO₂ emissions; (2) reduction of refrigerant losses from motor vehicle air conditioning system maintenance through the restriction of "do-it-yourself" automotive refrigerants; and (3) increased CH₄ (methane) capture from landfills through the required implementation of state-of-the-art capture technologies.

CARB Mandatory Reporting Regulations (December 2008). Under AB 32, CARB propounded regulations to govern mandatory greenhouse gas emissions reporting for certain sectors of the economy, most dealing with approximately 94 percent of the industrial and commercial stationary sources of emissions. Regulated entities include electricity generating facilities, electricity retail providers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 metric tons of CO₂ from stationary source combustion.

Senate Bill 97 (2007). By July 1, 2009, the Governor's Office of Planning and Research (OPR) is directed to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions, as required by the California Environmental Quality Act. The Resources Agency is required to certify and adopt these guidelines by January 1, 2010. OPR is required to periodically update these guidelines as CARB implements AB 32. In addition, SB 97 states that the failure to include a discussion of greenhouse gas emissions in any CEQA document for a project funded under the

Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or projects funded under the Disaster Preparedness and Flood Prevention Bond Act of 2006 shall not be a cause of action under CEQA. This last provision will be repealed on January 1, 2010.

Executive Order S-01-07 (2007). Executive Order S-01-07 calls for a reduction in the carbon intensity of California's transportation fuels by at least 10 percent by 2020. As noted above, the low-carbon fuel standard ("LCFS") was adopted by CARB as one of its three "early action measures" on June 21, 2007.

Senate Bill 1368 (2006) (Public Utilities Code §§ 8340-41). SB 1368 required the California Public Utilities Commission ("PUC") to establish a "GHG emission performance standard" by February 1, 2007, for all electricity providers under its jurisdiction, including the state's three largest privately owned utilities (Pub. Res. Code § 8341(d)(1)). These utilities provide approximately 30 percent of the state's electric power. After the PUC acted, the CEC adopted a performance standard "consistent with" the PUC performance standard and applied it to local publicly-owned utilities on May 23, 2007 (over one month ahead of its June 30, 2007 deadline). Cal. Pub. Res. Code § 8341(e)(1). However, the California Office of Administrative Law ("OAL") found four alleged flaws in the CEC's rulemaking. The CEC overcame these alleged flaws and adopted reformulating regulations in August 2007.

Senate Bill 107 (2006). Senate Bill 107 ("SB 107") requires investor-owned utilities such as Pacific Gas and Electric, Southern California Edison and San Diego Gas and Electric, to generate 20 percent of their electricity from renewable sources by 2010. Previously, state law required that this target be achieved by 2017.

Senate Bill 375 (September 2008). In September 2008, SB 375 was signed by Governor Schwarzenegger. SB 375 is a comprehensive global warming bill that helps to achieve the goals of AB32. To help establish these targets, the CARB assigned a Regional Targets Advisory Committee to recommend factors to be considered and methodologies for setting greenhouse gas emission reduction targets. SR 375 also provides incentive – relief from certain CEQA requirements for development projects that are consistent with regional plans that achieve the targets. SB 375 requires CARB to develop, in collaboration with the Metropolitan Planning Organization (MPO), passenger vehicle greenhouse gas emissions reduction targets for 2020 and 2035 by September 30, 2010. The MPO is required to include and adopt, in their regional transportation plan, a sustainable community strategy that will meet the region's target provided by CARB.

Energy Conservation Standards (2009). Energy Conservation Standards for new residential and non-residential buildings were adopted by the California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations [CCF]) with the standards going into effect in 2009. Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608), dated December 2006, were adopted by the California Energy Commission on October 11, 2006, and approved by the California Office of

Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. While these regulations are now often seen as “business as usual,” they do exceed the standards imposed by any other state and reduce GHG emissions by reducing energy demand. On July 17, 2008, the California Building Standards Commission adopted the nation’s first green building standards. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Part 11 established voluntary standards, some of which became mandatory in the 2010 edition of the Code, on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.

CEQA Guidelines. SB 97 required that the California Natural Resource Agency (CNRA) coordinate on the preparation of amendments to the CEQA Guidelines regarding feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions. Pursuant to SB 97, CNRA adopted CEQA Guidelines amendments on December 30, 2009. The amendments were approved by the Office of Administrative Law on February 16, 2010, and became effective on March 18, 2010.

With respect to the significance assessment, newly added CEQA Guidelines section 15064.4, subdivision (b), requires that the lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

- (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
- (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
- (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The new CEQA Guidelines do not include or recommend any particular threshold of significance; instead, they leave that decision to the discretion of the lead agency. The new CEQA Guidelines also do not suggest or recommend the use of any specific GHG emission mitigation measures. Instead, newly added CEQA Guidelines provides that lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Mitigation measures may include the following, among others:

- (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;
- (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures, such as those described in Appendix F;
- (3) Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions;
- (4) Measures that sequester greenhouse gases;
- (5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.

Among other things, CNRA noted in its Public Notice for these changes that the impacts of GHG emissions should be considered in the context of a cumulative impact, rather than a project impact. The Public Notice states: "While the Proposed Amendments do not foreclose the possibility that a single project may result in greenhouse gas emissions with a direct impact on the environment, the evidence before [CNRA] indicates that in most cases, the impact will be cumulative. Therefore, the Proposed Amendments emphasize that the analysis of greenhouse gas emissions should center on whether a project's incremental contribution of greenhouse gas emissions is cumulatively considerable."

South Coast Air Quality Management District Guidance. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold for projects where the SCAQMD is the lead agency. As to all other projects, where the SCAQMD is not the lead agency, the Board has, to date, adopted thresholds only for industrial (stationary source) projects. The SCAQMD has not yet adopted any significance thresholds for new residential/commercial development projects, but has over the last few years proposed several draft thresholds. To assist interested parties in assessing the significance of GHG emissions from new residential/commercial development projects under CEQA, SCAQMD staff has been working on developing thresholds together with the SCAQMD's GHG CEQA Significance Thresholds Working Group. To achieve its policy objective of capturing 90% of GHG emissions from new residential/commercial development projects and implementing a "fair share" approach to reducing emission increases from each new residential/commercial development sector, SCAQMD staff has proposed combining performance standards and screening thresholds. According to the presentation given at the September 28th, 2010 GHG CEQA Significance Working Group meeting, the last Working Group meeting prior to the date of this report, SCAQMD staff proposed a draft threshold for 2020 of 4.8 MT/SP/YR (metric tons of CO₂EQ per service population per year) for mixed use developments. Since the goal of AB 32 is to return to 1990 GHG emission levels by 2020, the basis for this threshold is the statewide

emission inventory for 1990 based on “land use” related sectors divided by the statewide service population. The SCAQMD has also developed draft thresholds for commercial and residential projects, where it is not the lead. The draft recommends a 3,000 MTCO₂EQ per year screening threshold. The SCAQMD’s working group has not set a date for finalizing the recommendations.

City of Big Bear Lake Plans, Policies, Regulations, and Laws. The City of Big Bear Lake does not have any plans, policies, regulations, significance thresholds or laws addressing climate change at this time.

3.0 Significance Thresholds

California Air Resource Board Significance Thresholds: The CARB is the lead agency for implementing AB32. In October 2008, CARB published a Proposed Scoping Plan, in coordination with the Climate Action Team (CAT), to establish a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California. The measures in the Scoping Plan approved by the Board will be developed over the next two years and be in place by 2020. California is the fifteenth largest emitter of GHGs on the planet, representing about 2 percent of the worldwide emissions. According to climate scientists, California and the rest of the developed world will have to cut emissions by 80 percent from today’s levels to stabilize the amount of CO₂ in the atmosphere and prevent the most severe effects of global climate change. This long-range goal is reflected in California Executive Order S-3-05 that requires an 80 percent reduction of greenhouse gases from 1990 levels by 2050. Reducing GHG emissions to 1990 levels means cutting approximately 30 percent from business-as-usual emissions levels projected for 2020, or about 15 percent from today’s levels. On a per-capita basis, that means reducing our annual emissions of 14 tons of CO₂ equivalent for every man, woman and child in California down to about 10 tons per person by 2020.

Significant progress can be made toward the 2020 goal with existing technologies and improving the efficiency of energy use. Other solutions involve improving our state’s infrastructure, transitioning to cleaner and more secure sources of energy, and adopting 21st century land use planning and development practices. Key elements of California’s recommendations for reducing its greenhouse gas emissions to 1990 levels by 2020 include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standard;
- Achieving a statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;

- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long term commitment to AB 32 implementation.

To meet the 1990 target established by AB 32, CARB recommends a de minimis (minimal importance) emission threshold of 0.1 MMT annual (100,000 MT per year) CO₂EQ per transportation source category. Source categories whose total aggregated emissions are below this level are not proposed for emission reduction requirements in the Scoping Plan but may contribute toward the target via other means. As each regulation to implement the Scoping Plan is developed, CARB and other agencies will consider more specific de minimis levels below which the regulatory requirements would not apply. These levels will consider the cost to comply, especially for small businesses, and other factors. Until approved thresholds and guidelines are adopted at the local and regional level, the proposed de minimis threshold of 100,000 MTCO₂EQ per year for transportation sources will be utilized for transportation sources.

In addition to the Proposed Scoping Plan, CARB released the Preliminary Draft Staff Proposal (Staff Proposal) on October 24, 2008 with the objective of developing interim significant thresholds for commercial and residential projects. CARB has already proposed a threshold of 7,000 annual MT for industrial operational sources. However, the Staff Proposal has not yet developed thresholds applicable for residential and commercial sources. Therefore, criteria for determining threshold levels for residential and commercial sources have yet to be defined. Under CARB's Staff Proposal, recommended approaches for setting interim significant thresholds for GHG under the CEQA are underway. CARB staff proposes to define certain performance standards (e.g., for energy efficiency) by referencing or compiling lists from existing local, state or national standards. For some sub-sources of GHG emissions (e.g., construction, transportation, waste), CARB staff has not identified reference standards.

The Staff Proposal's Potential Performance Standards and Measures were released in December 2008. Inside the Staff Proposal, CARB's Potential Performance Standard and Measures included some construction measures. These guideline measures are:

- Provide alternative transportation mode options or incentives for workers to and from worksite on days that construction requires 200 or more workers; and
- Recycle and/or salvage at least 75% of non-hazardous construction and demolition debris by weight (residential) or by weight in volume (commercial); and
- Use recycled materials for at least 20% of construction materials based on cost for building materials, based on volume for roadway, parking lot, sidewalk and curb material. Recycled materials may include salvaged, reused, and recycled content materials.

CARB's Staff Proposal has identified California Energy Commission's (CEC) Tier II Energy Efficiency goals as an appropriate performance standard for energy use. Under State Law, the CEC is required to establish eligibility criteria, conditions for incentives, and rating standards.

Thus, the CEC established energy efficiency standards for homes and commercial structures, and requires new buildings to exceed current building standards by meeting Tier Energy Efficiency goals. Currently, CEC's proposed guidelines for the solar energy incentive program recommend a Tier II goal for residential and commercial projects of a 30% reduction in building combined space heating, cooling, and water heating energy compared to the 2008 Title 24 standards.

Existing green building rating systems like LEED, GreenPoint Rated, the California Green Building Code, and others, contain examples of measures that are likely to result in substantial GHG emission reductions from residential and commercial projects. Performance standards that already exist and have been proven to be effective, at the local, state, national or international level, are preferable. For residential and commercial projects, staff has proposed that the GHG emissions of some projects that meet GHG performance standards might under some circumstances still be considered cumulatively considerable and therefore significant. However, criteria threshold for residential and commercial has yet to be developed.

SCAQMD's Significance Thresholds: In December 5, 2008, the South Coast Air Quality Management District (SCAQMD) adopted GHG significance threshold for Stationary Sources, Rules and Plans where the SCAQMD is lead agency. The threshold utilizes a tiered approach, with a screening significance threshold of 10,000 MTCO₂EQ, if the project was not part of a general plan's GHG reduction plan. The SCAQMD has also developed draft thresholds for commercial and residential projects, where it is not the lead. The draft recommends a 3,000 MTCO₂EQ per year screening threshold. The SCAQMD's working group has not set a date for finalizing the recommendations. The project is most closely related to a commercial project. Therefore, for this project a significance threshold of 3,000 MTCO₂EQ per year will be used.

4.0 Short Term Construction Emissions

Temporary impacts will result from construction activities. The primary source of GHG emissions generated by construction activities is from use of diesel-powered construction equipment and other combustion sources (i.e., generators, worker vehicles, materials delivery, etc.). The GHG air pollutants emitted by construction equipment would primarily be carbon dioxide.

Typical emission rates for construction equipment were obtained from CalEEMod (California Emissions Estimator Model) which was released by the SCAQMD in 2011. CalEEMod is a computer program that can be used to estimate emissions including operation (vehicle and area) sources, as well as construction projects associated with land development projects in California.

The proposed project site is approximately 10.4 acres. The proposed animal zoo would include demolition of the existing zoo site, as well as construction of the animal exhibits, zoo related buildings such as administration, retail and concession, amphitheater, and the 2,500 square foot restaurant at the new site. The project is anticipated to take approximately 18 months. There is also a proposed animal hospital, but the construction would occur separately in the future based on funding. This phase is not included in the report.

Using CalEEMod, the emissions from construction for the proposed project were calculated and are presented in Table 3. These emissions represent the total level of emissions based on the construction schedule. According to the SCAQMD's CEQA Handbook (Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group #5, August 27, 2008), construction emissions are amortized over the life of the project, defined by SCAQMD as 30 years, and are added to the annual operation emissions. Thus, the project's annualized construction emissions will be added to the operation emissions and compared to the applicable GHG significance threshold. Worksheets showing the specific data used to calculate the construction emissions are presented in the appendix.

Table 3
Construction CO₂ Emissions (Metric Tons Per Year)

Activity	Annual Emissions (MT/Year)			
	CO ₂	CH ₄	N ₂ O	CO ₂ EQ
Demolition	35.23	0.00	0.00	35.31
Site Preparation	37.18	0.00	0.00	37.27
Grading	257.05	0.02	0.00	257.49
Construction (2013)	161.04	0.02	0.00	161.39
Construction (2014)	435.08	0.04	0.00	436.00
Paving	27.96	0.00	0.00	28.05
Painting	2.85	0.00	0.00	2.86
Existing Zoo Demolition	6.98	0.00	0.00	7.00
Total Emissions	963.37	0.08	0.00	965.37
Project Live Average Annual Emissions*	32.1	0.0	0.0	32.2

* Based on 30 Year Project Life per SCAQMD Significance Thresholds
 MTCO₂EQ = metric tons equivalent carbon dioxide (CO₂).

5.0 Estimate of Project Greenhouse Gas Emissions

The primary source of GHG emissions generated by the proposed project will be from motor vehicles. Other emissions from the project will be generated from the combustion of natural gas, off-site GHG emissions from the generation of electricity consumed by the project, and to a lesser extent municipal waste and water usage. Note that some of the emissions from the proposed animal park would be offset by the existing emissions at the old animal park facilities.

Default CalEEMod variables were used for the calculations except the trip generation rate. The project's land uses, daily trip generation, and trip rates were obtained from the study titled "Traffic Impact Analysis Moonridge Animal Park" prepared by Albert A. Webb Associates, Inc., March 2012. The project site encompasses approximately 10.4 acre. The proposed zoo includes the development of animal exhibits, zoo related buildings such as administration, retail and concession, amphitheater, other support buildings, and 2,500 square foot restaurant. The CalEEMod modeling forecasts that the project would generate 748 average daily trips. The 748 daily trips include reduction from internal trips. Additionally, pass-by trips are included in the CalEEMod modeling.

The California Emissions Model (CalEEMod) developed by the SCAQMD in conjunction with the ARB provides GHG emission rates for electrical generation. The results are presented in Table 4.

Table 4
Annual Project Emissions Consumption

Activity	Annual Emissions (MT/day)			
	CO ₂	CH ₄	N ₂ O	CO ₂ EQ
Vehicular Emissions	1,184.4	0.1	0.0	1,185.4
Natural Gas Combustion	39.6	0.0	0.0	39.9
Electricity	134.1	0.0	0.0	135.0
Landscaping	0.0	0.0	0.0	0.0
Consumer Products	0.0	0.0	0.0	0.0
Architectural Coatings	0.0	0.0	0.0	0.0
Municipal Waste	6.0	0.4	0.0	13.5
Water	49.0	0.1	0.0	51.4
Total Emissions	1,413.3	0.5	0.0	1,425.1
Annualized Construction Emissions	32.1	0.0	0.0	32.2
Total Annual Project Emissions	1,445.4	0.5	0.0	1,457.3
Screening Threshold:				3,000
Exceed Threshold?				No

Table 4 shows that the project generates approximately 1,457 MTCO₂EQ per year. The emissions shown represent year 2014, and emissions are anticipated to decrease slightly in subsequent years due to improvements in vehicle fuel economy. The project emissions are below the SCAQMD threshold of 3,000 MTCO₂EQ per year, and therefore no significant climate change impacts are anticipated.

6.0 Mitigation Measures

No mitigation measures are required since the project will not result in any significant change in greenhouse gas emissions.

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- California Air Resource Board, "Climate Change Proposed Scoping Plan", October 2008.
- California Air Resource Board, "Staff Proposal-Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the CEQA", December 2008.
- California Air Resource Board, "Preliminary Draft Staff Proposal- Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the CEQA", October 24, 2008.
- SCAQMD, Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, December 5, 2008
- State of California Department of Water Resources (DWR), Climate Change Adaptation Strategies for California's Water, October 2008

Appendix

Big Bear Alpine Zoo
San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Parking Lot	35	Space
High Turnover (Sit Down Restaurant)	2.5	1000sqft
User Defined Recreational	169	User Defined Unit

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)		Utility Company	Southern California Edison
Climate Zone	10		2.2		
		Precipitation Freq (Days)			

1.3 User Entered Comments

32

Project Characteristics -

Land Use - User Defined Recreational is Animal Park and Size Metric is Thousand Guests Per Year-Per Traffic Study. SF is proposed total building area minus restaurant

Construction Phase - Durations changed to mach project schedule

Off-road Equipment - Modified to match Appdx D Table 3.2 >=10 acres

Trips and VMT - Grading haul trips changed to match CalEEMod manual stated default of 16 tons per load and 1.2641662 tons/CY

Grading - Total Acres changed to site size from questionable CalEEMod

Vehicle Trips - Trip rates changed to match traffic study. User defined use trip% based on CalEEMod and traffic study.

Landscape Equipment - Snow days based on NOAA data

Energy Use - User defined rates based on CalEEMod Retail defaults

Water And Wastewater - User defined use based on CalEEMod Retail uses for interior and City Park for exterior.

Solid Waste - User defined based on CalEEMod City Park

Construction Off-road Equipment Mitigation -

Energy Mitigation -

Off-road Equipment - .

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2013	0.60	4.56	2.92	0.01	1.90	0.26	2.15	0.18	0.26	0.44	0.00	490.48	490.48	0.05	0.00	491.47
2014	1.04	4.03	2.98	0.01	0.03	0.26	0.29	0.00	0.26	0.26	0.00	472.86	472.86	0.05	0.00	473.89
2015	0.51	3.91	2.59	0.00	0.06	0.19	0.24	0.00	0.19	0.19	0.00	446.42	446.42	0.04	0.00	447.29
Total	2.15	12.50	8.49	0.02	1.99	0.71	2.68	0.18	0.71	0.89	0.00	1,409.76	1,409.76	0.14	0.00	1,412.65

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2013	0.60	4.56	2.92	0.01	1.70	0.26	1.95	0.07	0.26	0.33	0.00	490.48	490.48	0.05	0.00	491.47
2014	1.04	4.03	2.98	0.01	0.03	0.26	0.29	0.00	0.26	0.26	0.00	472.86	472.86	0.05	0.00	473.89
2015	0.51	3.91	2.59	0.00	0.05	0.19	0.24	0.00	0.19	0.19	0.00	446.42	446.42	0.04	0.00	447.29
Total	2.15	12.50	8.49	0.02	1.78	0.71	2.48	0.07	0.71	0.78	0.00	1,409.76	1,409.76	0.14	0.00	1,412.65

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.18	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Energy	0.00	0.04	0.03	0.00		0.00	0.00		0.00	0.00	0.00	173.77	173.77	0.01	0.00	174.85
Mobile	0.76	2.26	7.58	0.01	1.32	0.09	1.40	0.05	0.09	0.14	0.00	1,184.42	1,184.42	0.05	0.00	1,185.39
Waste						0.00	0.00		0.00	0.00	6.04	0.00	6.04	0.36	0.00	13.53
Water						0.00	0.00		0.00	0.00	0.00	49.02	49.02	0.07	0.00	51.35
Total	0.94	2.30	7.61	0.01	1.32	0.09	1.40	0.05	0.09	0.14	6.04	1,407.21	1,413.25	0.49	0.00	1,425.12

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.18	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy	0.00	0.04	0.03	0.00		0.00	0.00		0.00	0.00	0.00	173.77	173.77	0.01	0.00	174.85
Mobile	0.76	2.26	7.58	0.01	1.32	0.09	1.40	0.05	0.09	0.14	0.00	1,184.42	1,184.42	0.05	0.00	1,185.39
Waste						0.00	0.00		0.00	0.00	6.04	0.00	6.04	0.36	0.00	13.53
Water						0.00	0.00		0.00	0.00	0.00	49.02	49.02	0.07	0.00	51.35
Total	0.94	2.30	7.61	0.01	1.32	0.09	1.40	0.05	0.09	0.14	6.04	1,407.21	1,413.25	0.49	0.00	1,425.12

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.04	0.35	0.21	0.00		0.02	0.02		0.02	0.02	0.00	34.06	34.06	0.00	0.00	34.14
Total	0.04	0.35	0.21	0.00	0.00	0.02	0.02	0.00	0.02	0.02	0.00	34.06	34.06	0.00	0.00	34.14

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.00	0.00	0.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.76	0.00	0.00	0.76
Total	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	1.17	0.00	0.00	1.17

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.04	0.35	0.21	0.00		0.02	0.02		0.02	0.02	0.00	34.06	34.06	0.00	0.00	34.14
Total	0.04	0.35	0.21	0.00	0.00	0.02	0.02	0.00	0.02	0.02	0.00	34.06	34.06	0.00	0.00	34.14

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.00	0.00	0.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.76	0.00	0.00	0.76
Total	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	1.17	0.00	0.00	1.17

3.3 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.10	0.00	0.10	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.05	0.40	0.23	0.00		0.02	0.02		0.02	0.02	0.00	36.27	36.27	0.00	0.00	36.35
Total	0.05	0.40	0.23	0.00	0.10	0.02	0.12	0.05	0.02	0.07	0.00	36.27	36.27	0.00	0.00	36.35

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.00	0.00	0.92
Total	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.00	0.00	0.92

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.04	0.00	0.04	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.05	0.40	0.23	0.00		0.02	0.02		0.02	0.02	0.00	36.27	36.27	0.00	0.00	36.35
Total	0.05	0.40	0.23	0.00	0.04	0.02	0.06	0.02	0.02	0.04	0.00	36.27	36.27	0.00	0.00	36.35

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.00	0.00	0.92
Total	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.00	0.00	0.92

3.4 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.23	0.00	0.23	0.12	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.24	1.83	1.16	0.00		0.10	0.10		0.10	0.10	0.00	178.22	178.22	0.02	0.00	178.62
Total	0.24	1.83	1.16	0.00	0.23	0.10	0.33	0.12	0.10	0.22	0.00	178.22	178.22	0.02	0.00	178.62

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.05	0.53	0.26	0.00	1.55	0.02	1.57	0.00	0.02	0.03	0.00	73.11	73.11	0.00	0.00	73.15
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	5.72	5.72	0.00	0.00	5.72

Total	0.05	0.53	0.30	0.00	1.56	0.02	1.58	0.00	0.02	0.03	0.00	78.83	78.83	0.00	0.00	78.87
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Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.09	0.00	0.09	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.24	1.83	1.16	0.00		0.10	0.10		0.10	0.10	0.00	178.22	178.22	0.02	0.00	178.62
Total	0.24	1.83	1.16	0.00	0.09	0.10	0.19	0.05	0.10	0.15	0.00	178.22	178.22	0.02	0.00	178.62

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.05	0.53	0.26	0.00	1.55	0.02	1.57	0.00	0.02	0.03	0.00	73.11	73.11	0.00	0.00	73.15
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	5.72	5.72	0.00	0.00	5.72
Total	0.05	0.53	0.30	0.00	1.56	0.02	1.58	0.00	0.02	0.03	0.00	78.83	78.83	0.00	0.00	78.87

3.5 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.21	1.40	0.95	0.00		0.09	0.09		0.09	0.09	0.00	148.42	148.42	0.02	0.00	148.77
Total	0.21	1.40	0.95	0.00		0.09	0.09		0.09	0.09	0.00	148.42	148.42	0.02	0.00	148.77

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.03	6.03	0.00	0.00	6.03
Worker	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	6.59	6.59	0.00	0.00	6.59
Total	0.00	0.04	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	12.62	12.62	0.00	0.00	12.62

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.21	1.40	0.95	0.00		0.09	0.09		0.09	0.09	0.00	148.42	148.42	0.02	0.00	148.77
Total	0.21	1.40	0.95	0.00		0.09	0.09		0.09	0.09	0.00	148.42	148.42	0.02	0.00	148.77

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.03	6.03	0.00	0.00	6.03
Worker	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	6.59	6.59	0.00	0.00	6.59
Total	0.00	0.04	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	12.62	12.62	0.00	0.00	12.62

3.5 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	0.52	3.51	2.54	0.00		0.22	0.22		0.22	0.22	0.00	401.27	401.27	0.04	0.00	402.16
Total	0.52	3.51	2.54	0.00		0.22	0.22		0.22	0.22	0.00	401.27	401.27	0.04	0.00	402.16

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.01	0.10	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	16.33	16.33	0.00	0.00	16.34
Worker	0.01	0.01	0.11	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	17.48	17.48	0.00	0.00	17.50
Total	0.02	0.11	0.17	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	33.81	33.81	0.00	0.00	33.84

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.52	3.51	2.54	0.00		0.22	0.22		0.22	0.22	0.00	401.27	401.27	0.04	0.00	402.16
Total	0.52	3.51	2.54	0.00		0.22	0.22		0.22	0.22	0.00	401.27	401.27	0.04	0.00	402.16

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.01	0.10	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	16.33	16.33	0.00	0.00	16.34
Worker	0.01	0.01	0.11	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	17.48	17.48	0.00	0.00	17.50
Total	0.02	0.11	0.17	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	33.81	33.81	0.00	0.00	33.84

3.6 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.05	0.32	0.21	0.00		0.03	0.03		0.03	0.03	0.00	26.46	26.46	0.00	0.00	26.55
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.05	0.32	0.21	0.00		0.03	0.03		0.03	0.03	0.00	26.46	26.46	0.00	0.00	26.55

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	1.50
Total	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	1.50

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.05	0.32	0.21	0.00		0.03	0.03		0.03	0.03	0.00	26.46	26.46	0.00	0.00	26.55
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.05	0.32	0.21	0.00		0.03	0.03		0.03	0.03	0.00	26.46	26.46	0.00	0.00	26.55

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	1.50
Total	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	1.50

3.7 Architectural Coating - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.44					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.03	0.02	0.00		0.00	0.00		0.00	0.00	0.00	2.55	2.55	0.00	0.00	2.56
Total	0.44	0.03	0.02	0.00		0.00	0.00		0.00	0.00	0.00	2.55	2.55	0.00	0.00	2.56

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.00	0.00	0.30
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.00	0.00	0.30

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Archit. Coating	0.44					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.03	0.02	0.00		0.00	0.00		0.00	0.00	0.00	2.55	2.55	0.00	0.00	2.56
Total	0.44	0.03	0.02	0.00		0.00	0.00		0.00	0.00	0.00	2.55	2.55	0.00	0.00	2.56

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.00	0.00	0.30
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.00	0.00	0.30

3.8 Existing MAP Demolition - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.01	0.07	0.04	0.00		0.00	0.00		0.00	0.00	0.00	6.81	6.81	0.00	0.00	6.83
Total	0.01	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.81	6.81	0.00	0.00	6.83

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.00	0.00	0.15

Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.00	0.00	0.17
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Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.01	0.07	0.04	0.00		0.00	0.00		0.00	0.00	0.00	6.81	6.81	0.00	0.00	6.83
Total	0.01	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.81	6.81	0.00	0.00	6.83

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.00	0.00	0.15
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.00	0.00	0.17

3.8 Existing MAP Demolition - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.51	3.90	2.54	0.00		0.19	0.19		0.19	0.19	0.00	435.96	435.96	0.04	0.00	436.82
Total	0.51	3.90	2.54	0.00	0.00	0.19	0.19	0.00	0.19	0.19	0.00	435.96	435.96	0.04	0.00	436.82

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.00	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	1.10	1.10	0.00	0.00	1.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.01	0.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	9.36	9.36	0.00	0.00	9.37
Total	0.00	0.02	0.05	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	10.46	10.46	0.00	0.00	10.47

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.51	3.90	2.54	0.00		0.19	0.19		0.19	0.19	0.00	435.96	435.96	0.04	0.00	436.82
Total	0.51	3.90	2.54	0.00	0.00	0.19	0.19	0.00	0.19	0.19	0.00	435.96	435.96	0.04	0.00	436.82

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.01	0.00	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	1.10	1.10	0.00	0.00	1.10
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.01	0.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	9.36	9.36	0.00	0.00	9.37
Total	0.00	0.02	0.05	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	10.46	10.46	0.00	0.00	10.47

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.76	2.26	7.58	0.01	1.32	0.09	1.40	0.05	0.09	0.14	0.00	1,184.42	1,184.42	0.05	0.00	1,185.39
Unmitigated	0.76	2.26	7.58	0.01	1.32	0.09	1.40	0.05	0.09	0.14	0.00	1,184.42	1,184.42	0.05	0.00	1,185.39
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VM1	Annual VM1
High Turnover (Sit Down Restaurant)	282.53	282.53	282.53	995,801	995,801
Parking Lot	0.00	0.00	0.00		
User Defined Recreational	464.75	464.75	464.75	1,433,594	1,433,594
Total	747.28	747.28	747.28	2,429,395	2,429,395

4.3 Trip Type Information

Land Use	Miles			Trip %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
High Turnover (Sit Down Restaurant)	8.90	13.30	7.40	8.50	72.50	19.00
Parking Lot	8.90	13.30	7.40	0.00	0.00	0.00
User Defined Recreational	8.90	13.30	7.40	33.00	48.00	19.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	134.14	134.14	0.01	0.00	134.98
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	134.14	134.14	0.01	0.00	134.98
NaturalGas Mitigated	0.00	0.04	0.03	0.00		0.00	0.00		0.00	0.00	0.00	39.63	39.63	0.00	0.00	39.87
NaturalGas Unmitigated	0.00	0.04	0.03	0.00		0.00	0.00		0.00	0.00	0.00	39.63	39.63	0.00	0.00	39.87
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	693775	0.00	0.03	0.03	0.00		0.00	0.00		0.00	0.00	0.00	37.02	37.02	0.00	0.00	37.25
Parking Lot	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User Defined Recreational	48912.6	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
Total		0.00	0.03	0.03	0.00		0.00	0.00		0.00	0.00	0.00	39.63	39.63	0.00	0.00	39.88

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	693775	0.00	0.03	0.03	0.00		0.00	0.00		0.00	0.00	0.00	37.02	37.02	0.00	0.00	37.25
Parking Lot	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User Defined Recreational	48912.6	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	2.61	2.61	0.00	0.00	2.63
Total		0.00	0.03	0.03	0.00		0.00	0.00		0.00	0.00	0.00	39.63	39.63	0.00	0.00	39.88

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr			MT/yr				
High Turnover (Sit Down Restaurant)	131000					38.10	0.00	0.00	38.34
Parking Lot	0					0.00	0.00	0.00	0.00
User Defined Recreational	330160					96.03	0.00	0.00	96.64
Total						134.13	0.00	0.00	134.98

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr			MT/yr				
High Turnover (Sit Down Restaurant)	131000					38.10	0.00	0.00	38.34
Parking Lot	0					0.00	0.00	0.00	0.00
User Defined Recreational	330160					96.03	0.00	0.00	96.64
Total						134.13	0.00	0.00	134.98

6.0 Area Detail

6.1 Mitigation Measures Area

- Use Low VOC Paint - Residential Interior
- Use Low VOC Paint - Residential Exterior
- Use Low VOC Paint - Non-Residential Interior
- Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.18	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unmitigated	0.18	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.04					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.14					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.18	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.04					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.14					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.18	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

7.0 Water Detail

7.1 Mitigation Measures Water

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					49.02	0.07	0.00	51.35
Unmitigated					49.02	0.07	0.00	51.35
Total	NA	NA	NA	NA	NA	NA	NA	NA

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
High Turnover (Sit Down Restaurant)	0.758834 / 0.0484362					3.04	0.02	0.00	3.72
Parking Lot	0 / 0					0.00	0.00	0.00	0.00
User Defined Recreational	1.56167 / 12.3914					45.98	0.05	0.00	47.63
Total						49.02	0.07	0.00	51.35

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
High Turnover (Sit Down Restaurant)	0.758834 / 0.0484362					3.04	0.02	0.00	3.72
Parking Lot	0 / 0					0.00	0.00	0.00	0.00
User Defined Recreational	1.56167 / 12.3914					45.98	0.05	0.00	47.63
Total						49.02	0.07	0.00	51.35

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					6.04	0.36	0.00	13.53
Unmitigated					6.04	0.36	0.00	13.53
Total	NA	NA	NA	NA	NA	NA	NA	NA

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
High Turnover (Sit Down Restaurant)	29.75					6.04	0.36	0.00	13.53
Parking Lot	0					0.00	0.00	0.00	0.00
User Defined Recreational	0					0.00	0.00	0.00	0.00
Total						6.04	0.36	0.00	13.53

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
High Turnover (Sit Down Restaurant)	29.75					6.04	0.36	0.00	13.53
Parking Lot	0					0.00	0.00	0.00	0.00
User Defined Recreational	0					0.00	0.00	0.00	0.00

Total						6.04	0.36	0.00	13.53
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9.0 Vegetation

APPENDIX C.1
Biological Resources Assessment



TANNER
ENVIRONMENTAL SERVICES

**MOONRIDGE ANIMAL PARK RELOCATION PROJECT:
GENERAL BIOLOGICAL RESOURCES ASSESSMENT,
RARE PLANT SURVEY AND
FOCUSED SOUTHWESTERN WILLOW FLYCATCHER SURVEY**

SEPTEMBER 29, 2011

**MOONRIDGE ANIMAL PARK RELOCATION PROJECT:
GENERAL BIOLOGICAL RESOURCE ASSESSMENT,
RARE PLANT SURVEY AND
FOCUSED SOUTHWESTERN WILLOW FLYCATCHER SURVEY**

September 29, 2011

Prepared for:
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Project Site Location: USGS Moonridge 7 ½ - Minute Topographic Map, Township 2 North,
Range 1 East, Section 22

APN: 2328-472-01, 2328-472-02 and 2328-472-03

Applicant: Moonridge Animal Park

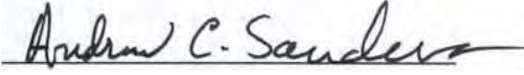
Owner: Big Bear Valley Recreation and Park District

Principal Investigator: Richard G. Tanner, Tanner Environmental Services (see above)

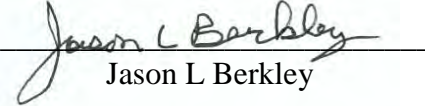
SIGNED: 
Richard Tanner, Report Author

DATE: September 28, 2011

Additional Work Performed By:

SIGNED: 
Andrew Sanders

DATE: September 28, 2011

SIGNED: 
Jason L Berkley

DATE: September 28, 2011

**MOONRIDGE ZOO RELOCATION PROJECT: GENERAL
BIOLOGICAL
RESOURCES ASSESSMENT, RARE PLANT SURVEY AND
FOCUSED SOUTHWESTERN WILLOW FLYCATCHER SURVEY**

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MOONRIDGE ZOO RELOCATION PROJECT: GENERAL BIOLOGICAL RESOURCES ASSESSMENT, RARE PLANT SURVEY AND FOCUSED SOUTHWESTERN WILLOW FLYCATCHER SURVEY

1.0 Executive Summary

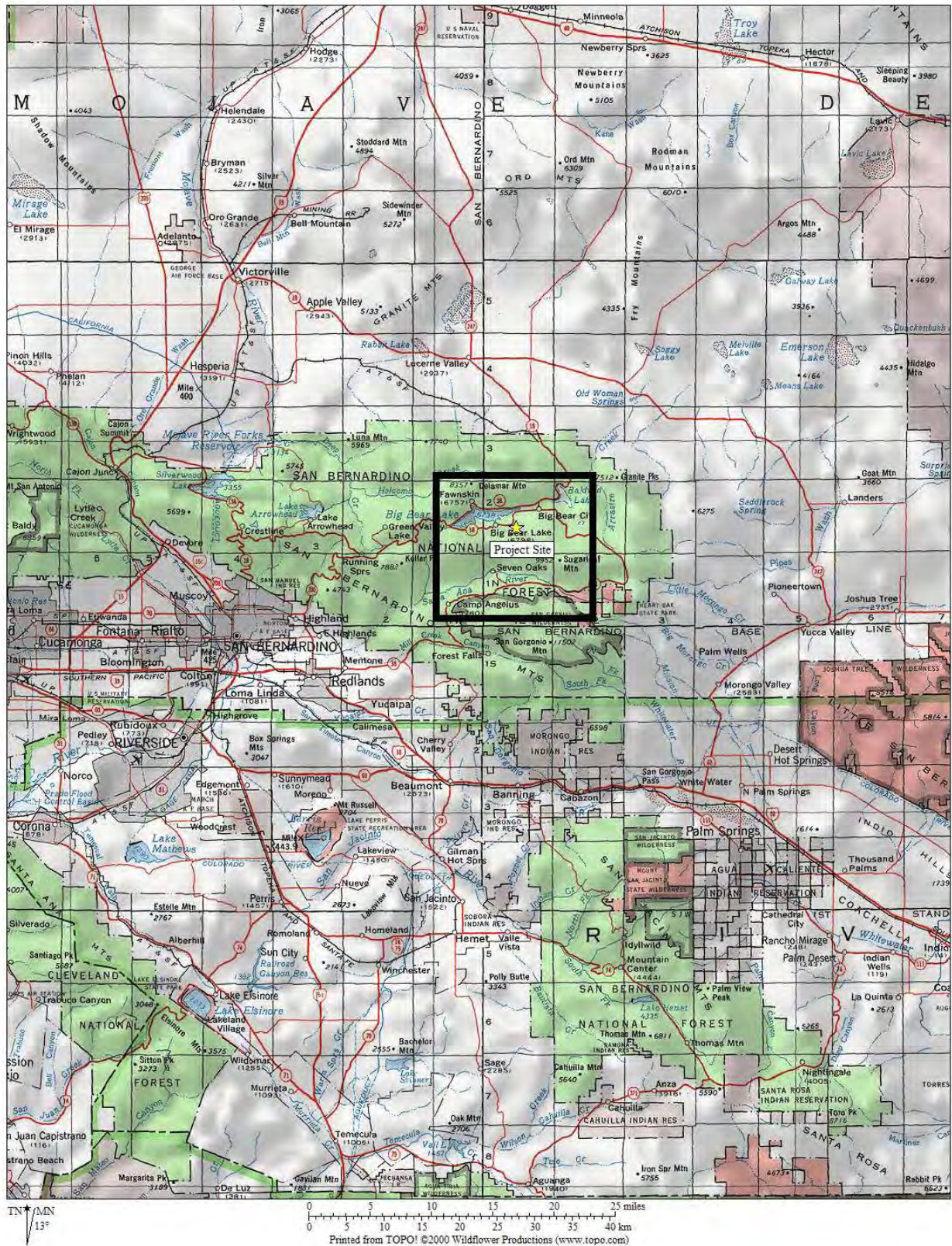
In the spring and summer of 2011, Tanner Environmental Services (TES) conducted a general bioassessment for biological resources; a survey for rare special-status plants including threatened and endangered species; and a focused survey for the federally protected southwestern willow flycatcher (*Empidonax traillii extimus*) on the proposed project site. Meadow habitat for rare plant species as well as designated critical willow riparian habitat for the southwestern willow flycatcher had been identified on the proposed project site. No sensitive plant or wildlife species were identified on the site during these surveys. One sensitive plant species (*Astragalus leucolobus*) was found outside of the project site in the one-half mile buffer area. This species has a California Rare Plant Ranking of 1B.2 and is on the Forest Service Watch List. Although no sensitive wildlife species were observed on the project site, it is highly likely that three sensitive species utilize or occupy habitat within the one-half mile buffer area. These include the southern rubber boa (*Charina umbratica*), the California spotted owl (*Strix o. occidentalis*) and the San Bernardino flying squirrel (*Glauomys sabrinus californicus*). In addition, the bald eagle (*Haliaeetus leucocephalus*) may use the buffer area for nighttime roosting. Adverse impacts to the willow riparian and dry meadow habitats through project development would likely result in a loss of sensitive habitat. We recommend mitigation measures including restoration and/or acquisition of willow riparian and dry meadow habitat.

2.0 Project Site Description

The proposed project site is a 10.3 acre area composed of three adjacent parcels in the Moonridge area near the city of Big Bear Lake (Figures 1 and 2). The project site is within the San Bernardino National Forest (SBNF) on Big Bear Valley Recreation and Park District lands in San Bernardino County. The site is located along Rathbone Creek at Clubview Drive and Moonridge Road and between Moonridge Road and the Bear Mountain Golf Course. This report addresses the biological resources occurring on or immediately adjacent to the project site and potential impacts to those resources from the proposed project. In addition to the project site, our surveys included a surrounding one-half mile buffer zone though access was limited because much of this area has been developed as single-family residential neighborhoods.

The project site is at an elevation of approximately 6950 feet (2,110 meters) on land with well-drained soils which slopes gently from southeast to northwest. The site is roughly bisected by Rathbone Creek, a perennial “blueline” stream and riparian corridor which drains into Big Bear Lake. The site has a combination of three major vegetation types which can be seen in Figures 3 and 4 and which are mapped in Figure 5. They include: dry meadow, sagebrush scrub/meadow, and willow riparian forest. In addition, there are two disturbed areas on the site: along the western edge where homes were recently removed and at the northwest corner which has

Figure 1. Regional Map



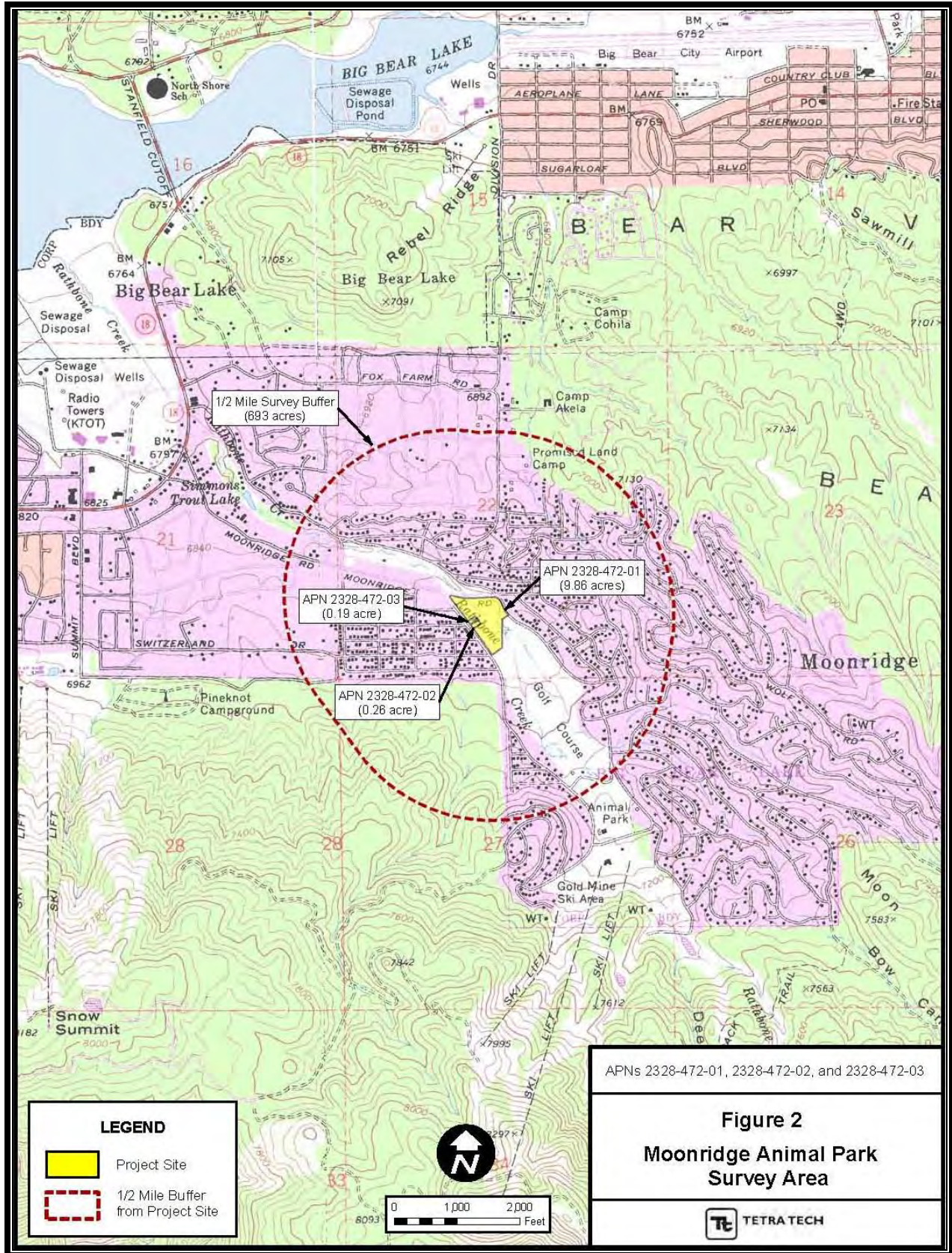




Figure 3 – View of Site from Northeast and Moonridge Road. Site habitat includes from front to back of photo: Dry Meadow, Sage Scrub/Meadow, and Willow Riparian with Jeffrey Pine Forest in buffer.



Figure 4 – View of Site from Southwest and Club View Drive showing site habitat similar to above photo with Dry Meadow, Sage Scrub/Meadow and Willow Riparian with Jeffrey Pine forest and residential neighborhood in buffer outside project area.

Figure 5 – Project Site Habitat Map. Top of the Map is due North.



converted to grassland. Also, there is a small portion of the riparian corridor along Rathbone Creek with no willows where it drains onto the site at the southern edge.

3.0 Focus Study/Species of Concern

At the request of the County of San Bernardino Special Districts Department, we were asked by Tetra Tech, Inc. to conduct focused surveys for the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*). The proposed project site includes Designated Critical Habitat for this species. Based on our knowledge of the project site and after consultations with SBNF staff botanists, we determined that surveys for rare plants should be conducted at the site. This effort focused on the following federally protected species: Bear Valley sandwort (*Arenaria (Eremogone) ursine*); ash-grey paintbrush (*Castilleja cinerea*); southern mountain buckwheat (*Eriogonum kennedyi austromontanum*); San Bernardino Mountains bladderpod (*Lesquerella kingii bernardina*); San Bernardino blue grass (*Poa atropurpurea*); California taraxacum (*Taraxacum californicum*); and slender-petaled theylypodium (*Thelypodium stenopetalum*).

4.0 General Biological Resources Assessment

4.1 Methods

Prior to conducting a biological resources assessment of the project site, we consulted available literature to identify special status wildlife which might occupy or forage in the area as well as suitable habitat for those species. These literature sources included the California Natural Diversity Data Base (CNDDDB; California Department of Fish and Game 2011) and SBNF's GIS database of modeled habitat, special status as well as general plant and wildlife species locations.

The general biological surveys were conducted on July 14, 2011 by Mr. Tony Lavictoire and August 16, 2011 by Mr. Richard Tanner. Surveys were conducted along the length of Rathbone Creek in the project area, in the adjacent meadow habitat and in the one-half mile buffer. Surveys were conducted on foot along the length of the riparian corridor and along random transects through meadow and scrub habitats. The buffer habitat was surveyed on foot when possible and otherwise by vehicle through residential neighborhoods.

4.2 Results

We did not observe any sensitive species or any sign of sensitive species on the project site during general biological surveys. However, the project site does have sensitive vegetation communities which have special status both because of the plant and wildlife species they support and because they are relatively rare in the Big Bear Valley area. Wildlife species and/or their sign observed during our surveys are included in Appendix 1.

4.2.1 Common Vegetation Types

The project site has a combination of three major vegetation types:

- Dry Montane Meadow – This type of vegetation is concentrated in the northeast and southwest parts of the parcel, on either side of the riparian area along Rathbone

Creek. The montane meadow habitat on the project site is fairly open with numerous herbs and a few scattered shrubs. Typically, this is a very productive habitat type with dense vegetation cover and is a species-rich vegetation community dominated by grasses, sedges, rushes and herbs (Thorne 1988).

- Sagebrush Scrub/Meadow – This vegetation is primarily along the western edge of the parcel beside Clubview Drive with a smaller patch along the east side of Rathbone Creek in the northeast corner of the project site. Though this habitat is generally similar to the dry montane meadow with many herb species in common, it is dominated by basin sagebrush (*Artemisia tridentata*), so that the area is clearly shrub rather than herb covered. This vegetation community is found in dry interior and transmontane locations where slopes are not steep and soils are coarse and well-drained.
- Willow Riparian Forest – This habitat follows Rathbone Creek and is dominated by arroyo willow (*Salix lasiolepis*) which has grown in thickets of erect and rather shrubby trees ranging from 10 to 20 feet tall forming a dense canopy over the flowing stream. This vegetation occurs along most of the length of the creek where it crosses the project site, except for a short section just below the golf course where the creek margins are dominated by grasses and sedges.

The buffer zone includes predominately Jeffrey pine forest though there is willow riparian forest along Rathbone Creek both up and downstream of the project site.

- Jeffrey Pine Forest – Most of the buffer area outside of residential areas is covered by Jeffrey pine series (Sawyer and Keeler-Wolf 1995). Jeffrey pine is the dominant tree in this vegetation community while California black oak (*Quercus kelloggii*), white fir (*Abies concolor*), western juniper (*Juniperus occidentalis*) and singleleaf pinyon pine (*Pinus monophylla*) occur at lower densities. In general the understory consists of scattered shrubs and low herbaceous cover.

4.2.2 Special Status Wildlife Species

No sensitive wildlife species were observed during surveys of the project site although the area does include designated critical habitat for the federally endangered southwestern willow flycatcher. The results of the focused surveys for the southwestern willow flycatcher are presented in Section 6. Also, based on the habitat on the project site, we do not anticipate that the site can support other sensitive wildlife species but it is possible that the riparian habitat is utilized by the Cooper's hawk (*Accipiter cooperii*) which is a CDFG Species of Special Concern but has no Federal or Forest Service status. The Cooper's hawk utilizes forest edges and, if present, would likely forage along the edges of the Jeffrey pine forest as well as the willow riparian habitat.

Based both on our assessment of habitat and on CNDDDB and SBNF records, we believe that the Jeffrey pine forest in the one-half mile buffer area is currently occupied by or is likely to provide habitat for several sensitive species. This is especially true for the undeveloped Forest Service

land to the west and southwest of the project site in the northwest quarter of Section 27. These species are as follows:

- Southern Rubber Boa (*Charina umbratica*) – The southern rubber boa is listed as threatened under the California Endangered Species Act and is a Forest Service Sensitive species. The likelihood that this species occurs in the buffer area is moderate to high based on several sightings less than one mile to the west of the project site.
- California Spotted Owl (*Strix o. occidentalis*) – This species is a CDFG Species of Special Concern and a Forest Service Sensitive and Management Indicator Species. The likelihood that the spotted owl uses the buffer area is high based on the location of the Bear Summit territory (CDFG #SB144) approximately three-fourths of a mile to the southwest of the project site. During our surveys for the California spotted owl across SBNF, we found that this territory was occupied in 2011 (Tanner Environmental Services 2011).
- San Bernardino Flying Squirrel (*Glauomys sabrinus californicus*) – The San Bernardino flying squirrel is currently a candidate for protection under the Endangered Species Act and is a Forest Service Sensitive Species. Based on records from the public and from trapping studies conducted by SBNF near Bear Mountain Ski Resort (Butler et al. 1991) within approximately one mile of the project site, we believe there is a high probability this species occurs in the buffer area.
- Bald Eagle (*Haliaeetus leucocephalus*) – The bald eagle was previously listed as threatened under the Endangered Species Act but was delisted in 2007. It remains an endangered species under the California Endangered Species Act and is a Forest Service Sensitive Species. Based on known nighttime roost locations within approximately one mile of the project site, we believe there is a moderate to high probability that this species could roost in the buffer area.

5.0 Rare Plant Survey

5.1 Background

Big Bear Valley is known for its high level of botanical diversity and high proportion of locally endemic and rare plant species (Krantz 1994). Many of these rare and endemic species have special status under the California or federal Endangered Species Acts. In addition, these plants as well as other sensitive plant species have been provided special status by the California Native Plant Society (CNPS). These species are listed in CNPS' *Inventory of Rare and Endangered Vascular Plants of California* (Tibor 2001).

5.2 Methods

Our botanist, Mr. Andrew Sanders, visited the site on two occasions, July 21 and July 27, 2011. The first visit was devoted entirely to the project site itself, while the second visit was divided between the project site and the surrounding one-half mile buffer.

All parts of the parcel that were passable were walked, including the wooded areas along the creek, though the thickets of willow stems prevented passage in many areas of the riparian habitat. Spacing between survey lines was irregular, but routes passed within approximately 5 meters of all parts of the project site. Where the thickets were impassable, he walked along the outside edges.

In addition to the project site, Mr. Sanders surveyed an approximately one-half mile buffer area by walking and or driving the forest and developed residential area. Because much of this area is owner-occupied private property, access was limited and coverage was much less than 100 percent these areas. All accessible areas were walked on foot and all areas which had the potential to support sensitive species were explored.

Mr. Sanders recorded all plant species encountered as they were found and notes were taken on the vegetation of the site. Upon returning from the field, all the plant species observed were entered into a database, with additional plant specific notes added as appropriate. This complete species list is presented in Appendix 2. Many species were collected and vouchers will be deposited as permanent records in the herbarium at University of California, Riverside.

5.3 Results

5.3.1 Special Status Plants

The plant survey of the project site was a floristic one, with an attempt made to identify every plant species present on the parcel and in the buffer area to a level sufficient to be sure it was not a listed sensitive species. On the parcel itself, no rare or sensitive plant species were found, despite the presence of what initially appeared to be potentially suitable habitat types. Many of the rare plants of the San Bernardino Mountains are herbs of open areas including meadows and pebble plains. There are meadows present, but none of the associated rare plant species were observed. There are no pebble plains present on the parcel.

In the surrounding buffer area, one sensitive plant species was found on a roadside west of the parcel: *Astragalus leucolobus* (Bear Valley Woollypod) – Forest Service Watch List and CNPS Rare Plant Ranking 1B.2 (Rare, threatened, or endangered in California and elsewhere, fairly threatened in California). This species is restricted to the San Bernardino Mountains (especially Big Bear Valley) and the eastern San Gabriel Mountains, as well as to a limited area of the Santa Rosa Mountains in Riverside County. Reports from Tehachapi and the Mount Pinos area need to be reviewed, as they may represent misidentifications of the related *A. purshii*. Despite its rarity overall, this species is fairly regularly encountered on dry low-gradient slopes among pines in the eastern parts of Big Bear Valley. A few specimens of this *Astragalus* were found on an open roadside approximately one-half mile west of the project site along Switzerland Drive near Cedar Avenue.

5.3.2 Special Status Vegetation

Both the dry montane meadow and willow riparian forest habitats on the project sites have special status with the state of California, the United States Fish and Wildlife Service (USFWS) and the Forest Service primarily because of the rare species which occur in them. Many of the rare plants of the San Bernardino Mountains are herbs of open areas including meadows and pebble plains in the Big Bear Valley. There are meadows present in the project site but none of

the associated rare plant species were observed. There are no pebble plains present in the project site or the buffer area.

Riparian forest is biologically productive and diverse and provides habitat for numerous sensitive species. Most natural riparian vegetation in southern California has been degraded or eliminated with some estimates as high 95 to 97 percent lost (Faber et al. 1989). Though few sensitive plant species are associated directly with riparian forest, many are found in adjacent wet meadows.

5.3.3 Special Status Plants Potentially Occurring on Project Site

Sensitive plant species that might have been expected at the site, based on general habitat and location, but which were not found are listed below. In addition to the state and federal listing status, the following California Rare Plant Rankings listed in parentheses following plant names are to be translated as follows (Tibor 2001):

- 1B.1** = Rare, threatened, or endangered in California and elsewhere: seriously threatened in California
- 1B.2** = Rare, threatened, or endangered in California and elsewhere: fairly threatened in California
- 1B.3** = Rare, threatened, or endangered in California and elsewhere: not very threatened in California
- 2.1** = Plants Rare, Threatened, or Endangered in California, but more common elsewhere: seriously threatened in California
- 2.2** = Plants Rare, Threatened, or Endangered in California, but more common elsewhere: fairly threatened in California
- 2.3** = Plants Rare, Threatened, or Endangered in California, but more common elsewhere: not very threatened in California
- 4.3** = Plants of Limited Distribution/ Watch List: not very threatened in California

Spreading sandwort (*Arenaria lanuginosa saxosa*) - CNPS 2.3 – – this species occurs in open Jeffrey pine woodland at elevations like those of the site, but there are no records in the immediate vicinity. The closest locations are four to five miles south in the upper Santa Ana River/Barton Flats area. There are no records north of the Sugarloaf Mountain ridge and the probability that this species could occur on the site is very low.

Bear Valley sandwort (*Arenaria (Eremogone) ursine*) - Federally Threatened, CNPS 1B.2: – – there are locations of this species within one mile of the parcel in the Moonridge area, but they are associated with pebble plains and there are no pebble plains on the site, or among the surrounding houses. Based on the lack of habitat, the probability of occurrence on the project site is very low.

Scalloped moonwort (*Botrychium crenulatum*) - Forest Service Sensitive, CNPS 2.2 – – the closest locations for this species are four to five miles south in the upper Santa Ana River/Barton Flats area. As for *Arenaria lanuginosa*, above, there are no records for this plant north of the Sugarloaf Mountain ridge. Because this species occurs in moist meadows along streams there is the potential that it might be found on-site but the probability of occurrence is very low.

Western sedge (*Carex occidentalis*) - CNPS 2.3 -- the closest locations for this species are four to five miles south in the upper Santa Ana River/Barton Flats area. As for *Arenaria lanuginosa*, above, there are no records for this species north of the Sugarloaf Mountain ridge. Probability of occurrence on the project site is very low.

Ash-grey paintbrush (*Castilleja cinerea*) - Federally Threatened, CNPS 1B.2 -- there are locations of this species within one mile of the parcel to the north, east and west, but this species is associated with pebble plains habitat, where it is typically parasitic on *Eriogonum* sp. No pebble plain habitat was present on the project site or none was located in the buffer area. Probability of occurrence on the project site is very low.

San Bernardino Mountains owl clover (*Castilleja lasiorhyncha*) - Forest Service Sensitive, CNPS 1B.2 -- there are scattered locations of this species in Big Bear Valley, including some in the eastern part of Moonridge approximately two miles east-southeast of the site, and other sites near Big Bear Lake approximately one and one-half miles northwest of the project site. This species is typically associated with meadow margins and open moist areas, but was not found on the project site. Probability of occurrence is low.

Heckard's paintbrush (*Castilleja montigena*) - Forest Service Watch List, CNPS 4.3 -- scattered locations of this species have been recorded in Big Bear Valley, but none within approximately two miles of the site. This species was not found on the project site and the probability of occurrence on the site is low.

Vanishing wild buckwheat (*Eriogonum evanidum*) - Forest Service Watch List, CNPS 1B.1 -- occurs approximately two miles northeast of site near Big Bear City, usually in dry open areas. Though this species can be difficult to identify it should have been seen if present but it was not identified on the project site. Probability of occurrence is very low.

Southern mountain buckwheat (*Eriogonum kennedyi austromontanum*) - Federally Threatened, CNPS 1B.2 -- occurs approximately one mile east-northeast of the site in the Moonridge area, but this species is associated with pebble plains and there are no such habitats present on the parcel. Probability of occurrence is very low.

Bear Lake buckwheat (*Eriogonum microthecum lacus-ursi*) - Forest Service Sensitive, CNPS 1B.1 -- the only known location is approximately two miles northwest of the site on old sediments above the shore of Big Bear Lake. No similar habitats are present and the probability of occurrence is very low, approaching zero.

Southern Sierra woolly sunflower (*Eriophyllum lanatum obovatum*) - Forest Service Watch List, CNPS 4.3 -- widespread in western Big Bear Valley, but very scarce or absent in the eastern parts of the valley, as around the project site. Probability of occurrence is low.

Pinewoods fritillary (*Fritillaria pinetorum*) - CNPS 4.3 -- known from locations approximately one mile east and southeast of the parcel, in the Sugarloaf and Moonridge areas. Survey timing may have been a bit late for this species with respect to flowering, but fruits would likely have been still visible if it were present. Probability of occurrence is low.

Parry's sunflower (*Hulsea vestita parryi*) - Forest Service Watch List, CNPS 4.3 -- known from approximately one mile east of the parcel in the Moonridge area. This species is conspicuous, even when not flowering, and if present it should have been seen. Probability of occurrence is low.

Silver-haired ivesia (*Ivesia argyrocoma*) - Forest Service Sensitive, CNPS 1B.2 -- there are known locations within a mile both east and north of the parcel. There is limited suitable habitat on the project site; however, the probability of occurrence is low.

San Bernardino Mountains bladderpod (*Lesquerella kingii bernardina*) - Federally Endangered, CNPS 1B.1 -- known location approximately one and one-half miles north, but this species is typically associated with carbonate outcrops, and there are none of this habitat present in the project site or buffer area. Probability of occurrence is very low.

Short-sepaled lewisia (*Lewisia brachycalyx*) - CNPS 2.2 -- occurs at scattered locations in Big Bear Valley, including a site within approximately two miles north to northwest. This species occurs in habitats similar to some patches of moist meadow near the edge of the riparian zone, but the extent of such habitat here is very slight and probability of occurrence is low.

Baldwin Lake linanthus (*Linanthus killipii*) - Forest Service Sensitive, CNPS 1B.2 -- occurs one to two miles northeast of the site, in the Moonridge/Sugarloaf area. It is usually associated with pebble plain habitats, and there were none of those observed in the area. Probability of occurrence is very low.

White adder's mouth (*Malaxis monophyllus brachypoda*) Forest Service Sensitive, CNPS 2.1 -- closest locations are four to five miles south in the upper Santa Ana River/Barton Flats area. There are no records north of the Sugarloaf Mountain ridge and this species is associated with wet meadows, not dry ones. Could possibly occur in wet areas along the creek, but the habitat is marginal. Probability of occurrence is very low.

San Bernardino Mountains monkeyflower (*Mimulus exiguous*) - Forest Service Sensitive, CNPS 1B.2 -- there are locations approximately one to one and one-half miles north and northwest of the site in the vicinity of Big Bear Lake. We did not observe any seasonally moist but open drainage margins typically associated with this species on the project site. Probability of occurrence is very low.

Purple monkeyflower (*Mimulus purpureus*) Forest Service Sensitive, CNPS 1B.2 -- there are locations approximately one to one and one-half miles north and northwest of the site in the vicinity of Big Bear Lake, and in the Sugarloaf area approximately two miles east of the site. We did not see any seasonally moist but open drainage margins on the project site which are typically associated with this species. Probability of occurrence is very low.

Chickweed starry puncturebract (*Oxytheca [Sidotheca] caryophylloides*) - Forest Service Watch List, CNPS 4.3 -- known from old and rather vague locations in "Big Bear Valley" that could theoretically be from the vicinity, but probably are not. The closest definite locations are

Metcalf Bay and Boulder Bay on the south side of Big Bear Lake approximately two to three miles northwest of the project site. Probability of occurrence is low.

Parish's yampah (*Perideridia parishii parishii*) CNPS 2.2 -- there are locations approximately one to one and one-half miles north and northwest of the site near Big Bear lake. This is a species associated with moist meadows and open grassy stream margins. Potentially suitable habitat on the parcel was very limited and did not appear to be occupied by the species. Probability of occurrence is low.

San Bernardino blue grass (*Poa atropurpurea*) - Federally Endangered, CNPS 1B.2 -- this species formerly occurred approximately one mile northwest of the site along Fox Farm Road. Though habitat conditions appeared generally suitable in places, this plant was not found on the project site. Probability of occurrence is low.

Laguna Mountains jewel-flower (*Streptanthus bernardinus*) - Forest Service Watch List, CNPS 4.3 -- closest definite locations are four to five miles northwest of the project site in the vicinity of Fawnskin on the north side of Big Bear Lake. There are a number of vague old records from "Big Bear Valley" but locations for these records have not been confirmed. Probability of occurrence is low.

California taraxacum (*Taraxacum californicum*) - Federally Endangered, CNPS 1B.1 -- occurs at Eagle Point approximately one and one-half miles northwest of the parcel. This is a species of open moist meadows where the grass is not too thick, and conditions here appear marginal. Weedy dandelions were seen on moist road edges along Moonridge Road, but nothing approaching the native species appeared to be present. Probability of occurrence is low.

Slender-petaled theylypodium (*Thelypodium stenopetalum*) - Federally and State Endangered, CNPS 1B.1 -- there are a number of localities for this species one to two miles north and northwest of the project site. This is a species associated with the margins of moist meadows, often with slightly alkaline soils, such as on the north side of Baldwin Lake where the species is perhaps best known. No suitable habitat was observed on the project site or in surrounding areas with relatively suitable habitat. Probability of occurrence is very low.

Smallflower bluecurls (*Trichostema micranthum*) - CNPS 4.3 -- known from approximately one mile north and two miles southeast of the site. This annual is widely scattered in seasonally moist places, including the edges of roads and along seasonal drainages. Habitat at the site appeared suitable, but the species could not be found. Probability of occurrence is low.

6.0 Focused Survey for Southwestern Willow Flycatcher

6.1 Background

The southwestern willow flycatcher (SWWF) is a neotropical migrant that breeds in the west from northern Baja California, Mexico to central British Columbia and generally east through the northern half of the United States to the Atlantic coast (American Ornithologists Union 1998). In California, the southwestern willow flycatcher breeds along the coast south of the San Fernando

Valley and north in the interior to about Independence, Inyo County (Unitt 1987). The SWWF breeds in willow dominated riparian habitats that are similar to least Bell’s vireo nesting habitats but it shows a stronger dependency on willow thickets for all its requirements (Grinnell and Miller 1944). In addition, the SWWF appears to have a preference for sites with surface water in the vicinity, such as along streams, the margins of a pond or lake, and at wet mountain meadows (Grinnell and Miller 1944, Flett and Sanders 1987, Harris *et al.* 1987).

On July 22nd, 1997, the USFWS published a final critical habitat for this species (USFWS 1997). Approximately 100 river miles in Kern, Riverside, San Bernardino, and San Diego counties were designated for the southwestern willow flycatcher. Following the designation of critical habitat, a lawsuit was filed challenging various aspects of the designation. In response to these lawsuits, the critical habitat designation was vacated and the USFWS was instructed by the court to re-evaluate its previous position. A final proposed critical habitat designation was published on October 19th, 2005 designating 737 stream miles. The proposed project site is located within the final designated critical habitat area for this species.

6.2 Methods

All surveys for the SWWF were conducted by Mr. Jason Berkley (USFWS Permit No. TE009015-3). Methods employed were in conformance with the U.S. Fish and Wildlife Service’s *Southwestern Willow Flycatcher Presence/Absence Survey Guidelines*, issued June 1, 2010 (Sogge et al. 2010). Accordingly, five surveys of all riparian habitats located adjacent (one-fourth mile up and downstream) to the project site were conducted within three survey periods. The first survey period occurs between May 15th and May 31st, with the second survey period between June 1st and June 24th, and the third between June 25th and July 17th. All surveys were conducted at least five days apart and began at dawn and ended between 9:00 and 10:00 A.M. Temperatures during surveys ranged between 43 and 76 degrees Fahrenheit. Weather conditions were suitable for surveys, with clear skies and winds at or below Beaufort scale 1.

One permitted field investigator slowly walked the suitable habitat, stopping at appropriate intervals, uttered pishing sounds, and played a tape of recorded SWWF vocalizations. The tape was played for several seconds at each interval, followed by a brief pause to listen for a response. Surveys were conducted on May 23rd, June 10th, June 17th, 28th, and July 17th, 2011. Survey details are listed in Table 1 below.

Table 1 – Summary of Surveys for Southwestern Willow Flycatcher, 2011

Date	Time		Wind (Beaufort)		Temperature (F)		Weather		Results
	Start	End	Start	End	Start	End	Start	End	
5/2/2011	0715	0800	0	1	51°	51°	Clear	Clear	No SWWF
6/10/2011	0900	0945	0	2	74°	76°	Clear	Clear	No SWWF
6/17/2011	0900	1000	0	1	70°	72°	Clear	Clear	No SWWF
6/28/2011	0915	1000	0	1	70°	74°	Clear	Clear	No SWWF
7/17/2011	0615	0730	0	1	43°	57°	Clear	Clear	No SWWF

6.3 Results

No SWWF were observed during the five surveys conducted over the three survey periods. Bird activity was relatively high during surveys and a list of all bird species observed is included in Appendix 3. No sensitive species were observed during the surveys.

7.0 Project Impacts

We anticipate that project construction will involve the grading of all dry meadow and sage scrub habitat on the project site at minimum. It is also possible that some or all of the riparian willow forest will be graded. Regardless of how much riparian willow habitat is graded, heavy equipment on the site will likely degrade the habitat quality. Staging of equipment and storage of fill or waste will likely impact habitat on the project site as well as adjacent to the parking area downstream (southwest) of the site.

7.1 Impacts to Special Status Plants and Habitat

No sensitive plants were located on the project site and therefore there should be no direct impacts to sensitive plant species in the graded areas. The specimens of *Astragalus leucolobus* were located approximately one-half mile west of the project site and therefore would not be directly (or indirectly) impacted by the project.

As indicated earlier, the dry meadow habitat on the project site would likely be lost during construction. Though no rare plants were observed during the survey, it is possible that the dry meadow habitat on the project site could support sensitive plant species such as those listed above (See Section 5.3.3). It is unclear how much of the riparian habitat will be lost during construction but alteration of the Rathbone Creek stream channel could be considered “significant” under California Environmental Quality Act (CEQA). Regardless, stream channel alteration could require permitting under Section 1603 of the CDFG Code or Section 404 of the Clean Water Act (US Army Corps of Engineers).

Edge effects resulting from development often lead to the die off of rare plants. Possible edge effects include the exclusion of rare plants by invasive weeds, altered hydrology, or pollution from landscaping chemicals. Though there are no sensitive plant species which could be impacted by edge effects, it is likely that sensitive riparian habitat and the species utilizing it will be affected.

7.2 Impacts to SWWF and Sensitive Wildlife Species

No SWWFs were identified on or adjacent to the project site and it is unclear how much of riparian habitat will be cleared. It is clear however that the project will include crossings or bridges that will pass over the stream channel. These breaks in the habitat will create edge effects for whatever willows are left intact. Edge effects such as increased risk of predation and nest parasitism can dramatically impact SWWFs.

According to the USFWS (2002), the greatest historical factor in the decline of the SWWF is the extensive loss, fragmentation and modification of their breeding habitat. Although we do not

consider the riparian habitat on the project site and downstream along the proposed parking area suitable for breeding, we believe it is suitable for migratory and non-breeding SWWFs.

8.0 Mitigation, Surveying and Monitoring Recommendations

8.1 Mitigation

Based on our survey results and habitat assessments, we make the following recommendations for mitigation:

- Willow Riparian Forest Habitat – Loss and/or degradation of this habitat which is SWWF Designated Critical Habitat will not result in a “take” under the Endangered Species Act because it was not occupied by SWWF. It will, however, need to be mitigated for through revegetation efforts and/or replacement through land acquisition. Revegetation efforts would ideally utilize salvaged willows from the project site. Again, revegetation efforts on-site may not be sufficient if they do not result in a minimum of 0.25 miles contiguous linear suitable habitat.
- Dry Meadow Habitat – Loss of this habitat should be mitigated for with acquisition and conservation of comparable or higher quality for regional sensitive plant species as listed above in Section 5.3.3.

8.2 Project Surveying and Monitoring

Our recommendations and the level of effort for surveying and monitoring depend on if and how much of the nesting habitat in the riparian corridor will be removed as part of the project:

- Pre-construction Surveys: Nesting bird and sensitive species surveys approximately three to five days prior to construction. Depending on the species, buffer zones of 300 to 500 feet must be established around nesting birds until nesting is confirmed to have failed or fledglings are deemed sufficiently developed and independent. In general these buffer zones and protection for nesting birds under the Migratory Bird Act remain in place between February 15 and September 15.
- Nesting Surveys: If the riparian habitat will be left intact on the project site, nesting surveys should be conducted later in the spring. Again, if nesting activity is confirmed then buffer zones will be created.
- If buffer zones are created around nest sites, monitors should at minimum check nesting status on a weekly basis. Buffers can be removed and work can resume in the area once nests are determined to have failed or fledglings are sufficiently developed.
- Staging and storage areas should be checked to confirm that the riparian habitat downstream of the project site (adjacent to parking area) is not degraded. These areas will also need to be monitored for sensitive wildlife especially the southern rubber boa.
- If construction occurs at nighttime, habitat in one-half mile buffer should not be utilized for staging/storage so as to avoid impacts to sensitive nocturnal species including: California spotted owl, San Bernardino flying squirrel and roosting bald eagles.

9.0 Literature Cited

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Appendix 1 - Wildlife Species Observed During General Biological Surveys, 2011

	SCIENTIFIC NAME	COMMON NAME	STATUS ¹
BIRDS			
Accipitridae	Hawks, Harriers		
	<i>Buteo jamaicensis</i>	Red-tailed hawk	C
Odontophoridae	Quails		
	<i>Callipepla californica</i>	California quail	C
Columbidae	Pigeons and Doves		
	<i>Patagioenas fasciata</i>	Band-tailed pigeon	C
Cuculidae	Cuckoos, Roadrunners, Anis		
	<i>Geococcyx californianus</i>	Greater roadrunner	C
Trochilidae	Hummingbirds		
	<i>Calypte anna</i>	Anna's hummingbird	C
Picidae	Woodpeckers		
	<i>Colaptes auratus</i>	Northern flicker	C
Tyrannidae	Tyrant Flycatchers		
	<i>Sayornis nigricans</i>	Black phoebe	C
	<i>Tyrannus verticalis</i>	Western kingbird	C
Hirundinidae	Swallows		
	<i>Tachycineta thalassina</i>	Violet-green swallow	C
Corvidae	Jays and Crows		
	<i>Cyanocitta stelleri</i>	Steller's jay	C
	<i>Aphelocoma californica</i>	Scrub jay	C
	<i>Corvus corax</i>	Common raven	C
Paridae	Chickadees, Titmice		
	<i>Poecile gambeli</i>	Mountain chickadee	C
Turdidae	Thrushes		
	<i>Turdus migratorius</i>	American robin	C
	<i>Sialia mexicana</i>	Western Bluebird	C
Regulidae	Kinglets		
	<i>Regulus calendula</i>	Ruby-crowned kinglet	C
Parulidae	Wood-warblers		
	<i>Vermivora celata</i>	Orange-crowned warbler	C
	<i>Wilsonia pusilla</i>	Wilson's warbler	C
Emberizidae	Emberizids		
	<i>Melospiza melodia</i>	Song sparrow	C
	<i>Junco hyemalis</i>	Dark-eyed junco	C
Icteridae	Blackbirds		
	<i>Euphagus cyanocephalus</i>	Brewer's blackbird	C
Fringillidae	Finches		
	<i>Carduelis psaltria</i>	Lesser goldfinch	C

Appendix 1 - Wildlife Species Observed During General Biological Surveys, 2011

	SCIENTIFIC NAME	COMMON NAME	STATUS¹
MAMMALS			
Sciuridae	Squirrels, Chipmunks		
	<i>Spermophilus beecheyi</i>	California ground squirrel	C
	<i>Neotamias merriami</i>	Merriam's chipmunk	C
Geomyidae	Pocket Gophers		
	<i>Thomomys bottae</i>	Pocket gopher	C
Cervidae	Deer		
	<i>Odocoileus hemionus</i>	Mule deer	C
Canidae	Foxes, Wolves		
	<i>Canis latrans</i>	Coyote	C
	<i>Canis lupus familiaris</i>	Domestic dog	C
	<i>Urocyon cinereoargenteus</i>	Gray fox	C
Procyonidae	Raccoons		
	<i>Procyon lotor</i>	Raccoon	C

¹ Status: C - Common, S - Sensitive

Appendix 2 - List of Plants Observed During Rare Plant Surveys, 2011

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABIT	CA ¹	NOTES
EQU	<i>Equisetum arvense</i> L.	Field horsetail	Perennial	N	Site Yes; Buffer No
EQU	<i>Equisetum laevigatum</i> A. Braun	Smooth horsetail	Perennial	N	Site Yes; Buffer No
CUP	<i>Juniperus occidentalis</i> Hook. ssp. <i>australis</i> Vasek	Western juniper	Tree	N	Site Yes; Buffer Yes; Voucher exists
PIN	<i>Abies concolor</i> (Gord. & Glend.) Lindl. ex Hildebr.	White fir	Tree	N	Site No; Buffer Yes
PIN	<i>Pinus jeffreyi</i> Grev.	Jeffrey pine	Tree	N	Site Yes; Buffer Yes
AMA	<i>Amaranthus blitoides</i> S. Wats.	Mat amaranth	Annual	N	Site Yes; Buffer Yes; Voucher exists
AMA	<i>Amaranthus palmeri</i> S. Wats. ?	Carelessweed	Annual	N	Site Yes; Buffer No
API	<i>Lomatium dissectum</i> (Nutt.) Mathias & Constance	Fernleaf biscuitroot	Perennial	N	Site No; Buffer Yes
API	<i>Osmorhiza chilensis</i> Hook. & Arn.	Sweetcicely	Perennial	N	Site No; Buffer Yes
AST	<i>Achillea millefolium</i> L.	Common yarrow	Perennial	N	Site Yes; Buffer Yes
AST	<i>Agoseris heterophylla</i> (Nutt.) Greene	Annual agoseris	Annual	N	Site Yes, Buffer No; Voucher exists
AST	<i>Ambrosia acanthicarpa</i> Hook.	Flatspine bur ragweed	Annual	N	Site No; Buffer Yes
AST	<i>Artemisia dracunculus</i> L.	tarragon	Perennial	N	Site Yes; Buffer Yes
AST	<i>Artemisia ludoviciana</i> Nutt.	Western mugwort	Perennial	N	Site Yes; Buffer Yes
AST	<i>Artemisia tridentata</i> Nutt.	Great Basin sagebrush	Shrub	N	Site Yes; Buffer Yes
AST	<i>Aster</i>	Aster	Perennial	N	Site Yes; Buffer Yes; Voucher exists
AST	<i>Chrysothamnus nauseosus</i> (Pall. ex Pursh) Britt.	Common rabbitbrush	Shrub	N	Site No; Buffer Yes
AST	<i>Cirsium scariosum</i> Nutt. var. <i>congdonii</i> (Moore & Frankton) Keil	Rosette thistle	Perennial	N	Site Yes; Buffer No
AST	<i>Conyza canadensis</i> (L.) Cronq.	Canadian horseweed	Annual	N	Site No; Buffer Yes
AST	<i>Erigeron divergens</i> Torr. & Gray	Spreading fleabane	Annual	N	Site Yes; Buffer Yes; Voucher exists
AST	<i>Gnaphalium palustre</i> Nutt.	Western marsh cudweed	Annual	N	Site Yes; Buffer Yes; Voucher exists
AST	<i>Helianthus annuus</i> L.	Common sunflower	Annual	I	Site No; Buffer Yes
AST	<i>Lactuca serriola</i> L.	Prickly lettuce	Annual	I	Site Yes; Buffer Yes
AST	<i>Machaeranthera canescens</i> (Pursh) Gray	Hoary tansyaster	Perennial	N	Site No; Buffer Yes
AST	<i>Madia elegans</i> Lindl.	Common madia	Annual	N	Site No; Buffer Yes; Voucher exists
AST	<i>Madia gracilis</i> (Smith) Keck ?	Grassy tarweed	Annual	N	Site Yes; Buffer No
AST	<i>Matricaria matricarioides</i> (Less.) Porter	Disc mayweed	Annual	I	Site Yes; Buffer Yes
AST	<i>Solidago californica</i> Nutt.	California goldenrod	Perennial	N	Site No; Buffer Yes
AST	<i>Sonchus asper</i> (L.) Hill	Spiny sowthistle	Annual	I	Site Yes; Buffer Yes
AST	<i>Stephanomeria virgata</i> Benth.	Rod wirelettuce	Annual	N	Site Yes; Buffer No

Appendix 2 - List of Plants Observed During Rare Plant Surveys, 2011

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABIT	CA ¹	NOTES
AST	<i>Taraxacum officinale</i> G.H. Weber ex Wiggers	Common dandelion	Perennial	I	Site Yes; Buffer Yes
AST	<i>Tragopogon dubius</i> Scop.	Yellow salsify	Biennial	I	Site Yes; Buffer Yes; Voucher exists
BOR	<i>Lappula redowskii</i> (Hornem.) Greene	Flatspine stickseed	Annual	N	Site Yes; Buffer No; Voucher exists
BRA	<i>Arabis holboellii</i> Hornem. ?	Holboell's rock-cress	Biennial	N	Site No; Buffer Yes
BRA	<i>Descurainia incisa</i> (Sweet) O.E. Schultz	Mountain tansymustard	Annual	N	Site Yes; Buffer Yes; Voucher exists
BRA	<i>Descurainia sophia</i> (L.) Webb ex Prantl	Herb sophia	Annual	I	Site Yes; Buffer Yes
BRA	<i>Erysimum capitatum</i> (Dougl. ex Hook.) Greene	Douglas wallflower	Biennial	N	Site No; Buffer Yes
BRA	<i>Lepidium virginicum</i> L. var. <i>pubescens</i> (Greene) Thellung	Wild peppergrass	Biennial	N	Site Yes; Buffer Yes
BRA	<i>Sisymbrium altissimum</i> L.	Tall tumbled mustard	Annual	I	Site Yes; Buffer Yes
CPR	<i>Symphoricarpos rotundifolius</i> Gray var. <i>parishii</i> ? (Rydb.)Dempster	Parish snowberry	Shrub	N	Site Yes; Buffer Yes; Voucher exists
CRY	<i>Silene verecunda</i> S. Wats.	San Francisco campion	Perennial	N	Site No; Buffer Yes
CHN	<i>Atriplex rosea</i> L.	Tumbling saltweed	Annual	I	Site No; Buffer Yes
CHN	<i>Chenopodium</i>	Goosefoot	Annual		Site Yes; Buffer Yes; Voucher exists
CHN	<i>Chenopodium fremontii</i> S. Wats.	Fremont's goosefoot	Annual	N	Site No; Buffer Yes; Voucher exists
CHN	<i>Kochia scoparia</i> (L.) Schrad.	Fireweed	Annual	I	Site Yes; Buffer Yes
CHN	<i>Salsola tragus</i> L. ?	Prickly Russian thistle	Annual	I	Site No; Buffer Yes
ERI	<i>Arctostaphylos patula</i> Greene	Greenleaf manzanita	Shrub	N	Site No; Buffer Yes
EUP	<i>Euphorbia serpyllifolia</i> Pers.	Thyme-leaved spurge	Annual	N	Site Yes; Buffer Yes; Voucher exists
FAB	<i>Amorpha californica</i> Nutt.	California false indigo	Shrub	N	Site No; Buffer Yes
FAB	<i>Astragalus leucolobus</i> S. Wats. ex M.E. Jones	Bear Valley woollypod	Perennial	N	Site No; Buffer Yes
FAB	<i>Lathyrus latifolius</i> L.	Perennial pea	Perennial	I	Site No; Buffer Yes
FAB	<i>Lotus argyraeus</i> (Greene) Greene	Canyon bird's-foot trefoil	Perennial	N	Site No; Buffer Yes
FAB	<i>Lotus crassifolius</i> (Benth.) Greene	Big deervetch	Perennial	N	Site No; Buffer Yes
FAB	<i>Lotus nevadensis</i> (S. Wats.) Greene	Sulphur-flowered lotus	Perennial	N	Site No; Buffer Yes
FAB	<i>Lotus purshianus</i> (Benth.) Clem. & Clem.	Prairie trefoil	Annual	N	Site Yes; Buffer Yes; Voucher exists
FAB	<i>Lupinus lepidus</i> Dougl. ex Lindl. var. <i>confertus</i> (Kell.) Smith	Crowded lupine	Perennial	N	Site Yes; Buffer Yes; Voucher exists
FAB	<i>Medicago sativa</i> L.	Alfafa	Perennial	I	Site No; Buffer Yes
FAB	<i>Melilotus albus</i> Medikus	White sweetclover	Annual	I	Site Yes; Buffer Yes

Appendix 2 - List of Plants Observed During Rare Plant Surveys, 2011

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABIT	CA ¹	NOTES
FAB	<i>Melilotus officinalis</i> (L.) Lam	Yellow sweetclover	Annual	I	Site Yes; Buffer Yes; Voucher exists
FAB	<i>Robinia pseudoacacia</i> L.	Black locust	Tree	I	Site No; Buffer Yes
FAG	<i>Quercus kelloggii</i> Newb.	California black oak	Tree	N	Site No; Buffer Yes
HYD	<i>Phacelia hastata</i> Lehm. ?	Silverleaf phacelia	Perennial	N	Site No; Buffer Yes
LAM	<i>Mentha canadensis</i> L.	Wild mint	Perennial	N	Site Yes; Buffer No; Voucher exists
LAM	<i>Scutellaria siphocampyloides</i> Vatke	Grayleaf skullcap	Perennial	N	Site No; Buffer Yes
LAM	<i>Stachys albens</i> Gray	Western hedgenettle	Perennial	N	Site Yes; Buffer No; Voucher exists
LOA	<i>Mentzelia montana</i> (Davids.) Davids. ?	Variegated-bract blazingstar	Annual	N	Site Yes; Buffer No; Voucher exists
MLV	<i>Malva neglecta</i> Wallroth. ?	Common mallow	Annual	I	Site Yes; Buffer Yes
MLV	<i>Sidalcea malviflora</i> (DC.) Benth.	Dwarf checkerbloom	Perennial	N	Site Yes; Buffer No; Voucher exists
OLE	<i>Syringa vulgaris</i> L.	Common lilac	Tree	I	Site Yes; Buffer Yes; (cultivated and persisting)
ONA	<i>Epilobium brachycarpum</i> C. Presl	Tall annual willowherb	Annual	N	Site Yes; Buffer Yes ; Voucher exists
ONA	<i>Epilobium ciliatum</i> Raf.	Fringed willowherb	Annual/Perennial	N	Site Yes; Buffer No; Voucher exists
ONA	<i>Gayophytum</i>	Groundsmoke	Annual	N	Site Yes; Buffer Yes; Voucher exists
ONA	<i>Oenothera californica</i> Wats.	California evening primrose	Perennial	N	Site Yes; Buffer Yes; Voucher exists
PTG	<i>Plantago lanceolata</i> L.	Narrowleaf plantain	Perennial	I	Site No; Buffer Yes
PLM	<i>Phlox gracilis</i> (Hook.) Greene	Slender phlox	Annual	N	Site Yes; Buffer No
PLG	<i>Eriogonum davidsonii</i> Greene	Davidson's buckwheat	Annual	N	Site No; Buffer Yes
PLG	<i>Polygonum aviculare</i> L.	Knotweed	Annual	I	Site Yes; Buffer Yes
PLG	<i>Polygonum convolvulus</i> L.	Black bindweed	Annual Vine	I	Site No; Buffer Yes
PLG	<i>Polygonum douglasii</i> Greene	Douglas' knotweed	Annual	N	Site Yes; Buffer Yes; Voucher exists
RHM	<i>Ceanothus cordulatus</i> Kell.	Whitethorn ceanothus	Shrub	N	Site No; Buffer Yes
ROS	<i>Amelanchier utahensis</i> Koehne	Service berry	Shrub	N	Site Yes; Buffer Yes; Voucher exists
ROS	<i>Cercocarpus ledifolius</i> Nutt.	Curlleaf mountain mahogany	Shrub/Tree	N	Site No; Buffer Yes
ROS	<i>Potentilla anserina</i> L.	Silverweed	Perennial	N	Site Yes; Buffer Yes
ROS	<i>Potentilla glandulosa</i> Lindl.	Sticky cinquefoil	Perennial	N	Site No; Buffer Yes
ROS	<i>Potentilla gracilis</i> Hook.	Slender cinquefoil	Perennial	N	Site Yes; Buffer No
ROS	<i>Prunus</i>	Plum	Tree	I	Site Yes; Buffer No; (purple leaf;persisting ornamental)
ROS	<i>Rosa</i>	Rose	Shrub	I	Site Yes; Buffer No; (persisting ornamental)

Appendix 2 - List of Plants Observed During Rare Plant Surveys, 2011

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABIT	CA ¹	NOTES
ROS	<i>Rosa californica</i> C. & S.	California wild rose	Shrub	N	Site No; Buffer Yes
SAL	<i>Salix lasiolepis</i> Benth.	Arroyo willow	Shrub	N	Site Yes; Buffer Yes;
SAL	<i>Salix lutea</i> Nutt.	Yellow willow	Shrub/Tree	N	Site No; Buffer Yes; Voucher exists
SAX	<i>Ribes cereum</i> Dougl.	Wax currant	Shrub	N	Site No; Buffer Yes
SCR	<i>Collinsia parryi</i> Gray ?	Parry's blue eyed mary	Annual	N	Site Yes; Buffer No
SCR	<i>Cordylanthus nevinii</i> Gray	Nevin's bird-beak	Annual	N	Site No; Buffer Yes; Voucher exists
SCR	<i>Mimulus guttatus</i> DC.	Seep monkeyflower	Perennial	N	Site Yes; Buffer No
SCR	<i>Penstemon labrosus</i> (Gray) Hook. f.	San Gabriel beardtongue	Perennial	N	Site Yes; Buffer Yes
SCR	<i>Verbascum thapsus</i> L.	Common mullein	Biennial	I	Site Yes; Buffer No
SCR	<i>Veronica anagallis-aquatica</i> L. ?	Water speedwell	Perennial	I	Site Yes; Buffer No; Voucher exists
SCR	<i>Veronica peregrina</i> L.	Neckweed	Annual	N	Site Yes; Buffer No; Voucher exists
URT	<i>Urtica dioica</i> L.	Stinging nettle	Perennial	N	Site Yes; Buffer Yes
VRB	<i>Verbena bracteata</i> Lag. & J. D. Rodriguez	Bigbract verbena	Annual	N	Site Yes; Buffer -; Voucher exists
VIO	<i>Viola purpurea</i> Kellogg	Goosefoot violet	Perennial	N	Site No; Buffer Yes
CYP	<i>Carex nebrascensis</i> Dewey ?	Nebraska sedge	Perennial	N	Site Yes; Buffer -; Voucher exists
CYP	<i>Carex praegracilis</i> W. Boott	Clustered field sedge	Perennial	N	Site Yes; Buffer Yes
IRI	<i>Iris missouriensis</i> Nutt.	Rocky Mountain iris	Perennial	N	Site Yes; Buffer -; Voucher exists
IRI	<i>Sisyrinchium bellum</i> S. Wats.	Western blue-eyed grass	Perennial	N	Site Yes; Buffer -; Voucher exists
JUN	<i>Juncus balticus</i> Willd.	Wire (Baltic) rush	Perennial	N	Site Yes; Buffer Yes;
JUN	<i>Juncus bufonius</i> L.	Toad rush	Annual	N	Site Yes; Buffer -; Voucher exists
JUN	<i>Juncus macrophyllus</i> Cov. ?	Long-leaved rush	Perennial	N	Site Yes; Buffer -
LIL	<i>Calochortus invenustus</i> Greene	Plain Mariposa lily	Perennial	N	Site Yes; Buffer -; Voucher exists
POA	<i>Agrostis stolonifera</i> L.	Creeping bentgrass	Perennial	I	Site Yes; Buffer Yes; Voucher exists
POA	<i>Bromus arenarius</i> Labill ?	Australian brome	Annual	I	Site Yes; Buffer -; Voucher exists
POA	<i>Bromus carinatus</i> H. & A.	California brome	Perennial	N	Site Yes; Buffer Yes; Voucher exists
POA	<i>Bromus inermis</i> Leys.	Smooth brome	Perennial	I	Site No; Buffer Yes
POA	<i>Bromus tectorum</i> L.	Cheat grass	Annual	I	Site Yes; Buffer Yes
POA	<i>Deschampsia cespitosa</i> (L.) Beauv.	Tufted hairgrass	Perennial	N	Site Yes; Buffer No; Voucher exists
POA	<i>Elymus elymoides</i> (Raf.) Swezey	Bottlebrush squirreltail	Perennial	N	Site Yes; Buffer Yes; Voucher exists
POA	<i>Elymus hispidus</i> (Opiz) Meld.	Intermediate wheatgrass	Perennial	I	Site Yes; Buffer Yes; Voucher exists

Appendix 2 - List of Plants Observed During Rare Plant Surveys, 2011

FAMILY	SCIENTIFIC NAME	COMMON NAME	HABIT	CA ¹	NOTES
POA	<i>Elymus trachycaulus</i> (Link.) Shinn.	Slender wheatgrass	Perennial	N	Site Yes; Buffer Yes; Voucher exists
POA	<i>Elymus triticoides</i> Buckl.	Beardless wild rye	Perennial	N	Site Yes; Buffer Yes; Voucher exists
POA	<i>Festuca arundinacea</i> Schreb.	Tall fescue	Perennial	I	Site Yes; Buffer Yes; Voucher exists
POA	<i>Festuca rubra</i> L.	Red fescue	Perennial	N	Site Yes; Buffer No; Voucher exists
POA	<i>Hordeum brachyantherum</i> Nevski ssp. <i>californicum</i> (Covas & Stebbins) Bothmer, Jacobsen & Seberg	California barley	Perennial	N	Site Yes; Buffer No; Voucher exists
POA	<i>Hordeum jubatum</i> L.	Foxtail barley	Perennial	N	Site Yes; Buffer No
POA	<i>Muhlenbergia richardsonis</i> (Trin.) Rydb.	Mat muhly	Perennial	N	Site Yes; Buffer No
POA	<i>Panicum miliaceum</i> L.	Broomcorn millet	Annual	I	Site Yes; Buffer No
POA	<i>Poa pratensis</i> L.	Kentucky bluegrass	Perennial	N/I	Site Yes; Buffer Yes; Voucher exists
POA	<i>Stipa comata</i> Trin. & Rupr.	Needle and thread	Perennial	N	Site No; Buffer Yes
POA	<i>Stipa (Achnatherum) hymenoides</i> Roemer & Schultes	Indian ricegrass	Perennial	N	Site No; Buffer Yes; = <i>Oryzopsis</i> h., <i>Achnatherum</i> h.
POA	<i>Stipa (Achnatherum) lettermanii</i> Vasey ?	Letterman's needlegrass	Perennial	N	Site No; Buffer Yes

¹ N: Native to California; I: Invasive

Appendix 3 - Bird Species Observed During Southwestern Willow Flycatcher Surveys, 2011

	SCIENTIFIC NAME	COMMON NAME	STATUS¹
Falconidae	Falcons		
	<i>Falco sparverius</i>	American kestrel	C
Odontophoridae	Quails		
	<i>Callipepla californica</i>	California quail	C
Columbidae	Pigeons and Doves		
	<i>Patagioenas fasciata</i>	Band-tailed pigeon	C
Cuculidae	Cuckoos, Roadrunners, Anis		
	<i>Geococcyx californianus</i>	Greater roadrunner	C
Trochilidae	Hummingbirds		
	<i>Archilochus alexandri</i>	Black-chinned hummingbird	C
	<i>Calypte anna</i>	Anna's hummingbird	C
	<i>Selasphorus sasin</i>	Allen's hummingbird	C
Picidae	Woodpeckers		
	<i>Colaptes auratus</i>	Northern flicker	C
Corvidae	Jays and Crows		
	<i>Cyanocitta stelleri</i>	Steller's jay	C
	<i>Corvus corax</i>	Common raven	C
Hirundinidae	Swallows		
	<i>Tachycineta thalassina</i>	Violet-green swallow	C
	<i>Petrochelidon pyrrhonota</i>	Cliff swallow	C
	<i>Stelgidopteryx serripennis</i>	Notrthern rough-winged swallow	C
Paridae	Chickadees, Titmice		
	<i>Poecile gambeli</i>	Mountain chickadee	C
Turdidae	Thrushes		
	<i>Turdus migratorius</i>	American robin	C
Sturnidae	Starlings		
	<i>Sturnus vulgaris</i>	European starling	C
Parulidae	Wood-warblers		
	<i>Vermivora celata</i>	Orange-crowned warbler	C
Emberizidae	Emberizids		
	<i>Pipilo maculatus</i>	Spotted towhee	C
	<i>Melospiza melodia</i>	Song sparrow	C
	<i>Junco hyemalis</i>	Dark-eyed junco	C
Cardinalidae	Cardinals, Saltators, Allies		
	<i>Pheucticus melanocephalus</i>	Black-headed grosbeak	C
Icteridae	Blackbirds		
	<i>Euphagus cyanocephalus</i>	Brewer's blackbird	C
Fringillidae	Finches		
	<i>Carpodacus mexicanus</i>	House finch	C
	<i>Carduelis psaltria</i>	Lesser goldfinch	C

¹ Status: C - Common, S - Sensitive

APPENDIX C.2
Biological Resources Assessment
Peer Review



Brian F. Smith & Associates

Archaeological/Historical/Paleontological/Biological/Consulting

30 January 2012

Nancy M. Ferguson
Senior Project Manager
The Altum Group
73-255 El Paseo Drive, Suite 15
Palm Desert, CA 92260

SUBJECT: Peer Review, Moonridge Animal Park Relocation Project: General Biological Resources Assessment, Rare Plant Survey and Focused Southwestern Willow Flycatcher Survey

Dear Ms. Ferguson:

Thank you for the opportunity to review the subject report. I consider a peer review to be an assessment done by others in the same field with the goal of maintaining or enhancing the quality of the work being reviewed. Peer review is based on the concept that someone outside of the project may be able to provide a more impartial evaluation than could those directly involved in the preparation of the document. My goal is, if possible, to strengthen the document and help make it less vulnerable to criticism. I did not find any technical flaws in the report, but I have noted some changes and additions that may make the report more complete. In many cases, I have phrased comments as questions that could be posed by concerned readers.

A weakness in the report is its treatment of wetlands. Wetlands are considered a sensitive plant community by state and federal agencies. A biological assessment should include a more thorough discussion of wetlands than what is presented in this report. A jurisdictional determination/delineation was completed for this project in November 2010. That report should be summarized and cited in the biological assessment. All figures related to wetlands in the biological assessment should be consistent with the jurisdictional determination/delineation. Mitigation discussed in the biological assessment should include mitigation described in the jurisdictional determination/delineation. It might be appropriate to include the jurisdictional delineation as an appendix to the assessment.

1.0 Executive Summary:

- Include a brief summary of project location and project description.

2.0 Project Site Description:

- Provide a site plan for the proposed project. The site plan should include the ultimate limits of disturbance for the project.
- The project site description would benefit by including a discussion of topography and drainage patterns. Soils could be discussed in more depth—identify soils involved, and include a brief description of soils (including whether or not soils are hydric) and a soil map. The CDFG requires that only one of the three wetland criteria established by USCOE be satisfied for an area to be considered a wetland. The presence of a hydric soil may be indicative of a wetland even though hydrophytic vegetation and wetland hydrology are absent.
- Discuss the significance of the phrase “blue-line stream.”
- Identify plant communities by California Natural Communities Code and nomenclature. This provides a common base to which readers can refer, and it is also the system used by the California Department of Fish and Game in the California Natural Diversity Data Base.

3.0 Focus Study/Species of Concern:

- Provide a map of designated southwestern willow flycatcher habitat on and adjacent to the project site. The significance of designated critical habitat on the proposed project site should be discussed.
- The list of species in this section would be better understood if put into a table that includes nomenclature, state, and federal status, as well as California Native Plant Society designation.

4.0 General Biological Resources Assessment:

4.1 Methods:

- Was the National Wetlands Inventory consulted to determine if previously mapped wetlands are present? In general, wetlands and potential jurisdictional waters other than wetlands seem to be minimized in this report. Although this report is not a wetland delineation or jurisdictional determination, it should identify the presence of wetlands and jurisdictional waters and present conclusions/recommendations regarding Clean Water Act permits and Section 1600 of the California Fish and Game Code.
- This section states that surveys were made on foot or from vehicles but it does not identify what was being searched for. State the objective of the surveys.
- The report does not discuss the potential effects of construction-related noise on nesting/breeding birds. The U.S. Fish and Wildlife Service has determined that noise levels of 60 dB(A) or higher may adversely affect nesting/breeding birds. Disruption of nesting may be considered as “take” under the Migratory Bird Treaty Act and the California Fish and Game Code. If the nesting bird survey determines that nesting birds

are present, it may be appropriate to recommend a noise assessment to determine if the nests may fall within the 60 dB(A) contour. If nesting birds will be adversely affected by construction related noise, attenuation and monitoring of noise levels may be appropriate. Noise levels at the edge of occupied habitat should not exceed 60 dB(A) or ambient (whichever is higher).

4.2 Results:

4.2.1 Common Vegetation Types:

- Descriptions of plant communities should include the California Natural Communities Code and nomenclature.
- The descriptions of plant communities should include a brief discussion of the predominant plants observed in each community.
- The report should include a table of plant communities observed and the acreage of each community on the proposed project site.
- In Figure 5, the habitat map for the proposed project site should include a north arrow and a legible scale bar.
- The watercourse on the project site should be depicted on the habitat map.
- As noted previously, plant communities should be identified using California Natural Communities Code and nomenclature.
- The map would be more easily understood if plant communities were color coded rather than identified by numbers.
- On page 7, under the discussion of Jeffery Pine Forest, Sawyer Keeler-Wolf 1995 is cited but this reference is not included in Section 9.0 (Literature Cited).

4.2.2 Special Status Wildlife Species:

- It is clear that the report's authors had criteria for predicting the probability of a species occurrence on the project site. A brief introduction describing the criteria used would be appropriate.
- The discussions of the species considered in this section should indicate if suitable habitat for the species of concern is present in the study area. This is done to some extent but should be consistent throughout.
- On page 8, under the discussion of the California spotted owl, there is a call-out (CDFG # SB144). This citation does not appear in Section 9.0 (Literature Cited). If there is no call-out for a reference, it would help to explain what it is.

5.0 Rare Plant Survey:

5.1 Background:

No comments.

5.2 Methods:

No comments.

5.3 Results:

5.3.1 *Special Status Plants:*

- The California Native Plant Society Rare Plant Inventory identifies *Astragalus leucolobus* as “Big Bear Valley woolypod” as opposed to “Bear Valley woolypod” as used in the report.
- Was suitable habitat for *A. leucolobus* found on the project site? What is the potential for it to occur on the project site?

5.3.2 *Special Status Vegetation:*

- The special status plant communities described in this section should be depicted on a map of the site.
- Please see the first page of this letter for comments on wetlands.

5.3.3 *Special Status Plants Potentially Occurring on Project Site:*

- See comments under Section 4.2.2, *Special Status Wildlife*, as they apply to this discussion as well.
- Since the California Native Plant Society Rare and Endangered Plants Inventory is cited throughout this discussion, nomenclature in the assessment should be consistent with the nomenclature in the inventory.
- Bear Valley sandwort (*Arenaria (Eremogone) ursine*) (sic) is listed as *Eremogone ursina* (note spelling), Big Bear Valley sandwort, by the California Native Plant Society. The use of brackets and parentheses should be consistent (see usage in discussion of *Oxytheca [Sidotheca] caryophylloides*).
- *Castilleja montigena* should be all italics.
- The California Native Plant Society lists San Bernardino Mountains bladderpod as *Physaria kingii ssp. bernardina*.
- White adder’s mouth is listed as white bog adder’s mouth by the California Native Plant Society.

- Chickweed starry puncturebract is listed as chickweed oxytheca by the California Native Plant Society.
- Smallflowered bluecurls should be small-flowered bluecurls.

6.0 Focused Survey for Southwestern Willow Flycatcher:

- The focused survey conforms to U.S. Fish and Wildlife Service protocols for this species. It is assumed the report was submitted to the U.S. Fish and Wildlife Service. It would be appropriate to attach the report of findings for the flycatcher surveys as an appendix to this assessment.

6.1 Background:

- On page 14, first full paragraph, it is mentioned that the project site is within designated critical habitat for the southwestern willow flycatcher. What effect does this have on the project? Does being with designated critical habitat place restrictions on the project?
- Provide a map depicting project relationship to designated critical habitat for this species.

6.2 Methods:

No comments.

6.3 Results:

No comments.

7.0 Project Impacts:

- This discussion should include a table with the plant communities present and their acreage as compared to the acreage of each community affected, i.e.

Plant Community	Acres	Acres affected	Balance

- Include a figure overlaying the project habitat map with the project site plan and depicting plant communities that will be affected. This figure should be included even if the project site will be built out 100 percent.

7.1 Impacts to Special Status Plants and Habitat:

- This section references Section 1603 of the California Fish and Game Code, as well as Section 404 of the Clean Water Act. This discussion should indicate that Section 1602 of the Fish and Game Code requires an entity to notify the Department of Fish and Game of any proposed activity that may substantially modify a river, stream, or lake. Section 1603 of the California Fish and Game Code indicates that after the notification is received, the Department of Fish and Game shall determine if the project may substantially affect fish and wildlife resources. If it is determined that fish and wildlife

resources would be substantially affected, a draft Lake and Streambed Alteration Agreement will be prepared for review and acceptance by the applicant.

- This discussion should include the need for a Section 401 Water Quality Certification from the local Regional Water Quality Control Board. The U.S. Army Corps of Engineers will not issue a 404 permit without a 401 certification.
- This section should also discuss whether this project would qualify for a Nationwide Permit. The Army Corps of Engineers has authorized 49 Nationwide Permits covering a range of activities. Many of these permits have been granted 401 certifications. The use of a Nationwide Permit, if applicable, would facilitate project implementation.

7.2 Impacts to SWWF and Sensitive Wildlife Species:

No comments.

8.0 Mitigation, Surveying, and Monitoring Recommendations:

8.1 Mitigation:

- Please include how many acres will be adversely affected, appropriate mitigation ratios, and the amount of mitigation land required.
- Please include that mitigation may also be accomplished payment of an appropriate fee to a mitigation bank, if one is available. It would be helpful if available mitigation banks were identified in this discussion.
- Is there an opportunity to mitigate for some of the adverse effects of the project through restoration or revegetation on the project site?

8.2 Project Surveying and Monitoring:

Pre-Construction Surveys

- Please specify that the surveys will be conducted by a qualified biologist/ornithologist, that a report of findings shall be prepared, and to what agency or group it will be submitted.
- Identify sensitive species to be included in pre-construction surveys.
- Section 7.1 states: “It is possible that the dry meadow habitat on the project site could support sensitive plant species.” If this is the case, then a provision requiring pre-construction surveys during the flowering period for the species involved should be included. These surveys should be conducted prior to any ground-disturbing activity.

Nesting Surveys

- Specify dates implied by the statement “later in the spring.”

Buffer Zones

- Specify that nest locations and corresponding buffers shall be noted on design plans.

- How will construction workers be able to identify buffers? Describe how buffers will be delineated on the ground.

Staging and Storage Areas

- Please specify who will be responsible for monitoring downstream riparian habitat, as well as indicate the frequency of monitoring.
- Identify to what agency or group the report of findings shall be submitted.
- Identify action to be taken if damage occurs to downstream habitat.

Night work

- Provide a map identifying the areas not to be used for staging/storage if work occurs at night or reference the appropriate figure in the report.

Appendix 1 – Wildlife Species Observed During General Biological Surveys:

- The title of Appendix 1 does not match the title in the table of contents.

Appendix 2 – Plants Observed During Rare Plant Surveys:

- The title of Appendix 2 does not match the title in the table of contents.
- Annotate Appendix 2 to indicate which plant communities each species was observed in.

Appendix 3 – Bird Species Observed During SWWF Surveys:

- The title of Appendix 3 does not match the title in the table of contents.

Once again, thank you for the opportunity to review this report. I hope my comments have been constructive and will help to strengthen the report. If I can be of further assistance, please contact me at your convenience.

Sincerely,



Laurence N. Dean
Senior Biologist

APPENDIX C.3
BBAZ Plant Survey

August 31, 2012

Nancy M. Ferguson
The Altum Group
73-255 El Paseo Drive, Suite 15
Palm Desert, CA 92260

SUBJECT: Report of a Focused Survey for Special-Status Plant Species at the 10.3-acre Moonridge Animal Park Relocation Project Site, City of Big Bear Lake, San Bernardino County, California

Dear Nancy:

Athena Group conducted focused surveys for special-status plants within the 10.3-acre Moonridge Animal Park Relocation Project Site (“Project Site”), located in the Moonridge Area of Big Bear Lake , San Bernardino County, California, U.S. Geological Survey 7.5’ topographic map Moonridge, California dated 1967, [photorevised 1988]; Section 22, Township 2 North, Range 1 West [Exhibit 1: Regional map and Exhibit 2: Vicinity map].

Senior Biologist, Tony Bomkamp, conducted the surveys on July 3, 2012. No special-status plants were detected during the focused survey. The Project Site was previously subject to focused surveys for special-status plants in July 2011 by Mr. Andrew Sanders, Tanner Environmental Services, during which no special-status plant species were detected within the Project Site, and one special-status plant, Big Bear Valley woollypod (*Astragalus leucolobus*), was found within a half-mile of the Project Site. For those species for which suitable habitat exists at the Project Site, none are expected to occur based on two consecutive years of negative surveys.

I. SITE LOCATION AND DESCRIPTION

The 10.3-acre Project Site is located along Rathbun Creek at Clubview Drive and Moonridge Road and between Moonridge Road and the Bear Mountain Golf Course in the Moonridge area of Big Bear Lake [Exhibits 1 and 2]. This report addresses the biological resources occurring on the Project Site and potential impacts to those resources from the proposed project.

The Project Site is at an elevation of approximately 6,950 feet (2,110 meters) on land with well-drained soils which slopes gently from southeast to northwest. The site is roughly bisected by Rathbun Creek, a perennial “blue-line” stream and riparian corridor which drains into Big Bear Lake. According to the vegetation map in the Tanner Environmental Services report and as verified by Mr. Bomkamp in the field, the site has a combination of three major vegetation types. They include: dry meadow, sagebrush scrub/meadow, and willow riparian forest. In addition, there are two disturbed areas on the site: (1) along the western edge where a home and ancilliary structures were recently removed and; (2) at the northwest corner which has converted to grassland. Also, there is a small portion of the riparian corridor along Rathbun Creek with no willows where it drains onto the site at the southern edge.

II. METHODOLOGY

A site-specific survey program was designed to accurately document the botanical resources within the Project Site and consisted of three components: (1) a literature search focusing on botanical resources; (2) preparation of a list of target special-status plant species that could occur within the Project Study Area; and (3) focused surveys for special-status plants. Vegetation mapping was not conducted; rather, the vegetation map from the Tanner Environmental Services report was used as a reference to assist in preparing the list of target botanical species.

Prior to conducting fieldwork, pertinent literature on the flora of the region was examined. A thorough archival review was conducted using available literature and other historical records. These resources included, but were not limited to, the following:

- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California; and
- California Natural Diversity Database (CNDDDB) records search of the Moonridge, Big Bear City, Big Bear Lake, and Fawnskin 7.5' quadrangles.

The CNDDDB and CNPS were initially consulted to determine known occurrences of special-status plants in the region. From the review of literature resources and knowledge of the region, a list of target sensitive plant species that could occur at the Project Study Area was developed and incorporated into a survey program to document the distribution and abundance of any special-status plant species within the Project Study Area.

Senior Biologist Tony Bomkamp conducted focused surveys for special-status plants on July 3, 2012. Surveys were conducted from 8:30 to 11:30 am, and consisted of walking transects across the Project Site allowing direct visual observation of the entire property. The surveys took into account the guidelines adopted by CNPS and California Department of Fish and Game (CDFG) (Nelson 1984, CNPS 2001). All plant species encountered during the focused surveys were identified and recorded following the guidelines adopted by CNPS and CDFG. Scientific nomenclature and common names used in this report follow the Jepson Herbarium Interchange.

III. RESULTS

A. Vegetation Types

As mapped by Tanner Environmental Services and verified by Tony Bomkamp, the project site has a combination of three major vegetation types, Dry Montane Meadow, Sagebrush Scrub/Meadow, and Willow Riparian Forest. Also present are disturbed areas, including a parking area and a vacant residential lot where structures have been removed.

Dry Montane Meadow

This type of vegetation is concentrated in the northeast and southwest parts of the parcel, on either side of the riparian area along Rathbun Creek. The montane meadow habitat on the Project Site is fairly open with numerous herbs and a few scattered shrubs. Typically, this is a very productive habitat type with dense vegetation cover and is a species-rich vegetation community dominated by grasses such as beardless wildrye (*Elymus triticoides*), California barley (*Hordeum brancnyantherum* ssp. *californicum*), sedges with clustered field sedge (*Carex preagracilis*) as dominant, Baltic rush (*Juncus balticus*) as the dominant rush and a variety of herbs.

Sagebrush Scrub/Meadow

This vegetation is primarily along the western edge of the parcel beside Clubview Drive with a smaller patch along the east side of Rathbun Creek in the northeast corner of the Project Site. Though this habitat is generally similar to the dry montane meadow with many grass, sedge and herb species in common, it is dominated by basin sagebrush (*Artemisia tridentata*), so that the area is clearly shrub rather than herb covered. This vegetation community is found in dry interior and transmontane locations where slopes are not steep and soils are coarse and well-drained.

Willow Riparian Forest

This habitat follows Rathbun Creek and is dominated by arroyo willow (*Salix lasiolepis*) which has grown in thickets of erect and rather shrubby trees ranging from 10 to 20 feet tall forming a dense canopy over the flowing stream. This vegetation occurs along most of the length of the creek where it crosses the Project Site, except for a short section just below the golf course where the creek margins are dominated by emergent rushes and sedges primarily Baltic rush (*Juncus balticus*) and Nebraska sedge (*Carex nebrascensis*). The riparian willow habitat doesn't provide critical habitat for the southwestern willow flycatcher (SWWF) or any other listed species within the proposed project area. Communication with John Taylor of the United States Fish and Wildlife Service (USFWS) on June 1, 2012 confirms this finding (see attachment).

B. Special-Status Plants

Special-status plants evaluated for the Project Site include state and federally listed species and those species with the following CNPS California Rare Plant Rankings (CRPR):

1B.1 - Rare, threatened, or endangered in California and elsewhere: seriously threatened in California

1B.2 - Rare, threatened, or endangered in California and elsewhere: fairly threatened in California

1B.3 - Rare, threatened, or endangered in California and elsewhere: not very threatened in California

2.1 - Plants Rare, Threatened, or Endangered in California, but more common elsewhere: seriously threatened in California

2.2 - Plants Rare, Threatened, or Endangered in California, but more common elsewhere: fairly threatened in California

2.3 - Plants Rare, Threatened, or Endangered in California, but more common elsewhere: not very threatened in California

4.3 - Plants of Limited Distribution/Watch List: not very threatened in California

Based upon the vegetation types that occur on-site and the literature search, the following species were evaluated for the Project Site.

Spreading sandwort (*Arenaria lanuginosa* var. *saxosa*; CRPR 2.3): This perennial herb occurs in open Jeffrey pine woodland at elevations of 1,800-2,600 meters and blooms from July to August. There are no records in the immediate vicinity of the Project Site. The closest locations are four to five miles south in the upper Santa Ana River/Barton Flats area. There are no records north of the Sugarloaf Mountain ridge. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection.

Big Bear Valley woollypod (*Astragalus leucolobus*; Forest Service Watch List, CRPR 1B.2): This perennial herb occurs on dry low-gradient slopes among pines in the eastern parts of Big Bear Valley. It generally occurs at elevations of 1,750 to 2,885 meters and blooms from May to July. This species is restricted to the San Bernardino Mountains (especially Big Bear Valley) and the eastern San Gabriel Mountains, as well as to a limited area of the Santa Rosa Mountains in Riverside County. Reports from Tehachapi and the Mount Pinos area need to be reviewed, as they may represent misidentifications of the related *A. purshii*. Despite its rarity overall, this species is fairly regularly encountered. In 2011, a few specimens of this *Astragalus* were found on an open roadside approximately one-half mile west of the Project Site along Switzerland Drive near Cedar Avenue. However, this species was not detected by focused surveys at the Project Site in either 2011 or 2012, and it is not expected to occur based on lack of detection.

Bear Valley sandwort (*Eremogone [Arenaria] ursina*; Federally Threatened, CRPR 1B.2): This perennial herb occurs in pebble plains at elevations of 1,800 to 2,900 meters and blooms from May to August. It is known from the Moonridge area within one mile of the Project Site, but no suitable pebble plain habitat occurs within the Project Site. Based on the lack of habitat and the lack of detection in 2011 and 2012, this species is not expected to occur.

Scalloped moonwort (*Botrychium crenulatum*; Forest Service Sensitive, CNPS 2.2): This perennial rhizomatous herb occurs in moist meadows along streams at elevations of 1,268 to 3,280 meters and blooms from June to September. The closest locations for this species are four to five miles south in the upper Santa Ana River/Barton Flats area. There are no records for this plant north of the Sugarloaf Mountain ridge. Although moderately suitable habitat occurs on-site, it is not expected to occur based on lack of detection in 2011 and 2012.

Western sedge (*Carex occidentalis*; CNPS 2.3): This perennial rhizomatous herb occurs in wet meadows and seeps at elevations of 1,645 to 3,135 meters and blooms from June to August. The closest locations for this species are four to five miles south in the upper Santa Ana River/Barton Flats area. There are no records for this species north of the Sugarloaf Mountain ridge. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and only marginally suitable habitat.

Ash-grey paintbrush (*Castilleja cinerea*; Federally Threatened, CNPS 1B.2): This hemiparasitic perennial herb occurs in pebble plain habitat at elevations of 1,800 to 2,960 meters, where it is typically parasitic on *Eriogonum* sp. It blooms from June to August. There are locations of this species within one mile of the Project Site to the north, east and west, but no pebble plain habitat was present on the Project Site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

San Bernardino Mountains owl clover (*Castilleja lasiorhyncha*; Forest Service Sensitive, CNPS 1B.2): This hemiparasitic annual herb occurs in meadow margins and open moist areas at elevations of 1,300 to 2,390 meters, and blooms from May to August. There are scattered locations of this species in Big Bear Valley, including some in the eastern part of Moonridge approximately two miles east-southeast of the site, and other sites near Big Bear Lake approximately one and one-half miles northwest of the Project Site. Although moderately suitable habitat occurs on-site, it is not expected to occur based on lack of detection in 2011 and 2012.

Heckard's paintbrush (*Castilleja montigena*; Forest Service Watch List, CNPS 4.3): This hemiparasitic perennial herb occurs in coniferous forest at elevations of 1,950 to 2,800 meters and blooms from May to August. Locations of this species have been recorded in Big Bear Valley, but none within approximately two miles of the site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Vanishing wild buckwheat (*Eriogonum evanidum*; Forest Service Watch List, CNPS 1B.1): This annual herb occurs in sandy soils in dry open areas at elevations of 1,100 to 2,225 meters and blooms from July to October. The nearest known occurrence is approximately two miles northeast of site near Big Bear City. Though this species can be difficult to identify it should have been seen if present given the timing of the focused surveys. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection.

Southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum*; Federally Threatened, CNPS 1B.2): This perennial herb occurs in pebble plains at elevations of 1,770 to 2,890 meters and blooms from June to September. The nearest occurrence is approximately one mile east-northeast of the Project Site in the Moonridge area within pebble plains. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Bear Lake buckwheat (*Eriogonum microthecum* var. *lacus-ursi*; Forest Service Sensitive, CNPS 1B.1): This perennial herb occurs on clay outcrops in coniferous forest at elevations of 2,000 to 2,100 meters, and blooms from July to August. The only known location is approximately two miles northwest of the

site on old sediments above the shore of Big Bear Lake. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Southern Sierra woolly sunflower (*Eriophyllum lanatum* var. *obovatum*; Forest Service Watch List, CNPS 4.3): This perennial herb occurs in sandy loam soils in coniferous forest at elevations of 1,114 to 2,500 meters, and blooms from June to July. This species is widespread in western Big Bear Valley, but very scarce or absent in the eastern parts of the valley, as around the project site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Pinewoods fritillary (*Fritillaria pinetorum*; CNPS 4.3): This perennial bulbiferous herb occurs in granitic or metamorphic substrates in chaparral and coniferous forest at elevations of 1,735 to 3,300 meters, and blooms from May to September. It is known from locations approximately one mile east and southeast of the Project Site in the Sugarloaf and Moonridge areas. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection.

Parry's sunflower (*Hulsea vestita* ssp. *parryi*; Forest Service Watch List, CNPS 4.3): This perennial herb occurs in rocky openings in coniferous forest at elevations of 1,370 to 2,895 meters, and blooms from April to August. It is known from approximately one mile east of the Project Site in the Moonridge area. This species is conspicuous and easily detected, even when not in flower. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Silver-haired ivesia (*Ivesia argyrocoma*; Forest Service Sensitive, CNPS 1B.2): This perennial herb occurs in meadows and seeps, pebble plains, and coniferous forest at elevations of 1,463 to 2,960 meters, and blooms from June to August. There are known locations of this species within a mile both to the east and north of the Project Site. Although there is limited suitable habitat at the Project Site, it is not expected to occur based on lack of detection by focused surveys in either 2011 or 2012.

San Bernardino Mountains bladderpod (*Physaria [Lesquerella] kingii* ssp. *bernardina*; Federally Endangered, CNPS 1B.1): This perennial herb occurs in carbonate outcrops in coniferous forest at elevations of 1,850 to 2,700 meters, and blooms from May to June. It is known from approximately one and one-half miles north of the Project Site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Short-sepaled lewisia (*Lewisia brachycalyx*; CNPS 2.2): This perennial herb occurs in mesic coniferous forest and meadow and seeps at elevations of 1,370 to 2,300 meters, and blooms from February to July. It occurs at scattered locations in Big Bear Valley, including a site within approximately two miles north to northwest of the Project Site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and marginally suitable habitat.

Baldwin Lake linanthus (*Linanthus killipii*; Forest Service Sensitive, CNPS 1B.2): This annual herb occurs in pebble plains at elevations of 1,700 to 2,400 meters and blooms from May to July. It occurs

one to two miles northeast of the Project Site in the Moonridge/Sugarloaf area. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

White adder's mouth (*Malaxis monophyllos* var. *brachypoda*; Forest Service Sensitive, CNPS 2.1): This perennial bulbiferous herb occurs in wet meadows at elevations of 2,200 to 2,743 meters and blooms from June to August. The closest locations to the Project Site are four to five miles south in the upper Santa Ana River/Barton Flats area. There are no records north of the Sugarloaf Mountain ridge. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and marginally suitable habitat.

San Bernardino Mountains monkeyflower (*Mimulus exiguus*; Forest Service Sensitive, CNPS 1B.2): This annual herb occurs in wet meadows and pebble plain at elevations of 1,800 to 2,315 meters, and blooms from May to July. This species occurs approximately one to one and one-half miles north and northwest of the Project Site in the vicinity of Big Bear Lake. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Purple monkeyflower (*Mimulus purpureus*; Forest Service Sensitive, CNPS 1B.2): This annual herb occurs in wet meadows meadows and pebble plains at elevations of 1,900 to 2,300 meters, and blooms from May to June. There are locations of this species approximately one to one and one-half miles north and northwest of the Project Site in the vicinity of Big Bear Lake, and in the Sugarloaf area approximately two miles east of the Project Site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Chickweed starry puncturebract (*Sidotheca [Oxytheca] caryophylloides*; Forest Service Watch List, CNPS 4.3): This annual herb occurs in sandy soils in coniferous forest at elevations of 1,114 to 2,600 meters, and blooms from July to September. It is known from old and rather vague locations in "Big Bear Valley" that could theoretically be from the vicinity, but locations for these accounts have not been confirmed. The closest definite locations are Metcalf Bay and Boulder Bay on the south side of Big Bear Lake approximately two to three miles northwest of the Project Site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection.

Parish's yampah (*Perideridia parishii* ssp. *parishii*; CNPS 2.2): This perennial herb occurs in moist meadows and open grassy stream margins at elevations of 1,465 to 3,000 meters, and blooms from June to August. There are locations approximately one to one and one-half miles north and northwest of the Project Site near Big Bear Lake. Although there is very limited suitable habitat at the Project Site, it is not expected to occur based on lack of detection by focused surveys in either 2011 or 2012.

San Bernardino blue grass (*Poa atropurpurea*; Federally Endangered, CNPS 1B.2): This perennial rhizomatous herb occurs in wet meadows at elevations of 1,360 to 2,455 meters, and blooms from April to August. This species formerly occurred approximately one mile northwest of the site along Fox Farm Road. Although moderately suitable habitat occurs at the Project Site, Though habitat conditions appeared generally suitable in places, this plant was not found on the Project Site, and it is not expected to occur based on lack of detection by focused surveys in either 2011 or 2012.

Laguna Mountains jewel-flower (*Streptanthus bernardinus*; Forest Service Watch List, CNPS 4.3): This perennial herb occurs in chaparral and coniferous forest at elevations of 670 to 2,500 meters, and blooms from May to August. The closest definite locations are four to five miles northwest of the Project Site in the vicinity of Fawnskin on the north side of Big Bear Lake. There are a number of vague historic records from “Big Bear Valley” but locations for these records have not been confirmed. This species was not detected by focused surveys in either 2011 or 2012 and is not expected to occur based on lack of detection.

California taraxacum (*Taraxacum californicum*; Federally Endangered, CNPS 1B.1): This perennial herb occurs in open moist meadows where the grass is not overly thick at elevations of 1,620 to 2,800 meters, and blooms from May to August. It occurs at Eagle Point approximately one and one-half miles northwest of the Project Site. During surveys in 2011, weedy dandelions were seen by Sanders on moist road edges along Moonridge Road, but the native species was not present. This species was not detected by focused surveys in either 2011 or 2012 and is not expected to occur based on lack of detection.

Slender-petaled theylypodium (*Theylypodium stenopetalum*; Federally and State Endangered, CNPS 1B.1): This perennial herb occurs at the margins of moist meadows, often with slightly alkaline soils, at elevations of 1,600 to 2,500 meters and blooms from May to September. There are a number of localities for this species one to two miles north and northwest of the Project Site. This species was not detected by focused surveys in either 2011 or 2012, and is not expected to occur based on lack of detection and lack of suitable habitat.

Smallflower bluecurls (*Trichostema micranthum*; CNPS 4.3): This annual herb occurs in wet meadows at elevations of 1,525 to 2,300 meters and blooms from June to September. It is known from approximately one mile north and two miles southeast of the Project Site. This annual is widely scattered in seasonally moist places, including the edges of roads and along seasonal drainages. Though habitat conditions appeared generally suitable in places, this plant was not found on the Project Site, and it is not expected to occur based on lack of detection by focused surveys in either 2011 or 2012.

IV. CONCLUSIONS

No special-status plants were detected in either 2011 or 2012 at the Project Site, and none are expected to occur based on surveys conducted in two consecutive years. Given the lack of detection of any special-status plants on the site, it is concluded that the project would not have any adverse impacts on special-status plants and would not result in significant impacts pursuant to California Environmental Quality Act (CEQA). Because the project would not result in significant impacts to special-status plants, mitigation would not be required for the project for impacts to areas of Dry Mountain Meadow or Sagebrush Scrub/Meadow habitats.

Nancy Ferguson
August 31, 2012
page 9

If you have any questions regarding this report, please email erinn@agroup-inc.com or call me at (949) 338-8644.

Sincerely,

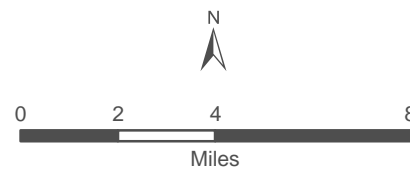
Erinn Johnson
President

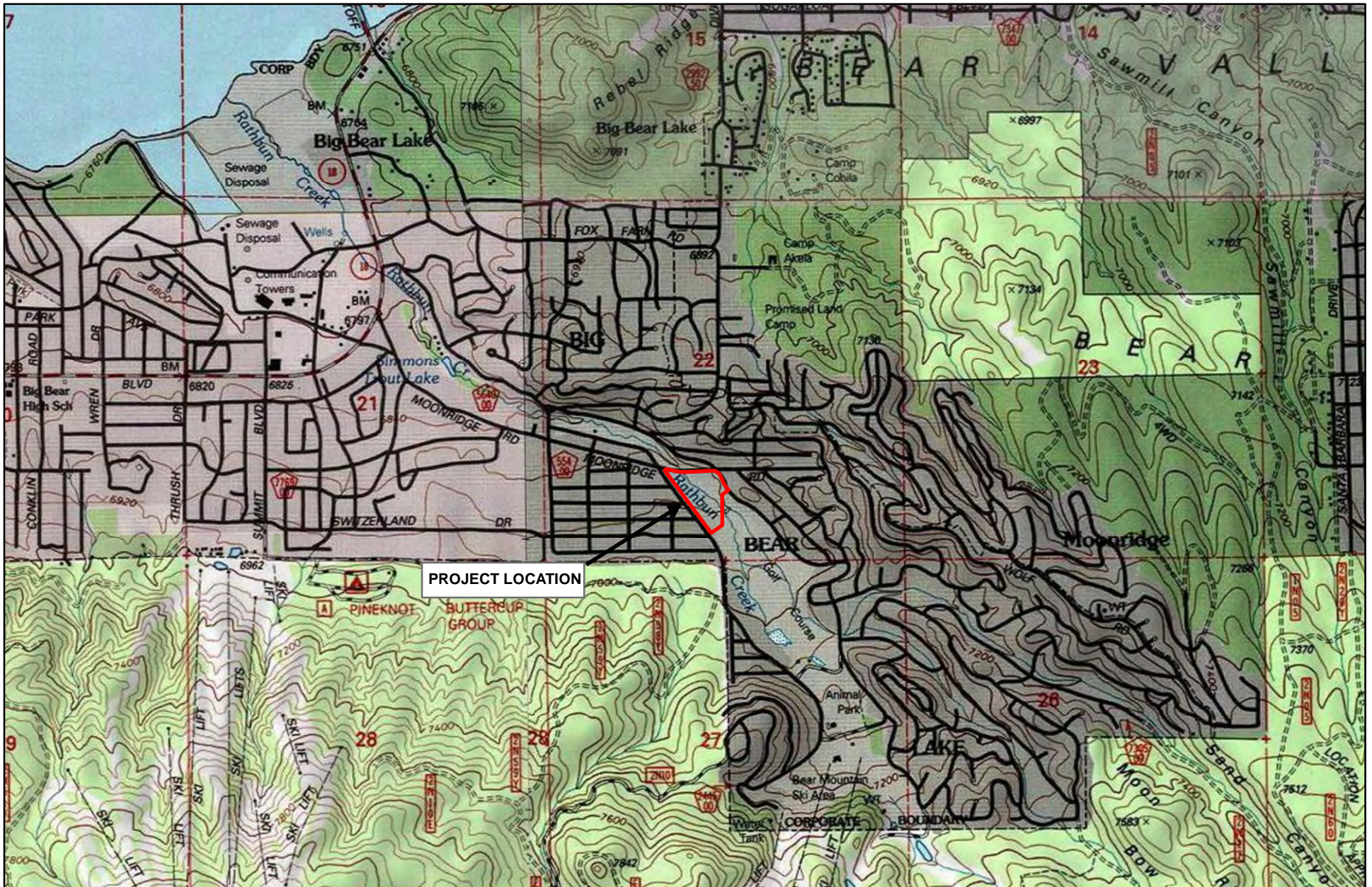


PROPOSED MOONRIDGE ZOO SITE

Exhibit 1 - Regional Map

Source: ESRI Basemaps, State Plane 5 NAD 83
 Prepared by K. Kartunen, GLA. May 2, 2012





PROPOSED MOONRIDGE ZOO SITE

Exhibit 2 - Vicinity Map

USGS Quadrangle Moonridge, CA - State Plane 5 NAD 83
 Prepared by K. Kartunen, GLA. May 2, 2012



From: John_M_Taylor@fws.gov
To: [Erinn Johnson](mailto:Erinn_Johnson)
Subject: RE: SWWF Critical Habitat
Date: Friday, June 01, 2012 12:04:01 PM

Erinn,

Per our telephone conversation (June 1st, 2012), you requested information regarding your proposed project and whether it fell within southwestern willow flycatcher (SWWF) critical habitat. Upon review of your mapped project location, the U.S. Fish and Wildlife Service concurs that SWWF critical habitat does not occur within your proposed project area.

Should you have any further questions, please feel free to contact me at any time.

Sincerely,

John M. Taylor
Fish & Wildlife Biologist
U.S. Fish and Wildlife Service
Palm Springs Fish and Wildlife Office
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, CA 92262
Ph: 760-322-2070 x218
john_m_taylor@fws.gov

-----"Erinn Johnson" <erinn@agroup-inc.com> wrote: -----

To: <John_M_Taylor@fws.gov>
From: "Erinn Johnson" <erinn@agroup-inc.com>
Date: 06/01/2012 10:20AM
Subject: RE: SWWF Critical Habitat

Attached is the Vicinity Map. Thank you.

From: John_M_Taylor@fws.gov [mailto:John_M_Taylor@fws.gov]
Sent: Friday, June 01, 2012 10:06 AM
To: erinn@agroup-inc.com
Subject: SWWF Critical Habitat

Erinn,

Would it be possible to get a map, pfd, or other location information regarding the project area? My contact information is below in my signature.

Best,

John M. Taylor
Fish & Wildlife Biologist
U.S. Fish and Wildlife Service

Palm Springs Fish and Wildlife Office
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, CA 92262
Ph: 760-322-2070 x218
john_m_taylor@fws.gov

[attachment "Vicinity Map.pdf" removed by John M Taylor/R8/FWS/DOI]

APPENDIX C.4
BBAZ Bridge Memo

PROJECT: Moonridge Animal Relocation Project

TO: Nancy Ferguson
The Altum Group
73-255 El Paseo Drive, Suite 15
Palm Desert, CA 92260

FROM: Erinn Johnson

DATE: August 3, 2012

SUBJECT: Potential Bridge Crossings for the Proposed Moonridge Zoo Site, Big Bear, California

Athena Group conducted a review of the site to determine optimal locations for potential placement of bridges across Rathbun Creek on the above referenced site [Exhibits 1 and 2]. The site survey was conducted by Senior Regulatory Specialist, Erinn Johnson, and Senior Biologist, Tony Bomkamp, on July 3, 2012. Exhibit 3 depicts the locations of U.S. Army Corps of Engineers (Corps) and California Department of Fish and Game (CDFG) jurisdiction as well as potential bridge locations. Site photographs are included as Exhibit 4.

Rathbun Creek

Rathbun Creek is a perennial stream that traverses the above referenced site. The stream enters the site from the south and flows to the north, exiting the site at Moonridge Road. Where it enters the site, the drainage is vegetated with emergent marsh species, dominated by Baltic rush (*Juncus balticus*) and Nebraska sedge (*Carex nebrascensis*). The emergent marsh extends for about 125 feet before transitioning into dense willow scrub dominated by arroyo willow (*Salix lasiolepis*). The willow scrub is characterized by “thickets” with each willow exhibiting numerous stems (ranging from 20 to 50 for each willow) [Exhibit 4, Photographs 1 and 2]. The growth form of the willow scrub, which consists of dense multi-stemmed thickets, makes mapping of any individual tree on the site infeasible. Nevertheless, it was possible to identify potential locations for locating bridges that would limit potential impacts to the wetland and riparian habitat associated with Rathbun Creek.

Regulatory Setting

Rathbun Creek is regulated under Section 404 of the Clean Water Act as a “Water of the United States” and as such, subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps). Rathbun Creek is also regulated as a “stream” by the California Department of Fish and Game (CDFG) pursuant to Section 1602 of the California Fish and Game Code. Placement of a bridge or bridges over Rathbun Creek is therefore potentially regulated by the Corps and CDFG.

U.S. Army Corps of Engineers

Section 404 of the Clean Water Act regulates the discharge of dredge or fill material into Waters of the United States and such discharge or fill within the areas depicted as Corps jurisdiction on Exhibit 4, would require authorization under Section 404 Permit, which could be through a Nationwide Permit (NWP) or through an Individual Permit (IP). Importantly, removal of vegetation from areas within Corps jurisdiction does not trigger the need for a Section 404 Permit such that it is possible to install a span bridge that would avoid discharge of dredge or fill into Corps jurisdiction. Specifically, trimming the willows or cutting them above ground in order to install such a bridge can be easily accomplished without the need for a Section 404 Permit.

California Department of Fish and Game

Under Section 1602 of the Fish and Game Code, CDFG regulates the alteration of streambeds and stream banks, which is typically understood by CDFG as including alterations to riparian vegetation, such as the willow scrub and emergent marsh associated with Rathbun Creek. As such, unlike the Corps, which does not regulate trimming of vegetation, CDFG does regulate such trimming and typically requires authorization for such trimming through a Section 1602 Streambed Alteration Agreement (SAA).

Description of the Proposed Bridge Locations

Athena Group identified four potential bridge locations along Rathbun Creek, two near the northern portion of the property (Bridge Locations 1 and 2), and two near the southern property boundary (Bridge Locations 3 and 4). Each is described below along with a discussion of the expected regulatory requirements. For each location, a pre-cast, span bridge that would be “dropped” into place is assumed. This approach assumes that the footings for the pre-cast bridge would be located outside of the wetland/riparian limits as generally depicted on Exhibit 1.

Bridge Location 1

Bridge Location 1 is near the northern limits of the property approximately 80 feet from Moonridge Road. As depicted on Exhibit 4, Photograph 3, a small gap occurs in the willow canopy at this location that would allow for placement of a span bridge with only localized trimming of the willows at this location. Assuming that the footings are located beyond the limits of the wetland/riparian habitat, it would not be necessary to obtain authorization from the Corps pursuant to Section 404 to place a span bridge at this location.

Trimming of the willows to install the bridge would require notification CDFG and would likely require a Section 1602 SAA. If CDFG requires authorization through a 1602 SAA, it is likely that mitigation for impacts to willow habitat would be required. Mitigation could be accommodated on the banks of the drainage near the southern boundary of the property where Rathbun Creek supports only emergent marsh vegetation.

Bridge Location 2

Bridge Location 2 is also near the northern limits of the property approximately 100 feet from Moonridge Road. As depicted on Exhibit 4, Photograph 4, a small gap occurs in the willow canopy at this location that would allow for placement of a span bridge with only localized trimming of the willows. Assuming that the footings are located beyond the limits of the wetland/riparian habitat, it would not be necessary to obtain authorization from the Corps pursuant to Section 404 to place a span bridge at this location.

As with Bridge Location 2, trimming of the willows to install the bridge at this location would require notification CDFG and would likely require a Section 1602 SAA. If CDFG requires authorization through a 1602 SAA, it is likely that mitigation for impacts to willow habitat would be required. Mitigation could be accommodated on the banks of the drainage near the southern boundary of the property where Rathbun Creek supports only emergent marsh vegetation.

Bridge Location 2 is the preferred location when compared with Bridge Location 1 because the amount of trimming necessary to locate a bridge at this location would be less than at Location 1.

Bridge Location 3

Bridge Location 3 is near the southern limits of the property approximately 200 feet from the adjacent golf course. As depicted on Exhibit 4, Photograph 5, a substantial gap occurs in the willow canopy at this location that would allow for placement of a span bridge with very limited trimming of the willows. Assuming that the footings are located beyond the limits of the wetland/riparian habitat, it would not be necessary to obtain authorization from the Corps pursuant to Section 404 to place a span bridge at this location.

As with Bridge Location 3, trimming of the willows to install the bridge at this location would require notification CDFG and would likely require a Section 1602 SAA. If CDFG requires authorization through a 1602 SAA, it is likely that mitigation for impacts to willow habitat would be required, but would be minimal. Mitigation could be accommodated on the banks of the drainage near the southern boundary of the property where Rathbun Creek supports only emergent marsh vegetation.

Bridge Location 4

Bridge Location 4 is near the southern limits of the property approximately 200 feet from adjacent golf course. As depicted on Exhibit 4, Photograph 6, this location that would allow for placement of a span bridge with no trimming of the willows or any impacts to vegetation. Assuming that the footings are

located beyond the limits of the wetland/riparian habitat, it would not be necessary to obtain authorization from the Corps pursuant to Section 404 to place a span bridge at this location.

As with Bridge Location 4, there would be no alteration of the vegetation though placement of a bridge could require notification CDFG and could require a Section 1602 SAA. If CDFG requires authorization through a 1602 SAA, it is unlikely that mitigation for impacts to the emergent marsh would be required.

Bridge Location 4 is the preferred location when compared with Bridge Location 3 because there would be no trimming of vegetation necessary to install a span bridge at this location; whereas, there would be minimal trimming as Location 3.

Conclusions

If designed to span Rathbun Creek, including footings beyond the limits of Corps jurisdiction, there would be no need to obtain authorization from the Corps for placing span bridges across the creek since the Corps does not regulate the trimming or above-ground removal of vegetation from areas within Section 404 jurisdiction.

Even if designed to avoid the need for a Section 404 Permit from the Corps, the span bridges would likely require authorization from CDFG, because CDFG typically regulates removal of riparian or wetland vegetation from areas subject to CDFG jurisdiction. Because impacts would be minimal, mitigation could be performed within the southerly portion of the site, while still allowing location of a bridge at Bridge Location 4.

If you have any questions regarding this report, please call me at (949) 338-8644.

Sincerely,

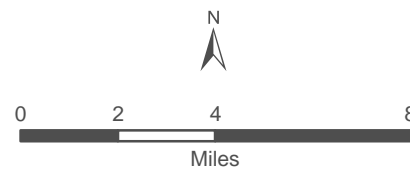
Erinn Johnson
President

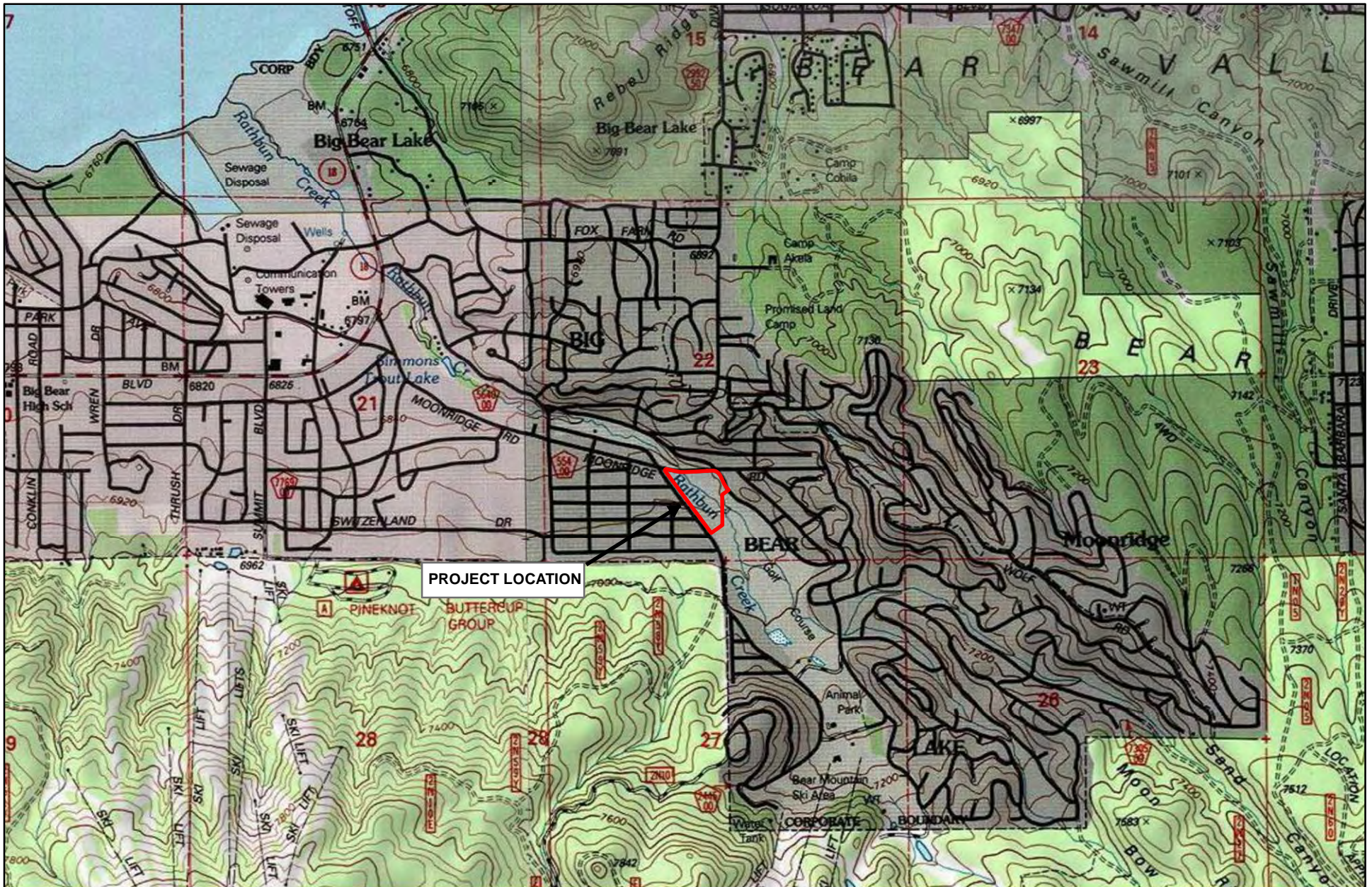


PROPOSED MOONRIDGE ZOO SITE

Exhibit 1 - Regional Map

Source: ESRI Basemaps, State Plane 5 NAD 83
 Prepared by K. Kartunen, GLA. May 2, 2012





PROPOSED MOONRIDGE ZOO SITE

Exhibit 2 - Vicinity Map

USGS Quadrangle Moonridge, CA - State Plane 5 NAD 83
 Prepared by K. Kartunen, GLA. May 2, 2012

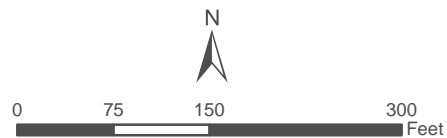




PROPOSED MOONRIDGE ZOO SITE

Exhibit 3 - Potential Bridge Location Map

Aerial Source: ESRI Basemaps, State Plane 5 NAD 83
Prepared by K. Kartunen, GLA. July 5, 2012



1 inch = 150 feet

Athena Group
Environmental Planning Solutions



Photograph 1: View of dense willow thicket associated with Rathbone Creek. Note numerous trunks ranging from 2-4 inch Diameter trunks.



Photograph 2: View of dense willow thicket associated with Rathbone Creek. Note numerous trunks ranging from 2-4 inch Diameter trunks.



Photograph 3: View of proposed bridge crossing 1. This location would require removal of two willow clumps.



Photograph 4: View of proposed bridge crossing 2. This location would require removal of 1 willow clump and trimming of second clump.



Photograph 5: View of proposed bridge crossing 3. This location would require limited trimming of one willow clump.



Photograph 6: View of proposed bridge crossing 4. This location would span emergent marsh, requiring trimming or other impacts.

APPENDIX D.1
Archaeological Resources Report

**A PHASE I CULTURAL RESOURCES STUDY FOR THE
MOONRIDGE ANIMAL PARK PROJECT
AT BIG BEAR LAKE
SAN BERNARDINO COUNTY, CALIFORNIA**

Lead Agency:

County of San Bernardino
Special Districts Department
157 West 5th Street, Second Floor
San Bernardino, California 92415

Prepared for:

The Altum Group
73-255 El Paseo Drive, Suite 15
Palm Desert, California 92260

Preparer:

**Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064
(858) 484-0915**



Signature

February 14, 2012; Revised March 6, 2012

National Archaeological Data Base Information

Author(s): Brian F. Smith

Consulting Firm: Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064
(858) 484-0915

Client: The Altum Group
73-255 El Paseo Drive, Suite 15
Palm Desert, California 92260

Proponent: County of San Bernardino
Special Districts Department
157 West 5th Street, Second Floor
San Bernardino, California 92415

Report Date: February 14, 2012; Revised March 6, 2012

Report Title: A Phase I Cultural Resources Study for the Moonridge Animal
Park Project at Big Bear Lake, California

Type of Study: Cultural Resources Survey

New Sites: None

Updated Sites: None

USGS Quadrangle: *San Luis Rey* (7.5 minute), California

Area: 10.4 Acres

Key Words: Archaeological survey of 10.4 acres; negative survey; USGS
Moonridge quadrangle (7.5 minute); Moonridge Animal Park.

A Phase I Cultural Resources Study for the Moonridge Animal Park at Big Bear Lake

I. Introduction

A Phase I cultural resource survey has been conducted on the above-referenced project by Brian F. Smith & Associates, Inc. (BFSA). Results of the survey data have determined that no cultural resources were identified within the project area. The existing Moonridge Animal Park (MAP) currently operates on a leased 2.5-acre site located in the Moonridge area of Big Bear Valley, a short distance south of the proposed new facility site studied for this document. The existing facility is operated by the Big Bear Valley Recreation and Park District, which is part of the San Bernardino County Special Districts Department. The existing facility was founded in 1959 and is San Bernardino County's only zoo and one of only two alpine zoos in the nation.

For this project, the County is proposing to relocate the MAP to a 10.4-acre property on the north side of the golf course at the intersection of Moonridge Road and Club View Road, approximately three-fourths of a mile north of the existing facility. The County's intent in proposing the project is to relocate the MAP to a new and expanded site to enhance the facility's image and visibility, upgrade the animal care facilities, and provide a self-sustaining, educational, and entertaining environment for visitors.

As shown in Figure 1, the proposed MAP site is located in the Moonridge area within the City of Big Bear Lake, at an elevation of approximately 7,000 feet above mean sea level. The area surrounding the City is part of the San Bernardino National Forest. Figure 1 shows the location of the project site within the larger region. Figure 2 shows the project site and vicinity. Photographs of the project site and vicinity are included in Plates 1 and 2.

II. Setting

The 10.4-acre project site is situated at the north end of a long sloping meadow that includes a golf course to the south. Currently, the project area is vacant, although a structure was previously located on the west side of the property. Rathbone Creek bisects the property from south to north, and the creek eventually empties into Big Bear Lake. The topography is gently sloping in a northerly direction toward the lake, and no unusual topographic features were observed. No granite outcrops were present, and dense grasses and shrubs covered the majority of the property. A few pine trees were also noted. Ground visibility was very limited due to the density of the grasses and shrubs.

III. Cultural Resources Study

This archaeological study conformed to the County of San Bernardino environmental policies and protocols. Statutory requirements of CEQA were followed in evaluating potential impacts. The survey of the project was conducted on February 3, 2012 by Brian F. Smith, consulting archaeologist. The survey protocol is characterized as an intensive archaeological reconnaissance that consisted of a pedestrian survey of the entire project APE. Transects, spaced approximately one-to-three meters apart were employed in a north-to-south orientation across the project area. The majority of the project was flat to gently sloping, and covered with grasses and shrubs. The limitations of the archaeological survey included poor ground visibility due to vegetation cover. At the time of the survey, no snow was present on the ground.

IV. Research

Record search information for the MAP was requested by the San Bernardino County Museum on January 12, 2012. Approximately 40 studies have been completed within a one-mile radius of the project area. In addition, a total of seven cultural resources have been identified within area. However, no sites have been previously identified within the project boundaries. The closest site to the property, CA-SBR-2414, is approximately 1,200 feet south along the eastern side of the existing golf course. This site was described as a lithic scatter that had been disturbed by the development of the golf course and the surrounding residential homesites. Other recorded sites in the area include isolates and historic refuse dumps. The majority of the sites within the record search radius are prehistoric Native American sites.

In addition to the records search, BFSa also processed a Sacred Lands File Search with the Native American Heritage Commission (NAHC). The NAHC responded that there are no recorded sacred or sensitive sites recorded within the project. The NAHC recommended that BFSa send letters to registered interested Native American groups in the project area to solicit further information regarding the property. Letters have been sent, as the NAHC recommended, but as of the date of this report, no responses have been received.

According to Paul Chase (1988), the Big Bear Lake area in aboriginal times was occupied by the *Yuhavetum*, who visited this valley seasonally to procure food. The *Yuhavetum* or “people of the pine place,” had their summer season settlements in the upland basin of Big Bear Valley with its abundant pine trees. The pinyon nuts from the pines there were harvested as a major summer food source, as were the ducks and waterfowl attracted to the marsh areas near Baldwin Lake. Tubers and bulbs, *pamaham*, growing in the wetlands also were important local foods (Bean and Vane 1981). The area at the western end of Baldwin Lake was called *Maktsuk* (or *Kajavpeat*). This place name referred to the location of a natural hot spring (Pan Hot Springs).

V. Results

The current archaeological study did not identify the presence of any archaeological features or artifacts (historic or prehistoric) within the project area. Neither the records searches nor the physical survey of the property identified any historic or prehistoric artifacts or features. The study is considered to be negative; however, the surface area of the property was obscured by

dense vegetation, and that circumstance did affect ground visibility and therefore the accuracy of the field investigation. Where the ground was visible, no artifacts were observed.

VI. Recommendations

Although no archaeological resources were identified during the Phase I cultural resources survey, the presence of a large prehistoric site a short distance to the south of the MAP Project as well as the recorded prehistoric use of the valley during season occupation by local Native American groups suggest that the meadow area that includes the project could have been part of the prehistoric subsistence use area. The potential does exist that artifacts could be buried or masked from view within the property, although no evidence of this potential was noted during the survey. Because of the grading of the project could uncover and expose artifacts associated with the prehistoric occupation of the area or historic materials associated with the development of the valley, monitoring of grading by an archaeologist is recommended. The implementation of a monitoring program during grading would constitute a mitigation monitoring and reporting program (MMRP) and would provide a means to mitigate potential impacts to cultural resources that could be present but are currently obscured from view. The MMRP is provided below.

Mitigation Monitoring—Cultural Resources (MM-CR)

MM-CR-1: Potential Impacts to Cultural Deposits Discovered During Grading

The construction of the Moonridge Animal Park (MAP) would require the implementation of a Mitigation Monitoring and Reporting Program (MMRP) in compliance with CEQA. The basis for this requirement is that the construction APE will include areas where potentially important cultural deposits could be discovered. Significant cultural sites are present in close proximity to the MAP, and the potential exists that associated elements of either prehistoric or historic occupations of the area could be encountered during grading. To identify any significant and previously undocumented cultural resources, the MMRP will require the presence of an archaeological monitor during all rough grading and utility trenching associated with the project. The actual building of the MAP will not require monitoring. The MMRP shall state the following:

- MM-CR-1.1: During the cutting of previously undisturbed soil, an archaeological monitor shall be on-site full time to perform inspections of the excavations. The presence of the archaeologist is a mandatory grading requirement. Monitoring will be suspended or reduced in scope at the discretion of the Consulting Archaeologist in response to changes in the conditions at the project.
- MM-CR-1.2: Prior to the initiation of grading, the contractor shall organize a preconstruction meeting of all personnel scheduled to work on the grading and construction phases of the project. The purpose of this meeting will be a Worker's Education Program to instruct the work force about the cultural resources associated with the project, the sensitivity of these resources to the local Native American community, and the protocols to be followed should any workers encounter artifacts during work on

the project. The Consulting Archaeologist shall conduct the Worker's Education Program.

- MM-CR-1.3: Isolates and clearly non-significant deposits will be documented in the field but will not be subjected to data recovery mitigation.
- MM-CR-1.4: In the event that previously unidentified and potentially significant cultural resources are discovered, the monitoring archaeologist shall have the authority to divert or temporarily halt ground disturbance operations at the specific location of the discovery to review and assess the discovery. This temporary diversion of work shall be as brief as possible; however, if a discovery is confirmed, the supervising archaeologist shall report this to the project manager and the Lead Agency representative. The discovery location shall be secured from further disturbance to allow evaluation of potentially significant cultural resources. The Consulting Archaeologist, in consultation with the Lead Agency, shall determine the significance of the discovered resources and appropriate measures to reduce the effect of the grading impacts to the resource. For any significant cultural resources discovered during monitoring of grading, further mitigation measures (data recovery) will be necessary to complete the impact mitigation. A detailed description of the proposed data recovery program will be prepared by the Consulting Archaeologist and approved by the Lead Agency, prior to implementation. If any human remains are discovered, the County Coroner shall be contacted (see MM-CR-2). In the event that the remains are determined to be of Native American origin, the MLDs shall be contacted to determine proper treatment and disposition of the remains.
- MM-CR-1.5: Any artifacts collected during the grading monitoring program shall be processed and curated according to current professional repository standards and as required by the environmental policies and guidelines of the Lead Agency. The collections and associated records shall be transferred, including title, to an appropriate curation facility, to be accompanied by payment of the fees necessary for permanent curation.

MM-CR-2: Human Remains Encountered within the Construction Zone

In the event of the discovery or recognition of any human remains in any location other than a dedicated cemetery, protocols and procedures noted in the Public Resources Code Section 5097.98, the California Government Code Section 27491, the Health and Safety Code Section 7050.5, and the County of San Bernardino policy for the treatment of human remains encountered at archaeological sites will be followed. The procedures listed below shall be followed where human remains are encountered:

- A. There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
 - a. The Lead Agency is contacted.

- b. The Coroner is contacted to determine that no investigation of the cause of death is required, and
- c. If the Coroner determines the remains are Native American:
 - i. The Coroner shall contact the Native American Heritage Commission (Commission) within 24 hours.
 - ii. The Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American.
 - iii. The Most Likely Descendent (MLD) may make recommendations to the landowner or the Lead Agency for the excavation work.
- B. The Native American human remains and associated funerary items that are removed from the Project APE may be reburied at a location mutually agreed upon by the Applicant, Lead Agency, and the MLD(s). If reinterment of human remains cannot be accomplished at the time of discovery, the MLD(s) shall either take temporary possession of the remains or identify a location for the temporary but secure storage of the remains.
- C. In consultation with the Lead Agency, the Consulting Archaeologist, and the MLD, additional measures, such as focused archaeological excavations, may be required to determine the extent of burials or ensure the recovery of all elements of the burial.



Figure 1

General Location Map

The Moonridge Animal Park Project

USGS San Bernardino (1:250,000 series)



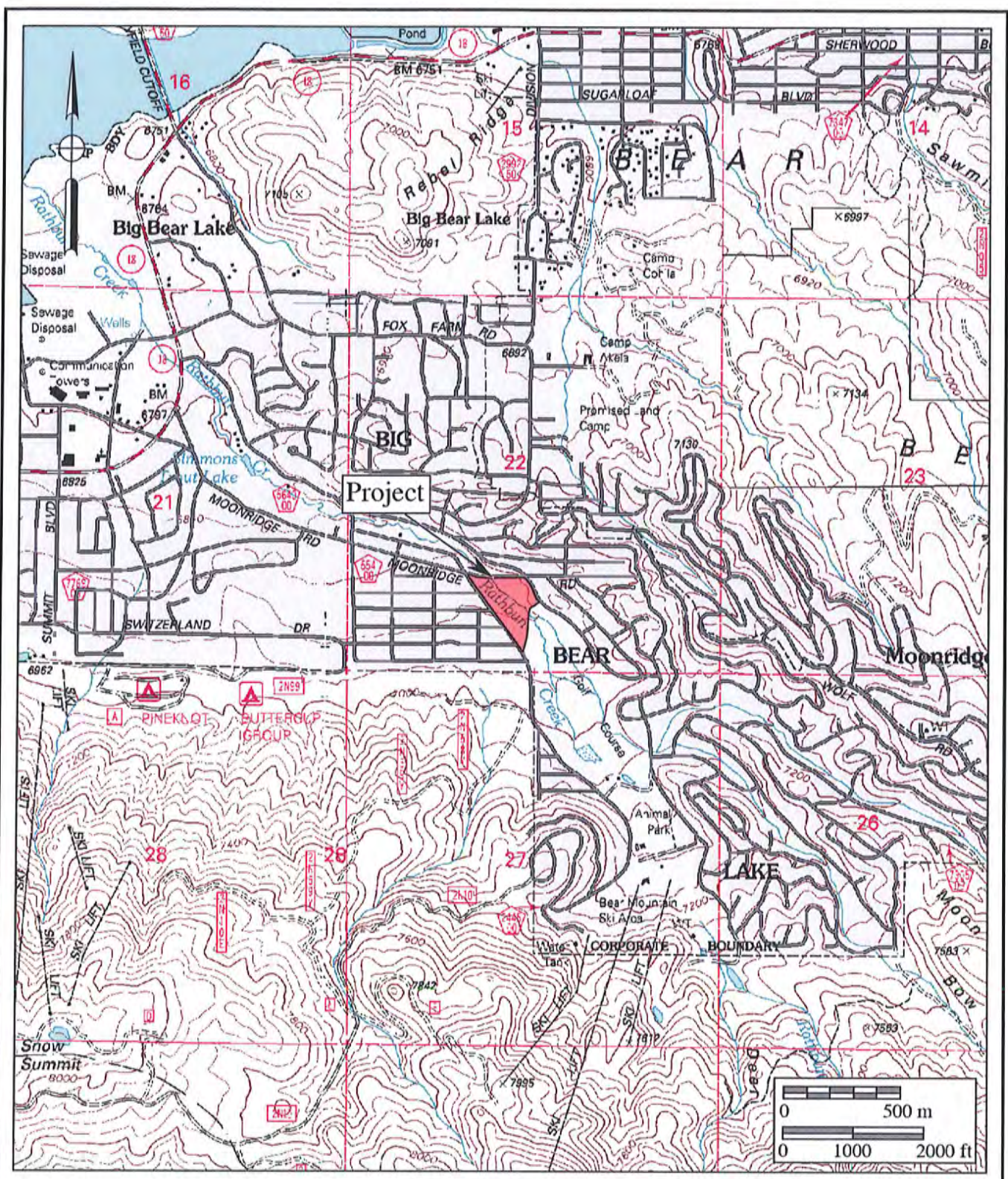


Figure 2

Project Location Map

The Moonridge Animal Park Project

USGS Big Bear Lake, Big Bear City, Fawnskin, and Moonridge Quadrangles (7.5 minute series)



Figure 3

Project Development Map

Moonridge Animal Park





**Plate 1: Overview of eastern side of the project area,
facing southeast toward Sugarloaf Mountain.**

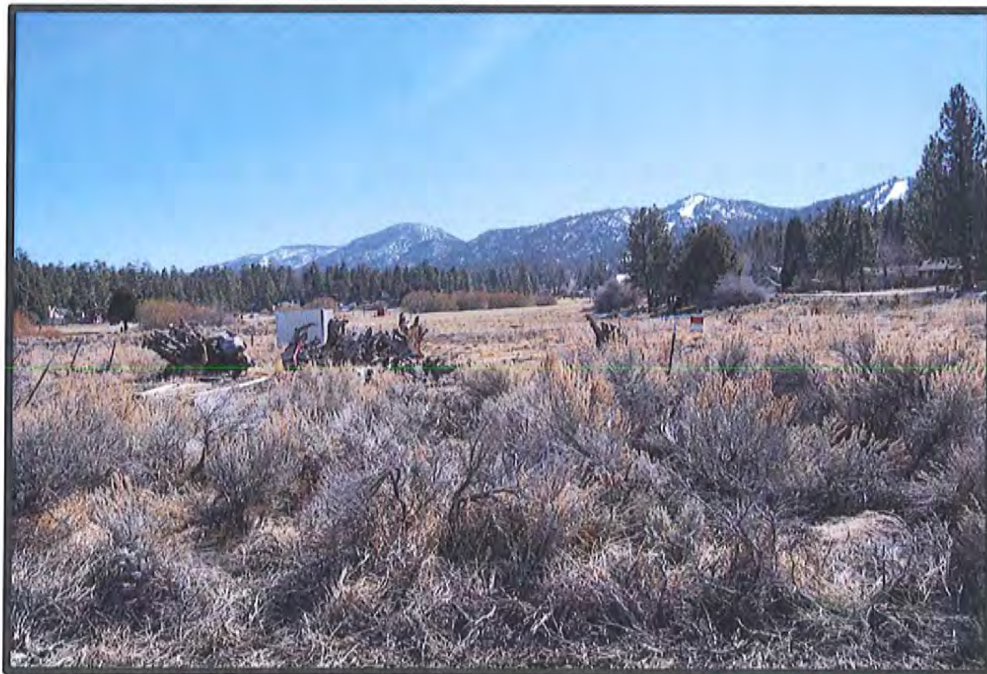


Plate 2: Overview of the western side of the project area, facing southeast.

APPENDIX D.2
Paleontological Resources Report



6 February 2012

Ms. Nancy M. Ferguson
Senior Project Manager
The Altum Group
73-4750 El Paseo Drive, Suite 15
Palm Desert, California 92260

Subject: Paleontological Resource Assessment, Moonridge Animal Park, City of Big Bear Lake, San Bernardino County, California (APNs 2328-472-01, -02 and -03)

Dear Ms. Ferguson:

A paleontological resource assessment and museum collections and records search has been completed for the 10.4-acre subject property (APNs 2328-472-01, -02 and -03), located in the southeastern part of the incorporated city of Big Bear Lake in San Bernardino County, California (see project location maps, Attachments 1 and 2). On the U. S. Geological Survey, 7.5-minute, Moonridge, California, topographic quadrangle, the project site is located in the south-central part of Section 22, Township 2 North, Range 1 East, San Bernardino Base and Meridian. The subject property is situated in the alluvial valley of Rathbun Creek, and is bounded on the west by Club View Drive, on the north and east by Moonridge Road, and on the south by the Bear Mountain golf course. In the Thomas Brothers' map book (The Thomas Guide, 2008, San Bernardino County street guide), the project location is shown near the northwest corner of map page 4812.

Geologically, the project site is located in the central portion of the northwest-trending San Bernardino Mountains, which are composed primarily of uplifted Cretaceous, Jurassic and Triassic granitic and metamorphic rocks. Quaternary surficial deposits of local derivation are present on the valley slopes and along the valley bottoms. The published 1:62,500-scale geologic map of the project area (Attachment 3, enlarged to 1:24,000 scale, after T. W. Dibblee, Jr., 1964, Geologic map of the the San Gorgonio Mountain quadrangle, San Bernardino and Riverside Counties, California: U. S. Geological Survey Miscellaneous Geologic Investigations Map I-431, scale 1:62,500) shows the project area to be underlain by surface exposures of Quaternary (Holocene and late Pleistocene) alluvium (Qa) in the valley of Rathbun Creek. These "Recent [*i.e.*, Holocene], possibly in part very late Pleistocene" ... "unconsolidated, generally undissected alluvial fill [deposits] of present valleys and canyons" are composed of "torrential boulder gravels in major stream-channels, [and] mostly cobble-pebble gravel and coarse sand elsewhere" (Dibblee, 1964). The younger Quaternary alluvial deposits are incised into older fanglomerates of

Pleistocene age (Qof on Attachment 3). The geotechnical report for the project site (H. Shiwakoti and S. A. Mathis, 2011, Geotechnical investigation report for the proposed Moonridge Animal Park relocation, prepared for the County of San Bernardino Special Districts Department, San Bernardino, by Converse Consultants, Redlands, Calif.) documented the subsurface sedimentary profile at the site, based on boring logs, to consist mostly of loose to medium dense gravel, sand, silt and clay layers, with a distinct change to greater density at approximately 35 feet below ground level. These authors regard the less dense sediments to be Holocene (*i.e.*, less than 10,000 years) in age, but note that “the surficial sedimentary deposits are likely underlain by denser Pleistocene older alluvium and, at depth, by Mesozoic granitic bedrock” (Shiwakoti and Mathis, 2011). Lacking any radiocarbon age data on the young Quaternary sediments, we regard the less dense, upper part of the sedimentary profile to be Holocene in age, and the deeper and distinctly denser sediments below about the 35 foot depth level to be Pleistocene in age. Note that the generalized 1:250,000-scale, 2-degree San Bernardino sheet of the Geologic Map of California (E. J. Bortugno and T. E. Spittler, 1986, Geologic Map of California, San Bernardino sheet: California Division of Mines and Geology, Regional Geologic Map Series, Map 3A), cited below by Scott (2012), treats the valley fill sediments as “well dissected alluvial deposits laid down during the Pleistocene Epoch,” but probably represents a lumping of the Holocene alluvium (Qa) and Pleistocene older fanglomerate (Qof) units of Dibblee (1964) into a single inclusive map unit. We regard the more detailed map to be of greater reliability in defining the sedimentary units in the project area.

A paleontological collections and records search performed by the Division of Geological Sciences at the San Bernardino County Museum (E. G. Scott, 2012, attached) did not identify any previously recorded fossil localities within the boundaries of the subject property, nor within a one-mile radius of the project area in any direction. The records search report does note that “vertebrate fossils have been reported from elsewhere in the Big Bear region, but the fossils upon which these reports were based cannot be located in museum collections, and so the presence and presumed Pleistocene age of these localities cannot be verified.”

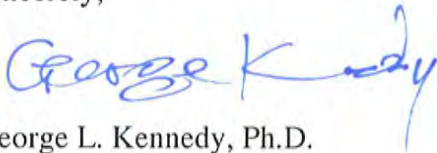
The literature and records review of the project site (Scott, 2012) regards the alluvial valley fill sediments (of Bortugno and Spittler, 1986) on the property as having an undetermined paleontological resource potential, based on the “altitude and depositional context of the sediments within the boundaries of the proposed study area.” The County of San Bernardino Development Code §82.20.030 includes a provision by which areas of possible paleontological resource potential, but of unknown sensitivity, be subjected to field surveys before grading, in order to establish the need for paleontological monitoring. A walk-over survey of the proposed project area was conducted by BFSA on February 3, 2012. The site slopes gently to the north, is generally flat, and (in winter) is covered by dead grasses with only limited exposures of pebbly soils showing through. The stream bed of Rathbun Creek is somewhat incised into the modern flood plain, and lacks any exposures of the older fanglomerate unit (Qof) as mapped by Dibblee (1964) on the adjacent hillsides (*cf.* Attachment 3). No fossiliferous sediments were observed anywhere on the project site during the field survey.

Based on the lack of identified fossil localities or identifiable fossiliferous sedimentary deposits in the greater Big Bear Lake area (Scott, 2012), the geotechnical report conclusions establishing presence of Holocene rather than Pleistocene alluvial deposits across the modern flood plain of

Rathbun Creek (except at depths exceeding ~ 35 feet) (Shiwakoti and Mathis, 2011), the lack of any evidence of fossils or fossiliferous sediments during the field survey of the site (BFSA, 2012), and the limited amount of grading and earthmoving activities expected to occur during infrastructure work during the relocation of the Moonridge Animal Park, we do not believe that such site preparations would result in any adverse impacts to significant nonrenewable paleontological resources (*i.e.*, fossils) and recommend that a paleontological mitigation, monitoring and reporting program (MMRP) *not* be required for this project at this time.

If you have any questions, please feel free to get in touch. Thank you for the opportunity to have provided paleontological services on this project.

Sincerely,



George L. Kennedy, Ph.D.
Senior Paleontologist

Attachments: Index maps, geologic map, SBCM record search report



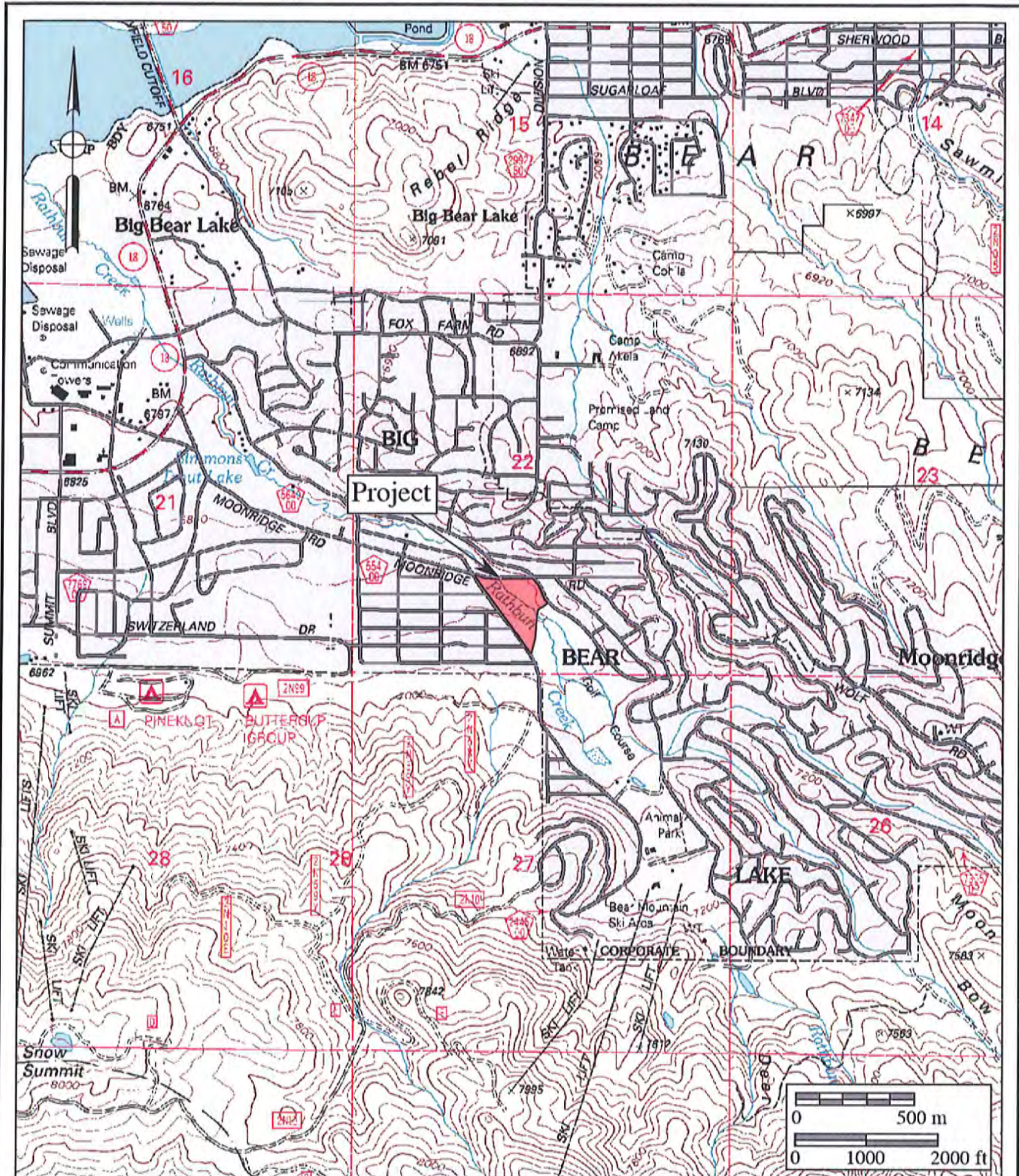
Attachment 1

General Location Map

The Moonridge Animal Park Project

USGS San Bernardino (1:250,000 series)





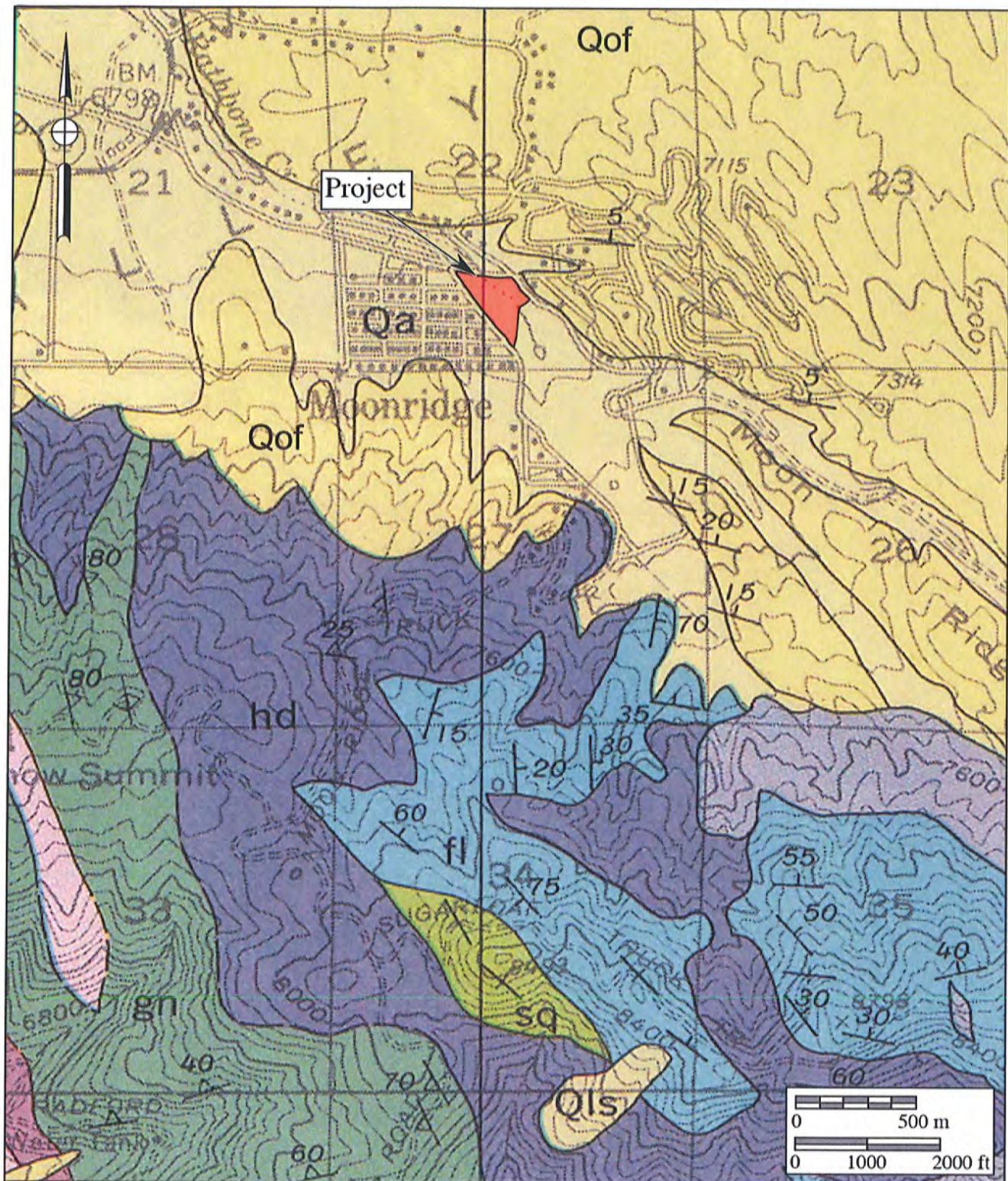
Attachment 2

Project Location Map

The Moonridge Animal Park Project



USGS Big Bear Lake, Big Bear City, Fawnskin, and Moonridge Quadrangles (7.5 minute series)



Attachment 3

Geologic Map

The Moonridge Animal Park Project

Geology after Dibblee (1964)





SAN BERNARDINO COUNTY MUSEUM



COUNTY OF SAN BERNARDINO

2024 Orange Tree Lane • Redlands, California USA 92374-4560
(909) 307-2669 • Fax (909) 307-0539 • www.sbcountymuseum.org
TDD (909) 792-1462

ROBERT L. McKERNAN
Director

27 January 2012

Brian F. Smith and Associates
attn: George L. Kennedy, PhD, Senior Paleontologist
14010 Poway Road, Suite A
Poway, CA 92064

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, BIG BEAR LAKE
PROPERTY, SAN BERNARDINO COUNTY, CALIFORNIA**

Dear Dr. Kennedy,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-referenced property in the Big Bear Lake area of San Bernardino County, California. Specifically, the property is located in the southern half of section 22, Township 2 North, Range 1 East, San Bernardino Base and Meridian, as seen on the Moonridge, California 7.5' United States Geological Survey topographic quadrangle map (1970 edition, photorevised 1978).

Geologic mapping by Bortugno and Spittler (1986) indicates that the proposed project property is situated upon surface exposures of well-dissected alluvial deposits laid down during the Pleistocene Epoch (± 2.6 million years ago to $\sim 11,000$ years ago). Throughout much of inland San Bernardino and Riverside Counties, alluvium of Pleistocene age has high potential to contain significant nonrenewable paleontologic resources subject to adverse impact during development-related excavation. However, given the altitude and depositional context of the sediments within the boundaries of the proposed study area, high paleontologic potential cannot be demonstrated. These dissected Pleistocene alluvial deposits are therefore assigned undetermined paleontologic sensitivity.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no previously known paleontologic resource localities are recorded by the SBCM from within the boundaries of the study area, nor from within at least one mile in any direction. The RPLI does record that vertebrate fossils have been reported from elsewhere in the Big Bear region, but the fossils upon which these reports were based cannot be located in museum collections, and so the presence and presumed Pleistocene age of these localities cannot be verified.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that

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excavation into Pleistocene alluvial deposits within the boundaries of the proposed Big Bear Lake project property has undetermined potential to impact significant nonrenewable fossil resources. This property is therefore assigned undetermined sensitivity.

The County of San Bernardino (Development Code §82.20.030) requires that paleontologic mitigation programs include, but not be limited to:

(a) Field survey before grading. In areas of potential but unknown sensitivity, field surveys before grading shall be required to establish the need for paleontologic monitoring.

(b) Monitoring during grading. A project that requires grading plans and is located in an area of known fossil occurrence, or that has been demonstrated to have fossils present in a field survey, shall have all grading monitored by trained paleontologic crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Paleontologic monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring is not necessary if the potentially-fossiliferous units described for the property in question are not present, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.

(c) Recovered specimens. Qualified paleontologic personnel shall prepare recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils is essential in order to fully mitigate adverse impacts to the resources.

(d) Identification and curation of specimens. Qualified paleontologic personnel shall identify and curate specimens into the collections of the Division of Geological Sciences, San Bernardino County Museum, an established, accredited museum repository with permanent retrievable paleontologic storage. These procedures are also essential steps in effective paleontologic mitigation and CEQA compliance. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not considered complete until curation into an established museum repository has been fully completed and documented.

(e) Report of findings. Qualified paleontologic personnel shall prepare a report of findings with an appended itemized list of specimens. A preliminary report shall be submitted and approved before granting of building permits, and a final report shall be submitted and approved before granting of occupancy permits. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into the collections of the San Bernardino County Museum, will signify completion of the program to mitigate impacts to paleontologic resources.

The County of San Bernardino (Development Code §82.20.040) defines a qualified vertebrate paleontologist as meeting the following criteria:

Education: An advanced degree (Masters or higher) in geology, paleontology, biology or related disciplines (exclusive of archaeology).

Professional experience: At least five years professional experience with paleontologic (not including cultural) resources, including the collection, identification and curation of the resources.

References

Bortugno, E.J. and T. E. Spittler, 1986. Geologic map of California, San Bernardino sheet, scale 1:250,000. California Division of Mines and Geology Regional Geologic Map Series, Map 3A.

Please do not hesitate to contact us if you have any further questions.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

APPENDIX E.1
Site Geotechnical Report

**GEOTECHNICAL INVESTIGATION REPORT FOR
THE PROPOSED MOONRIDGE ANIMAL PARK
RELOCATION**

10.4-acre Parcel Intersection of Moonridge Road and
Club View Drive
City of Big Bear, San Bernardino County, California

Prepared for:

**Special Districts Department
County of San Bernardino**
157 West Fifth Street, Second Floor
San Bernardino, CA 92415-0450

Converse Project No. 11-81-309
December 28, 2011



Converse Consultants

Geotechnical Engineering, Environmental and Groundwater Science, Inspection and Testing Services

December 28, 2011

Mr. James A. Oravets
Division Manager
Special Districts Department
County of San Bernardino
157 West Fifth Street, Second Floor
San Bernardino, CA 92415-0450

Subject: **GEOTECHNICAL INVESTIGATION REPORT FOR THE PROPOSED
MOONRIDGE ANIMAL PARK RELOCATION**
10.4-acre Parcel Intersection of Moonridge Road and Club View Drive
City of Big Bear, San Bernardino County, California
Converse Project No. 11-81-309-01

Dear Mr. Oravets:

Enclosed are the findings of the geotechnical investigation performed by Converse Consultants (Converse) for the proposed Moonridge Animal Park Relocation located at the intersection of Moonridge Road and Club View Drive, City of Big Bear, San Bernardino County, California. The purpose of this investigation was to provide development recommendations including site grading and foundation design and construction. Our services were performed in accordance with our proposal dated October 29, 2011 and your Work Order Number 10712-101 dated November 01, 2011.

Based on our field investigation, laboratory testing, and analysis, the proposed Moonridge Animal Park Project is feasible from a geotechnical standpoint, provided the findings and recommendations presented in this report are implemented during design, and construction.

We appreciate the opportunity to be of continued service to the County of San Bernardino Special Districts. If you have any questions regarding this report, please feel free to contact the undersigned at (909) 796-0544.

CONVERSE CONSULTANTS

Hashmi S. E. Quazi, Ph.D., G. E.
Regional Manager/Principal Engineer

Dist.: 4/Addressee
HS/SM/HSQ/bag

EXECUTIVE SUMMARY

The following is a summary of our geotechnical investigation, conclusions and recommendations, as presented in the body of this report; please refer to the appropriate sections of the report for complete conclusions and recommendations. In the event of a conflict between this summary and the report, or an omission in the summary, the report shall prevail.

- The proposed zoo site is located at the intersection of Moonridge Road and Club View Drive in the City of Big Bear, San Bernardino County, California. The 10.4-acre property is bounded by Club View Drive to the west, Moonridge Drive to the north and east and Big Bear Mountain Golf Course to the south.
- The property is presently vacant. In general the site is relatively flat with areas of sage scrub on the north and meadows on the south. The Rathbun Creek runs through the site oriented southeast to northwest. The creek is surrounded by dense vegetation that includes trees and bushes. There is no exposed bedrock on the site. In addition to the zoo site, there is an additional parking location north of zoo site across Moonridge Drive. This parking area is covered with compacted gravel.
- The proposed project is planned to be built in three phases. Phase 1 will provide housing for all of the animals currently in the zoo collection. Included in Phase 1 are the entry plaza, amphitheater, animal holding buildings, restaurant, gift shop, administration building, toilets, maintenance building and yard, and all holding buildings to support exhibits. Phase 2 will provide permanent, fully built-out exhibits for the species housed in temporary exhibits in Phase 1. Included in Phase 2 are the education building, the reptile house, and the permanent nocturnal house. A proposed hospital is being considered as its own phase to be completed when the park is able to acquire funding.
- We understand that the site lies within FEMA Floodway Zone AE. The floodway is a channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. The site is planned to be raised approximately about 1 to 5 feet above the existing grade to prevent flooding related damage. The height required to raise the site above the floodplain should be verified by a competent civil engineer/hydrologist.
- Seven borings were planned to be drilled for this project. Three (3) borings (BH-1 through BH-3) were drilled on November 11, 2011. The drill rig broke on that day and remaining borings (BH-4 through BH-7) were drilled on November 18, 2011. Five borings (BH-1, BH-3, BH-4, BH-5 and BH-6) were drilled to a planned depth of 11.5 feet bgs. We planned to drill BH-7 to a depth of 11.5 feet bgs. Water was encountered at about 8 feet bgs on BH-7. Boring BH-7 was continued to a depth of



46 feet to confirm the groundwater elevation at the boring. BH-2 was drilled to a depth of 51.5 feet as planned.

- The subsurface profile at the proposed site consists mostly of loose to medium dense sand, silt and clay layers. Deeper borings BH-2 and BH-7 indicate that the relative density changes from dense to very dense at approximately 35 feet bgs. The southeastern corner of the property where boring BH-3 was drilled indicated dense to very dense layers of silty sand and sandy silt. Borings BH-1, BH-2 and BH-4 through BH-7 have similar soil characteristics and can be considered to be representative of the project site.
- Groundwater, interpreted as perched, was encountered in boring BH-2 at approximately 14 feet bgs (6912 feet msl) and in BH-4 at approximately 8 feet bgs (6918 feet msl). Groundwater was encountered in BH-2 at approximately 45 feet bgs (6881 feet msl). Groundwater was encountered in BH-7 at approximately 8 feet bgs (6883 feet msl). Groundwater was not encountered in other borings. Soil cuttings from the drilling were observed to be moist, and soil samples collected had high moisture contents, in the range of 13 to 50 percent. At the time of the field investigation, the proposed site was covered by approximately four inches of snow. Active surface water flow was observed in Rathbun Creek, which runs through the site from southeast to northwest. The high soil moisture content is likely due to the infiltration of melted snow and water from Rathbun Creek, which was held by the layers of fine grained soils such as silts and clays.
- Based on our field exploration, the earth materials on the proposed site should be excavatable with conventional heavy-duty earth moving equipment.
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) – 06071C8026H indicates that the planned Moonridge Animal Park Relocation site can be characterized as Floodway Zone AE. The floodway is a channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- The site is not situated within a currently designated State of California Earthquake Fault Zone, but is within a seismically active area of southern California.
- Shallow perched groundwater is present at the site. The site soils are generally relatively fine-grained; however, layers of granular soil may potentially be subject to liquefaction in the event of a seismic event. Liquefaction induced settlement at the proposed site is estimated to be in the range of 1 to 2 inches. The potential for surface manifestations due to liquefaction such as sand boiling and surface fissures are considered to be low due to layers of non-liquefiable fine grained soils.



- After clearing and grubbing of all vegetation, the existing grade should be excavated to remove all the organics and roots. The depth of removal/ scarification should be a minimum of six inches below the bottom of the roots. The excavated depth should be backfilled with material similar to onsite material after proper processing, free of organics and deleterious materials. The backfill should be recompacted to a minimum of 90 percent of laboratory maximum dry density at about two (2) percent above optimum moisture for fine-grained soils and to within \pm three (3) percent of optimum moisture for coarse-grained soils.
- Imported fill materials to be used as backfill to raise the site grade can be similar to the native soils after proper processing, and free of organic or deleterious materials. Imported fill materials should be tested for any contamination and should be environmentally clean. Processing consists of drying or mixing with dry coarse grained soils to lower the moisture content.
- Fill should be placed on top of the processed and compacted existing grade in loose thickness not exceeding eight inches and compacted to about 80 to 85 percent of the laboratory maximum dry density (ASTM D1557), at about two (2) percent above optimum moisture for fine-grained soils and to within \pm three (3) percent of optimum moisture for coarse-grained soils. Transition slopes should be constructed at 2H:1V (horizontal :vertical) slope where the raised site meets the Rathbun Creek banks. The site slopes should be protected with appropriate benching and/or erosion control vegetation.
- At the structure footprints, the compacted fill (to raise the existing grade) soils should be overexcavated to a depth at least 24 inches below the bottom of the proposed footings. Such excavation should extend at least two (2) feet horizontally beyond the structure footprints. In areas to receive asphalt concrete or portland cement concrete paving, including sidewalks, curbs and gutters, and other flatwork, the upper two (2) feet below the subgrade elevation should be excavated. After the required excavation and grading, the proposed structures and streets should be supported entirely on properly compacted structural fill as presented in Appendix C, C1.7 *Structural Fill Below Structures and Streets*.
- Based on an average of 92 percent relative compaction of the excavated native soil from the proposed site, the approximate shrinkage factor for the upper five (5) feet of soils is estimated to range from about twenty (20) percent shrinkage to about one (1) percent bulkage, depending on the specific area and type of soil. For planning purposes, an average of twelve (12) percent shrinkage may be used.
- Structures to house the animals, office/commercial buildings, shade structures, restroom buildings, food centers and similar structures may be supported on continuous (strip) and/or isolated spread footings. Continuous and isolated spread footings should be at least 12 inches wide. The depth of embedment below lowest



adjacent soil grade of interior and exterior footings should be at least 12 inches and 15 inches respectively. Footings should be founded on at least 24 inches of compacted fill, or equal to the maximum footing dimension, whichever is greater.

- For shallow spread footings founded on compacted structural backfill, an allowable net bearing capacity of 1,800 pounds per square foot (psf), plus 300 psf for each additional foot of depth, may be used. The maximum allowable bearing capacity should be limited to 2,500 psf. Based on the maximum allowable net bearing pressures of 2,500 psf, as presented above, settlement less than 0.5 inch should be anticipated.
- Light pole structures can be supported on drilled pier foundations deriving their support primarily through skin friction. The piers may be designed for compression using an allowable skin friction value of 200 psf for a minimum of 15 feet deep below the finished grade. This value may be increased by 33 percent for transient wind and seismic forces. For pier design in tension, 50 percent of the recommended allowable skin friction values in compression may be used.
- Lateral loads can be resisted by an allowable passive earth pressure of 275 pounds per foot of depth for dense natural soil or compacted fill applied against below-grade wall elements. The maximum passive pressure should not exceed 2,500 psf. In addition, a friction coefficient of 0.35 between the concrete and dense natural soil or compacted fill can be used in combination with passive earth pressures to resist lateral loads.
- The recommended values of the various soil parameters for the pipe design are provided in the text of this report.
- Recommendations for temporary sloped excavations, and shoring design recommendations are provided in the text of this report.
- Preliminary flexible pavement recommendations based on R-value for subgrade soil of 40 is presented in the text of this report.

Results of our investigation indicate that the site is suitable from a geotechnical standpoint for the proposed park relocation project, provided that the recommendations contained in this report are incorporated into the design and construction of the project. We recommend that the appropriate flood control measures should be in place.



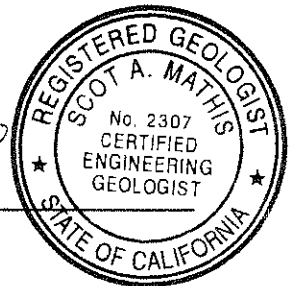
PROFESSIONAL CERTIFICATION

The following professionals whose seals and signatures appear hereon have prepared this report.

The findings, recommendations, specifications and professional opinions contained in this report were prepared in accordance with the generally accepted professional engineering and engineering geologic principle and practice in this area of Southern California. We make no other warranty, either expressed or implied.



Harihar Shiwakoti, P.E.
Project Engineer



Scot Mathis, C.E.G.
Senior Geologist



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1.0 INTRODUCTION

This report contains the findings of our geotechnical investigation performed by Converse at the site for the proposed Moonridge Animal Park Relocation Project, located at the Intersection of Moonridge Road and Club View Drive in the City of Big Bear, San Bernardino County, California, as shown on Figure No. 1 *Site Location Map*.

The purpose of this investigation was to evaluate the nature and pertinent engineering properties of the subsurface materials and to provide recommendations regarding general site grading and geotechnical parameters for the design and construction of the proposed project.

This report is written for the project described herein and is intended for use solely by the County of San Bernardino Special District and its authorized agents for design purposes. It should not be used as a bidding document but may be made available to the potential contractors for information on factual data only. For bidding purposes, the contractors should be responsible for making their own interpretation of the data contained in this report.

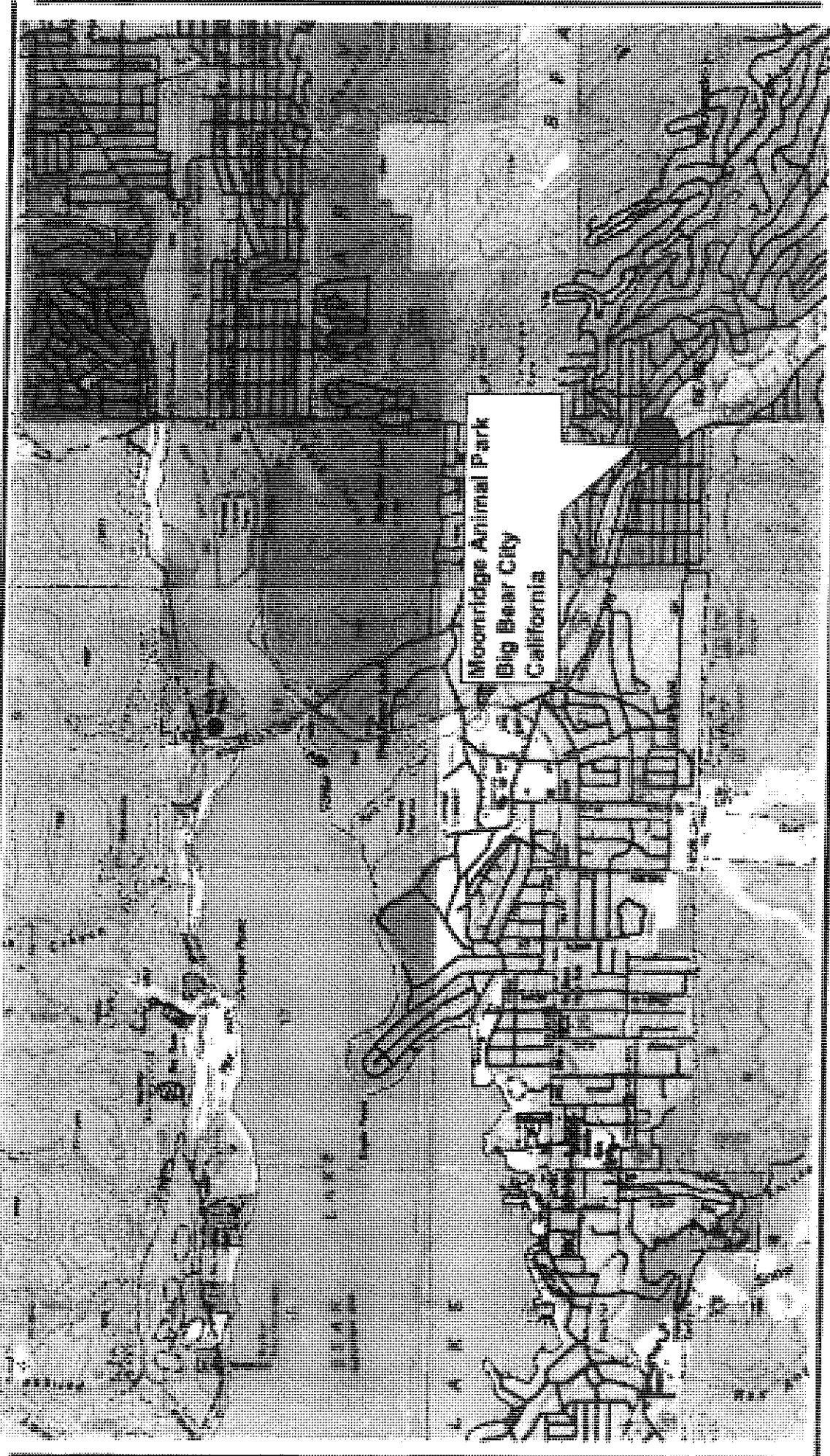
2.0 PROJECT DESCRIPTION

The site is planned to be built in phases. Phase 1 will provide housing for all of the animals currently in the zoo collection. Included in Phase 1 are the entry plaza, amphitheater, animal holding building, restaurant, gift shop, administration building, toilets, maintenance building and yard, and all holding buildings to support exhibits. Phase 2 will provide permanent, fully built-out exhibits for the species housed in temporary exhibits in Phase 1. Included in Phase 2 are the education building, the reptile house, and the permanent nocturnal house. A proposed animal hospital is being considered as its own phase to be completed when the park is able to acquire funding.

We understand that the site lies on FEMA Floodway Zone AE. The site is planned to be raised approximately about 1 to 5 feet above the existing grade to prevent flooding related damage. The height required to raise the site above the floodplain should be verified by a competent civil engineer/hydrologist.

We assumed that the structures built to house the animals are generally light weight structures founded on shallow foundations and slab-on-grade. There will be associated retaining walls, utility pipe lines, light pole foundations and streets.





SITE LOCATION MAP

Moonridge Animal Park

City of Big Bear, San Bernardino County, California

For: San Bernardino County Special District



Converse Consultants

Project Number	11-81-309-01
Scale	NTS
Date	December 2011
Figure No.	1

3.0 SITE DESCRIPTION

The proposed zoo site is located at the intersection of Moonridge Road and Club View Drive in the Big Bear City, San Bernardino County, California.

The 10.4-acre property is bounded by Club View Drive to the west, Moonridge Drive to the north and east and Big Bear Mountain Golf Course to the south. The Rathbun Creek runs through the site oriented southeast to northwest. The creek is surrounded by dense vegetation that includes trees and bushes. There is no exposed bedrock on the site.

The property is presently vacant. In general the site is relatively flat with areas of sage scrub on the north and meadows on the south as shown in Photos No. 1 and 2, *Proposed Moonridge Animal Park-Existing Site Condition*. The elevation of the park site varies from approximately 6943 feet above mean sea level (msl) on southeast corner to approximately 6904 feet amsl on the northwest corner.

In addition to the zoo site, there is an additional parking located north of the zoo site across Moonridge Drive. This parking area is covered with compacted gravel. The elevation of the parking lot varies from approximately 6890 feet to approximately 6860 feet (msl). The area is bounded by Moonridge Dr. to the south, Rathbun Creek to the north and east, and Elm Street to the west.

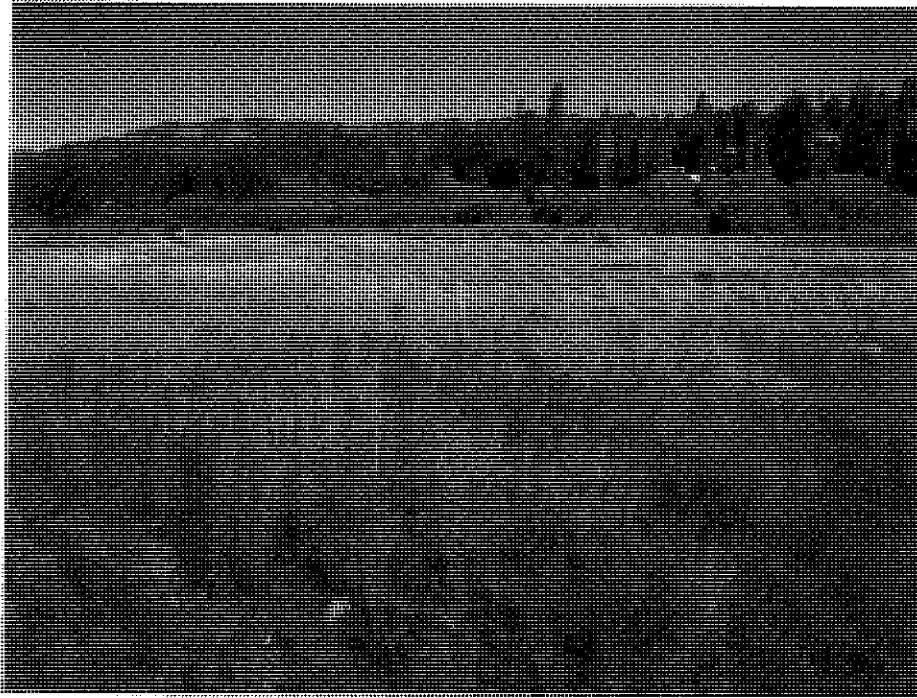


Photo No 1. Proposed Moonridge Animal Park-Existing Site Condition





Photo No 2: Proposed Moonridge Animal Park-Existing Site Condition

4.0 SCOPE OF WORK

Our scope of work consisted of the tasks described in the following subsections.

4.1 Project Set-up and Coordination

The project set-up and coordination included the following:

- Reviewed existing documents available for the project site
- Marked the boring locations
- Called Underground Services Alert (USA)
- Rented a rig to drill the exploratory borings

4.2 Field Exploration

Seven (7) borings (BH-1 through BH-7) were drilled on November 11 and 18, 2011, to a maximum explored depth of 51.5 feet below existing ground surface (bgs). Five borings (BH-1, BH-3, BH-4, BH-5 and BH-6) were drilled to a planned depth of 11.5 feet bgs. We planned to drill BH-7 to a depth of 11.5 feet bgs. Water was encountered at about 8 feet bgs on BH-7. Boring BH-7 was continued to a depth of 46 feet to confirm the groundwater elevation at the boring. BH-2 was drilled to a depth of 51.5 feet as planned.



The borings were visually logged by our engineer and sampled at regular intervals and at changes in subsurface soils. Relatively undisturbed ring and bulk soil samples were obtained for laboratory testing. The borings were drilled using a truck-mounted rig equipped with 8-inch diameter hollow-stem augers for soils sampling. Borings were backfilled with soil cuttings at the completion of drilling.

The approximate locations of the exploratory borings are shown in Figures No. 2a and 2b, *Approximate Boring Location Map*. For a description of the field exploration and sampling program see Appendix A, *Field Exploration*.

4.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in the classification and to evaluate relevant engineering properties. The tests performed included:

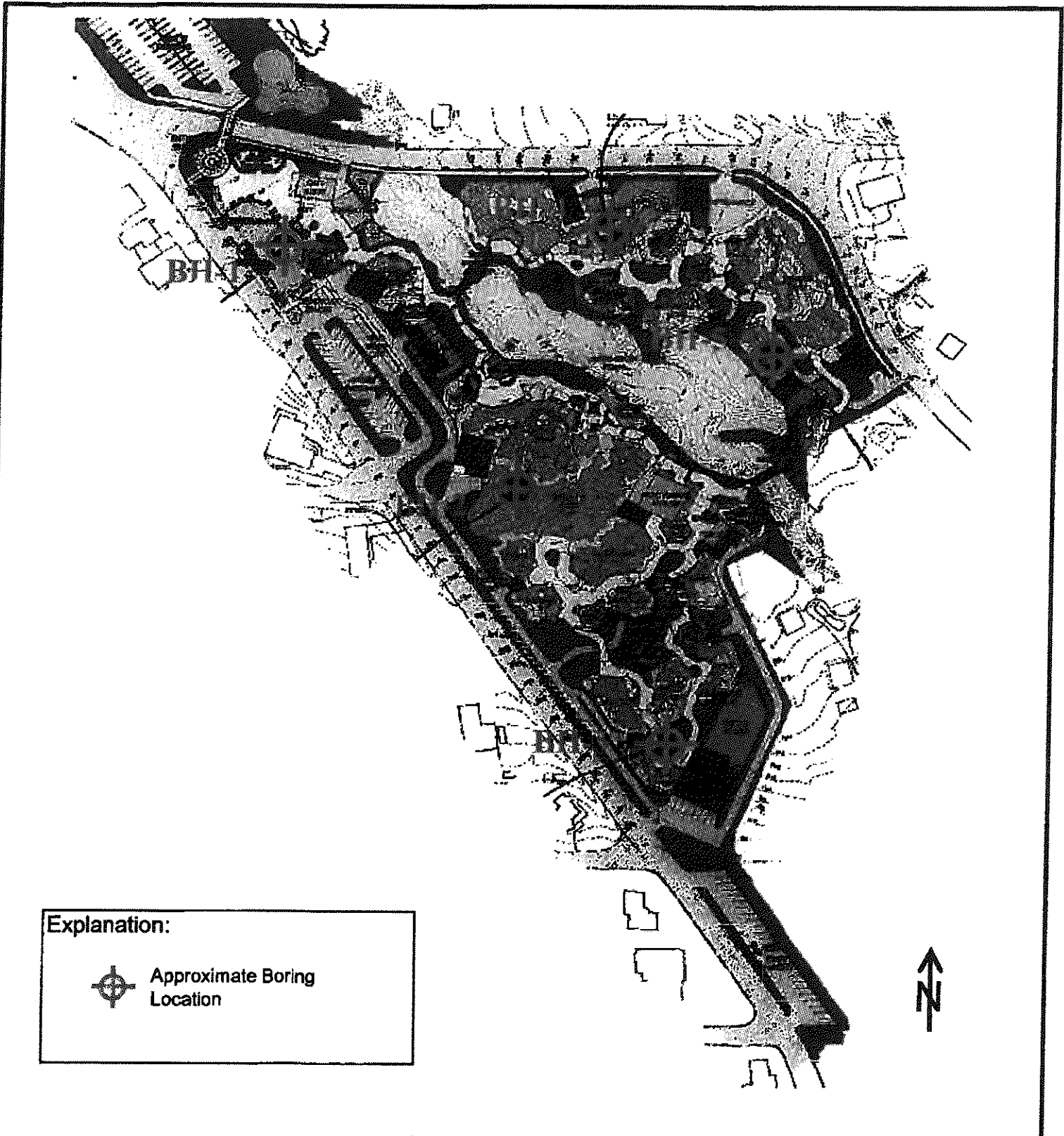
- ◆ In situ moisture contents and dry densities (ASTM Standard D2216)
- ◆ Collapse (ASTM Standard D5333)
- ◆ Sand equivalent (ASTM D24A)
- ◆ Expansion index (ASTM Standard D4829)
- ◆ Soil corrosivity tests (Caltrans 643, 422, 417, and 532)
- ◆ R-value (Caltrans 309G)
- ◆ Grain size analysis (ASTM Standard D422)
- ◆ Maximum dry density and optimum-moisture content relationship (ASTM Standard D1557)
- ◆ Direct shear (ASTM Standard D3080)

For *in situ* densities and moisture contents, see the Logs of Borings in Appendix A, *Field Exploration*. For a description of the laboratory test methods and test results, see Appendix B, *Laboratory Testing Program*.

4.4 Analyses and Report

Data obtained from the exploratory fieldwork and laboratory-testing program were analyzed and evaluated. This report was prepared to provide the findings, conclusions and recommendations developed during our investigation and evaluation.





APPROXIMATE BORING LOCATION MAP

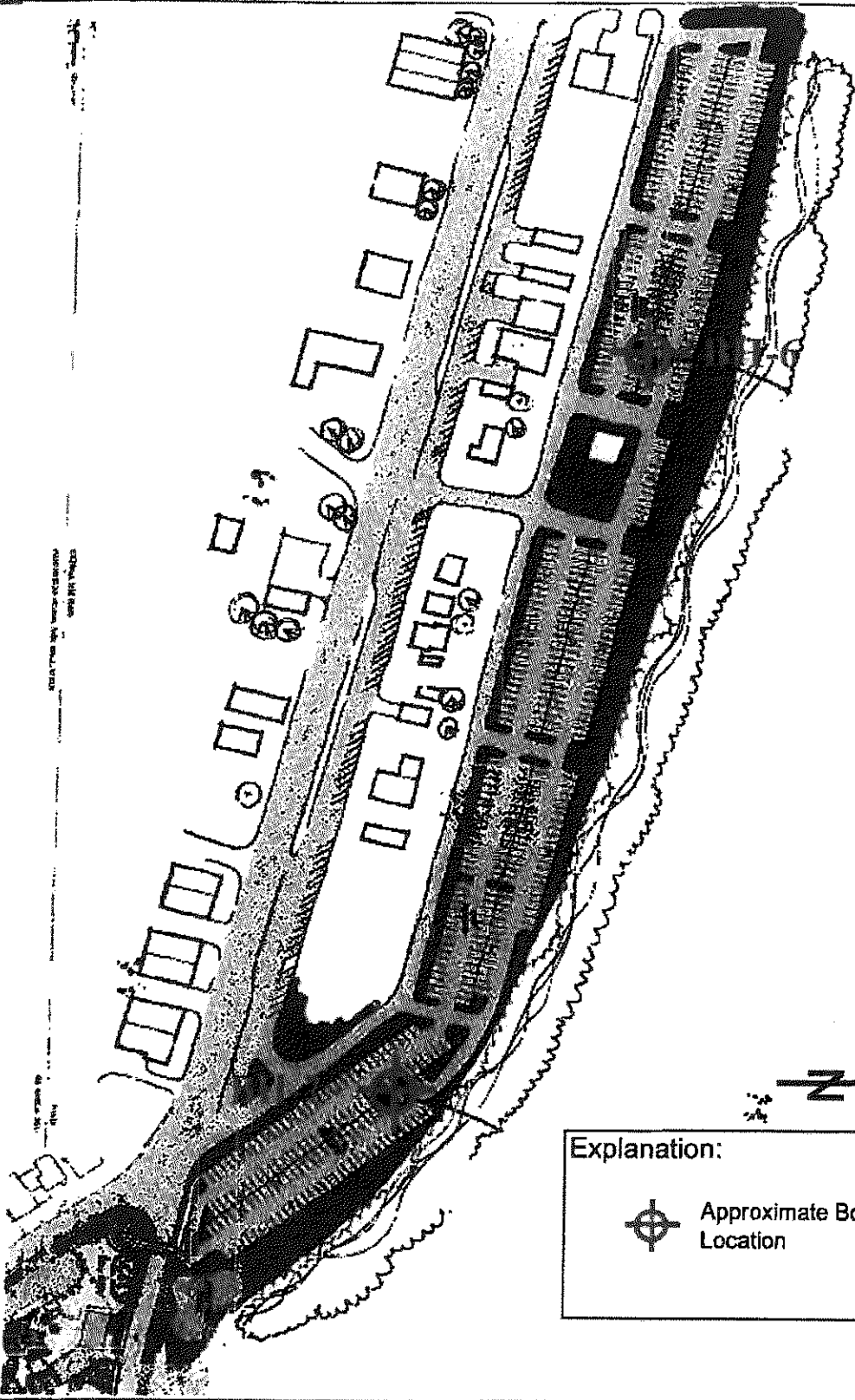
Moonridge Animal Park
City of Big Bear San Bernardino County, California
For: San Bernardino County Special Districts

Project Number:
11-81-309-01


Date:
December 2011

 **Converse Consultants**


Figurs No.
2a



Explanation:


 Approximate Boring Location

APPROXIMATE BORING LOCATION MAP

<p>Moonridge Animal Park</p>	<p>Project Number: 11-81-309-01</p>
<p>City of Big Bear, San Bernardino County, California</p>	
<p>For: San Bernardino County Special Districts</p>	<p>Date: December 2011</p>
<p> Converse Consultants</p>	<p>Figure No. 2b</p>

5.0 ENGINEERING GEOLOGY

5.1 Regional Geology

The project site lies within the Transverse Ranges Geomorphic Province of California. The Transverse Ranges are a complex series of mountain ranges and valleys distinguished by an anomalous dominant east-west trend, contrasting to the northwest-southeast direction of the Coast Ranges and Peninsular Ranges. The western limit of the province is the island group of San Miguel, Santa Rosa, and Santa Cruz. The eastern limit within the Mojave Desert includes the San Bernardino Mountains on the east side of the San Andreas fault.

The project site is located in the central portion of the northwest-trending San Bernardino Mountains. The San Bernardino Mountain range is composed primarily of uplifted Cretaceous, Jurassic, and Triassic granitic rocks. The range is bounded by the San Andreas fault zone to the south and the North Frontal fault zone to the north.

5.2 Geology of Project Site

The subject site is underlain by Holocene alluvial deposits, consisting of mixtures of clay, silt, sand, and gravel. The surficial sedimentary deposits are likely underlain by denser Pleistocene older alluvium and, at depth, by Mesozoic granitic bedrock. (Dibblee, 1964)

6.0 SUBSURFACE CONDITIONS

Subsurface conditions are discussed in the following subsections.

6.1 Subsurface Profile

The subsurface profile at the proposed site consists mostly of loose to medium dense mix of silt, clay and sand. Deeper borings BH-2 and BH-7 indicate that the relative density changes from dense to very dense at approximately 35 feet bgs. The southeastern corner of the property where boring BH-3 was drilled indicated dense to very dense layers of silty sand and sandy silt. Borings BH-1, BH-2, and BH-4 through BH-7 have similar soil characteristics and can be considered to be representative of the project site.

For additional information on the subsurface conditions, see the Logs of Borings in Appendix A, *Field Exploration*.



6.2 Groundwater

Groundwater, interpreted as perched, was encountered in boring BH-2 at approximately 14 feet bgs (6912 feet msl) and in BH-4 at approximately 8 feet bgs (6918 feet msl). Groundwater was encountered in BH-2 at approximately 45 feet bgs (6881 feet msl). Groundwater was encountered in BH-7 at approximately 8 feet bgs (6883 feet msl). Groundwater was not encountered in other borings. Soil cuttings from the drilling were observed to be moist, and soil samples collected had high moisture contents, in the range of 13 to 50 percent.

At the time of the field investigation, the proposed site was covered by approximately four inches of snow. Active surface water flow was observed in Rathbun Creek, which runs through the site from southeast to northwest. The high soil moisture content is likely due to the infiltration of melted snow and water from Rathbun Creek, which was held by the layers of fine grained soils such as silts and clays.

Localized areas of moist to saturated soil conditions are expected to be encountered during the construction/excavation on the proposed site, depending on the season and surface water conditions.

It should be noted that the groundwater level could vary depending upon the seasonal precipitation and possible groundwater pumping activity in the site vicinity.

6.3 Excavatability

Based on our field exploration, the earth materials on the proposed site should be excavatable with conventional heavy-duty earth moving equipment.

6.4 Flooding

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) – 06071C8026H indicates that the planned Moonridge Animal Park Relocation site can be characterized as Floodway Zone AE. The floodway zone AE is a channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

6.5 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and depositional characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions are between or beyond the boring locations. If,



during construction, subsurface conditions different from those presented in this report are encountered, this office should be notified immediately so that recommendations can be modified, if necessary.

7.0 LABORATORY TESTING

Results of the various laboratory tests are presented in Appendix B, *Laboratory Testing Program*, except for the results of *in-situ* moisture and dry density tests which are presented on the Logs of Borings in Appendix A, *Field Exploration*. The results are also discussed below:

7.1 Physical Testing

- *In-situ* Moisture and Dry Density – *In-situ* dry density and moisture content in the upper ten (10) feet of the site ranged from 72 to 117 pounds per cubic feet (pcf) and 13 to 50 percent, respectively. The low *in-situ* density observed in some soil samples is likely due to the presence of organics in the soil.
- Collapse Potential – The collapse potential of three (3) relatively undisturbed samples were tested under a vertical stress of 2.0 kips per square foot (ksf) in accordance with the ASTM Standard D2435/D5333 test method. The tests results indicated percent swell of 0.05 to 0.1 percent.
- Sand Equivalent – Two (2) representative bulk soil samples were tested to evaluate Sand Equivalent (SE) in accordance with the ASTM D2419 test method. The measured SE of the soil samples from the upper ten feet were 7 and 10.
- Expansion Index – One (1) representative sample from the upper ten (10) feet bgs was tested to evaluate Expansion Potential in accordance with the ASTM Standard D4829. The test result indicates the EI of 24, which corresponds to “Low” expansion potential.
- R-value – One (1) representative bulk soil sample was tested for resistance value (R-value) in accordance with ASTM Standard D2844. This test is designed to provide a relative measure of soil strength for use in pavement design. The test indicated the site soils have an R-value of 40.
- Gradation Analysis – Grain size analysis were performed according to ASTM Standard D422. The results are presented in Drawing No. B-1, *Grain Size Distribution Results*, in Appendix B, *Laboratory Testing Program*.
- Maximum Dry Density and Optimum Moisture Content – Typical moisture-density relationship of one (1) representative near surface soil sample tested according to



ASTM Standard D1557 indicated the maximum dry density was 124.0 pounds per cubic foot (pcf). The optimum moisture content of sample tested was 10.7 percent. The results are presented in Drawing No. B-2, *Moisture Density Relationships Results*, in Appendix B, *Laboratory Testing Program*.

- Direct Shear – Three (3) direct shear tests were performed in accordance with ASTM Standard D3080 on a relatively undisturbed ring sample. Results of the direct shear tests are presented in Drawings No. B-3 through B-5, *Direct Shear Test Results* in Appendix B, *Laboratory Testing Program*. Results of the direct shear testing indicate that the soil tested had moderate shear strength.

For additional information on the subsurface conditions, see the Logs of Borings in Appendix A, *Field Exploration*.

7.2 Chemical Testing - Corrosivity Evaluation

One (1) representative soil sample was tested by HDR/Schiff for corrosivity evaluation with respect to common construction materials such as concrete and steel. The test results are discussed below and are presented in Appendix B, *Laboratory Testing Program*. The test includes pH, sulfate and chloride content, and saturated minimum electrical resistivity.

The sulfate content of the sample tested was 53 mg/kg, which indicated that site soils are not deleterious to concrete. Therefore, Type I or II Portland Cement may be used for the construction of the concrete structures.

The chloride concentration of samples tested was 5.4 mg/kg. The pH value of the site soils was 7.6. The measured value of the minimum electrical resistivity when saturated was 4,200 ohm-cm.

Results of these tests indicate that the site soils are 'Moderately Corrosive' to ferrous metals in contact with the soil. A corrosion engineer may be consulted for the corrosion mitigation for ferrous metals in contact with the soil.

8.0 FAULTING AND SEISMICITY

Faulting and seismicity relative to the site are discussed in the following sections.



8.1 Faulting

An active fault is defined as the one that has had surface displacement within Holocene time (about the last 11,000 years). There are no known active faults projecting toward or extending across the project site. The site is not situated within a currently designated State of California Earthquake Fault Zone, but is within a seismically active area of southern California.

Although there are no documented active faults projecting towards the site, there are a number of nearby faults, which could produce significant ground shaking at the site during a major earthquake. The closest known active fault is the North Frontal Fault Zone. Table No. 1, *Seismic Characteristics of Nearby Faults*, shows the location of the most active known faults for the project.

Table No. 1, Seismic Characteristics of Nearby Active Faults

Fault Name and Section	Approximate Distance to Site (kilometers)	Max. Moment Magnitude (Mw)
North Frontal Fault Zone (East)	9.7	6.7
North Frontal Fault Zone (West)	10.1	7.0
Helendale-S Lockhardt	14.6	7.1
San Andreas-San Bernardino	22.5	7.3
San Andreas – Southern	22.5	7.4
Pinto Mountain	24.3	7.0
Lenwood-Lockhart-Old Woman Springs	25.0	7.3
Cleghorn	31.2	6.5
Johnson Valley (Northern)	34.1	6.7
Landers	39.9	7.3
San Jacinto-San Jacinto Valley	41.4	6.9
San Jacinto-San Bernardino	41.9	6.7
Emerson So.-Copper Mtn	44.5	6.9
Burnt Mtn.	44.6	6.5
Eureka Peak	45.5	6.5
San Andreas-Coachella	50.9	7.1
Cucamonga	52.3	7.0
Calico-Hidalgo	54.1	7.1
San Jacinto-Anza	55.7	7.2
Pisgah-Bullion Mtn-Mesquite Lk	60.9	7.1
San Andreas-1857 Rupture	61.3	7.8
San Andreas-Mojave	61.3	7.1
Gravel Hills-Harper Lake	70.5	6.9
San Jose	76.8	6.5
Sierra Madre (Central)	76.9	7.0



Fault Name and Section	Approximate Distance to Site (kilometers)	Max. Moment Magnitude (Mw)
Chino Central Avenue (Elsinore)	78.9	6.7
Elsinore-Glen Ivy	78.9	6.8
Elsinore-Temecula	79.6	6.8
Whittier	82.6	6.8
Blackwater	88.3	6.9
Clamshell-Sawpit	89.8	6.5
San Jacinto-Coyote Creek	93.1	6.8
Elysian Park Thrust	95.3	6.7
Elsinore Julian	96.8	7.1
Elsinore-Julian	97.2	7.1

8.2 CBC Seismic Design Parameters

Seismic parameters based on the 2010 California Building Code are provided in Table No. 2, *CBC Seismic Parameters*, based on site coordinates 34.2396° north and 116.869° west.

Seismic parameters based on the 2010 California Building Code are provided in Table No. 2, *CBC Seismic Parameters*.

Table No. 2, CBC Seismic Parameters

Seismic Parameters	
Site Coordinates	34.2396°N 116.869°W
Site Class	"D"
Mapped Short period (0.2-sec) Spectral Response Acceleration, S_s	1.791g
Mapped 1-second Spectral Response Acceleration, S_1	0.690g
Site Coefficient (from Table 1613.5.3(1)), F_a	1.0
Site Coefficient (from Table 1613.5.3(2)), F_v	1.5
Design Spectral Response Acceleration for short period, S_{ds}	1.194g
Design Spectral Response Acceleration for 1-second period, S_{d1}	0.690g

8.3 Other Effects of Seismic Activities

In general, secondary effects of seismic activity include surface fault rupture, soil liquefaction, lateral spreading, landslides, earthquake-induced flooding, tsunamis, and seiches. Site-specific potential for each of these seismic hazards is discussed in the following sections.



Surface Fault Rupture: The site is not located within a currently designated State of California Earthquake Fault Zone. Based on a review of existing geologic information no known active surface fault zone crosses or projects toward the site. The potential for surface rupture resulting from the movement of the nearby major faults is not known with certainty but is considered very low.

Liquefaction: Liquefaction is defined as the phenomenon in which a soil mass, because of the development of excess pore pressures, suffers a substantial reduction in its shear strength to a constant value and deforms continuously until the imposed shear stresses become equal to steady-state shear strength. During earthquakes, excess pore pressures in saturated soil deposits may develop as a result of induced cyclic shear stresses resulting in liquefaction.

Soil liquefaction occurs in submerged granular soils during or after strong ground shaking. There are several requirements for liquefaction to occur. They are as follows:

- Soils must be submerged
- Soils must be primarily granular
- Soils must be contractive, that is, loose to medium-dense
- Ground motion must be intense
- Duration of shaking must be sufficient for the soils to lose shear resistance

Shallow perched groundwater is present at the site at some locations. The site soils are generally relatively fine-grained; however, layers of granular soil may potentially be subject to liquefaction in the event of a seismic event. Liquefaction induced settlement at the proposed site is estimated to be in the range of 1 to 2 inches. The potential for surface manifestations due to liquefaction such as sand boiling and surface fissures are considered to be low due to layers of non-liquefiable fine grained soils.

Seismic Settlement: Seismically-induced settlement occurs during ground shaking associated with earthquakes. The total potential dynamic dry settlement at the site is considered to be very low.

Lateral Spreading: Seismically induced lateral spreading involves primarily lateral movement of earth materials due to ground shaking. It differs from the slope failure in that complete ground failure involving large movement does not occur due to the relatively smaller gradient of the initial ground surface. Lateral spreading is demonstrated by near-vertical cracks with predominantly horizontal movement of the soil mass involved. The topography at the project site and in the immediate vicinity of the site is relatively flat with the exception of the banks of Rathbun Creek, which flows through the site. Liquefaction of soils underlying the creek banks could result in lateral spreading into the creek channel.



Landslides: Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes. The project site is relatively flat. In the absence of significant ground slopes, the potential for seismically induced landslides to affect the proposed site is considered to be low; however, localized slope failures could occur along the banks of Rathbun Creek.

Tsunamis: Tsunamis are large waves generated in open bodies of water by fault displacement or major ground movement. Based on the inland location of the site, tsunamis do not pose a hazard to this site.

Seiches: Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Based on the distance of the site from significant bodies of water, the potential impact to the site from seiching is considered to be very low.

Earthquake-Induced Flooding: Dams or other water-retaining structures may fail as a result of large earthquakes. The site is above the elevation of the nearby Big Bear Lake, and is not in close proximity to other water-retaining structures. The potential for earthquake-induced flooding is considered to be low.

9.0 EARTHWORK AND SITE GRADING RECOMMENDATIONS

9.1 General Site Grading

This section contains our general recommendations regarding earthwork and site grading for the proposed project. The recommendations provided in the following sections are based on our field exploration, laboratory testing, and data evaluation as presented in the preceding sections. These recommendations may need to be modified based on observation of the actual field conditions exposed during grading. A grading plan is not available at this time. The grading plan should be reviewed to verify that the design is in conformance to the recommendations presented in this report.

The site soils can be excavated utilizing conventional heavy-duty earth-moving equipment. A Converse representative must observe the bottom of all excavated areas prior to placement of new fill. Soils removed during the over-excavation procedures may be utilized as compacted fill, provided they have been stripped of organic and other deleterious materials. All proposed fill should be placed as determined by a Converse representative and in accordance with the specifications presented in Appendix C, *Earthwork Specifications*.

Based on field observations, removal of localized areas deeper than recommended may be required during grading. The final bottom surface of all excavations should be observed to locate zones of overly saturated and/or loose, unsuitable material of any origin and should be approved by the project geotechnical consultant prior to placing any



fill and/or structures. All surface trash and vegetation should be removed from the areas to be graded and hauled off the site.

Site grading recommendations provided below are based on our experience with similar projects and our evaluation of the results of the field exploration, laboratory testing, and data evaluation as presented in the preceding sections.

9.2 Backfill to Raise the Site Above Floodplain

The site is characterized by FEMA as Floodway Zone AE. The floodway is a channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. We understand that the site is planned to be raised approximately 1-5 feet above the existing grade to prevent flooding. The height required to raise the site above the floodplain, or to the finish grade, should be verified by a competent civil engineer/hydrologist.

Prior to the start of any earthwork, the site should be cleared of all vegetation and debris. The materials resulting from the clearing and grubbing operations should be removed from the site. Selected trees may be protected in place as required.

After clearing and grubbing of all vegetation, the existing grade should be excavated to remove all the organics and roots. The depth of removal/scarification should be a minimum of six inches below the bottom of the roots. The excavated depth should be backfilled with material similar to onsite material after proper processing, free of organics and deleterious materials. The backfill should be recompacted to a minimum of 90 percent of laboratory maximum dry density at about two (2) percent above optimum moisture for fine-grained soils and to within \pm three (3) percent of optimum moisture for coarse-grained soils.

Imported fill materials can then be backfilled on top of the processed and compacted existing grade. Fill material to be used as backfill to raise the site grade can be similar to the native soils after proper processing, and free of organic or deleterious materials. Imported fill materials should be tested for any contamination and should be environmentally clean. Processing consists of drying or mixing with dry coarse grained soils to lower the moisture content. Fill should be placed in loose thickness not exceeding eight inches and compacted to about 80 to 85 percent of the laboratory maximum dry density (ASTM D1557), at about two (2) percent above optimum moisture for fine-grained soils and to within \pm three (3) percent of optimum moisture for coarse-grained soils.

Transition slopes should be constructed at 2H:1V (horizontal :vertical) slope where the raised site meets the Rathbun Creek banks. The site slopes should be protected with appropriate benching and/or erosion control vegetation.



9.3 Subgrade Preparation for Structures and Streets

At the structure footprints, the compacted fill (to raise the existing grade) soils should be overexcavated to a depth at least 24 inches below the bottom of the proposed footings. Such excavation should extend at least two (2) feet horizontally beyond the structure footprints. In areas to receive asphalt concrete or portland cement concrete paving, including sidewalks, curbs and gutters, and other flatwork, the upper two (2) feet below the subgrade elevation should be excavated. After the required excavation and grading, the proposed structures and streets should be supported entirely on properly compacted structural fill as presented in Appendix C, C1.7 *Structural Fill Below Structures and Streets*.

9.4 Shrinkage and Subsidence

The shrinkage and/or bulking would depend on, among other factors, the depth of cut and/or fill, and the grading method and equipment utilized. For preliminary estimation, shrinkage factors may be taken as presented below:

Based on an average of 92 percent relative compaction of the excavated native soil from the proposed site, the approximate shrinkage factor for the upper five (5) feet of soils is estimated to range from about twenty (20) percent shrinkage to about one (1) percent bulking, depending on the specific area and type of soil. For planning purposes, an average of twelve (12) percent shrinkage may be used.

Subsidence would depend on the construction methods including type of equipment utilized. For estimation purposes, ground subsidence may be taken as 0.2 foot.

Although these values are only approximate, they represent our best estimates of the factors to be used to calculate lost volume that may occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field-testing using the actual equipment and grading techniques be conducted.

10.0 DESIGN AND CONSTRUCTION RECOMMENDATIONS

The various design recommendations provided in this section are based on the assumptions that in preparing the site, the earthwork and site grading recommendations provided in this report will be followed.

10.1 General Evaluation

Based on our field exploration, laboratory testing, and analyses of subsurface conditions at the site, remedial grading is required to prepare the site for support of the planned structures. To reduce differential settlement, variations in the soil type, degree of



compaction, and thickness of the compacted fill placed underneath the footings should be kept to a minimum.

10.2 Foundation Type and Bearing Pressures

Structures to house the animals, office buildings, shade structures, restroom buildings, food centers and similar structures may be supported on continuous (strip) and/or isolated spread footings. Continuous and isolated spread footings should be at least 12 inches wide. The depth of embedment below lowest adjacent soil grade of interior and exterior footings should be at least 12 inches and 15 inches respectively. Footings should be founded on at least 12 inches of compacted fill, or equal to the maximum footing dimension, whichever is greater.

For shallow spread footings founded on compacted structural backfill, an allowable net bearing capacity of 1,800 pounds per square foot (psf), plus 300 psf for each additional foot of depth, may be used. The maximum allowable bearing capacity should be limited to 2,500 psf.

The allowable net bearing capacity is defined as the maximum allowable net bearing pressure on the ground. It is obtained by dividing the net ultimate bearing capacity by a safety factor. The ultimate bearing capacity is the bearing stress at which ground fails by shear or experiences a limiting amount of settlement at the foundation. The net ultimate bearing capacity is obtained by subtracting the total overburden pressure on a horizontal plane at the foundation level from the ultimate bearing capacity.

The net allowable bearing values indicated above are for the dead loads and frequently applied live loads and are obtained by applying a factor of safety of 3.0 to the net ultimate bearing capacity. If normal code requirements are applied for design, the above vertical bearing value may be increased by 33 percent for short duration loadings, which will include loadings induced by wind or seismic forces.

10.3 Lateral Earth Pressures and Resistance to Lateral Loads

10.3.1 Lateral Earth Pressure

The following subsections outline lateral earth pressures and resistance to lateral loads. Lateral earth pressure and resistance to lateral loads are estimated by using on-site native soils or imported material with a minimum total unit weight of 120 pounds per cubic foot (pcf), cohesion of 100 pounds per square foot (psf), and an internal friction angle of 30 degrees.



The active earth pressure behind any buried wall depends primarily on the allowable movement, type of backfill materials, backfill slopes, wall inclination, surcharges, and any hydrostatic pressures. In general, the lateral earth pressures are presented in Table No. 3, *Lateral Earth Pressure*.

Table No. 3, Lateral Earth Pressure

Loading Conditions	Equivalent Fluid Pressure
Active earth conditions (wall is free to deflect at least 0.001 radian) -	40
At-rest (wall is restrained) -	60

These pressures assume a level ground surface behind the wall for a distance greater than the wall height, no surcharge, no hydrostatic pressure, and soil expansion index less than 30. If water pressure is allowed to build up behind the walls, the active pressures should be reduced by 50 percent and added to a full hydrostatic pressure to compute the design pressures against the walls.

10.3.2 Passive Earth Pressure

Lateral loads can be resisted by an allowable passive earth pressure of 275 pounds per foot of depth for dense natural soil or compacted fill applied against below-grade wall elements. The allowable passive earth pressure indicated above is obtained by applying a factor of safety of 1.5 to the ultimate passive earth pressure. Due to the low overburden stress of the soil at shallow depth, the upper one foot of passive resistance should be neglected unless the soil is confined by pavement or slab. The maximum passive pressure should not exceed 2,500 psf. In addition, a friction coefficient of 0.35 between the concrete and dense natural soil or compacted fill can be used in combination with passive earth pressures to resist lateral loads. The coefficient of friction should be applied to net normal dead loads only.

10.4 Settlement

The settlement of structures supported on strip and/or spread footings founded on soil will depend on the actual footing dimensions and the imposed vertical loads. Based on the maximum allowable net bearing pressures of 2,500 psf, as presented above, settlement less than 0.5 inch should be anticipated. In order to evaluate differential settlement, data on the relative dimension of adjacent footings, magnitude of imposed loads and distance between footings is needed. In the absence of such data, and based on our experience on similar projects for similarly loaded footings, the differential settlement may be taken as equal to about one-half of the total settlement.



10.5 Slabs-on-grade

The design of the slab-on-grade will depend on, among other factors, on the expansive potential of the pad soils. Based on the expansion index testing performed during the investigations, the expansive potential of the soil is "Low". Specific recommendations regarding type of slab-on-grade should be based on the expansion index testing of the pad subgrade soils at the completion of grading and structural requirements.

Subgrade soils must be firm and non-yielding prior to placement of concrete. In hot weather, the contractor should take appropriate curing precautions after placement of concrete to minimize cracking of the slabs. The potential for slab cracking may be lessened by the addition of fiber mesh to the concrete and/or control of the water/cement ratio.

Concrete should be cured by protecting it against loss of moisture and rapid temperature change for at least seven (7) days after placement. Moist curing, waterproof paper, white polyethylene sheeting, white liquid membrane compound, or a combination thereof may be used after finishing operations have been completed. The edges of concrete slabs exposed after removal of forms should be immediately protected to provide continuous curing.

The above recommendations are based on the results of tests performed on representative site soils. If soils other than those presently encountered within the project site are placed as structural fill, the modulus of subgrade reaction should be reevaluated. The final slab design should be based on the actual modulus of subgrade reaction.

10.6 Soil Parameters for Pipeline Design

Any soft and/or unsuitable materials encountered at the utility pipeline subgrade should be removed and replaced with compacted fill or an adequate bedding material. For a majority of the project site, the subsurface materials for the utility pipeline have sand equivalent (SE) less than 30. Two representative soil samples tested to determine sand equivalent indicated SE of 7 and 10. Suitable imported coarse grained material with SE greater than 30 should be used as pipe bedding material.

The final subgrade surface should be level, firm, uniform, and free of loose materials and properly graded to provide uniform bearing and support to the entire section of the pipeline placed on bedding material. The trench zone should be backfilled as presented in Appendix C 1.8, *Trench Zone Backfill*.

Structural design of pipes requires proper evaluation of all possible loads acting on the pipe, including dead and live or transient loads. The stresses and strains induced in a buried pipe depending on many factors, including the type of pipe (i.e., either rigid or flexible), depth and width of trench, bedding and embedment conditions, soil density,



angle of internal friction, coefficient of passive earth pressure, and coefficient of friction at the interface between the backfill and native soils.

The recommended values of the various native soil parameters for the pipe design are provided below:

- ◆ Average dry soil unit weight $\Psi_d = 100$ pcf
- ◆ Average moist soil unit weight $\Psi_m = 128$
pcf
- ◆ Average submerged soil unit weight $\Psi_b = 63$
pcf
- ◆ Angle of internal friction of soils $\phi = 30^\circ$
- ◆ Soil cohesion $c = 100$ psf
- ◆ Coefficient of friction between backfill and native soils $f_s = 0.35$
- ◆ Coefficient of friction between pipe and pipe bedding material (dry) $f_s = 0.30$
- ◆ Coefficient of friction between pipe and pipe bedding material (saturated) $f_s = 0.19$
- ◆ Coefficient of active earth pressure $K_a = 0.31$
- ◆ Coefficient of passive earth pressure $K_p = 3.25$
- ◆ Modulus of Soil Reaction (for native soils compacted to min 90% relative density) $E' = 1000$ psi
- ◆ Modulus of Soil Reaction (for compacted aggregate base) $E' = 3000$ psi

10.7 Temporary Sloped Excavations

The following recommendations are provided for use by the Engineer during the design of the project. This information is not for use by the Contractor for estimating his bid and for the design and construction of shoring.

Based on the materials encountered in the exploratory borings, temporary excavations may be supported by shoring or constructed according to the slope ratios presented in Table No. 4, *Slope Ratios for Temporary Excavation*. Temporary cuts encountering loose fill or loose dry sand, excavated near existing structures may require shoring or have to be constructed at a flatter gradient than presented in the following table.

Table No. 4, Slope Ratios for Temporary Excavations

Maximum Depth of Excavation (feet)	Maximum Slope Ratio (horizontal:vertical)
0 – 4	1:1
4 – 10	1.5:1

¹ Slope ratio assumed to be uniform from top to toe of slope.



If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required. For steeper temporary construction slopes or deeper excavations, shoring should be provided by the contractor as necessary, to protect the workers in the excavation.

Surfaces exposed in slope excavations should be kept moist but not saturated to retard raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Surcharge loads, including construction materials, should not be placed within five (5) feet of the unsupported slope edge. Stockpiled soils with a height larger than six (6) feet will require greater distance from trench edges.

If the excavation occurs near existing structures, special construction considerations would be required during excavation to protect these existing structures during construction. The proposed excavation should not cause loss of bearing and/or lateral supports of the existing structures.

10.8 Shoring Design

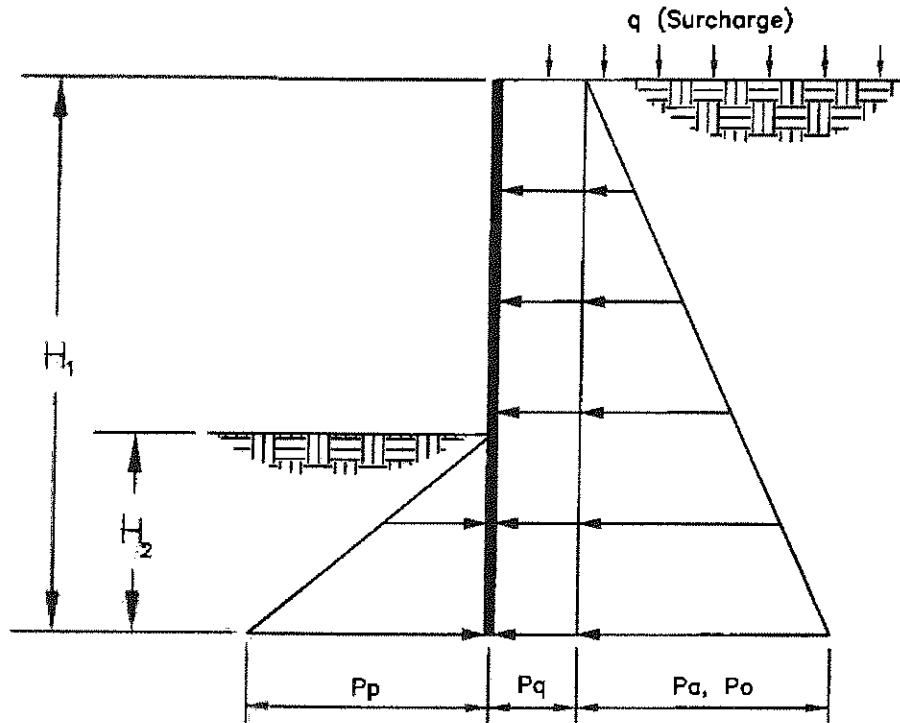
Temporary shoring will be required where open cut excavations will not be feasible and where there are space limitations for sloped excavations or because of nearby existing structures or facilities. Temporary shoring may consist of the use of a trench box (where feasible), conventional soldier piles and lagging, or interlocking sheet pile systems. The shoring for the pipe excavations may be cantilevered or may be laterally supported by walers and cross bracing. Drilled excavations for soldier piles will require the use of drilling fluids to prevent caving and to maintain an opened hole for pile installation.

Design of cantilever shoring consisting of soldier piles spaced at least two diameters on-center or sheet piles, can be performed based on Figure No. 3, *Recommended Pressures on Cantilever Retaining Wall*. For the design of cantilever shoring, an equivalent fluid pressure of 40 psf/ft of depth below grade may be used. These pressures assume a level ground surface behind the wall for a distance greater than the wall height.

Braced shoring should be designed to support a uniform rectangular lateral earth pressure of 27 psf, based on Figure No. 4, *Recommended Lateral Earth Pressure for Braced Excavation*.

In addition to the lateral earth pressure, surcharge pressures due to miscellaneous loads, such as soil stockpiles, vehicular traffic or construction equipment located adjacent to the shoring, should be included in the design of the shoring. A uniform lateral pressure of 100 psf should be included in the upper 10 feet of the shoring to account for normal vehicular and construction traffic within 10 feet of the trench





$$P = Pq + Pa$$

$$= 0.5q + 40 H_1$$

$$= 0.5q + 60 H_1$$

$$Pp = 275 H_2 \leq 2500\text{psf}$$

- (350 psf minimum if less than 350 psf)
- active earth pressure (Cantilever walls)
 - at-rest earth pressure (Restrained walls)
 - passive earth pressure (on native or compacted soils)
- $\mu = 0.35$ - allowable friction coefficient between concrete and soil

Notes:

1. All values of height (H) in feet, pressure (P) and surcharge (q) in pounds per square foot (psf).
2. Pp, Pa, and Po are the passive, active, and at-rest earth pressures, respectively; Pq is the incremental seismic earth pressure; Pa is the incremental surcharge earth pressure; and μ is the allowable friction coefficient, applied to dead normal loads acting on non-pile supported elements.
3. For restrained walls (not free to rotate), use at-rest (Po) earth pressure
4. Pp include a safety factor of 1.5.
5. Neglect the upper 1 foot for passive pressure unless the surface is confined by a pavement or slab.
6. Surcharge load only applies the upper 10 feet.
7. Earth pressures assume no hydrostatic pressures. If hydrostatic pressures are allowed to build up, the incremental earth pressures below the ground-water level should be reduced by 50 percent and added to hydrostatic pressure for total lateral pressure.
8. For traffic surcharge, assume a 100-psf uniform pressure along the top 10 feet.

RECOMMENDED LATERAL EARTH PRESSURES ON CANTILEVER SHORING

Moonridge Animal Park
 City of Big Bear
 San Bernardino County, California
 For: San Bernardino County Special Districts

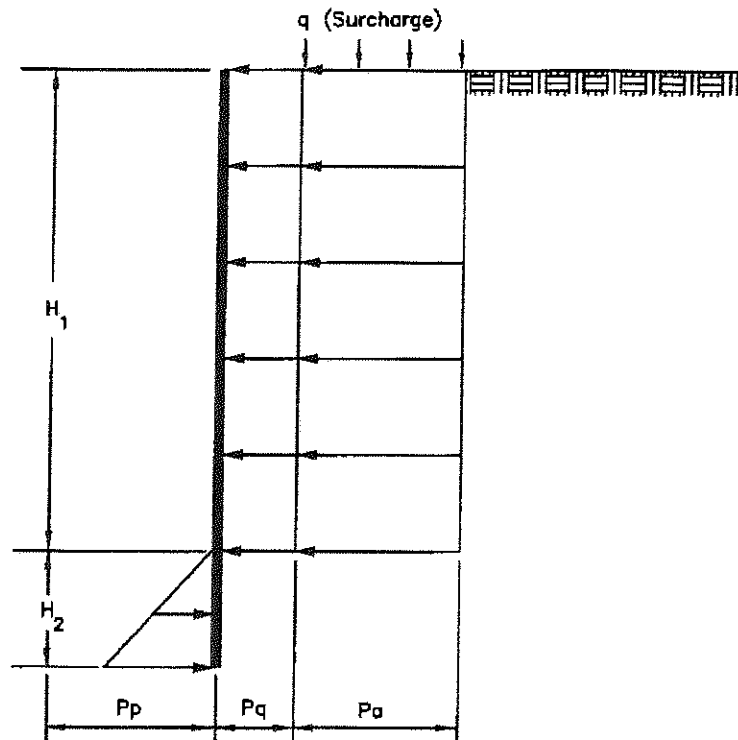
Project No.
 11-81-309-01



Converse Consultants

Figure No.
 3

TEMPORARY BRACED EXCAVATION LATERAL EARTH PRESSURE



$$P = Pq + Pa$$

$$= 0.5q + 27H_1 \text{ (350 psf minimum)} - \text{active earth pressure}$$

$$Pp = 275 H_2 \leq 2500 \text{ psf} - \text{passive earth pressure (on native or compacted soils)}$$

$$\mu = 0.35 - \text{allowable friction coefficient between concrete and soil}$$

$$\mu = 0.30 - \text{allowable friction coefficient between steel sheet pile and soil}$$

Notes:

1. All values of height (H) in feet, pressure (P) and surcharge (q) in pounds per square foot (psf).
2. Pp and Pa are the passive and active earth pressure respectively; Pq is the incremental surcharge earth pressure; and μ is the allowable friction coefficient, applied to dead normal loads acting on non-pile supported elements.
3. Earth pressures assume no hydrostatic pressures. If hydrostatic pressures are allowed to build up, the incremental earth pressures below the ground-water level should be reduced by 50 percent and added to hydrostatic pressure for total lateral pressure.
4. Pp includes a safety factor of 1.5.
5. Neglect the upper 1 foot for passive pressure unless the surface is confined by a pavement of slab.
6. For traffic surcharge, use a uniform pressure of 100 psf over the top 10 feet.

RECOMMENDED LATERAL EARTH PRESSURE FOR BRACED EXCAVATION

Moonridge Animal Park
City of Big Bear
San Bernardino County, California
For: San Bernardino County Special Districts

Project No.

11-81-309-01



Converse Consultants

Figure No.

4

excavation. As previously mentioned, all shoring should be designed and installed in accordance with state and federal safety regulations.

For the design of soldier piles spaced at least two diameters on-center, the passive resistance of the soils adjacent to the piles may be assumed to be 500 psf/ft of embedment depth. Soldier pile members placed in drilled holes should be properly backfilled with a sand/cement slurry or lean concrete in order to develop the required passive resistance. For sheet piles, a passive resistance of 275 psf/ft of embedment, up to a maximum of 2,500 psf, may be used.

The lagging between the soldier piles may consist of pressure-treated wood members or solid steel sheets. In our opinion, steel sheeting is expected to be more expedient than wood lagging to install. Although soldier piles and any bracing used should be designed for the full-anticipated earth pressures and surcharge pressures, the pressures on the lagging are less because of the effect of arching between the soldier piles. Accordingly, the lagging between the piles may be designed for a nominal pressure of up to a maximum of 300 psf.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act of 1987 and current amendments, and the Construction Safety Act should be met. The soils exposed in cuts should be observed during excavation by a competent person employed by the contractor. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

10.9 Drilled Pier Foundations for Light Poles

Light pole structures can be supported on drilled pier foundations deriving their support primarily through skin friction. The piers may be designed for compression using an allowable skin friction value of 200 psf for a minimum of 15 feet deep below the finished grade. This value may be increased by 33 percent for transient wind and seismic forces. For pier design in tension, 50 percent of the recommended allowable skin friction values in compression may be used. For design purpose, the upper two (2) feet of the soils should be neglected in determining the skin friction. The equivalent lateral earth pressure equal to 275 pounds per square foot per foot of depth may be used for the design.

10.10 Drilled Pier Foundation Installation Recommendations

It is the responsibility of the contractor to select proper construction equipment and method to correctly install the piers based on his own interpretation of the information presented in this report.



Perched groundwater was encountered in two exploratory boreholes at about 8 and 14 feet below existing ground surface. Caving may occur in loose sandy soils. Casing, or other methods approved by the project geotechnical consultant, should be used to support the sides of the pile excavation.

Casing should be used at the discretion of the contractor. Casing should be advanced as drilling proceeds by drilling with a flight or bucket auger smaller in diameter than the inside of the casing. Occasional hammering may be required to advance the casing within the excavation. The casing, when used, should not be left in place as the pile designs are based on skin friction only. Casing should be pulled as the concrete is being poured, while always maintaining a head of concrete inside the casing. The contractor should have equipment on-site with sufficient pulling capacity to pull the casing at the proper time. The casing should have outside diameter not less than the specified diameter of the pile.

The bottoms of the excavations should be cleaned of any loose cuttings before placing concrete. All applicable state and federal OSHA safety regulations must be satisfied during construction.

Drilled pile installation shall be performed under continuous observation by the project geotechnical consultant to confirm that the subsurface soils are similar to the soils encountered during our field investigation, which have formed the basis of our pile design recommendations. The contractor shall provide access and necessary facilities, including droplights, at his expense, to accommodate pile observations.

Drilled pile installation shall be performed such that compliance with all safety rules and requirements is achieved.

10.11 Pavement Design and Construction

One (1) representative sample from the proposed site was tested to evaluate the resistance (R-value) in accordance with the ASTM Standard D2844. The result is presented in Appendix B, Laboratory Testing Program. Laboratory data indicates R-value of 40. At the completion of grading, after the subgrade elevation is reached and additional evaluations are made, a final analysis must be performed. Flexible pavement structural sections were determined based on the method suggested in the Caltrans Highway Design Manual for a range of Traffic Indices (TIs) and R-values. Result of this analysis is presented in Table No. 5, *Recommended Preliminary Pavement Sections*, for different combinations of asphalt concrete and aggregate base sections. These preliminary sections are provided for planning purposes only. Final pavement structural sections should be provided by Converse based on the R-value of the actual soil conditions after grading.



Table No. 5, Recommended Preliminary Pavement Sections (R value-40)

Structural Sections		
Traffic Index (TI)	Asphalt Concrete (AC) (inches)	Aggregate Base (AB) (inches)
5	3.0	4.0
6	4.0	5.0
7	4.5	6.0

In areas to support asphalt pavement, the subgrade should be compacted to a minimum of 95 percent of the laboratory maximum density, to a depth of at least 12 inches below the final subgrade prior to paving, as recommended in Appendix C, *Earthwork Specifications*. At the time of placing pavement, the subgrade should be firm and unyielding during proof rolling, and up to two (2) percent above optimum for fine-grained soils. All base materials should be compacted to a minimum of 95 percent of the (ASTM D1557) laboratory maximum dry density.

Base material should consist of Caltrans Class 2 Aggregate Base (Caltrans Standard Specification 26-1.02B) or should conform to Section 200-2.2, "Crushed Aggregate Base," and should be placed in accordance with Section 301-2, "Untreated Base," of the SSPWC.

Asphaltic materials should conform to Section 203-1, "Paving Asphalt," of the SSPWC and should be placed in accordance with Section 302-5, "*Asphalt Concrete Pavement*," of the SSPWC.

The street pavement structures and sidewalks should be provided with adequate surface and subsurface drainage.

10.12 Site Drainage

Adequate positive drainage should be provided away from any structure to prevent ponding and to reduce percolation of water into structural backfill. A desirable slope for surface drainage is two (2) percent in landscaped areas and one (1) percent in paved areas.

Planters and landscaped areas adjacent to the building perimeter should be designed to minimize water infiltration into the subgrade soils. Gutters and downspouts should be installed on the roof, and runoff should be directed to storm drain through nonerosive devices.



11.0 PLAN REVIEW AND CONSTRUCTION INSPECTION SERVICES

This report has been prepared to aid in evaluation of the site, to prepare site-grading recommendations, and to assist the civil/structural engineer in the design. It is recommended that this office be provided the opportunity to provide final site grading and design recommendations once the final grading plan becomes available and has been reviewed.

All site grading and earthwork should be completed under the observation and testing of a qualified geotechnical consultant to verify compliance with the recommendations set forth in this report. All ground surfaces should be examined and approved by the project geotechnical consultant prior to placing any fill and/or structure. All footing excavations should be observed prior to placement of steel and concrete to see that footings are founded on satisfactory soil and that excavations are free of loose, disturbed or deleterious materials.

12.0 CLOSURE

The findings and recommendations of this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice. We make no other warranty, either expressed or implied. Our conclusions and recommendations are based on the results of the field and laboratory investigations, combined with an interpolation and extrapolation of soil conditions between and beyond boring locations. If conditions encountered during construction appear to be different from those shown by the borings, this office should be notified.

Design recommendations given in this report are based on the assumption that the earthwork and site grading recommendations contained in this report are implemented. Additional consultation may be prudent to interpret Converse's findings for contractors, or to possibly refine these recommendations based upon the review of the final site grading and actual site conditions encountered during construction. If the scope of the project changes, if project completion is to be delayed, or if the report is to be used for another purpose, this office should be consulted.



13.0 REFERENCES

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APPENDIX A
FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

Our field investigation included a site reconnaissance and a subsurface exploration program consisting of drilling soil borings. During the site reconnaissance, the surface conditions were noted and the locations of the borings were staked. The approximate boring locations were marked in a map by the County of San Bernardino Special District. These locations were staked using existing boundary features as a guide and should be considered accurate only to the degree implied by the method used.

Seven borings were planned to be drilled for this project. Three (3) borings (BH-1 through BH-3) were drilled on November 11, 2011. The drill rig broke on that day and remaining borings (BH-4 through BH-7) were drilled on November 18, 2011. Borings were drilled up to a maximum explored depth of 51.5 feet below existing ground surface (bgs).

Five borings (BH-1, BH-3, BH-4, BH-5 and BH-6) were drilled to a depth of 11.5 feet bgs. Boring BH-7 was planned to be drilled to a depth of 11.5 feet bgs. Groundwater was encountered at 8 feet bgs on BH-7. To confirm the groundwater elevation, boring BH-7 was continued to a depth of 46 feet bgs. BH-2 was drilled to a planned depth of 51.5 feet bgs.

The borings were drilled using a truck-mounted rig equipped with 8-inch diameter hollow-stem augers for soil sampling. Soils were logged by our engineer and classified in the field by visual examination in accordance with the Unified Soil Classification System (ASTM D2488). The field descriptions have been modified where appropriate to reflect the laboratory test results.

Relatively undisturbed ring samples were obtained using California Modified Samplers (2.4 inches inside diameter and 3.0 inches outside diameter). The steel sampler was driven into the bottom of the borehole with successive drops of a 140-pound driving weight falling 30 inches. Blow counts at each sample interval are presented on the boring logs. Samples were retained in brass rings (2.4-inches inside diameter and 1.0-inch in height) and carefully sealed in waterproof plastic containers for shipment to the Converse laboratory. Bulk samples of typical soil types were also obtained.

Standard Penetration Tests (SPTs) were performed in two borings (BH-2 and BH-4) starting at a depth of 20 feet bgs. A standard split-spoon sampler (1.4 inches inside diameter and 2.0 inches outside diameter) was driven into the ground with successive drops of a 140-pound hammer falling 30 inches by means of a mechanically driven pulley. The number of successive drops of the driving weight ("blows") required for



every 6-inch of penetration of the sampler for the total of 18 inches are shown on the boring logs.

It should be noted that the exact depths at which material changes occur cannot always be established accurately. Unless a more precise depth can be established by other means, changes in material conditions that occur between drive samples are indicated on the logs at the tip of the next drive sample.

The approximate locations of the exploratory borings are shown in Figure No. 2, *Approximate Boring Location Map*. For a key to soil symbols and terminology used in the boring logs, refer to Drawing No. A-1, *Unified Soil Classification and Key to Boring Log Symbols*. For logs of borings, see Drawings No. A-2 through A-8, *Logs of Borings*.



SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	
	SAND AND SANDY SOILS	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
			SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
				CH	INORGANIC CLAYS OF HIGH PLASTICITY	
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SAMPLE TYPE

- STANDARD PENETRATION TEST
Split barrel sampler in accordance with ASTM D-1586-84 Standard Test Method
- DRIVE SAMPLE 2.42" I.D. sampler (CMS).
- DRIVE SAMPLE No recovery
- BULK SAMPLE
- GROUNDWATER WHILE DRILLING
- GROUNDWATER AFTER DRILLING

BORING LOG SYMBOLS

LABORATORY TESTING ABBREVIATIONS		
TEST TYPE (Results shown in Appendix B) CLASSIFICATION Plasticity: pi Grain Size Analysis: ma Passing No. 200 Sieve: wa Sand Equivalent: se Expansion Index: ei Compaction Curve: max Hydrometer: h Disturb: Dist.	STRENGTH Pocket Penetrometer: p Direct Shear: ds Direct Shear (single point): ds* Unconfined Compression: uc Triaxial Compression: tc Vane Shear: vs Consolidation: c Collapse Test: col Resistance (R) Value: r Chemical Analysis: ca Electrical Resistivity: er Permeability: perm Soil Cement: sc	

Apparent Density	Very Loose	Loose	Medium	Dense	Very Dense
SPT (N)	< 4	4 - 11	11 - 30	31 - 60	> 60
CA Sampler	< 6	6 - 12	13 - 36	36 - 60	> 60
R-value Density (%)	< 20	20 - 40	40 - 60	60 - 80	> 80

Consistency	Very Soft	Soft	Medium	Stiff	Very Stiff	Hard
SPT (N)	< 2	2-4	5-8	9-15	16-30	> 30
CA Sampler	< 3	3-8	7-12	13-25	26-50	> 50

UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS



Converse Consultants

Moonridge Animal Park Relocation
 City of Big Bear, San Bernardino County, California
 For: San Bernardino County Special Districts

Project No.
 11-81-309-01



Drawing No.
 A-1

Log of Boring No. BH- 1

Dates Drilled: 11/11/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6904 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	<p style="text-align: center;">SUMMARY OF SUBSURFACE CONDITIONS</p> <p style="font-size: small;">This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</p>	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
5		<p>SILTY SAND (SM): fine to coarse-grained, dark brown.</p> <p style="margin-top: 20px;">- trace clay</p>			<p>5/4/5</p> <p>5/5/9</p> <p>4/10/9</p>	<p>13</p> <p>23</p> <p>27</p>	<p>108</p> <p>108</p> <p>100</p>	<p>ds, r</p> <p>col</p>
10		<p>End of boring at 11.5 feet. No groundwater encountered. Borehole backfilled loose with soil cuttings on 11/11/11.</p>			<p>5/5/5</p>			



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Project No. Drawing No.

11-81-309-01

A-2

Log of Boring No. BH- 2

Dates Drilled: 11/11/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6926 Depth to Water (ft): 14

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
5		SANDY SILT (ML): fine-grained, some organics, trace clay, dark brown.	■		6/4/4	30	86	
10		CLAYEY SAND (SC): fine to coarse-grained, few gravel up to 1/2" in largest dimension, some organics, trace silt, black.	■		2/5/6	32	95	ma, ca, er, el
15		SANDY SILT (ML): fine to medium-grained sand, trace clay, black.	■		2/3/5	32	94	
20			■		2/4/4	25	104	
25		SANDY SILT (ML): fine to medium-grained sand, trace clay, black.	■		3/5/7	26	103	
30		SANDY CLAY (CL): fine to coarse-grained sand, brownish gray.	■	⊗	2/2/4			
35			■	⊗	4/6/6	21	111	
40			■	⊗	5/8/12			



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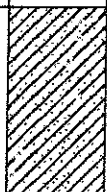


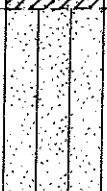


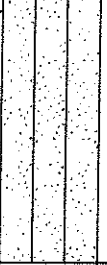




A-3a

Log of Boring No. BH- 2

Dates Drilled: 11/11/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6926 Depth to Water (ft): 14

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
40		CLAYEY SAND (SC): fine-grained, light brown.			12/28/44	25	99	
45		SILTY SAND (SM): fine to coarse-grained, trace clay, brown. - yellowish brown			10/14/24			
50					17/50-6"	15	118	
		End of boring at 51.5 feet. Perched water encountered at 14 feet. Groundwater encountered at 45 feet. Borehole backfilled with soil cuttings on 11/11/11.			24/24/42			



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A-3b

Log of Boring No. BH- 3

Dates Drilled: 11/11/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6943 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
5	[Stippled Pattern]	SILTY SAND (SM): fine to coarse-grained, few gravel up to 2" in largest dimension, brown.	[Solid Black]	[Cross-hatched]	6/11/11	25	100	col
	[Vertical Lines]	SANDY SILT (ML): fine to medium-grained sand, trace clay, light yellowish brown.	[Solid Black]	[Cross-hatched]	6/20/37	18	113	max, ma, se, ds
	[Stippled Pattern]	SILTY SAND (SM): fine to coarse-grained, trace clay, brown.	[Solid Black]	[Cross-hatched]	10/30/40	17	113	
	[Diagonal Lines]	SANDY CLAY (CL): fine to coarse-grained, light brown.	[Solid Black]	[Cross-hatched]	13/26/38	19	113	
		End of boring at 11.5 feet. No groundwater encountered. Borehole backfilled loose with soil cuttings on 11/11/11.						



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Project No. Drawing No.

11-81-309-01

A-4

Log of Boring No. BH- 4

Dates Drilled: 11/18/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6925 Depth to Water (ft): 7.4

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
5		SILTY SAND (SM): fine to coarse-grained, some organics, trace clay, dark brown.	█	█	4/5/6	20	107	
		SANDY CLAY (CL): fine to medium-grained, some organics, black.	█	█	5/4/4	24	103	
		SANDY SILT (ML): fine to coarse-grained, trace clay, few organics, gray.	█	█	3/3/4	19	117	
10		SILTY SAND (SM): fine to coarse-grained, trace clay, brown.	█	█	2/5/6	26	98	
		End of boring at 11.5 feet. Groundwater encountered at 7'-4". Borehole backfilled loose with cuttings on 11/18/11.						



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Project No. Drawing No.

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A-5

Log of Boring No. BH- 5

Dates Drilled: 11/18/2011 Logged by: JGR Checked By: HS
 Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in
 Ground Surface Elevation (ft): 6931 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS <small>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</small>	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
		<p>SILTY SAND (SM): fine to coarse-grained, some organics, dark gray.</p> <p>SANDY SILT (ML): fine to medium-grained sand, some organics, dark gray.</p> <p>SANDY CLAY (CL): fine to coarse-grained, trace organics, dark brown.</p>						
5					9/7/8	10	92	
					5/8/6	24	99	
					2/4/5	29	94	
10					3/6/6			
		<p>End of boring at 11.5 feet. No groundwater encountered. Borehole backfilled loose with soil cuttings on 11/18/11.</p>						



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Project No. **11-81-309-01** Drawing No. **A-6**

Log of Boring No. BH- 6

Dates Drilled: 11/18/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6860 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
5		<p>SILTY SAND (SM): fine to coarse-grained, some organics, few gravel up to 1-1/2" in largest dimension, black.</p> <p>SANDY SILT (ML): fine to medium-grained sand, some organics, trace clay, black.</p>	■	■	4/6/6	26	93	ds, se
			■	■	2/3/3	34	91	
			■	■	5/4/5	26	103	
			■	■	3/4/4			
10		<p>End of boring at 11.5 feet. No groundwater encountered. Borehole backfilled with soil cuttings on 11/18/11.</p>						



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Project No. Drawing No.

11-81-309-01

A-7

Log of Boring No. BH- 7

Dates Drilled: 11/18/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6891 Depth to Water (ft): 8

Depth (ft)	Graphic Log	<p style="text-align: center;">SUMMARY OF SUBSURFACE CONDITIONS</p> <p style="font-size: small;">This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</p>	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
5		<p>CLAYEY SAND (SC): fine to medium-grained, some organics, black.</p>	X		8/7/7	27	103	ma, col
10			X		10/10/19	24	99	
15			X		4/5/5	50	72	
20			X		4/5/6	22	107	
25			X		3/3/4	31	91	
20		<p>SILTY SAND (SM): fine to coarse-grained, some organics, few gravel up to 1" in largest dimension, black.</p>	X		4/8/8			
25		<p>SANDY GRAVEL (GP): fine to coarse-grained, brown.</p>	X		6/10/14	6	120	
30		<p>SANDY SILT (ML): fine to medium-grained, olive brown.</p>	X		3/8/13			



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Project No. Drawing No.

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A-8a

Log of Boring No. BH-7

Dates Drilled: 11/18/2011 Logged by: JGR Checked By: HS

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 6891 Depth to Water (ft): 8

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS <small>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</small>	SAMPLES		BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
			DRIVE	BULK				
40	[Stippled pattern]	SILTY SAND (SM): fine to coarse-grained, few fine gravel, brown.	■		50-5"	18	113	
45	[Vertical lines]	SILT (ML): fine-grained, olive brown.	X		7/10/15			
45	[Stippled pattern]	SILTY SAND (SM): fine to medium-grained, brown.	■		24/50-5"	19	110	
		Boring terminated at 46 feet. Groundwater encountered at 8 feet. Borehole backfilled with soil cuttings on 11/18/11.						



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A-8b

APPENDIX B
LABORATORY TESTING

APPENDIX B

LABORATORY TESTING PROGRAM

Tests were conducted in our laboratory on representative soil samples for the purpose of classification and evaluation of their relevant physical characteristics and engineering properties. The amount and selection of tests were based on the geotechnical requirements of the project. Test results are presented herein and on the Logs of Borings in Appendix A, *Field Exploration*. The following is a summary of the laboratory tests conducted for this project.

In Situ Moisture Content and Dry Density

Results of moisture content and dry density tests, performed on relatively undisturbed ring samples were used to aid in the classification of the soils and to provide quantitative measure of the *in situ* dry density. Data obtained from this test provides qualitative information on strength and compressibility characteristics of site soils. For test results, see the Logs of Borings in Appendix A, *Field Exploration*.

Collapse Tests

To evaluate the moisture sensitivity (collapse/swell potential) of the encountered soils, three (3) representative ring samples were loaded up to approximately two kips per square foot (ksf), allowed to stabilize under load, and then submerged. The tests were conducted in accordance with ASTM Standard D5333 laboratory procedure. The test results are presented in the following table.

Table No. B-1, Collapse Test Result

Boring No.	Depth (feet)	Overburden Pressure (ksf)	Percent Swell + Percent Collapse -
BH-1	5.0-6.5	2.0	+0.05
BH-3	2.0-3.5	2.0	+0.1
BH-7	2.0-3.5	2.0	+0.7

Sand Equivalent

Two (2) representative soil samples were tested in accordance with the ASTM D2419 test method to determine the Sand Equivalent (SE). The test results are presented in the following table.



Table No. B-2, Sand Equivalent Test Results

Boring No.	Depth (feet)	Soil Description	Sand Equivalent
BH-3	3-8	Sandy Silt (ML)	7
BH-6	5-10	Sandy Silt (ML)	10

Expansion Index Test

One (1) representative bulk sample was tested to evaluate the expansion potential of the materials encountered at the site. This test was conducted in accordance with ASTM Standard D4829. For test results, see the following table.

Table No. B-2, Expansion Index Test Result

Boring No.	Depth (feet)	Soil Description	Expansion Index	Expansion Potential
BH-2	5-10	CLAYEY SAND (SC)	24	Low

Soil Corrosivity

One (1) representative soil sample was tested to determine minimum electrical resistivity, pH, and chemical content, including soluble sulfate and chloride concentrations. The purpose of this test is to determine the corrosion potential of site soils when placed in contact with common construction materials. HDR/Schiff and Associates, in Claremont, California, performed these tests and the results are summarized in the following table.

Table No. B-3, Soil Corrosivity Test Result

Location/ Depth	Depth (feet)	pH	Chloride (ppm)	Sulfate (ppm)	Saturated Resistivity (saturated) (ohm-cm)
BH-2	5-10	7.6	5.4	53	4,200

R-value Test

One (1) representative bulk sample of the surface soil was tested for resistance value (R-value) in accordance with State of California Standard Method 301-G. This test is designed to provide a relative measure of the soil strength for use in pavement design. For test results, see the following table.



Table No. B-4, R-value Test Result

Boring No.	Depth (ft)	Soil Classification USCS	R-value
BH-1	0-5	Silty Sand (SM)	40

Sieve Analysis

To aid in classification of the soils, mechanical grain-size analyses was performed on three (3) representative samples. Testing were performed in accordance with the ASTM Standard D422 test method. For test results, see Drawing No. B-1, *Grain Size Distribution Results*.

Laboratory Maximum Density Test

Laboratory maximum density-optimum moisture content relationship tests were performed on one (1) representative bulk sample. The test was conducted in accordance with the ASTM Standard D1557 test method. For test data, including sample density and moisture content, see Drawing No. B-2, *Moisture-Density Relationship Results*. Test results are summarized in the table below.

Table No. B-5, Moisture-Density Relationship Results

Boring No.	Depth (feet)	Soil Classification	Optimum Moisture (%)	Maximum Density (lb/cu ft)
BH-3	3-8	Sandy Silt (ML)	10.7	124.0

Direct Shear Test

Three (3) direct shear tests were performed on representative samples. The tests were conducted at soaked moisture condition. For each test, three (3) samples contained in brass sampler rings was placed, one at a time, directly into the test apparatus and subjected to a range of normal loads appropriate for the anticipated conditions. Each sample was then sheared at a constant strain rate of 0.01 inch/minute. Shear deformation was recorded until a maximum of about 0.25-inch shear displacement was achieved. Peak strength was selected from the shear-stress vs. deformation data and plotted to determine the shear strength parameters. The test results are summarized in the following table and presented in Drawings No. B-3 through B-5, *Direct Shear Test Results*.



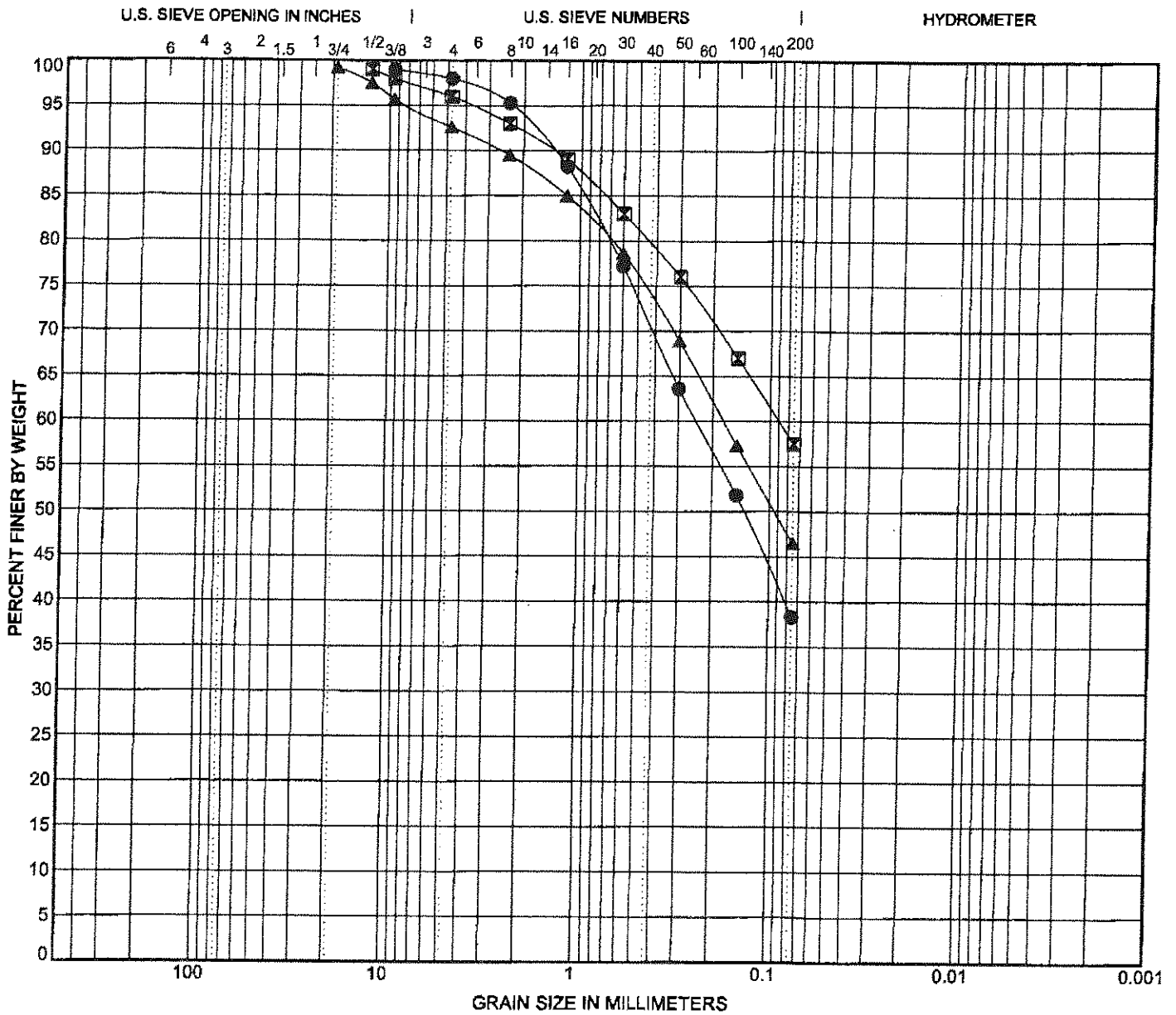
Table No. B-7 Direct Shear Test Results

Boring No.	Depth (feet)	Soil Description	Peak Strength Parameters	
			Friction Angle (degrees)	Cohesion (psf)
BH-1	2.0-3.5	Silty Sand (SM)	30	200
BH-3	5.0-6.5	Sandy Silt (ML)	30	300
BH-6	7.0-8.5	Sandy Silt (ML)	29	300

Sample Storage

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report, unless this office receives a specific request to retain the samples for a longer period.





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring No.	Depth (ft)	Description					LL	PL	PI	Cc	Cu
● BH-2	5-10	CLAYEY SAND (SC)									
☒ BH-3	3-8	SANDY SILT (ML)									
▲ BH-7	0-5	CLAYEY SAND (SC)									
Boring No.	Depth (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
● BH-2	5-10	9.5	0.242			1.0	59.7	38.3			
☒ BH-3	3-8	12.5	0.09			3.0	38.5	57.5			
▲ BH-7	0-5	19	0.175			6.6	46.1	46.5			

GRAIN SIZE DISTRIBUTION RESULTS

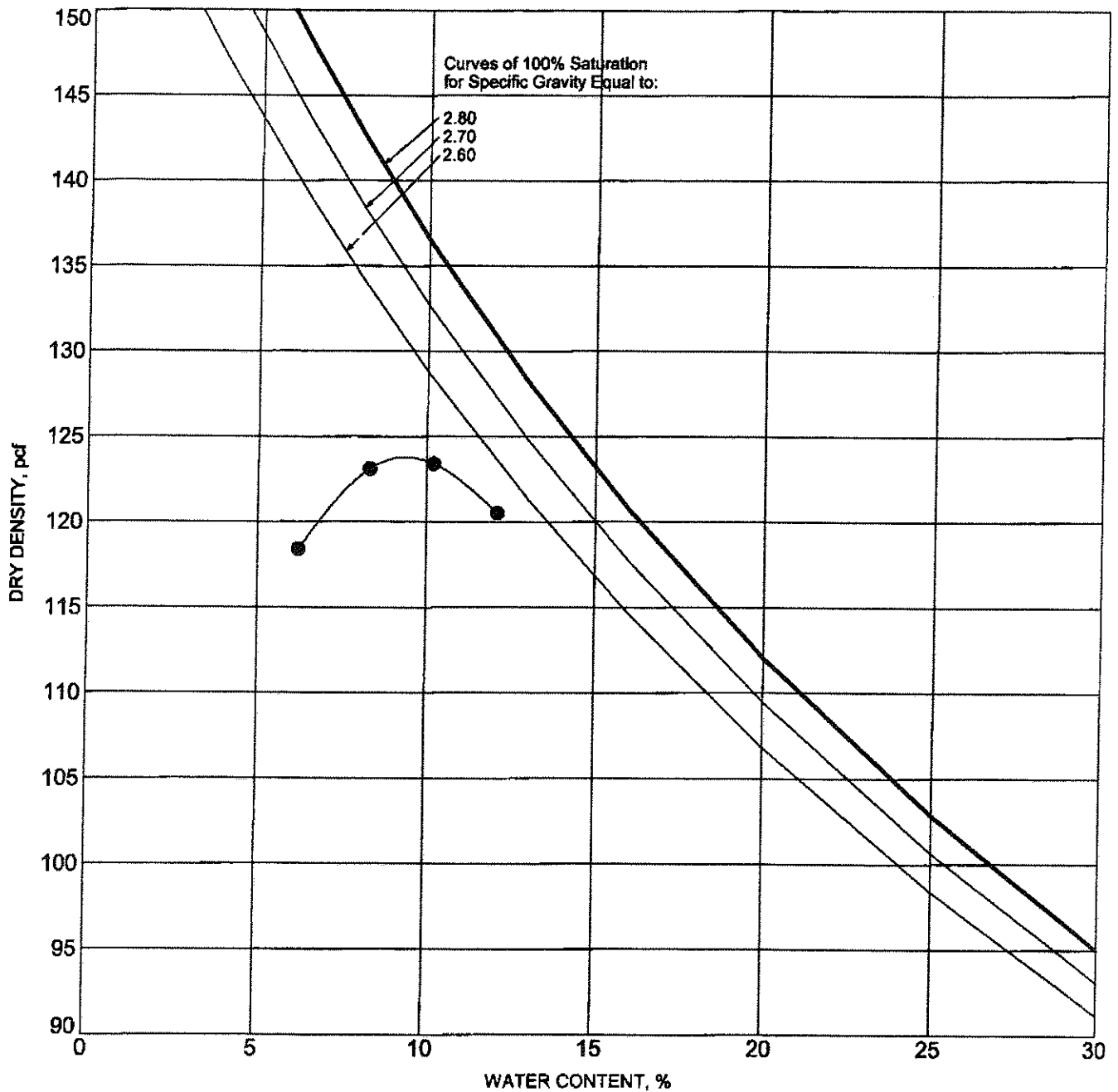


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Moonridge Animal Park Relocation
 City of Big Bear, San Bernardino County, California
 For: San Bernardino County Special Districts

Project No.
 11-81-309-01

Drawing No.
 B-1



SYMBOL	BORING NO.	DEPTH (ft)	DESCRIPTION	ASTM TEST METHOD	OPTIMUM WATER, %	MAXIMUM DRY DENSITY, pcf
●	BH-3	3-8	SANDY SILT (ML), olive brown	D1557 - B	9.3	124.5

MOISTURE-DENSITY RELATIONSHIP RESULTS

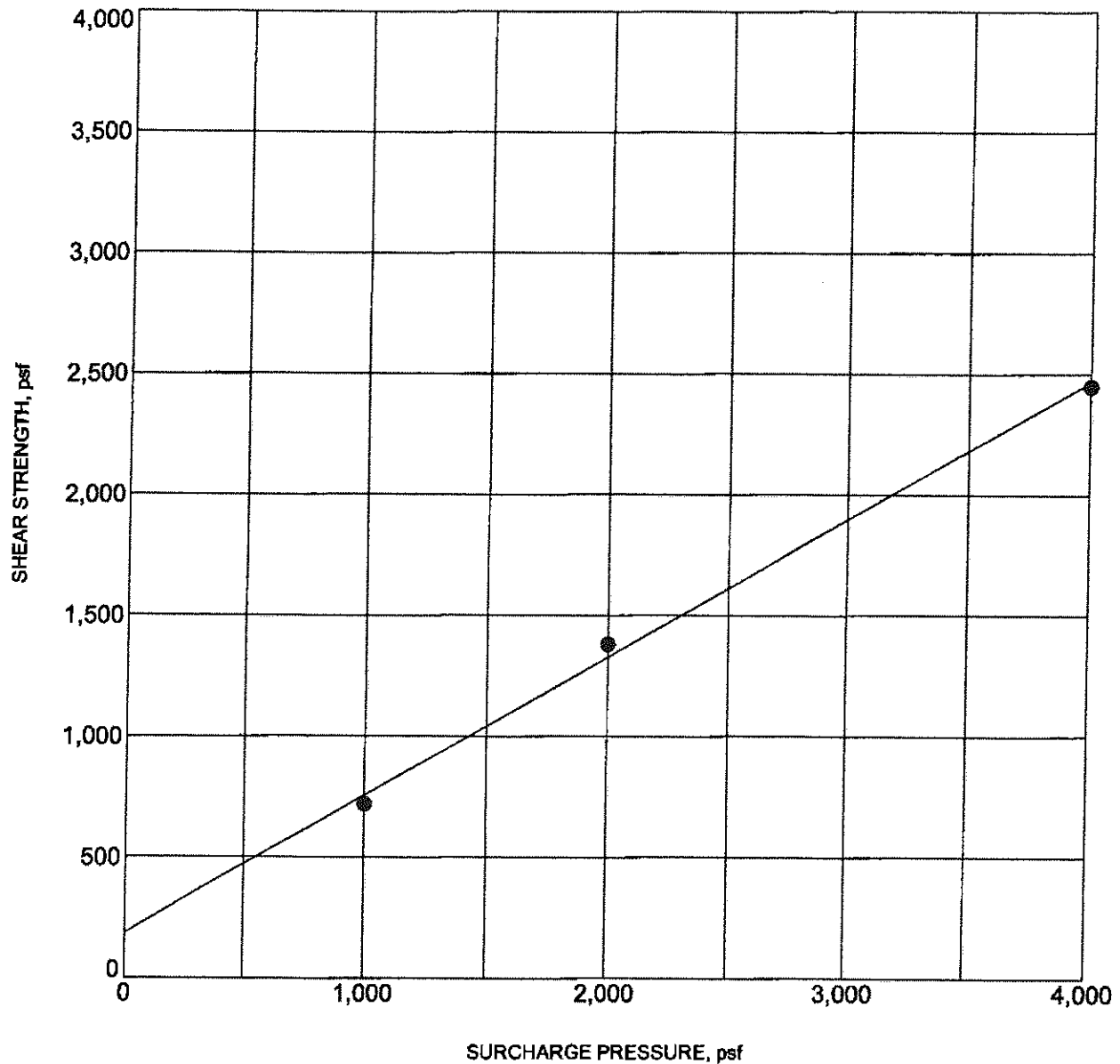


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 For: San Bernardino County Special Districts

Project No.
 11-81-309-01

Drawing No.
 B-2



BORING NO.	: BH- 1	DEPTH (ft)	: 2.0-3.5
DESCRIPTION	: SILTY SAND (SM)		
COHESION (psf)	: 200	FRICITION ANGLE (degrees)	: 30
MOISTURE CONTENT (%)	: 13.1	DRY DENSITY (pcf)	: 107.8

NOTE: Ultimate Strength.

DIRECT SHEAR TEST RESULTS

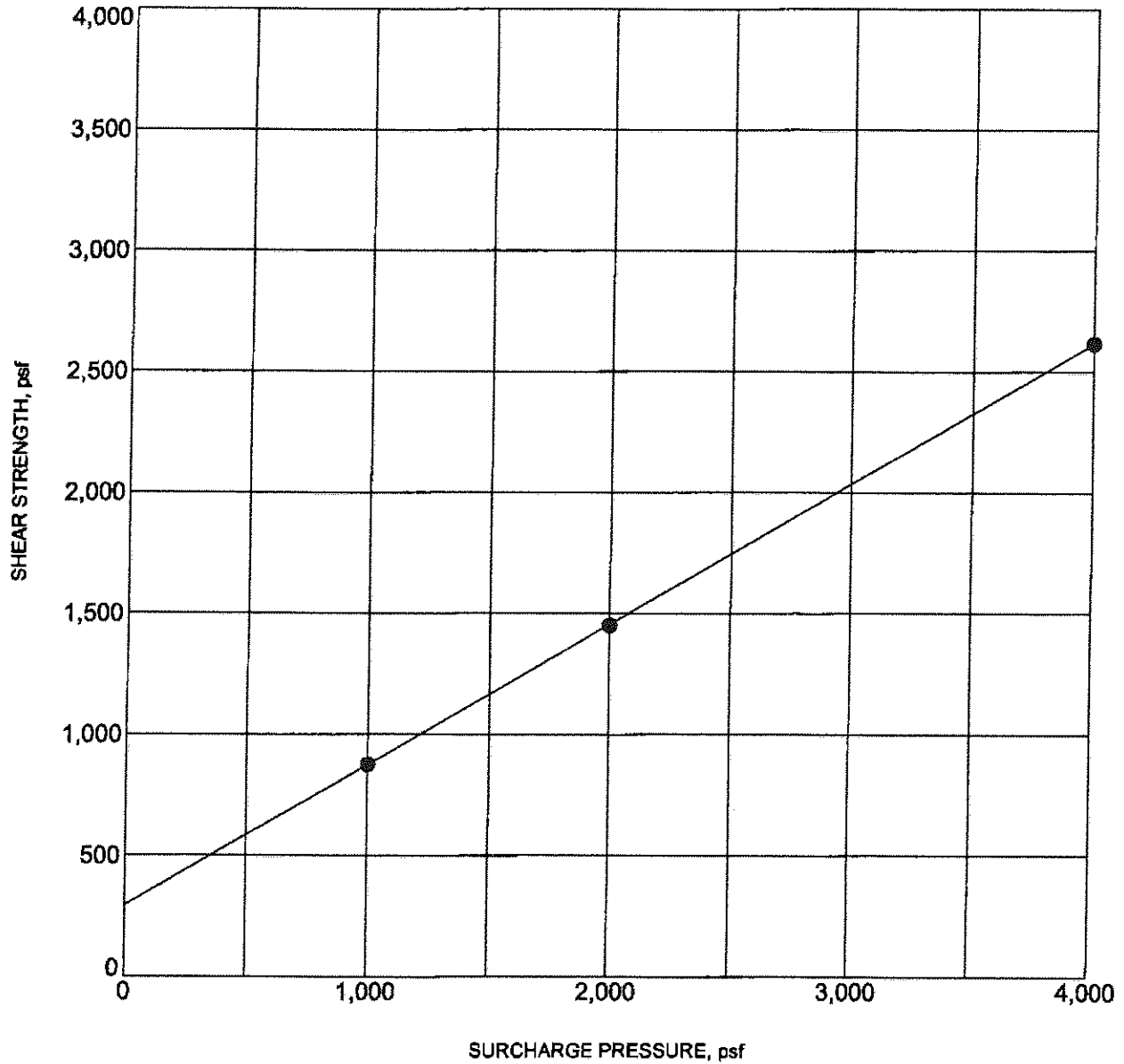


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 11-81-309-01

Drawing No.
 B-3



BORING NO. :	BH- 3	DEPTH (ft) :	5.0-6.5
DESCRIPTION :	SANDY SILT (ML)		
COHESION (psf) :	300	FRICTION ANGLE (degrees)	30
MOISTURE CONTENT (%) :	18.0	DRY DENSITY (pcf) :	113.7

NOTE: Ultimate Strength.

DIRECT SHEAR TEST RESULTS

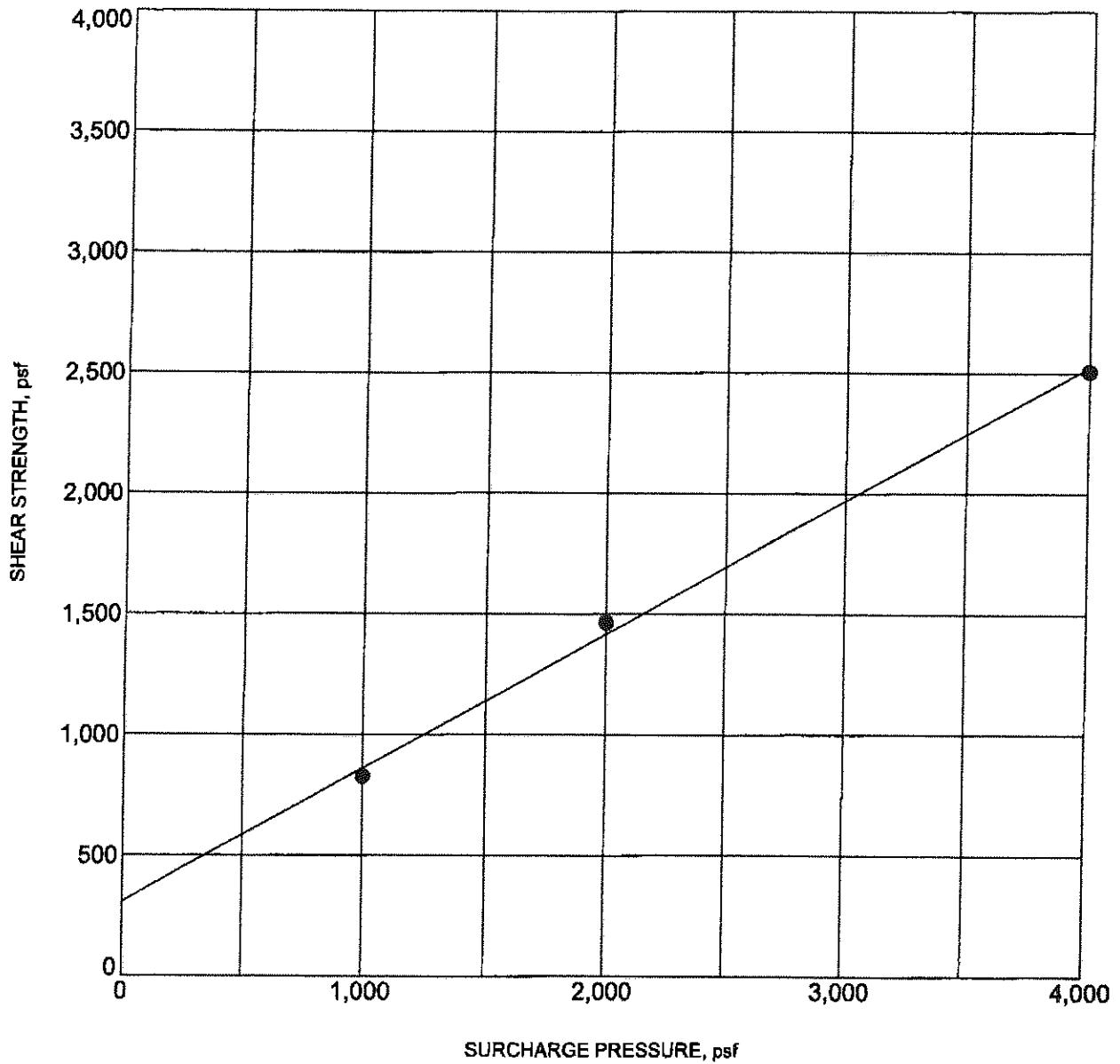


Converse Consultants

Moonridge Animal Park Relocation
 City of Big Bear, San Bernardino County, California
 For: San Bernardino County Special Districts

Project No.
 11-81-309-01

Drawing No.
 B-4



BORING NO. :	BH- 6	DEPTH (ft) :	7.0-8.5
DESCRIPTION :	SANDY SILT (ML)		
COHESION (psf) :	300	FRICTION ANGLE (degrees)	29
MOISTURE CONTENT (%) :	26.4	DRY DENSITY (pcf) :	103.0

NOTE: Ultimate Strength.

DIRECT SHEAR TEST RESULTS



Converse Consultants

Moonridge Animal Park Relocation
 City of Big Bear, San Bernardino County, California
 For: San Bernardino County Special Districts

Project No.
11-81-309-01

Drawing No.
B-5

APPENDIX C

RECOMMENDED EARTHWORK SPECIFICATIONS

APPENDIX C

EARTHWORK SPECIFICATIONS

C1.1 Scope of Work

The work includes all labor, supplies and construction equipment required to construct the Moonridge Animal Park Relocation Project in a good, workmanlike manner, as shown on the drawings and herein specified. The major items of work covered in this section include the following:

- Site Inspection
- Authority of Geotechnical Engineer
- Site Clearing
- Excavations
- Preparation of Fill Areas
- Placement and Compaction of Fill
- Observation and Testing

C1.2 Site Inspection

1. The Contractor shall carefully examine the site and make all inspections necessary, in order to determine the full extent of the work required making the completed work conform to the drawings and specifications. The Contractor shall satisfy himself as to the nature and location of the work, ground surface and the characteristics of equipment and facilities needed prior to and during prosecution of the work. The Contractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between the actual field conditions and the drawings, or between the drawings and specifications must be brought to the Owner's attention in order to clarify the exact nature of the work to be performed.
 2. This *Geotechnical Investigation Report* may be used as a reference to the surface and subsurface conditions on this project. The information presented in this above referenced report is intended for use in design and is subject to confirmation of the conditions encountered during construction. The exploration logs and related information depict subsurface conditions only at the particular time and location designated on the boring logs. Subsurface conditions at other locations may differ from conditions encountered at the exploration locations. In addition, the passage of time may result in a change in subsurface conditions at the exploration locations. Any review of this information shall not relieve the Contractor from performing such independent investigation and evaluation to
-



satisfy himself as to the nature of the surface and subsurface conditions to be encountered and the procedures to be used in performing his work.

C1.3 Authority of the Geotechnical Engineer

1. The Geotechnical Engineer will observe the placement of compacted fill and will take sufficient tests to evaluate the uniformity and degree of compaction of filled ground.
2. As the Owner's representative, the Geotechnical Engineer will (a) have the authority to cause the removal and replacement of loose, soft, disturbed and other unsatisfactory soils and uncontrolled fill; (b) have the authority to approve the preparation of native ground to receive fill material; and (c) have the authority to approve or reject soils proposed for use during grading.
3. The Civil Engineer and/or Owner will decide all questions regarding (a) the interpretation of the drawings and specifications, (b) the acceptable fulfillment of the contract on the part of the Contractor, and (c) the matters of compensation.

C1.4 Site Clearing

1. Clearing and grubbing shall consist of the removal of all existing pavement, utilities, and vegetation. Selected trees can be left protected in place.
2. Organic and inorganic materials resulting from the clearing and grubbing operations shall be hauled away from the areas to be graded.

C1.5 Backfill to Raise The Site Above Floodplain

1. After clearing and grubbing of all vegetation, the existing grade should be excavated to remove all the organics and roots. The depth of removal/scarification should be a minimum of six inches below the bottom of the roots. The excavated depth should be backfilled with material similar to onsite material after proper processing, free of organics and deleterious materials. The backfill should be recompacted to a minimum of 90 percent of laboratory maximum dry density at about two (2) percent above optimum moisture for fine-grained soils and to within \pm three (3) percent of optimum moisture for coarse-grained soils.
2. Imported fill materials to be used as backfill to raise the site grade can be similar to the native soils after proper processing and free of organic or deleterious materials. Imported fill materials should be tested for any contamination and should be environmentally clean. Processing consists of drying or mixing with dry coarse grained soils to lower the moisture content.



3. Fill should then be placed on top of the processed and compacted existing grade in loose thickness not exceeding eight inches and compacted to about 80 to 85 percent of the laboratory maximum dry density (ASTM D1557), at about two (2) percent above optimum moisture for fine-grained soils and to within \pm three (3) percent of optimum moisture for coarse-grained soils.
4. Transition slopes should be constructed at 2H:1V (horizontal :vertical) slope where the raised site slope meets the Rathbun Creek banks.
5. The site slopes should be protected with appropriate benching and/or erosion control vegetation.

C1.6 Preparation of Structure/Street Subgrade

1. For buildings and structures founded on shallow footings, the compacted fill for raised grade should be overexcavated to a depth at least 24 inches below the bottom of the footing elevation. The excavation should also extend two feet horizontally outside the structure footprint.
2. In areas to receive asphalt concrete or portland cement concrete paving, including sidewalks, curbs and gutters, and other flatwork, the upper two (2) feet of existing soils below the subgrade elevation should be excavated. Such excavation should extend at least two (2) feet beyond the pavement edges.
3. Based on observations made during our field explorations, the surficial soils, or compacted imported soils to raise the site can be excavated with conventional earthwork equipment.

C1.7 Structural Fill Below Structures and Streets

1. Compacted fill placed for the support of parking lot, building structures, slabs-on-grade, and driveways will be considered structural fill. Structural fill may consist of approved on-site soils or imported fill that meets the criteria indicated below.
2. Fill consisting of selected on-site earth materials after proper processing, or imported soils approved by the Geotechnical Engineer shall be placed in layers on approved earth materials. Soils used as compacted structural fill shall have the following characteristics:
 - a. All structural fill shall not exceed three (3) inches in nominal size, and shall be free of organic matter and miscellaneous inorganic debris and inert rubble.
 - b. Structural fill materials should primarily be well graded coarse grained material with fines (percent passing # 200) about 10-30 percent.



- c. Structural fill materials shall have an Expansion Index (EI) less than 30.
 - d. Structural fill materials shall have less than 0.1 percent sulfate salts, if possible. If laboratory test results indicate import fill materials contain more than 0.1 percent sulfate salts, a concrete mix should be designed to resist the sulfate levels indicated by the laboratory test results.
3. Structural fill shall be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified below. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer.
 4. All structural fill placed, except mentioned elsewhere in this report, shall be compacted to at least 90 percent of the laboratory maximum dry density as determined by ASTM Standard D1557 test method. Granular soils shall be moisture conditioned to within \pm three (3) percent, and fine-grained soils to at least two (2) percent above, of optimum moisture content.
 5. At least the upper 12 inches of subgrade soils underneath any exterior slabs, driveways, interior streets or parking areas should be compacted to a minimum of 95 percent of the laboratory maximum dry density as per ASTM Standard D1557 test method. All base and subbase, if any, for pavement structures should be compacted to at least 95 percent of the laboratory maximum dry density as per ASTM Standard D1557 test method.
 6. Representative samples of materials being used as structural fill will be analyzed in the laboratory by the Geotechnical Engineer to obtain information on their physical properties. Maximum laboratory density of each soil type used in the fill will be determined by the ASTM Standard D1557 compaction method.
 7. On-site soils have high moisture contents. Moisture conditioning/drying will be necessary prior to the on-site material being placed as structural fill. The amount of processing required for proper moisture conditioning at the site will depend on the variations in the in-situ moisture conditions, the equipment and the processing method.
 8. Fill materials shall not be placed, spread or compacted during unfavorable weather conditions. When site grading is interrupted by heavy rain, filling operations shall not resume until the Geotechnical Engineer approves the moisture and density conditions of the previously placed fill.
 9. It shall be the Grading Contractor's obligation to take all measures deemed necessary during grading to provide erosion control devices in order to protect slope areas and adjacent properties from storm damage and flood hazard originating on this project. It shall be the contractor's responsibility to maintain slopes in their as-graded form until all slopes are in satisfactory compliance with



job specifications, all berms have been properly constructed, and all associated drainage devices meet the requirements of the Civil Engineer.

C 1.8 Trench Zone Backfill

The trench zone is defined as the portion of the trench above the pipe bedding extending up to the final grade level of the trench surface.

Excavated on-site soils free of deleterious matter may be used to backfill the trench zone. Imported trench backfill, if used, should be approved by the project soils consultant prior to delivery at the site.

The following recommendations are provided as a guide for the field quality control of the trench backfill. Additional consultation may be required during construction.

- ◆ Trench excavations to receive backfill should be free of trash, debris or other unsatisfactory materials at the time of backfill placement.
- ◆ Trench zone backfill shall be compacted to at least 90 percent of the laboratory maximum dry density as per ASTM Standard D1557 test method. At least the upper one (1) foot of trench backfill underlying pavement should be compacted to at least 95 percent of the laboratory maximum dry density as per ASTM Standard D1557 test method.
- ◆ Particles larger than one (1) inch should not be placed within 12 inches of the top of pipe or pavement subgrade. Rocks larger than three (3) inches in the largest dimension should not be placed as trench backfill. No more than 30 percent of the backfill volume should be larger than ¾-inch in the largest dimension. Gravel should be well mixed with finer soil.
- ◆ Trench backfill should be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers or mechanical tampers to achieve the density specified herein. The backfill materials should be brought to within three (3) percent of optimum moisture content for sandy soil, then placed in horizontal layers. The thickness of uncompacted layers should not exceed eight (8) inches. Each layer should be evenly spread, moistened or dried as necessary, and then tamped or rolled until the specified density has been achieved.
- ◆ The field density of the compacted soil should be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent.



- ◆ It should be the responsibility of the contractor to maintain safe working conditions during all phases of construction. The contractor should select the equipment and processes to be used to achieve the specified density without damage to adjacent ground, structures, utilities and completed work.
- ◆ Trench backfill should not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations should not resume until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are in compliance with project specifications.

C1.9 Observation and Testing

1. During the progress of grading, the Geotechnical Engineer will provide observation of the fill placement operations.
2. Field density tests will be made during grading to provide an opinion on the degree of compaction being obtained by the contractor. Where compaction of less than specified herein is indicated, additional compactive effort with adjustment of the moisture content shall be made as necessary until the required degree of compaction is obtained.
3. A sufficient number of field density tests will be performed to provide an opinion to the degree of compaction achieved. In general, density tests will be performed on each one-foot lift of fill, but not less than one for each 500 cubic yards of fill placed.



APPENDIX E.2
NRCS Site Soils Report



United States
Department of
Agriculture



NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for San Bernardino National Forest Area, California

Moonridge Animal Park Relocation Site



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://soils.usda.gov/sqi/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

Custom Soil Resource Report

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND






















Area of Interest (AOI)


 Area of Interest (AOI)

Soils


 Soil Map Units

Special Point Features




-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot




 Wet Spot

 Other


Special Line Features

-  Gully
-  Short Steep Slope
-  Other






Political Features

-  Cities
-  PLSS Township and Range
-  PLSS Section

Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

MAP INFORMATION

Map Scale: 1:4,300 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino National Forest Area, California
 Survey Area Data: Version 5, Sep 1, 2009

Date(s) aerial images were photographed: 8/23/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

San Bernardino National Forest Area, California (CA777)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BoD	Morical, very deep-Hecker families complex, 2 to 15 percent slopes	88.8	100.0%
Totals for Area of Interest		88.8	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Bernardino National Forest Area, California

BoD—Morical, very deep-Hecker families complex, 2 to 15 percent slopes

Map Unit Setting

Elevation: 5,000 to 7,800 feet

Mean annual precipitation: 25 to 35 inches

Mean annual air temperature: 46 to 54 degrees F

Frost-free period: 120 to 175 days

Map Unit Composition

Morical family, very deep, and similar soils: 50 percent

Hecker family and similar soils: 25 percent

Description of Morical Family, Very Deep

Setting

Landform: Terraces

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Properties and qualities

Slope: 2 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Moderate (about 7.4 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 6 inches: Gravelly loam

6 to 36 inches: Gravelly clay loam

36 to 60 inches: Gravelly sandy loam

Description of Hecker Family

Setting

Landform: Terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Riser

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Properties and qualities

Slope: 2 to 15 percent

Depth to restrictive feature: More than 80 inches

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Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Moderate (about 7.9 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 6 inches: Gravelly fine sandy loam

6 to 50 inches: Very gravelly sandy clay loam, very gravelly fine sandy loam

50 to 60 inches: Extremely gravelly sandy loam, extremely gravelly loam

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the "[National Soil Survey Handbook](#)."

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

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Very low: 0 to 3

Low: 3 to 6

Moderate: 6 to 9

High: 9 to 12

Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology) from the preceding or following layer; a plane of deposition. It commonly marks a change

in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age,

the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of

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streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown.

Custom Soil Resource Report

The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasesers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasesers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

- Very low:* Less than 0.2
- Low:* 0.2 to 0.4
- Moderately low:* 0.4 to 0.75
- Moderate:* 0.75 to 1.25
- Moderately high:* 1.25 to 1.75
- High:* 1.75 to 2.5
- Very high:* More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent

Low: 0.5 to 1.0 percent

Moderately low: 1.0 to 2.0 percent

Moderate: 2.0 to 4.0 percent

High: 4.0 to 8.0 percent

Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5

Extremely acid: 3.5 to 4.4

Very strongly acid: 4.5 to 5.0

Strongly acid: 5.1 to 5.5

Moderately acid: 5.6 to 6.0

Slightly acid: 6.1 to 6.5

Neutral: 6.6 to 7.3

Slightly alkaline: 7.4 to 7.8

Moderately alkaline: 7.9 to 8.4

Strongly alkaline: 8.5 to 9.0

Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they

form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
 - A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
 - B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
 - C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
 - A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
 - B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletalans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “Rock outcrop” is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which “severely eroded,” “very severely eroded,” or “gullied” is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds

and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1

Moderate: 13-30:1

Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Custom Soil Resource Report

Very coarse sand: 2.0 to 1.0

Coarse sand: 1.0 to 0.5

Medium sand: 0.5 to 0.25

Fine sand: 0.25 to 0.10

Very fine sand: 0.10 to 0.05

Silt: 0.05 to 0.002

Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents

the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated

Prismatic: Vertically elongated and having flat tops

Columnar: Vertically elongated and having rounded tops

Angular blocky: Having faces that intersect at sharp angles (planes)

Subangular blocky: Having subrounded and planar faces (no sharp angles)

Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand

Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variiegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

APPENDIX F.1
Phase 1 Environmental Site Assessment

**PHASE I
ENVIRONMENTAL SITE ASSESSMENT
FOR PROPERTY LOCATED
AT SOUTHEAST CORNER OF
CLUB VIEW DRIVE AND MOONRIDGE ROAD
BIG BEAR LAKE, CALIFORNIA**

Prepared For:

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Appendix E	San Bernardino County, Fire Department Correspondence

1.0 INTRODUCTION

This Environmental Site Assessment (ESA) is prepared for the review of three parcels on approximately 10.4 acres, located at the southeast corner of the intersection of Club View Drive and Moonridge Road, in the City of Big Bear Lake, California. Refer to Figures 1, 2 and 3 for a Regional Location Map, Vicinity Map, and Parcel Map, respectively. Parcels 2328-472-01 and 02 are vacant, however, parcel 2328-472-03 has a vacated residence on-site. The ESA examines the existing environmental conditions in the vicinity of the subject site and surrounding land uses that may pose environmental concerns.

The purpose of this Phase I Environmental Site Assessment is to assess historical uses that may have affected the subject site specifically relating to the presence or likely presence of hazardous materials. This report includes any observed potential impacts to the site that may have altered the site's ecology, environment, functional use, or economic value. Visual observations and inquiry into public records are documented; no documents related to the placement of water pipelines, gas mains or other infrastructure were reviewed. No testing of soil, air, water or any other matter was conducted to render a technical opinion except where mentioned in this report. No structures were evaluated as part of the ESA.

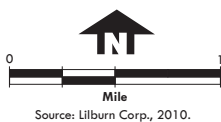
Standard Practice for Environmental Site Assessment Process (ASTM). ASTM Designation E 1527-05: This environmental assessment follows the guidelines established by the American Society for Testing and Materials Standard Practice Manual for the *Phase I Environmental Site Assessment* process.

The objective of this ESA is to evaluate the subject site for current and historical sources of environmental concerns, evidence of hazardous substance disposal or releases from or onto the subject site, evidence of environmental threats from adjacent properties, and whether further environmental testing of the site is warranted. This report meets *ASTM Standards for ESA's*.

To meet these objectives, Lilburn Corporation performed the following tasks:

- Reviewed available environmental reports.
- Reviewed historic land use records and files.
- Reviewed pertinent regulatory agency documents.
- Reviewed available current and historical aerial photographs of the site and adjacent properties.
- Performed a reconnaissance of adjacent and immediately surrounding properties.
- Performed an on-site reconnaissance of the property.
- Prepared this report.

Results of this Environmental Site Assessment for the site located in the City of Big Bear Lake, California are presented in the following Sections 2.0 – 7.0.



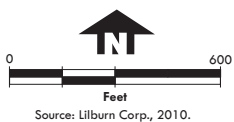
Source: Lilburn Corp., 2010.

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Regional Location

Moonridge Zoo - Phase 1 Site Review
Big Bear Lake, California

Figure 1



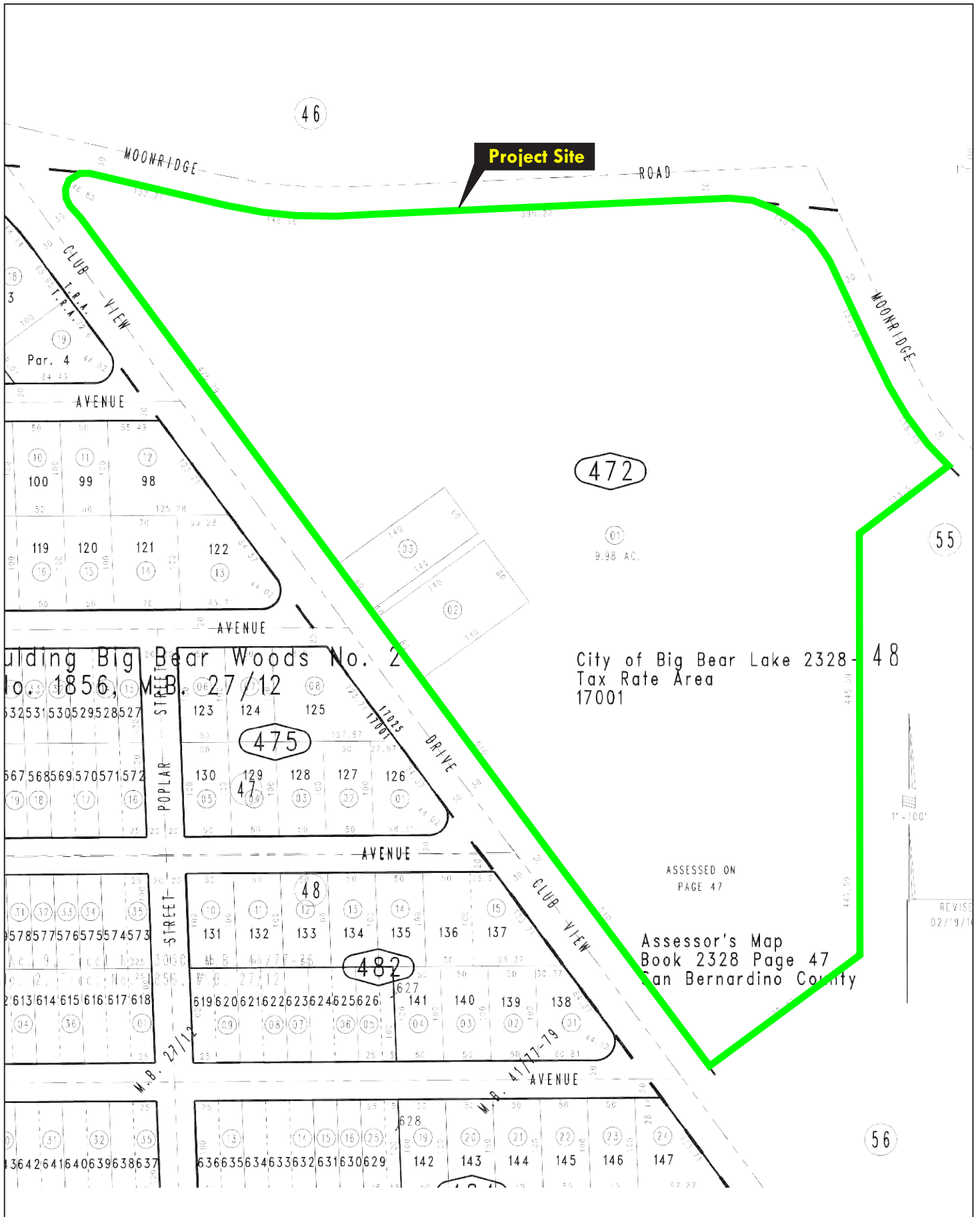
Source: Lilburn Corp., 2010.

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Site Vicinity

Moonridge Zoo - Phase 1 Site Review
Big Bear Lake, California

Figure 2



Assessor's Parcel Map

Moonridge Zoo - Phase 1 Site Review
Big Bear Lake, California

2.0 SITE LOCATION

The subject site herein referred to as “site, subject site” or "property" is being evaluated at the request of County of San Bernardino, Special District Department. The property consists of three parcels totaling approximately 10.4 acres located at the southeast corner of the intersection of Club View Drive and Moonridge Road, in the City of Big Bear Lake.

The geographical location of the site is as follows:

Elevation: 6,905 feet above sea level

Latitude: 34° 14' 20''

Longitude: 116° 52' 3''

Assessor's Parcel Numbers:

2328-472-01, 02, and 03

The subject site boundaries are within the USGS Topographic Map: Moon Ridge U.S.G.S. 7.5 minute quadrangle, T1N, R1E, Section 22.

2.1 DESCRIPTION OF SURROUNDING AREA

The property is predominately surrounded by residential land uses. Existing surrounding land uses consist of residential land uses to the north, east, and west. Gold Mine Golf Course is to the south. Two parcels of the subject site are vacant and one contains a vacated residence (2328-472-03) located adjacent to Club View Drive.

2.2 REVIEW OF HISTORIC PHOTOGRAPHS

Aerial photographs available show the subject site and surrounding land uses for the following years: 1938, 1953, 1969, 1972, 1989, 1994, and 2005. The aerial photographs were taken at different altitudes, causing a scale variation between the different photographs and years. The subject site is marked on each photograph to show an approximate location. Copies of the aerial photographs are included in Appendix A.

The following is a summary of the photograph observations for the corresponding years when the photographs were taken. The observations describe the land uses on-site and in the vicinity.

- The 1938 aerial photograph shows the subject site and vicinity as undeveloped land. Dirt roads are evident east and west of the site.
- The 1953 aerial photograph shows no significant changes from the 1938 aerial photograph. The subject site is unchanged.
- The 1969 aerial photograph shows no significant changes from the 1953 aerial photograph. However, scattered development is evident west of the site. The project site is unchanged.

- The 1972 aerial photograph shows significant changes from the 1969 aerial photograph. Properties throughout the vicinity have been developed with structures. Development of Moonridge Road and Club View Drive are evident. The subject site is unchanged.
- The 1989 aerial photograph shows no significant changes from the 1972 aerial photograph. The subject site is unchanged.
- The 1994 aerial photograph shows no significant changes from the 1989 aerial photograph. The structure on parcel 2328-472-03 has been developed. Increased development is evident throughout the vicinity. The subject site is unchanged.
- The 2005 aerial photograph shows no significant changes from the 1994 aerial photograph. The site is unchanged.

2.3 HISTORIC UNITED STATES GEOLOGICAL SURVEY (USGS) MAPS

Available historic and current USGS maps that include the subject site and surrounding area were reviewed for the years 1901, 1902, 1932, 1954, 1970, 1978, 1988, 1994 and 1996. Copies of the maps are included in Appendix B. The subject site is located on the Moon Ridge USGS Quadrangle. A summary of the review of the maps are discussed herein.

- The 1901 USGS map of the area shows the entire region as primarily undeveloped land.
- The 1902 USGS map of the area shows no significant change. The site is unchanged.
- The 1932 USGS map of the area shows no significant changes compared to the 1902 map. The site is unchanged.
- The 1954 USGS map of the area shows significant changes compared to the 1932 map. Development is evident throughout the vicinity. Moonridge Road and Club View Drive appear to have been developed. The site is unchanged.
- The 1970 USGS map of the area shows no significant changes compared to the 1954 map. Continued development is evident throughout the vicinity. The site is unchanged.
- The 1978 USGS map of the area shows no significant changes compared to the 1970 map. Continued development is evident throughout the vicinity. The site is unchanged.
- The 1988 USGS map of the area shows no significant changes compared to the 1978 map. Continued development is evident throughout the vicinity. The site is unchanged.
- The 1994 USGS map of the area shows no significant changes compared to the 1988 map. The site is unchanged.
- The 1996 USGS map of the area shows no significant changes compared to the 1994 map. The site is unchanged.

None of the USGS maps reviewed show any infrastructure development (railroad tracks, utility easements, or bridges) on the subject property.

3.0 SITE VISIT

Summary: The project site includes three parcels on approximately 10.4 acres, 2328-472-01, -02, and -03. A vacated residence is located on parcel 2328-472-03. The parcel was delineated with household trash and construction material. A 55-gallon drum filled with unknown contents was discovered on the western portion of the parcel. A capped off pipe was discovered adjacent to or on parcel 2328-472-02. It appears to be a septic tank cleanout. Parcel 2328-472-01 was clear. Refer to photographs in Appendix C which depict the site.

3.1 PROPERTY EVALUATION

On-Site Observations

Mr. Frank Amendola of Lilburn Corporation conducted a site survey/property evaluation on April 30, 2010. Access to the subject site was unrestricted along Club View Drive and Moonridge Road. The subject site consisted of three parcels on approximately 10.4 acres. Parcel 2328-472-01 was clear and no discoloration of soils was evident and no remnants of underground storage tanks were observed during the visual site inspection. No remnants of foundation were visible. No discoloration of soils was evident and no remnants of underground storage tanks were observed during the visual site inspection.

An abandon residence located adjacent to the subject property along Club View Drive had a 55-gallon drum filled with unknown contents (Parcel #2328-472-03). General trash and construction dumping delineated the western portion of the residence spilling onto the adjacent project site parcels. A capped off pipe was discovered near the property boundary between parcels -02 and -03. It appears to be a septic tank cleanout. However, its location in relation to the subject parcels lot lines could not be verified. Refer to photographs in Appendix C which depict the site and adjacent uses.

A detailed description of surrounding land uses follows.

Surrounding Land Uses

North Land Uses

Land uses to the north of the subject property include Moonridge Road and single-family residences.

South Land Uses

Land uses to the south of the subject property included Gold Mine Golf Course and single-family residences.

West Land Uses

Land uses to the west of the subject property include Club View Drive and single-family residences.

East Land Uses

Land uses to the east of the subject property include Moonridge Road and single-family residences.

3.2 INTERVIEWS WITH PREVIOUS LAND OWNERS

Lilburn Corporation was unable to contact any prior owners of the property.

4.0 GEOLOGY AND HYDROGEOLOGY

Summary: According to the Environmental Data Resources, Inc (EDR) report included as Appendix D, the project site is within the 100-year flood plain. Rathbun Creek flows through the middle of the site.

4.1 GEOLOGY

Topography

The topographic conditions of the subject site vary from an elevation of approximately 6,890 feet above mean sea level (amsl) in the west to approximately 7,216 feet amsl in the east. The general area slopes to the northeast.

Fault Systems

According to the City of Big Bear Lake General Plan Final Environmental Impact Report (FEIR), the project site is not located within a known fault system. However, according to Exhibit III-4 of the General Plan FEIR, the site is susceptible to the effects of liquefaction. The closest mapped fault is the Helendale Fault, which lies approximately eight (8) miles north of the project site.

Earthquakes, due to their ground acceleration and shifting, can cause major damage to buildings and create dangerous hazards to people through injury or death. Development projects in the seismically active southern California region must mitigate these potential hazards through strict adherence to the California Building Code (CBC) and recommendations by geotechnical engineers.

4.2 REGIONAL HYDROLOGY AND GROUNDWATER

According to the Environmental Data Resources, Inc (EDR) report included as Appendix D, the project site is within the 100-year flood plain. Rathbun Creek flows through the middle of the site. Groundwater flows to the northwest.

5.0 LOCAL AGENCY REVIEW

Summary: The County of San Bernardino, Office of Fire Marshal, Hazardous Material Division was contacted on April 30, 2010 and a request for information relating to the subject site was submitted. On May 14, 2010 the agency confirmed that no records exist for the subject site.

Various local (City and County) agencies maintain databases or records which are useful for evaluating the history of a property, and which may provide indications pertaining to the past uses of the property and any potential environmental concerns. For the purposes of this ESA, available records reviewed are presented below.

- San Bernardino County Fire Department
- Property Chain of Title Conveyance Documents-San Bernardino County Recorder's Office

County San Bernardino, Office of Fire Marshal, Hazardous Material Division

The County of San Bernardino, Office of Fire Marshal, Hazardous Material Division was contacted on April 30, 2010 and a request for information relating to the subject site was submitted. On May 14, 2010 the agency confirmed that no records exist for the subject site.

Property Chain of Title Conveyance

After a review of the Chain of Title and aerial photographs, no environmental concerns were identified. Refer to Table 1 for the property's deed chain dating back to 1979.

**Table 1
Chain of Title**

2328-472-01			
Name	Owner Status	Relationship	Recording Date
ATK DEVELOPMENT LLC	Present Owner	SOLE OWNER	2007/07/10
ROBERT GUMBINER FOUNDATION	Past Owner	CORPORATION	2006/12/13
PLAZA LAND CORP	Past Owner	SOLE OWNER	1980/06/11
2328-472-02			
Name	Owner Status	Relationship	Recording Date
ATK DEVELOPMENT LLC	Present Owner	SOLE OWNER	2007/07/10
THE ROBERT GUMBINER FOUNDATION	Past Owner	CORPORATION	2006/12/13

GUMBINER, ROBERT REVOCABLE TRUST	Past Owner	TRUST REVOCABLE	2002/08/30
HERKINS , ROBERT A	Past Owner	JOINT TENANCY	1996/09/06
HERKINS , ERIC G	Past Owner	JOINT TENANCY	1996/09/06
BEAR MOUNTAIN LTD	Past Owner	CORPORATION	1992/10/30
BREWER , JUDY	Past Owner	COMMUNITY PROPERTY	1992/10/21
BREWER , BURLEIGH	Past Owner	COMMUNITY PROPERTY	1992/10/21
REICH , ELEANOR S TR	Past Owner	TRUST REVOCABLE	1991/08/16
REICH , HERBERT TR	Past Owner	TRUST REVOCABLE	1991/08/16
REICH , ELEANOR S	Past Owner	HUSBAND AND WIFE	1987/04/20
REICH , HERBERT	Past Owner	HUSBAND AND WIFE	1987/04/20
DOLLARHIDE , LILLIAN A	Past Owner	UNKNOWN	1979/10/26
DOLLARHIDE , JOHN E	Past Owner	UNKNOWN	1979/10/26
2328-472-03			
Name	Owner Status	Relationship	Recording Date
ATK DEVELOPMENT LLC	Present Owner	SOLE OWNER	2007/07/10
THE ROBERT GUMBINER FOUNDATION	Past Owner	CORPORATION	2006/12/13
PLAZA LAND CORP	Past Owner	SOLE OWNER	1982/12/20
EDWARDS , LINDA L	Past Owner	UNKNOWN	1979/11/30
EDWARDS , FRANK C	Past Owner	UNKNOWN	1979/11/30

Source: County of San Bernardino Assessor

6.0 REGULATORY REVIEW

Summary: A review of Federal and State environmental databases revealed no environmental concerns or issues, which would be considered “an impairment” to the subject site. A copy of the EDR report is included in Appendix D.

The State of California and various federal government agencies investigate and/or track numerous environmental concerns on a regional basis. For the purposes of this ESA, the following agency records were reviewed for a one-mile radius of the property site.

FEDERAL RECORDS

NPL: National Priority List

Source: EPA

Telephone: N/A

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA’s Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Proposed NPL: Proposed National Priority List Sites

Source: EPA

Telephone: N/A

This database includes site proposed for listing in the NPL database.

DELISTED NPL: National Priority List Deletions

Source: EPA

Telephone: N/A

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establish the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

NPL LIENS: Federal Superfund Liens

Source: EPA

Telephone: 205-564-4267

Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

Source: EPA

Telephone: 703-412-9810

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by States, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS includes sites that are either proposed for or on the National Priorities List (NPL), and sites that are in the screening and assessment phase for possible inclusion on the NPL.

CERCLIS - NFRAP: No Further Remedial Action Planned

Source: EPA

Telephone: 703-412-9810

As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, States, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

LIENS 2: CERCLA Lien Information

Source: EPA

Telephone: 202-564-6023

Database provides information as the identity of sites and properties that have used Superfund funds.

CORRACTS: Corrective Action Report

Source: EPA

Telephone: 800-424-9346

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

RCRA: Resource Conservation and Recovery Act Information

Source: EPA

Telephone: 415-495-8895

RCRA Info is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg

and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kg of hazardous waste, or over 1kg of actual hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

US ENG CONTROLS: Engineering Controls Sites List

Source: Environmental Protection Agency

Telephone: 703-603-8905

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

US INST CONTROL: Sites with Institutional Controls

Source: Environmental Protection Agency

Telephone: 703-603-8905

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

ERNS: Emergency Response Notification System

Source: EPA/NTIS

Telephone: 202-267-2180

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

HMIRS: Hazardous Materials Information Reporting System

Source: U.S. Department of Transportation

Telephone: 202-366-4555

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

DOT OPS: Incident and Accident Data

Source: Department of Transportation, Office of Pipeline Safety

Telephone: 202-366-4595

Pipeline safety and incident report database.

CDL: Clandestine Drug Labs

Source: Department of Toxic Substances Control

Telephone: 916-255-6504

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

US BROWNFIELDS: A Listing of Brownfields Sites

Source: Environmental Protection Agency

Telephone: 202-566-2777

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

DOD: Department of Defense Sites

Source: USGS

Telephone: 703-692-8801

This data sets consists of federally owned or administered lands, administered by the Department of Defense, that have any equal to or greater than 640 acre of the United States, Puerto Rico, and the U.S. Virgin islands.

FUDS: Formerly Used Defense Sites

Source: U.S. Army Corps of Engineers

Telephone: 202-528-4285

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

LUCIS: Land Use Control Information System

Source: Department of the Navy

Telephone: 843-820-7326

Database contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

CONSENT: Superfund (CERCLA) Consent Decrees

Source: EPA Regional Offices

Telephone: Varies

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters. Date of Government Version.

ROD: Records of Decision

Source: NTIS

Telephone: 703-416-0223

Record of Decision. ROD documents mandate a permanent remedy at a NPL (Superfund) site containing technical and health information to aid in the cleanup.

UMTRA: Uranium Mill Tailings sites

Source: Department of Energy

Telephone: 505-845-0011

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized. In 1978, 24 inactive uranium mill tailings sites in Oregon, Idaho, Wyoming, Utah, Colorado, New Mexico, Texas, North Dakota, South Dakota, Pennsylvania, and on Navajo and Hopi tribal lands, were targeted for cleanup by the Department of Energy.

ODI: Open Dump Inventory

Source: Environmental Protection Agency

Telephone: 800-424-9346

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

Source: EPA

Telephone: 415-972-3336

A listing of illegal dump sites located on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

MINES: Mines Master Index File

Source: Department of Labor, Mine Safety and Health Administration

Telephone: 303-231-5959

TRIS: Toxic Chemical Release Inventory System

Source: EPA

Telephone: 202-566-0250

Toxic Release Inventory System. TRIS identifies facilities that release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

TSCA: Toxic Substances Control Act

Source: EPA

Telephone: 202-260-5521

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

FTTS: FIFRA/TSCA Tracking System – FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act)/TSCA(Toxic Substance Control Act)

Source: EPA

Telephone: 202-566-1667

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

FTTS INSP: FIFRA/TSCA Tracking System – FIFRA(Federal Insecticide, Fungicide, and Rodenticide Act)/TSCA(Toxic Substance Control Act)

Source: EPA

Telephone: 202-564-1667

HIST FTTS: FIFRA/TSCA Tracking System Administration Case Listing

Source: EPA

Telephone: 202-564-2501

Database tracks establishments that generate pesticide use within the course of the calendar year.

SSTS: Section & Tracking System

Source: EPA

Telephone: 202-564-4203

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

ICIS: Integrated Compliance Information System

Source: EPA

Telephone: 202-564-5088

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

PADS: PCB Activity Database System

Source: EPA

Telephone: 202-566-0500

PCB Activity Database. PADS Identifies generators, transporters, commercial stores and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

MLTS: Material Licensing Tracking System

Source: Nuclear Regulatory Commission

Telephone: 301-415-7169

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements.

RADINFO: Radiation Information Database

Source: EPA

Telephone; 202-343-9775

Contains information about facilities that are regulated by U.S. EPA regulations for radiation and radioactivity.

FINDS: Facility Index System/Facility Identification Initiative Program Summary Report

Source: EPA

Telephone: 415-947-8000

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

RAATS: RCRA Administrative Action Tracking System

Source: EPA

Telephone: 202-564-4104

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA retains a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

BRS: Biennial Reporting System

Source: EPA/NTIS

Telephone: 800-424-9346

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

STATE AND LOCAL RECORDS:

HIST CAL-SITES: Calsites Database

Source: Department of Toxic Substance Control

Telephone: 916-323-3400

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

CA BOND EXP. PLAN: Bond Expenditure Plan

Source: Department of Health Services

Telephone: 916-255-2118

Department of Health Services

SCH: School Property Evaluation Program

Source: Department of Toxic Substance Control

Telephone: 916-323-3400

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the Cal Sites category depending on the level of threat to public health and safety or the environment they pose.

TOXIC PITS: Toxic Pits Cleanup Act Sites

Source: State Water Resources Control Board

Telephone: 916-227-4364

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

SWF/LF (SWIS): Solid Waste Information System

Source: Integrated Waste Management Board

Telephone: 916-341-6320

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 2004 criteria for solid waste landfills or disposal sites.

WMUDS/SWAT: Waste Management Unit Database

Source: State Water Resources Control Board

Telephone: 916-227-4448

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

CA WDS: Waste Discharge system

Source: State Water resources Control Board

Telephone: 916-341-5227

Sites that have been issued waste discharge requirements.

CORTESE: “Cortese” Hazardous Waste & Substance Sites List

Source: CAL EPA/Office of Emergency Information

Telephone: 916-323-3400

The sites for the list are designated by the State Water Resources Control Board (LUST), the Integrated Waste Management Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

SWRCY: Recycler Database

Source: Department of Conservation

Telephone: 916-323-3836

A listing of recycling facilities in California.

LUST: Geotracker’s Leaking Underground Fuel Tank Report

Source: State Water Resources Control Board

Telephone: Per Region

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

CA FID UST: Facility Inventory Database

Source: California Environmental Protection Agency

Telephone: 916-341-5851

The facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resources Control Board.

SLIC: Statewide SLIC Cases

Source: State Water Resources Control Board

Telephone: 886-480-1028

The Spills, Leaks, Investigations, and Cleanups (SLIC) listings includes unauthorized discharges from spills and leaks, other than from underground storage tanks or other regulated sites.

UST: Active UST Facilities

Source: State Water Resources Control Board

Telephone: 916-480-1028

Active UST facilities gathered from the local regulatory agencies.

UST MENDOCINO: Mendocino County UST Database

Source: Department of Public Health

Telephone: 707-463-4466

A list of underground storage tanks in Mendocino County.

HIST UST: Hazardous Materials Storage Container Database

Source: State Water Resources control Board

Telephone: 916-341-5851

The Hazardous Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

AST: Aboveground Petroleum Storage Tank Facilities

Source: State Water Resources Control Board

Telephone: 916-341-5712

Registered Aboveground Storage Tanks.

LIENS: Environmental Liens Listing

Source: Department of Toxic Substances Control

Telephone: 916-323-3400

A listing of property locations with environmental liens for California where DTSC is a lien holder.

SWEEPS UST: SWEEPS UST Listing

Source: State Water Resources Control Board

Telephone: N/A

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1980s? The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

CHMIRS: California Hazardous Material Incident Report System

Source: Office of Emergency Services

Telephone: 916-845-8400

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

NOTIFY 65: Proposition 65 Records

Source: State Water Resources Control Board

Telephone: 916-445-3846

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

DEED: List of Deed Restrictions

Source: Department of Toxic Substance Control

Telephone: 916-323-3400

The use of recorded land use restrictions is one of the methods the DTSC uses to protect the public from unsafe exposures to hazardous substances and wastes.

VCP: Voluntary Cleanup Program Properties

Source: Department of Toxic Substances Control

Telephone: 916-323-3400

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

DRY CLEANERS: Cleaner Facilities

Source: Department of Toxic Substance Control

Telephone: 916-327-4498

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial, garment pressing and cleaner's agents, linen supply, coin-operated laundries and cleaning, drycleaning plants, except rugs, carpet and upholstery cleaning, industrial launders, laundry and garment services.

WIP: Well Investigation Program Case List

Source: Los Angeles Water Quality Control Board

Telephone: 213-576-6726

Well investigation program case in the San Gabriel and San Fernando Valley area.

CDL: Clandestine Drug Labs

Source: Drug enforcement Administration

Telephone: 202-307-1000

Database provides a listing of clandestine drug lab locations.

RESPONSE: State Response Sites

Source: Department of Toxic Substances Control

Telephone: 916-323-3400

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

HAZNET: Hazardous Waste Information System

Source: California Environmental Protection Agency

Telephone: 916-255-1136

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the Department of Toxic Substance Control (DTSC). The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

EMI: Emissions Inventory Data

Source: California Air Resources Board

Telephone: 916-322-2990

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

HAULERS: Registered Waste Tire Haulers Listing

Source: Integrated Waste Management Board

Telephone: 916-341-6422

A listing of registered waste tire haulers.

ENVIROSTOR: EnviroStor Database

Source: Department of Toxic Substances Control

Telephone: 916-323-3400

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

TRIBAL REORDS

INDIAN RESERV: Indian Reservations

Source: USGS

Telephone: 202-208-3710

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

INDIAN LUST: Leaking Underground Storage Tanks on Indian Land

Source: Environmental Protection Agency

Telephone: 617-918-1313

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

INDIAN UST: Underground Storage Tanks on Indian Land

Source: EPA Region 9

Telephone: 415-972-3368

HISTORICAL AND OTHER DATABASE(S)

Depending on the geographic area covered by the EDR Report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included.

Other Databases

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from

this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

EDR Historical Auto Stations: EDR Proprietary Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR’s review was limited to those categories of sources that might, in EDR’s opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

EDR Historical Cleaners: EDR Proprietary Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR’s review was limited to those categories of sources that might, in EDR’s opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

6.1 DATABASES WITH NO MAPPED SITES

No mapped sites were found or no records were available for either the site or surrounding area (within a one-mile radius of the site) for the databases shown in Table 2.

**Table 2
Databases with No Mapped Sites**

NPL	INDIAN RESERV	CA BOND EXP. PLAN
Proposed NPL	INDIAN ODI	SCH
Delisted NPL	INDIAN LUST	SWF/LF
NPL LIENS	INDIAN UST	CA WDS
CERCLIS	INDIAN VCP	WMUDS/SWAT
CERC-NFRAP	HIST Cal-Sites	SWRCY
CORRACTS	Toxic Pits	SLIC
LIENS 2	LIENS	UST
RCRA-TSDF	DEED	AST
RCRA-LQG	LDX	CHMIRS
RCRA-CESQG	MCS	Notify 65
RCRA-NONGEN	DOT OPS	VCP
US ENG Controls	San Bern.Co. Permit	DRYCLEANERS
US INST Control	HAZNET	WIP
RESPONSE	EMI	CDL
ENVUIROSTOR	SCRD	HAULERS
HMIRS	DRYCLEANERS	PADS
DOD	TSCA	MLTS
US CDL	FTTS	RADINFO
US BROWNFIELDS	HIST FTTS	FINDS
LUCIS	SSTS	RAATS
CONSENT	MINES	ICIS

ROD UMTRA	TRIS ODI	DEBRIS REGION 9
--------------	-------------	-----------------

Source: EDR Report, April 29, 2010 (Appendix D).

6.2 TARGET PROPERTY SEARCH RESULTS

A review of databases containing records that may impact the site did not list any events, notifications, or identification of the site in any of the Local, State or federal databases reviewed. The agency records were reviewed for a one-mile radius of the subject site. Refer to the EDR report in Appendix D for further information on these sites.

6.3 SURROUNDING SITES SEARCH RESULTS

Orphan Sites: These are sites that cannot be mapped because of poor or inadequate information relating to the location of the site in relation to the subject site. Further information was not obtained for these sites.

Based on the information obtained from the EDR report, the majority of the sites could be eliminated as potential locations of environmental concern to the subject site. The EDR report includes the complete list of orphan sites obtained for this study area. The sites, which could not be eliminated, are provided in Table 3. Refer to the Appendix D (EDR report) for further information regarding these sites.

The following orphan sites were eliminated from Table 3 as they were either down-gradient or located more than ½ -mile from the property.

- DWP-Big Bear Lake/Moonridge
- Big Bear High
- Big Bear Elementary
- Big Bear Landfill
- Verizon-Big Bear City
- Mitsubishi Cement Co
- Hi-Grade Materials Co
- Big Bear City/Fire Station #2
- Big Bear Autobody
- Grace Valley Ranch
- Bear Valley Community Hospital
- Big Bear Aero Specialties
- Grace Valley Ranch

**Table 3
Orphan Sites**

Site Name	EDR ID
Big Bear City	1008237155
Big Bear City	1011978846
Fort Irwin Lucky Fuse Disposal	S103442535
Big Bear Boat Landing	S104533210
Unocal 76 Station #5863	S106933483
Lower Moonridge Pipeline	S109449191
Union Oil Service Station	U001574558

Source: EDR Report, April 29, 2010 (Appendix D)

7.0 CONCLUSION

Summary: No significant environmental concerns or impairments were encountered during the ESA process for the subject site.

Based on a visual inspection of the subject site and the surrounding area; an environmental records search and review of local, federal, and State databases; and in accordance with the limitations presented in this report, Lilburn Corporation presents the following conclusions/recommendations concerning the subject site:

- No evidence of underground storage tanks or other potential environmental impairments were observed during the visual inspection of the subject site.
- Local records reviewed to date have not revealed environmental concerns or issues that would be considered an immediate impairment to property development
- No geologic or hydrogeologic impairments to the subject site were encountered.
- Federal and State environmental databases revealed no environmental issues, which would be considered “an impairment” to the subject site. A copy of the EDR report is included in Appendix D.

CERTIFICATION

I, Frank Amendola, REA certify and agree that:

- (1) The inspector has no present or contemplated future interest in the site inspected.
- (2) The inspector has no personal interest in or bias with respect to the subject matter of the assessment report or the participants to the sale. This Site Assessment Report is not based in whole or in part upon the race, color, or national origin of the prospective owners or occupants of the site inspected, or upon the race, color or national origin of the present owners or occupants of the properties in the vicinity of the site inspected.
- (3) The inspector has personally inspected the site and has made an exterior inspection of all neighboring properties in the report. To the best of the inspector's knowledge and belief, all statements and information in this Site Assessment Report are true and correct, and the inspector has not knowingly withheld any significant information.
- (4) The legal description and address furnished is correct according to the information furnished to the inspector.
- (5) This Site Assessment Report was prepared in conformity with and is subject to the requirements of the Code of Professional Ethics and Standards of Professional Conduct of the environmental organizations with which the inspector is affiliated.
- (6) All conclusions and opinions concerning the subject site that are set forth in the Site Assessment Report were prepared by the inspector whose signature appears below.

Frank Amendola, REA

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. Not laboratory testing was performed in conjunction with this report. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

The purpose of an environmental assessment is to reasonably evaluate the potential for or actual impact of past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

No investigation is thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not therefore be construed as a guarantee of the absence of such materials on the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

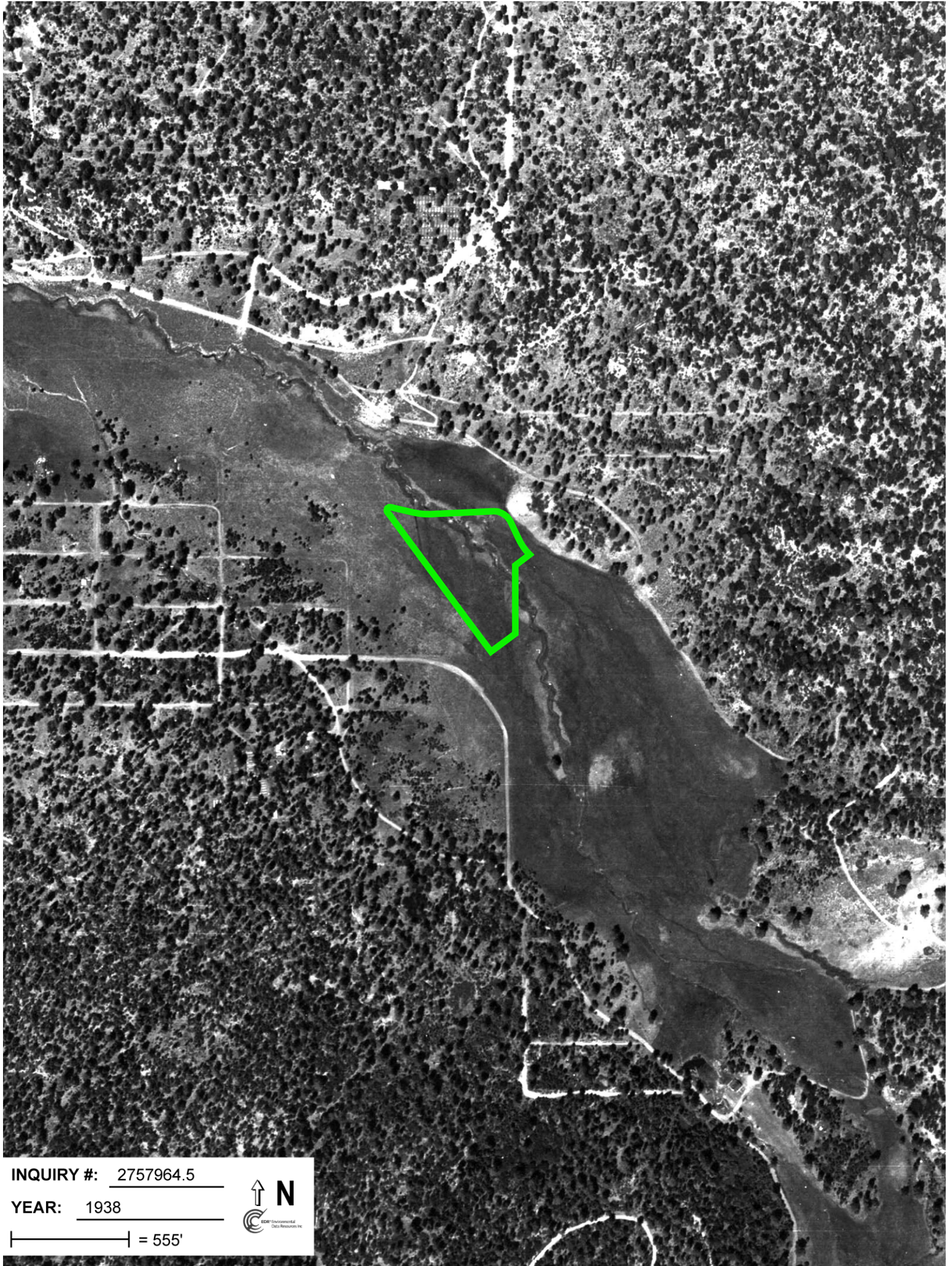
Environmental conditions may exist at the site that cannot be identified by visual observation. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

Except where there is express concern of our client, or where specific environmental contaminants have been previously reported by others, naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.

REFERENCES

- Environmental Data Resources, Inc. (EDR April 29, 2010), EDR Report No. 2757964.2s
- City of Big Bear Lake General Plan Final Environmental Impact Report (FEIR), July 1999.

APPENDIX A
AERIAL PHOTOGRAPHS

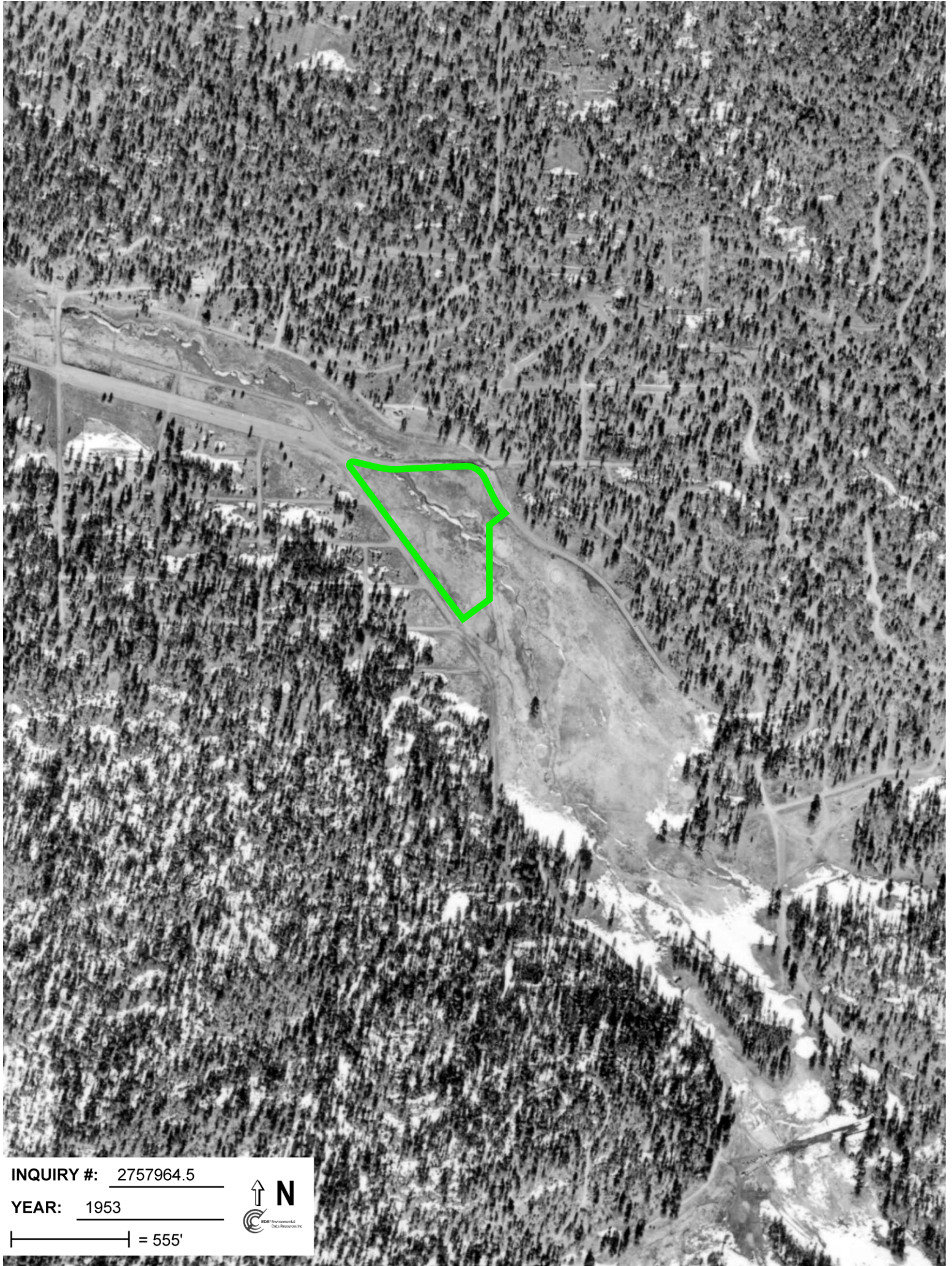


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YEAR: 1938

| = 555'





INQUIRY #: 2757964.5

YEAR: 1953

| = 555'





INQUIRY #: 2757964.5

YEAR: 1969

| = 666'





INQUIRY #: 2757964.5

YEAR: 1972

| = 440'





INQUIRY #: 2757964.5

YEAR: 1989

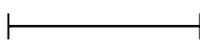
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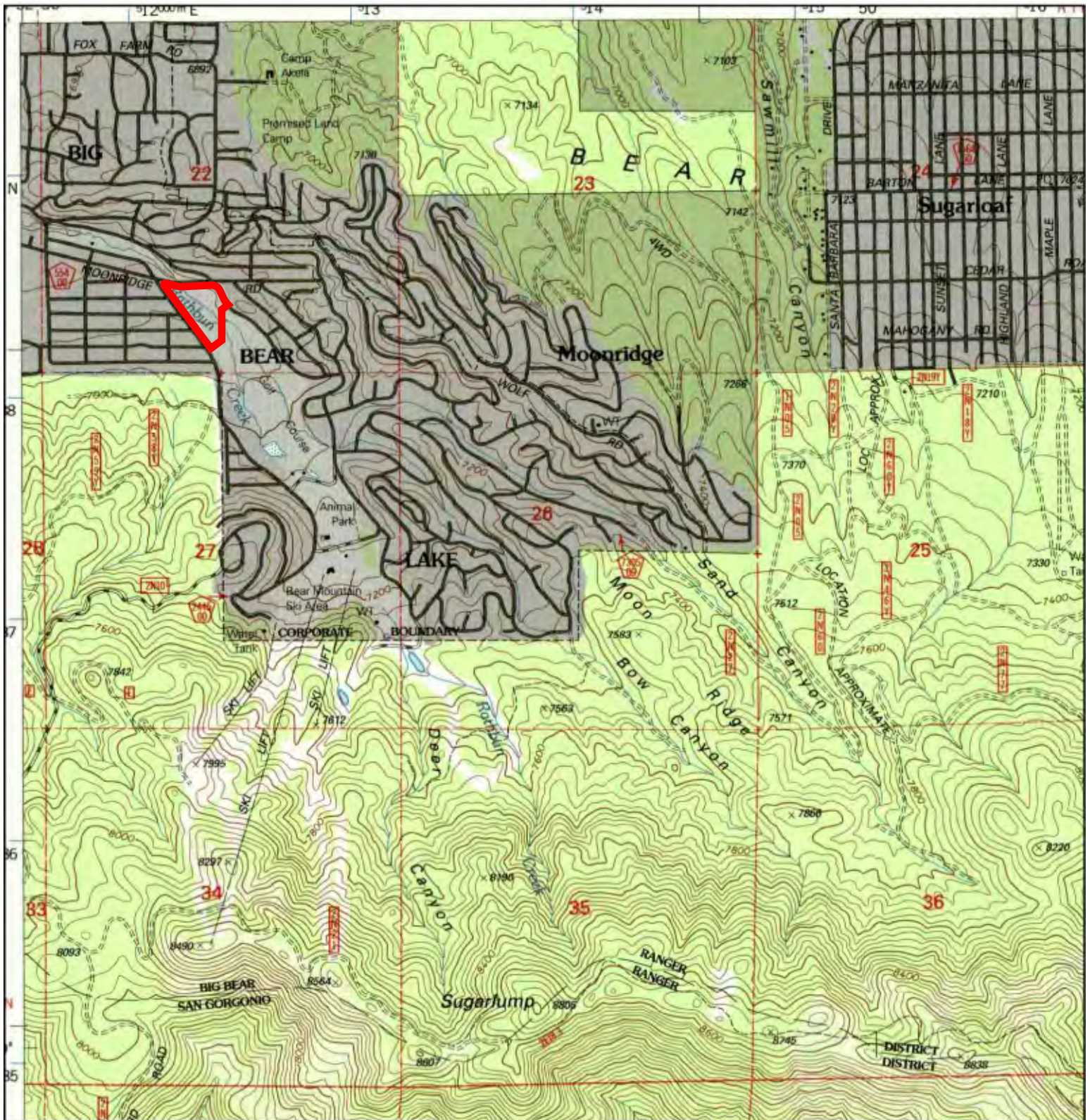
YEAR: 2005

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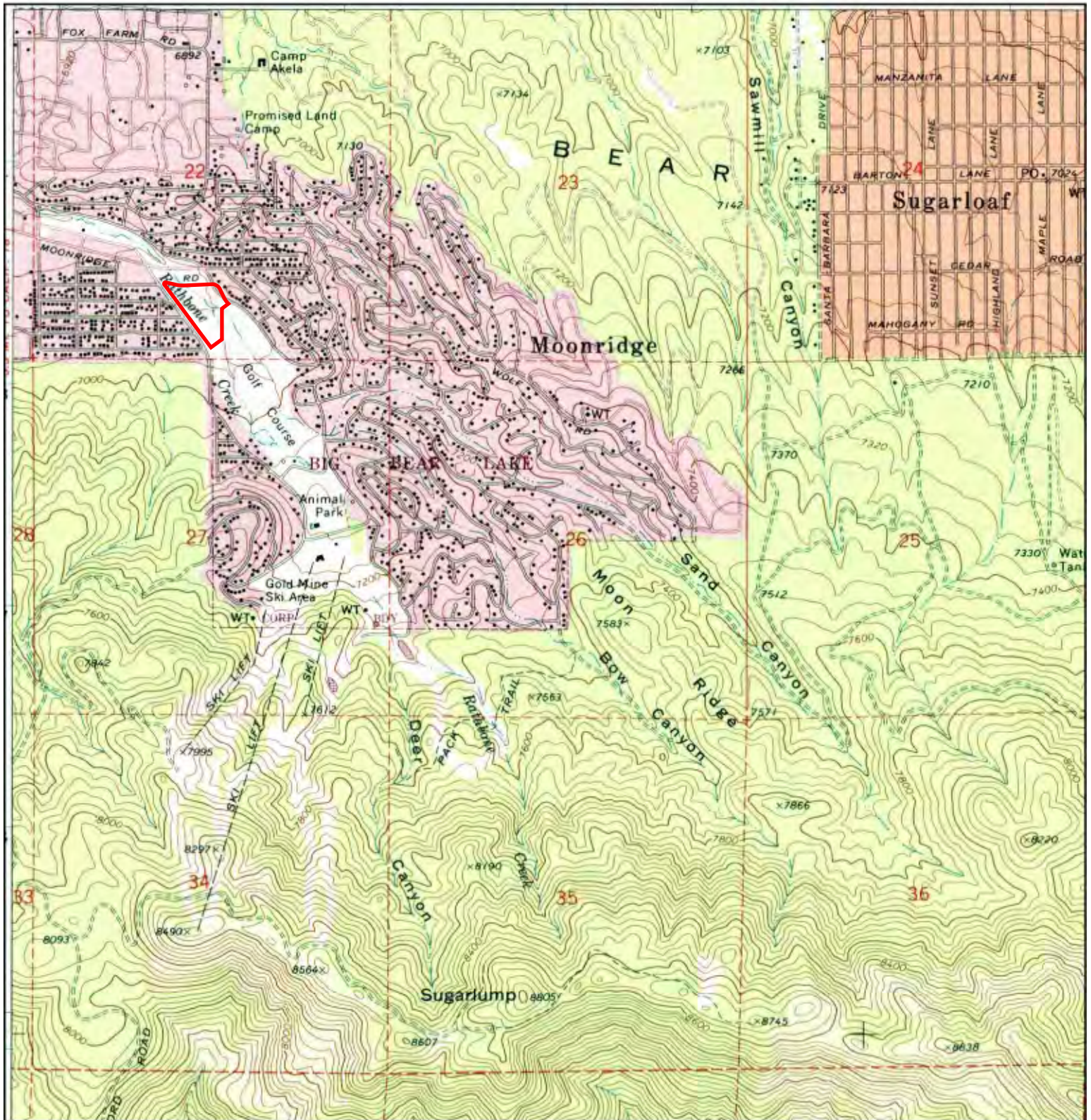
APPENDIX B
GEOLOGICAL SURVEY (USGS) MAPS

Historical Topographic Map



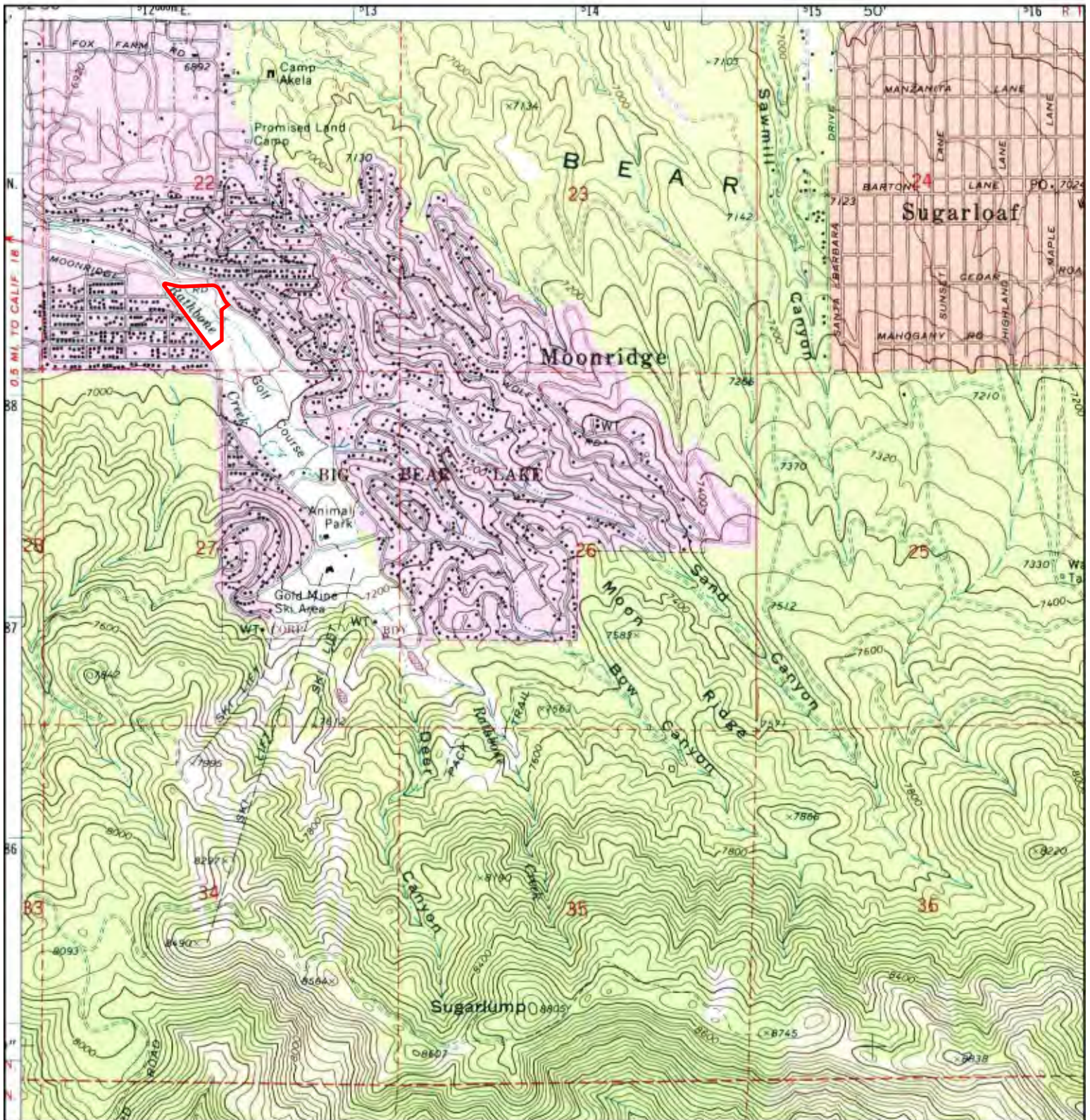
N 	TARGET QUAD NAME: MOON RIDGE MAP YEAR: 1996	SITE NAME: Big Bear Moonridge Site Review ADDRESS: 734 Club View Drive Big Bear City, CA 92314 LAT/LONG: 34.2388 / 116.8674	CLIENT: Lilburn Corporation CONTACT: Frank Amendola INQUIRY#: 2757964.4 RESEARCH DATE: 04/29/2010
	SERIES: 7.5 SCALE: 1:24000		

Historical Topographic Map



<p>N ↑</p>	TARGET QUAD	SITE NAME:	Big Bear Moonridge Site	CLIENT:	Lilburn Corporation	
	NAME: MOON RIDGE	Review	CONTACT:	Frank Amendola		
	MAP YEAR: 1994	ADDRESS:	734 Club View Drive	INQUIRY#:	2757964.4	
	REVISED FROM: 1970	Big Bear City, CA 92314	LAT/LONG:	34.2388 / 116.8674	RESEARCH DATE:	04/29/2010
	SERIES: 7.5					
	SCALE: 1:24000					

Historical Topographic Map



<p>N ↑</p>	TARGET QUAD	SITE NAME:	Big Bear Moonridge Site Review	CLIENT:	Lilburn Corporation
	NAME: MOON RIDGE	ADDRESS:	734 Club View Drive	CONTACT:	Frank Amendola
	MAP YEAR: 1988	LAT/LONG:	34.2388 / 116.8674	INQUIRY#:	2757964.4
	PHOTOREVISED FROM: 1970			RESEARCH DATE:	04/29/2010
	SERIES: 7.5				
	SCALE: 1:24000				

Historical Topographic Map



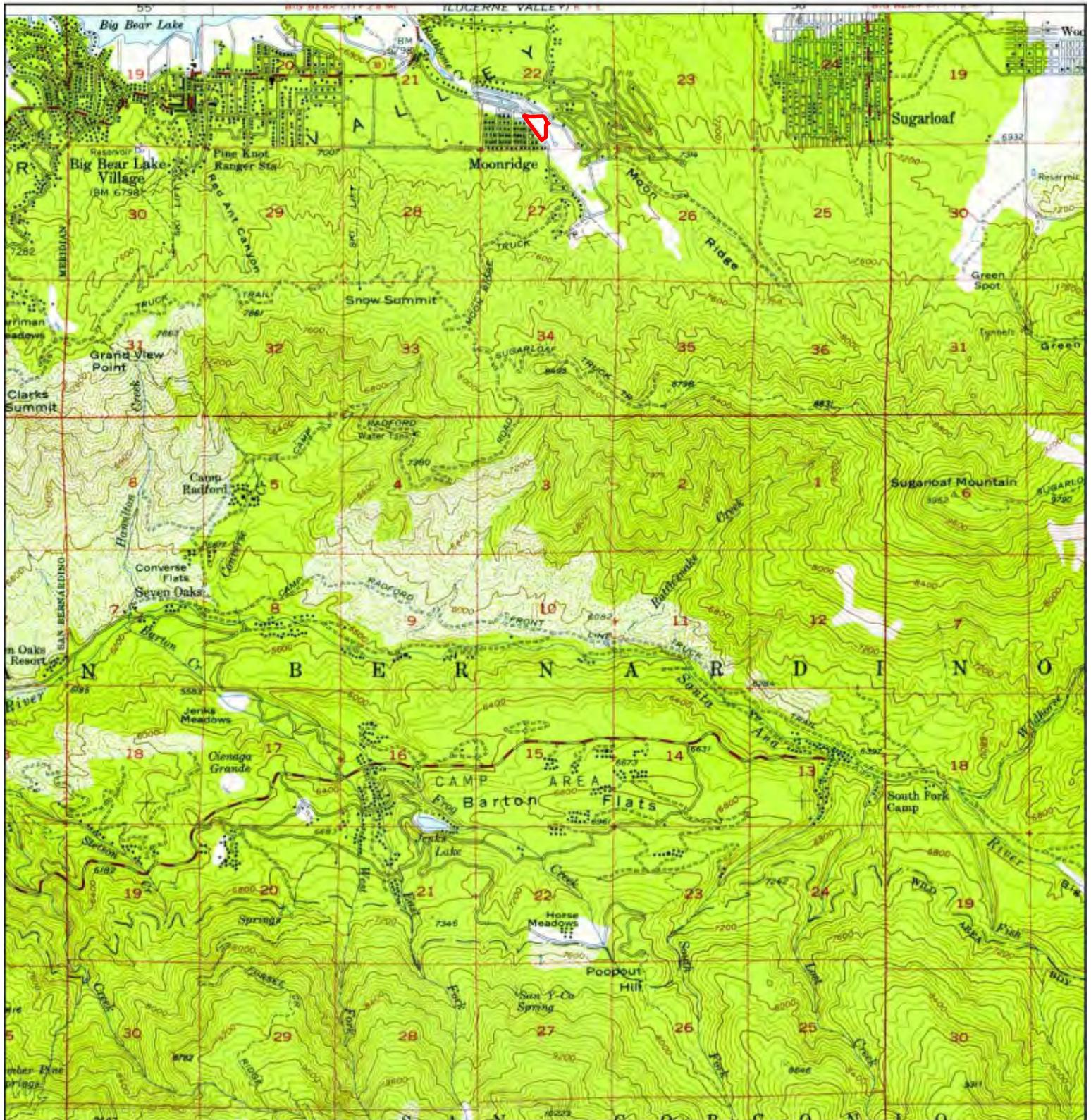
 N	TARGET QUAD	SITE NAME:	CLIENT:
	NAME: SAN GORGONIO MOUNTAIN	Big Bear Moonridge Site Review	Lilburn Corporation
	MAP YEAR: 1978	ADDRESS: 734 Club View Drive Big Bear City, CA 92314	CONTACT: Frank Amendola
	SERIES: 15	LAT/LONG: 34.2388 / 116.8674	INQUIRY#: 2757964.4
	SCALE: 1:50000		RESEARCH DATE: 04/29/2010

Historical Topographic Map



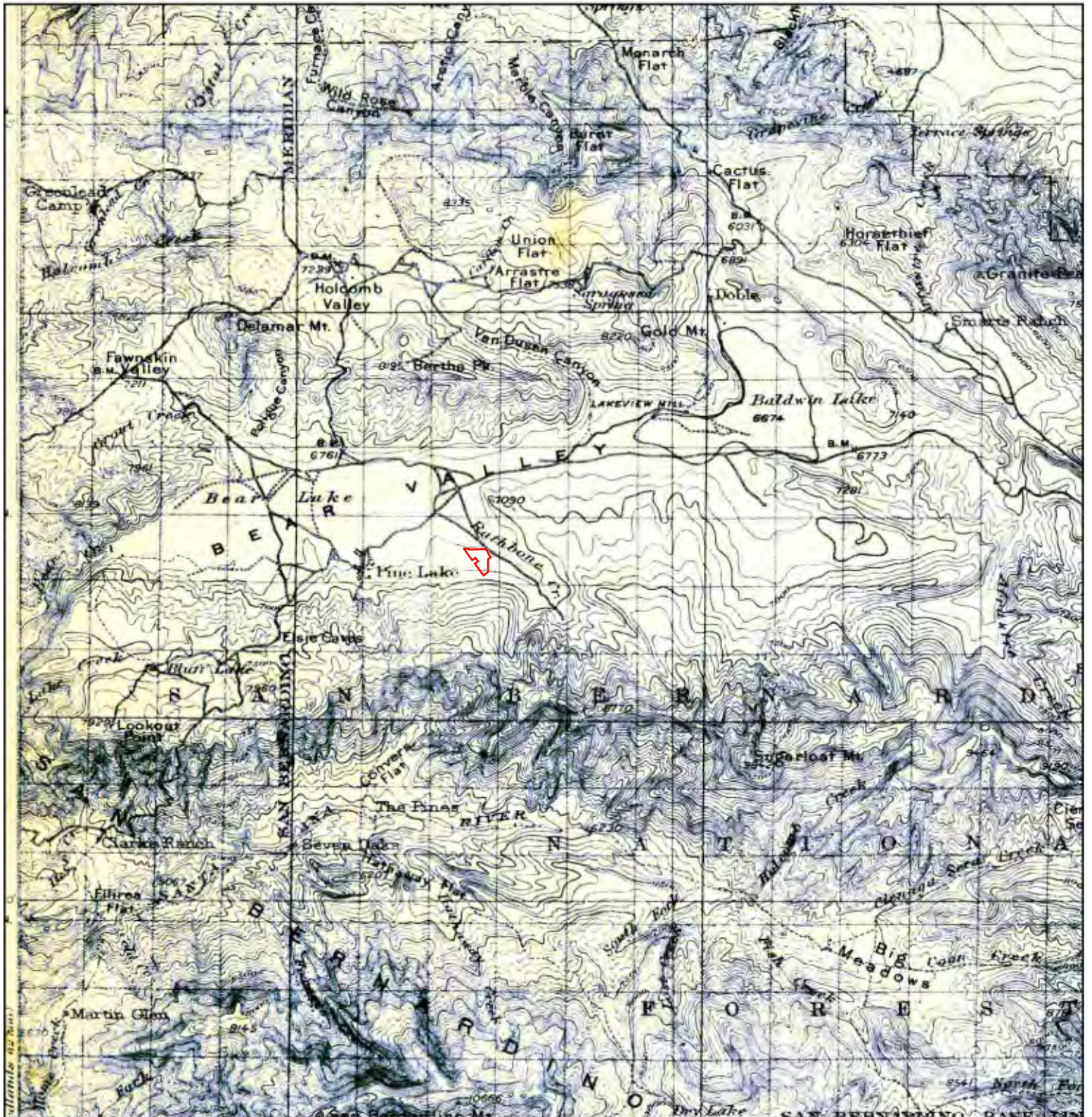
<p>N ↑</p>	<p>TARGET QUAD NAME: MOON RIDGE MAP YEAR: 1970</p>	<p>SITE NAME: Big Bear Moonridge Site Review ADDRESS: 734 Club View Drive Big Bear City, CA 92314 LAT/LONG: 34.2388 / 116.8674</p>	<p>CLIENT: Lilburn Corporation CONTACT: Frank Amendola INQUIRY#: 2757964.4 RESEARCH DATE: 04/29/2010</p>
	<p>SERIES: 7.5 SCALE: 1:24000</p>		

Historical Topographic Map



	TARGET QUAD	SITE NAME:	Big Bear Moonridge Site	CLIENT:	Lilburn Corporation
	NAME: SAN GORGONIO MOUNTAIN	ADDRESS:	734 Club View Drive	CONTACT:	Frank Amendola
	MAP YEAR: 1954	LAT/LONG:	34.2388 / 116.8674	INQUIRY#:	2757964.4
	SERIES: 15			RESEARCH DATE:	04/29/2010
	SCALE: 1:62500				

Historical Topographic Map



<p>N ↑</p>	<p>TARGET QUAD NAME: SAN GORGONIO MAP YEAR: 1902</p>	<p>SITE NAME: Big Bear Moonridge Site Review</p>	<p>CLIENT: Lilburn Corporation</p>
	<p>SERIES: 30 SCALE: 1:125000</p>	<p>ADDRESS: 734 Club View Drive Big Bear City, CA 92314</p>	<p>CONTACT: Frank Amendola INQUIRY#: 2757964.4 RESEARCH DATE: 04/29/2010</p>

Historical Topographic Map



<p>N ↑</p>	<p>TARGET QUAD NAME: SOUTHERN CA SHEET 1 MAP YEAR: 1901</p>	<p>SITE NAME: Big Bear Moonridge Site Review</p>	<p>CLIENT: Lilburn Corporation</p>
	<p>SERIES: 60 SCALE: 1:250000</p>	<p>ADDRESS: 734 Club View Drive Big Bear City, CA 92314</p>	<p>CONTACT: Frank Amendola INQUIRY#: 2757964.4 RESEARCH DATE: 04/29/2010</p>

APPENDIX C
SITE PHOTOS

Site Photos



Photograph #1: Looking across the site northeasterly via Club View Drive.



Photograph #2: Looking north across the site via golf course. Vacated residence to the west.



Photograph #3: Looking south across the site from the west via Moonridge Road



Photograph #4: Capped pipe adjacent to Club View Drive.



Photograph #5: Vacated residence on-site adjacent to Club View Drive.



Photograph #6: Filled 55-gallon drum on-site adjacent to vacated residence.

Surrounding Land Uses



Photograph #7: Residential land uses and Club View Drive west of the site.



Photograph #8: Gold Mine Golf Course south of the site.



Photograph #9: Residential land use and Moonridge Road east of the site.



Photograph #10: Residential land uses and Moonridge Road north of the site.

APPENDIX D
ENVIRONMENTAL DATA RESOURCES INC.
REPORT

Big Bear Moonridge Site Review

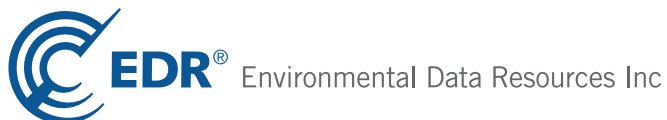
734 Club View Drive

Big Bear City, CA 92314

Inquiry Number: 2757964.2s

April 29, 2010

The EDR Radius Map™ Report with GeoCheck®



440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
 Please contact EDR at 1-800-352-0050
 with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

734 CLUB VIEW DRIVE
BIG BEAR CITY, CA 92314

COORDINATES

Latitude (North): 34.238800 - 34° 14' 19.7"
Longitude (West): 116.867400 - 116° 52' 2.6"
Universal Transverse Mercator: Zone 11
UTM X (Meters): 512211.2
UTM Y (Meters): 3788447.0
Elevation: 6905 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	34116-B7 MOONRIDGE, CA
Most Recent Revision:	1994
North Map:	34116-C7 BIG BEAR CITY, CA
Most Recent Revision:	1994
West Map:	34116-B8 BIG BEAR LAKE, CA
Most Recent Revision:	1994
Northwest Map:	34116-C8 FAWNSKIN, CA
Most Recent Revision:	1994

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2005
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP..... CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE..... State Response Sites

EXECUTIVE SUMMARY

State- and tribal - equivalent CERCLIS

ENVIROSTOR..... EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... Solid Waste Information System

State and tribal leaking storage tank lists

LUST..... Geotracker's Leaking Underground Fuel Tank Report

SLIC..... Statewide SLIC Cases

INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST..... Active UST Facilities

AST..... Aboveground Petroleum Storage Tank Facilities

INDIAN UST..... Underground Storage Tanks on Indian Land

FEMA UST..... Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing

VCP..... Voluntary Cleanup Program Properties

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations

ODI..... Open Dump Inventory

WMUDS/SWAT..... Waste Management Unit Database

SWRCY..... Recycler Database

HAULERS..... Registered Waste Tire Haulers Listing

INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL..... Clandestine Drug Labs

HIST Cal-Sites..... Historical Calsites Database

SCH..... School Property Evaluation Program

Toxic Pits..... Toxic Pits Cleanup Act Sites

CDL..... Clandestine Drug Labs

US HIST CDL..... National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST..... Facility Inventory Database

EXECUTIVE SUMMARY

HIST UST..... Hazardous Substance Storage Container Database
SWEEPS UST..... SWEEPS UST Listing

Local Land Records

LIENS 2..... CERCLA Lien Information
LUCIS..... Land Use Control Information System
LIENS..... Environmental Liens Listing
DEED..... Deed Restriction Listing

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System
CHMIRS..... California Hazardous Material Incident Report System
LDS..... Land Disposal Sites Listing
MCS..... Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen..... RCRA - Non Generators
DOT OPS..... Incident and Accident Data
DOD..... Department of Defense Sites
FUDS..... Formerly Used Defense Sites
CONSENT..... Superfund (CERCLA) Consent Decrees
ROD..... Records Of Decision
UMTRA..... Uranium Mill Tailings Sites
MINES..... Mines Master Index File
TRIS..... Toxic Chemical Release Inventory System
TSCA..... Toxic Substances Control Act
FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing
SSTS..... Section 7 Tracking Systems
ICIS..... Integrated Compliance Information System
PADS..... PCB Activity Database System
MLTS..... Material Licensing Tracking System
RADINFO..... Radiation Information Database
FINDS..... Facility Index System/Facility Registry System
RAATS..... RCRA Administrative Action Tracking System
CA BOND EXP. PLAN..... Bond Expenditure Plan
CA WDS..... Waste Discharge System
NPDES..... NPDES Permits Listing
Cortese..... "Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE..... Hazardous Waste & Substance Site List
Notify 65..... Proposition 65 Records
DRYCLEANERS..... Cleaner Facilities
WIP..... Well Investigation Program Case List
San Bern. Co. Permit..... Hazardous Material Permits
HAZNET..... Facility and Manifest Data
EMI..... Emissions Inventory Data
INDIAN RESERV..... Indian Reservations
SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing
PROC..... Certified Processors Database
HWP..... EnviroStor Permitted Facilities Listing
HWT..... Registered Hazardous Waste Transporter Database

EXECUTIVE SUMMARY

COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List
COAL ASH DOE..... Sleam-Electric Plan Operation Data
MWMP..... Medical Waste Management Program Listing
PCB TRANSFORMER..... PCB Transformer Registration Database
FINANCIAL ASSURANCE..... Financial Assurance Information Listing

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants..... EDR Proprietary Manufactured Gas Plants
EDR Historical Auto Stations.. EDR Proprietary Historic Gas Stations
EDR Historical Cleaners..... EDR Proprietary Historic Dry Cleaners

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

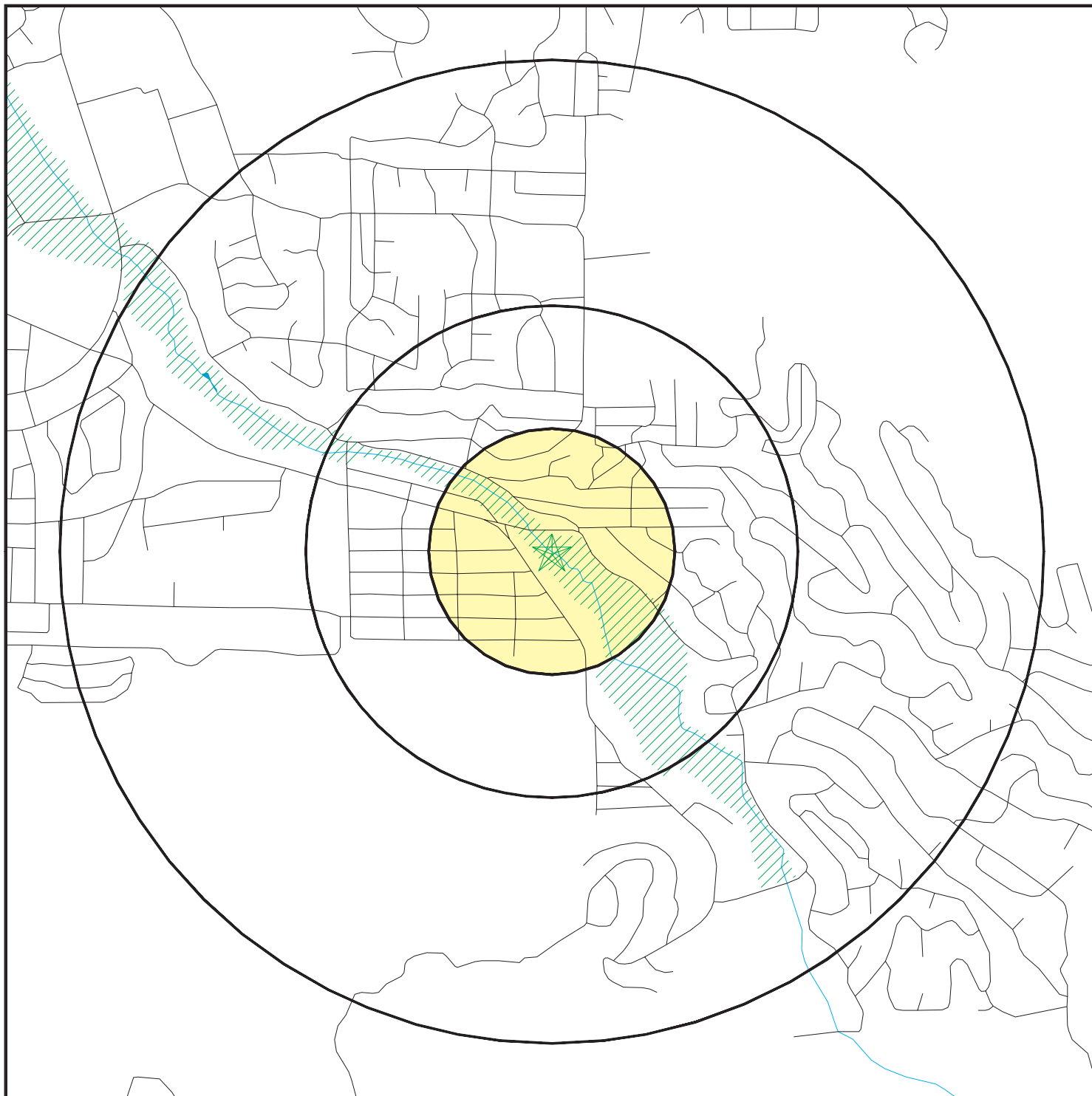
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

<u>Site Name</u>	<u>Database(s)</u>
BIG BEAR BOAT LANDING, IN	HIST CORTESE
FORT IRWIN LUCKY FUSE DISPOSAL	CHMIRS,HIST CORTESE,WMUDS/SWAT
LOWER MOONRIDGE PIPELINE REPLACEME	NPDES
UNOCAL 76 STN #5863	SWEEPS UST
GRACE VALLEY RANCH	HAZNET,CHMIRS,PERMITS SAN
	BERNARDINO
GRACE VALLEY RANCH	LUST SAN MATEO
UNION OIL SERVICE STATION #586	HIST UST
BIG BEAR LANDFILL	AST
VERIZON-BIG BEAR CITY	AST
BIG BEAR CITY/FIRE STATION #2	HAZNET
BIG BEAR AERO SPECIALTIES	HAZNET
BIG BEAR AUTOBODY	HAZNET
BEAR VALLEY COMMUNITY HOSPITAL	HAZNET
BIG BEAR CITY	FINDS
BIG BEAR CITY	FINDS
DWP - BIG BEAR LAKE/MOONRIDGE	FINDS
BIG BEAR HIGH	FINDS
BIG BEAR ELEMENTARY	FINDS
HI-GRADE MATERIALS CO.	MINES
MITSUBISHI CEMENT CO	MINES

OVERVIEW MAP - 2757964.2s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

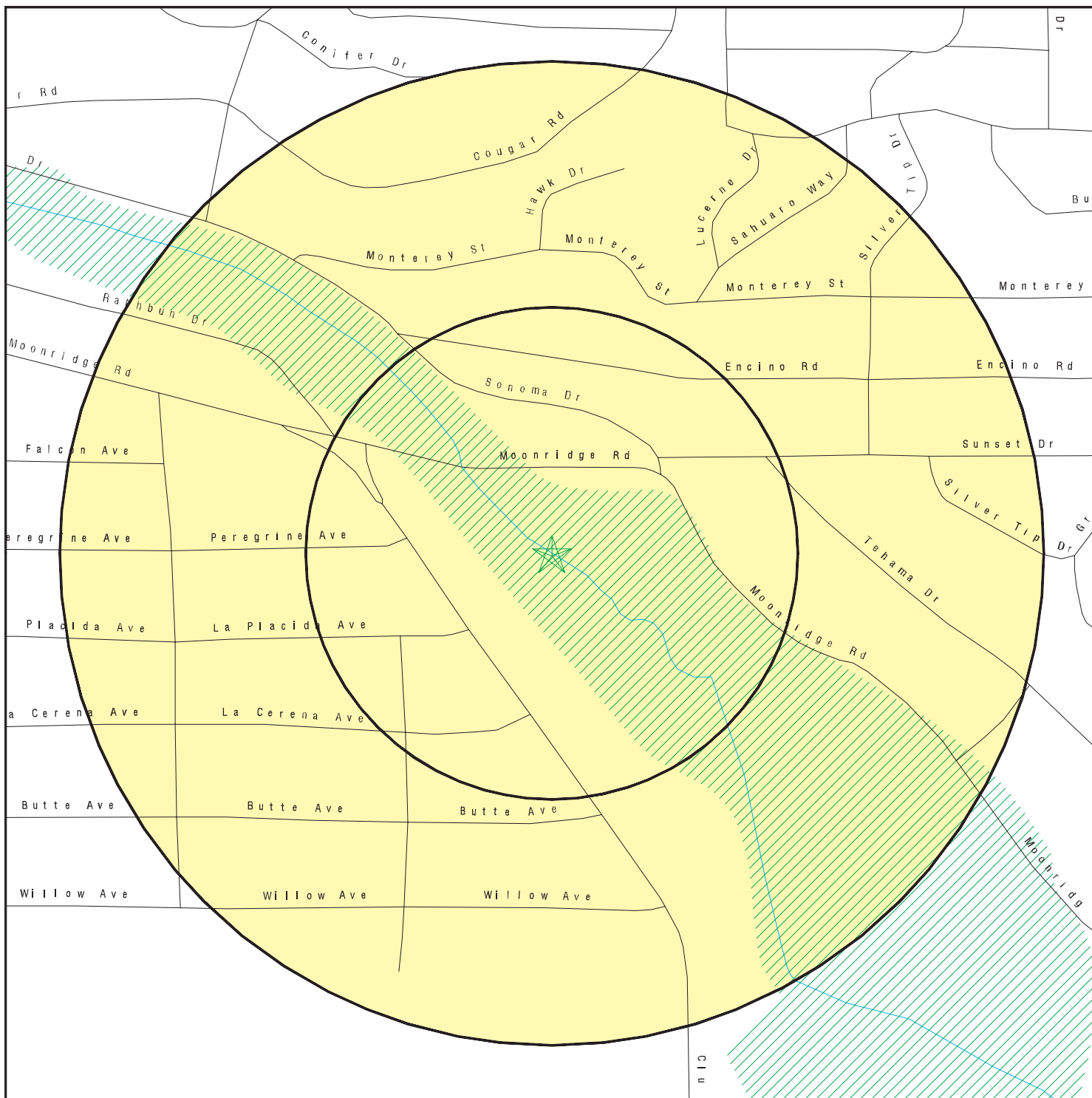
- Indian Reservations BIA
- Oil & Gas pipelines
- ▨ 100-year flood zone
- ▨ 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Big Bear Moonridge Site Review
 ADDRESS: 734 Club View Drive
 Big Bear City CA 92314
 LAT/LONG: 34.2388 / 116.8674

CLIENT: Lilburn Corporation
 CONTACT: Frank Amendola
 INQUIRY #: 2757964.2s
 DATE: April 29, 2010 12:54 pm

DETAIL MAP - 2757964.2s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ⚙ Manufactured Gas Plants
- ⚡ Sensitive Receptors
- 🚚 National Priority List Sites
- 🏠 Dept. Defense Sites

- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern



This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Big Bear Moonridge Site Review
 ADDRESS: 734 Club View Drive
 Big Bear City CA 92314
 LAT/LONG: 34.2388 / 116.8674

CLIENT: Lilburn Corporation
 CONTACT: Frank Amendola
 INQUIRY #: 2757964.2s
 DATE: April 29, 2010 12:55 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
<u>STANDARD ENVIRONMENTAL RECORDS</u>								
<i>Federal NPL site list</i>								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL		1.000	0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
CERCLIS		0.500	0	0	0	NR	NR	0
FEDERAL FACILITY		1.000	0	0	0	0	NR	0
<i>Federal CERCLIS NFRAP site List</i>								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS		1.000	0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
<i>Federal institutional controls / engineering controls registries</i>								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS		TP	NR	NR	NR	NR	NR	0
<i>State- and tribal - equivalent NPL</i>								
RESPONSE		1.000	0	0	0	0	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
ENVIROSTOR		1.000	0	0	0	0	NR	0
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
SWF/LF		0.500	0	0	0	NR	NR	0
<i>State and tribal leaking storage tank lists</i>								
LUST		0.500	0	0	0	NR	NR	0
SLIC		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST		0.500	0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
FEMA UST		0.250	0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
<u>ADDITIONAL ENVIRONMENTAL RECORDS</u>								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	0	0	NR	0
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
US HIST CDL		TP	NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.250	0	0	NR	NR	NR	0
HIST UST		0.250	0	0	NR	NR	NR	0
SWEEPS UST		0.250	0	0	NR	NR	NR	0
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
LDS		TP	NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS		TP	NR	NR	NR	NR	NR	0
<i>Other Ascertainable Records</i>								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
NPDES		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	0	0	0	NR	NR	0
HIST CORTESE		0.500	0	0	0	NR	NR	0
Notify 65		1.000	0	0	0	0	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
San Bern. Co. Permit		0.250	0	0	NR	NR	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
PROC		0.500	0	0	0	NR	NR	0
HWP		1.000	0	0	0	0	NR	0
HWT		0.250	0	0	NR	NR	NR	0
COAL ASH EPA		0.500	0	0	0	NR	NR	0
COAL ASH DOE		TP	NR	NR	NR	NR	NR	0
MWMP		0.250	0	0	NR	NR	NR	0
PCB TRANSFORMER		TP	NR	NR	NR	NR	NR	0
FINANCIAL ASSURANCE		TP	NR	NR	NR	NR	NR	0
<u>EDR PROPRIETARY RECORDS</u>								
<i>EDR Proprietary Records</i>								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0
EDR Historical Auto Stations		0.250	0	0	NR	NR	NR	0
EDR Historical Cleaners		0.250	0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

<u>Database</u>	<u>Target Property</u>	<u>Search Distance (Miles)</u>	<u>< 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>> 1</u>	<u>Total Plotted</u>
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NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

NO SITES FOUND

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BIG BEAR LAKE	1008019759	DWP - BIG BEAR LAKE/MOONRIDGE	41972 GARSTIN DRIVE (PO BOX 19	92315	FINDS
BIG BEAR	1008237155	BIG BEAR CITY	BIG BEAR	92315	FINDS
BIG BEAR LAKE	1008265092	BIG BEAR HIGH	351 MAPLE LANE	92315	FINDS
BIG BEAR LAKE	1008265098	BIG BEAR ELEMENTARY	409040 PENNSYLVANIA	92315	FINDS
BIG BEAR CITY	1011978846	BIG BEAR CITY	UNKNOWN		FINDS
BIG BEAR CITY	A100345544	BIG BEAR LANDFILL	38550 HOLCOLMB VALLEY RD	92314	AST
BIG BEAR CITY	A100346283	VERIZON-BIG BEAR CITY	135 SHERWOOD BLVD	92314	AST
	M300000964	MITSUBISHI CEMENT CO	LUCERNE VALLEY (CUSHENBURY PLA		MINES
	M300003171	HI-GRADE MATERIALS CO.	LUCERNE VALLEY PIT & PLANT		MINES
BIG BEAR	S100856467	BIG BEAR CITY/FIRE STATION #2	99 MAPLE LANE	00000	HAZNET
BIG BEAR LAKE	S100930775	BIG BEAR AUTOBODY	4260 GARSTIN RD	92315	HAZNET
BIG BEAR CITY	S102681018	GRACE VALLEY RANCH	3780 HWY 38	92314	HAZNET,CHMIRS,PERMITS SAN BERNARDINO
	S103442535	FORT IRWIN LUCKY FUSE DISPOSAL	FORT IRWIN		CHMIRS,HIST CORTESE,WMUDS/SV
BIG BEAR LAKE	S103658590	BEAR VALLEY COMMUNITY HOSPITAL	41870 JARSTIN RD	92315	HAZNET
BIG BEAR CITY	S103678828	BIG BEAR AERO SPECIALTIES	HANGAR I BIG BEAR CITY AIRPOR	92314	HAZNET
BIG BEAR LAKE	S104533210	BIG BEAR BOAT LANDING, IN	439	92315	HIST CORTESE
BIG BEAR LAKE	S106933483	UNOCAL 76 STN #5863	HIGHWAY 18	92315	SWEEPS UST
BIG BEAR CITY	S108536659	GRACE VALLEY RANCH	3780 HIGHWAY 38	92314	LUST SAN MATEO
BIG BEAR LAKE	S109449191	LOWER MOONRIDGE PIPELINE REPLACEME	CEDAR WILLOW AVE PEREGRINE AVE	92315	NPDES
BIG BEAR LAKE	U001574558	UNION OIL SERVICE STATION #586	HIGHWAY 18	92315	HIST UST

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 03/31/2010	Source: EPA
Date Data Arrived at EDR: 04/02/2010	Telephone: N/A
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 04/02/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 03/31/2010	Source: EPA
Date Data Arrived at EDR: 04/02/2010	Telephone: N/A
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 04/02/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991	Source: EPA
Date Data Arrived at EDR: 02/02/1994	Telephone: 202-564-4267
Date Made Active in Reports: 03/30/1994	Last EDR Contact: 03/01/2010
Number of Days to Update: 56	Next Scheduled EDR Contact: 05/31/2010
	Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/31/2010	Source: EPA
Date Data Arrived at EDR: 04/02/2010	Telephone: N/A
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 04/02/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 01/29/2010	Source: EPA
Date Data Arrived at EDR: 02/09/2010	Telephone: 703-412-9810
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 03/30/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of NPL and Base Realignment & Closure sites found in the CERCLIS database where FERRO is involved in cleanup projects.

Date of Government Version: 06/23/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: 703-603-8704
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 04/14/2010
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 06/23/2009	Source: EPA
Date Data Arrived at EDR: 09/02/2009	Telephone: 703-412-9810
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 03/11/2010
Number of Days to Update: 19	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/11/2009	Source: EPA
Date Data Arrived at EDR: 12/29/2009	Telephone: 800-424-9346
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 02/15/2010
Number of Days to Update: 43	Next Scheduled EDR Contact: 05/31/2010
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 01/13/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 01/13/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 01/13/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 01/13/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/20/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/20/2010	Telephone: 703-603-0695
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 03/15/2010
Number of Days to Update: 82	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/20/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/20/2010	Telephone: 703-603-0695
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 03/15/2010
Number of Days to Update: 82	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2009	Source: National Response Center, United States Coast Guard
Date Data Arrived at EDR: 01/22/2010	Telephone: 202-267-2180
Date Made Active in Reports: 02/11/2010	Last EDR Contact: 04/07/2010
Number of Days to Update: 20	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 02/08/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 02/09/2010	Telephone: 916-323-3400
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 02/09/2010
Number of Days to Update: 9	Next Scheduled EDR Contact: 05/24/2010
	Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/22/2010
Date Data Arrived at EDR: 02/24/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 8

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 02/24/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Quarterly

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 04/19/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 03/22/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 03/22/2010
Date Data Arrived at EDR: 03/23/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 17

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/23/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 04/19/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 03/22/2010
Date Data Arrived at EDR: 03/23/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 17

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/23/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 03/22/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 04/19/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 12/10/2009
Next Scheduled EDR Contact: 03/29/2010
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 02/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 02/08/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/02/2010	Source: EPA Region 10
Date Data Arrived at EDR: 02/03/2010	Telephone: 206-553-2857
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 15	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/19/2009	Source: EPA Region 1
Date Data Arrived at EDR: 02/19/2009	Telephone: 617-918-1313
Date Made Active in Reports: 03/16/2009	Last EDR Contact: 03/01/2010
Number of Days to Update: 25	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 02/25/2010	Source: EPA Region 8
Date Data Arrived at EDR: 02/25/2010	Telephone: 303-312-6271
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 46	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 03/05/2010	Source: EPA Region 6
Date Data Arrived at EDR: 03/05/2010	Telephone: 214-665-6597
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 38	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 03/10/2010	Source: EPA Region 4
Date Data Arrived at EDR: 03/16/2010	Telephone: 404-562-8677
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 27	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/01/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/03/2010	Telephone: 415-972-3372
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 40	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/24/2009	Source: EPA Region 7
Date Data Arrived at EDR: 05/20/2009	Telephone: 913-551-7003
Date Made Active in Reports: 06/17/2009	Last EDR Contact: 02/01/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Varies

State and tribal registered storage tank lists

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UST: Active UST Facilities

Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/22/2010	Source: SWRCB
Date Data Arrived at EDR: 03/23/2010	Telephone: 916-480-1028
Date Made Active in Reports: 04/14/2010	Last EDR Contact: 03/23/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009	Source: State Water Resources Control Board
Date Data Arrived at EDR: 09/10/2009	Telephone: 916-341-5712
Date Made Active in Reports: 10/01/2009	Last EDR Contact: 04/12/2010
Number of Days to Update: 21	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 02/02/2010	Source: EPA Region 10
Date Data Arrived at EDR: 02/03/2010	Telephone: 206-553-2857
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 02/17/2010
Number of Days to Update: 15	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/01/2010	Source: EPA Region 9
Date Data Arrived at EDR: 03/03/2010	Telephone: 415-972-3368
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 40	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 02/25/2010	Source: EPA Region 8
Date Data Arrived at EDR: 02/25/2010	Telephone: 303-312-6137
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 46	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2008	Source: EPA Region 7
Date Data Arrived at EDR: 12/30/2008	Telephone: 913-551-7003
Date Made Active in Reports: 03/16/2009	Last EDR Contact: 02/01/2010
Number of Days to Update: 76	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 02/11/2010
Date Data Arrived at EDR: 02/11/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 60

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations).

Date of Government Version: 03/10/2010
Date Data Arrived at EDR: 03/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 27

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 25

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/19/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 02/22/2010
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients--States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 11/04/2009
Date Made Active in Reports: 12/16/2009
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/23/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 03/22/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000	Source: State Water Resources Control Board
Date Data Arrived at EDR: 04/10/2000	Telephone: 916-227-4448
Date Made Active in Reports: 05/10/2000	Last EDR Contact: 03/15/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 05/31/2010
	Data Release Frequency: Quarterly

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 01/06/2010	Source: Department of Conservation
Date Data Arrived at EDR: 03/24/2010	Telephone: 916-323-3836
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 03/24/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 03/09/2010	Source: Integrated Waste Management Board
Date Data Arrived at EDR: 03/10/2010	Telephone: 916-341-6422
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 03/08/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/03/2007	Telephone: 703-308-8245
Date Made Active in Reports: 01/24/2008	Last EDR Contact: 02/08/2010
Number of Days to Update: 52	Next Scheduled EDR Contact: 05/24/2010
	Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 08/19/2009	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 12/29/2009	Telephone: 202-307-1000
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 12/14/2009
Number of Days to Update: 43	Next Scheduled EDR Contact: 03/22/2010
	Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 02/25/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009	Source: Department of Public Health
Date Data Arrived at EDR: 09/23/2009	Telephone: 707-463-4466
Date Made Active in Reports: 10/01/2009	Last EDR Contact: 03/08/2010
Number of Days to Update: 8	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990	Source: State Water Resources Control Board
Date Data Arrived at EDR: 01/25/1991	Telephone: 916-341-5851
Date Made Active in Reports: 02/12/1991	Last EDR Contact: 07/26/2001
Number of Days to Update: 18	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994	Source: State Water Resources Control Board
Date Data Arrived at EDR: 07/07/2005	Telephone: N/A
Date Made Active in Reports: 08/11/2005	Last EDR Contact: 06/03/2005
Number of Days to Update: 35	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/05/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/11/2010	Telephone: 202-564-6023
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 60	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005	Source: Department of the Navy
Date Data Arrived at EDR: 12/11/2006	Telephone: 843-820-7326
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 03/17/2010
Number of Days to Update: 31	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 01/28/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 01/29/2010	Telephone: 916-323-3400
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/21/2010
Number of Days to Update: 20	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/15/2010
Date Data Arrived at EDR: 03/16/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 24

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/16/2010
Next Scheduled EDR Contact: 12/28/2009
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 35

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/07/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 05/09/2008
Date Made Active in Reports: 06/20/2008
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 03/22/2010
Date Data Arrived at EDR: 03/23/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 17

Source: State Water Quality Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/23/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 03/22/2010
Date Data Arrived at EDR: 03/23/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 17

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/23/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

Other Ascertainable Records

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 01/13/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transportation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/12/2010	Source: Department of Transportation, Office of Pipeline Safety
Date Data Arrived at EDR: 02/09/2010	Telephone: 202-366-4595
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 02/09/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 05/24/2010
	Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 11/10/2006	Telephone: 703-692-8801
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/21/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2008	Source: U.S. Army Corps of Engineers
Date Data Arrived at EDR: 09/30/2009	Telephone: 202-528-4285
Date Made Active in Reports: 12/01/2009	Last EDR Contact: 03/18/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 08/03/2009	Source: Department of Justice, Consent Decree Library
Date Data Arrived at EDR: 10/27/2009	Telephone: Varies
Date Made Active in Reports: 11/09/2009	Last EDR Contact: 04/05/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/01/2009	Source: EPA
Date Data Arrived at EDR: 12/15/2009	Telephone: 703-416-0223
Date Made Active in Reports: 01/19/2010	Last EDR Contact: 04/02/2010
Number of Days to Update: 35	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 01/05/2009	Source: Department of Energy
Date Data Arrived at EDR: 05/07/2009	Telephone: 505-845-0011
Date Made Active in Reports: 05/08/2009	Last EDR Contact: 01/21/2010
Number of Days to Update: 1	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 11/17/2009	Source: Department of Labor, Mine Safety and Health Administration
Date Data Arrived at EDR: 12/08/2009	Telephone: 303-231-5959
Date Made Active in Reports: 01/19/2010	Last EDR Contact: 03/10/2010
Number of Days to Update: 42	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2008	Source: EPA
Date Data Arrived at EDR: 01/13/2010	Telephone: 202-566-0250
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 03/02/2010
Number of Days to Update: 36	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002	Source: EPA
Date Data Arrived at EDR: 04/14/2006	Telephone: 202-260-5521
Date Made Active in Reports: 05/30/2006	Last EDR Contact: 04/21/2010
Number of Days to Update: 46	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009	Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 03/01/2010
Number of Days to Update: 25	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009	Source: EPA
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 03/01/2010
Number of Days to Update: 25	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2007
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2008
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2008	Source: EPA
Date Data Arrived at EDR: 01/06/2010	Telephone: 202-564-4203
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 02/01/2010
Number of Days to Update: 35	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/10/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/18/2009	Telephone: 202-564-5088
Date Made Active in Reports: 01/19/2010	Last EDR Contact: 03/29/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 09/01/2009	Source: EPA
Date Data Arrived at EDR: 10/21/2009	Telephone: 202-566-0500
Date Made Active in Reports: 12/01/2009	Last EDR Contact: 04/22/2010
Number of Days to Update: 41	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 12/24/2009	Source: Nuclear Regulatory Commission
Date Data Arrived at EDR: 12/31/2009	Telephone: 301-415-7169
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 03/15/2010
Number of Days to Update: 41	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/12/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/13/2010	Telephone: 202-343-9775
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 04/14/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/19/2009	Source: EPA
Date Data Arrived at EDR: 10/22/2009	Telephone: (415) 947-8000
Date Made Active in Reports: 12/01/2009	Last EDR Contact: 03/15/2010
Number of Days to Update: 40	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995	Source: EPA
Date Data Arrived at EDR: 07/03/1995	Telephone: 202-564-4104
Date Made Active in Reports: 08/07/1995	Last EDR Contact: 06/02/2008
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/01/2008
	Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2007	Source: EPA/NTIS
Date Data Arrived at EDR: 02/19/2009	Telephone: 800-424-9346
Date Made Active in Reports: 05/22/2009	Last EDR Contact: 02/25/2010
Number of Days to Update: 92	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Biennially

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 03/01/2010
Next Scheduled EDR Contact: 06/14/2010
Data Release Frequency: Quarterly

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 02/22/2010
Date Data Arrived at EDR: 02/24/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/24/2010
Next Scheduled EDR Contact: 06/07/2010
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 01/06/2010
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 12

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 04/07/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES].

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 12/22/2009
Date Data Arrived at EDR: 01/25/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 4

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 04/14/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 10/21/2009
Date Made Active in Reports: 10/28/2009
Number of Days to Update: 7

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/26/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 07/14/2009
Date Made Active in Reports: 07/23/2009
Number of Days to Update: 9

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 04/09/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 02/10/2010
Date Data Arrived at EDR: 02/11/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 60

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 04/23/2010
Next Scheduled EDR Contact: 08/09/2010
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 01/06/2010
Date Data Arrived at EDR: 03/24/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 16

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/24/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 02/24/2010
Date Data Arrived at EDR: 03/17/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 23

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 11/09/2009
Date Data Arrived at EDR: 12/18/2009
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/16/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 01/18/2010
Date Data Arrived at EDR: 01/19/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 10

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action (a??cleanupsa??) tracked in EnviroStor.

Date of Government Version: 02/08/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 9

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/09/2010
Next Scheduled EDR Contact: 05/24/2010
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINANCIAL ASSURANCE 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 03/09/2010	Source: California Integrated Waste Management Board
Date Data Arrived at EDR: 03/10/2010	Telephone: 916-341-6066
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 03/08/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Varies

FINANCIAL ASSURANCE: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 03/01/2007	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 06/01/2007	Telephone: 916-255-3628
Date Made Active in Reports: 06/29/2007	Last EDR Contact: 03/12/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005	Source: U.S. Geological Survey
Date Data Arrived at EDR: 02/06/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/21/2010
Number of Days to Update: 339	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: N/A

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 01/01/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/18/2009	Telephone: 202-566-0517
Date Made Active in Reports: 05/29/2009	Last EDR Contact: 02/24/2010
Number of Days to Update: 100	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR Historical Auto Stations: EDR Proprietary Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR Historical Cleaners: EDR Proprietary Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/19/2010	Source: Alameda County Environmental Health Services
Date Data Arrived at EDR: 01/21/2010	Telephone: 510-567-6700
Date Made Active in Reports: 01/29/2010	Last EDR Contact: 04/05/2010
Number of Days to Update: 8	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 01/19/2010	Source: Alameda County Environmental Health Services
Date Data Arrived at EDR: 01/21/2010	Telephone: 510-567-6700
Date Made Active in Reports: 02/02/2010	Last EDR Contact: 04/05/2010
Number of Days to Update: 12	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/10/2010	Source: Contra Costa Health Services Department
Date Data Arrived at EDR: 02/11/2010	Telephone: 925-646-2286
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 02/08/2010
Number of Days to Update: 7	Next Scheduled EDR Contact: 05/24/2010
	Data Release Frequency: Semi-Annually

FRESNO COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 12/31/2009	Source: Dept. of Community Health
Date Data Arrived at EDR: 01/20/2010	Telephone: 559-445-3271
Date Made Active in Reports: 01/29/2010	Last EDR Contact: 04/16/2010
Number of Days to Update: 9	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Semi-Annually

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing Kern County Sites and Tanks Listing.

Date of Government Version: 03/16/2010	Source: Kern County Environment Health Services Department
Date Data Arrived at EDR: 03/17/2010	Telephone: 661-862-8700
Date Made Active in Reports: 04/14/2010	Last EDR Contact: 03/15/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 05/31/2010
	Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern

San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009	Source: EPA Region 9
Date Data Arrived at EDR: 03/31/2009	Telephone: 415-972-3178
Date Made Active in Reports: 10/23/2009	Last EDR Contact: 03/29/2010
Number of Days to Update: 206	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: No Update Planned

HMS: Street Number List

Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 09/30/2009	Source: Department of Public Works
Date Data Arrived at EDR: 12/28/2009	Telephone: 626-458-3517
Date Made Active in Reports: 01/18/2010	Last EDR Contact: 04/19/2010
Number of Days to Update: 21	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Semi-Annually

List of Solid Waste Facilities

Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/25/2010	Source: La County Department of Public Works
Date Data Arrived at EDR: 01/27/2010	Telephone: 818-458-5185
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/23/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/09/2010
	Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009	Source: Engineering & Construction Division
Date Data Arrived at EDR: 03/10/2009	Telephone: 213-473-7869
Date Made Active in Reports: 04/08/2009	Last EDR Contact: 03/02/2010
Number of Days to Update: 29	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/09/2010	Source: Community Health Services
Date Data Arrived at EDR: 02/12/2010	Telephone: 323-890-7806
Date Made Active in Reports: 03/04/2010	Last EDR Contact: 04/22/2010
Number of Days to Update: 20	Next Scheduled EDR Contact: 08/09/2010
	Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/25/2010	Source: City of El Segundo Fire Department
Date Data Arrived at EDR: 01/25/2010	Telephone: 310-524-2236
Date Made Active in Reports: 02/02/2010	Last EDR Contact: 04/23/2010
Number of Days to Update: 8	Next Scheduled EDR Contact: 08/09/2010
	Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003	Source: City of Long Beach Fire Department
Date Data Arrived at EDR: 10/23/2003	Telephone: 562-570-2563
Date Made Active in Reports: 11/26/2003	Last EDR Contact: 02/01/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/21/2010	Source: City of Torrance Fire Department
Date Data Arrived at EDR: 01/25/2010	Telephone: 310-618-2973
Date Made Active in Reports: 02/02/2010	Last EDR Contact: 04/19/2010
Number of Days to Update: 8	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 01/20/2010	Source: Public Works Department Waste Management
Date Data Arrived at EDR: 02/03/2010	Telephone: 415-499-6647
Date Made Active in Reports: 02/23/2010	Last EDR Contact: 04/12/2010
Number of Days to Update: 20	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination

A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008	Source: Napa County Department of Environmental Management
Date Data Arrived at EDR: 07/09/2008	Telephone: 707-253-4269
Date Made Active in Reports: 07/31/2008	Last EDR Contact: 03/08/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 06/21/2010
	Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Closed and Operating Underground Storage Tank Sites

Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: No Update Planned

ORANGE COUNTY:

List of Industrial Site Cleanups

Petroleum and non-petroleum spills.

Date of Government Version: 12/02/2009
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 16

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups

Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/03/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 16

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities

Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/03/2010
Date Data Arrived at EDR: 02/12/2010
Date Made Active in Reports: 02/23/2010
Number of Days to Update: 11

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities

List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/16/2010
Date Data Arrived at EDR: 03/17/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 23

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 03/15/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites

Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 01/21/2010
Date Data Arrived at EDR: 01/27/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 22

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Underground Storage Tank Tank List

Underground storage tank sites located in Riverside county.

Date of Government Version: 01/21/2010	Source: Health Services Agency
Date Data Arrived at EDR: 01/27/2010	Telephone: 951-358-5055
Date Made Active in Reports: 02/02/2010	Last EDR Contact: 03/29/2010
Number of Days to Update: 6	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List

List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 01/05/2010	Source: Sacramento County Environmental Management
Date Data Arrived at EDR: 01/15/2010	Telephone: 916-875-8406
Date Made Active in Reports: 01/29/2010	Last EDR Contact: 04/12/2010
Number of Days to Update: 14	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 01/21/2010	Source: Sacramento County Environmental Management
Date Data Arrived at EDR: 02/02/2010	Telephone: 916-875-8406
Date Made Active in Reports: 02/18/2010	Last EDR Contact: 04/12/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/16/2010	Source: San Bernardino County Fire Department Hazardous Materials Division
Date Data Arrived at EDR: 03/17/2010	Telephone: 909-387-3041
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 02/15/2010
Number of Days to Update: 23	Next Scheduled EDR Contact: 05/31/2010
	Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/16/2008	Source: Hazardous Materials Management Division
Date Data Arrived at EDR: 10/29/2008	Telephone: 619-338-2268
Date Made Active in Reports: 11/26/2008	Last EDR Contact: 03/31/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 12/04/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 45

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 02/01/2010
Next Scheduled EDR Contact: 05/17/2010
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 12/15/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 34

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 03/16/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversight Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 03/16/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 12

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 03/16/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST

A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 10/14/2009
Date Data Arrived at EDR: 10/15/2009
Date Made Active in Reports: 11/02/2009
Number of Days to Update: 18

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory

List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 01/05/2010
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 13

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/22/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Fuel Leak List

A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/22/2010
Date Data Arrived at EDR: 03/23/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 17

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/22/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing

A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 05/29/2009
Date Data Arrived at EDR: 06/01/2009
Date Made Active in Reports: 06/15/2009
Number of Days to Update: 14

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Annually

Hazardous Material Facilities

Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 08/31/2009
Date Data Arrived at EDR: 08/31/2009
Date Made Active in Reports: 09/18/2009
Number of Days to Update: 18

Source: City of San Jose Fire Department
Telephone: 408-277-4659
Last EDR Contact: 02/15/2010
Next Scheduled EDR Contact: 05/31/2010
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks

A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/11/2010
Date Data Arrived at EDR: 03/16/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 24

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Quarterly

Underground Storage Tanks

Underground storage tank sites located in Solano county.

Date of Government Version: 03/11/2010
Date Data Arrived at EDR: 03/16/2010
Date Made Active in Reports: 04/14/2010
Number of Days to Update: 29

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: Quarterly

SONOMA COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/05/2010	Source: Department of Health Services
Date Data Arrived at EDR: 01/06/2010	Telephone: 707-565-6565
Date Made Active in Reports: 01/18/2010	Last EDR Contact: 04/05/2010
Number of Days to Update: 12	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks

Underground storage tank sites located in Sutter county.

Date of Government Version: 04/01/2009	Source: Sutter County Department of Agriculture
Date Data Arrived at EDR: 04/02/2009	Telephone: 530-822-7500
Date Made Active in Reports: 04/09/2009	Last EDR Contact: 04/13/2010
Number of Days to Update: 7	Next Scheduled EDR Contact: 06/28/2010
	Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 01/26/2010	Source: Ventura County Environmental Health Division
Date Data Arrived at EDR: 02/25/2010	Telephone: 805-654-2813
Date Made Active in Reports: 03/04/2010	Last EDR Contact: 02/23/2010
Number of Days to Update: 7	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2009	Source: Environmental Health Division
Date Data Arrived at EDR: 10/05/2009	Telephone: 805-654-2813
Date Made Active in Reports: 10/13/2009	Last EDR Contact: 02/01/2010
Number of Days to Update: 8	Next Scheduled EDR Contact: 05/17/2010
	Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008	Source: Environmental Health Division
Date Data Arrived at EDR: 06/24/2008	Telephone: 805-654-2813
Date Made Active in Reports: 07/31/2008	Last EDR Contact: 02/23/2010
Number of Days to Update: 37	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 03/05/2010	Source: Environmental Health Division
Date Data Arrived at EDR: 03/24/2010	Telephone: 805-654-2813
Date Made Active in Reports: 04/14/2010	Last EDR Contact: 03/24/2010
Number of Days to Update: 21	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Quarterly

YOLO COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 12/28/2009	Source: Yolo County Department of Health
Date Data Arrived at EDR: 12/31/2009	Telephone: 530-666-8646
Date Made Active in Reports: 01/18/2010	Last EDR Contact: 03/29/2010
Number of Days to Update: 18	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2007	Source: Department of Environmental Protection
Date Data Arrived at EDR: 08/26/2009	Telephone: 860-424-3375
Date Made Active in Reports: 09/11/2009	Last EDR Contact: 03/02/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Annually

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2009	Source: Department of Environmental Protection
Date Data Arrived at EDR: 01/20/2010	Telephone: N/A
Date Made Active in Reports: 02/05/2010	Last EDR Contact: 04/23/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/04/2010	Source: Department of Environmental Conservation
Date Data Arrived at EDR: 02/11/2010	Telephone: 518-402-8651
Date Made Active in Reports: 03/17/2010	Last EDR Contact: 02/11/2010
Number of Days to Update: 34	Next Scheduled EDR Contact: 05/24/2010
	Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2008	Source: Department of Environmental Protection
Date Data Arrived at EDR: 12/01/2009	Telephone: N/A
Date Made Active in Reports: 12/14/2009	Last EDR Contact: 02/23/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 06/07/2010
	Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 11/03/2009	Source: Department of Environmental Management
Date Data Arrived at EDR: 02/12/2010	Telephone: 401-222-2797
Date Made Active in Reports: 02/22/2010	Last EDR Contact: 03/01/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 06/14/2010
	Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 07/17/2009
Date Made Active in Reports: 08/10/2009
Number of Days to Update: 24

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/22/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data

Source: PennWell Corporation
Telephone: (800) 823-6277

This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.
Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes

Source: National Institutes of Health
Telephone: 301-594-6248

Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools

Source: National Center for Education Statistics
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities

Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)

Source: United States Geologic Survey

A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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GEOCHECK[®] - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

BIG BEAR MOONRIDGE SITE REVIEW
734 CLUB VIEW DRIVE
BIG BEAR CITY, CA 92314

TARGET PROPERTY COORDINATES

Latitude (North): 34.23880 - 34° 14' 19.7"
Longitude (West): 116.8674 - 116° 52' 2.6"
Universal Tranverse Mercator: Zone 11
UTM X (Meters): 512211.2
UTM Y (Meters): 3788447.0
Elevation: 6905 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map: 34116-B7 MOONRIDGE, CA
Most Recent Revision: 1994

North Map: 34116-C7 BIG BEAR CITY, CA
Most Recent Revision: 1994

West Map: 34116-B8 BIG BEAR LAKE, CA
Most Recent Revision: 1994

Northwest Map: 34116-C8 FAWNSKIN, CA
Most Recent Revision: 1994

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

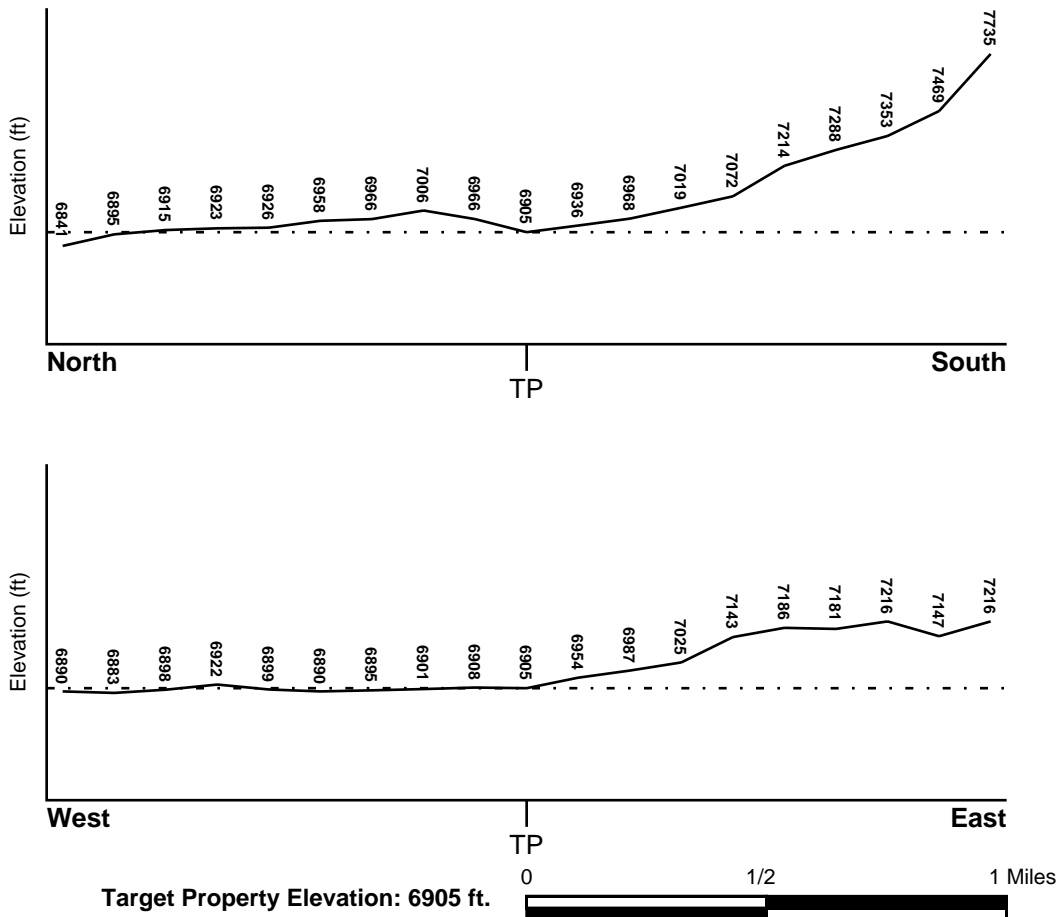
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General West

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

<u>Target Property County</u> SAN BERNARDINO, CA	<u>FEMA Flood Electronic Data</u> YES - refer to the Overview Map and Detail Map
Flood Plain Panel at Target Property:	06071C - FEMA DFIRM Flood data
Additional Panels in search area:	Not Reported

NATIONAL WETLAND INVENTORY

<u>NWI Quad at Target Property</u> MOONRIDGE	<u>NWI Electronic Data Coverage</u> YES - refer to the Overview Map and Detail Map
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HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data:*

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

<u>MAP ID</u>	<u>LOCATION FROM TP</u>	<u>GENERAL DIRECTION GROUNDWATER FLOW</u>
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

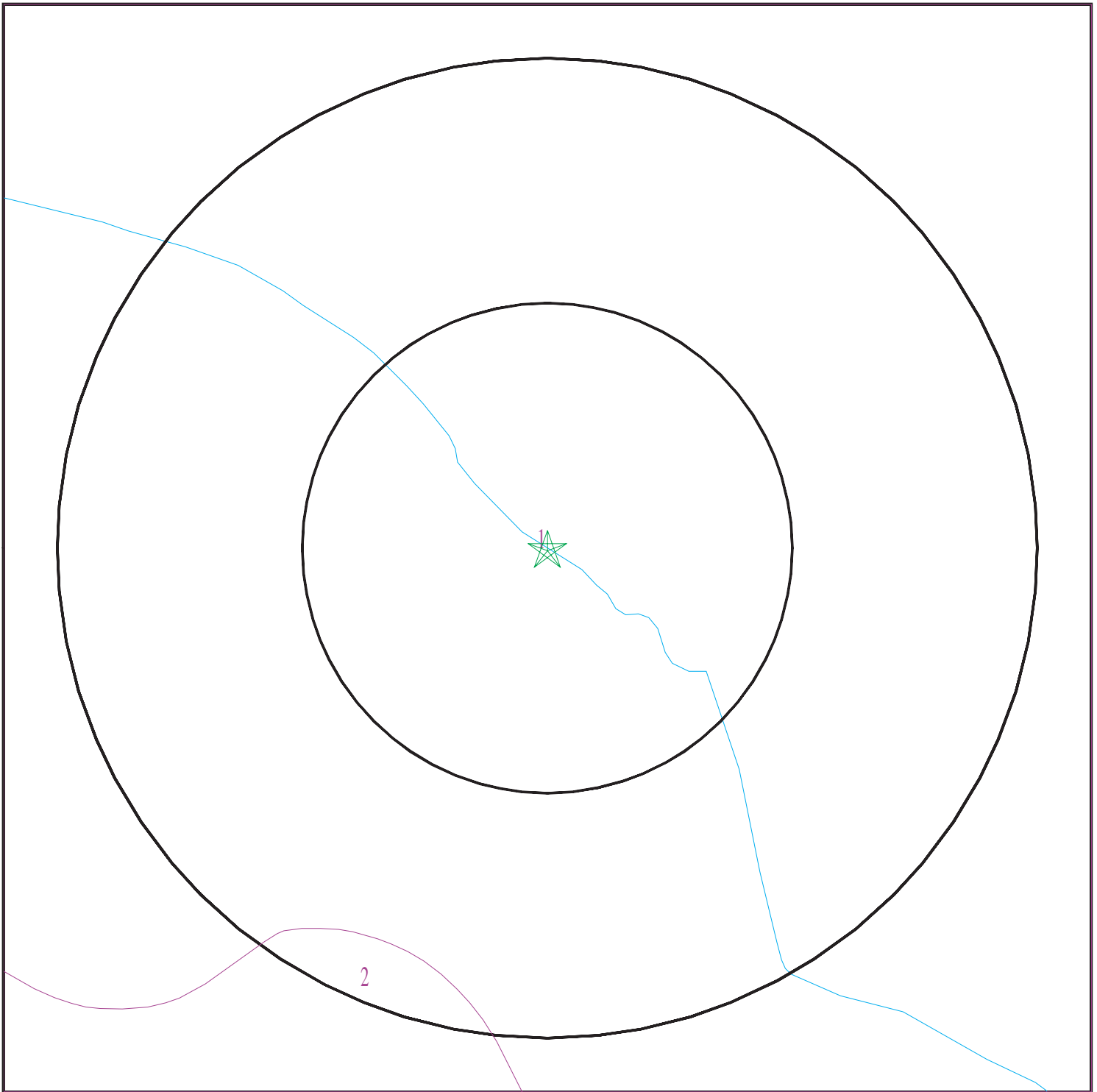
Era:	Paleozoic
System:	Pennsylvanian
Series:	Upper Paleozoic
Code:	uPz (<i>decoded above as Era, System & Series</i>)

GEOLOGIC AGE IDENTIFICATION

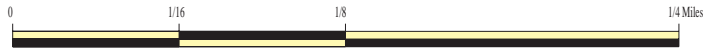
Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 2757964.2s



- ★ Target Property
- ∩ SSURGO Soil
- ∩ Water



SITE NAME: Big Bear Moonridge Site Review
ADDRESS: 734 Club View Drive
Big Bear City CA 92314
LAT/LONG: 34.2388 / 116.8674

CLIENT: Lilburn Corporation
CONTACT: Frank Amendola
INQUIRY #: 2757964.2s
DATE: April 29, 2010 12:55 pm

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Morical family

Soil Surface Texture: gravelly loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
Layer	Boundary		Soil Texture Class	Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
	Upper	Lower		AASHTO Group	Unified Soil		
1	0 inches	5 inches	gravelly loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 6.1
2	5 inches	35 inches	gravelly clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 6.1
3	35 inches	59 inches	gravelly sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 6.1

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Map ID: 2

Soil Component Name: Merkel family

Soil Surface Texture: unweathered bedrock

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 76 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
Layer	Boundary		Soil Texture Class	Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
	Upper	Lower		AASHTO Group	Unified Soil		
1	29 inches	33 inches	unweathered bedrock	Not reported	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42 Min: 14	Max: 7.3 Min: 6.1
2	3 inches	18 inches	very gravelly loam	Not reported	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42 Min: 14	Max: 7.3 Min: 6.1
3	0 inches	3 inches	very gravelly loam	Not reported	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42 Min: 14	Max: 7.3 Min: 6.1
4	18 inches	29 inches	very gravelly loam	Not reported	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42 Min: 14	Max: 7.3 Min: 6.1

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

<u>DATABASE</u>	<u>SEARCH DISTANCE (miles)</u>
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

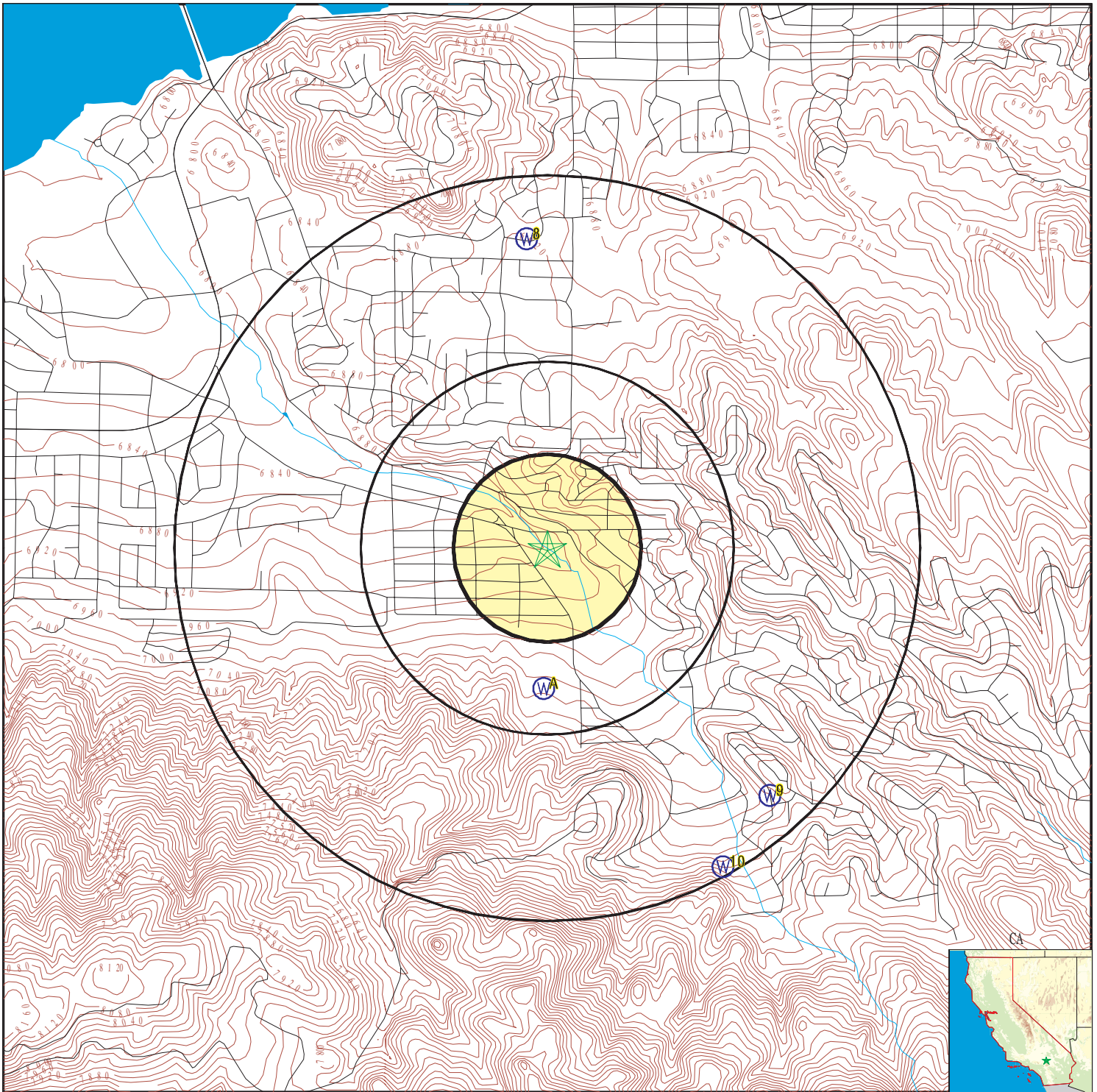
<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

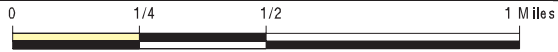
<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
A1	1632	1/4 - 1/2 Mile South
A2	1629	1/4 - 1/2 Mile South
A3	1625	1/4 - 1/2 Mile South
A4	1624	1/4 - 1/2 Mile South
A5	1626	1/4 - 1/2 Mile South
A6	1628	1/4 - 1/2 Mile South
A7	1627	1/4 - 1/2 Mile South
8	1601	1/2 - 1 Mile North
9	1618	1/2 - 1 Mile SE
10	18819	1/2 - 1 Mile SSE

PHYSICAL SETTING SOURCE MAP - 2757964.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- Indeterminate Groundwater Flow at Location
- Groundwater Flow Varies at Location
- Closest Hydrogeological Data
- Oil, gas or related wells



SITE NAME: Big Bear Moonridge Site Review
 ADDRESS: 734 Club View Drive
 Big Bear City CA 92314
 LAT/LONG: 34.2388 / 116.8674

CLIENT: Lilburn Corporation
 CONTACT: Frank Amendola
 INQUIRY #: 2757964.2s
 DATE: April 29, 2010 12:55 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
 Direction
 Distance
 Elevation

Database EDR ID Number

A1
South
1/4 - 1/2 Mile
Higher

CA WELLS 1632

Water System Information:

Prime Station Code:	02N/01E-27Q03 S	User ID:	TAN
FRDS Number:	3610044019	County:	San Beernardino
District Number:	13	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341400.0 1165200.0	Precision:	1 Mile (One Minute)
Source Name:	SLANT WELL 03		
System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929 BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		

A2
South
1/4 - 1/2 Mile
Higher

CA WELLS 1629

Water System Information:

Prime Station Code:	02N/01E-27K02 S	User ID:	TAN
FRDS Number:	3610044029	County:	San Beernardino
District Number:	13	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341400.0 1165200.0	Precision:	Undefined
Source Name:	SLANT WELL 13		
System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929 BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		

A3
South
1/4 - 1/2 Mile
Higher

CA WELLS 1625

Water System Information:

Prime Station Code:	02N/01E-27J03 S	User ID:	TAN
FRDS Number:	3610044015	County:	San Beernardino
District Number:	13	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Destroyed
Source Lat/Long:	341400.0 1165200.0	Precision:	Undefined
Source Name:	LASSEN 03 - DESTROYED		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Sample Collected:	10/15/2008	Findings:	7.8
Chemical:	PH, LABORATORY		
Sample Collected:	10/15/2008	Findings:	320 MG/L
Chemical:	ALKALINITY (TOTAL) AS CaCO3		
Sample Collected:	10/15/2008	Findings:	390 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/15/2008	Findings:	380 MG/L
Chemical:	HARDNESS (TOTAL) AS CaCO3		
Sample Collected:	10/15/2008	Findings:	95 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/15/2008	Findings:	39 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/15/2008	Findings:	8.2 MG/L
Chemical:	SODIUM		
Sample Collected:	10/15/2008	Findings:	3.7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	10/15/2008	Findings:	14 MG/L
Chemical:	CHLORIDE		
Sample Collected:	10/15/2008	Findings:	.22 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	10/15/2008	Findings:	430 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	10/15/2008	Findings:	6.4 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	10/15/2008	Findings:	1400 UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	10/20/2009	Findings:	5.6 MG/L
Chemical:	NITRATE (AS NO3)		

**A5
South
1/4 - 1/2 Mile
Higher**

CA WELLS 1626

Water System Information:

Prime Station Code:	02N/01E-27J04 S	User ID:	TAN
FRDS Number:	3610044014	County:	San Bernardino
District Number:	13	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341400.0 1165200.0	Precision:	Undefined
Source Name:	LASSEN 01		
System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929 BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

A6
South
1/4 - 1/2 Mile
Higher

CA WELLS 1628

Water System Information:

Prime Station Code:	02N/01E-27K01 S	User ID:	TAN
FRDS Number:	3610044028	County:	San Beernardino
District Number:	13	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341400.0 1165200.0	Precision:	Undefined
Source Name:	SLANT WELL 12		
System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929 BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		

A7
South
1/4 - 1/2 Mile
Higher

CA WELLS 1627

Water System Information:

Prime Station Code:	02N/01E-27J07 S	User ID:	TAN
FRDS Number:	3610044030	County:	San Beernardino
District Number:	13	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341400.0 1165200.0	Precision:	Undefined
Source Name:	SLANT WELL 14		
System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929 BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		

8
North
1/2 - 1 Mile
Higher

CA WELLS 1601

Water System Information:

Prime Station Code:	02N/01E-15C07 S	User ID:	TAN
FRDS Number:	3610044008	County:	San Beernardino
District Number:	13	Station Type:	WELL/AMBNT
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341503.0 1165203.0	Precision:	100 Feet (one Second)
Source Name:	DIVISION PLANT WELL 07		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929 BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		
Sample Collected:	10/18/2006	Findings:	3.8 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	03/12/2007	Findings:	2.3 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/12/2007	Findings:	2.3 PCI/L
Chemical:	GROSS ALPHA MDA95		
Sample Collected:	05/22/2007	Findings:	1.5 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	05/22/2007	Findings:	1.3 PCI/L
Chemical:	GROSS ALPHA MDA95		
Sample Collected:	08/08/2007	Findings:	.531 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	08/08/2007	Findings:	.5 PCI/L
Chemical:	RADIUM 228 MDA95		
Sample Collected:	11/28/2007	Findings:	4.1 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	11/28/2007	Findings:	.647 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	11/28/2007	Findings:	.6 PCI/L
Chemical:	RADIUM 228 MDA95		
Sample Collected:	10/22/2008	Findings:	580 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	10/22/2008	Findings:	8.1
Chemical:	PH, LABORATORY		
Sample Collected:	10/22/2008	Findings:	250 MG/L
Chemical:	ALKALINITY (TOTAL) AS CaCO3		
Sample Collected:	10/22/2008	Findings:	310 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/22/2008	Findings:	270 MG/L
Chemical:	HARDNESS (TOTAL) AS CaCO3		
Sample Collected:	10/22/2008	Findings:	57 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/22/2008	Findings:	28 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/22/2008	Findings:	24 MG/L
Chemical:	SODIUM		
Sample Collected:	10/22/2008	Findings:	2.1 MG/L
Chemical:	POTASSIUM		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Sample Collected:	10/22/2008	Findings:	15 MG/L
Chemical:	CHLORIDE		
Sample Collected:	10/22/2008	Findings:	.98 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	10/22/2008	Findings:	250 UG/L
Chemical:	IRON		
Sample Collected:	10/22/2008	Findings:	92 UG/L
Chemical:	ALUMINUM		
Sample Collected:	10/22/2008	Findings:	340 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	10/22/2008	Findings:	4.4 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	10/22/2008	Findings:	.9 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	10/22/2008	Findings:	990 UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	10/20/2009	Findings:	4.1 MG/L
Chemical:	NITRATE (AS NO3)		

**9
SE
1/2 - 1 Mile
Higher**

CA WELLS 1618

Water System Information:

Prime Station Code:	02N/01E-26E01 S	User ID:	TAN
FRDS Number:	3610044001	County:	San Bernardino
District Number:	13	Station Type:	WELL/AMBNT
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341345.0 1165122.0	Precision:	100 Feet (one Second)
Source Name:	BOW CANYON		
System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929 BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		
Sample Collected:	03/13/2007	Findings:	.71 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/13/2007	Findings:	.74 PCI/L
Chemical:	GROSS ALPHA MDA95		
Sample Collected:	05/15/2007	Findings:	.8 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	05/15/2007	Findings:	.83 PCI/L
Chemical:	GROSS ALPHA MDA95		
Sample Collected:	08/16/2007	Findings:	.521 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Sample Collected:	08/16/2007	Findings:	.5 PCI/L
Chemical:	RADIUM 228 MDA95		
Sample Collected:	11/28/2007	Findings:	.577 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	11/28/2007	Findings:	.5 PCI/L
Chemical:	RADIUM 228 MDA95		
Sample Collected:	10/22/2008	Findings:	250 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	10/22/2008	Findings:	8.2
Chemical:	PH, LABORATORY		
Sample Collected:	10/22/2008	Findings:	110 MG/L
Chemical:	ALKALINITY (TOTAL) AS CaCO ₃		
Sample Collected:	10/22/2008	Findings:	130 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/22/2008	Findings:	75 MG/L
Chemical:	HARDNESS (TOTAL) AS CaCO ₃		
Sample Collected:	10/22/2008	Findings:	20 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/22/2008	Findings:	5.2 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/22/2008	Findings:	26 MG/L
Chemical:	SODIUM		
Sample Collected:	10/22/2008	Findings:	1.3 MG/L
Chemical:	POTASSIUM		
Sample Collected:	10/22/2008	Findings:	7 MG/L
Chemical:	CHLORIDE		
Sample Collected:	10/22/2008	Findings:	.33 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	10/22/2008	Findings:	7.8 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/22/2008	Findings:	130 UG/L
Chemical:	IRON		
Sample Collected:	10/22/2008	Findings:	48 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/22/2008	Findings:	87 UG/L
Chemical:	ALUMINUM		
Sample Collected:	10/22/2008	Findings:	150 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	10/22/2008	Findings:	.2 NTU
Chemical:	TURBIDITY, LABORATORY		

10
SSE
1/2 - 1 Mile
Higher

CA WELLS 18819

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Water System Information:

Prime Station Code:	3610044-039	User ID:	TAN
FRDS Number:	3610044039	County:	San Bernardino
District Number:	13	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	341335.0 1165130.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	LASSEN WELL 04		
System Number:	3610044		
System Name:	CITY OF BIG BEAR LAKE - BEAR VALLEY		
Organization That Operates System:	P.O. BOX 1929		
	BIG BEAR LAKE, CA 92315		
Pop Served:	8146	Connections:	9051
Area Served:	Not Reported		
Sample Collected:	11/08/2006	Findings:	8.4 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	03/14/2007	Findings:	1.8 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/14/2007	Findings:	1.9 PCI/L
Chemical:	GROSS ALPHA MDA95		
Sample Collected:	05/15/2007	Findings:	1.4 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	05/15/2007	Findings:	1.4 PCI/L
Chemical:	GROSS ALPHA MDA95		
Sample Collected:	08/08/2007	Findings:	.745 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	08/08/2007	Findings:	.65 PCI/L
Chemical:	RADIUM 228 MDA95		
Sample Collected:	11/28/2007	Findings:	5.1 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	11/28/2007	Findings:	5.6 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	11/28/2007	Findings:	.546 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	11/28/2007	Findings:	.5 PCI/L
Chemical:	RADIUM 228 MDA95		
Sample Collected:	10/22/2008	Findings:	620 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	10/22/2008	Findings:	8.2
Chemical:	PH, LABORATORY		
Sample Collected:	10/22/2008	Findings:	310 MG/L
Chemical:	ALKALINITY (TOTAL) AS CaCO3		
Sample Collected:	10/22/2008	Findings:	380 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/22/2008	Findings:	330 MG/L
Chemical:	HARDNESS (TOTAL) AS CaCO3		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Sample Collected:	10/22/2008	Findings:	76 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/22/2008	Findings:	28 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/22/2008	Findings:	8.2 MG/L
Chemical:	SODIUM		
Sample Collected:	10/22/2008	Findings:	4.4 MG/L
Chemical:	POTASSIUM		
Sample Collected:	10/22/2008	Findings:	9.8 MG/L
Chemical:	CHLORIDE		
Sample Collected:	10/22/2008	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	10/22/2008	Findings:	64 UG/L
Chemical:	ALUMINUM		
Sample Collected:	10/22/2008	Findings:	340 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	10/22/2008	Findings:	5.8 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	10/22/2008	Findings:	1300 UG/L
Chemical:	NITRATE + NITRITE (AS N)		
Sample Collected:	10/20/2009	Findings:	3.8 MG/L
Chemical:	NITRATE (AS NO3)		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zip	Total Sites	> 4 Pci/L	Pct. > 4 Pci/L
92314	6	1	16.67

Federal EPA Radon Zone for SAN BERNARDINO County: 2

- Note: Zone 1 indoor average level > 4 pCi/L.
- : Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
- : Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for SAN BERNARDINO COUNTY, CA

Number of sites tested: 18

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.678 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)

Source: United States Geologic Survey

EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)

Source: United States Geologic Survey

A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^R Information System

Source: EDR proprietary database of groundwater flow information

EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit

Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Services

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)

Telephone: 800-672-5559

SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)

This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database

Source: Department of Water Resources

Telephone: 916-651-9648

California Drinking Water Quality Database

Source: Department of Health Services

Telephone: 916-324-2319

The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations

Source: Department of Conservation

Telephone: 916-323-1779

Oil and Gas well locations in the state.

RADON

State Database: CA Radon

Source: Department of Health Services

Telephone: 916-324-2208

Radon Database for California

Area Radon Information

Source: USGS

Telephone: 703-356-4020

The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA

Telephone: 703-356-4020

Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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APPENDIX E
SAN BERNARDINO COUNTY,
FIRE DEPARTMENT CORRESPONDENCE

SAN BERNARDINO COUNTY FIRE DEPARTMENT



COUNTY OF SAN BERNARDINO

OFFICE OF THE FIRE MARSHAL
HAZARDOUS MATERIALS DIVISION
620 South "E" Street • San Bernardino, CA 92415-0153
(909) 386-8401 • Fax (909) 386-8460

PAT A. DENNEN
Fire Chief
County Fire Warden

May 14, 2010

Lilburn Corporation
1905 Business Center Dr.
San Bernardino, CA 92408

ATTENTION: Frank Amendola

SUBJECT: CERTIFIED RECORD SEARCH FINDINGS

**RE: Assessor Parcel No. 2328-472-01
Big Bear City, California**

This is to confirm that the Hazardous Materials Division has searched its records for any file(s) pertaining to the subject property, as described in your request, and finds no records exist in this office for the above site description(s).

Records searched include:

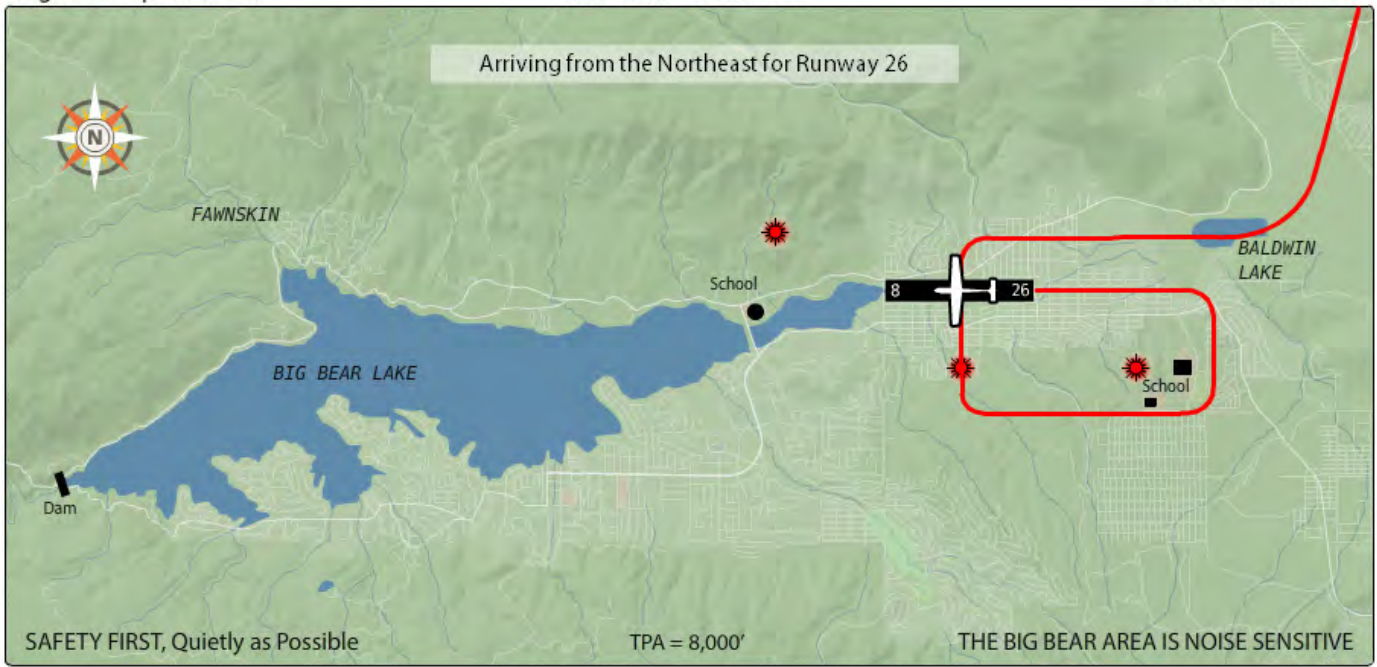
- facilities with hazardous waste generator permits, hazardous materials handler permits, underground storage tank permits, above ground storage tank permit, universal waste permits, tiered permits, EPCRA facilities, RMP facilities, Cal ARP facilities, and/or waste recycling generators, including inactive and/or out of business records, as well as non-permitted facility actions;
- logs of permits issued for the removal, installation, and/or modification of underground storage tanks;
- records and databases pertaining to illicit dumping, spill reports and release notifications, and complaints;
- incidents responded to by the hazardous materials emergency response team;
- and sites undergoing remediation for contaminated soil and/or groundwater.

ELIZABETH A. KING
Environmental Specialist III
OFM Hazardous Materials Division
eking@sbcfire.org
(909) 386-8468 (909) 386-8460 fax

GREGORY C. DEVEREAUX
County Administrative Officer

Board of Supervisors	
BRAD MITZELFELT.....First District	NEIL DERRY.....Third District
PAUL BIANE.....Second District	GARY C. OVITT.....Fourth District
JOSIE GONZALES.....Fifth District	

APPENDIX F.2
Airport Arrival and Departure Paths



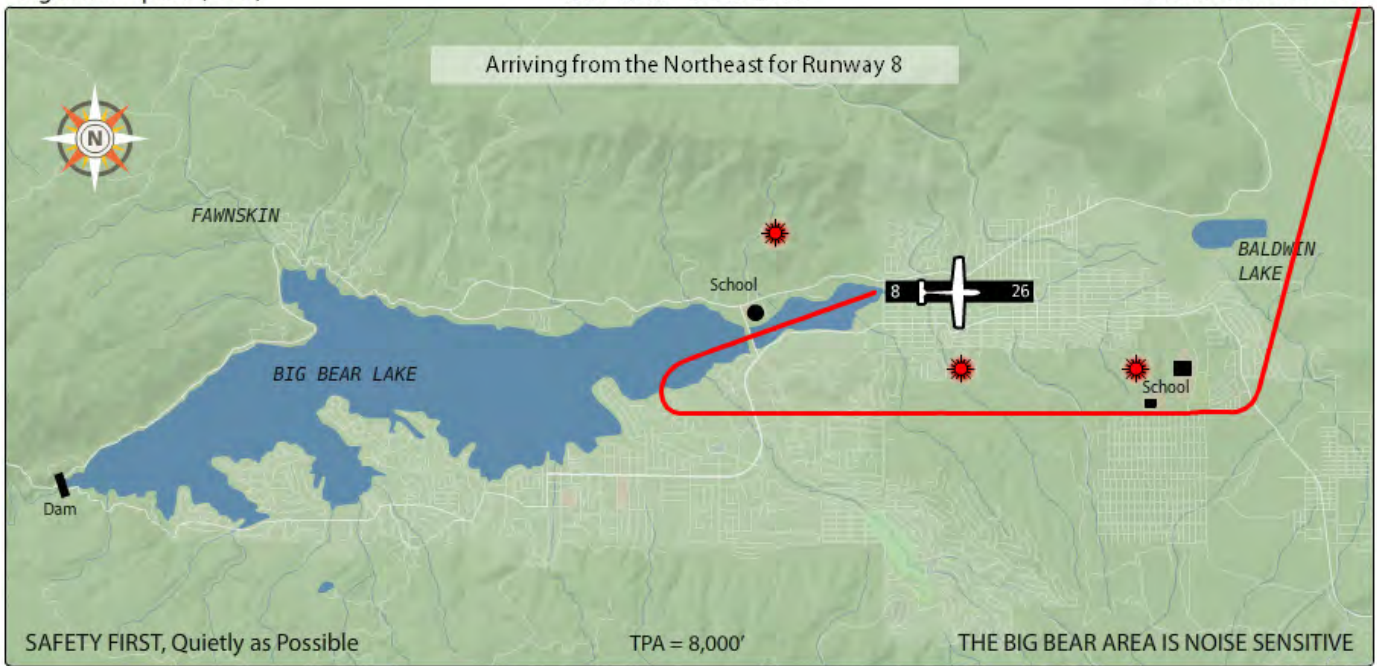
ARRIVALS			
Runway 8 from	W	NW	NE
Runway 26 from	W	NW	NE

Aircraft landing Runway 08 please avoid the round school and playground on final approach; stay south of school over water until you pass the school.

FREQUENCIES	
AWOS-3	135.925 (909-585-4033)
Unicom	122.725
SoCal App	127.25 (West bound)
LA Center	126.35 (East bound)

DEPARTURES			
Runway 8 to	W	NW	NE
Runway 26 to	W	NW	NE

Departing aircraft Runway 08 execute 10° left turn at END OF RUNWAY Do not overfly schools on departure.
 Departing aircraft Runway 26 execute 10° left turn at END OF RUNWAY AVOID SCHOOL (round building) AND PLAY-GROUNDS



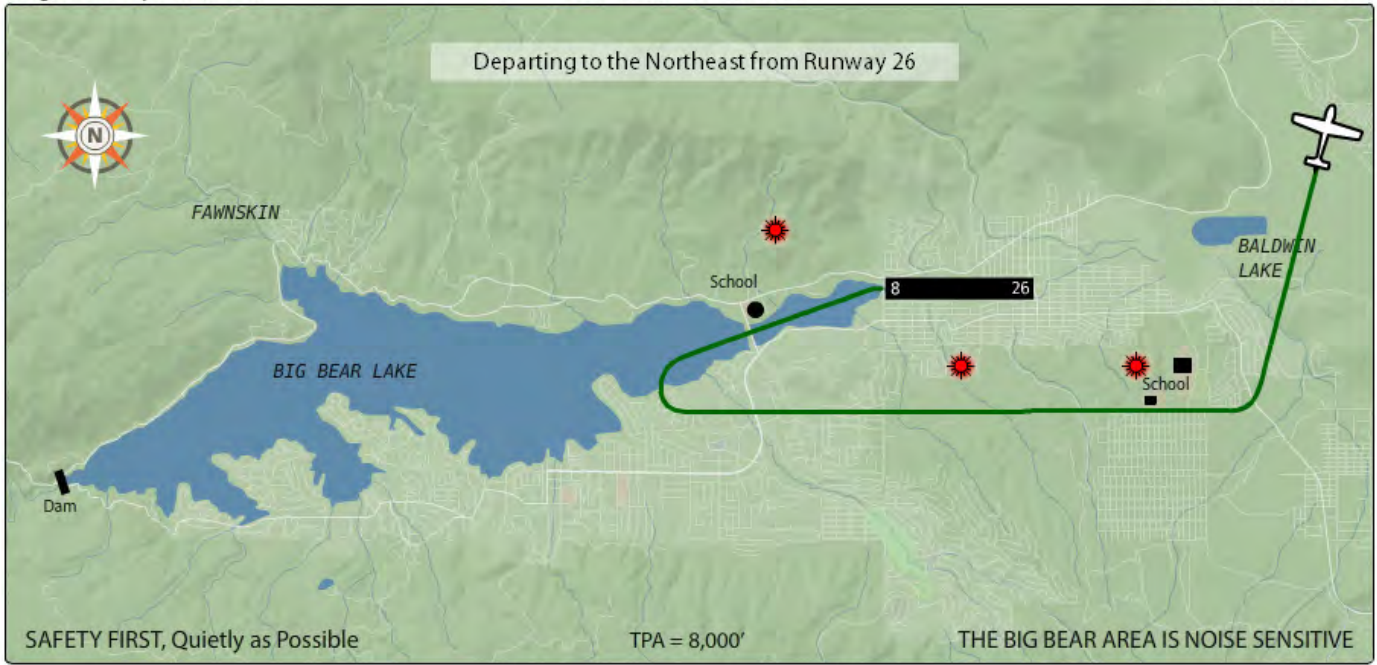
ARRIVALS			
Runway 8 from	W	NW	NE
Runway 26 from	W	NW	NE

Aircraft landing Runway 08 please avoid the round school and playground on final approach; stay south of school over water until you pass the school.

FREQUENCIES	
AWOS-3	135.925 (909-585-4033)
Unicom	122.725
SoCal App	127.25 (West bound)
LA Center	126.35 (East bound)

DEPARTURES			
Runway 8 to	W	NW	NE
Runway 26 to	W	NW	NE

Departing aircraft Runway 08 execute 10° left turn at END OF RUNWAY Do not overfly schools on departure.
 Departing aircraft Runway 26 execute 10° left turn at END OF RUNWAY AVOID SCHOOL (round building) AND PLAY-GROUNDS



ARRIVALS			
Runway 8 from	W	NW	NE
Runway 26 from	W	NW	NE

Aircraft landing Runway 08 please avoid the round school and playground on final approach; stay south of school over water until you pass the school.

FREQUENCIES	
AWOS-3	135.925 (909-585-4033)
Unicom	122.725
SoCal App	127.25 (West bound)
LA Center	126.35 (East bound)

DEPARTURES			
Runway 8 to	W	NW	NE
Runway 26 to	W	NW	NE

Departing aircraft Runway 08 execute 10° left turn at END OF RUNWAY Do not overfly schools on departure.
 Departing aircraft Runway 26 execute 10° left turn at END OF RUNWAY AVOID SCHOOL (round building) AND PLAY-GROUNDS



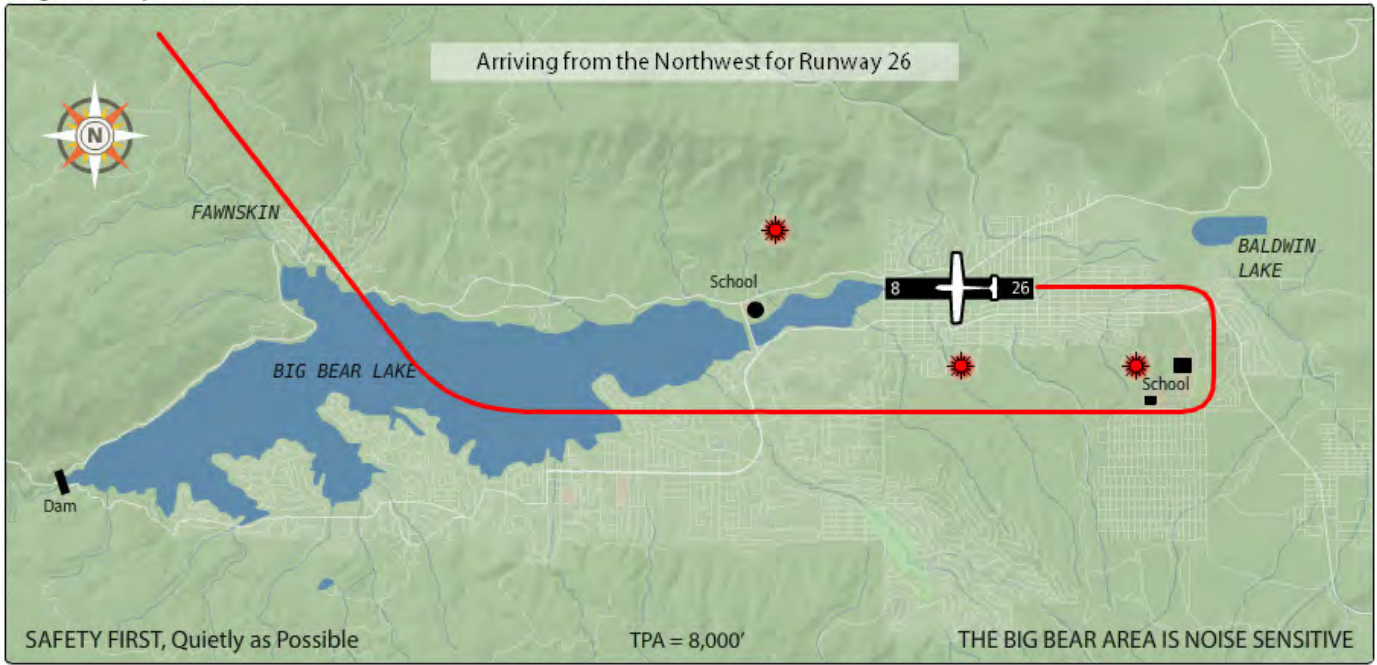
ARRIVALS			
Runway 8 from	W	NW	NE
Runway 26 from	W	NW	NE

Aircraft landing Runway 08 please avoid the round school and playground on final approach; stay south of school over water until you pass the school.

FREQUENCIES	
AWOS-3	135.925 (909-585-4033)
Unicom	122.725
SoCal App	127.25 (West bound)
LA Center	126.35 (East bound)

DEPARTURES			
Runway 8 to	W	NW	NE
Runway 26 to	W	NW	NE

Departing aircraft Runway 08 execute 10° left turn at END OF RUNWAY Do not overfly schools on departure.
 Departing aircraft Runway 26 execute 10° left turn at END OF RUNWAY AVOID SCHOOL (round building) AND PLAY-GROUNDS



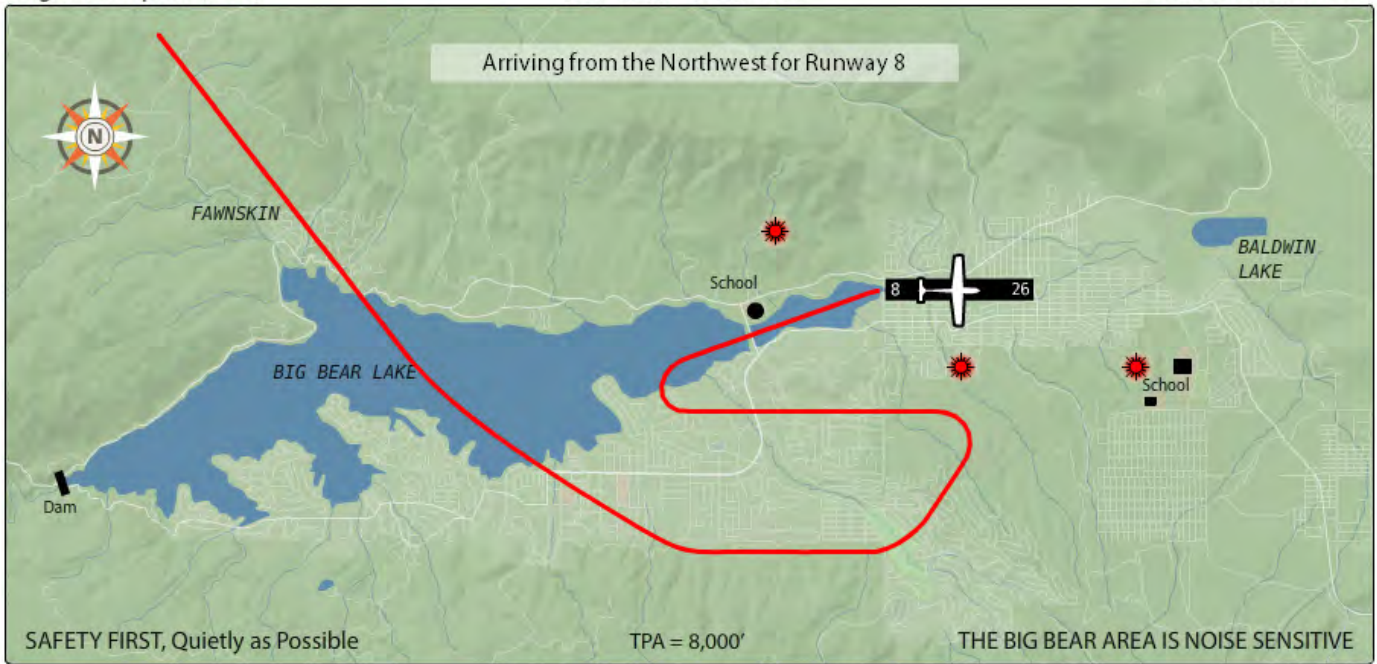
ARRIVALS			
Runway 8 from	W	NW	NE
Runway 26 from	W	NW	NE

Aircraft landing Runway 08 please avoid the round school and playground on final approach; stay south of school over water until you pass the school.

FREQUENCIES	
AWOS-3	135.925 (909-585-4033)
Unicom	122.725
SoCal App	127.25 (West bound)
LA Center	126.35 (East bound)

DEPARTURES			
Runway 8 to	W	NW	NE
Runway 26 to	W	NW	NE

Departing aircraft Runway 08 execute 10° left turn at END OF RUNWAY Do not overfly schools on departure.
 Departing aircraft Runway 26 execute 10° left turn at END OF RUNWAY AVOID SCHOOL (round building) AND PLAY-GROUNDS



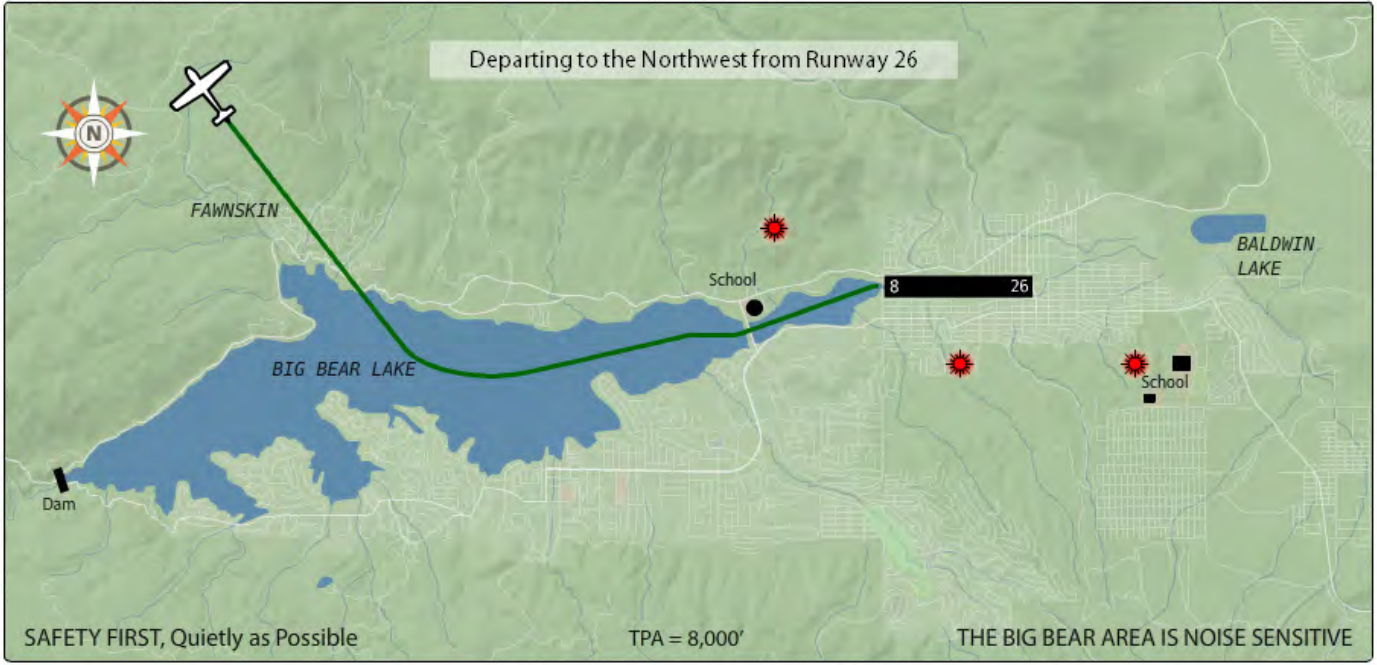
ARRIVALS			
Runway 8 from	W	NW	NE
Runway 26 from	W	NW	NE

Aircraft landing Runway 08 please avoid the round school and playground on final approach; stay south of school over water until you pass the school.

FREQUENCIES	
AWOS-3	135.925 (909-585-4033)
Unicom	122.725
SoCal App	127.25 (West bound)
LA Center	126.35 (East bound)

DEPARTURES			
Runway 8 to	W	NW	NE
Runway 26 to	W	NW	NE

Departing aircraft Runway 08 execute 10° left turn at END OF RUNWAY Do not overfly schools on departure.
 Departing aircraft Runway 26 execute 10° left turn at END OF RUNWAY AVOID SCHOOL (round building) AND PLAY-GROUNDS



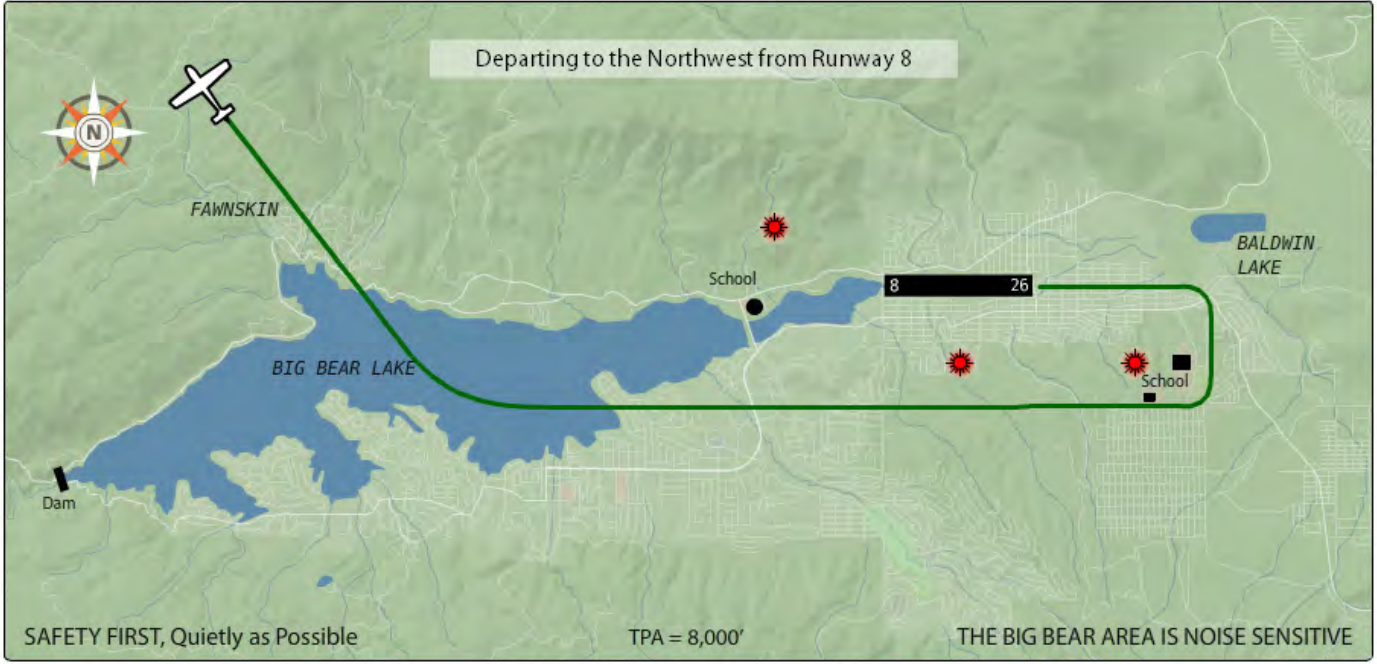
ARRIVALS			
Runway 8 from	W	NW	NE
Runway 26 from	W	NW	NE

Aircraft landing Runway 08 please avoid the round school and playground on final approach; stay south of school over water until you pass the school.

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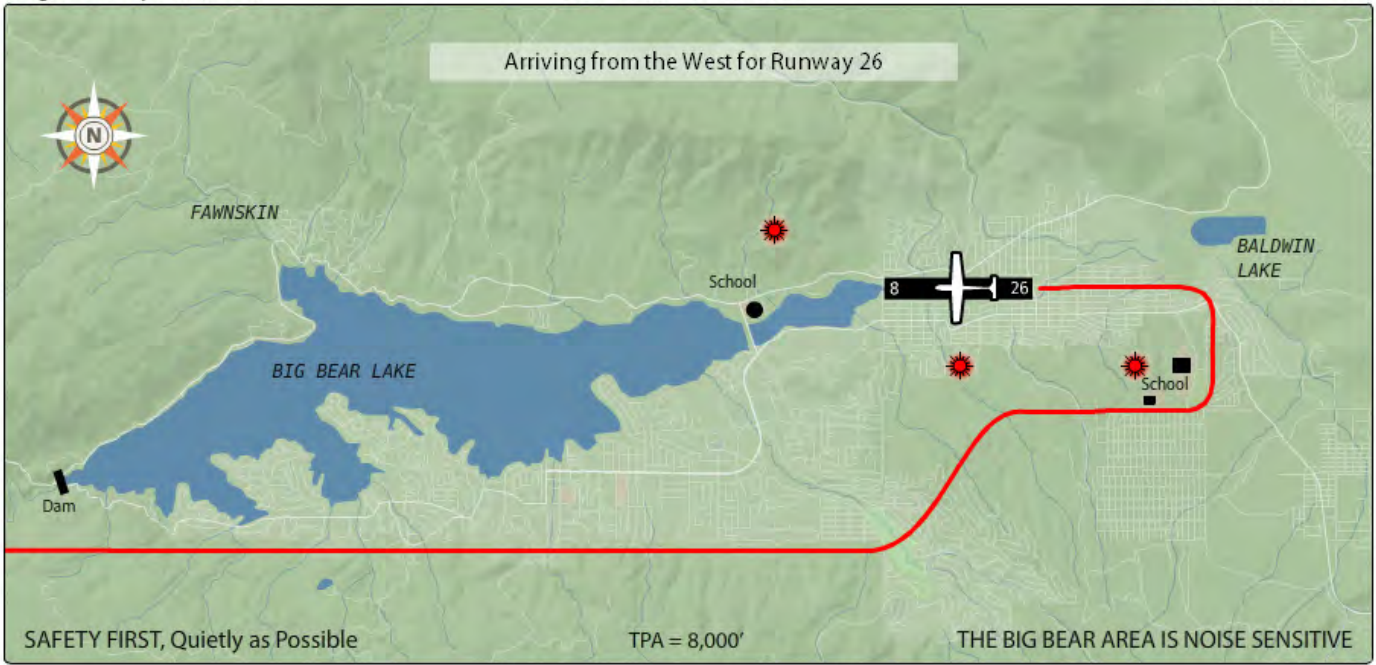
ARRIVALS			
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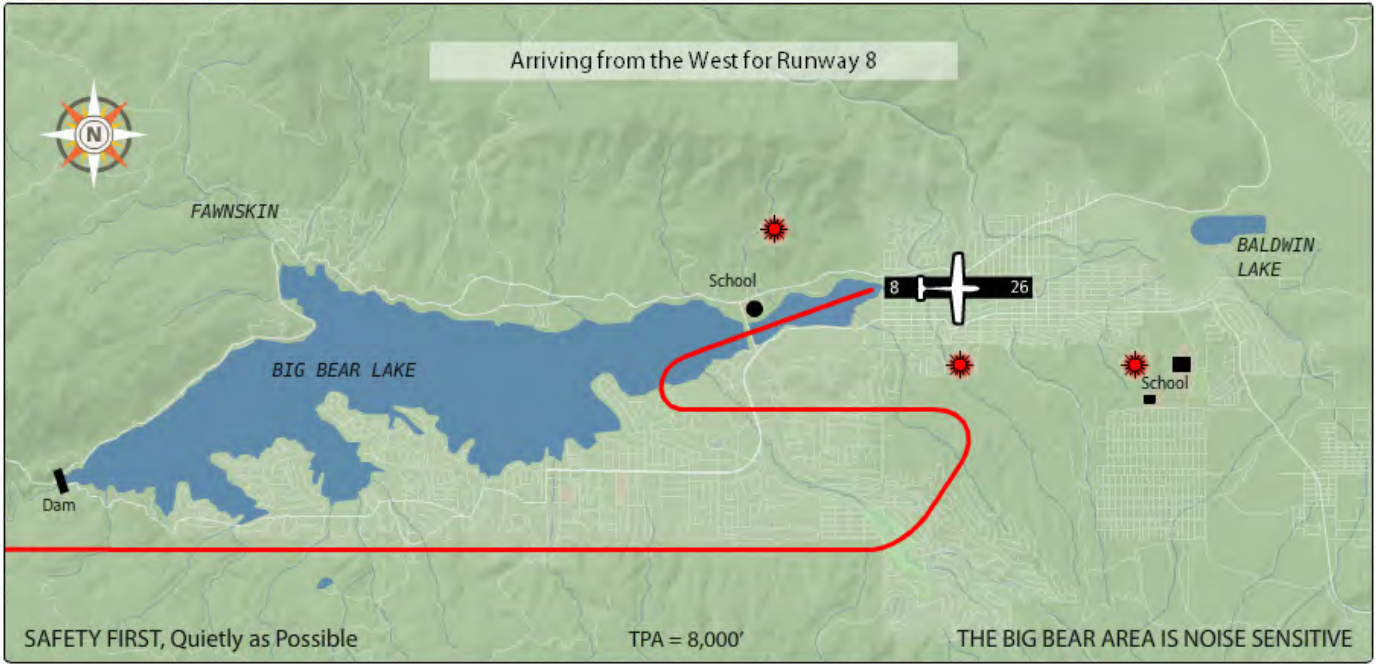
ARRIVALS			
Runway 8	from	W	NW NE
Runway 26	from	--- W	NW NE

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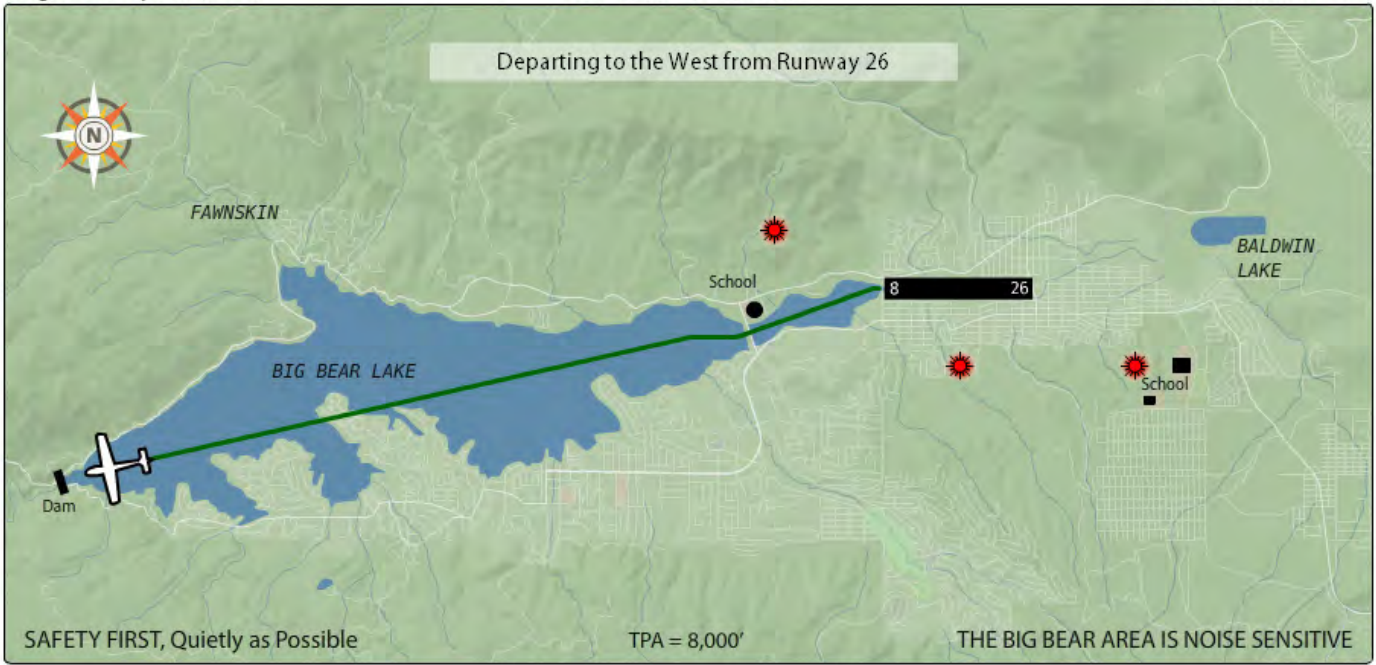
ARRIVALS			
Runway 8	from	--- W	NW NE
Runway 26	from	W	NW NE

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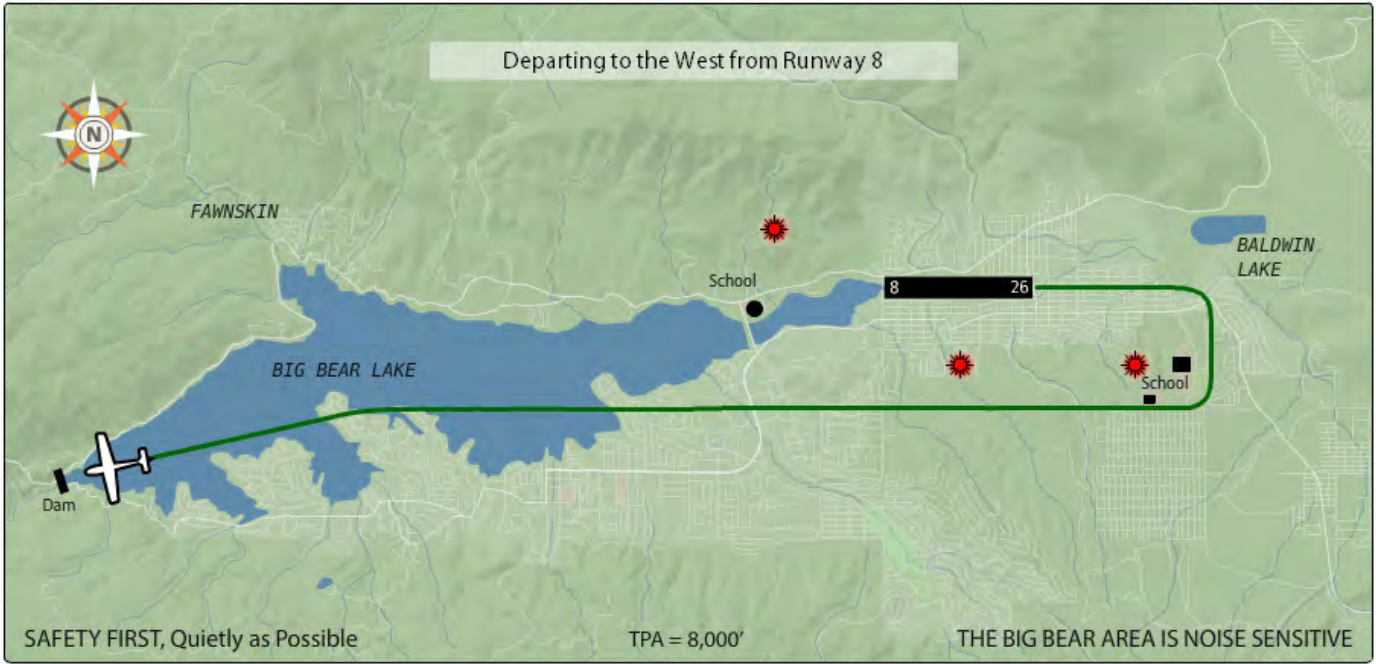
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Runway 8 from	W	NW	NE
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