DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE

COCHRANE ROAD PLANNED UNIT DEVELOPMENT

SCH# 2004112060

VOLUME II OF III - APPENDICES

PREPARED FOR:

CITY OF MORGAN HILL
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PREPARED BY:

PMC
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JULY 2005

Technical Appendices

Appendix B – Agricultural Resources

Pacific Municipal Consultants. California Agricultural Land Evaluation and Site Assessment Model for the Cochrane Road Planned Unit Development. June 12, 2005

PMC

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June 12, 2005

Rebecca Tolentino
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RE: AGRICULTURAL LAND EVALUATION AND SITE ASSESSMENT MODEL – COCHRANE ROAD PUD EIR

Dear Rebecca:

The California Land Evaluation and Site Assessment (LESA) model was used to determine the quality of the agricultural land at the Cochrane Road Planned Unit Development (PUD) property, as recommended by Appendix G of the California Environmental Quality Act (CEQA). The project site is approximately 66.49 acres and is comprised of rural residential uses, an equestrian facility and active agricultural land that has been in production since at least 1917. Agricultural uses at the project site include approximately 16.7-acres of dry-land grain crop, 26.9-acres of irrigated row and field crop, 7.7-acres of pasture, and 6.8-acres of vineyard.

The California Department of Conservation, Division of Land Resource Protection, recommends using the Land Evaluation and Site Assessment (LESA) model, a point-based approach, to rate the relative value of agricultural land resources. The LESA model defines and measures two separate sets of factors: 1) a 'Land Evaluation' factor, which measures the inherent soil-based qualities of land as they relate to agricultural suitability, and 2) a 'Site Assessment' factor, which measures social, economic, and geographic attributes that also contribute to the overall value of the agricultural land. This evaluation is based on information contained within the following documents, as well as information provided by the project applicant:

- Department of Conservation, Office of Land Conservation. *California Agricultural Land Evaluation and Site Assessment Model.* 1997.
- Twining Laboratories, Inc., *Phase I Environmental Site Assessment, Northeast of Interstate 101 and Cochrane Road, Morgan Hill, Santa Clara County, California,* June 2004.

The project site has total LESA score of 63.37 points. The 'Land Evaluation' factor score is 41.62 and the Site Assessment score is 21.75. LESA scores between 40 and 59 points are considered significant only if the 'Land Evaluation' and 'Site Assessment' sub-scores are both greater than or equal to 20 points. Since both the Land Evaluation and Site Assessment sub-score for the proposed project are greater than 20 points, conversion of the agricultural land at the project site is considered significant under the LESA model.

The following provides an overview of the LESA model, the LESA model worksheets, and a map presenting the zone of influence boundaries.

Land Evaluation. The 'Land Evaluation' portion of the LESA model includes two separate factors: 1) The Land Capability Classification Rating (LCC), and 2) the Storie Index Rating. According to the *Soil Survey of Eastern Santa Clara Area, California* approximately 90 percent of the project site, or 59.84 acres, is comprised of the Arbuckle gravelly loam, 0 to 2 percent slopes (ArA) soil series and approximately ten percent of the project site, or approximately 6.65 acres, is comprised of San Ysidro loam, 0 to 2 percent slopes (SdA) soil series. The Arbuckle gravelly loam soil series has a LCC of IIs and a Storie Index rating of 72. The San Ysidro loam soil series has a LCC rating of IIIs and a Storie Index rating of 51. Using the numerical conversion of LCC provided in the *California Agricultural LESA Model Instruction Manual* (DOC 1997) and the Storie Index rating, the LCC score and the Storie Index rating score were calculated for the project site based on the percentage of each soil series. As shown in Table 1, the project site has an overall LCC score of 78 and a Storie Index score of 69.

TABLE 1
LAND EVALUATION WORKSHEET

Land Capability Classification (LCC) and Storie Index Scores							
A	B	C	D	E	F	G	H
Soil Map Unit	Project Acres	Proportion of Project Area	LCC	LCC Rating	LCC Score (C x E)	Storie Index	Storie Index Score (C x G)
ArA	59.84	0.9	IIs	80	72	72	64.8
SdA	6.65	0.1	IIIs	60	6	51	5.1
Totals	66.49	(Must Sum to 1.0)		LCC Total	78	Storie Index Total	69.9

Site Assessment. The 'Site Assessment' portion of the LESA model rates four factors separately, including the following: 1) project size, 2) availability of irrigation water, 3) surrounding agricultural land, and 4) surrounding protected agricultural land (e.g. under a Williamson Act contract or conservation easement).

1. Project Size. The project size component relies upon LCC and the acreages of each soil type at the project site. As discussed above, the Arbuckle gravelly loam, 0 to 2 percent slopes (ArA) soil series comprises approximately 59.84 acres of the project site and has a LCC of IIs. The San Ysidro loam soil series, 0 to 2 percent slopes (SdA) has a LCC rating of IIIs and comprises approximately 6.65 acres of the project site. Based on the 'project scoring' for in the *California Agricultural LESA Model Instruction Manual* (DOC 1997), the ArA soil series would result in a score of 80 and the SdA soil series would result in a project

score of zero because this soil series is less than ten acres of the total acreage of the project site. The highest project score, in this case a score of 80 for the ArA soil series, is the final 'project size' score used in the site assessment portion of the LESA model.

2. Water Resource Availability. The water resources availability component is based upon identifying the various water sources that would supply water to the project site and determining whether restrictions in supply are likely to take place in years characterized as being periods of drought and non-drought. Agricultural production is feasible at the project site during non-drought year's, however irrigation production during drought years is feasible but is considered physically and economically restrictive. Therefore, the project site was given a water resource availability score of 65.

3. Surrounding Agricultural Land. Surrounding agricultural land or Zone of Influence (ZOI) is defined as the land near a given project, both directly adjoining and within a defined distance, that is likely to influence, and be influenced by the agricultural land use of the subject project site. Points are given for the percentage of agricultural land in the ZOI. Due to the surrounding existing development and agricultural land, the percentage of surrounding agricultural land is under 40 percent. As the amount of surrounding agricultural land located within the ZOI is under 40 percent; it received a score of zero, as noted in the *California Agricultural LESA Model Instruction Manual* (DOC 1997).

4. Surrounding Protected Resource Land. Protected resource lands are those lands with long-term use restrictions that are compatible with or supportive of agricultural uses of land. The uses include, Williamson Act Lands, publicly owned lands such as park, forest or watershed resources, and lands with agricultural, wildlife habitat, open space, or other natural resource easements that restrict the conversion of such land to urban or industrial uses. The Zone of Influence was used to determine the percentage of surrounding properties that are considered protected resource land. As in the Surrounding Agricultural Land factor a score of less than 40 percent garners a score of zero (DOC 1997). The protected land project score is less than 40 percent of the ZOI; therefore the "Surrounding Protected Resource Land' score is zero.

LESA Score. A single LESA score is generated for a given project after all the individual 'Land Evaluation' and 'Site Assessment' factors have been scored and weighed as described above. The LESA Model is weighed so that 50 percent of the total LESA score is derived from the 'Land Evaluation' factors and 50 percent from the 'Site Assessment' factors. Scoring thresholds for projects are based upon both the total LESA score as well as the component 'Land Evaluation' and 'Site Assessment' sub-scores, as shown in Table 2, LESA Model Scoring Thresholds.

TABLE 2
LESA MODEL SCORING THRESHOLDS

Total LESA Score	Scoring Decision
0 – 39 Points	Not Considered Significant
40 – 59 Points	Considered Significant only if LE and SA sub-scores are each greater than or equal to 20 points
60 – 79 Points	Considered Significant unless either LE or SA sub-scores is less than 20 points
80 – 100 Points	Considered Significant

The LESA model score for the proposed project site is **63.37**, as shown in Table 3. Since the overall score is greater than 60 points and the 'Site Assessment' and 'Land Evaluation' sub-score for the proposed project are greater than 20 points, conversion of the agricultural land at the project site is considered significant under the LESA model.

TABLE 3
FINAL LESA SCORE SHEET

A	B		C		D
Factor Name	Factor Rating (0-100 points)	X	Factor Weighting (Total = 1.00)	=	Weighted Factor Rating
Land Evaluation		X			
1. Land Capability Classification	78	X	0.25	=	19.5
2. Storie Index Rating	69.9	X	0.25	=	22.12
Subtotal		X			41.62
SITE ASSESSMENT		X			
1. Project Size	80	X	0.15	=	12
2. Water Resource Availability	65	X	0.15	=	9.75
3. Surrounding Agricultural Lands	0	X	0.15	=	0
4. Protected Resource Lands	0	X	0.05	=	0
Subtotal					21.75
			Total LESA Score		63.37

Please contact me if you have any questions at (831) 644-9174, Extension #209.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

Erika Spencer
Senior Planner/Soil Scientist

Technical Appendices

Appendix C – Biological Resources

Pacific Municipal Consultants. Species Commonly Occurring in Santa Clara County. 2005.

Pacific Municipal Consultants. Arborist Report & Tree Inventory Summary. June 29, 2005

Table 3.4-1: Species Commonly Occuring in Santa Clara County.

Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
Amphibians/Reptiles					
California slender salamander	*Batrachoseps attenuatus*	ensatina	*Ensatina eschscholtzii*	western fence lizard	*Sceloporus occidentalis*
coast horned lizard	*Phrynosoma coronatum*	gopher snake	*Pituophis catenifer*	western rattlesnake	*Crotalus oreganus (=viridis)*
common garter snake	*Thamnophis sirtalis*	Pacific treefrog	*Pseudacris (=Hyla) regilla*	western toad	*Bufo boreas*
common kingsnake	*Lampropeltis getula*	red-legged frog	*Rana aurora*		
common side-blotched lizard	*Uta stansburiana*	tiger whiptail	*Cnemidophorus tigris*		
Birds					
acorn woodpecker	*Melanerpes formicivorus*	Cooper's hawk	*Accipiter cooperii*	red-shouldered hawk	*Buteo lineatus*
American coot	*Fulica americana*	double-crested cormorant	*Phalacrocorax auritus*	red-winged blackbird	*Agelaius phoeniceus*
American goldfinch	Carduelis tristis	downy woodpecker	*Picoides pubescens*	ring-billed gull	*Larus delawarensis*
Anna's hummingbird	*Calypte anna*	European starling	*Sturnus vulgaris*	sanderling	*Calidris alba*
barn owl	*Tyto alba*	great blue heron	*Ardea herodias*	sharp-shinned hawk	*Accipiter striatus*
belted kingfisher	*Ceryle alcyon*	great horned owl	*Bubo virginianus*	song sparrow	*Melospiza melodia*
Bewick's wren	*Thryomanes bewickii*	greater yellowlegs	*Tringa melanoleuca*	spotted sandpiper	*Actitis macularia*
black phoebe	*Sayornis nigricans*	house finch	*Carpodacus mexicanus*	spotted towhee	*Pipilo maculatus*
brown pelican	*Pelecanus occidentalis*	house sparrow	*Passer domesticus*	tree swallow	*Tachycineta bicolor*
bushtit	*Psaltriparus minimus*	killdeer	*Charadrius vociferus*	turkey vulture	*Cathartes aura*
California gull	*Larus californicus*	lark sparrow	*Chondestes grammacus*	western bluebird	*Sialia mexicana*
California quail	*Callipepla californica*	lesser goldfinch	*Carduelis psaltria*	western meadowlark	*Sturnella neglecta*
California thrasher	*Toxostoma redivivum*	mallard	*Anas platyrhynchos*	western scrub-jay	*Aphelocoma californica*
California towhee	*Pipilo crissalis*	mourning dove	*Zenaida macroura*	western tanager	*Piranga ludoviciana*
Canada goose	*Branta canadensis*	northern flicker	*Colaptes auratus*	white-crowned sparrow	*Zonotrichia leucophrys*
cedar waxwing	*Bombycilla cedrorum*	northern harrier	*Circus cyaneus*	white-tailed kite	*Elanus leucurus*
chestnut-backed chickadee	*Poecile rufescens*	northern mockingbird	*Mimus polyglottos*	wrentit	*Chamaea fasciata*
cinnamon teal	*Anas cyanoptera*	Pacific loon	*Gavia pacifica*	yellow-rumped warbler	*Dendroica coronata*
common raven	*Corvus corax*	red-tailed hawk	*Buteo jamaicensis*		
Mammals					
big brown bat	*Eptesicus fuscus*	common raccoon	*Procyon lotor*	ornate shrew	*Sorex ornatus*
black rat	Rattus rattus	coyote	*Canis latrans*	pallid bat	*Antrozous pallidus*
black-tailed jackrabbit	*Lepus californicus*	desert cottontail	*Sylvilagus audubonii*	striped skunk	*Mephitis mephitis*
Botta's pocket gopher	*Thomomys bottae*	house mouse	*Mus musculus*	western gray squirrel	*Sciurus griseus*
broad-footed mole	*Scapanus latimanus*	little brown bat	*Myotis lucifugus*	Yuma myotis	*Myotis yumanensis*
California ground squirrel	*Spermophilus beecheyi*	mule deer	*Odocoileus hemionus*		
California vole	*Microtus californicus*	Norway rat	*Rattus norvegicus*		

Source: Sierra Club Online Database for the California Bay-Delta Area, Including Santa Clara County (winter season)

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
alkali milk-vetch	*Astragalus tener var. tener*	FSC;--;1B	Alkali playa, valley and foothill grassland, vernal pools; low ground, alkali flats, and flooded lands; in annual grassland, playas, or vernal pools.	Unlikely	The majority of the project location consists of urban and agricultural habitats. A small area of annual grassland, comprised of mainly invasive species, showed no indications of supporting vernal pools during the site inspection. Therefore, it is unlikely alkali milk-vetch would be present at the project location.
arcuate bush mallow	*Malacothamnus arcuatus (= fasciculat)*	--;--;1B;SLC	Chaparral; gravelly alluvium.	Unlikely	The majority of the project location consists of urban and agricultural habitats. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely arcuate bush mallow would be present at the project location.
Ben Lomond buckwheat (= naked buckwheat)	*Eriogonum nudum var. decurrens*	FSC;--;1B	Chaparral, cismontane woodland, lower montane coniferous forest; ponderosa pine sand hills in Santa Cruz County (known only from Contra Costa and Santa Cruz Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats. In addition, the project site is outside of the known range for this species. Therefore, it is unlikely Ben Lomond buckwheat would be present at the project location.
big-scale (= California) balsamroot	*Balsamorhiza macrolepis var. macrolepis*	--;--;1B;SLC	Valley and foothill grassland, cismontane woodland; sometimes on serpentine.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, the project site has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). Therefore, it is unlikely big-scale balsamroot would be present at the project location.
Brandegee's woolly-star (= eriastrum)	*Eriastrum brandegeeae*	FSC;--;1B	Chaparral, cismontane woodland; on barren volcanic soils; often in open areas.	Unlikely	The majority of the project area consists of urban and agricultural habitats. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Brandegee's woolly-star would be present at the project location.
California sea blite	*Suaeda californica*	FE;--;1B	Marshes and swamps; margins of coastal salt marshes.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, no marsh or swamp areas were noted during the site inspection at or immediately surrounding the project location. Therefore, it is unlikely California sea blite would be present at the site.
caper-fruited tropidocarpum	*Tropidocarpum capparideum*	FSC;--;1A	Valley and foothill grassland; alkaline clay.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely caper-fruited tropidocarpum would be present at the project location.
chaparral harebell (= bellflower)	*Campanula exigua*	--;--;1B;SLC	Chaparral; rocky sites, usually on serpentine in chaparral.	Unlikely	The majority of the project area consists of urban and agricultural habitats. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely chaparral harebell would be present at the project location.
clustered lady's slipper	*Cypripedium fasciculatum*	FSC;--;4	North Coast coniferous forest, lower montane coniferous forest; in serpentine seeps and moist stream banks.	Unlikely	The majority of the project area consists of urban and agricultural habitats. The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, has barren concrete banks. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely clustered lady's slipper would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
Congdon's tarplant	*Centromadia parryi ssp. congdonii*	FSC;–;1B	Valley and foothill grassland; alkaline soils, sometimes described as heavy white clay.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Congdon's tarplant would be present at the project location.
Contra Costa goldfields	*Lasthenia conjugens*	FE;–;1B	Valley and foothill grassland, vernal pools, cismontane woodland; vernal pools, swales, low depressions, in open grassy areas (extirpated from most of its range; extremely endangered).	Unlikely	The majority of the project location consists of urban and agricultural habitats. A small area of annual grassland, comprised of mainly invasive species, showed no indications of supporting vernal pools during the site inspection. Therefore, it is unlikely Contra Costa goldfields would be present at the project location.
coyote ceanothus	*Ceanothus ferrisiae*	FE;–;1B	Chaparral, valley and foothill grassland, coastal scrub; serpentine sites in the Mt. Hamilton range (endemic to Santa Clara County).	Unlikely	Coyote ceanothus is recorded on the CNDDB within one mile of the project location. A small area of annual grassland, comprised mainly of invasive species, is present at the project site, but has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Coyote ceanothus would be present at the project location.
curly-leaved (=curlyleaf) monardella	*Monardella undulata*	FSC;–;4	Chaparral, coastal dunes, coastal scrub, lower montane coniferous forest; ponderosa pine sand hills; sandy soils.	Unlikely	The majority of the project area consists of urban and agricultural habitats. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely curly-leaved monardella would be present at the project location.
Delta tule-pea	*Lathyrus jepsonii var. jepsonii*	FSC;–;1B	Freshwater and brackish marshes; often found with *Typha, Astyer lentus, Rosa californica, Juncus ssp., Scirpus,* etc.; usually on marsh and slough edges (most of distribution restricted to the Sacramento/San Joaquin River Delta).	Unlikely	The majority of the project site consists of urban and agricultural habitats. No marsh or swamp areas were noted during the site inspection at or immediately surrounding the project location. In addition, the project site is outside of the known range for this species. Therefore, it is unlikely Delta tule-pea would be present at this location.
fragrant fritillary (=prairie bells)	*Fritillaria liliacea*	FSC;–;1B	Coastal scrub, valley and foothill grassland, coastal prairie; often on serpentine; various soils reported though usually clay in grassland.	Unlikely	A small area of annual grassland, comprised mainly of invasive species, is present at the project site, but has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). In addition, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely fragrant fritillary would be present at the project location.
Franciscan onion	*Allium peninsulare var. franciscanum*	–;–;1B;SLC	Cismontane woodland, valley and foothill grassland; clay soils; often on serpentine; dry hillsides.	Unlikely	A small area of annual grassland, comprised mainly of invasive species, is present at the project site, but has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). In addition, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Franciscan onion would be present at the project location.
Gairdner's yampah	*Perideridia gairdneri ssp. gairdneri*	FSC;–;4	Broadleaved upland forest, chaparral, coastal prairie, valley and foothill grassland, vernal pools; adobe flats or grasslands, wet meadows and vernal pools, under *Pinus radiata* along the coast; mesic sites.	Unlikely	The majority of the project location consists of urban and agricultural habitats. A small area of annual grassland, comprised of mainly invasive species, showed no indications of supporting vernal pools during the site inspection. Therefore, it is unlikely Gairdner's yampah would be present at the project location.
Greene's popcorn flower	*Plagiobothrys reticulatus var. rossianorum*	FSC;–;–	Foothill woodland, valley grassland; slopes; clay.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Greene's popcorn flower would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
hairless allocarya (=popcorn-flower)	*Plagiobothrys glaber*	FSC;–;1A	Meadows and seeps, marshes and swamps; coastal salt marshes and alkaline meadows.	Unlikely	The majority of the project site consists of urban and agricultural habitats. Also, no marsh or swamp areas were noted during the site inspection at or immediately surrounding the project location. Therefore, it is unlikely hairless allocarya would be present at this location.
Hall's bush mallow	*Malacothamnus hallii (=fasciculatus)*	–;–;1B;SLC	Chaparral; some populations on serpentine.	Unlikely	The majority of the project area consists of urban and agricultural habitats. Also, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Hall's bush mallow would be present at the project location.
Hoover's button-celery	*Eryngium aristulatum var. hooveri*	FSC;–;1B	Vernal pools; alkaline depressions, vernal pools, roadside ditches, and other wet places near the coast (most historical populations from San Benito, Santa Clara, and San Luis Obispo Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats. A small area of annual grassland, comprised of mainly invasive species, showed no indications of supporting vernal pools during the site inspection. In addition, adjacent roadways are level with the project site, without any significant roadside depressions or ditches. Therefore, it is unlikely Hoover's button-celery would be present at the project location.
interior California (Hospital Canyon) larkspur	*Delphinium californicum ssp. interius*	FSC;–;1B	Cismontane woodland, chaparral; in wet, boggy meadows, openings in chaparral and in canyons.	Unlikely	The majority of the project site consists of urban and agricultural habitats. Also, no wet or boggy meadows were noted during the site inspection at or immediately surrounding the project location. Therefore, it is unlikely interior California larkspur would be present at this location.
Kings Mountain manzanita	*Arctostaphylos regismontana*	–;–;1B;SLC	Broadleaved upland forest, chaparral, north coast coniferous forest; granitic or sandstone outcrops (endemic to Santa Cruz and San Mateo Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats. In addition, the project site is outside of the known range for this species. Therefore, it is unlikely Kings Mountain manzanita would be present at the project location.
large-flowered (=flower) linanthus	*Linanthus grandiflorus*	FSC;–;–	Foothill woodland, northern coastal scrub, coastal sage scrub, closed-cone pine forest, valley grassland, coastal prairie; coastal dunes.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, the project site has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). Therefore, it is unlikely large-flowered linanthus would be present at the project location.
legenere	*Legenere limosa*	–;–;1B	Vernal pools; in beds of vernal pools (many historical occurrences are extirpated).	Unlikely	The majority of the project location consists of urban and agricultural habitats. A small area of annual grassland, comprised of mainly invasive species, showed no indications of supporting vernal pools during the site inspection. Therefore, it is unlikely legenere would be present at the project location.
Loma Prieta hoita	*Hoita strobilina*	FSC;–;1B	Chaparral, cismontane woodland, riparian woodland; serpentine; mesic sites.	Unlikely	The majority of the project area consists of urban and agricultural habitats. Also, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Loma Prieta hoita would be present at the project location.
maple-leaved checkerbloom	*Sidalcea malachroides*	–;–;1B;SLC	Broadleaved upland forest, coastal prairie, coastal scrub, north coast coniferous forest; woodlands and clearings near the coast; often in disturbed areas.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Therefore, it is unlikely maple-leaved checkerbloom would be present at the site.
Metcalf Canyon jewel-flower	*Streptanthus albidus ssp. albidus*	FE;–;1B	Valley and foothill grassland; relatively open areas in dry grassy meadows on serpentine soils; also on serpentine balds (endemic to Santa Clara County).	Unlikely	Metcalf Canyon jewel-flower is recorded on the CNDDB within one mile of the project location. A small area of annual grassland, comprised mainly of invasive species, is present at the project site, but has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). In addition, a soil survey of Santa Clara County defines native soil in the vicinity of the project site as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Metcalf Canyon jewel-flower would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
Monterey spineflower	*Chorizanthe pungens var. pungens*	FT;–;1B	Coastal dunes, chaparral, cismontane woodland, coastal scrub; sandy soils in coastal dunes or more inland within chaparral or other habitats (only known from Monterey and Santa Cruz Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). In addition, the project site is outside of the known range for this species. Therefore, it is unlikely Monterey spineflower would be present at the project location.
most beautiful (uncommon) jewel-flower	*Streptanthus albidus ssp. peramoenus*	FSC;–;1B	Chaparral, valley and foothill grassland, cismontane woodland; serpentine outcrops, on ridges and slopes.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. The topography of the site is flat (no ridges or slopes) from years of agricultural use. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely most beautiful jewel-flower would be present at the project location.
Mt. Diablo cottonweed	*Micropus amphibolus*	–;–;3	Valley and foothill grassland, cismontane woodland, broadleaved upland forest; bare, grassy, or rocky slopes.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. The topography of the site is flat (no ridges or slopes) from years of agricultural use. Therefore, it is unlikely Mt. Diablo cottonweed would be present at the project location.
Mt. Diablo phacelia	*Phacelia phacelioides*	FSC;–;1B	Chaparral, cismontane woodland; adjacent to trails, on rock outcrops and talus slopes; sometimes on serpentine.	Unlikely	The majority of the project location consists of urban and agricultural habitats. The topography of the site is flat (no outcrops or slopes) from years of agricultural use. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Mt. Diablo phacelia would be present at the project location.
Mt. Hamilton coreopsis	*Coreopsis hamiltonii*	FSC;–;1B	Cismontane woodland; on steep shale talus with open southwestern exposure (only known from Santa Clara and Stanislaus Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats. The topography of the site is flat (no slopes) from years of agricultural use. Therefore, it is unlikely Mt. Hamilton coreopsis would be present at the project location.
Mt. Hamilton (=Sharesmith's) harebell	*Campanula sharsmithiae*	FSC;–;1B	Chaparral; serpentine barrens (only known from Santa Clara and Stanislaus Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Mt. Hamilton harebell would be present at the project location.
Mt. Hamilton jewel-flower	*Streptanthus callistus*	–;–;1B;SLC	Chaparral, cismontane woodland, open talus slopes on shale with grey pine and/or black oak (endemic to Santa Clara County).	Unlikely	The majority of the project location consists of urban and agricultural habitats. The topography of the site is flat (no slopes) from years of agricultural use. Therefore, it is unlikely Mt. Hamilton jewel-flower would be present at the project location.
Mt. Hamilton lomatium	*Lomatium observatorium*	–;–;1B;SLC	Cismontane woodland; open to partially shaded spaces in *Pinus coulteri* and oak woodland; sedimentary Franciscan rocks and volcanics (endemic to the Mt. Hamilton range, mostly around Mt. Hamilton itself).	Unlikely	The majority of the project location consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). In addition, the project site is outside of the known range for this species. Therefore, it is unlikely Mt. Hamilton lomatium would be present at the project location.
Mt. Hamilton thistle	*Cirsium fontinale var. campylon*	FSC;–;1B	Cismontane woodland, chaparral, valley and foothill grassland; in seasonal and perennial drainages on serpentine.	Unlikely	Mt. Hamilton thistle is recorded on the CNDDB within one mile of the project location. The majority of the project area consists of urban and agricultural habitats. A small area of annual grassland, comprised mainly of invasive species, is present at the project site, but has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, has barren concrete banks. In addition, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Mt. Hamilton thistle would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
northcoast (=Point Reyes) bird's-beak	*Cordylanthus maritimus ssp. palustris*	FSC;–;1B	Coastal salt marsh; usually in coast salt marsh with *Salicornia, Distichlis, Jaumea, Spartina,* etc.	Unlikely	The majority of the project location consists of urban and agricultural habitats. No marsh or swamp areas were noted during the site inspection at or immediately surrounding the project site. Therefore, it is unlikely northcoast bird's-beak would be present at this location.
Oregon meconella (=white fairypoppy)	*Meconella oregana*	FSC;–;1B	Coastal prairie, coastal scrub; open, moist places.	Unlikely	The majority of the project location consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). No marsh or other wetland areas were noted during the site inspection at or immediately surrounding the project site. Therefore, it is unlikely Oregon meconella would be present at the project location.
Pacific cordgrass (=California cordgrass)	*Spartina foliosa*	–;–;–;SLC	Coastal salt marsh.	Unlikely	The majority of the project location consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). No marsh or other wetland areas were noted during the site inspection at or immediately surrounding the project site. Therefore, it is unlikely Pacific cordgrass would be present at the project location.
rayless ragwort	*Senecio aphanactis*	–;–;2	Cismontane woodland, coastal scrub; drying alkaline flats.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Therefore, it is unlikely rayless ragwort would be present at the site.
robust monardella	*Monardella villosa ssp. globosa*	–;–;1B	Broadleaved upland forest, chaparral, cismontane woodland, valley and foothill grassland; openings.	Unlikely	The majority of the project area consists of urban and agricultural habitats. A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, the project site has been disturbed by agricultural activities since at least 1917 (Twining Laboratories 2005). Therefore, it is unlikely robust monardella would be present at the project location.
robust spineflower	*Chorizanthe robusta var. robusta*	FE;–;1B	Cismontane woodland, coastal dunes, coastal scrub; sandy terraces and bluffs or in loose sand.	Unlikely	The majority of the project location consists of urban and agricultural habitats. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely robust spineflower would be present at the project site.
rock sanicle	*Sanicula saxatilis*	FSC;CR;1B	Broadleaved upland forest, chaparral, valley and foothill grassland; bedrock outcrops and talus slopes in chaparral or oak woodland habitat (known only from Contra Costa and Santa Clara Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats. The topography of the site is flat (no outcrops or slopes) from years of agricultural use. Therefore, it is unlikely rock sanicle would be present at the project location.
Salinas Valley (=hooked) popcornflower	*Plagiobothrys uncinatus*	FSC;–;1B	Chaparral, cismontane woodland, valley and foothill grassland, coastal bluff scrub; sandstone outcrops and canyon sides; often in burned or disturbed areas.	Unlikely	The majority of the project area consists of urban and agricultural habitats. A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, the topography of the site is flat (no outcrops or slopes) from years of agricultural use. Therefore, it is unlikely Salinas Valley popcornflower would be present at the project location.
San Francisco Bay spineflower	*Chorizanthe cuspidata var. cuspidata*	FSC;–;1B	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub; closely related to *Chorizanthe pungens*; sandy soil on terraces and slopes.	Unlikely	The majority of the project location consists of urban and agricultural habitats with flat topography (no terraces or slopes) from years of farming activity. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely San Francisco Bay spineflower would be present at the project site.
San Francisco collinsia	*Collinsia multicolor*	–;–;1B	Closed-cone coniferous forest, coastal scrub; on decomposed shale (mudstone) mixed with humus.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely San Francisco collinsia would be present at the site.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
San Francisco wallflower	*Erysimum franciscanum*	FSC;–;4	Coastal dunes, coastal scrub, valley and foothill grassland; often occurs on serpentine soils or outcrops; sometimes granite; occasionally on grassy, rocky slopes (endemic to the greater San Francisco Bay area).	Unlikely	The majority of the project site consists of urban and agricultural habitats. A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, the topography of the site is flat (no outcrops or slopes) from years of farming activity and the native soil is Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely San Francisco wallflower would be present at the project location.
San Joaquin spearscale (=saltbush)	*Atriplex joaquiniana*	FSC;–;1B	Chenopod scrub, alkali meadow, valley and foothill grassland; in seasonal alkali wetlands or alkali sink scrub with *Distichlis spicata, Frankenia,* etc.	Unlikely	The majority of the project location consists of urban and agricultural habitats, which have occurred at this site since at least 1917 (Twining Laboratories 2005). A small area of annual grassland is present within the project area, but is comprised mainly of invasive species. No wetland areas were noted during the site inspection at or immediately surrounding the project area. Therefore, it is unlikely San Joaquin spearscale would be present at this location.
Santa Clara Valley dudleya	*Dudleya setchellii*	FE;–;1B	Valley and foothill grassland, cismontane woodland; on rocky serpentine outcrops and on rocks within grassland or woodland (endemic to serpentines of Santa Clara County).	Unlikely	The majority of the project site consists of urban and agricultural habitats. A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. In addition, the topography of the site is flat (no outcrops or slopes) from years of farming activity and the native soil is Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Santa Clara Valley dudleya would be present at the project location.
Santa Cruz clover	*Trifolium buckwestiorum*	–;–;1B	Coastal prairie, broadleaved upland forest, cismontane woodland; moist grassland (endemic to Santa Cruz County).	Unlikely	The majority of the project location consists of urban and agricultural habitats, which have been present in this area since at least 1917 (Twining Laboratories 2005). In addition, the project site is outside of the known range for this species. Therefore, it is unlikely Santa Cruz clover would be present at the project location.
Santa Cruz manzanita	*Arctostaphylos andersonii*	–;–;1B;SLC	Broadleaved upland forest, chaparral, north coast coniferous forest; open sites, redwood forest (known only from the Santa Cruz Mountains).	Unlikely	The majority of the project location consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). In addition, the project site is outside of the known range for this species. Therefore, it is unlikely Santa Cruz manzanita would be present within the project area.
Santa Cruz Mountains beardtongue	*Penstemon rattanii var. kleei*	–;–;1B;SLC	Chaparral, lower montane coniferous forest; sandy shale slopes; sometimes in the transition between forest and chaparral (known only from Santa Clara and Santa Cruz Counties).	Unlikely	The majority of the project location consists of urban and agricultural habitats with flat topography (no slopes) from years of farming activity. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Santa Cruz Mountains beardtongue would be present at the project site.
Santa Cruz Mountains pussypaws	*Calyptridium parryi var. hesseae*	–;–;3	Chaparral, cismontane woodland; in bare granite or fine textured soil.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Santa Cruz Mountains pussypaws would be present at the site.
serpentine bedstraw	*Galium andrewsii ssp. gatense*	–;–;4;SLC	Chaparral, cismontane woodland, lower montane coniferous forest; dry, rocky places in serpentine soil.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely serpentine bedstraw would be present at the site.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
Sharsmith's onion	*Allium sharsmithae*	FSC;–;1B	Cismontane woodland; rocky, serpentine slopes (endemic to the Mt. Hamilton range).	Unlikely	The majority of the project location consists of urban and agricultural habitats with flat topography (no slopes) from years of farming activity. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Sharsmith's onion would be present at the project site.
Shevock's copper-moss	*Schizymenium shevockii*	–;–;1B;SLC	Cismontane woodland; moss on metamorphic rocks, mesic sites; on rocks along roads, in same habitat as *Mielichhoferia elongata.*	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, no rocky areas supporting moss species were noted during the site inspection. Therefore, it is unlikely Shevock's copper-moss would be present at the site.
showy Indian clover	*Trifolium amoenum*	FE;–;1B	Valley and foothill grassland, coastal bluff scrub; sometimes on serpentine soil, open sunny sites, swales; most recently sited on roadside and eroding cliff face.	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of invasive species. The topography of the site is flat (no swales or cliffs) from years of agricultural use. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely showy Indian clover would be present at the project location.
smooth lessingia	*Lessingia micradenia var. glabrata*	FSC;–;1B	Chaparral; serpentine; often on roadsides (endemic to Santa Clara County).	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely smooth lessingia would be present at the project site.
South Bay clarkia (=Santa Clara red ribbons)	*Clarkia concinna ssp. automixa*	FSC;–;4	Cismontane woodland, chaparral; on slopes and near drainages.	Unlikely	The majority of the project location consists of urban and agricultural habitats with flat topography (no slopes) from years of farming activity. The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, has barren concrete banks. Therefore, it is unlikely South Bay clarkia would be present at the project location.
talus fritillary	*Fritillaria falcata*	FSC;–;1B	Chaparral, cismontane woodland, lower montane coniferous forest; on shale, granite, or serpentine talus.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). The topography of the site is flat (no outcrops or slopes) from years of farming activity and the native soil is Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely talus fritillary would be present at the site.
Tiburon buckwheat	*Eriogonum luteolum var. caninum*	–;–;3;SLC	Chaparral, valley and foothill grassland, coastal prairie; serpentine soils (known from the greater Bay Area).	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of ruderal invasive species. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Tiburon buckwheat would be present at the project location.
Tiburon Indian paintbrush	*Castilleja affinis ssp. neglecta*	FE;CT;1B	Valley and foothill grassland; rocky serpentine sites (known only from Marin, Napa, and Santa Clara Counties).	Unlikely	A small area of annual grassland is present at the project location, but is comprised mainly of ruderal invasive species. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely Tiburon Indian paintbrush would be present at the project location.
Tracy's eriastrum	*Eriastrum tracyi*	–;CR;1B	Chaparral, cismontane woodland; gravelly shale or clay; often in open areas.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Therefore, it is unlikely Tracy's eriastrum would be present at the project site.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Plants					
water sack (=saline) clover	*Trifolim depauperatum var. hydrophilum*	FSC;–;1B	Marshes and swamps, valley and foothill grassland, vernal pools; mesic, alkaline sites.	Unlikely	The majority of the project site consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). A small area of annual grassland, comprised of mainly invasive species, showed no indications of supporting vernal pools during the site inspection. Also, no marsh or swamp areas were noted at or immediately surrounding the project location. Therefore, it is unlikely water sack clover would be present at the site.
western leatherwood	*Dirca occidentalis*	–;–;1B;SLC	Broadleaved upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland; on brushy slopes, mesic sites; mostly in mixed evergreen and foothill woodland communities.	Unliikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Therefore, it is unlikely western leatherwood would be present at the project site.
woolly-headed lessingia	*Lessingia hololeuca*	–;–;3	Coastal scrub, lower montane coniferous forest, valley and foothill grassland; clay, serpentine; roadsides, fields.	Unlikely	The majority of the project area consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). A small area of annual grassland is present at the project location, but is comprised mainly of ruderal invasive species. Also, a soil survey of Santa Clara County defines native soil in the project vicinity as Arbuckle gravelly loam (USDA 1971). Therefore, it is unlikely woolly-headed lessingia would be present at the project site.
Invertebrates					
Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT;–;X	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay; *Plantago erecta* is the primary host plant; *Orthocarpus densiflorus* and *Orthocarpus purpurscens* are the secondary host plants.	Unlikely	The Kirby critical habitat unit, which supports one of the largest populations of Bay checkerspot butterfly, is located within one mile of the project location. The project area is well within the adult dispersal range (up to 4.7 miles has been documented) for this species (USFWS 1998a) however, the primary and secondary host plants for this species were not noted during the site inspection. Due to ongoing agricultural activities and the lack of host plants at the site, it is unlikely Bay checkerspot butterfly are residents at the project location.
California linderiella fairy shrimp	*Linderiella occidentalis*	FSC;–;–	Seasonal pools in unplowed grasslands with alluvial soils underlain by hardpan or in sandstone depressions; water in the pools has very low alkalinity, conductivity, and total dissolved solids.	Unlikely	The majority of the project site consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, no indications of vernal/seasonal pools were noted during the site inspection. Therefore, it is unlikely California linderiella fairy shrimp would be present at the project location.
Edgewood blind harvestman	*Calicina (=sitalcina) minor*	FSC;–;–	Open grassland in areas of serpentine bedrock; found on the underside of moist serpentine rocks near permanent springs.	Unlikely	Edgewood blind harvestman is recorded on the CNDDB within one mile of the project location. Blind harvestmen in this area are primarily found in serpentine areas under medium to large rocks that have been in contact with the soil for a prolonged period (USFWS 1998a). Serpentine soils/rocks are not expected to occur static onsite, since the area has been historically disturbed by agricultural practices. Therefore, it is unlikely that Edgewood blind harvestman would be present at the project location.
Hom's microblind harvestman	*Microcina homi*	FSC;–;–	Serpentine soils (San Francisco Bay area).	Unlikely	With one exception, Hom's microblind harvestman has been found underneath rocks with moist surfaces on serpentine slopes often adjacent to running water (USFWS 1998a). The soil and topography of the project site have been disturbed from years of agricultural activities. In addition, the nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, only accepts season drainage (no consistent running water) from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Therefore, it is unlikely Hom's microblind harvestman would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Invertebrates					
Jung's microblind harvestman	*Microcina jungi*	FSC;–;–	Serpentine soils (San Francisco Bay area).	Unlikely	Only one population of Jung's microblind harvestman is known, located on rocky serpentine grassland (co-located with Hom's microblind harvestman) over one mile north of the project site (USFWS 1998a). Due to the on-going agricultural activity within the project area, it is unlikely Jung's microblind harvestman would be present at the project location.
Opler's longhorn moth	*Adela oplerella*	FSC;–;–	From Marin County and the Oakland area on the inner coast ranges south to Santa Clara County, one record from Santa Cruz County; all but Santa Cruz site is on serpentine grassland; larvae feed on California cream cups (*Platystemon californicus*).	Unlikely	A large population of Opler's longhorn moth is recorded on the CNDDB approximately .75-miles from the project site. This population is located on Coyote Ridge at the Kirby Canyon Butterfly Reserve mitigation area (USFWS 1998a). Opler's longhorn moth is typically found within a few yards of California cream cups, commonly on potential nectar plants such as goldfields (Lasthenia sp.), tidy tips (Layia sp.), and linanthus (Linanthus sp.). No California cream cups were noted in the immediate area during the site inspection; and due to on-going agricultural activities at the project site, it is unlikely this plant is present. In addition, current studies suggest this species' lack of strong flying ability limits their distribution potential to no more than .6 miles (USFWS 1998a). Therefore, it is unlikely Opler's longhorn moth would be present at the project location.
Ricksecker's water scavenger beetle	*Hydrochara ricksecker*i	FSC;–;–	Aquatic (known from the San Francisco Bay area).	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage (no consistent water) from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Therefore, it is unlikely Ricksecker's water scavenger beetle, an aquatic species, would be present at the project location.
unsilvered fritillary butterfly	*Speyeria adiaste adiaste*	FSC;–;–	Fern-dominated grassland, wetland areas; forages on *Viola sp.* (known from Santa Cruz Mountains and Santa Cruz County).	Unlikely	No ferns or wetland areas were noted during the site inspection. In addition, the project is located in Santa Clara County. Therefore, it is unlikely the unsilvered fritillary butterfly would be present at the project location.
vernal pool fairy shrimp	*Branchinecta lynchi*	FT;–;–	In astatic rain-filled pools; inhabits small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools (endemic to the grasslands of the Central Valley, Central Coast Mountains, and South Coast Mountains)	Unlikely	The majority of the project site consists of urban and agricultural habitats, which have been present at this location since at least 1917 (Twining Laboratories 2005). Also, no indications of vernal/seasonal pools were noted during the site inspection. Therefore, it is unlikely vernal pool fairy shrimp would be present at the project location.
Fish					
Central California coastal steelhead	*Oncorhynchus mykiss irideus*	FT;–;–	From Russian River, south to Soquel Creek and to, but not including, Pajaro River; also San Francisco and San Pablo Bay basins.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or permanent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely Central California coastal steelhead would be present at the project location.
Central Valley fall/late fall-run chinook salmon	*Oncorhynchus tshawytscha*	FC;CSC;X	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or permanent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely Central Valley fall/late fall-run chinook salmon would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Fish					
Central Valley spring-run chinook salmon	*Oncorhynchus tshawytscha*	FT;CT;–	Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel; water temperatures greater than 27 degrees Celsius lethal to adults; federal listing refers to populations spawning in the Sacramento River and tributaries.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely Central Valley spring-run chinook salmon would be present at the project location.
Central Valley steelhead	*Oncorhynchus mykiss irideus*	FT;–;–	Populations in the Sacramento and San Joaquin Rivers and their tributaries.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely Central Valley steelhead would be present at the project location.
coho salmon (central California coast)	*Oncorhynchus kisutch*	FT;CE;–	Federal listing refers to populations between Punta Gorda and San Lorenzo River; state listing refers to populations south of Punta Gorda; require beds of loose, silt-free, coarse gravel for spawning; also need cover, cool water and sufficient dissolved oxygen.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely coho salmon would be present at the project location.
delta smelt	*Hypomesus transpacificus*	FT;CT;–	Sacramento-San Joaquin Delta; seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay; seldom found at salinities greater than 10 parts per trillion; most often at salinities less than 2 parts per trillion.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely delta smelt would be present at the project location.
green sturgeon	*Acipenser medirostris*	FC;CSC;–	Spawn in the Sacramento River and the Klamath River; spawn at temperatures between 8 to 14 degrees Celsius; preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely green sturgeon would be present at the project location.
longfin smelt	*Spirinchus thaleichthys*	FSC;CSC;–	Euryhaline, nektonic, and anadromous; found in open waters of estuaries, mostly in the middle or bottom of water column; prefers salinities of 15 to 30 parts per trillion, but can be found in completely freshwater to almost pure seawater.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely longfin smelt would be present at the project location.
Sacramento splittail	*Pogonichthys macrolepidotus*	FSC;CSC;–	Endemic to the lakes and rivers of the Central Valley, but now confined to the Delta, Suisun Bay, and associated marshes; slow moving river sections, dead end sloughs; requires flooded vegetation for spawning and foraging for young.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely Sacramento splittail would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Fish					
South Central California steelhead	*Oncorhynchus mykiss irideus*	FT;--;--	Federal listing refers to runs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely South Central California steelhead would be present at the project location.
tidewater goby	*Eucyclogobius newberryi*	FE;CSC;--	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River; found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely tidewater goby would be present at the project location.
winter-run chinook salmon	*Oncorhynchus tshawytscha*	FE;CE;--	Sacramento River below Keswick Dam; spawns in the Sacramento River but not in tributary streams; requires clean, cold water over gravel beds with water temperatures between 6 and 14 degrees Celsius for spawning.	Unlikely	The nearest waterway, the Santa Clara Valley Water District Cochrane Channel located along the west side of the project site, accepts only season drainage from Highway 101 and a few surrounding areas such as the project site (SCVWD 2004). Furthermore, no consistent source of water or perminent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely winter-run chinook salmon would be present at the project location.
Amphibians and Reptiles					
Alameda whipsnake	*Masticophis lateralis euryxanthus*	FT;CT;X	Restricted to valley-foothill hardwood habitat of the coast ranges between the vicinity of Monterey and North San Francisco Bay; inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with oak trees and grasses.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely Alameda whipsnake would be present at the project location.
California red-legged frog	*Rana aurora draytonii*	FT;CSC;PX	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation; requires 11 to 20 weeks of permanent water for larval development; must have access to estivation habitat.	Unlikely	Annual grassland located at the project site has moderate suitability for reproduction, cover, and foraging of this species. However, no consistent source of water or permanent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Therefore, it is unlikely California red-legged frog would be present at the project location.
California tiger salamander	*Ambystoma californiense*	FT;CSC;PX	Species now listed as threatened statewide; populations in Santa Barbara and Sonoma Counties formerly listed as endangered; need underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding.	Unlikely	The westernmost section of the project location is recorded on the CNDDB as within the range of California tiger salamander. Annual grassland and burrows noted onsite (during the site inspection) provide high suitability for cover and foraging of this species. However, the project area would not be suitable for reproduction due to the absence of breeding pools, ongoing agricultural activites and the majority of the recorded range being located on the other side of Highway 101.
coast (California) horned lizard	*Phrynosoma coronatum (frontale)*	FSC;CSC;--	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes; open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Unlikely	Habitat at the project site provides low suitability for reproduction, cover, and foraging of this species. Therefore, it is unlikely coast horned lizard would be present at the project location.
foothill yellow-legged frog	*Rana boylii*	FSC;CSC;--	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats; needs at least some cobble-sized substrate for egg-laying; needs at least 15 weeks to attain metamorphosis.	Unlikely	Habitat at the project site provides low suitability for reproduction, cover, and foraging of this species. Therefore, it is unlikely foothill yellow-legged frog would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Amphibians and Reptiles					
northwestern pond turtle	*Emys (=Clemmys) marmorata marmorata*	FSC;CSC;–	Associated with permanent or nearly permanent water in a wide variety of habitats; requires basking sites; nests sites may be found up to 0.5 kilometers from water.	Unlikely	Annual grassland located at the project site provides moderate suitability for reproduction, cover, and foraging of this species. However, no consistent source of water or permanent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Furthermore, the project site is at this species' typical maximum dispersal distance (approximately .3 miles) from a permanent water source (Coyote Creek). Therefore, it is unlikely northwestern pond turtle would be present at the project location.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	FE;CE;–	Vicinity of freshwater marshes, ponds, and slow moving streams; prefers dense cover and water depths of at least one foot; upland areas near water are also very important (in San Mateo County and extreme northern Santa Cruz County).	Unlikely	Annual grassland located at the project site provides high suitability for reproduction, cover, and foraging of this species. However, no consistent source of water, permanent water feature, or hydrophitic vegetation was noted (during the site inspection) within or immediately adjacent to the project area. Furthermore, the project site is outside of the known range for this species. Therefore, it is unlikely San Francisco garter snake would be present at the project location.
San Joaquin coachwhip (=whipsnake)	*Masticophis flagellum ruddocki*	FSC;CSC;–	Open, dry habitats with little or no tree cover; found in valley grassland and saltbush scrub in the San Joaquin Valley; needs mammal burrows for refuge and oviposition sites.	Unlikely	Due to ongoing agricultural activities, habitat at the project site provides low suitability for reproduction, cover, and foraging of this species. Therefore, it is unlikely San Joaquin coachwhip would be present at the project location.
silvery legless lizard	*Anniella pulchra pulchra*	FSC;CSC;–	Sandy or loose loamy soils under sparse vegetation; soil moisture is essential; they prefer soils with a high moisture content.	Unlikely	Due to ongoing agricultural activities, habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely silvery legless lizard would be present at the project location.
southwestern pond turtle	*Emys (=Clemmys) marmorata pallida*	FSC;CSC;–	Inhabits permanent or nearly permanent bodies of water in many habitat types; below 6,000 foot elevation; requires basking sites such as partially submerged logs, vegetation mats, or mud bank; need suitable nesting sites.	Unlikely	Annual grassland located at the project site provides moderate suitability for reproduction, cover, and foraging of this species. However, no consistent source of water or permanent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Furthermore, the project site is at this species' typical maximum dispersal distance (approximately .3 miles) from a permanent water source (Coyote Creek). Therefore, it is unlikely southwestern pond turtle would be present at the project location.
western pond turtle	*Emys (=Clemmys) marmorata*	–;CSC;–	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation; need basking sites and suitable (sandy banks or grassy open fields) upland habitat for egg-laying.	Unlikely	Annual grassland located at the project site provides moderate suitability for reproduction, cover, and foraging of this species. However, no consistent source of water or permanent water feature was noted (during the site inspection) within or immediately adjacent to the project area. Furthermore, the project site is at this species' typical maximum dispersal distance (approximately .3 miles) from a permanent water source (Coyote Creek). Therefore, it is unlikely western pond turtle would be present at the project location.
western spadefoot toad	*Spea hammondii*	FSC;CSC;–	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands; vernal pools are essential for breeding and egg-laying.	Unlikely	Annual grassland and burrows noted onsite (during the site inspection) provide high suitability for cover and foraging of this species. However, the project area would not be suitable for reproduction due to the absence of vernal pools or other appropriate water source (the Cochrane channel is devoid of vegetation with steep concrete banks). In addition, the CWHR reports that this toad rarely travels extensively from breeding areas. Therefore, it is unlikely western spadefoot toad would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Birds					
Alameda (South Bay) song sparrow	*Melospiza melodia pusillula*	FSC;CSC;–	Resident of salt marshes bordering the south arm of San Francisco Bay; inhabits *Salicornia* marshes; nests low in *Grindelia* bushes (high enough to escape high tides) and in *Salicornia*.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely Alameda song sparrow would be present at the project location.
Allen's hummingbird	*Selasphorus sasin*	FSC;–;–	Woods, thickets, gardens, parks.	Likely	Urban areas within and surrounding the project site provide high suitability for reproduction, cover, and foraging of this species during summer months. Therefore, it is likely Allen's hummingbird would be present at the project location during the summer.
American bittern	*Botaurus lentiginosus*	FSC;–;–	Freshwater and slightly brackish marshes; also in coastal saltmarshes; dense reed beds.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely American bittern would be present at the project location.
American peregrine falcon	*Falco peregrinus anatum*	FD;CE;–	(Nesting) Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures; nest consists of a scrape on a depression or ledge in an open site.	Unlikely	Although habitat within and surrounding the project area could provide high suitability for reproduction, cover, and foraging of this species, the City of Morgan Hill General Plan states that breeding habitat for peregrine falcon is generally absent from their planning area (Morgan Hill 2001). Therefore, it is unlikely American peregrine falcon would be present at the project location.
bald eagle	*Haliaeetus leucocephalus*	FT;CE;–	(Nesting and Wintering) Ocean shore, lake margins, and rivers for both nesting and wintering; most nests within one mile of water; nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine; roosts communally in winter.	Unlikely	Habitat at the project site provides low suitability for foraging of this species, but is not typically suitable for reproduction or cover. Therefore, it is unlikely bald eagle would be present at the project location.
Bell's sage sparrow	*Amphispiza belli belli*	FSC;CSC;–	(Nesting) Nests in chaparral dominated by fairly dense stands of chamise; found in coastal sage scrub in south of range; nest located on the ground beneath a shrub or in a shrub 6 to 18 inches above ground; territories about 50 yards apart.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely Bell's sage sparrow would be present at the project location.
black skimmer	*Rynchops niger*	FSC;CSC;–	(Nesting colony) Nests along the north and south ends of the Salton Sea; also, on salt pond dikes of south San Diego Bay; nests on gravel bars, low islets, and sandy beaches, in unvegetated sites; nesting colonies usually less than 200 pairs.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely black skimmer would be present at the project location.
black swift	*Cypseloides niger*	FSC;CSC;–	(Nesting) Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above surf; forages widely (coastal belt of Santa Cruz and Monterey Counties; central and southern Sierra Nevada; San Bernardino and San Jacinto Mountains).	Possible	Habitat within and surrounding the project site provides moderate forage suitability for this species during summer months. Therefore, it is possible black swift would be present at the project location during the summer.
California black rail	*Laterallus jamaicensis coturniculus*	–;CT;–	Mainly inhabits salt-marshes bordering larger bays; occurs in tidal salt marsh heavily grown to pickleweed; also in freshwater and brackish marshes, all at low elevation.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely California black rail would be present at the project location.
California brown pelican	*Pelecanus occidentalis californicus*	FE;CE;–	(Nesting colony) Colonial nester on coastal islands just outside the surf line; nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely California brown pelican would be present at the project location.
California clapper rail	*Rallus longirostris obsoletus*	FE;CE;–	Salt-water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay; associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely California clapper rail would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Birds					
California least tern	*Sterna antillarum (=albifrons) browni*	FE;CE;–	(Nesting colony) Nests along the coast from San Francisco Bay south to northern Baja, California; colonial breeder on bare or sparsely vegetated, flat substrates, sand beaches, alkali flats, land fills, or paved areas.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely California least tern would be present at the project location.
California thrasher	*Toxostoma redivivum*	FSC;–;–	Chaparral.	Possible	Urban areas within and surrounding the project site provide moderate suitability for reproduction, cover, and foraging of this species. Therefore, it is possible California thrasher would be present at the project location.
Costa's hummingbird	*Calypte costae*	FSC;–;–	Desert areas.	Possible	Urban areas within and surrounding the project site provide high suitability for reproduction, cover, and foraging of this species during summer months. Therefore, it is possible Costa's hummingbird would be present at the project location during the summer.
ferruginous hawk	*Buteo regalis*	FSC;CSC;–	(Wintering) Open grasslands, sagebrush flats, desert scrub, low foothills, and fringes of pinyon-juniper habitats; mostly eats lagomorphs, ground squirrels, and mice; population trends may follow lagomorph population cycles.	Likely	Habitat within and surrounding the project area provides high suitability for cover and foraging of this species during winter months. Therefore, it is likely ferruginous hawk would be present at the project location during winter months.
golden eagle	*Aquila chrysaetos*	–;CSC;–	(Nesting and wintering) Rolling foothills, mountain areas, sage-juniper flats, desert; cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	Unlikely	Although habitat within and surrounding the project area could provide high foraging suitability for this species, the City of Morgan Hill General Plan states that breeding habitat for golden eagle is generally absent from their planning area (Morgan Hill 2001). Therefore, it is unlikely golden eagle would be present at the project location.
great blue heron	*Ardea herodias*	–;–;–	(Rookery) Colonial nester in tall trees, cliff sides, and sequestered spots on marshes; rookery sites in close proximity to foraging areas; marshes, lake margins, tide-flats, rivers and streams, wet meadows.	Possible	Habitat within and surrounding the project area provides high cover and foraging suitability for this species. Therefore, it is possible that great blue heron would be present at the project location.
Lawrence's goldfinch	*Carduelis lawrencei*	FSC;–;–	(Nesting) Nests in open oak or other arid woodland and chaparral, near water; nearby herbaceous habitats used for feeding; closely associated with oaks.	Likely	Habitat within and surrounding the project area provides high foraging suitability for this species. Therefore, it is likely Lawrence's goldfinch would be present at the project location.
least Bell's vireo	*Vireo bellii pusillus*	FE;CE;–	(Nesting) Summer resident of southern California in low riparian in vicinity of water or in dry river bottoms; below 2,000 feet; nests placed along margins of bushes or on twigs projecting into pathways, usually willow, *Baccharis*, or mesquite.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely least Bell's vireo would be present at the project location.
Lewis' woodpecker	*Melanerpes lewis*	FSC;–;–	Dry open woods, orchards, farmlands, foothills.	Possible	Habitat within and surrounding the project area provides high foraging suitability for this species. Therefore, it is possible Lewis' woodpecker would be present at the project location.
loggerhead shrike	*Lanius ludovicianus*	FSC;CSC;–	(Nesting) Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub and washes; prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	Likely	Habitat within and surrounding the project area provides high cover and foraging suitability for this species. Therefore, it is likely loggerhead shrike would be present at the project location.
long-billed curlew	*Numenius americanus*	FSC;CSC;–	(Nesting) Breeds in upland shortgrass prairies and wet meadows in northeastern California; habitats on gravelly soils and gently rolling terrain are favored over others.	Likely	Habitat within and surrounding the project area provides high cover and foraging suitability for this species. Therefore, it is likely long-billed curlew would be present at the project location.
marbled godwit	*Limosa fedoa*	FSC;–;–	Summers on moist grasslands; winters along coast.	Unlikely	Habitat at the project site provides low suitability for cover and foraging of this species, but is not typically suitable for reproduction. Therefore, it is unlikely marbled godwit would be present at the project location.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Birds					
marbled murrelet	*Brachyramphus marmoratus*	FT;CE;–	(Nesting) Feeds near-shore; nests inland along coast, from Eureka to Oregon border and Half Moon Bay to Santa Cruz; nests in old-growth redwood-dominated forests, up to six miles inland, often in Douglas firs.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely marbled murrelet would be present at the project location.
mountain plover	*Charadrius montanus*	FSC;CSC;–	(Wintering) Short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms; short vegetation, bare ground and flat topography; prefer grazed areas and areas with burrowing rodents.	Unlikely	Although habitat at the project site is suitable for cover and foraging of this species, the project is located outside the typical range of this species. Therefore, it is unlikely mountain plover would be present at the project location.
olive-sided flycatcher	*Contopus cooperi*	FSC;–;–	(Nesting) Nesting habitats are mixed conifer, montane hardwood-conifer, Douglas fir, redwood, red fir, and lodgepole pine; most numerous in montane conifer forests where tall trees overlook canyons, meadows, lakes, or other terrain.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely olive-sided flycatcher would be present at the project location.
red-breasted sapsucker	*Sphyrapicus ruber*	FSC;–;–	Moist woodlands.	Possible	Urban habitat within and surrounding the project area provides high suitability for reproduction, cover, and foraging of this species during winter months. Therefore, it is possible red-breasted sapsucker would be present at the project location during winter months.
red knot	*Calidris canutus*	FSC;–;–	Summers on tundra; winters on coastal beaches and mudflats.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely red knot would be present at the project location.
rufous hummingbird	*Selasphorus rufus*	FSC;–;–	(Nesting) Breeds in transition life zone of northwest coastal area from Oregon border to southern Sonoma County; nests in berry tangles, shrubs, and conifers; favors habitats rich in nectar-producing flowers.	Likely	Urban habitat within and surrounding the project area provides moderate suitability for cover and high suitability for foraging of this species, which migrates through the area. Therefore, it is likely rufous hummingbird would be present at the project location as a migrant.
saltmarsh common yellowthroat	*Geothlypis trichas sinuosa*	FSC;CSC;–	In fresh and salt water marshes; requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting (resident of the San Francisco Bay region).	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely saltmarsh common yellowthroat would be present at the project location.
tricolored blackbird	*Agelaius tricolor*	FSC;CSC;–	(Nesting colony) Highly colonial species, most numerous in Central Valley and vicinity; largely endemic to California; requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	Unlikely	Although habitat within and surrounding the project area could provide high foraging suitability for this species, the City of Morgan Hill General Plan states that breeding habitat for tricolored blackbird is generally absent from their planning area (Morgan Hill 2001). Therefore, it is unlikely tricolored blackbird would be present at the project location.
Vaux's swift	*Chaetura vauxi*	FSC;CSC;–	(Nesting) Redwood, Douglas fir, and other coniferous forests; nests in large hollow trees and snags; often nests in flocks; forages over most terrains and habitats but shows a preference for foraging over rivers and lakes.	Likely	Urban habitat within and surrounding the project area provides high suitability for foraging of this species during summer months. Therefore, it is likely Vaux's swift would be present at the project location during the summer.
western burrowing owl	*Athene cunicularia hypugaea*	FSC;CSC;–	(Burrow sites) Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation; subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Likely	Western burrowing owl is recorded on the CNDDB at the project location. Habitat within and surrounding the project area provides high suitability for reproduction, cover, and foraging of this species. Therefore, it is likely western burrowing owl would still be present at the project location.
western snowy plover	*Charadrius alexandrinus nivosus*	FT;CSC;–	(Nesting) Federal listing applies only to the Pacific coastal population; sandy beaches, salt pond levees and shores of large alkali lakes; needs sandy, gravelly or friable soils for nesting.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely western snowy plover would be present at the project location.
whimbrel	*Numenius phaeopus*	FSC;–;–	Summers on tundra; winters along fresh or salt water and on agricultural fields.	Possible	Habitat within and surrounding the project area provides moderate suitability for foraging of this species during winter months. Therefore, it is possible whimbrel would be present at the project location during the winter.

Table 3.4-2: Listed and Proposed Species Potentially Occurring in the Project Area.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Rationale
Birds					
white-tailed (=black-shouldered) kite	*Elanus leucurus*	FSC;–;–	(Nesting) Rolling foothills/valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland; open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Likely	Habitat within and surrounding the project area provides high suitability for reproduction, cover, and foraging of this species. Therefore, it is likely white-tailed kite would still be present at the project location.
willow flycatcher	*Empidonax traillii*	–;CE;–	(Nesting) Inhabits extensive thickets of low, dense willows on the edge of wet meadows, ponds, or backwaters; requires dense willow thickets for nesting/roosting; low, exposed branches are used for singing posts/hunting perches.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely willow flycatcher would be present at the project location.
Mammals					
American badger	*Taxidea taxus*	–;CSC;–	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils; need sufficient food, friable soils and open, uncultivated ground; preys on burrowing rodents; digs burrows.	Possible	Habitat at the project site provides moderate foraging suitability for this species. Therefore, it is possible American badger would be present at the project location.
fringed myotis bat	*Myotis thysanodes*	FSC;–;–	In a wide variety of habitats, optimal habitats are pinyon-juniper, valley foothill hardwood and hardwood-conifer; uses caves, mines, buildings, or crevices for maternity colonies and roosts.	Unlikely	Habitat at the project site provides low suitability for foraging of this species, but is not typically suitable for reproduction or cover due to human disturbance. Therefore, it is unlikely fringed myotis bat would be present at the project location.
greater western mastiff-bat	*Eumops perotis californicus*	FSC;CSC;–	Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc.; roosts in crevices in cliff faces, high buildings, trees, and tunnels.	Unlikely	Although habitat at the project site could provide moderate foraging suitability for this species, the City of Morgan Hill General Plan states that breeding habitat for California matiff bat is generally absent from their planning area (Morgan Hill 2001). Therefore, it is unlikely greater western mastiff-bat would be present at the project location.
long-eared myotis bat	*Myotis evotis*	FSC;–;–	Found in all brush, woodland, and forest habitats from sea level to about 9,000 feet; prefers coniferous woodlands and forests; nursery colonies in buildings, crevices, spaces under bark, and snags; caves used primarily as night roosts.	Possible	Habitat at the project site provides moderate foraging suitability for this species. Therefore, it is possible long-eared myotis bat would be present at the project location.
long-legged myotis bat	*Myotis volans*	FSC;–;–	Most common in woodland and forest habitats above 4,000 feet; trees are important day roosts, caves and mines are night roosts; nursery colonies usually under bark or in hollow trees, but occasionally in crevices or buildings.	Unlikely	Habitat at the project site provides low suitability for foraging of this species, but is not typically suitable for reproduction or cover. Therefore, it is unlikely long-legged myotis bat would be present at the project location.
Pacific (=Townsend's) western big-eared bat	*Corynorhinus (=Plecotus) townsendii townsendii*	FSC;CSC;–	Humid coastal regions of Northern and Central California; roost in limestone caves, lava tubes, mines, buildings, etc.; will only roost in the open, hanging from walls and ceilings; roosting sites limiting; extremely sensitive to disturbance.	Unlikely	Habitat at the project site provides low suitability for foraging of this species, but is not typically suitable for reproduction or cover due to human disturbance. Therefore, it is unlikely Pacific western big-eared bat would be present at the project location.
riparian brush rabbit	*Sylvilagus bachmani riparius*	FE;CE;–	Riparian areas on the San Joaquin River in northern Stanislaus County; dense thickets of wild rose, willows, and blackberries.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely riparian brush rabbit would be present at the project location.
salt marsh harvest mouse	*Reithrodontomys raviventris*	FE;CE;–	Only in the saline emergent wetlands of San Francisco Bay and its tributaries; pickleweed is primary habitat; do not burrow, build loosely organized nests; require higher areas for flood escape.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely salt marsh harvest mouse would be present at the project location.
salt marsh vagrant (=wandering) shrew	*Sorex vagrans halicoetes*	FSC;CSC;–	Salt marshes of the south arm of San Francisco Bay; medium high marsh 6 to 8 foot above sea level where abundant driftwood is scattered among *Salicornia*.	Unlikely	Habitat at the project site is not typically suitable for reproduction, cover, or foraging of this species. Therefore, it is unlikely salt marsh vagrant shrew would be present at the project location.

Table 3.4-3: Listed and Proposed Species Potentially Occurring in the Project Area Potentially Needing Study.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Potential for Occurrence
Invertebrates					
Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT;–;X	Seasonal pools in unplowed grasslands with alluvial soils underlain by hardpan or in sandstone depressions; water in the pools has very low alkalinity, conductivity, and total dissolved solids.	Unlikely	The project area is centrally located between three critical habitat areas for the Bay checkerspot butterfly (one each to the northeast, northwest, and southwest). All three areas are within 2 miles of each other, which is well within the adult dispersal range (up to 4.7 miles has been documented) for this species (USFWS 1998a) however, the primary and secondary host plants for this species were not noted during the site inspection. Due to ongoing agricultural activities and the lack of host plants at the site, it is unlikely Bay checkerspot butterfly are residents at the project location.
Amphibians and Reptiles					
California tiger salamander	*Ambystoma californiense*	FT;CSC;PX	Species now listed as threatened statewide; populations in Santa Barbara and Sonoma Counties formerly listed as endangered; need underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding.	Unlikely	California tiger salamander range in this area, as recorded on the CNDDB, is bisected by Highway 101, which separates the project site (east of the highway) from the majority of the range (west of the highway). Because of this separation, the lack of suitable breeding pools, and ongoing agricultural activities, it is unlikely California tiger salamander are residents at the project site.
Birds					
raptors (birds of prey, such as falcons, hawks, owls) and other migratory and resident birds	NA	MBTA;§3503 .5 DFG Code;–	Various habitats.	Likely	Trees (primarily *Juglans nigra*) within the project area provide potential nest sites for raptors. Also, foraging or transient migratory and resident birds have a potential for occurrence in the project area.
Allen's hummingbird	*Selasphorus sasin*	FSC;–;–	Woods, thickets, gardens, parks.	Likely	Allen's hummingbird forages on nectar, insects, and at hummingbird feeders. This bird also uses sprinklers, birdbaths, and other water sources provided by humans for drinking and bathing. This species mostly winters in Mexico, but migrates north to nest from mid-February through early August. Therefore, Allen's hummingbird is a likely resident of areas within and/or surrounding the project site.
black swift	*Cypseloides niger*	FSC;CSC;–	(Nesting) Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above surf; forages widely (coastal belt of Santa Cruz and Monterey Counties; central and southern Sierra Nevada; San Bernardino and San Jacinto Mountains).	Possible	Black swifts nest on steep, rocky cliffs, but will forage long-distances over many habitats for flying insects. This species is present within the project vicinity from May through September. Therefore, it is possible black swift forage on insects that occur at the project location.

Table 3.4-3: Listed and Proposed Species Potentially Occurring in the Project Area Potentially Needing Study.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Potential for Occurrence
Birds					
California thrasher	*Toxostoma redivivum*	FSC;–;–	Chaparral.	Possible	California thrasher forages on the ground for insects, small lizards, fruits and berries. In addition, this species often uses bird feeders and birdbaths provided by humans in urban areas. These birds nest and take cover in riparian thickets, supported by local waterways. Therefore, it is possible California thrasher are residents of surrounding areas and forage within the project site.
Costa's hummingbird	*Calypte costae*	FSC;–;–	Desert areas.	Possible	Costa's hummingbird arrives in the project vicinity mid-March and stays until late September when it migrates south. This species prefers dry environments, but is found in valley foothill riparian areas like those along local waterways. Costa's hummingbird eats nectar, spiders, insects, and visits feeders in an urban environment. Therefore, it is possible Costa's hummingbird forages within the project site and adjacent areas from March through September.
ferruginous hawk	*Buteo regalis*	FSC;CSC;–	(Wintering) Open grasslands, sagebrush flats, desert scrub, low foothills, and fringes of pinyon-juniper habitats; mostly eats lagomorphs, ground squirrels, and mice; population trends may follow lagomorph population cycles.	Likely	Ferruginous hawk are fairly common residents of grasslands and agricultural areas in California from September through mid-April. Therefore, it is likely Ferruginous hawk utilizes the project area during this timeframe.
great blue heron	*Ardea herodias*	–;–;–	(Rookery) Colonial nester in tall trees, cliff sides, and sequestered spots on marshes; rookery sites in close proximity to foraging areas; marshes, lake margins, tide-flats, rivers and streams, wet meadows.	Possible	Great blue heron prefer habitats near wetland areas, such as marshes, swamps, and river or lake edges. They forage in shallow water on a variety of prey, such as fish, amphibians, and insects, but also hunt in open fields for small mammals. Since Coyote Creek and Anderson Lake are in areas surrounding the project site, it is possible great blue heron occasionally forage and/or find cover at the project location.
Lawrence's goldfinch	*Carduelis lawrencei*	FSC;–;–	(Nesting) Nests in open oak or other arid woodland and chaparral, near water; nearby herbaceous habitats used for feeding; closely associated with oaks.	Likely	Lawrence's goldfinch forages on the ground and in low grasses for seeds and insects as well as at bird feeders for sunflower and thistle seeds. Therefore, it is likely Lawrence's goldfinch forages within and surrounding the project area.
Lewis' woodpecker	*Melanerpes lewis*	FSC;–;–	Dry open woods, orchards, farmlands, foothills.	Possible	Lewis' woodpecker forages mainly on insects, but also eats acorns, nuts, fruits, and seed from bird feeders. Therefore, it is possible Lewis' woodpecker forages within and surrounding the project area.

Table 3.4-3: Listed and Proposed Species Potentially Occurring in the Project Area Potentially Needing Study.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Potential for Occurrence
Birds					
loggerhead shrike	*Lanius ludovicianus*	FSC;CSC;–	(Nesting) Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub and washes; prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting	Likely	Loggerhead shrike is a common resident of California that is often found in open cropland. Therefore, it is likely loggerhead shrike would be found within grassland and agricultural areas at the project site.
long-billed curlew	*Numenius americanus*	FSC;CSC;–	(Nesting) Breeds in upland shortgrass prairies and wet meadows in northeastern California; habitats on gravelly soils and gently rolling terrain are favored over others.	Likely	Long-billed curlew are found in central California from late-June through mid-April. This species is commonly found in coastal estuaries, but also forages on grasslands and fields for prey such as insects, worms, spiders, berries, and snails. Therefore, grassland and dryland grain crop at the project location is likely to provide cover and forage for the long-billed curlew.
red-breasted sapsucker	*Sphyrapicus ruber*	FSC;–;–	Moist woodlands.	Possible	Red-breasted sapsucker occurs most frequently in moist woodlands, such as those found along Coyote Creek. This species nests and roosts in tree cavities and forages on the soft tissues of trees and insects. Therefore, it is possible to find red-breasted sapsucker utilizing trees within and surrounding the project site.
rufous hummingbird	*Selasphorus rufus*	FSC;–;–	(Nesting) Breeds in transition life zone of northwest coastal area from Oregon border to southern Sonoma County; nests in berry tangles, shrubs, and conifers; favors habitats rich in nectar-producing flowers.	Likely	Rufous hummingbird is a common migrant species throughout California. This species forages on nectar, insects, spiders, and sap from holes drilled by sapsuckers as well as visits hummingbird feeders. Therefore, it is likely rufous hummingbirds would forage and find cover within the project site as it migrates through the area.
Vaux's swift	*Chaetura vauxi*	FSC;CSC;–	(Nesting) Redwood, Douglas fir, and other coniferous forests; nests in large hollow trees and snags; often nests in flocks; forages over most terrains and habitats but shows a preference for foraging over rivers and lakes	Likely	Vaux's swift is a common summer resident of northern California. This species forages for insects over most terrains and habitats, especially near rivers. Due to the proximity of the project site to Coyote Creek, it is likely Vaux's swift forage within the area.
western burrowing owl	*Athene cunicularia hypugaea*	FSC;CSC;–	(Burrow sites) Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation; subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Likely	Small mammal burrows noted onsite during the site inspection provide suitable cover and nest areas for this owl. The CNDDB records previous sightings of this species at the project location. Therefore, it is likely western burrowing owls are utilizing the project area.

Table 3.4-3: Listed and Proposed Species Potentially Occurring in the Project Area Potentially Needing Study.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Potential for Occurrence
Birds					
whimbrel	*Numenius phaeopus*	FSC;–;–	Summers on tundra; winters along fresh or salt water and on agricultural fields.	Possible	Whimbrel winter mainly along fresh or marine wetlands, where they forage for crustaceans and mollusks. However, whimbrel also forage on adjacent agricultural fields for insects and spiders. Therefore, it is possible whimbrel forage within and near the project location during the winter.
white-tailed (=black-shouldered) kite	*Elanus leucurus*	FSC;–;–	(Nesting) Rolling foothills/valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland; open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Likely	White-tailed kite is a common yearlong resident of coastal and valley California. This species is most often found near agricultural areas, where it preys mainly on voles and other small mammals as well as birds, insects, reptiles, and amphibians. Therefore, it is likely white-tailed kite would utilize the project site.
Mammals					
American badger	*Taxidea taxus*	–;CSC;–	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils; need sufficient food, friable soils and open, uncultivated ground; preys on burrowing rodents; digs burrows.	Possible	American badgers are found throughout California, except for the extreme northwest. Badgers are somewhat tolerant of human activities, but do not survive in cultivated areas. They prey on fossorial rodents, such as ground squirrels, and use burrows for cover. Uncultivated portions of the surrounding areas could support American badger, which then would possibly forage at the project location.
long-eared myotis bat	*Myotis evotis*	FSC;–;–	Found in all brush, woodland, and forest habitats from sea level to about 9,000 feet; prefers coniferous woodlands and forests; nursery colonies in buildings, crevices, spaces under bark, and snags; caves used primarily as night roosts.	Possible	Long-eared myotis bats forage along habitat edges, in open habitats, and over water. Therefore, due to the proximity of water features (Coyote Creek and Anderson Lake) as well as site characteristics (open, agricultural land), it is possible long-eared myotis forage over the project location.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE;CT;–	Annual grasslands or grassy open stages with scattered shrubby vegetation; need loose-textured sandy soils for burrowing, and suitable prey base.	Unlikely	San Joaquin kit fox are found in a variety of habitats, including row crop, vineyard, pasture, and grasslands. Distributional records for this species show the presence of kit fox near Anderson Lake about 10 miles from the project site. Home ranges of up to 12 miles have been recorded for this fox (USFWS 1998b). However, residential areas situated between the project site and Anderson Lake may prohibit distribution of the fox to the project site. In addition, the City of Morgan Hill General Plan states that breeding habitat for San Joaquin kit fox is generally absent from their planning area (Morgan Hill 2001). Therefore, it is unlikely that San Joaquin kit fox utilize the project location.

Table 3.4-3: Listed and Proposed Species Potentially Occurring in the Project Area Potentially Needing Study.

Common Name	Scientific Name	Status	General Habitat Description	Species' Presence Onsite (Likely/Possible/Unlikely)	Potential for Occurrence
Mammals					
small-footed myotis bat	*Myotis ciliolabrum*	FSC;–;–	Rock outcrops, open grasslands, canyons, woodlands; roosts in cracks, crevices in cliffs, beneath tree bark, in mines or caves, and the occasional human dwelling.	Likely	Small-footed myotis bats occur in a wide variety of habitats, usually near water. They roost and seek cover in several areas, including buildings, crevices, under bridges, and under bark. This species often forages among trees and over water sources, such as streams, ponds, springs, and stock tanks. Therefore, small-footed myotis is likely to either be roosting in structures at the project site and/or foraging over the project site.
Yuma myotis bat	*Myotis yumanensis*	FSC;–;–	Optimal habitats are open forests and woodlands with sources of water over which to feed; distribution is closely tied to bodies of water; maternity colonies in caves, mines, buildings, or crevices.	Possible	Yuma myotis bats are common throughout most of California, especially near water sources over which they can feed. The current project setting is moderately suitable as foraging habitat for this species, especially considering the project's proximity to Coyote Creek (approximately .5-miles north of the site). Additionally, abandoned wooden buildings on the property could provide roost and/or cover sites for this species. Therefore, it is possible Yuma myotis would be present within and/or foraging over the project location.

Notes

CE	California endangered
CNDDB	California Natural Diversity Database
CSC	California species of concern
CT	California threatened
DFG	California Department of Fish and Game
FD	Federal delisted; species will be monitored for five years
FE	Federal endangered
FSC	Federal species of concern
FT	Federal threatened
MBTA	Migratory Bird Treaty Act
PX	Proposed critical habitat
USFWS	US Fish and Wildlife Service
.X	Critical habitat designated for this species

PMC

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June 29, 2005

Rebecca Tolentino, Associate Planner
City of Morgan Hill Planning Department
17555 Peak Avenue
Morgan Hill, CA 95037-4128

Re: Cochrane Road Planned Unit Development
Preliminary Arborist Report & Inventory Summary

Dear Rebecca:

On December 13, 2004, Kevin Grant (ISA Certified Arborist #23090/WE-4192A) visited the Cochrane Road Planned Unit Development (PUD) project site, located within the City of Morgan Hill, California. The purpose of this site visit was to conduct a field inspection and collect field data in order to prepare a Preliminary Arborist Report in compliance with the City of Morgan Hill Ordinance Section 12.32.030 through 12.32.080, Restrictions on Removal of Significant Trees, which requires an inventory and field identification of any single-trunked non-indigenous species with a circumference of 40-inches or more and 18-inches or more for indigenous species measured at four and one-half feet vertically above the ground. The trees were identified (GPS locations) and tagged in the field with round, blue metal numbered tags beginning with tree No. 501. For your reference, the numbers utilized in this report correspond to the tag affixed to the tree.

Project Description

The Cochrane Road Planned Unit Development (PUD) project (hereinafter "proposed project") consists of a zoning amendment and a general plan amendment application to establish a precise development plan for a retail shopping center on a 66.49-acre site located at the northeast corner of Cochrane Road and U.S. Highway 101. The proposed project would include two large anchor stores, retail shops, restaurants (sit-down and fast-food), and a multi-plex cinema with up to 14 screens. The proposed anchor stores could consist of the relocation and expansion of the `Target' store (currently located at the Cochrane Plaza shopping center) and construction of over 530,000 square feet of additional retail, which could include a home improvement store, wholesale store or department store; retail shops; restaurants (sit-down and fast food); and a 63,200 square foot multi-plex cinema with up to 14 screens. The proposed project includes an optional 12-position fuel station that would incorporate a 1,600

square foot convenience market and a 600 square foot car wash as a substitution for 2,200 square feet of retail space. The expanded `Target´ will not include a full-size grocery store.

The project site is generally level and consists of vacant fallow agricultural land, cultivated land (row crops and vineyards), three residences, and an equestrian boarding facility. Surrounding land uses include vacant land planned for commercial uses and the De Paul Health Center (formerly the St. Louise Hospital) located south of the project site; unincorporated County land located within the City's sphere of influence and vacant land located within the city limits designated 'Single-Family Medium' in the *City of Morgan Hill General Plan* located east of the project site; unincorporated County land located within the City's sphere of influence designated 'Rural County' in the *City of Morgan Hill General Plan* located north of the project site; and U.S. Highway 101 and the SCVWD drainage channel located west of the project site. Although the project site is primarily rural in nature, the area west of the U.S. Highway 101/Cochrane Road interchange is developed primarily with commercial uses, including the Cochrane Plaza shopping center located at the southwest quadrant of this intersection, and a Chevron Station, two hotels, two vacant restaurant pads, and the Madrone Business Park located at the northwest quadrant of this intersection.

Inventory Analysis

As you will see from Table 1, Inventory Summary, the project site contains 118 trees, five (5) of which fall within the criteria of the City of Morgan Hill Ordinance Section 12.32.070 due to their size and species. Due to the nature of the proposed project, all trees were accounted for during the survey. Species composition includes forty-six (46) Black Walnut (*Juglans nigra*), eleven (11) Pepper (*Shinus molle*), ten (10) Monterey Pine *(Pinus radiata),* nine (9) White Ash *(Fraxinus americana),* ten (10) Palm *(Trachycarpus spp.),* four (4) Gum *(Eucalyptus spp.),* three (3) Valley Oak (*Quercus lobata*), three (3) Olive (*Olea uropea*), three (3) Strawberry (*Arbutus unedo*), three (3) Paper Mulberry *(Broussonetia papyrifera),* two (2) Japanese Loquat *(Eriobotrya japonica),* two (2) Deodar (*Cedrus deodara*), two (2) Live Oak (*Quercus wizlizenii),* two (2) Privet (*Ligustrum spp.*), two (2) Pecan (*Carya illinoinensis*), two (2) Juniper (*Juniperus californica*), one (1) California Redwood *(Sequoia sempervirens),*one (1) Willow *(Salix alba),* one (1) White Fir (*Abies concolor*), and one (1) Sycamore (*Acer pseudoplatanus*). The arborist survey tables and aerials that present the location of these trees are attached to this letter.

Of that total, 108 trees have been recommended for removal due to structural defects and invasive unhealthy qualities. Five trees are subject to City of Morgan Hill Ordinance Section 12.32.070 due to their size and species.

Health

Overall there is decay and/or indications of hollow areas in the large limbs, root crown, and trunks; a few small callused-over foreign objects (e.g., nails, wire, etc) present; a small amount of fungus is evident particularly small saprophytes on exposed wood; some small, callusing injuries are present; some small limbs are dead and decaying and callus is forming at their base; some excessive limb weight exists; the amount of dead limbs and twigs present are within the normal range; some large callused areas are present; some small cavities and areas of decay are present; the growth rate is average and/or slightly below average; and some leaf size, color, leaf arrangement and density varies.

Maintenance of the trees at the project site has not been performed on a routine basis and therefore the trees have declined in overall health. The majority of the trees at the project site are unhealthy

and would not withstand major construction impacts. In fact, the trees left in their current state would pose more of a hazard (fuel loads for fire), are not aesthetically pleasing, nor provide substantial fruit/shade or economic value to the property. All trees, except for approximately ten palm trees, have been recommended for removal.

TABLE 1
INVENTORY SUMMARY

	Number	DBH
INVENTORY TOTAL	118	1,868
Trees recommended to be removed	108	1,771
Trees recommended to be transplanted and protected	10	97
Trees recommended to be protected in place	0	0
TOTAL		55

Recommended Replacement Program

Removal and/or relocation of trees at the project site shall be in compliance with Sections 12.32.030 through 12.32.080 of the City of Morgan Hill Municipal Code, Restrictions on Removal of Significant Trees. Should the City of Morgan Hill require the project applicant to preserve any existing trees in place and/or transplant any trees at the project site, the following tree protection standards shall be implemented during construction and demolition activities at the project site.

> To improve as much as possible the chance for long-term survival of all trees that are protected or transplanted at the project site, tree protection standards shall be implemented. Prior to commencement of construction activities, to the greatest extent feasible, the critical root zone (measurement of the dripline radius taken from the tree trunk to the tip of the farthest reaching branch as determined by a Certified Arborist or Registered Professional Forrester) of any tree to be retained shall be fenced with a four-foot high brightly colored synthetic fence at the outermost edge of the critical root zone to prevent injury to the trees prior to grading and during construction activities within the project area. The fencing shall remain in place until all construction activities are complete. Trenching, grading, soil compaction, parking of vehicles or heavy equipment, stockpiling of construction materials, and/or dumping of materials shall not be allowed within the critical root zone.

Please feel free to give me a call if you have any questions or require additional information.

Sincerely,

Kevin L. Grant
ISA Certified Arborist WE-4192A

TABLE #2
ARBORIST SURVEY

Tree #	Common Name	Species	Total DBH (inches)	DLR (feet)	Condition Assessment						Arborist Recommended Removals	Maintenance Recommendations
					Structure			Vigor				
					P	P-F	F	P	P-F	F		
501	Black Walnut	*Juglans nigra.*	22	22	x			x			Wounded/Diseased/Remove	
502	Black Walnut	*Juglans nigra.*	25	22	x			x			Wounded/Diseased/Remove	
503	Black Walnut	*Juglans nigra.*	22	25	x			x			Wounded/Diseased/Remove	
504	Black Walnut	*Juglans nigra.*	25	26	x			x			Wounded/Diseased/Remove	
505	Black Walnut	*Juglans nigra.*	25	20	x			x			Wounded/Diseased/Remove	
506	Black Walnut	*Juglans nigra.*	22	20	x			x			Wounded/Diseased/Remove	
507	Black Walnut	*Juglans nigra.*	19	20	x			x			Wounded/Diseased/Remove	
508	Black Walnut	*Juglans nigra.*	19	20	x			x			Wounded/Diseased/Remove	
509	Black Walnut	*Juglans nigra.*	25	22	x			x			Wounded/Diseased/Remove	
510	Black Walnut	*Juglans nigra.*	22	18	x			x			Wounded/Diseased/Remove	
511	Black Walnut	*Juglans nigra.*	22	28	x			x			Wounded/Diseased/Remove	
512	Black Walnut	*Juglans nigra.*	25	23	x			x			Wounded/Diseased/Remove	
513	Black Walnut	*Juglans nigra.*	15	22	x			x			Wounded/Diseased/Remove	
514	Black Walnut	*Juglans nigra.*	19	19	x			x			Wounded/Diseased/Remove	
515	Black Walnut	*Juglans nigra.*	22	20	x			x			Wounded/Diseased/Remove	
516	Black Walnut	*Juglans nigra.*	18	19	x			x			Wounded/Diseased/Remove	
517	Black Walnut	*Juglans nigra.*	25	22	x			x			Wounded/Diseased/Remove	

NOTES:

DBH – Diameter at Breast Height
DLR – Drip Line Radius

P – Poor
P-F – Poor to Fair
F - Fair

Tree #	Common Name	Species	Total DBH (inches)	DLR (feet)	Condition Assessment						Arborist Recommended Removals	Maintenance Recommendations
					Structure			Vigor				
					P	P-F	F	P	P-F	F		
518	Black Walnut	*Juglans nigra.*	23	20	x			x			Wounded/Diseased/Remove	
519	Black Walnut	*Juglans nigra.*	22	20	x			x			Wounded/Diseased/Remove	
520	Black Walnut	*Juglans nigra.*	25	22	x			x			Wounded/Diseased/Remove	
521	Black Walnut	*Juglans nigra.*	22	20	x			x			Wounded/Diseased/Remove	
522	Black Walnut	*Juglans nigra.*	22	22	x			x			Wounded/Diseased/Remove	
523	Black Walnut	*Juglans nigra.*	19	22	x			x			Wounded/Diseased/Remove	
524	Black Walnut	*Juglans nigra.*	22	20	x			x			Wounded/Diseased/Remove	
525	Black Walnut	*Juglans nigra.*	23	23	x			x			Wounded/Diseased/Remove	
526	Black Walnut	*Juglans nigra.*	18	20	x			x			Wounded/Diseased/Remove	
527	Black Walnut	*Juglans nigra.*	20	20	x			x			Wounded/Diseased/Remove	
528	Black Walnut	*Juglans nigra.*	19	20	x			x			Wounded/Diseased/Remove	
529	Black Walnut	*Juglans nigra.*	23	23	x			x			Wounded/Diseased/Remove	
530	Black Walnut	*Juglans nigra.*	22	20	x			x			Wounded/Diseased/Remove	
531	Black Walnut	*Juglans nigra.*	28	25	x			x			Wounded/Diseased/Remove	
532	Black Walnut	*Juglans nigra.*	30	20	x			x			Wounded/Diseased/Remove	
533	Black Walnut	*Juglans nigra.*	15	22	x			x			Wounded/Diseased/Remove	
534	Black Walnut	*Juglans nigra.*	26	23	x			x			Wounded/Diseased/Remove	
535	Pepper	*Shinus molle*	33	36		x				x	Remove/unhealthy	
536	Pepper	*Shinus molle*	22	29		x				x	Remove/unhealthy	
537	Japanese Loquat	*Eriobotrya japonica*	10	22		x				x	Remove/unhealthy	

NOTES:

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Tree #	Common Name	Species	Total DBH (inches)	DLR (feet)	Condition Assessment						Arborist Recommended Removals	Maintenance Recommendations
					Structure			Vigor				
					P	P-F	F	P	P-F	F		
538	Pepper	*Shinus molle*	22	26			x			x	Remove/not 'significant tree'	
539	Black Walnut	*Juglans nigra.*	9	15			x			x	Remove/not 'significant tree'	
540	Black Walnut	*Juglans nigra.*	6	15	x			x			Remove/unhealthy	
541	Strawberry Tree	*Arbutus unedo*	9	11			x			x	Remove/not 'significant tree'	
542	Strawberry Tree	*Arbutus unedo*	6	12			x			x	Remove/not 'significant tree'	
543	Strawberry Tree	*Arbutus unedo*	6	12			x			x	Remove/not 'significant tree'	
544	Olive	*Olea europa*	10	20			x			x	Remove/not 'significant tree'	
545	Olive	*Olea europa*	10	20			x			x	Remove/not 'significant tree'	
546	Pepper	*Shinus molle*	22	30			x			x	Remove/not 'significant tree'	
547	Black Walnut	*Juglans nigra.*	22	21	x			x			Remove/unhealthy	
548	Black Walnut	*Juglans nigra.*	10	15		x		x			Remove/unhealthy	
549	Black Walnut	*Juglans nigra.*	9	15		x		x			Remove/unhealthy	
550	Pecan	*Carya illinoinensis*	10	12	x			x			Remove/unhealthy	
551	Pecan	*Carya illinoinensis*	6	11	x			x			Remove/unhealthy	
552	Palm	Trachycarpus spp.	9	10		x			x			Transplant
553	Black Walnut	*Juglans nigra.*	12	19	x			x			Remove/unhealthy	
554	Palm	Trachycarpus spp.	10	11			x			x		Transplant
555	Pepper	*Shinus molle*	12	15		x			x		Remove/unhealthy	
556	Palm	Trachycarpus spp.	8	10			x			x		Transplant
557	Palm	Trachycarpus spp.	8	11			x			x		Transplant

NOTES:

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F - Fair

Tree #	Common Name	Species	Total DBH (inches)	DLR (feet)	Condition Assessment						Arborist Recommended Removals	Maintenance Recommendations
					Structure			Vigor				
					P	P-F	F	P	P-F	F		
558	Pepper	*Shinus molle*	18	19		x			x		Remove/unhealthy	
559	Palm	Trachycarpus spp.	9	11			x			x		Transplant
560	Privet	*Ligustrum spp.*	8	10	x			x			Remove/unhealthy	
561	Palm	Trachycarpus spp.	8	12			x			x		Transplant
562	Pepper	*Shinus molle*	26	29		x			x		Remove/unhealthy	
563	Palm	Trachycarpus spp.	9	12		x				x		Transplant
564	Pepper	*Shinus molle*	22	26		x			x		Remove/unhealthy	
565	Palm	Trachycarpus spp.	8	11			x			x		Transplant
566	Pepper	*Shinus molle*	26	30		x			x		Remove/unhealthy	
567	Palm	Trachycarpus spp.	8	11		x				x		Transplant
568	Monterey Pine	*Pinus radiata*	14	25		x				x	Remove/Powerline Pruned	
569	Deodar	*Cedrus deodora*	11	18			x			x	Remove/not 'significant tree'	
570	Monterey Pine	*Pinus radiata*	12	20			x			x	Remove/not 'significant tree'	
571	Deodar	*Cedrus deodora*	12	20			x			x	Remove/not 'significant tree'	
572	Monterey Pine	*Pinus radiata*	12	20		x				x	Remove/unhealthy	
573	Monterey Pine	*Pinus radiata*	25	29	x			x			Remove/unhealthy	
574	Monterey Pine	*Pinus radiata*	22	30	x			x			Remove/unhealthy	
575	Monterey Pine	*Pinus radiata*	9	15		x			x		Remove/unhealthy	
576	White Fir	*Abies concolor*	8	15			x			x	Remove/not 'significant tree'	
577	Monterey Pine	*Pinus radiata*	12	26		x		x			Remove/unhealthy	

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F - Fair

Tree #	Common Name	Species	Total DBH (inches)	DLR (feet)	Condition Assessment						Arborist Recommended Removals	Maintenance Recommendations
					Structure			Vigor				
					P	P-F	F	P	P-F	F		
578	Monterey Pine	*Pinus radiata*	11	20		x				x	Remove/unhealthy	
579	Black Walnut	*Juglans nigra.*	9	19	x			x			Remove/unhealthy	
580	Pepper	*Shinus molle*	15	20		x			x		Remove/unhealthy	
581	Gum	*Eucalyptus spp.*	28	36			x			x	Remove/not 'significant tree'	
582	Live Oak	Quercus wizlizenii	15	22		x				x	Remove/unhealthy	
583	Common juniper	*Juniperus communis*	10	8		x			x		Remove/unhealthy	
584	Valley Oak	*Quercus lobata*	8	12	x			x			Remove/unhealthy	
585	Valley Oak	*Quercus lobata*	15	23			x			x	Remove/unhealthy	
586	Valley Oak	*Quercus lobata*	10	20			x			x	Remove/unhealthy	
587	Japanese Loquat	*Eriobotrya japonica*	10	20		x			x		Remove/unhealthy	
588	Pepper	*Shinus molle*	13	19		x			x		Remove/unhealthy	
589	Live Oak	Quercus wizlizenii	12	19			x			x	Remove/unhealthy	
590	Black Walnut	*Juglans nigra.*	10	12	x			x			Remove/unhealthy	
591	White Ash	Fraxinus americana	6	12			x		x		Remove/unhealthy	
592	White Ash	Fraxinus americana	6	12			x		x		Remove/unhealthy	
593	White Ash	Fraxinus americana	16	19			x		x		Remove/unhealthy	
594	White Ash	Fraxinus americana	12	19			x		x		Remove/unhealthy	
595	White Ash	Fraxinus americana	10	15			x		x		Remove/unhealthy	
596	White Ash	Fraxinus americana	10	15			x	x			Remove/unhealthy	
597	Gum	*Eucalyptus spp.*	15	20			x			x	Remove/unhealthy	

NOTES:

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F - Fair

Tree #	Common Name	Species	Total DBH (inches)	DLR (feet)	Condition Assessment						Arborist Recommended Removals	Maintenance Recommendations
					Structure			Vigor				
					P	P-F	F	P	P-F	F		
598	White Ash	Fraxinus americana	11	15		x		x			Remove/unhealthy	
599	Gum	*Eucalyptus spp.*	15	20			x		x		Remove/unhealthy	
600	White Ash	Fraxinus americana	6	12		x			x		Remove/unhealthy	
601	Gum	*Eucalyptus spp.*	22	20		x		x			Remove/unhealthy	
602	Juniper	*Juniperus californica*	16	23		x			x		Remove/unhealthy	
603	unknown	?	11	20		x			x		Remove/unhealthy	
604	Monterey Pine	*Pinus radiata*	10	20			x			x	Remove/not 'significant tree'	
605	Monterey Pine	*Pinus radiata*	10	16	x			x			Remove/unhealthy	
606	Willow	*Salix alba*	30	29	x			x			Remove/unhealthy	
607	Black Walnut	*Juglans nigra.*	22	20	x			x			Remove/unhealthy	
608	Black Walnut	*Juglans nigra.*	12	15	x			x			Remove/unhealthy	
609	Palm	Trachycarpus spp.	20	18			x			x		Transplant
610	Black Walnut	*Juglans nigra.*	9	12	x			x			Remove/unhealthy	
611	Paper Mulberry	*Broussonetia papyrifera*	9	16	x			x			Remove/unhealthy	
612	Paper Mulberry	*Broussonetia papyrifera*	9	19	x			x			Remove/unhealthy	
613	Paper Mulberry	*Broussonetia papyrifera*	8	19	x			x			Remove/unhealthy	
614	Black Walnut	*Juglans nigra.*	11	18	x			x			Remove/unhealthy	
615	Privet	*Ligustrum spp.*	15	26	x						Remove/topped	
616	California Redwood	*Sequoia sempervirens*	23	26		x		x			Remove/unhealthy	
617	Sycamore	*Acer pseudoplatanus*	15	23		x			x		Remove/unhealthy	

NOTES:

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F - Fair

Tree #	Common Name	Species	Total DBH (inches)	DLR (feet)	Condition Assessment						Arborist Recommended Removals	Maintenance Recommendations
					Structure			Vigor				
					P	P-F	F	P	P-F	F		
618	White Ash	Fraxinus americana	26	26		x			x		Remove/unhealthy	
619	Olive	*Olea europa*	6	13		x				x	Remove/unhealthy	

NOTES:

DBH – Diameter at Breast Height
DLR – Drip Line Radius

P – Poor
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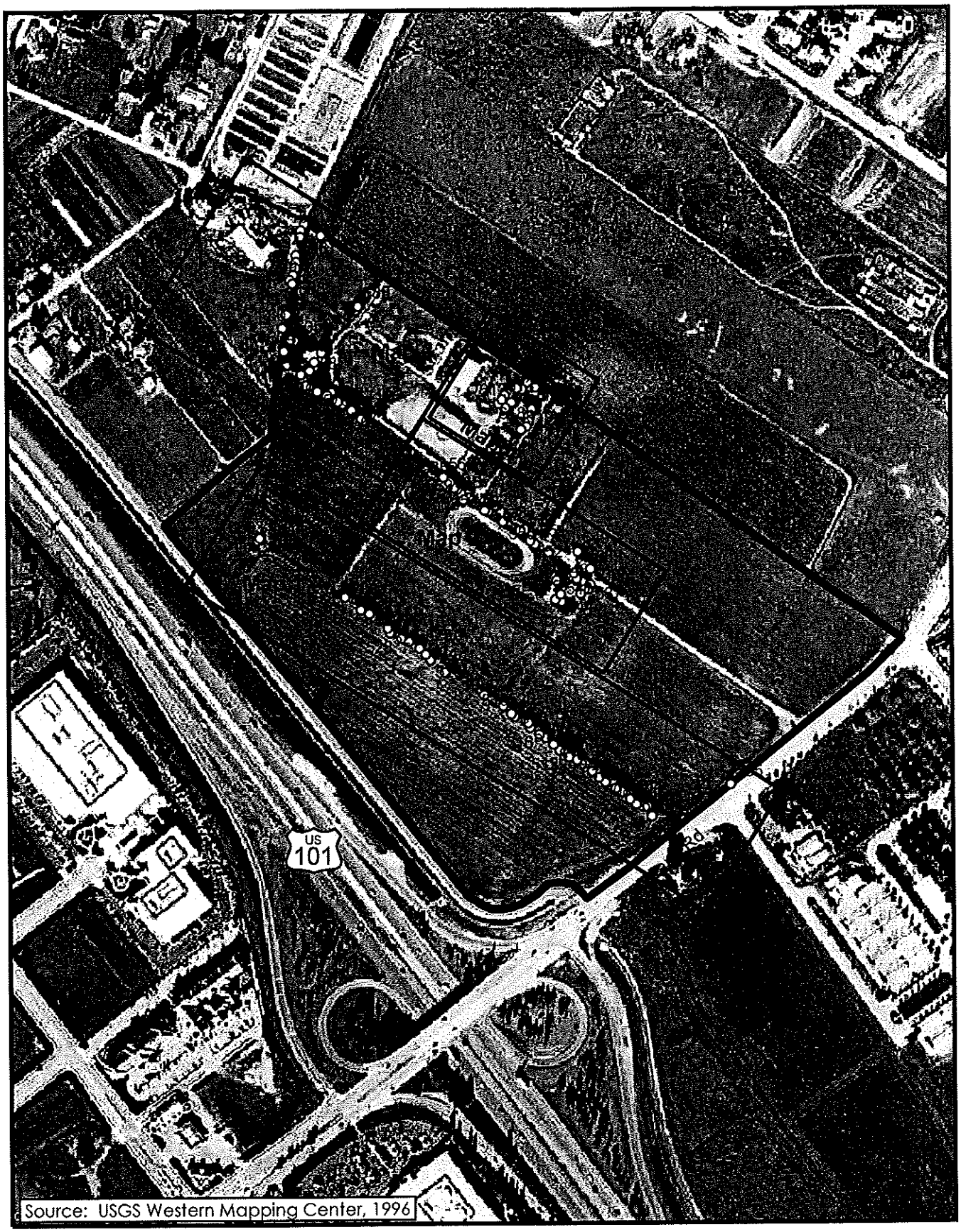
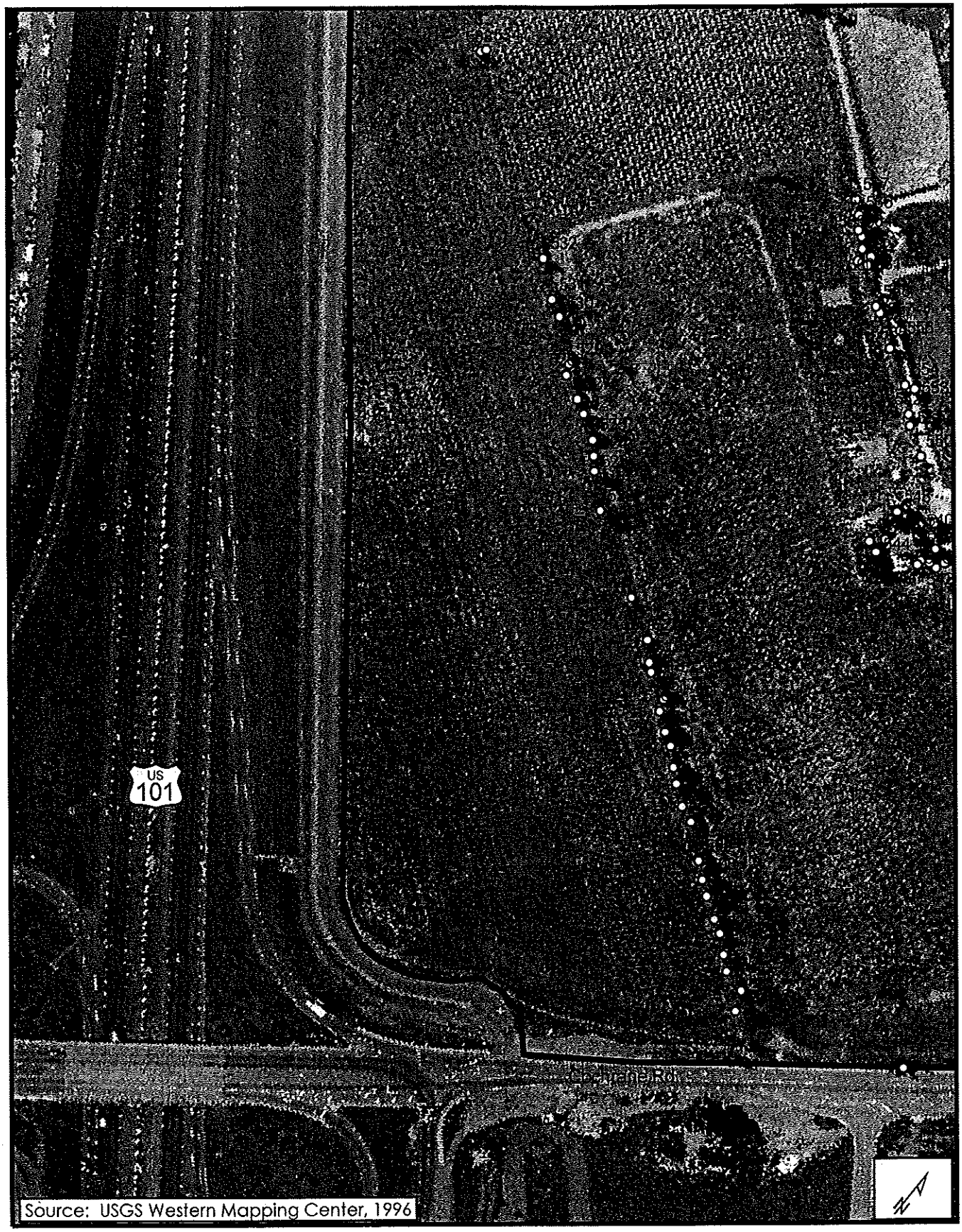
F - Fair



PMC

Cochrane Road Planned Unit Development
Tree Survey
Index Map



PMC

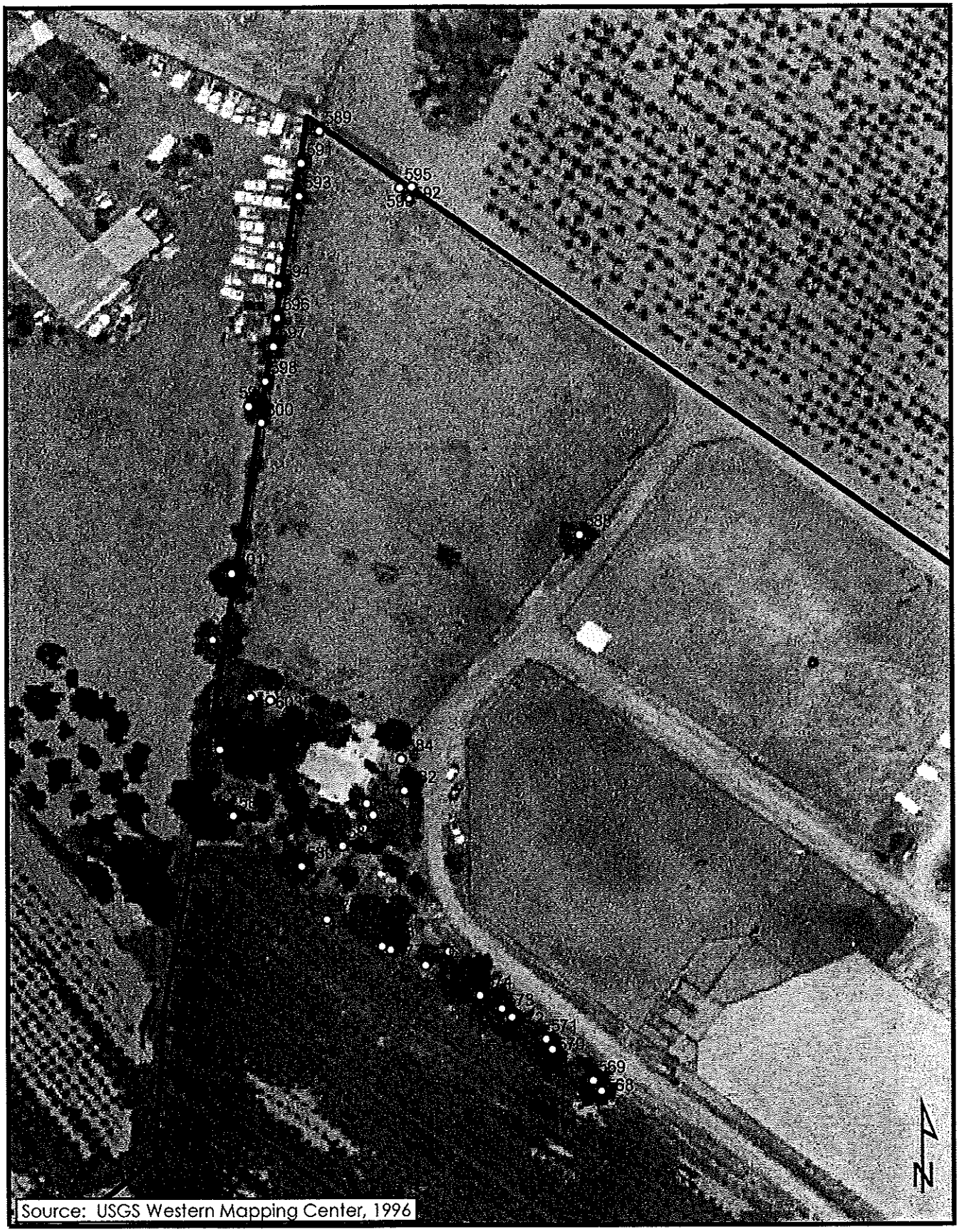
Cochrane Road Planned Unit Development
Tree Survey
Map 1



Source: USGS Western Mapping Center, 1996

PMC

Cochrane Road Planned Unit Development
Tree Survey
Map 2



Source: USGS Western Mapping Center, 1996

PMC

Cochrane Road Planned Unit Development
Tree Survey
Map 3



PMC

Cochrane Road Planned Unit Development
Tree Survey
Map 4

Technical Appendices

Appendix D - Air Quality

Illingworth and Rodkin, Inc. Cochrane Road Retail Development Air Quality Assessment, Morgan Hill, California. March 15, 2005.

COCHRANE ROAD RETAIL DEVELOPMENT
AIR QUALITY ASSESSMENT
MORGAN HILL, CALIFORNIA

March 15, 2005

* * *

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Job No.: 04-190

INTRODUCTION

This section examines the degree to which the proposed project may result in significant adverse changes to air quality. Both short-term construction emissions occurring from activities such as site grading, as well as long-term effects related to the ongoing operation of the proposed project are discussed. The analysis contained herein focuses on air pollution from two perspectives: daily emissions and pollutant concentrations. "Emissions" refers to the actual quantity of pollutant, measured in pounds per day. "Concentrations" refers to the amount of pollutant material per volumetric unit of air. Concentrations are measured in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$).

OVERALL REGULATORY SETTING

The Federal Clean Air Act governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the Federal level, the United States Environmental Protection Agency (USEPA) administers the Clean Air Act (CAA). The California Clean Air Act is administered by the California Air Resources Board (CARB) at the State level and by the Air Quality Management Districts at the regional and local levels. The Bay Area Air Quality Management District (BAAQMD) regulates air quality at the regional level, which includes the nine-county Bay Area.

United States Environmental Protection Agency

The USEPA is responsible for enforcing the Federal CAA. The USEPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS are required under the 1977 CAA and subsequent amendments. The USEPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by the CARB.

California Air Resources Board

In California, the CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for meeting the state requirements of the Federal CAA, administering the California CAA, and establishing the California Ambient Air Quality Standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the State to endeavor to achieve and maintain the California Ambient Air Quality Standards (CAAQS). The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. The CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB established passenger vehicle fuel specifications, which became effective on March 1996. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

Bay Area Air Quality Management District

In 1955, the California Legislature created the Bay Area Air Quality Management District (BAAQMD). The agency is primarily responsible for assuring that the National and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, as well as many other activities. The BAAQMD has jurisdiction over much of the nine-county Bay Area counties.

National and State Ambient Air Quality Standards

As required by the Federal Clean Air Act, the NAAQS have been established for six major air pollutants: carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur oxides, and lead. Pursuant to the California Clean Air Act, the State of California has also established ambient air quality standards, known as the California Ambient Air Quality Standards (CAAQS). These standards are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles.

Both State and Federal standards are summarized in Table 1. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation and other aspects of the general welfare. The use of the NAAQS or CAAQS is a function of the project approval process. The NAAQS is applicable if the project is federally funded or requires federal action. The proposed project is not federally funded and does not require federal action. Additionally, the CAAQS are more stringent than the NAAQS. Thus, the CAAQS are used as the comparative standard in the analysis contained in this report.

Criteria Air Pollutants & Effect

Air quality studies generally focus on five pollutants that are most commonly measured and regulated: CO, O_3, NO_2, SO_2, and suspended particulate, i.e., PM_{10} and $PM_{2.5}$.

Carbon Monoxide. CO, a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue, and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. Automobile exhausts release approximately 70 percent of the CO in the Bay Area. A substantial amount also comes from burning wood in fireplaces and wood stoves. CO is a non-reactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. The highest CO concentrations measured in the Bay Area are typically recorded during the winter.

Ozone. O_3, a colorless toxic gas, is the chief component of urban smog. O_3 enters the blood stream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. Although O_3 is not directly emitted, it forms in the atmosphere through a

chemical reaction between reactive organic gas (ROG) and nitrogen oxides (NO_X) under sunlight.[1] ROG and NOx are primarily emitted from automobiles and industrial sources. O_3 is present in relatively high concentrations within the Bay Area, and the damaging effects of photochemical smog are generally related to the concentration of O_3. Highest O_3 concentrations occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies.

Nitrogen Dioxide. NO_2, a reddish-brown gas, irritates the lungs. It can cause breathing difficulties at high concentrations. Like O_3, NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as nitrogen oxides (NO_x) and are major contributors to O_3 formation. NO_2 also contributes to the formation of PM_{10} (see discussion of PM_{10} below).

Sulfur Oxides. Sulfur oxides, primarily SO_2, are a product of high-sulfur fuel combustion. The main sources of SO_2 are coal and oil used in power stations, in industries, and for domestic heating. SO_2 is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 concentrations have been reduced to levels well below the state and national standards, but further reductions in emissions are needed to attain compliance with standards for PM_{10}, of which SO_2 is a contributor.

Suspended Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles suspended in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when industry and gaseous pollutant undergo chemical reactions in the atmosphere. Respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) represent fractions of particulate matter. PM_{10} refers to particulate matter less than 10 microns in diameter and $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter. Major sources of PM_{10} include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning, industrial sources, windblown dust from open lands, and atmospheric chemical and photochemical reactions. $PM_{2.5}$ results primarily from diesel fuel combustion (from motor vehicles, power generation, industrial facilities), residential fireplaces, and wood stoves. PM_{10} and $PM_{2.5}$ pose a greater health risk than larger-size particles, because these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract increasing the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Whereas, larger particles tend to collect in the upper portion of the respiratory system, $PM_{2.5}$ are so tiny that they can penetrate deeper into the lungs and damage lung tissues.[2] Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

Toxic Air Contaminants (TAC)

TACs are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants listed above.

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[1] *ROG and NO_X are emitted from automobiles and industrial sources.*

[2] *The NAAQS for $PM_{2.5}$ was adopted in 1997. Presently no methodologies for determining impacts relating to $PM_{2.5}$ have been developed or adopted by federal, state, or regional agencies. The State standard for PM_{10} is more stringent than the Federal $PM_{2.5}$ standard.*

TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., benzene near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to the CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the ARB, and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants programs. California has adopted a comprehensive diesel risk reduction program. The U.S. EPA has adopted low sulfur diesel fuel standards that will reduce diesel particulate matter substantially. These go into effect in June 2006.

In cooler weather, smoke from residential wood combustion can be a source of TACs. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind, the pollution can persist for many hours. This occurs in sheltered valleys during the winter. Woodsmoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Woodsmoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

Bay Area Clean Air Plan

The BAAQMD along with the other regional agencies (i.e., Association of Bay Area Governments and the Metropolitan Transportation Commission) has prepared an Ozone Attainment Plan to address the NAAQS for O_3. A Carbon Monoxide Maintenance Plan was also prepared in 1994 to demonstrate how the NAAQS for carbon monoxide standard will be maintained. Another plan, the Bay Area Clean Air Plan, was prepared to address the more stringent requirements of the California Clean Air Act with respect to O_3. This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan objective is to indicate how the region would make progress toward attaining the stricter state air quality standards, as mandated by the California Clean Air Act. The plan is designed to achieve a region-wide reduction of O_3 precursor pollutants through the expeditious implementation of all feasible measures. Air quality plans addressing the California Clean Air Act are developed about every three years. The latest plan (Bay Area 2000 Clean Air Plan) was prepared in 2000. The plan proposes implementation of transportation control measures (TCMs) and programs such as *Spare the Air*. *Spare the* Air is a public outreach program designed to educate the public about air pollution in the Bay Area and promote individual behavior changes that improve air quality. Some of these measures or programs rely on local governments for implementation. The 2001 Ozone Plan included the strategy to attain the national ambient air quality standard for O_3. In 2004, U.S. EPA made a finding that the Bay Area has attained the national 1-hour ozone standard. Because of this finding, the previous planning commitments in the 2001 Ozone Attainment Plan are no longer required. The finding of attainment does not mean the Bay Area has been reclassified as an attainment area for the 1-hour standard. The region must submit a redesignation request to EPA in order to be reclassified as an attainment area. To address both the national and California ambient air quality standards, the BAAQMD is preparing an updated ozone strategy. In 2004, the BAAQMD held community meetings throughout the Bay Area to

describe the draft control measures proposed for the Ozone Strategy and to invite public input. The draft Ozone Strategy, including proposed control measures, will be released for public review in 2005.

A key element in air quality planning is to make reasonably accurate projections of future human activities that are related to air pollutant emissions. Most important is vehicle activity. The BAAQMD uses population projections made by the Association of Bay Area Governments and vehicle use trends made by the Metropolitan Transportation Commission to formulate future air pollutant emission inventories. The basis for these projections comes from cities and counties. In order to provide the best plan to reduce air pollution in the Bay Area, accurate projections from local governments are necessary. When General Plans are not consistent with these projections, they cumulatively reduce the effectiveness of air quality planning in the region.

SETTING

Climate and Topography

The climate is mainly characterized by warm dry summers with abundant sunshine and cool moist winters with variable cloudiness. The proximity of the Pacific Ocean and San Francisco Bay has a moderating influence on the climate. Morgan Hill lies in the southern portion of the Santa Clara Valley, which is generally oriented from the northwest to the southeast. This valley is bounded to the north by the San Francisco Bay, and by mountains to the east, south, and west. The surrounding terrain greatly influences winds in the valley, resulting in a prevailing wind that follows along the valley's northwest-southeast axis. During the afternoon and early evening, a north-northwesterly sea breeze often flows through the valley, and a light south-southeasterly drainage flow often occurs during the late evening and early morning hours.

Typical summer maximum temperatures for the region are in the 80's, while winter maximum temperatures are in the high 50's or low 60's. Minimum temperatures usually range from the high 50's in the summer to the upper 30's and low 40's in the winter. Rainfall in the valley is approximately 20 to 25 inches per year, occurring mostly in the months of November through March.

Air quality standards for ozone traditionally are exceeded when relatively stagnant conditions occur for periods of several days during the warmer months of the year. Weak wind flow patterns combined with strong inversions substantially reduces normal atmospheric mixing. Key components of ground-level ozone formation are sunlight and heat; therefore, significant ozone formation only occurs during the months from late spring through early fall. Prevailing winds during the summer and fall can transport and trap ozone precursors from the more urbanized portions of the Bay Area. Meteorological factors make air pollution potential in the southern Santa Clara Valley quite high. The clear skies with relatively warm conditions that are typical in summer combine with transported and localized air pollutant emissions to elevate ozone levels. The surrounding mountains up slope and downslope flows may also recirculate pollutants already present, contributing to the buildup of air pollution. Light winds and stable conditions during the late fall and winter contribute to the buildup of particulate matter from motor vehicles, agriculture, and wood burning in fireplaces and stoves.

Air Monitoring Data

Air quality in the region is controlled by the rate of pollutant emissions and meteorological conditions. Meteorological conditions such as wind speed, atmospheric stability, and mixing height may all affect the atmosphere's ability to mix and disperse pollutants. Long-term variations in air quality typically result from changes in air pollutant emissions, while frequent, short-term variations result from changes in atmospheric conditions. The San Francisco Bay Area is considered to be one of the cleanest metropolitan areas in the country with respect to air quality. The BAAQMD monitors air quality conditions at over 30 locations throughout the Bay Area. There are no air pollutant monitoring stations in Morgan Hill; the BAAMQD monitoring stations closest to Morgan Hill are in San Martin and San Jose. Air pollutant concentrations measured at these stations closest are shown below in Table 2.

The pollutant of most concern in the Morgan Hill area is ozone, since prevailing summertime wind conditions tend to cause a build up of ozone in the southern Santa Clara Valley. Ozone levels measured in San Martin, which is close to Morgan Hill, exceeded the state ozone standard from 4 to 8 times in 2000-2003; however, there were no exceedances in 2004. The federal 1-hour ozone standard has not been exceeded in the last five years at San Martin, but the 8-hour standard was exceeded from 1 to 5 days for 2000-2003 and no exceedances in 2004. PM_{10} levels measured in San Jose are probably higher than those that would be measured in Morgan Hill due to the urban nature around the monitoring station. Measured exceedances of the state PM_{10} standard have occurred between 2 and 4 times each year in San Jose. Exceedances of the federal PM2.5 standard were not measured in San Jose. In the more rural areas near Morgan Hill where PM_{10} is monitored, such as Watsonville and Hollister, there were no measured exceedances of the federal or state PM_{10} standard. The entire Bay Area, including Morgan Hill, did not experience any exceedances of other air pollutants. Table 3 reports the number of days that an ambient air quality standard was exceeded at any of the stations near Morgan Hill and in the entire Bay Area.

Attainment Status

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The Bay Area as a whole does not meet State or Federal ambient air quality standards for ground level O_3 and State standards for fine particulate matter.

Under the Federal CAA, the US EPA has designated the region as *moderate non-attainment* for ground level O_3. However, the US EPA has recognized that the region has not violated the 1-hour O_3 standard over the last three years (2000-2003) and has proposed to redesignate the Bay Area as a maintenance area. This is the first step towards designating the Bay Area as attainment of that standard. However, US EPA has recently classified the region as marginally nonattainment for the newer more stringent 8-hour O_3 standard. EPA requires the region to adopt a plan that will bring it into attainment with that standard by 2007. The Bay Area has met the CO standards for over a decade and is classified *attainment maintenance* by the US EPA. The US EPA grades the region *unclassified* for all other air pollutants, which include PM_{10} and $PM_{2.5}$.

At the State level, the region is considered *serious non-attainment* for ground level O_3 and non-attainment for PM_{10}. California ambient air quality standards are more stringent than the national ambient air quality standards. The region is required to adopt plans on a triennial basis that show progress towards meeting the State O_3 standard. The area is considered attainment or unclassified for all other pollutants.

Sensitive Receptors

Some groups of people are more affected by air pollution than others. CARB has identified the following people who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks.

ENVIRONMENTAL IMPACTS AND MITIGATION

Thresholds of Significance

The CEQA Guidelines (Section 15064.7) provide that, when available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make determinations of significance. The following are the significance criteria that the BAAQMD has established to determine project impacts:

Construction

The BAAQMD's approach to the CEQA analysis of construction impacts is to emphasize the implementation of effective and comprehensive control measures rather than detailed quantification of emissions. PM_{10} is the pollutant of greatest concern from construction activities.[3] The BAAQMD CEQA Guidelines provide feasible control measures for construction emissions of PM_{10}. If the appropriate construction controls are implemented, air pollutant emissions for construction activities would be considered less than significant.

Operations

Plan build out would cause a significant air quality impact if it were to result in:

- Ozone precursor emissions (ROG and NO_x) and PM_{10} emissions from direct and indirect sources (non typical construction) that exceed the thresholds recommended by the BAAQMD. The BAAQMD recommends a threshold of 80 pounds per day or 15 tons per year for direct and indirect sources of ROG, NO_x, and PM_{10}.

- Emissions of carbon monoxide cause a projected exceedance of the ambient carbon monoxide state standard of 9.0 ppm for 8-hour averaging period.

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[3] *Construction equipment emits ozone precursors. However, these emissions are included in the emission inventory, which are the basis for the regional air quality plan and are not expected to impede attainment of ozone in the Bay Area.*

Cumulative Impacts

Build out of the project would result in a significant cumulative air quality impact if project impacts are significant as listed above or the project is found to be inconsistent with the applicable General Plan and/or the BAAQMD Clean Air Plan.

ENVIRONMENTAL IMPACTS

Project Impacts

Impact 1: Construction Impacts. Construction activity during build out of the project would generate air pollutant emissions that could expose sensitive receptors to substantial pollutant concentrations. This is a potentially significant impact.

Build out of the shopping center would involve construction over several years. This construction period would likely include an initial grading of the site and then many small and medium size construction projects that could result in different air quality impacts based on their size, duration and proximity to sensitive receptors. Construction activities would generate pollutant emissions from the following construction activities: grading, construction worker travel to and from project sites, delivery and hauling of construction supplies and debris to and from the project site, and fuel combustion by on-site construction equipment. These construction activities would temporarily create emissions of dusts, fumes, equipment exhaust, and other air contaminants. PM_{10} is typically the most significant source of air pollution from construction, particularly during site preparation and grading. PM_{10} emissions from construction can vary daily, depending on various factors, such as the level of activity, type of construction activity taking place, the equipment being operated, weather conditions, and soil conditions. Typically, the BAAQMD does not require quantitative analysis for construction. Rather the analysis is focused on identifying the most appropriate control measures. The BAAQMD has identified a set of feasible PM_{10} control measures for construction activities. These measures are listed at the end of this section under "Construction Phase Mitigation Measures." According to the BAAQMD CEQA Guidelines, if all of these control measures are implemented, a less than significant impact is expected for PM_{10} emissions.

Construction Phase Mitigation Measures

The following is a list of feasible control measures that the BAAQMD recommends for construction emissions of PM_{10}. These mitigation measures shall be implemented for all areas (both on-site and off-site) where construction activities would occur.

1. Sprinkle water to all active construction areas at least twice daily and more often when conditions warrant.
2. Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard.
3. Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
4. Sweep daily all paved access roads, parking areas, and staging areas at construction sites.
5. Sweep streets daily if visible soil material is carried onto adjacent public streets.

6. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas.
7. Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.).
8. Limit traffic speeds on unpaved roads to 15 miles per hour.
9. Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
10. Replant vegetation in disturbed areas as quickly as possible.
11. Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site.
12. Suspend grading activities when winds exceed 25 miles per hour (mph) and visible dust clouds cannot be prevented from extending beyond active construction areas.
13. Limit the area subject to excavation, grading and other construction activity at any one time.

Impact 2: Operational Emissions. The project would generate new emissions that would affect long-term air quality. This would be a significant impact.

The proposed shopping center would produce new automobile trips, generating emissions of criteria air pollutants, which could affect both regional and local air quality. The traffic study predicts an addition of about 22,000 daily weekday automobile trips at the time of full build out. All predicted traffic increases were assumed to be attributed to the plan build out conditions. Future changes to air quality were predicted using computer models. Project-related emissions were calculated using the latest available version of the URBEMIS model while predicted CO concentrations were modeled using screening methodologies based on the Caline4 model. The methodologies used for these analyses along with modeling output are contained in Appendix X.

Local Carbon Monoxide Impacts

Carbon monoxide emissions from traffic generated by the project would be the pollutant of greatest concern at the local level. Intersections along Cochrane Road would be most affected by the project. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Carbon monoxide concentrations were predicted for intersections along Cochrane Road. There are 1- and 8-hour standards for carbon monoxide. The 8-hour standard is the most stringent and is always exceeded if the 1-hour standard is exceeded. Therefore, this analysis evaluated impacts against the 8-hour standard.

Carbon monoxide concentrations were modeled using screening methods recommended by the BAAQMD that are based on the Caline4 Line-Source dispersion model. This method uses traffic volumes, emissions, meteorology, and the roadway/receptor geometry. For this assessment, meteorological conditions most conducive for high carbon monoxide concentrations in the Bay Area, peak-hour traffic conditions (i.e., evening period), slow traffic speeds and emission factors generated by the California Air Resources Board emission factor model (i.e., EMFAC2002) were used as input to the model. Modeled concentrations were added to background levels to predict total carbon monoxide concentrations. This assessment was conducted for existing conditions (2004) and project conditions in (about 2007), and with cumulative build out that would occur beyond 2010. The screening method is designed to be a conservative method of determining whether or not a project may cause exceedances of the carbon monoxide air quality standard. If the screening method predicts significant levels, than a

more-refined analysis may be conducted that would more accurately predict carbon monoxide levels, which would likely be lower. Results of this assessment are shown in Table 4.

As shown in Table 4, the screening analysis indicates that modeled existing 8-hour Carbon Monoxide concentrations are currently below California Ambient Air Quality Standards. Predicted 8-hour Carbon monoxide concentrations with the project are predicted to remain below California ambient air quality standards. Although traffic will increase under cumulative conditions, carbon monoxide concentrations are anticipated to decrease because of cleaner less-polluting vehicles using the roadways. This impact on local air quality resulting from the project is considered to be less-than-significant.

Regional Air Quality Impacts

Emissions of ozone precursor pollutants (i.e., reactive organic gases [ROG] and nitrogen oxides [NO_x]) and small particulate matter (i.e., PM_{10}) can affect air quality throughout the Bay Area. It is virtually impossible to predict the affect of emissions from the project to levels of ozone and PM_{10} in the region. However, the significance of project air pollutant emissions are evaluated against emission significance thresholds established by the BAAQMD.

To evaluate the project effects on regional air quality, emissions of ozone precursor pollutants and PM_{10} were predicted. The URBEMIS2002 Model, obtained from the California Air Resources Board, was used to predict air pollutant emissions associated with project-related automobile use. This model combines assumptions for automobile activity (e.g., number of trips, vehicle mix, vehicle miles traveled, etc.) with vehicle emission factors. Project trip generation data provided by the Traffic Engineer (i.e., Fehr and Peers) were used as input to the model. Potential emissions of ROG from a possible gas station were predicted and are added to the URBEMIS2002 modeling results. Daily emissions of regional air pollutants from build out of the proposed shopping center are shown in Table 5. Project direct and indirect emissions of ozone precursor pollutants (i.e., ROG and NOx) would exceed the thresholds established by the BAAQMD. PM_{10} emissions, which could lead to both regional and local air quality impacts, would also exceed the significance thresholds. Because the project generates more traffic on weekend days (i.e., Saturdays), emissions would be higher. In fact, emissions of ozone precursor pollutants and PM_{10}, which are significant on weekdays, would be over 30 percent higher on peak Saturdays. Emissions of ozone precursor pollutants that exceed the significance thresholds would impact the regions' effort to attain and maintain the ozone ambient air quality standards. The project's emissions of PM_{10}, which also exceed the thresholds, may cumulatively contribute to violations of the Sate standard. These emissions are predicted to be above the significance thresholds established by the BAAQMD, and therefore, would be considered significant.

Operational Phase Mitigation

This adverse impact can be reduced, but not fully mitigated through implementation of this mitigation measure. The project applicant shall implement a facilities trip reduction plan. Elements of this plan that would reduce traffic (mostly project worker trips), and thus air pollutant emissions, are listed below.

- Provide bus pullouts and transit stops at several locations with pedestrian access to the project. Project emissions could be reduced by about 2% if bus service is eventually brought to the site,

- Bicycle amenities should be provided for the project. This would include secure bicycle parking for employees, bicycle racks for customers, and bike lane connections. This vehicle trip reduction measure could reduce emissions by 2%.

- Pedestrian facilities should link future transit stops and access roadways to the major sites uses. This may reduce emissions by 1%.

- Designate a portion of the parking lot for weekday Park-and-Ride parking spaces which would reduce emissions from traffic in general.

- Project site employers would be required to post transit rates and scheduling information on bulletin boards, which may reduce emissions by 1%.

Mitigation measures to reduce traffic congestion in the area could result in lower emissions from vehicle travel. The amount of congestion relief is unknown, since the project would only contribute funds that would eventually provide improvements. No reduction could be estimated unless improvements were in place when the project becomes operational.

The impact would remain significant and unavoidable, even with full effectiveness of the mitigation measure.

CUMULATIVE IMPACTS

Cumulative air quality impacts are evaluated based on both a quantification of the Project-related air quality impacts and the consistency of the Project with local and regional air quality plans (i.e., the *Morgan Hill General Plan* and the 2000 Bay Area Clean Air Plan). At the local level, future cumulative traffic conditions would not result in any violation of the carbon monoxide standard. As a result, there would not be a cumulative impact to local air quality. Emissions associated with traffic generated by the proposed shopping center are predicted to be above the significant thresholds established by the Bay Area Air Quality Management District, and therefore, would result in a cumulatively considerable net increase of any criteria pollutant for which the region is nonattainment under an applicable federal or state ambient air quality standard.

The Bay Area Air Quality Management District (BAAQMD) is the regional agency responsible for overseeing compliance with State and Federal laws, regulations, and programs within the San Francisco Bay Area Air Basin. The BAAQMD, with assistance from the Association of Bay Area Governments and the Metropolitan Transportation Commission has prepared and implements specific plans to meet the applicable laws, regulations, and programs. Among them are the *Carbon Monoxide Maintenance Plan* (1994), *Bay Area Clean Air Plan* (2000), and the 2001 Ozone Attainment Plan (currently under review for approval by EPA). The BAAQMD has also developed CEQA guidelines to assist lead agencies in evaluating the significance of air quality impacts. In formulating compliance strategies, the BAAQMD relies on planned land uses established by local general plans. When a project proposes to change planned uses, by requesting a general plan amendment, the project may depart from the assumptions used to formulate BAAQMD in such a way that the cumulative result of incremental changes may hamper or prevent the BAAQMD from achieving its goals. This is because land use patterns influence transportation needs, and motor vehicles are the primary source of air pollution.

The proposed project would include a general plan amendment (GPA) for the relocation of a future collector street extending from Mission View Drive north of Cochrane Road instead of extending from St. Louise Drive as designated on the *City of Morgan Hill General Plan* map. This amendment is not likely to interfere with population projections or change vehicle miles traveled in Morgan Hill. The project is proposing a retail center that would serve the needs of the population. It is unlikely to interfere with region-wide population or vehicle miles traveled projections that are used in Clean Air planning efforts.

The proposed project would not interfere with regional air quality planning efforts. However, because the project results in significant emissions of air pollutants that affect regional air quality, it is considered to result in a significant cumulative air quality impact.

TABLE 1
CALIFORNIA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	National Standards [a]	
			Primary [b,c]	Secondary [b,d]
Ozone	8-hour	—	0.08 ppm (176 μg/m^3)	—
	1-hour	0.09 ppm (180 μg/m^3)	0.12 ppm (235 μg/m^3)	Same as primary
Carbon monoxide	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
Nitrogen dioxide	Annual	—	0.053 ppm (100 μg/m^3)	Same as primary
	1-hour	0.25 ppm (470 μg/m^3)	—	—
Sulfur dioxide	Annual	—	0.03 ppm (80 μg/m^3)	—
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	—
	3-hour	—	—	0.5 ppm (1,300 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	—	—
PM_{10}	Annual	30 μg/m^3 (geometric mean)	50 μg/m^3 (arithmetic mean)	Same as primary
	24-hour	50 μg/m^3	150 μg/m^3	Same as primary
$PM_{2.5}$	Annual	12 μg/m^3	15 μg/m^3	
	24-hour	—	65 μg/m^3	
Lead	Calendar quarter	—	1.5 μg/m^3	Same as primary
	30-day average	1.5 μg/m^3	—	—

Notes: (a) Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

(b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

(c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.

(d) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

TABLE 2
HIGHEST MEASURED AIR POLLUTANT CONCENTRATIONS

Pollutant	Average Time	MEASURED AIR POLLUTANT LEVELS				
		2000	2001	2002	2003	2004*
San Martin						
Ozone (O_3)	1-Hour	**0.11** ppm	**0.12** ppm	**0.12** ppm	**0.11** ppm	0.09 ppm
	8-Hour	**0.10** ppm	**0.09** ppm	**0.10** ppm	**0.09** ppm	0.08 ppm
Central San Jose						
Carbon Monoxide (CO)	8-Hour	6.3 ppm	5.1 ppm	4.5 ppm	4.0 ppm	2.9 ppm
Nitrogen Dioxide (NO_2)	1-Hour	0.11 ppm	0.11 ppm	0.08 ppm	0.09 ppm	0.07 ppm
	Annual	0.025ppm	0.024ppm	NA	0.021ppm	NA
San Jose – Tully Road						
Fine Particulate Matter ($PM_{2.5}$)	1-Hour	**69** ug/m^3	**75** ug/m^3	**70** ug/m^3	**58** ug/m^3	NA
	Annual	21 ug/m^3	23 ug/m^3	NA	**25** ug/m^3	NA
Respirable Particulate Matter (PM_{10})	24-Hour	NA	NA	**58** ug/m^3	**52** ug/m^3	NA
	Annual	NA	NA	NA	**10** ug/m^3	NA
Bay Area (Basin Summary)						
Ozone (O_3)	1-Hour	**0.15** ppm	**0.13** ppm	**0.16** ppm	**0.13** ppm	NA
	8-Hour	**0.11** ppm	**0.10** ppm	**0.11** ppm	**0.10** ppm	NA
Carbon Monoxide (CO)	8-Hour	6.3 ppm	5.1 ppm	4.5 ppm	4.0 ppm	NA
Nitrogen Dioxide (NO_2)	1-Hour	0.11 ppm	0.11 ppm	0.08 ppm	0.09 ppm	NA
	Annual	0.025ppm	0.024ppm	0.014ppm	0.021ppm	NA
Fine Particulate Matter ($PM_{2.5}$)	1-Hour	NA	NA	**77** ug/m^3	56 ug/m^3	NA
	Annual	NA	NA	14 ug/m^3	11.7 ug/m^3	NA
Respirable Particulate Matter (PM_{10})	24-Hour	**76** µg/m^3	**109** µg/m^3	**84** µg/m^3	**60** µg/m^3	NA
	Annual	**24** ug/m^3	**26** ug/m^3	**25** ug/m^3	**25** ug/m^3	NA

* Partial data set for some pollutants
Source: California Air Resources Board 2004.
Note: ppm = parts per million
Values reported in bold exceed ambient air quality standard
NA = data not available.

TABLE 3
SUMMARY OF MEASURED AIR QUALITY EXCEEDANCES

Pollutant	Standard	Monitoring Station	Days Exceeding Standard				
			2000	2001	2002	2003	2004
Ozone (O3.)	NAAQS 1-hr	San Martin BAY AREA	0 3	0 1	0 2	0 1	0 --
	NAAQS 8-hr	San Martin BAY AREA	1 4	2 7	5 7	4 7	0 --
	CAAQS 1-hr	San Martin BAY AREA	4 12	7 15	8 16	2 19	2 --
Fine Particulate Matter (PM_{10})	NAAQS 24-hr	San Jose BAY AREA	0 0	0 0	0 0	0 0	0 0
	CAAQS 24-hr	San Jose BAY AREA	2 7	4 10	2 6	2 6	0 --
Fine Particulate Matter ($PM_{2.5}$)	NAAQS 24-hr	San Jose BAY AREA	NA 1	NA 5	NA 7	0 0	0 --
All Other (CO, NO_2, Lead, SO_2)	All Other	San Jose (Tully) BAY AREA	0 0	0 0	0 0	0 0	0 0

TABLE 4
PREDICTED 8-HOUR WORST CASE CARBON MONOXIDE LEVELS (in PPM)

Description	2005 Existing	Project Conditions ~2007	Cumulative with Project ~2010	General Plan Buildout 2025
Cochrane Rd and US 101 Northbound	5.7 ppm	6.8 ppm*	6.0 ppm*	4.2 ppm
Cochrane Rd and US 101 Southbound	6.8 ppm	7.4 ppm*	6.4 ppm*	4.3 ppm
Cochrane Rd and Butterfield Blvd.	5.1 ppm	5.6 ppm*	5.1 ppm*	4.2 ppm
Significance Thresholds (CAAQS)	*9.0 ppm for 8-hour exposure*			

TABLE 5
DAILY REGIONAL AIR POLLUTANT EMISSIONS (POUNDS PER DAY)

Description	Reactive Organic Gases	Nitrogen Oxides	Particulate Matter (PM_{10})
Weekday Emissions	149*	135	110
Weekend Emissions	189*	177	146
BAAQMD Significance Thresholds	*80 lbs*	*80 lbs*	*80 lbs*

Includes estimated 19 pounds per day of Reactive Organic Gas emissions associated with possible gas station

ATTACHMENT

CO ANALYSIS PROCEDURE FOR TRAFFIC INCREASES

Traffic : From traffic report. Only weekday PM traffic was used, since highest CO concentrations occur during the early morning or evening. While weekends may generate the greatest traffic, that traffic would occur during the midday when meteorological conditions are less conducive to high CO concentrations.

Emission Factors :

Modeled using EMFAC2002 for Santa Clara County
Used worst-case speed 5 mph for all links, which results in high emission rates

EMFAC2002 rates for 2005 used to model existing; rates for 2007 for project conditions, and 2010 used for cumulative with project.

Emission Factor (EMFAC2002):

14.05 gram/mile for 2004 (LOS F – 5mph)
8.01 gram/mile for 2010 (LOS F - 5 mph)
3.02 gram/mile for 2020 (LOS F - 5 mph)

Reference CO Concentration at *edge* of roadway (worst case):

11.9 for Primary at grade 4-lane road
3.3 for Secondary at grade 4-lane Road

Background 8-hour CO concentration: 3.5 ppm

Screening Method & Assumptions

Use BAAQMD CO Hot Spots Manual calculation method to estimate roadside CO concentrations. The 1-hr average CO concentration is estimated using BAAQMD CEQA Guidelines Table 12 values. The BAAQMD max. 1-hr CO values are based on worst-case met conditions and converted to an 8-hour average. The screening calculations that compute the max 1-hour CO concentration contribution from each roadway (in ppm) is based on the following equation:

$$Ci = (Cri \times Vi \times Efi) / 100{,}000$$

Where, Cri = CO reference conc. in ppm
Vi = hourly traffic volume
EFi = CO emission factor in g/VMT

This yields a 1-hour CO concentration based on worst-case meteorology that is then converted to a 8-hour concentration using a persistence factor of 0.7 (recommended by BAAQMD) and then added to the existing background 8-hour concentration (3.5 ppm). The resulting concentration is then compared to NAAQS and CAAQS. *Calculations attached.*

Regional Emissions Calculations

Regional emissions were calculated using the URBEMIS 2002 model (version 7.5) obtained from the California Air Resources Board website: *http://www.arb.ca.gov/html/soft.htm*

URBEMIS 2002 is a computer program that can is used to estimate emissions associated with land development projects in California such as residential neighborhoods, shopping centers, and office buildings. The model calculates emissions from traffic generation, area sources (such as gas appliances, wood stoves, fireplaces, and landscape maintenance equipment) and construction projects. The model includes land use types for different types of retail use. Inputs to the model are as follows:

Project Type Size:	Regional shopping center
Trip Rate:	Adjusted for project traffic projections
Project Year:	2007
Season:	Summer
Temperature:	85°F

All other inputs were default inputs used for analysis conducted in the San Francisco Bay Area Air Basin. Emissions were predicted for area sources and operational motor vehicle sources.

Area Source Emissions
The model predicts area source emissions from the different land uses. These include emissions from natural gas usage and landscape equipment.

Traffic Emissions
The model predicts vehicle trips and associated vehicle miles traveled based on the land use types. The trip generation from these land use types is adjusted for project-specific forecasts.

Gasoline fueling stations
Potential gasoline fueling emissions were calculated for the project. The California Air Pollution Control Officers Association (CAPCOA) reports emission rates of 1.27 pounds of ROG per 1,000 gallons of fuel dispense assuming required controls. Predicted throughput for the gasoline dispensing is not available for this project. A review of 2004 and 2005 air quality permits issued by the BAAQMD indicates a range of throughput values between 2 and 10 million gallons per year with most below 5 million gallons per year. An annual throughput of 5 million gallons per year or 15 thousand gallons per day was used to calculate daily emissions.

15,000 gal. fuel dispensed * *1.27 pounds ROG* / *1,000 gal. Fuel dispensed* = **19 pounds ROG per day**

Source: *Gasoline Service Station Industry Wide Risk Assessment Guidelines, CAPCOA, Nov. 1997 http://www.arb.ca.gov/ab2588/rrap-iwra/gasiwra.pdf*

URBEMIS2002 Model Output Attached.
CO Screening analysis attached

URBEMIS 2002 For Windows 7.5.0

File Name: <Not Saved>
Project Name: Cochrane Rd. PUD weekday
Project Location: San Francisco Bay Area
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.54	6.36	3.13	0.00	0.01

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	129.41	128.58	1,291.12	0.73	110.09
TOTALS (lbs/day, mitigated)	129.41	128.58	1,291.12	0.73	110.09

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	129.96	134.94	1,294.24	0.73	110.10

Both Area and Operational Mitigation must be turned on to get a combined mitigated total.

URBEMIS 2002 For Windows 7.5.0

File Name: <Not Saved>
Project Name: Cochrane Rd. PUD weekday
Project Location: San Francisco Bay Area
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.46	6.35	2.54	-	0.01
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.08	0.01	0.58	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.54	6.36	3.13	0.00	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Regnl shop. center	129.41	128.58	1,291.12	0.73	110.09
TOTAL EMISSIONS (lbs/day)	129.41	128.58	1,291.12	0.73	110.09

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2007 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Regnl shop. center	33.49 trips / 1000 sq. ft.	657.25	22,011.30

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	55.20	1.80	97.80	0.40
Light Truck < 3,750 lbs	15.10	3.30	94.00	2.70
Light Truck 3,751- 5,750	16.10	1.90	96.90	1.20
Med Truck 5,751- 8,500	7.10	1.40	95.80	2.80
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.40	0.00	50.00	50.00
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.70	82.40	17.60	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.20	8.30	83.30	8.40

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.8	4.6	6.1	11.8	5.0	5.0
Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip Speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	27.3	21.2	51.5			
% of Trips - Commercial (by land use)						
Regnl shop. center				2.0	1.0	97.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2007.

URBEMIS 2002 For Windows 7.5.0

File Name: <Not Saved>
Project Name: Cochrane WEEKEND 2007
Project Location: San Francisco Bay Area
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.54	6.36	3.13	0.00	0.01

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	169.21	170.93	1,716.35	0.97	146.35
TOTALS (lbs/day, mitigated)	169.21	170.93	1,716.35	0.97	146.35

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	169.76	177.29	1,719.47	0.97	146.36

Both Area and Operational Mitigation must be turned on to get a combined mitigated total.

URBEMIS 2002 For Windows 7.5.0

File Name: <Not Saved>
Project Name: Cochrane WEEKEND 2007
Project Location: San Francisco Bay Area
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.46	6.35	2.54	-	0.01
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.08	0.01	0.58	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.54	6.36	3.13	0.00	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Regnl shop. center	169.21	170.93	1,716.35	0.97	146.35
TOTAL EMISSIONS (lbs/day)	169.21	170.93	1,716.35	0.97	146.35

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2007 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Total Trips
Regnl shop. center	44.52 trips / 1000 sq. ft.	657.25	29,260.77

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	55.20	1.80	97.80	0.40
Light Truck < 3,750 lbs	15.10	3.30	94.00	2.70
Light Truck 3,751- 5,750	16.10	1.90	96.90	1.20
Med Truck 5,751- 8,500	7.10	1.40	95.80	2.80
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.40	0.00	50.00	50.00
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.70	82.40	17.60	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.20	8.30	83.30	8.40

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	11.8	4.6	6.1	11.8	5.0	5.0
Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip Speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	27.3	21.2	51.5			
% of Trips - Commercial (by land use)						
Regnl shop. center				2.0	1.0	97.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

Changes made to the default values for Operations

The operational emission year changed from 2004 to 2007.

COCHRANE ROAD PUD, MORGAN HILL

CARBON MONOXIDE ANALYSIS PM Peak Hour

Assumes worst case of all intersections based on total volume, LOS and project traffic contribution

Intersection	Traffic Volume: Exist	Project	Cumulative + Project	General Plan 2025	1-Hour CO Contribution: Exist	Project	Cumulative + Project	General Plan 2025	Total 1-Hour CO Concentration: Exist	Project	Cumulative + Project	General Plan 2025	Total 8-Hour CO Concentration: Exist	Project	Cumulative + Project	General Plan 2025
Link: Cochrane Rd/US 101 Northbound (#6)									9.2	10.7	9.6	7.1	5.7	6.8	6.0	4.2
Cochrane Rd (4 lanes)	1701	3120	3278	3690	2.5	4.0	3.1	0.9								
US 101 NB (2 lanes)	1336	1846	1693	1775	0.6	0.7	0.6	0.1								
Cochrane Rd/US 101 Southbound (#5)									10.8	11.5	10.2	7.1	6.8	7.4	6.4	4.3
Cochrane Rd (4 lanes)	2902	3784	3395	4090	4.3	4.9	3.7	1.0								
US 101 SB (2 lanes)	897	1639	1715	1620	0.4	0.7	0.5	0.1								
Cochrane Rd/Butterfield (#5)									8.3	9.0	8.3	7.0	5.1	5.6	5.1	4.2
Cochrane Rd (4 lanes)	1345	2052	2148	2930	2.0	2.6	2.0	0.7								
Butterfield (4 lanes)	637	972	979	3500	0.3	0.3	0.3	0.2								

* Indicates primary roadway (due to higher volume)

Emission Factors (EMFAC2002 - 5mph)			
Santa Clara County			
LOS E or F (5mph)	2005	=	12.6 g/mi
	2007	=	10.8 g/mi
	2010		7.9 g/mi
V	2025		2.1 g/mi

Background CO Levels -	1-Hour	8-Hour
Morgan Hill (BAAQMD)	6	3.5

Dispersion Factors	
Primary	Edge
2 Ln	14.0
4 Ln	11.9
6 Ln	9.5
Secondary	
2 Ln	3.7
4 Ln	3.3
6 Ln	2.8

Technical Appendices

Appendix E – Cultural Resources

Pacific Municipal Consultants. Archaeological and Historical Investigations for the Cochrane Road Planned Unit Development Project in the City of Morgan Hill, Santa Clara County. January 2005.

ARCHAEOLOGICAL and HISTORICAL INVESTIGATIONS for the COCHRANE ROAD PLANNED USE DEVELOPMENT PROJECT in the CITY OF MORGAN HILL, SANTA CLARA COUNTY

Report Prepared For:

The City of Morgan Hill

Report Prepared By:

Pacific Municipal Consultants
585 Cannery Row
Suite 304
Monterey, CA 93940

January 2005

MANAGEMENT SUMMARY

The City of Morgan Hill is proposing a zoning and general plan amendment to facilitate the construction of a retail facility identified as the Cochrane Road Planned Unit Development (Cochrane PUD). The Project Area of Potential Effects (APE) for the Cochrane PUD consists of an approximately 66-acre site at the northeast corner of Cochrane Road and U.S. Highway 101. The project site is primarily used as agricultural land, but also includes private residences and equestrian boarding facilities. The proposed project includes: demolition of existing buildings and structures on the site; construction of an approximately 625,000 square foot retail facility that may include "big-box" stores, restaurants, grocery stores, and a cinema; construction of access roads; and installation of infrastructure (e.g., sewer, water, and electrical facilities). The project is subject to the legal requirements of the California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq.) 1970, as amended.

Cultural resources staff of Pacific Municipal Consultants (PMC) conducted archaeological and historical investigations for the Cochrane Road PUD in December 2004. Archaeological and historical investigations included: a records search at the Northwest Information Center; a sacred lands search conducted by the Native American Heritage Commission; consultation with the Native American community and other interested parties (e.g., local historical societies); and pedestrian surface survey of the APE for the Cochrane PUD. These investigations did not identify any significant cultural resources (e.g., prehistoric sites, historic sites, historic buildings, or isolated artifacts) in the project APE. Therefore, it is not anticipated that implementation and completion of the Cochrane PUD would likely affect any historical resources (i.e., properties determined eligible for inclusion in the California Register of Historical Resources) or unique archaeological resources.

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Figure 13. Residence at 1195 Cochrane Road C....20

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The City of Morgan Hill is proposing a zoning and general plan amendment to facilitate the construction of a retail facility identified as the Cochrane Road Planned Unit Development (Cochrane PUD). The Project Area of Potential Effects (APE) for the Cochrane PUD consists of an approximately 66-acre site at the northeast corner of Cochrane Road and U.S. Highway 101. The proposed project includes: demolition of existing buildings and structures on the site; construction of an approximately 625,000 square foot retail facility that may include "big-box" stores, restaurants, grocery stores, and a cinema; construction of access roads; and installation of infrastructure (e.g., sewer, water, and electrical facilities).

1.2 PROJECT LOCATION

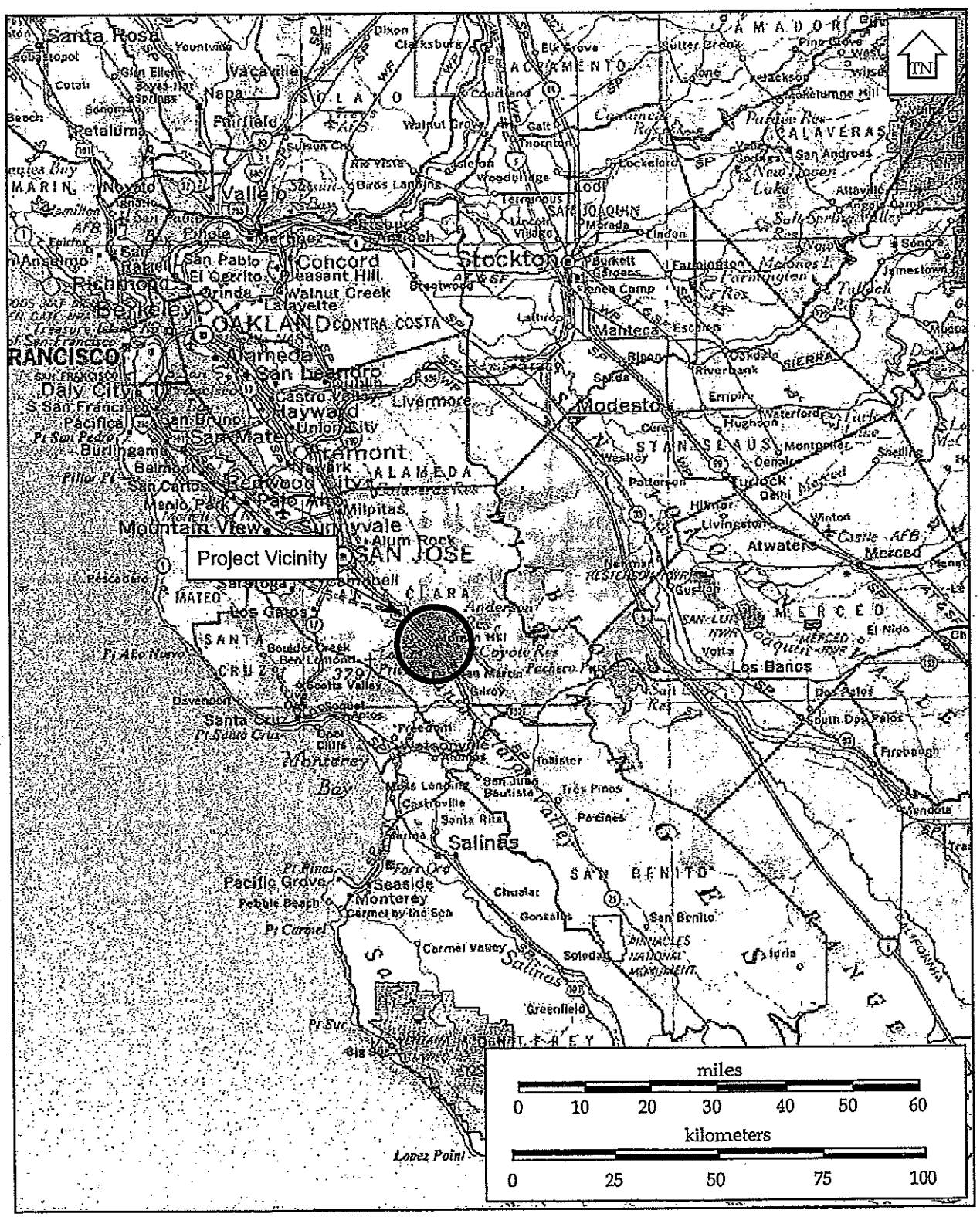
The Cochrane PUD is located at the northeast corner of Cochrane Road and U.S. Highway 101 in the City of Morgan Hill, Santa Clara County (Figures 1-3). The project APE encompasses an approximately 66-acre site that is primarily used as agricultural land, but also includes private residences and equestrian boarding facilities. In addition, a Santa Clara Valley Water District irrigation canal is adjacent to the western edge of the project APE and the project site is near current residential and commercial developments.

1.3 SCOPE OF WORK

The City of Morgan Hill contracted Pacific Municipal Consultants (PMC) to complete the environmental documents necessary for the proposed Cochrane Road PUD, including archaeological and historical investigations. Archaeological and historical investigations for the project included: a records search at the Northwest Information Center at Sonoma State University, Rohnert Park; a sacred lands search conducted by the Native American Heritage Commission; consultation with the Native American community and other interested parties (e.g., local historical societies); pedestrian surface survey of the APE for the Cochrane Road PUD; and completion of a report documenting the results of archaeological and historical investigations.

1.3.1 Archaeological Resource Identification

The record search for the project APE and a ¼mile area surrounding it identified four previous surveys (cf., Jackson 1973; Melandry 1976; Hampson and Breschini 1986; and Busby et al. 2003) within the project APE and 2 previous surveys (cf., Haversat and Breschini 1979; and Brown 1999) beyond the project APE, but within ¼ mile of it. None of these previous surveys identified any prehistoric sites, historic sites, or historic buildings within the project APE. Regardless of these results, cultural resources staff of PMC conducted a pedestrian surface survey across the APE for the Cochrane PUD using 20 meter transects. Surface visibility was generally good across approximately 75% of the project APE (i.e., this area is in agricultural production and was recently disced prior to archaeological survey). Surface visibility, however, across the remaining approximately 25% of the project APE was limited by vegetation (i.e., this area is planted in vineyards, used for equestrian boarding, and includes private residences and other structures used for storage). Regardless of the vegetation (e.g., vineyards and grasses) in parts of the project APE, there were open spaces in it that provided sufficient surface visibility for adequate survey of the project APE. In addition, the project APE is previously disturbed by: approximately 100 years of agricultural use (e.g., the APE was recently disced to a depth of 40-50cm); installation of irrigation facilities; construction of private residences; construction of storage facilities (e.g., barns and other structures); installation of infrastructure; road construction; and deposition of fill materials (i.e., materials generated from a Santa Clara Water District pipeline project north of the current project site) in the eastern quadrant of the APE. The project site is also: surrounded by recent residential and commercial developments; adjacent to U.S. Highway 101; and the Leroy Anderson Dam is approximately 1 mile to the east.



SOURCE: National Geographic TOPOI; San Francisco CD; 2003

Figure 1. Project Vicinity Map.

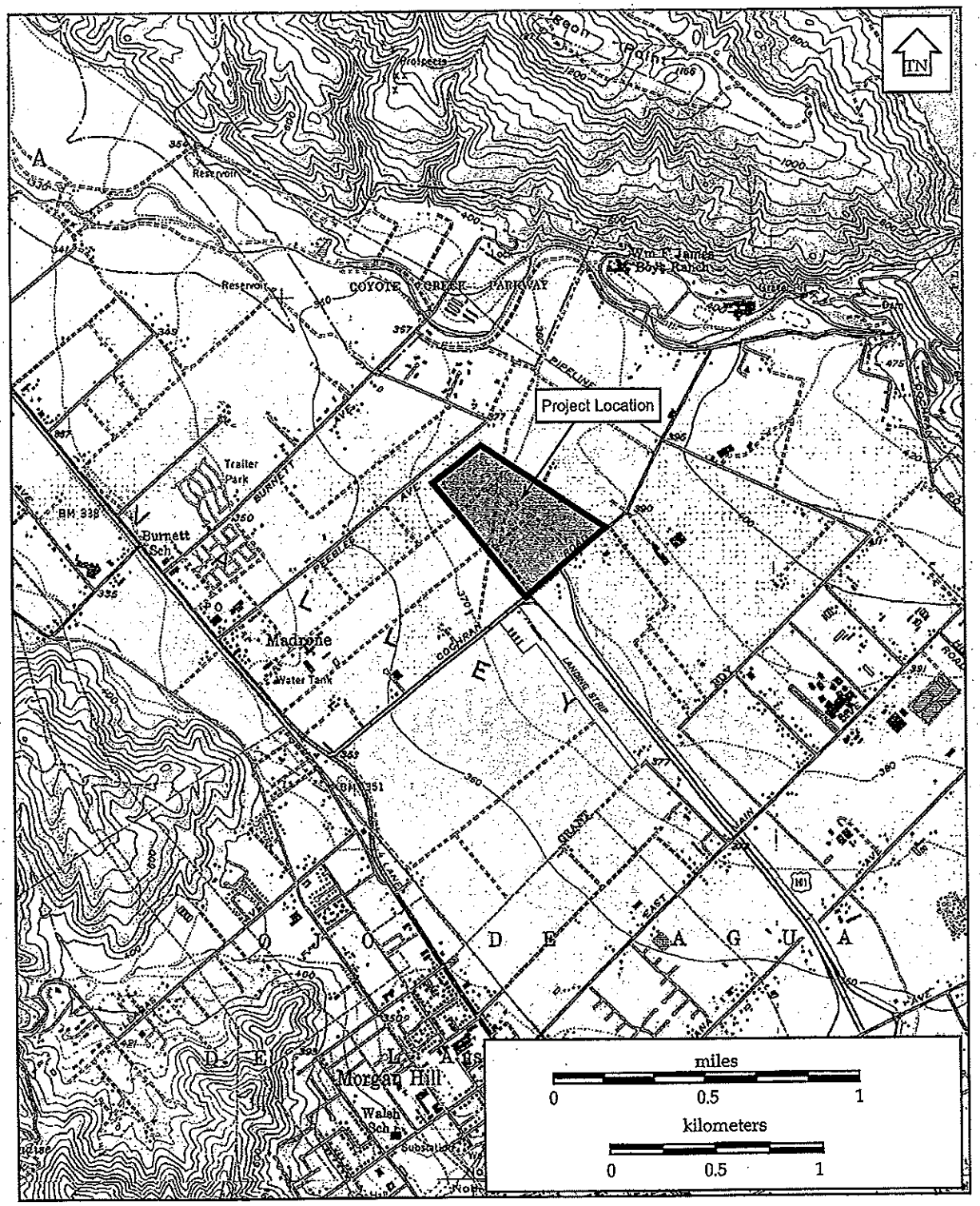


Figure 2. Project Location Map.

SOURCE: National Geographic TOPOI; San Francisco CD; 2003; showing the Morgan Hill quadrangle; T9S, R3E; MDM.

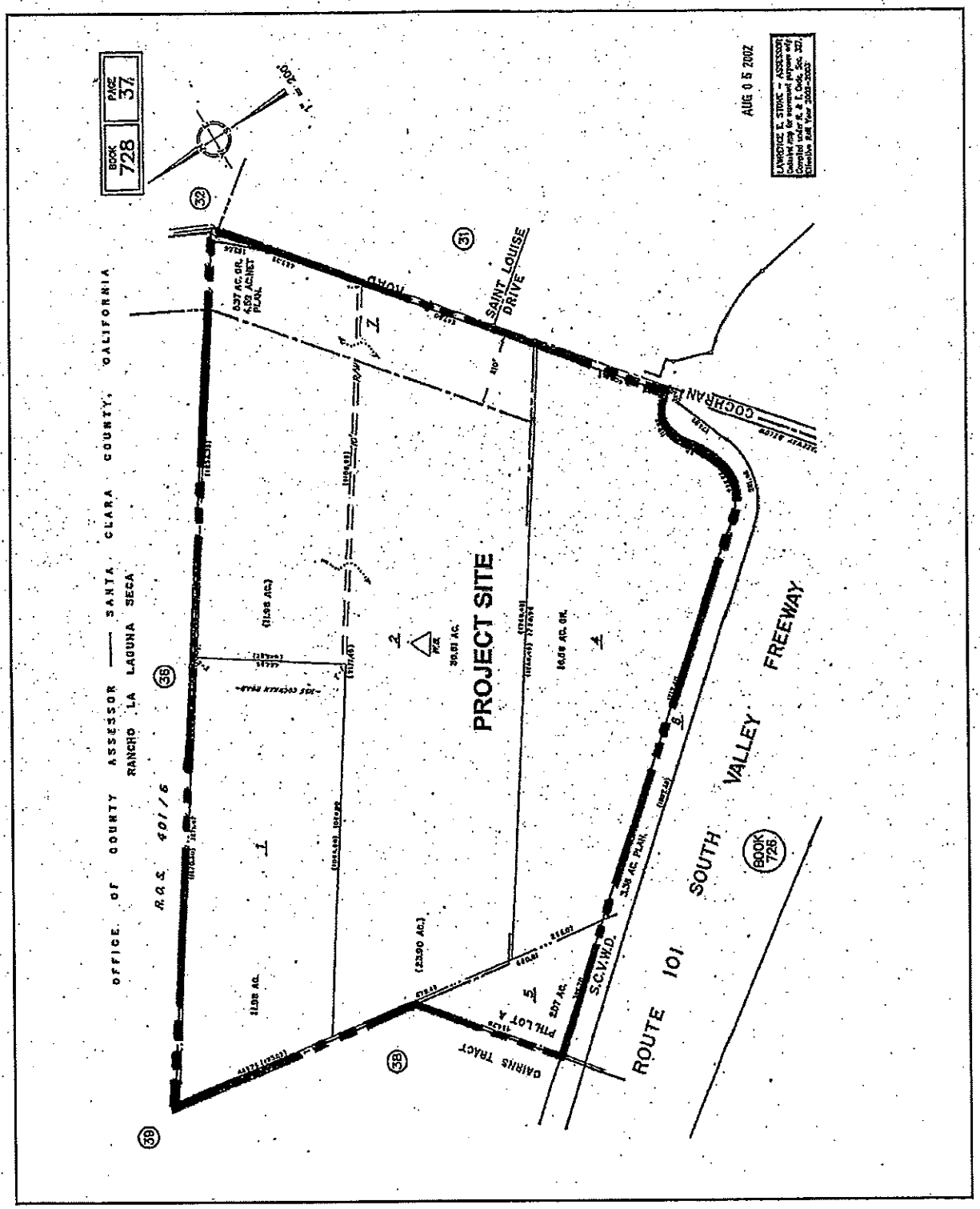


Figure 3. Project Site Map.

SOURCE: Office of County Assessor - Santa Clara County, California; Rancho La Laguna Seca.

Current archaeological and historical investigations for the Cochrane PUD did not identify any prehistoric sites, historic sites, or any isolated artifacts within the project APE. These investigations, however, did identify three private residences and associated structures (e.g., tank houses, barns, and other storage facilities) within the project APE. These residences and structures do not appear to meet the criteria for inclusion in the California Register of Historical Resources (CRHR). Archaeological investigations are adequate for the project, and a reasonable effort has been made to identify cultural resources within the APE for the Cochrane Road PUD. There are no historical resources or significant archaeological resources within the project APE.

1.3.2 Site Recording

Current archaeological and historical investigations identified three private residences and associated structures (e.g., tank houses, barns, and other storage facilities) within the project APE. These buildings and structures were documented on appropriate Department of Parks and Recreation Site Record Forms. The site records are included in Attachment A, Site Records.

1.4 NATIVE AMERICAN AND OTHER CONSULTATION

Cultural resources staff of PMC requested a sacred lands search and a list of Native American contacts from the Native American Heritage Commission. The results of sacred lands search were received on December 8, 2004, and did not identify any Native American cultural resources either within or near the APE for the currently proposed project. PMC contacted all groups and/or individuals on the list provided by the Native American Heritage Commission and also contacted other interested parties (e.g., local historical societies) regarding the Cochrane PUD (Attachment B, Native American and Other Consultation). PMC cultural resources staff, to date, has not received any comments regarding the proposed project.

1.5 PERSONNEL CONDUCTING RESEARCH

Professional staff of PMC performed all current archaeological and historical investigations for the Cochrane Road PUD. Field and archival research for the project was conducted in December 2004. John A. Nadolski, M.A. was responsible for overall project management and implementation, including report writing. Kurt E. Lambert, B.A. assisted Mr. Nadolski in the completion of archaeological and historical investigations. Andrea Galvin, M.A., an architectural historian of Galvin & Associates, reviewed the site records and findings for the buildings and structures within the boundaries of the Cochrane Road PUD. All project personnel meet the Secretary of the Interior's Standards and Guidelines for Professional Qualifications.

2.0 ENVIRONMENTAL CONTEXT

The project is located in California's Coast Ranges, which primarily consists of northwest trending mountain ranges, broad basins, and elongated valleys that generally parallel the coast (Norris and Webb 1990). The diverse resources and ecosystems in the area attracted prehistoric and historic Native American populations and Euroamerican populations. The Santa Clara Valley and the area immediately surrounding it provided prehistoric and historic Native American populations with a rich, varied, and relatively stable resource base. Similarly, Euroamericans were attracted to the area because of its diverse resources and agricultural potential.

2.1 GEOGRAPHY AND GEOLOGY

The Cochrane Road PUD is located in the Santa Clara Valley in the Coast Range geomorphic province. The project is located in a narrow section of he valley identified as the Coyote Narrows. The Santa Clara Valley is a generally broad northwesterly trending alluvial basin bordered on the east by the Diablo Range and on the west by the Santa Cruz Mountains. The Franciscan Formation represents the oldest exposed rock formations in the general project area (Norris and Webb 1990). Outcrops of the Franciscan formation provided materials for the manufacture of stone tools by local prehistoric and historic Native American populations. Most rock formations in the Santa Clara Valley, however, are buried beneath thick deposits of alluvial sediments. These sediments vary from relatively coarse-grained alluvial fan deposits at the edges of the valley to fine grained gravel, silt, and clay stream deposits in the center of the valley (Twinning Laboratories 2004). Currently, streams in the north end of Santa Clara Valley drain into river systems (e.g., the Guadalupe River and its tributaries) that flow into San Francisco Bay and streams in the south end of the valley drain into river systems (e.g., the Pajaro River and its tributaries) that flow into Elkhorn Slough and Monterey Bay (Elsasser 1986).

The Santa Clara Valley is in a Mediterranean climatic zone, which is characterized by warm, dry summers and cool, rainy winters. The Pacific Ocean influences regional climate causing fog and onshore winds that generally maintain temperatures in the range of 40-70 degrees along the coast, while temperatures can reach 85-100 degrees in the valleys within the coast mountain ranges.

2.2 FLORA AND FAUNA

The area surrounding the City of Morgan Hill and the APE for the Cochrane Road PUD is changing from a rural, agricultural area to a suburban, residential area. The APE for the Cochrane Road PUD consists of agricultural lands, vineyards, and pasture that are surrounded by residential and commercial developments. Consequently, the plant and animal communities encompassing and surrounding the project area are a mixture of cropland (Zeiner 1988a), vineyards (Schultze 1940), pasture (Zeiner 1988b), and urban (e.g., landscaped yards) habitats (McBride and Reid 1988).

3.0 CULTURAL CONTEXT

The proposed project is located in an area with a long history of use by both Native American and Euroamerican populations. Archaeological evidence suggests that Native American populations have occupied the area for 10,000 years and Spanish exploration/settlement of the area dates to the 1600s.

3.1 REGIONAL PREHISTORY

Scant archaeological work was conducted in the Santa Clara Valley until relatively recently. Interior areas tended to be overlooked in favor of coastal areas, such as San Francisco Bay and Monterey Bay, where large shellmounds were relatively easily identified on the landscape. Regardless, archaeological research in San Francisco Bay, Monterey Bay, and along the coast is relevant to the prehistory of the Santa Clara Valley.

Archaeological research in vicinity of Monterey Bay dates to 1875, when Saxe tested the Sand Hill Bluff site, CA-SCR-7, just north of Santa Cruz (Saxe 1875). Early research was continued by Kroeber (1915), who recorded nine sites near Monterrey Bay, and by Golomshtok (1921-1922), Hill (1929), and Wood (1930) all of whom conducted surveys near Elkhorn Slough. Following this early work, virtually no archaeological research was conducted in the area until the late 1940s and 1950s. Research during this period is highlighted by the work of: Pilling (1948), who identified numerous sites in Monterey County and specifically Elkhorn Slough; Greengo (1951), who sampled shellmounds near Elkhorn Slough; and Broadbent (1951a, 1951b), who tested the Berwick Park site, CA-MNT-107. Most of this work may be classified as exploratory, and tended to be site specific rather than integrative in focus. One of the first major site reports in the Monterey Bay area was completed by Pritchard (1968) for CA-MNT-101. Since the completion of Pritchard's report, archaeological research and interest in the Monterey Bay area has steadily grown. A catalyst to this development is the implementation and completion of numerous cultural resource management projects. These projects have expanded the archaeological database for the area and also have made significant contributions to our understanding of its prehistory. Similarly, cultural resources management projects in the Santa Clara Valley beginning in the 1970s and continuing to the present have expanded our knowledge of the area.

This recent archaeological work involved the development of regional chronologies and models of culture change for Monterey Bay and its immediate environs. Significant contributions in this regard have been presented by: Breschini (1983); Breschini et al. (1983); Breschini and Haversat (1992); Cartier (1993); Dietz (1985); Dietz et al. (1988); Dietz and Jackson (1981); Hildebrandt and Mikkelsen (1993); Jones and Hylkema (1988); Jones (1993); Jones et al. (1992); Jones and Jones (1992); and Patch and Jones (1984). Relatively recent archaeological investigations in the Santa Clara Valley have also generated models of regional chronology and culture change (cf., King and Hickman 1973; Bergthold 1982; Elsasser 1986; and Hidlebrandt and Mikkelsen 1993).

Breschini and Haversat proposed two archaeological "patterns" for the Monterey Bay area: the Sur Pattern and the Monterey Pattern (Breschini and Haversat 1980; Breschini 1983). They suggest that the Sur Pattern represents an early "forager" subsistence strategy and a very generalized economy. The Sur Pattern appears by 3000 B.P., and its sites reflect a variety of activities, with both inland and coastal sites exhibiting similar artifact assemblages. Breschini and Haversat associate the Sur Pattern with Hokan speaking ancestors of historic Esselen populations. By contrast, Breschini and Haversat suggest the later Monterey Pattern represents a "collector" subsistence strategy. This pattern appears in the Monterey Bay area after 2450 B.P., and its sites reflect two different strategies of resource exploitation. Coastal sites highlight exploitation of marine resources, while sites located further inland exhibit evidence of more diversified subsistence activities. Breschini and Haversat associate the Monterey Pattern with Penutian speaking ancestors of historic Costanoan populations (1980).

Dietz' and Jackson's (1981) archaeological investigations at nineteen sites along the northern shore of Monterey Peninsula confirmed the presence of two archaeological "populations" in the area that are

comparable to the Sur and Monterey Patterns. Like Breschini and Haversat, they identified a group of foragers and a group of collectors. The foraging group, which dated to approximately 4,000 B.P., was probably Hokan-speaking ancestors of the Esselen. The subsequent group of collectors entered the area about 2000 B.P. and either absorbed or replaced the foragers inhabiting the area. These groups of collectors were probably early Costanoan populations. The early Costanoans exploited both the coastal and inland areas, establishing temporary camps along the shore and permanent residential base camps further inland.

Recently, the work of Breschini and Haversat (1980) and Dietz and Jackson (1981) has been thoroughly revised by Dietz et al. (1988), Jones and Hylkema (1988), Hylkema (1991), Hildebrandt and Mikkelsen (1993), and Jones (1993). This recent work proposes a series of seven cultural periods for the Monterey Bay area. These seven periods and their associated dates are: Paleoindian 10,000–8,000 B.C.; Millingstone 8,000–3,500 B.C.; Early 3,500–600 B.C.; Middle 600 B.C.–A.D. 1200; Late A.D. 1200–1769; and Historic. All seven periods are represented in the Monterey Bay area, but are only formally established for the Early, Middle, and Late periods.

The Paleoindian and Millingstone periods are identified as local expressions of the Paleo-Coastal Tradition (Jones et al. 1996). The Early period is best represented at CA-MNT-391, and is characterized by Class L *Olivella* beads, contracting stem Rossi Square-stemmed projectile points, mortars and pestles, and handstones and milling slabs (Cartier 1993). The Middle period is represented at CA-SCR-9, and is characterized by Class G2 *Olivella* beads, Año Nuevo Long-stemmed and contracting stem Rossi Square-stemmed projectile points, mortars and pestles, and handstones and milling slabs (Hylkema 1991). The Late period has been difficult to define in the Monterey Bay area. Sites CA-MNT-1485/H and -1486/H, however, represent this period and are characterized by Class E, K, and M *Olivella* beads, Desert Side-notched projectile points, bedrock mortars, and pestles (Breschini and Haversat 1992).

King and Hickman (1973) proposed a chronology and settlement/subsistence model for the southern Santa Clara Valley. Their chronology is similar to other chronologies for the Monterey Bay area, and includes the Millingstone Horizon, 5,000 B.C.-2,000 B.C., the Middle Horizon, 2,000 B.C.-A.D. 400, and the Protohistoric Period, A.D. 400-A.D. 1500. King and Hickman's (1973) settlement/subsistence model for the southern Santa Clara Valley correlated paleoenvironmental data with archaeological sites and modern ecological zones in the valley. Their model highlighted the process of change associated with the transition of relatively mobile hunter-gatherer populations to a relatively sedentary way of life as a result of access to a wide variety of plentiful resources. King and Hickman (1973) believed that their model was useful in predicting the location of certain types of sites not only in the southern Santa Clara Valley, but the entire valley. Bergthold (1982), however, did not find evidence to support King and Hickman's model in her extensive survey of the archaeology of the Santa Clara Valley.

Elsasser (1986) presents an overview of the prehistory of the Santa Clara Valley that summarizes archaeological work in the area and relates it to research in San Francisco Bay, Monterey Bay, and the Central Valley. Elsasser (1986) also suggests a chronology for the Santa Clara Valley that incorporates the frameworks of other regional chronologies and includes four main periods. These periods are: Period I (9,000 B.C.-6,000 B.C.) that is highlighted by the stratified site CA-SCL-178; Period II (6,000 B.C.-3,000B.C.) that appears to mark a shift from hunting to seed gathering and is characterized by milling stones and handstones; Period III (3,000 B.C.-2,000 B.C.) that is highlighted by an exploitation of a wide variety of both plant and animal resources, including fish; and Period IV (2,000B.C.-Euroamerican contact) that is highlighted by a shift to acorn collecting and processing. Elsasser (1986) examined the relationship between bay sites, coastal sites, and inland sites in an attempt to resolve conflicts between different chronological schemes and to identify diagnostic characteristics that might be useful in comparing sites from different areas.

Hildebrandt and Mikkelsen (1993) also investigated the relationship between coastal and inland sites in the southern Santa Clara Valley and present a settlement/subsistence model for the area. They (1993) suggest that: Early Period (3,000 B.C.-500 B.C.) sites in the valley are characterized by hunting, minimal use of wetland resources, and exploitation of marine resources, which implies that regular trips were made to the coast; Middle Period (500B.C.-A.D. 1150) sites in the valley highlight occupation of the area by less mobile

populations and a reduction in the use marine resources from the coast; and Late Period (A.D. 1150-1769) sites in the valley that highlight a further reduction in the mobility of local populations, an abandonment of marine resources, and increased exploitation of lacustrine resources (e.g., waterfowl, turtles, fresh water mussel, and fish). This model suggests that the Santa Clara Valley was inhabited at an early date by populations that split time between the interior and the coast and that these populations eventually abandoned use of the coast, concentrating on lacustrine resources in the valley.

Elsasser (1986) and Hildebrandt and Mikkelsen (1993) provide interesting models for the occupation and use of the Santa Clara Valley. Other recent archaeological work in the Santa Clara Valley has also expanded our knowledge of the area. Regardless, research in the Santa Clara Valley is still in its infancy, and additional research is necessary to understand the prehistory of the area and to relate it to the prehistory of the surrounding areas (e.g., San Francisco Bay, Monterey Bay, and the Central Valley).

3.2 ETHNOGRAPHY

At the time of Euroamerican contact (ca. 1769), Native American groups of the Costanoan language family occupied the area from San Francisco Bay to southern Monterey Bay and the lower Salinas River. The Costanoan language family consists of eight separate and distinct languages, and approximately 50 tribelets (Levy 1978). The Santa Clara Valley and surrounding area was primarily occupied by speakers of three different Costanoan languages: Awaswas speakers occupied northern Monterey Bay near Aptos; Mutsun speakers occupied the Pajaro River drainage; and Tamyen speakers occupied the south end of San Francisco Bay and the Santa Clara Valley. The tribelets of Matalan, Pitac, and Chitactac occupied the Santa Clara Valley and the area around the City of Morgan Hill (City of Morgan Hill General Plan EIR 2000). Unfortunately, Costanoan culture was dramatically affected by missionization, and information (e.g., mission records and travelers logs) regarding its pre-contact organization is incomplete and inconsistent. In fact, Costanoan languages were probably extinct by 1935, and in 1971 the remaining Costanoan descendants united as a corporate entity identified as the Ohlone Indian Tribe (Levy 1978).

3.2.1 Settlement, Social Organization, and Subsistence Patterns

Costanoans lived in an area extending from San Francisco Bay to Monterey Bay. This large area was subdivided among several individual tribelets occupying specific territories. Each tribelet consisted of approximately 200 individuals, who were grouped into clans and moieties, usually controlled by a headman (Harrington 1933, 1942; Levy 1978). The position of headman was passed patrilineally, usually from father to son, with succession being subject to approval by the community. If no suitable male heir was available, a woman could also assume the role of headman. Tribelet political organization also included a council of elders, official speakers, and shamans (Levy 1978).

Costanoan tribelets experienced both friendly and hostile relations with each other and with neighboring cultural groups such as the Salinan and Yokuts. Interaction between these groups involved marriage, trade, and warfare. Intermarriage usually occurred between adjacent tribes, and was rare between tribes at greater distances (Milliken et al. 1993). Trade was a regular activity among the tribes of the area, with resources such as shell, piñon, and obsidian moving between coastal and inland groups. Warfare is a common theme in many historical accounts of various groups of Costanoans, and is usually associated with territorial disputes and/or access to and control of particular resources (Broadbent 1972; Langsdorff 1968).

Costanoans usually moved between several semi-permanent camps and villages to take full advantage of seasonally available resources. Dwellings at these camps and villages were dome-shaped, with pole frameworks and thatch for roof and walls. Other structures typically found in a Costanoan village included: acorn granaries; sweathouses; menstrual houses; and dance and/or assembly houses, generally located in the center of a village (Broadbent 1972).

A wide variety of ecological zones, including foothills, valleys, sloughs, and coastal areas, were exploited by Costanoans to obtain subsistence resources. These resources included: various seeds; nuts (e.g., acorn,

buckeye, laurel, and hazelnuts); berries; grasses; corms; roots; insects; birds (e.g., geese, mallard, and coot); fish (e.g., steelhead, salmon, and sturgeon); shellfish (e.g., abalone, mussel and clam); and both marine and terrestrial mammals (e.g., sea otter, sea lion, harbor seal, deer, elk, grizzly bear, rabbits, antelope, raccoon, and squirrels) (Levy 1978).

3.2.2 Technology

Costanoan technology highlights exploitation of both marine and terrestrial resources. Tule balsas were used for transportation, fishing, and hunting (Levy 1978). Hunting weaponry and facilities included: sinew-backed and self-bows; wooden arrow shafts; projectile points and other flaked stone tools made from locally available chert or obsidian obtained through trade; and nets (Levy 1978). Costanoans utilitarian tools and facilities included: baskets, primarily twined, for food and water collection, food storage, and food preparation; portable stone mortars and bedrock mortars; pestles; metates; soaproot brushes; stone bowls; and bone awls (Levy 1978). Clothing, robes, and blankets were made of various animal skins (Levy 1978).

Steatite, serpentine, bone, and abalone were used for personal ornaments. In addition, *Olivella* and other shell were cut and ground into beads. Some Costanoans also decorated themselves with pigment and tattoos (Levy 1978).

3.2.3 Euroamerican Contact

Sebastian Vizcaino's landing at present day Monterey in 1602 is the earliest documented contact with Native Americans in the area. Following Vizcaino's landing, other Spanish ships may have stopped at Monterey, but contact was minimal until the initial overland exploration of the area by Gaspar de Portolá in 1769 (Hoover et al. 1990). Portolá's expedition followed the coast, while subsequent exploration of the region by Pedro Fages in 1770 and 1772, Fernando Javier de Rivera in 1774, and Juan Bautista de Anza in 1776 traveled on the east side of the Santa Cruz Mountains through the Santa Clara Valley, and along a route that became known as El Camino Real (Beck and Haase 1974).

Gaspar de Portolá founded Monterey in 1769, and in 1770 Padre Junipero Serra founded Mission San Carlos de Borromeo, which was later relocated to Carmel (Jones et al 1996). Other missions (e.g., Mission Santa Cruz, founded in 1791; Mission San Juan Bautista, founded in 1797; and Mission Santa Clara de Asís, founded in 1777) are also located in the general area and had a dramatic effect on Native American populations. The Spanish attempted to convert the Native American population to Catholicism and incorporate them into the "mission system." The process of missionization disrupted traditional Costanoan cultural practices, and they were generally slow to adapt to the mission system. The Spanish, however, were intent on implementing the system, and by 1810 most Native Americans in the area were either incorporated or relocated into local missions. This factor, coupled with exposure to European diseases, virtually ended the traditional life of Native Americans in the Santa Clara Valley and surrounding area.

The Mexican period (ca. 1821-1848) in California is an outgrowth of the Mexican Revolution, and its accompanying social and political views affected the mission system. In 1833 the missions were secularized and their lands divided among the *Californios* as land grants called *Ranchos.* These *ranchos* facilitated the growth of a semi-aristocratic group that controlled the larger *ranchos.* Owners of *ranchos* used local populations, including Native Americans, essentially as forced labor to accomplish work on their large tracts of land. Consequently, Costanoans, and other Native American groups across California, were forced into a marginalized existence as *peons* or *vaqueros* on the large *ranchos. Ranchos* in the general project area include: San Francisco de las Llagas, de Laguna Seca, San Ysidro, Ojo de Agua de la Coche, and Las Animas (Beck and Haase 1974).

The end of the Mexican-American War and the signing of the Treaty of Guadalupe Hidalgo in 1848 marked the beginning of the American period (ca. 1848-Present) in California history. The onset of this period, however, did nothing to change the economic condition of the Native American populations working on the *ranchos.* The *rancho* system generally remained intact until 1862–1864, when a drought forced many landowners to sell off or subdivide their holdings. At this time landowners started to fence ranges and the economy began a shift from cattle ranching to dairy farming and agriculture based on crops such as wheat

and grapes for wine production. Regardless of a change of economic focus, the plight of Native American populations remained, at best, relatively unchanged (e.g., the U.S. Senate rejected treaties between the government and Native Americans in 1851 and 1852, and military reserves were established to maintain various groups) (Heizer 1974).

The latter half of the nineteenth century witnessed an ongoing and growing immigration of Euroamericans into the area, which was also accompanied by regional cultural and economic changes. Euroamerican culture expanded at the expense of Hispanic culture. Dispersed farmsteads slowly replaced the immense Mexican ranchos, and the farming of various crops slowly replaced cattle ranching as the primary economic activity in the region. The advent of the railroad in the area in the late 1800s, and the mechanization of farming with steam-driven machinery, once again altered the economy of the region. For example, larger and larger tracts of land were opened for farming. Some of this land consisted of areas reclaimed from sloughs and lowlands, but corporations specializing in crops grown for export soon purchased many of these farms. These agricultural developments demanded a large labor force and sparked a new wave of immigration into the region. Groups of Chinese were the first new immigrants in the area, and were followed by Japanese, Filipino, and Mexican laborers.

3.2.4 Morgan Hill

The Spanish established settlements at San Jose and Monterey by the late 1700s. The road that connected these two settlements passed through the Santa Clara Valley, and was identified as Monterey Road. The road is still identified today as Monterey Road in the City of Morgan Hill. The earliest settlements in the Santa Clara Valley were established along Monterey Road, and included Madrone. Madrone was located in vicinity of the current intersection of Peebles Avenue and Monterey Road in Morgan Hill. The growth of Madrone, and the Santa Clara Valley in general, was accelerated by the construction of a railroad line between San Jose and Gilroy in 1868-1869 (City of Morgan Hill General Plan EIR 2000). The founding and growth of Morgan Hill typify the development of the area.

Rancho Ojo de Agua de la Coche, one of the original Mexican land grants in the area, was purchased by Martin Murphy, Sr. in 1835. In the 1880s Murphy's granddaughter, Diana Murphy, married Hiram Morgan Hill, and the couple took up residence on the rancho. The rancho soon became known as Morgan Hill Ranch, and Hiram and Diana built a home, "Villa Mira Monte" on the ranch in 1884[1]. Trains passing through Santa Clara Valley would stop at the ranch to let off visitors and soon a depot and town were established near the Morgan Hill Ranch. The train stop was identified as Morgan Hill, and as a town grew around the depot it retained the name of Morgan Hill.

The town of Morgan Hill expanded rapidly in the late 1800s and was incorporated as a city in 1906, with a population of approximately 600 (City of Morgan Hill General Plan EIR 2000). Development of the area peaked in the early 1900s and remained relatively stagnant until the 1970s-1980s when U.S. Highway 101 was opened, linking the area to San Jose. At this time there was a dramatic increase in the population and development of the City of Morgan Hill and the surrounding area. The population and economic development in the City of Morgan Hill and the surrounding area has continued to the present, and it is changing from agricultural area to a suburban residential area. The Cochrane Road PUD is a result of the residential and commercial development of the City of Morgan Hill.

[1] The Morgan Hill Historical Society restored Villa Mira Monte, and it is currently open to the public.

4.0 RESULTS OF RESEARCH

Archaeological and historical investigations for the Cochrane Road Planned Unit Development are complete. These investigations included: a record search at the Northwest Information Center at Sonoma State University, Rohnert Park; a sacred lands search conducted by the Native American Heritage Commission; consultation with the Native American community and other interested parties (e.g., local historical societies); and pedestrian surface survey of the project APE. These investigations did not identify any prehistoric sites, historic sites, or isolated artifacts, but did identify three private residences and associated structures (e.g., tank houses, barns, and other storage facilities) that were built in 1912, 1930, and 1940 within the project APE. Therefore, current archaeological and historical investigations addressed the eligibility of the three private residences and their associated outbuildings for inclusion in the CRHR and for designation as unique archaeological resources.

4.1 SITE CHARACTERIZATION AND ELIGIBILITY FOR THE CALIFORNIA REGISTER OF HISTORICAL RESOURCES

The APE for the Cochrane Road PUD includes three private residences: 1195 Cochrane Road A built in 1930; 1195 Cochrane Road B built in 1912; and 1195 Cochrane Road C built in 1940. CEQA presents guidelines at §15064.5 and §21083.2 for the identification of historical resources and determining their historical significance. CEQA §15064.5(a)(3) presents the following eligibility criteria for inclusion of historical resources in the CRHR:

> (1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
> (2) Is associated with lives of persons important in our past;
> (3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
> (4) Has yielded, or may be likely to yield, information important in prehistory or history.

CEQA also presents criteria for the identification of unique archaeological resources at §21083.2(g):

> (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
> (2) It has a special and particular quality such as being the oldest of its type or the best available example of its type.
> (3) Is directly associated with a scientifically recognized important prehistoric or historic event.

In addition to the eligibility criteria at CEQA §15064.5(a)(3), the California Code of Regulations (CCR), Title 14, Division 3, Chapter 11.5 § 4852 (c) also states that integrity of historical resources should be considered when addressing their eligibility for inclusion in the CRHR. This section of the CCR describes integrity as the

> ...authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Historical resources eligible for listing in the California Register must...retain enough of their historic character to be recognizable as historical resources and to convey the reasons for their significance.
>
> Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association.

4.1.1 1195 Cochrane Road A

The private residence at 1195 Cochrane Road A (APN: 728-37-002) is a single story, Craftsman Style building constructed in 1930 (Figure 4). The building is a vernacular example of the Craftsman Style that was common from 1905-1930 (Attachment B, Site Records). The building has a: front gabled, composite shingle, low-pitched roof; aluminum windows with wood casings; stucco exterior; and a front porch centered on the building with a low-pitched roof, matching the roof line of the building, supported by wood posts. The building is well maintained and appears to have been remodeled. Remodeling and/or reconstruction have compromised the overall integrity (i.e., integrity of design, materials, and workmanship) of the building. In addition, residential and commercial developments surrounding the property have comprised its integrity of setting, feeling, and association.

Two structures are associated with the residence. There is a wood shed at the rear of the building and a tank house, which was built in 1930 (Figure 5), opposite the front entrance to the building. The shed is used as a kennel for dogs and storage. The tank house is two-stories in height with a metal roof, clapboard siding, and sections of wood panel siding designed to mimic clapboard. There also are sheds attached to the side and the rear of the tank house. Tank house were routinely constructed in areas where wells were the source of water during the early 1900s. They were constructed over or near wells and generally consisted of a windmill-powered pump, which raised water from a well to an elevated tank. Tank houses provided a high platform to increase water pressure and facilitate distribution of water for residential or agricultural uses. In addition, the open space under the elevated tank was often enclosed to provide shelter for animals, use as a tool-shed, or use as a spare room. Tank houses began to disappear with the installation of pressurized and piped water systems. The design and construction of the tank house at 1195 Cochrane Road A is typical of this type of structure, and it does not exhibit any unique elements of design or construction.

Archival research regarding the residence and structures (i.e., tank house and shed) at 1195 Cochrane Road A did not identify any information to suggest that the residence and structures is associated with events that made a broad contribution to California's history. Therefore, the residence and structures do not appear to meet eligibility Criterion 1 for inclusion in the CRHR.

Archival research regarding the residence and structures (i.e., tank house and shed) at 1195 Cochrane Road A did not identify any information to suggest that the residence and structures is associated with individuals important in our past. Therefore, the residence and structures do not appear to meet eligibility Criterion 2 for inclusion in the CRHR.

Field and archival research for the residence and structures (i.e., tank house and shed) at 1195 Cochrane Road A determined that it does not embody any distinctive elements of design or methods of construction that are representative of a particular type or period of construction. Remodeling and/or reconstruction (e.g., composite shingle roof, aluminum windows, shed attachments) have compromised the integrity of the residence and tank house. Therefore, the residence and structures do not appear to meet eligibility Criterion 3 for inclusion in the CRHR.

The residence and structures (i.e., tank house and shed) at 1195 Cochrane Road A are adequately recorded, and additional research regarding the property does not appear to possess the potential to yield additional information important in history. Therefore, the residence and structures do not appear to meet eligibility Criterion 4 for inclusion in the CRHR.

In summary, the residence and tank house at 1195 Cochrane Road A were originally built in 1930. Regardless, remodeling and/or reconstruction (e.g., new roof, new windows, and shed attachments) and encroaching residential and commercial developments have compromised the integrity of the building and tank house. The residence and tank house are not associated with any events or persons important in history and do not exhibit distinctive elements of design or construction. Current research appears to have exhausted the potential of the property to yield any additional information important in history. Therefore, the property does not appear to meet the eligibility criteria for inclusion in the CRHR or for consideration as a unique archaeological resource.



Figure 4. Residence at 1195 Cochrane Road A

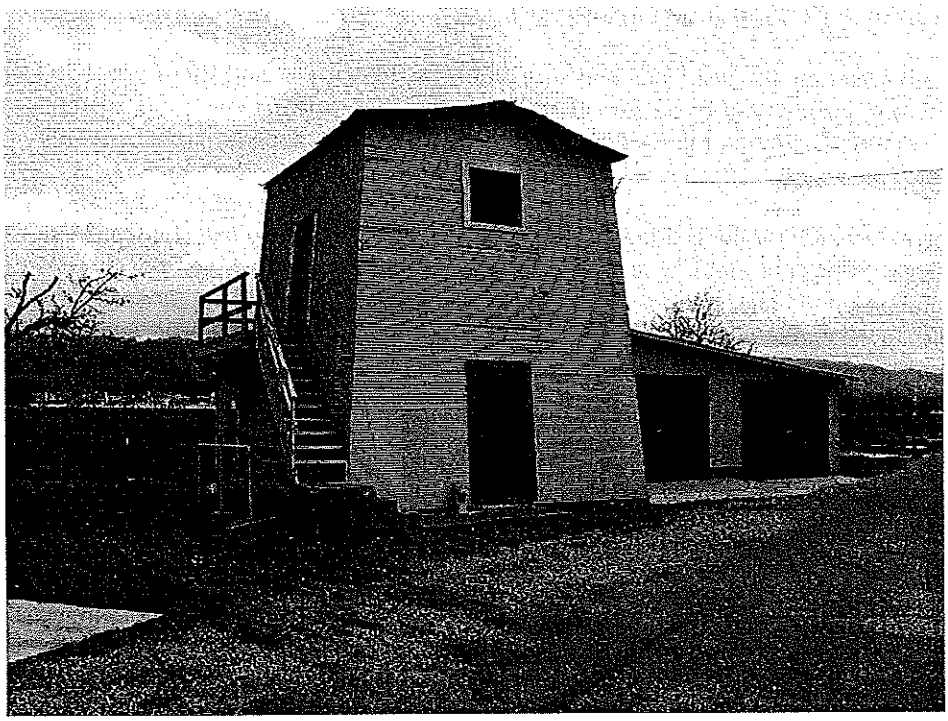


Figure 5. Tank house at 1195 Cochrane Road A

4.1.2 1195 Cochrane Road B

The private residence at 1195 Cochrane Road B (APN: 728-37-001) is a single story, Craftsman Style building constructed in 1912 (Figures 6-7). The building is a vernacular example of the Craftsman Style that was common from 1905-1930 (Attachment B, Site Records). The building has a: front gabled, composite shingle, low-pitched roof; double hung wood framed windows with wood casings; aluminum windows with wood casings; wood siding; a half-width front porch with a low-pitched roof supported by wood posts; an addition along the side of the building that includes a side entrance; and a square bay with aluminum windows at the rear of the building. Remodeling and/or reconstruction have compromised the overall integrity (i.e., integrity of design, materials, and workmanship) of the building. In addition, residential and commercial developments surrounding the property have comprised its integrity of setting, feeling, and association.

Six structures are associated with the residence. These structures include two wood sided barns, a wood sided shed, a metal-framed hay barn, a pump house, and a restroom (Figures 8-11). The metal-framed hay barn and restroom were constructed either in the late 1970s or early 1980s when the property began to be used as an equestrian boarding facility. The dates of construction for the other structures are uncertain. Regardless, these structures do not exhibit any unique designs or methods of construction. The design and construction of the six structures on the property is typical for these types of structures (e.g., barns), and they do not exhibit any unique elements of design or construction.

Archival research regarding the residence and structures (e.g., barns) at 1195 Cochrane Road B did not identify any information to suggest that the residence and structures are associated with events that made a broad contribution to California's history. Therefore, the residence and structures do not appear to meet eligibility Criterion 1 for inclusion in the CRHR.

Archival research regarding the residence and structures (e.g., barns) at 1195 Cochrane Road B did not identify any information to suggest that the residence and structures are associated with individuals important in our past. Therefore, the residence and structures do not appear to meet eligibility Criterion 2 for inclusion in the CRHR.

Field and archival research for the residence and structures (e.g., barns) at 1195 Cochrane Road B determined that they do not embody any distinctive elements of design or methods of construction that are representative of a particular type or period of construction. Indeed, remodeling and/or reconstruction (e.g., the addition along the side of the building) compromised the integrity of the residence. Similarly, the integrity of the structures has been compromised by a lack of maintenance (Figure 9) and remodeling/reconstruction (Figures 10-11). Therefore, the residence and structures do not appear to meet eligibility Criterion 3 for inclusion in the CRHR.

The residence and structures at 1195 Cochrane Road B are adequately recorded, and additional research regarding the property does not appear to possess the potential to yield additional information important in history. Therefore, the residence and structures do not appear to meet eligibility Criterion 4 for inclusion in the CRHR.

In summary, the residence at 1195 Cochrane Road B was originally built in 1912. Regardless, remodeling and/or reconstruction (e.g., new roof and windows) and encroaching residential and commercial developments have compromised the integrity of the building. The residence is not associated with any events or persons important in history and does not exhibit distinctive elements of design or construction. The date of construction for the structures at 1195 Cochrane Road B is uncertain. Regardless, the integrity of the structures has also been compromised by a lack of maintenance and remodeling/reconstruction. Current research appears to have exhausted the potential of the property to yield any additional information important in history. Therefore, the property does not appear to meet the eligibility criteria for inclusion in the CRHR or for consideration as a unique archaeological resource.

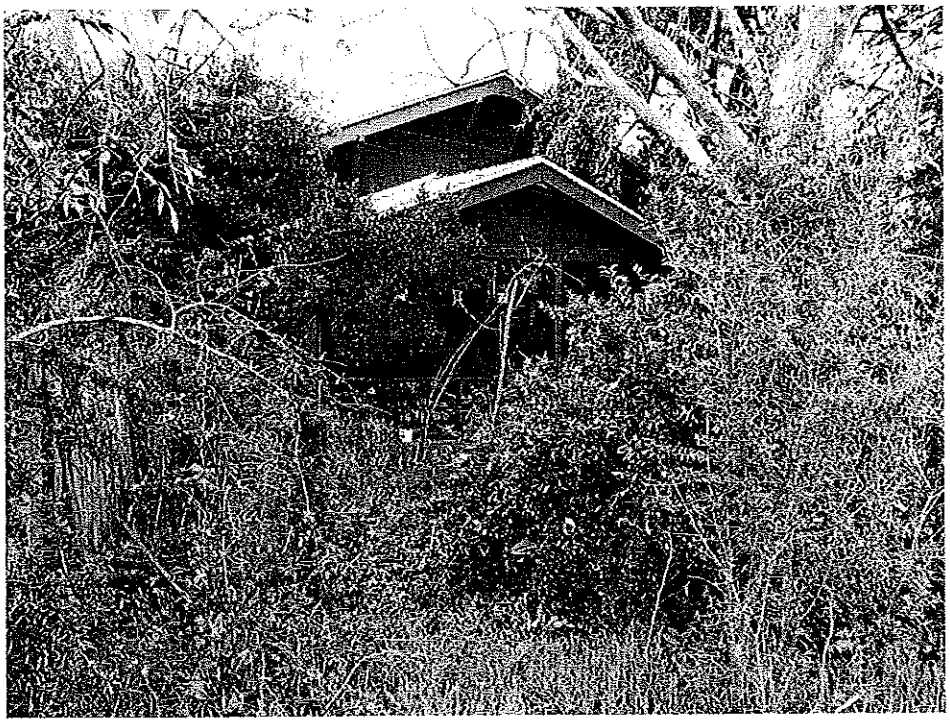


Figure 6. Front Entrance to Residence at 1195 Cochrane Road B



Figure 7. Rear of Residence at 1195 Cochrane Road B

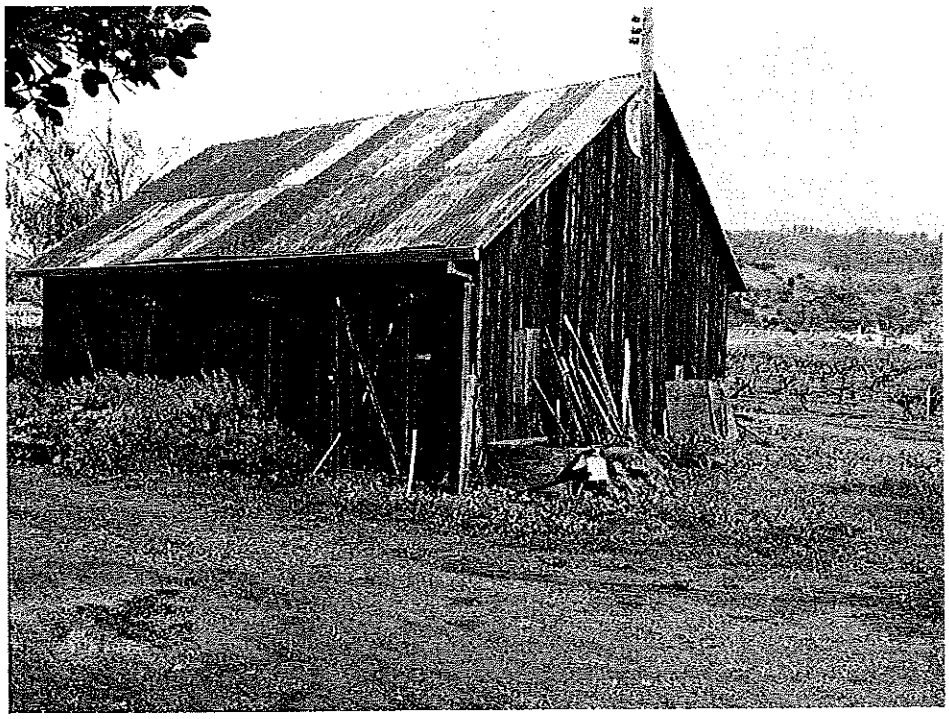


Figure 8. Barn at 1195 Cochrane Road B

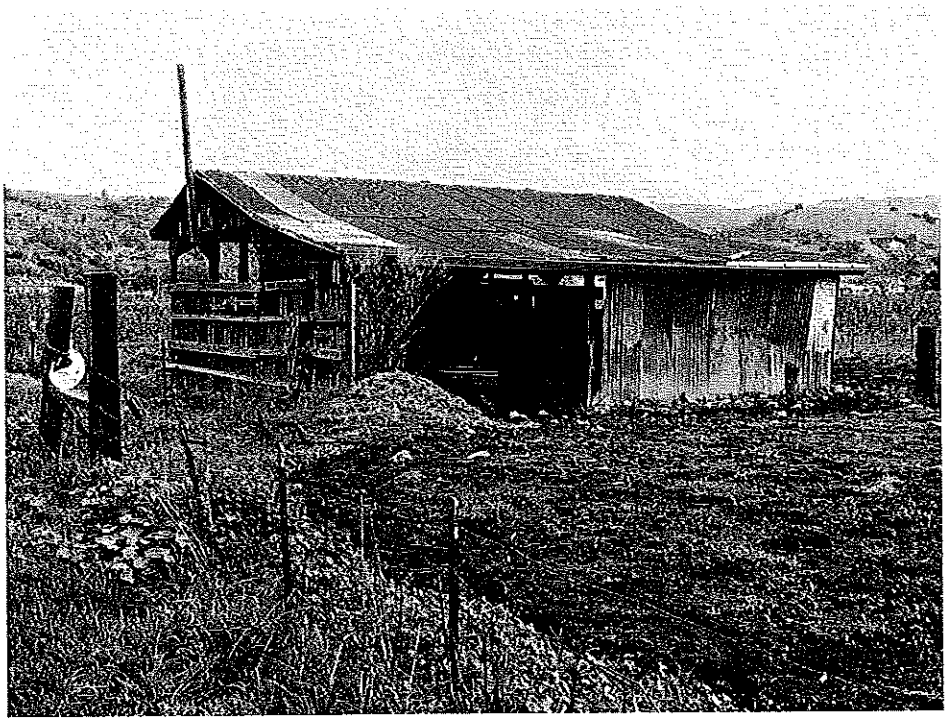


Figure 9. Barn at 1195 Cochrane Road B

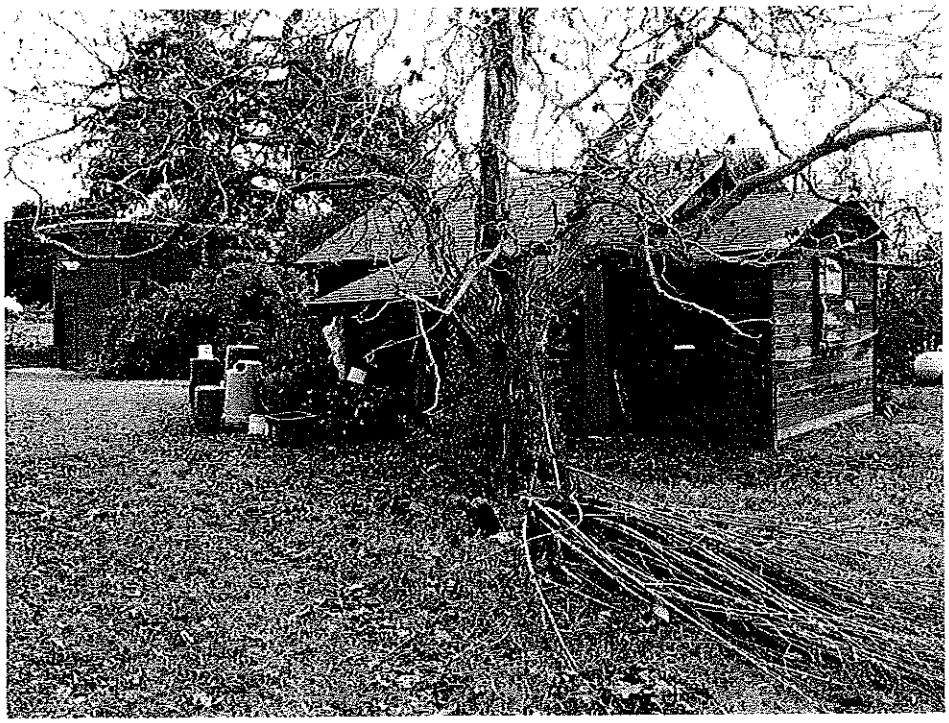


Figure 10. Wooden shed at 1195 Cochrane Road B

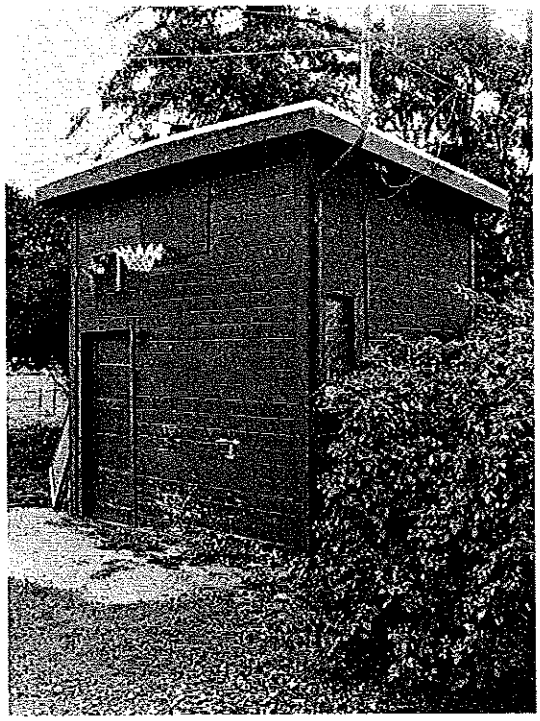


Figure 11. Pump house at 1195 Cochrane Road B

4.1.3 1195 Cochrane Road C

The private residence at 1195 Cochrane Road C (APN: 728-37-001) is a single story, Ranch style building constructed in 1940 (Figures 12-13). The building is a vernacular example of the Ranch Style, which was common in rural areas of California from 1935 through the 1970s. The building has a: composition shingle, low-pitched hipped-roof with a small dormer and what appears to be a large angular skylight; wood framed windows; a metal framed sliding glass door used as the entrance; stucco exterior; four wood framed ribbon windows; an enclosed addition at the front of the building with five wood framed ribbon windows that are angled away from the foundation of the addition; an attached garage; and a full-length shed addition at the side of the building. The Santa Clara County Assessor's Office does not have any information regarding this building, but it is reported in other sources (cf., Morgan Hill Auto Mall/Retail Center EIR 1993) that the building was moved to its current location from Santa Clara in 1977. Regardless, remodeling and/or reconstruction give the building a disjointed appearance and have compromised its overall integrity (i.e., integrity of design, materials, and workmanship). In addition, residential and commercial developments surrounding the property have comprised its integrity of setting, feeling, and association.

Archival research regarding the residence at 1195 Cochrane Road C did not identify any information to suggest that the residence is associated with events that made a broad contribution to California's history. Therefore, the residence does not appear to meet eligibility Criterion 1 for inclusion in the CRHR.

Archival research regarding the residence at 1195 Cochrane Road C did not identify any information to suggest that the residence is associated with individuals important in our past. Therefore, the residence does not appear to meet eligibility Criterion 2 for inclusion in the CRHR.

Field and archival research for the residence at 1195 Cochrane Road C determined that it does not embody any distinctive elements of design or methods of construction that are representative of a particular type or period of construction. Indeed, remodeling and/or reconstruction (e.g., two additions to the building) compromised the integrity of the residence. Therefore, the residence does not appear to meet eligibility Criterion 3 for inclusion in the CRHR.

The residence at 1195 Cochrane Road C is adequately recorded, and additional research regarding the property does not appear to possess the potential to yield additional information important in history. Therefore, the residence does not appear to meet eligibility Criterion 4 for inclusion in the CRHR.

In summary, the residence at 1195 Cochrane Road C was originally built in 1940. Regardless, remodeling and/or reconstruction (e.g., two additions to the building) and encroaching residential and commercial developments have compromised the integrity of the building. The residence is not associated with any events or persons important in history and does not exhibit distinctive elements of design or construction. Current research appears to have exhausted the potential of the property to yield any additional information important in history. Therefore, the property does not appear to meet the eligibility criteria for inclusion in the CRHR or for consideration as a unique archaeological resource.

4.2 SITE MANAGEMENT RECOMMENDATIONS

Archaeological and historical investigations are adequate for the Cochrane Road PUD. These investigations identified residences and other structures within the project APE. None of the residences or structures within the project APE appears eligible for inclusion in the CRHR. The eligibility determinations for the buildings and structures within the project APE were reviewed by an architectural historian, Andrea Galvin, M.A. of Galvin & Associates, who concurred with the finding that the buildings and structures do not appear to meet the eligibility criteria for inclusion in the CRHR. Therefore, the buildings and structures do not require any mitigation or special protective measures either prior to or during project implementation, and the Cochrane Road PUD may be implemented as currently designed.



Figure 12. Residence at 1195 Cochrane Road C

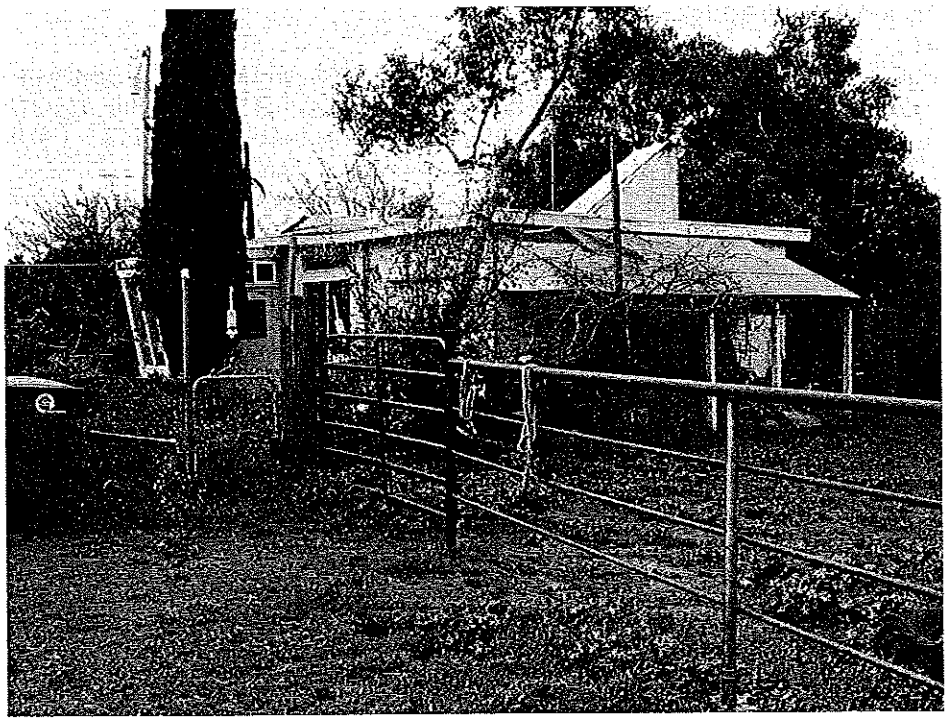


Figure 13. Residence at 1195 Cochrane Road C

5.0 MANAGEMENT CONSIDERATIONS

The City of Morgan Hill is proposing a zoning and general plan amendment to facilitate the construction of a retail facility identified as the Cochrane Road Planned Unit Development. The Project Area of Potential Effects for the Cochrane PUD consists of an approximately 66-acre site at the northeast corner of Cochrane Road and U.S. Highway 101. The project site is primarily used as agricultural land, but also includes private residences and equestrian boarding facilities. The proposed project includes: demolition of existing buildings and structures on the site; construction of an approximately 625,000 square foot retail facility that may include "big-box" stores, restaurants, grocery stores, and a cinema; construction of access roads; and installation of infrastructure (e.g., sewer, water, and electrical facilities). The project is subject to the legal requirements of the California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq.) 1970, as amended.

Archaeological and historical investigations for the Cochrane Road Planned Unit Development were conducted to comply with regulations and criteria presented in CEQA and its guidelines at §15064.5 and §21083.2. The purpose of the current archaeological report is to document the cultural resources identification efforts for the Cochrane Road Planned Unit Development. Archaeological and historical investigations included: a records search conducted by the Northwest Information Center, Sonoma State University, Rohnert Park; a scared lands search conducted by the Native American Heritage Commission; consultation with local Native American individuals and groups identified by the NAHC; consultation with other interested parties (e.g., local historical societies); and field investigation of the project APE. Archaeological and historical investigations for the project were conducted during December 2004. These investigations did not identify any prehistoric sites or historic sites, but did identify three residences and associated structures (e.g., tank houses and barns) within the project APE. Archival research determined that: the residence and tank house at 1195 Cochrane Road A were built in 1930; the residence at 1195 Cochrane Road B was built in 1912, and the construction dates for the seven structures (e.g., barns and a tank house) associated with the residence are uncertain; and the residence at 1195 Cochrane Road C was built in 1940. All of the buildings/structures within the project APE were adequately documented using Department of Parks and Recreation site record forms, and their eligibility for inclusion in the California Register of Historical Resources was determined for the current project. None of the buildings/structures within the project APE appear to meet any of the criteria for inclusion in the California Register of Historical Resources or for consideration as a unique archaeological resource. Therefore, implementation of the Cochrane Road Planned Unit Development would not likely affect any historical resources or unique archaeological resources and may be implemented as currently proposed.

Archaeological investigations for the Cochrane Road Planned Unit Development are complete and adequate for project needs. These investigations did not identify any historical resources or unique archaeological resources within the project APE. Regardless of these findings, it is always possible to inadvertently uncover cultural resources or human remains during ground disturbing project activity. Therefore, if any cultural resources or human remains are uncovered during ground disturbing project activity it is recommended that all activity cease within 25 feet of the discovery and a qualified archaeologist be retained to determine the significance of the discovery. If human remains are discovered, all work must stop in the immediate vicinity of the find, and the County Coroner must be notified, according to Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner will notify the Native American Heritage Commission, and follow the procedures outlined in the CEQA Guidelines §15064.5(e).

6.0 REFERENCES

Beck, Warren and Ynez D. Haase
1974 *Historical Atlas of California.* University of Oklahoma Press, Norman, Oklahoma.

Bergthold, J.
1982 The Prehistoric Settlement and Trade Models in the Santa Clara Valley, California. Unpublished M.A. Thesis, Department of Anthropology, San Francisco State University.

Breschini, G. S.
1983 Models of Population Movements in Central California Prehistory. Coyote Press, Salinas.

Breschini, G. S. and T. Haversat
1980 Preliminary Archaeological Report and Archaeological Management Recommendations for CA-MNT-170, on Pescadero Point, Monterey County, California. Report on file Northwest Information Center, Sonoma State University, Rohnert Park, California.

1992 Baseline Archaeological Studies at Rancho San Carlos, Carmel Valley, Monterey County, California. *Archives of California Prehistory* 36. Coyote Press, Salinas.

Breschini, Gary S., Trudy Haversat, and R. P. Hampson
1983 A Cultural Resources Overview of the Coast and Coast-Valley Study Areas. Report prepared for the Bureau of Land Management. Archaeological Consulting, Salinas, California.

Broadbent, S.M.
1951a Field Notes from Site CA-Mnt-101. University of California Archaeological Survey Manuscripts 125.

1951b Field Notes from Mnt-107, Berwick Park, Pacific Grove. Manuscript on file at the Pacific Grove Museum, Pacific Grove, California.

1972 The Rumsen of Monterey: an Ethnography from Historical Sources. *University of California Archaeological Research Facility Contributions* 14.

Cartier, R.
1993 *The Saunders Site: MNT-391. A Littoral Site of the Early Period.* Scotts Valley Historical Society, Scotts Valley, California.

City of Morgan Hill General Plan EIR
2000 City of Morgan Hill General Plan EIR. EIR on file at the City of Morgan Hill.

Dietz, S. A.
1985 Archaeological Reconnaissance for Pacific Bell Projects NE1841T and NE1843T Located from Olmsted Road to Torero Drive on Highway 68 and from Jackson Street to Del Monte Avenue and Castroville to Boronda Road on Highway 183, Monterey County, California. Report on file Northwest Information Center, Sonoma State University, Rohnert Park, California.

Dietz, S. A. and T. L. Jackson
1981 Report of Archaeological Investigations at Nineteen Archaeological Sites for the Stage I Pacific Grove Monterey Consolidation Project of the Regional Sewage System. Prepared for Engineering-Science, Inc.

Dietz, S. A., W. Hildebrandt, and T. L. Jones
1988 Archaeological Investigations at Elkhorn Slough: CA-MNT-229, a Middle Period Site on the Central California Coast. *Papers in Northern California Anthropology.* Northern California Archaeology Group. Berkeley.

Elssaser
1986 *Part I: Review of the Prehistory of the Santa Clara Valley Region, California.* Coyote Press Archives of California Prehistory, Number 7.

Golomshtok, E. A.
1921 Monterey, Pacific Grove, and Salinas Mounds. University of California Archaeological Survey Manuscripts 374.

Greengo, R.E.
1951 Molluscan Species in California Shell Middens. *University of California Archaeological Survey Reports* 13:1-29.

Harrington, J.P.
1933 Report of Fieldwork on Indians of Monterey and San Bernardino Counties. *49th Annual Report of the Bureau of American Ethnology for the Years 1931-1932* Washington.

1942 Culture Element Distributions, XIX: Central California Coast. *University of California Anthropological Records* 7(1):1-46.

Heizer, Robert F.
1974 *The Destruction of the California Indians.* Peregrine Publishers, Salt Lake City, Utah.

Hildebrandt, W.R. and P. Mikkelsen
1993 Archaeological Test Excavations at Fourteen Sites Along Highways 101 and 152, Santa Clara and San Benito Counties, California, Volume 1. Submitted to Caltrans District 4, Contract No. 0E633-EP. Report S-15442. Report on file Northwest Information Center, Sonoma State University, Rohnert Park, California.

Hill, W. W.
1929 Monterey County Sites, General. University of California Archaeological Survey Manuscripts 38.

Hoover, M. B., H. E. Rensch, E. G. Rensch, and W. N. Abeloe
1990 *Historic Spots in California.* Stanford University Press, Stanford, California.

Hylkema, M.
1991 Prehistoric Native American Adaptations Along the Central California Coast of San Mateo and Santa Cruz Counties. Unpublished Master's Thesis, Department of Social Science, San Jose State University.

Jones, T. L.
1993 Big Sur: A Keystone In Central California Culture History. *Pacific Coast Archaeological Society Quarterly* 10:163-186.

Jones, T. L. and M. Hylkema
1988 Two Proposed Projectile Point Types for the Monterey Bay Area: the Año Nuevo Long-stemmed and the Rossi Square-stemmed. *Journal of California and Great Basin Archaeology* 10:163-186.

Jones, T. L. and D.A. Jones
1992 Elkhorn Slough Revisited: Reassessing the Chronology of CA-MNT-229. *Journal of California and Great Basin Anthropology* 14:159-179.

Jones, T. L., T. Van Bueren, S. Grantham, J. Huddleson, and T. Fung
1992 Phase II Archaeological Investigations for the Castroville Bypass Project, Monterey County, California. Report on file California Department of Transportation, District 5, San Luis Obispo.

Jones, T. L., T. M. Van Bueren, S. Grantham, J. Huddleson, and T. W. Fung
1996 Archaeological Test Excavations for the State Highway 1 Widening Project Near Castroville, Monterey, California. Report submitted to Caltrans District 5, San Luis Obispo, California.

King, Thomas F. and P.P. Hickman
1973 The Southern Santa Clara Valley: A General Plan for Archaeology, San Felipe Archaeology I. Report submitted to the National Park Service, San Francisco. Report on file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Kroeber, A. L.
1915 Monterey Bay Mounds, General. University of California Archaeological Survey Manuscripts 27.

Langsdorff, G. H. von
1968 Voyages and Travels in Various Parts of the World during the Years 1803, 1804, 1805, 1806, and 1807 [1813-1814]. 2 vols. (Biblioteca Australiana 41). New York: De Capo Press.

Levy, R.
1978 Costanoan. In *California*, edited by R.F. Heizer, pp. 485-495. Handbook of North American Indians Vol. 8, W.C. Strurtevant, general editor. Smithsonian Institute, Washington, D.C.

Milliken, R. T., J. G. Costello, C. Johnson, G. A. Laffey, A. Sayers, and P. Orozco
1993 Archaeological Test Excavations at Fourteen Sites Along Highways 101 and 152, Santa Clara and San Benito Counties, California, Volume 2: History, Ethnohistory, and Historic Archaeology. Report S-15442. Report on file Northwest Information Center, Sonoma State University, Rohnert Park, California.

Morgan Hill Auto Mall/Retail Center EIR
1993 Morgan Hill Auto Mall/Retail Center EIR. EIR on file at the City of Morgan Hill.

Norris, R. M. and R. W. Webb
1990 *Geology of California*, 2nd edition. John Wiley and Sons, Inc., New York, New York.

Patch, D. and T. L. Jones
1984 Paleoenvironmental Change at Elkhorn Slough: Implications for Human Adaptive Strategies. *Journal of California and Great Basin Anthropology* 6(1):19-43.

Pilling, A. R.
1948 Archaeological Survey of Northern Monterey Bay County. *University of California Archaeological Survey Manuscripts* 106.

Pritchard, W. E.
1968 Preliminary Excavations at El Castillo, Presidio of Monterey, Monterey, California. Central California Archaeological Foundation, Sacramento, California.

Saxe, W. E.
1875 Observations at a Shellmound at Laguna Creek, 6 Miles North of Santa Cruz. *Proceedings of the California Academy of Sciences* 5:157.

Schultze, Rnald F.
1988 Orchard-Vineyard, in *A Guide to Wildlife Habitats of California,* edited by Mayer, K.E. and W.F. Laudenslayer, Jr. California Department of Forestry and Fire Protection, Sacramento, California.

Mayer, Kenneth E. and William F. Laudenslayer, Jr.
1988 *A Guide to Wildlife Habitats of California.* California Department of Forestry and Fire Protection, Sacramento, California.

Wood, A.
1930 Monterey Bay Mounds. University of California Archaeological Research Facility Manuscript Nos. 380.

Zeiner, David C.
1988a Cropland, in *A Guide to Wildlife Habitats of California,* edited by Mayer, K.E. and W.F. Laudenslayer, Jr. California Department of Forestry and Fire Protection, Sacramento, California.

1988b Pasture, in *A Guide to Wildlife Habitats of California,* edited by Mayer, K.E. and W.F. Laudenslayer, Jr. California Department of Forestry and Fire Protection, Sacramento, California.

ATTACHMENT A
SITE RECORDS

ATTACHMENT B
NATIVE AMERICAN CORRESPONDENCE

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial #
NRHP Status Code
Other Listings
Review Code Reviewer Date

P1. Other Identifier: 1195 Cochrane Road A

***P2. Location:** ☐ Not for publication ☒ Unrestricted
***a. County:** Santa Clara
***b. USGS 7.5' Quad:** Morgan Hill 1955, Photorevised 1980; Township 9 South, Range 3 East, Unsectioned; Mt. Diablo Base Meridian
c. Address: 1195 Cochrane Road
d. UTM: 4,111,720m N; 618,651m E
e. Other Locational Data: APN: 728-037-002

***P3a. Description:** The building at 1195 Cochran Road A (APN: 728-037-002) is a single story, Craftsman Style building constructed in 1930. The building is a vernacular example of the Craftsman Style that was common from 1905-1930. The building has a: front gabled, composite shingle, low-pitched roof; aluminum windows with wood casings; stucco exterior; and a front porch centered on the building with a low-pitched roof, matching the roof line of the building, supported by wood posts. The building is well maintained and appears to have been remodeled. There is a wood shed at the rear of the building and a tank house opposite the front of the building. The shed is used as a dog kennel and for storage. The tank house was built in 1930, and is two-stories in height with a metal roof, clapboard siding, and sections of wood panel siding designed to mimic clapboard. There also are sheds attached to the side and the rear of the tank house (see Continuation sheet).

***P3b. Resource Attributes:** HP2 Single Family Property; AH15 Standing Structures
***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐Site☐ District ☐ Element of District ☐ Other



***P5b. Description of photo:** View of the residence facing southwest from the access road to the property

***P6. Date Constructed/Age:**
☐ Prehistoric ☒ Historic

***P7. Owner and Address:**
George E. Guglielmo
1480 East Main Avenue
Morgan Hill, California 95037

***P8. Recorded by:**
John Nadolski
Pacific Municipal Consultants
10461 Old Placerville Road
Suite 110
Sacramento, CA 95827

***P9. Date Recorded:** 12/15/04

***P10. Survey Type:** Intensive pedestrian surface survey and architectural inventory

P11. Report Citation: Archaeological and Historical Investigations for the Cochrane Road Planned Unit Development; John Nadolski, 2005

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other:

B1. Historic Name: None
B2. Common Name: None
B3. Original Use: Residence
B4. Present Use: Residence

***B5. Architectural Style:** The building is a vernacular example of the Craftsman Style, which was common from 1905-1930.

***B6. Construction History:** The Santa Clara County Assessor's Office does not have any information regarding this residence at 1195 Cochrane Road A (APN: 728-037-002). The current owner of the property reports that the residence was built in 1930. The residence has been remodeled/reconstructed since it was built, including replacement of the original roof, installation of aluminum-framed windows, and probably replacement or repair of the stucco exterior.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**
Original Location:

***B8. Related Features:** There is a wood shed at the rear of the building used as a dog kennel and for storage. There also is a tank house opposite the front entrance to the residence. The current owner of the property reports that the tank house was built in 1930. The tank house is relatively well maintained and exhibits evidence of repair. Sheds were also added to the side and rear of the structure. The design and construction of the tank house is typical of this type of structure, and it does not exhibit any unique elements of design or construction.

B9a. Architect: Unknown **b. Builder:** Unknown

***B10. Significance: Theme:** Residential Development **Area:** Morgan Hill, CA

Period of Significance: 1920-1950 **Property Type:** Residential

Applicable Criteria: N/A: The property is evaluated as ineligible for inclusion in the California Register of Historical Resources (CRHR).

The residence and tank house at 1195 Cochrane Road A do not appear to meet any of the eligibility criteria presented in CEQA at §15064.5(a)(3) for inclusion in the CRHR. Historic investigation of the property does not suggest that: it is associated with any significant events in regional or local history; it is associated with any persons significant in history; it embodies distinctive characteristics of type, period, or method of construction; or it is likely that additional research regarding the property would produce significant new information about the residential or agricultural development of the area. Therefore, the property does not appear to meet any of the eligibility criteria for inclusion in the CRHR.

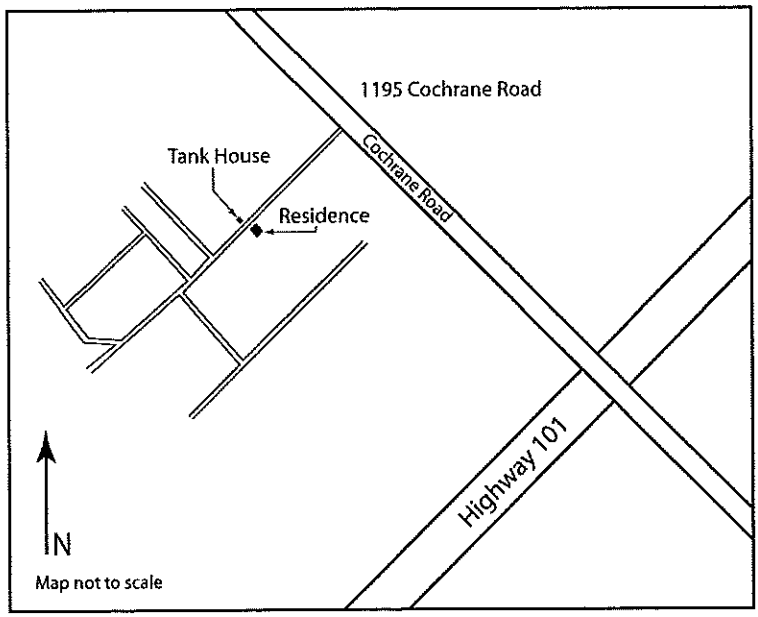
The integrity (e.g., design, workmanship, materials, setting, association, and feeling) of the residence also has been compromised. The roof, windows, and probably the exterior of the building have been replaced. In addition, most of the architectural elements (e.g., decorative beams under the eaves) that typify the Craftsman Style are not present on the building. These elements probably were removed during remodeling/reconstruction of the building. In addition, the residence is surrounded by new residential and commercial developments and is adjacent to Highway 101.

B11. Additional Resource Attributes: N/A

***B12. References:**
Blumenson, John J.G., 1981, Identifying American Architecture, W.W. Norton Company, New York
McAlester, Virginia and Lee, 1984, A Field Guide to American Homes, Alfred A. Knopf, New York
Santa Clara County Assessor's Office Records

B13. Remarks: N/A

***B14. Evaluator:** John Nadolski, M.A. ***Date of Evaluation:** 01/10/05



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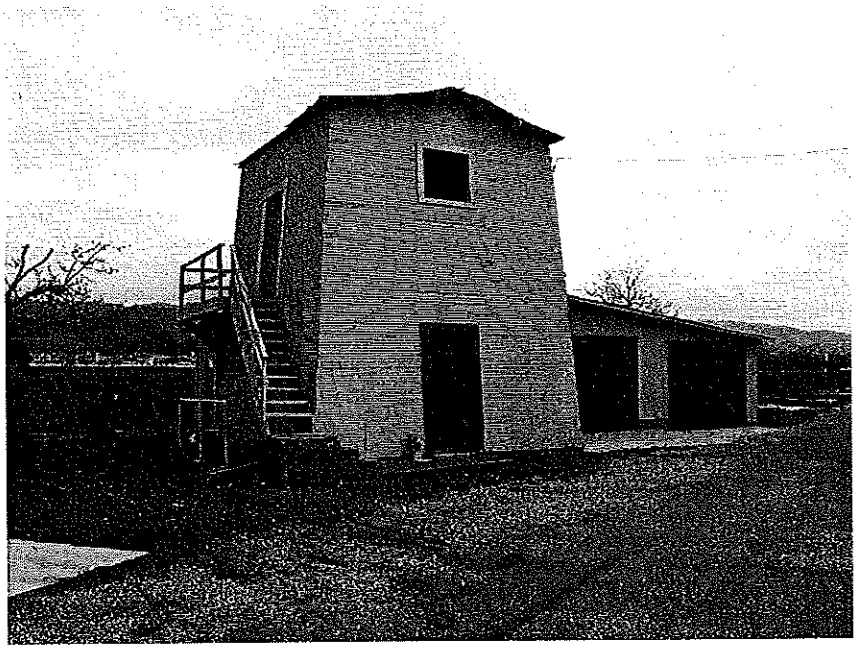
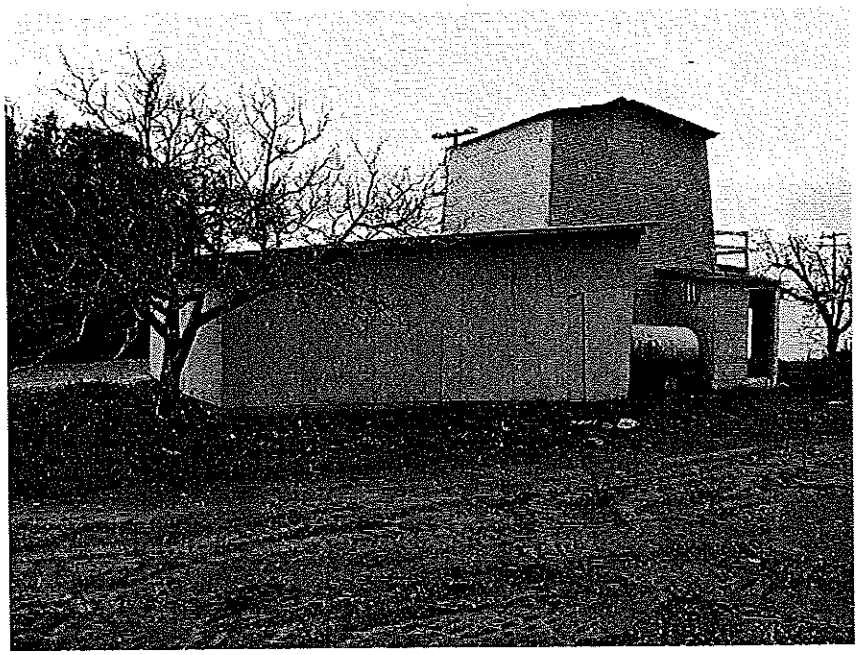


View of Tank House facing east from residence



View of tank House facing west from a field behind the structure

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

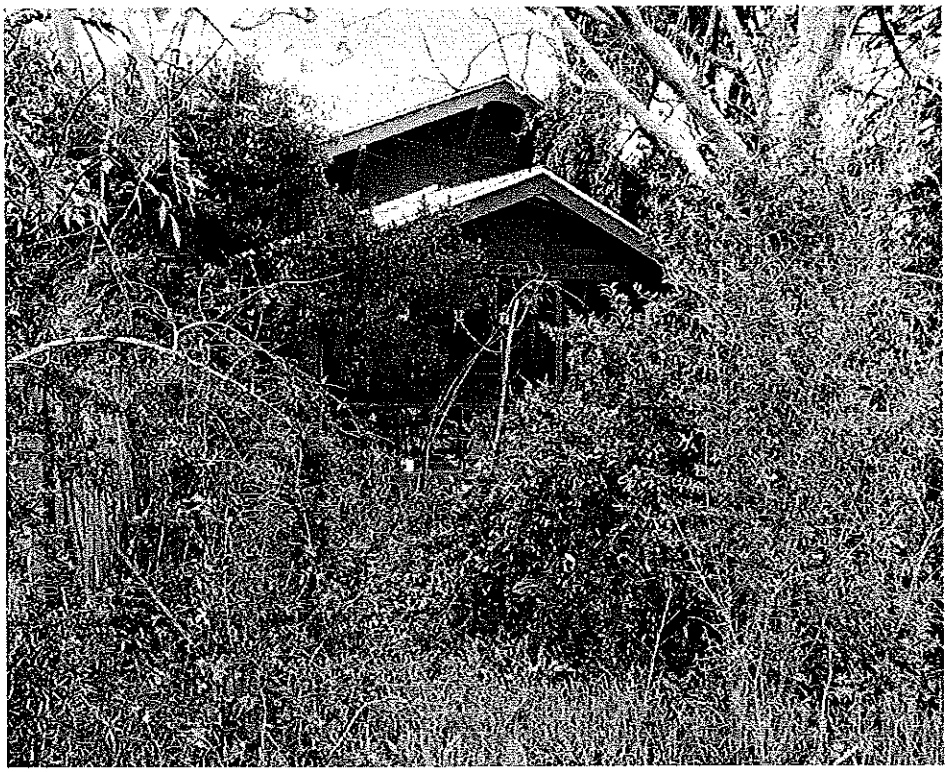
Primary #_____
HRI # _____
Trinomial #_____
NRHP Status Code _____
Other Listings _____
Review Code _____ Reviewer_____ Date_____

P1. Other Identifier: 1195 Cochrane Road B

***P2. Location:** ☐ Not for publication ☒ Unrestricted
***a. County:** Santa Clara
***b. USGS 7.5' Quad:** Morgan Hill 1955, Photorevised 1980; Township 9 South, Range 3 East, Unsectioned; Mt. Diablo Base Meridian
c. Address: 1195 Cochrane Road
d. UTM: 4,111,879m N; 618,511m E
e. Other Locational Data: APN: 728-037-001

***P3a. Description:** There is a residence and seven structures at 1195 Cochrane Road B (APN: 728-037-001). The private residence is a single story, Craftsman Style building constructed in 1912 (see Continuation sheet). The building is a vernacular example of the Craftsman Style that was common from 1905-1930. The building has a: front gabled, composite shingle, low-pitched roof; double hung wood framed windows with wood casings; aluminum windows with wood casings; wood siding; a half-width front porch with a low-pitched roof supported by wood posts; an addition along the side of the building that includes a side entrance; and a square bay with aluminum windows at the rear of the building. The six structures associated with the residence include a metal-framed hay barn, restroom, a pump house, two wood sided barns, and a wood sided shed. (Continued)

***P3b. Resource Attributes:** HP2 Single Family Property; AH15 Standing Structures
***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐Site☐ District ☐ Element of District ☐ Other



***P5b. Description of photo:** View of the residence facing southwest from the access road to the property

***P6. Date Constructed/Age:**
☐ Prehistoric ☒ Historic

***P7. Owner and Address:**
Jean Millerd-Low
1195 Cochrane Road
Morgan Hill, California 95037

***P8. Recorded by:**
John Nadolski
Pacific Municipal Consultants
10461 Old Placerville Road
Suite 110
Sacramento, CA 95827

***P9. Date Recorded:** 12/15/04

***P10. Survey Type:** Intensive pedestrian surface survey and architectural inventory

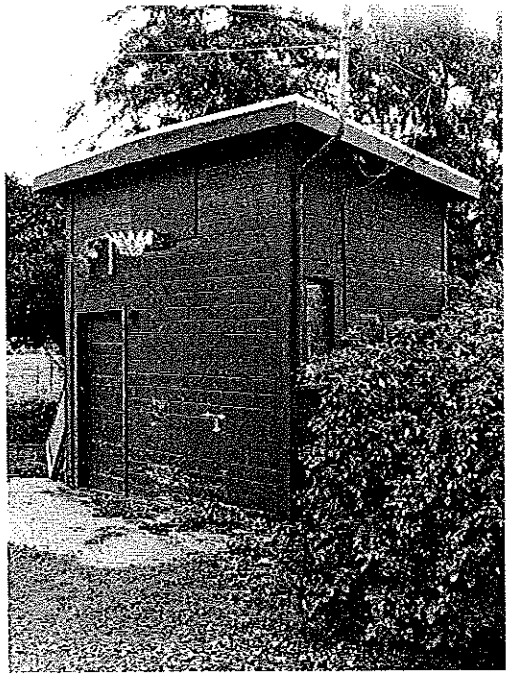
P11. Report Citation: Archaeological and Historical Investigations for the Cochrane Road Planned Unit Development; John Nadolski, 2005

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other:

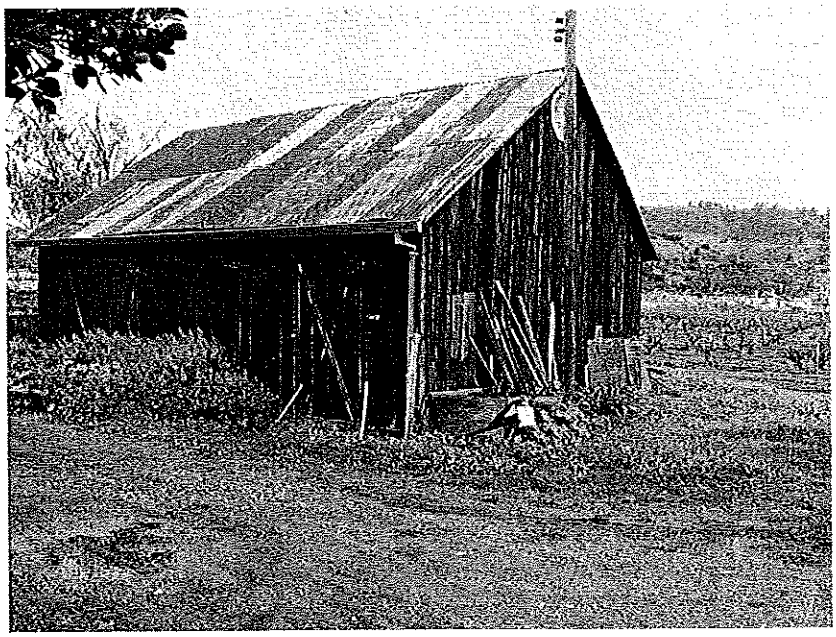
*Recorded by: John Nadolski *Date: December 15, 2004 ☒ Continuation ☐ Update

*P3a. Description: (continued)

The hay barn and restroom were constructed either in the late 1970s or early 1980s when the property began to be used as an equestrian boarding facility. Structure 1 is a single story pump house with a flat roof, horizontal wood siding, and windows with wood casings. The date of construction of the structure is uncertain. Structure 2 is a barn with: a steep-pitched, gabled metal roof; vertical wood siding; and a pair of double width swinging wood doors. The date of construction of the structure is uncertain. (continued)



Structure 1: Pump house facing southeast

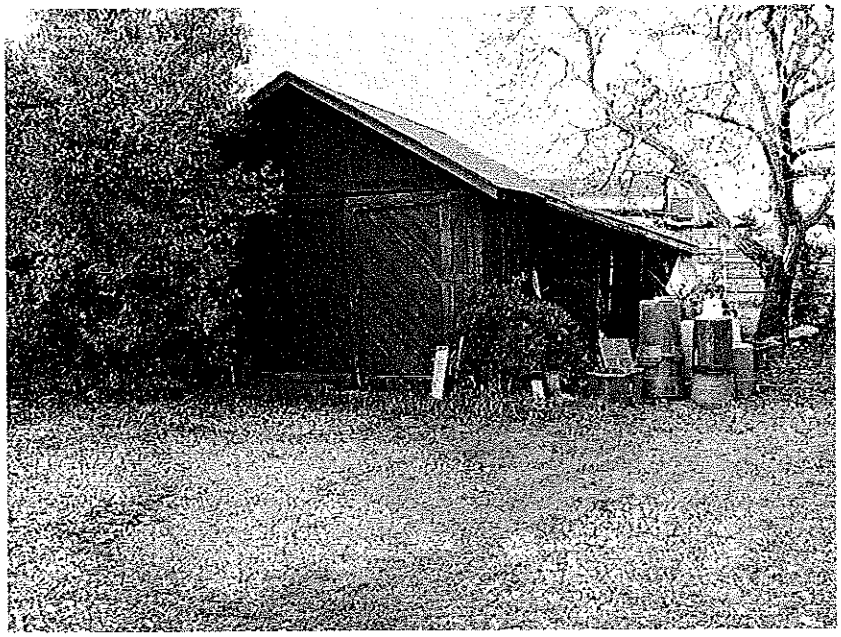


Structure 2: Barn facing northeast

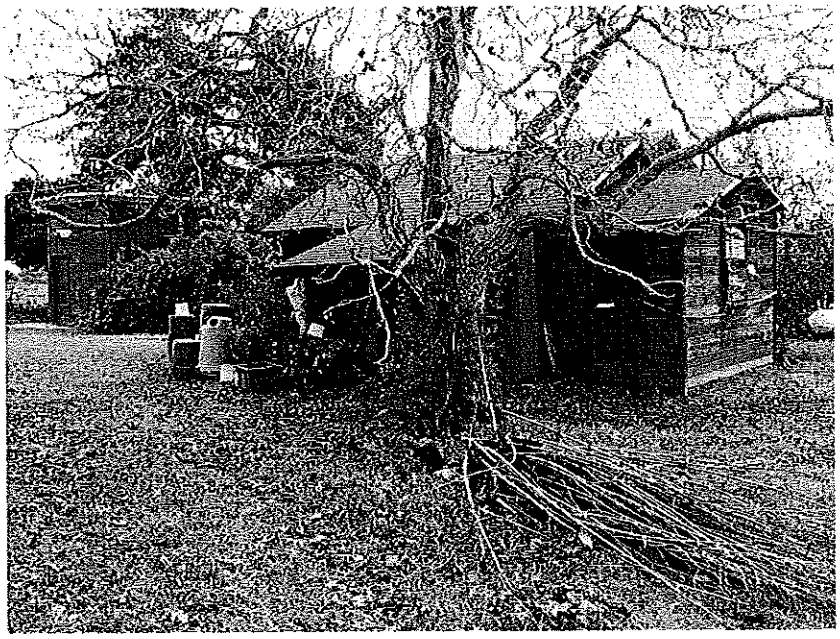
*Recorded by: John Nadolski *Date: December 15, 2004 ☒ Continuation ☐ Update

*P3a. Description: (continued)

Structure 3 is a shed with: a composite shingle low-pitched gabled roof; vertical wood siding on the main structure; horizontal wood siding on two additions to the shed; a double width wood door with angled planks set in a frame on the main structure; wood doors on the two additions to the shed; and windows with wood casings. The date of construction of the structure is uncertain. (continued)



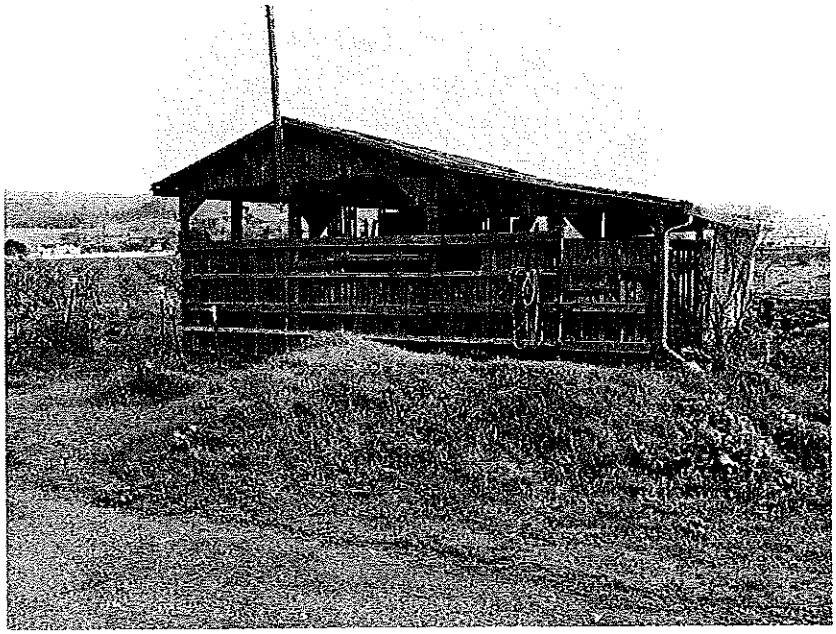
Structure 3: Shed facing north



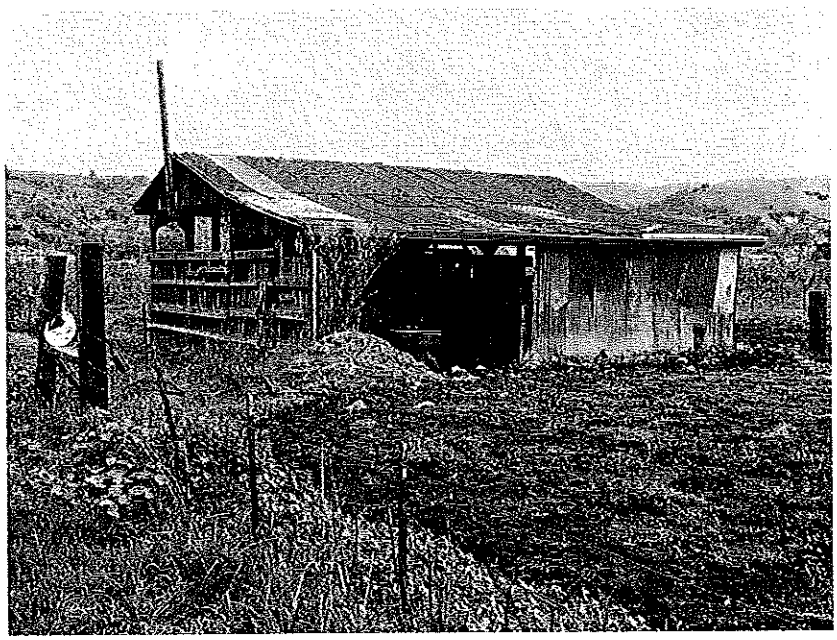
Structure 3: Shed facing southeast

*P3a. Description: (continued)

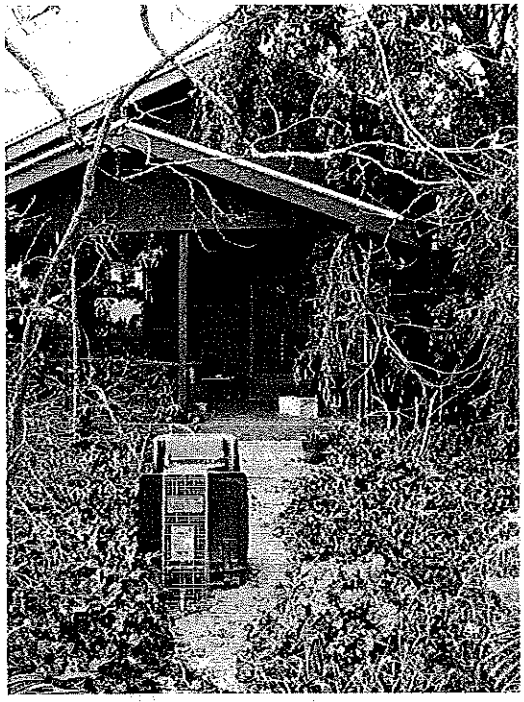
Structure 4 is a barn with: a low-pitched gabled, extended metal roof; wood slat and corrugated metal siding; and open entry bays. The date of construction of the structure is uncertain.



Structure 4: Barn facing south



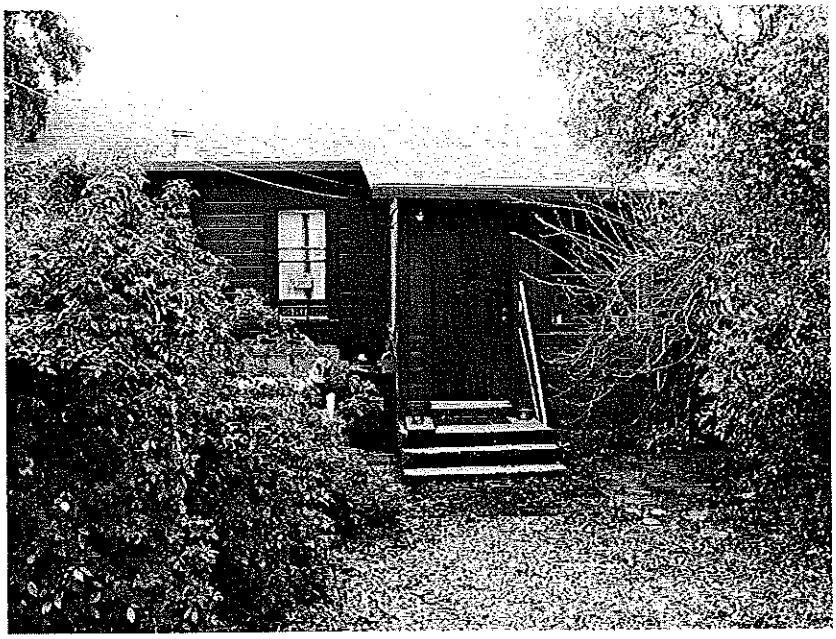
Structure 4: Barn facing east



View of front entrance to residence facing west



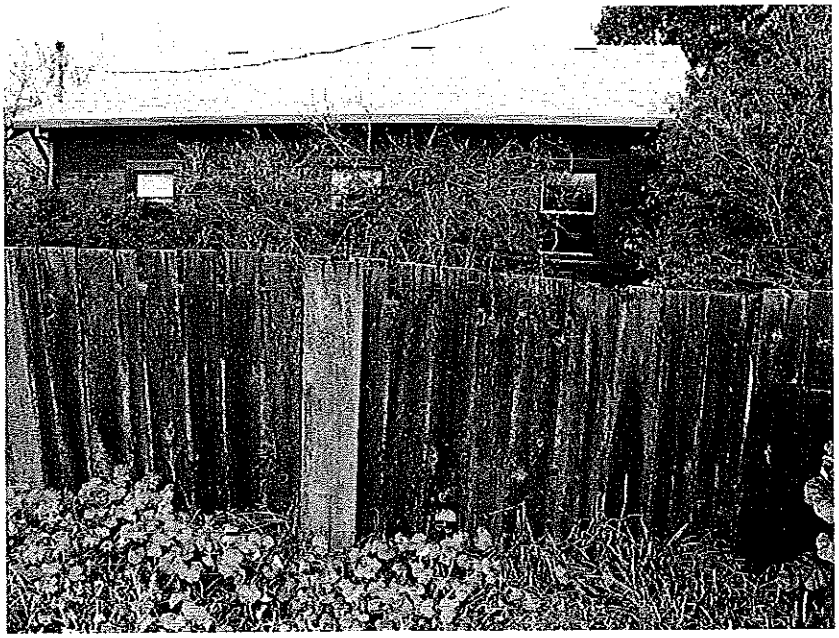
View of north side of residence facing northwest with front entrance at left of photograph



View of side entrance to residence facing north



View of rear of residence facing east



View of residence facing south



View of hay barn facing north

*NRHP Status Code
*Resource Name or # 1195 Cochrane Road B

B1. Historic Name: None
B2. Common Name: None
B3. Original Use: Residence
B4. Present Use: Residence

*B5. Architectural Style: The building is a vernacular example of the Craftsman Style, which was common from 1905-1930.

*B6. Construction History: The Santa Clara County Assessor's Office does not have any information regarding this residence at 1195 Cochrane Road A (APN: 728-037-001). The current owner of the property reports that the residence was built in 1912. The residence has been remodeled/reconstructed since it was built, including replacement of the original roof, installation of aluminum-framed windows, and construction of additions on the building.

*B7. Moved? ☒No ☐Yes ☐Unknown Date:
Original Location:

*B8. Related Features: There are six structures associated with the residence, including a metal-framed hay barn, restroom, pump house two barns, and a shed. Structure 1 is a single story pump. Structure 2 is a wood sided barn with a metal roof. Structure 3 is a wood sided shed with a composite shingle low-pitched gabled roof that also has two additions attached to the side and rear of the main structure. Structure 4 is a metal and wood sided barn with a low-pitched gabled, extended metal roof. The hay barn and restroom were constructed either in the late 1970s or early 1980s when the property began to be used as an equestrian boarding facility. The date of construction of the other structures is uncertain.

B9a. Architect: Unknown b. Builder: Unknown

*B10. Significance: Theme: Residential Development Area: Morgan Hill, CA

Period of Significance: 1920-1950 Property Type: Residential

Applicable Criteria: N/A: The property is evaluated as ineligible for inclusion in the California Register of Historical Resources (CRHR).

The residence and associated structures at 1195 Cochrane Road B do not appear to meet any of the eligibility criteria presented in CEQA at §15064.5(a)(3) for inclusion in the CRHR. Historic investigation of the property does not suggest that: it is associated with any significant events in regional or local history; it is associated with any persons significant in history; it embodies distinctive characteristics of type, period, or method of construction; or it is likely that additional research regarding the property would produce significant new information about the residential or agricultural development of the area. Therefore, the property does not appear to meet any of the eligibility criteria for inclusion in the CRHR.

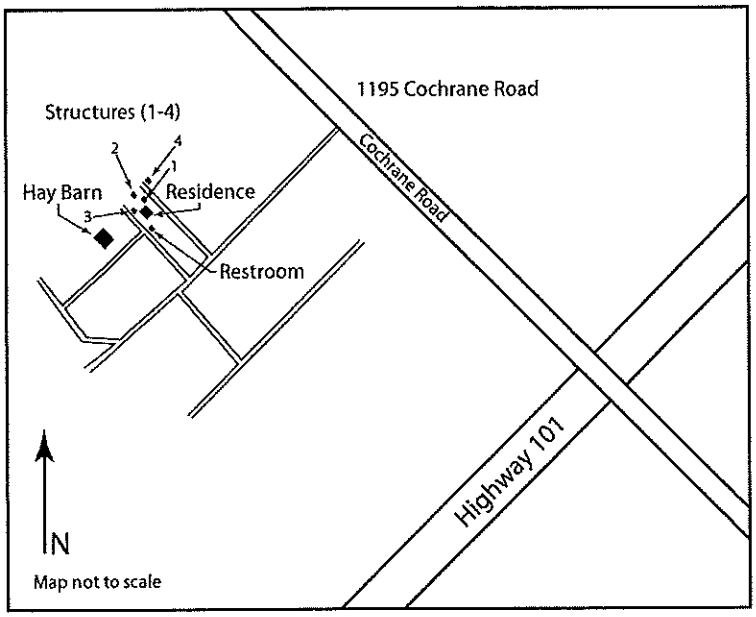
The integrity (e.g., design, workmanship, materials, setting, association, and feeling) of the residence also has been compromised. The roof and windows have been replaced and there is an addition along the east side and rear of the building. In addition, the two additions to the building give it a disjointed appearance that does not reflect the original Craftsman Style of the building. In addition, the residence is surrounded by new residential and commercial developments and is adjacent to Highway 101.

B11. Additional Resource Attributes: N/A

*B12. References:
Blumenson, John J.G., 1981, Identifying American Architecture, W.W. Norton Company, New York
McAlester, Virginia and Lee, 1984, A Field Guide to American Homes, Alfred A. Knopf, New York
Santa Clara County Assessor's Office Records

B13. Remarks: N/A

*B14. Evaluator: John Nadolski, M.A. *Date of Evaluation: 01/10/05



(This space reserved for official comments.)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

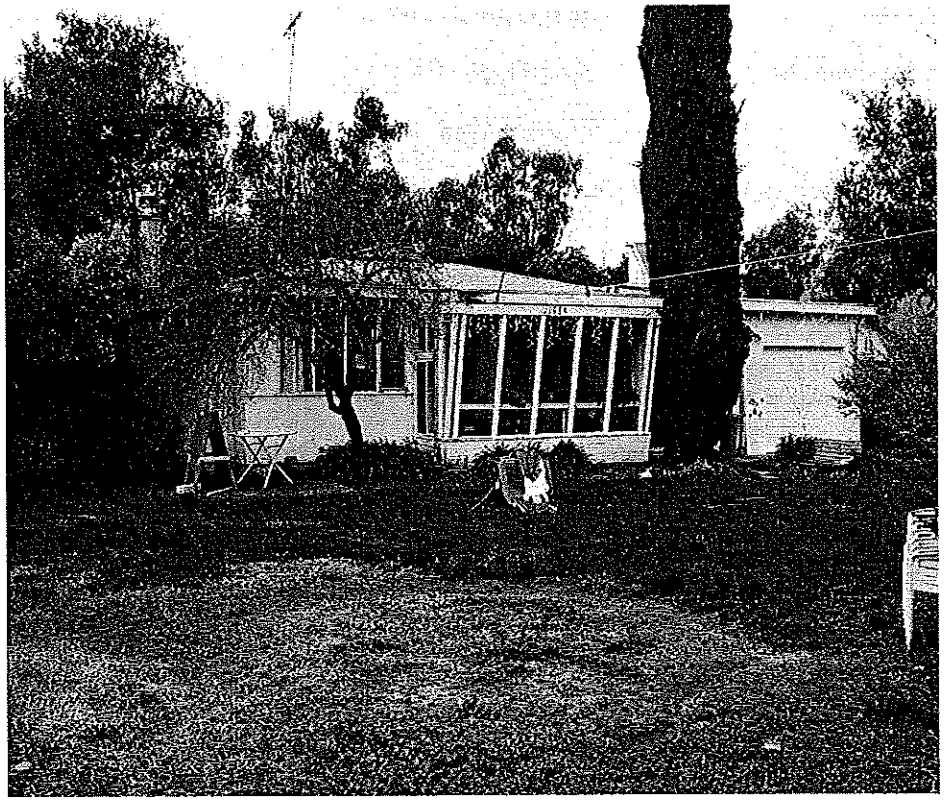
Primary #_____
HRI # _____
Trinomial #_____
NRHP Status Code _____
Other Listings _____
Review Code _____ Reviewer_____ Date_____

P1. Other Identifier: 1195 Cochrane Road C

***P2. Location:** ☐ Not for publication ☒ Unrestricted
***a. County:** Santa Clara
***b. USGS 7.5' Quad:** Morgan Hill 1955, Photorevised 1980; Township 9 South, Range 3 East, Unsectioned; Mt. Diablo Base Meridian
c. Address: 1195 Cochrane Road
d. UTM: 4,111,862m N; 618, 672m E
e. Other Locational Data: APN: 728-037-001

***P3a. Description:** The building at 1195 Cochrane Road C (APN: 728-37-001) is a single story, Ranch style building constructed in 1940. The building is a vernacular example of the Ranch Style, which was common in rural areas of California from 1935 through the 1970s. The building has a: composition shingle, low-pitched hipped-roof with a small dormer and what appears to be a large angular skylight; wood framed windows; a metal framed sliding glass door used as the entrance; stucco exterior; four wood framed ribbon windows; an enclosed addition at the front of the building with five wood framed ribbon windows that are angled away from the foundation of the addition; an attached garage; and a full-length shed addition at the side of the building.

***P3b. Resource Attributes:** HP2 Single Family Property
***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐Site☐ District ☐ Element of District ☐ Other



***P5b. Description of photo:** View of the residence facing northeast from the access road to the property

***P6. Date Constructed/Age:**
☐ Prehistoric ☒ Historic

***P7. Owner and Address:**
Jean Millerd-Low
1195 Cochrane Road
Morgan Hill, California 95037

***P8. Recorded by:**
John Nadolski
Pacific Municipal Consultants
10461 Old Placerville Road
Suite 110
Sacramento, CA 95827

***P9. Date Recorded:** 12/15/04

***P10. Survey Type:** Intensive pedestrian surface survey and architectural inventory

P11. Report Citation: Archaeological and Historical Investigations for the Cochrane Road Planned Unit Development; John Nadolski, 2005

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other:

*NRHP Status Code
*Resource Name or # 1195 Cochrane Road C

B1. Historic Name: None
B2. Common Name: None
B3. Original Use: Residence
B4. Present Use: Residence

*B5. Architectural Style: The building is a vernacular example of the Ranch Style, which was common in rural areas of California from 1935 through the 1970s.

*B6. Construction History: The Santa Clara County Assessor's Office does not have any information regarding the residence at 1195 Cochrane Road C (APN: 728-037-001). The owner reports that the residence was built in 1940. The residence has been remodeled and/or reconstructed since it was built, including construction of two additions to the building.

*B7. Moved? ☐No ☐Yes ☒Unknown Date: The 1993 EIR for the Morgan Hill Auto Mall/Retail Center encompassed the current project site and states that the residence was built in Santa Clara in 1940 and moved to its current location in 1977. There is no other information, however, regarding the original construction site for the building.

Original Location: The 1993 EIR for the Morgan Hill Auto Mall/Retail Center encompassed the current project site and states that the residence was built in Santa Clara in 1940, but there is no other evidence to prove or refute this statement.

*B8. Related Features: N/A

B9a. Architect: Unknown b. Builder: Unknown

*B10. Significance: Theme: Residential Development Area: Morgan Hill, CA

Period of Significance: 1935-1970 Property Type: Residential

Applicable Criteria: N/A: The property is evaluated as ineligible for inclusion in the California Register of Historical Resources (CRHR).

The residence at 1195 Cochrane Road C does not appear to meet any of the eligibility criteria presented in CEQA at §15064.5(a)(3) for inclusion in the CRHR. Historic investigation of the property does not suggest that: it is associated with any significant events in regional or local history; it is associated with any persons significant in history; it embodies distinctive characteristics of type, period, or method of construction; or it is likely that additional research regarding the property would produce significant new information about the residential or agricultural development of the area. Therefore, the property does not appear to meet any of the eligibility criteria for inclusion in the CRHR.

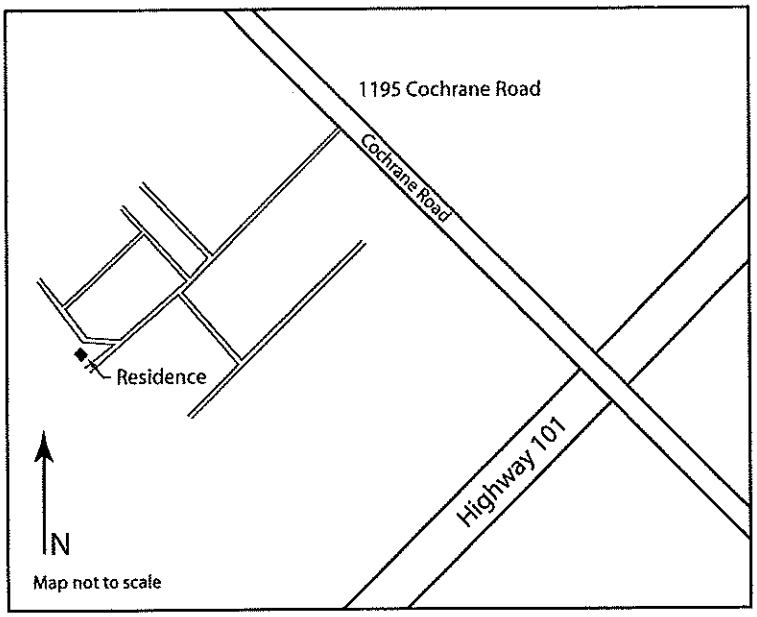
The integrity (e.g., design, workmanship, materials, setting, association, and feeling) of the residence also has been compromised (e.g., there are two additions on the building), and it may have been moved from its original location. In addition, the two additions to the building give it a disjointed appearance that does not reflect the original Ranch Style design of the building. In addition, the residence is surrounded by new residential and commercial developments and is adjacent to Highway 101.

B11. Additional Resource Attributes: N/A

*B12. References:
Blumenson, John J.G., 1981, Identifying American Architecture, W.W. Norton Company, New York
McAlester, Virginia and Lee, 1984, A Field Guide to American Homes, Alfred A. Knopf, New York
Santa Clara County Assessor's Office Records

B13. Remarks: N/A

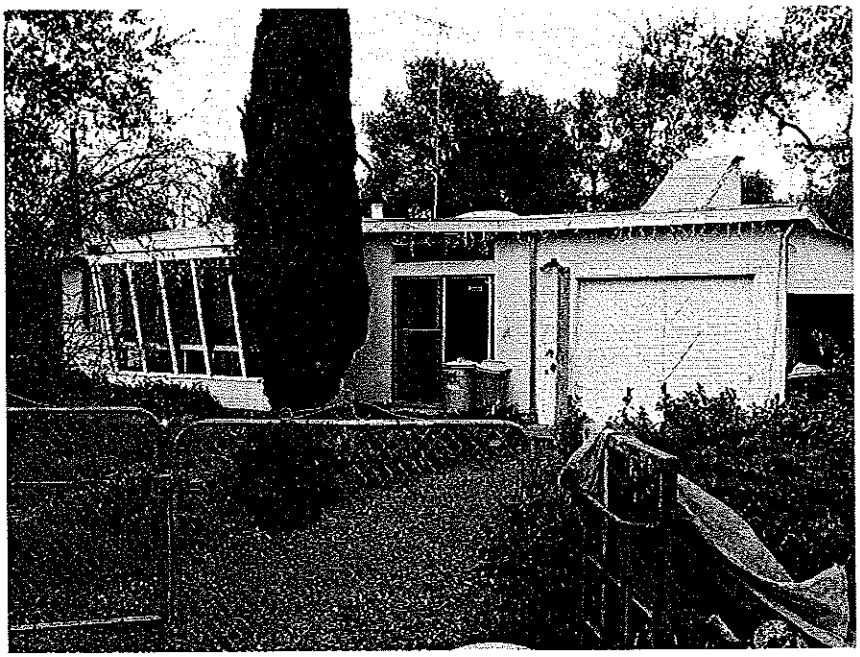
*B14. Evaluator: John Nadolski, M.A. *Date of Evaluation: 01/10/05



(This space reserved for official comments.)



View of residence facing west



View of residence facing northwest

ATTACHMENT B
NATIVE AMERICAN CORRESPONDENCE

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December 17, 2004

The Ohlone Indian Tribe
Andrew Galvan
PO Box 3152
Mission San Jose, Ca. 94539

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Mr. Galvan:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
Cultural Resources Specialist
Rancho Cordova Office

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December 17, 2004

Trina Marine Ruano Family
Ramona Garibay, Representative
6626 Thornton Ave.
Newark, Ca. 94560

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Garibay:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
Cultural Resources Specialist
Rancho Cordova Office

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December 17, 2004

Jakki Kehl
720 North 2nd Street
Patterson, Ca. 95363

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Kehl:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
Cultural Resources Specialist
Rancho Cordova Office

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December 17, 2004

Amah Mutsun Tribal Band
Edward Ketchum
35867 Yosemite Ave.
Davis, Ca. 95616

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Mr. Ketchum:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
Cultural Resources Specialist
Rancho Cordova Office

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December 17, 2004

Amah Mutsun Tribal Band
Valentin Lopez
3095 Eastern Ave.
Sacramento, Ca. 95821

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Mr. Lopez:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

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December 17, 2004

Amah Mutsun Tribal Band
Quirina Luna
3534 Katie Lane
Ceres, Ca. 95307

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Luna:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

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Rancho Cordova Office

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December 17, 2004

Amah Mutsun Tribal Band
Marion Martinez
26206 Coleman Avenue
Hayward, Ca. 94544

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Martinez:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski

John Nadolski
Cultural Resources Specialist
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December 17, 2004

Katherine Erolinda Perez
1234 Luna Lane
Stockton, Ca. 95206

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Perez:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

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John Nadolski
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December 17, 2004

Ella Rodriguez
PO Box 1411
Salinas, Ca. 93902

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Rodriguez:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski

John Nadolski
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Phone (858) 453-3602
Fax (858) 453-3628

December 17, 2004

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
PO Box 28
Hollister, Ca. 95024

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Sayers:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill,. Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
Cultural Resources Specialist
Rancho Cordova Office

PMC

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December 17, 2004

Amah Mutsun Tribal Band
Michelle Zimmer
PO Box 62-558
Woodside, Ca. 94062

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Zimmer:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
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Phone (858) 453-3602
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December 17, 2004

Amah Mutsun Tribal Band
Irene Zwierlein, Chairperson
789 Canada Road
Woodside, Ca. 94062

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Ms. Zwierlein:

I obtained your name from the Native American Heritage Commission in order to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
Cultural Resources Specialist
Rancho Cordova Office

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January 19, 2005

Morgan Hill Historical Society
PO Box 1258
Morgan Hill, Ca. 95038

RE: COCHRANE PLANNED UNIT DEVELOPMENT

Dear Sir:

The purpose of my letter is to inform you of the proposed Cochrane Planned Unit Development Project in Morgan Hill, Santa Clara County. The project is the construction of a small commercial center on 65 acres of current agriculture land. The project site is 1195 Cochrane Road and is at the northeast corner of the intersection of Cochrane Road and US Highway 101. If you have any questions and/or concerns regarding this project please do not hesitate to contact me.

Sincerely,

PACIFIC MUNICIPAL CONSULTANTS

John Nadolski
Cultural Resources Specialist
Rancho Cordova Office

Technical Appendices

Appendix F – Geology and Soils

Twining Laboratories, Inc. Preliminary Geotechnical Investigation, Proposed Retail Shopping Center, Northeast Corner of State Highway 101 and Cochrane Road, Morgan Hill, California. November 1, 2004.

THE TWINING LABORATORIES, INC.
EST. 1898
ANALYTICAL CHEMISTRY · ENVIRONMENTAL SERVICES
GEOTECHNICAL ENGINEERING · SAMPLING SERVICES
CONSTRUCTION INSPECTION & MATERIALS TESTING

DRAFT

PRELIMINARY GEOTECHNICAL ENGINEERING INVESTIGATION

PROPOSED RETAIL SHOPPING CENTER

NORTHEAST CORNER OF STATE HIGHWAY 101 AND COCHRANE ROAD

MORGAN HILL, CALIFORNIA

Project Number: A07261.03-01

For:

Browman Development Company, Inc.
100 Swan Way, Suite 206
Oakland, CA 94621-1459

November 1, 2004

CORPORATE
2527 Fresno Street
Fresno, CA 93721-1804
(559) 268-7021
Fax 268-7126

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Modesto, CA 95356-9322
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THE TWINING LABORATORIES, INC.
EST. 1893
ANALYTICAL CHEMISTRY · ENVIRONMENTAL SERVICES
GEOTECHNICAL ENGINEERING · SAMPLING SERVICES
CONSTRUCTION INSPECTION & MATERIALS TESTING

November 1, 2004 A07261.03-01

Browman Development Company, Inc.
100 Swan Way, Suite 206
Oakland, CA 94621-1459

Attention: Mr. Jerry Neighbors

Subject: *DRAFT*; Preliminary Geotechnical Investigation
Proposed Retail Shopping Center
Northeast Corner of State Highway 101 and Cochrane Road
Morgan Hill, California

Dear Mr. Neighbors:

We are pleased to submit this preliminary geotechnical engineering investigation report prepared for the general project planning of the proposed retail shopping center development to be located at the northeast corner of the intersection of State Highway 101 and Cochrane Road in Morgan Hill, California. The contents of this report include the purpose of the study, scope of services, background information, investigative procedures, our findings, evaluation, conclusions, and recommendations.

Grading, architectural, structural plans, etc. for the proposed development were not available at the time of this study. It is recommended that those portions of the plans and specifications that pertain to earthwork, pavements, foundations and other related drawings be reviewed by The Twining Laboratories, Inc. (Twining), when they become available, to determine if they are consistent with our recommendations. This service is not a part of this current contractual agreement, however, it is recommended that the client provide these documents for our review prior to their issuance for construction bidding purposes. This report presents preliminary information relative to the proposed development. As such, additional geotechnical engineering investigations will be required subsequent to preparation of final project plans.

In addition, it is recommended that Twining be retained to provide inspection and testing services for the excavation, earthwork, pavement, and foundation phases of construction. These services are necessary to determine if the subsurface conditions are consistent with those used in the analyses and formulation of recommendations for this investigation, and if the pertinent aspects of construction comply with our recommendations. These services are not, however, part of this current contractual agreement. We would appreciate the opportunity to provide a proposal for these additional services after construction documents are completed. A representative of our firm (800-268-7021) will contact you in the near future regarding these services.

We appreciate the opportunity to be of service to Browman Development Company, Inc. If you have any questions regarding this report, or if we can be of further assistance, please contact us at your convenience.

Sincerely,
THE TWINING LABORATORIES, INC.

DRAFT

Harry C. Wise
Monterey Area Engineering Manager
Geotechnical Engineering Division

HCW

EXECUTIVE SUMMARY

The Twining Laboratories, Inc. (Twining) was authorized by Mr. Jerry Neighbors with Browman Development Company, Inc. to conduct a preliminary geotechnical engineering investigation for the proposed retail shopping center development, as outlined in our proposal dated August 24, 2004. The subject property is located at the northeast corner of the intersection of State Highway 101 and Cochrane Road in Morgan Hill, California and comprises approximately 56 acres. The purpose of our study was to provide preliminary geotechnical engineering parameters for use in design of foundations, pavement sections, slabs-on-grade, and preparation of related construction documents.

Based on a preliminary site plan provided by the Browman Development Company, Inc., the proposed construction will include the following structures:

- Nine (9) Retail Store Buildings (8 Major Tenants and 1 Marketplace) will comprise approximately 492,943 square feet in plan dimensions;
- One (1) Store Area will comprise approximately 14,000 square feet in plan dimensions; and
- Eight (8) Pads will comprise approximately 44,500 square feet in plan dimensions.

It is anticipated that the proposed larger Major Stores and other smaller buildings (pads) will consist of single story structures with concrete masonry unit, steel, wood, or concrete tilt-up walls, steel and/or wood frame roofs, and concrete slab-on-grade floors. Basements are not anticipated, however, depressed truck ramps and loading docks typically accompany the major stores. The project will also include asphaltic concrete and Portland Cement Concrete (PCC) parking and drive areas.

The scope of work provided in this report does not meet the geotechnical report requirements for major retail store tenants, or include any recommendations for off-site street improvements. It is anticipated that the building column and line loads will be moderately variable for the various structures constructed within the proposed shopping center. In any case, for the purposes of this geotechnical engineering investigation, maximum column and line loads of 150 kips and 5 kips per lineal foot, respectively, have been assumed for the proposed development.

It should be noted that once a definitive site plan with building types is developed, design level geotechnical engineering investigation reports will be required to address major store requirements, specific design building loads of the various structures, and building pad earthwork requirements for the different loading and subsurface site conditions.

At the time of the field exploration, the project site was predominantly used for agricultural purposes. In addition, two (2) residential dwellings and seven (7) additional buildings were present at the time of the field exploration. The seven additional buildings included barns, a garage, tack rooms, pump houses, and restrooms. On-site septic systems were reported by the landowners in association with the residential dwellings. Also, domestic wells and irrigation wells were noted on the site.

EXECUTIVE SUMMARY (con't)

During the geotechnical field exploration conducted on September 1 and 2, 2004, a total of twelve (12) test borings were drilled within the proposed site development. Both disturbed and undisturbed soil samples were collected and returned to our laboratory for classification and testing.

In two (2) borings (B-3 and B-11) of the twelve (12) borings drilled, near surface, very stiff, sandy lean clays were encountered from the ground surface to depths of about 3 feet below site grade (BSG). However, in general, the near surface soils encountered at the boring locations consisted of very stiff to hard sandy silts interbedded with medium dense to dense silty sands extending from the ground surface to depths of about 3 feet BSG. From about 3 feet to about 20 feet BSG, the very stiff to hard silts and medium dense to dense silty sands were interbedded with medium dense to very dense silty to clayey gravels. Below 20 feet BSG, the interbedded hard silts and medium dense to very dense sands and gravels extended to the maximum depth explored of 51½ feet BSG, with the exception of one (1) boring (B-8) where very stiff to hard sandy clay was encountered between depths of 20 and 25½ feet BSG.

The near surface soils exhibited high compressibility and high collapse potential, high shear strength, and poor to fair pavement support characteristics. Near surface sandy lean clay soils were encountered in two (2) of the twelve (12) borings. The results of two (2) Atterberg Limits tests indicated that the near surface sandy lean clays had liquid limits of 36 and 21, and plasticity indices of 21 and 5, respectively. Also, the near surface sandy clay to sandy silt soils exhibited a low potential for expansion (EI=11 and 23).

The chemical analyses results indicate a resistivity value of 16,000 ohms/centimeter and a pH value of 5.8. Based on the resistivity value, the soils exhibit "mildly corrosive" corrosion potential. In addition, the results of soil sample analyses indicate sulfate concentrations of 0.00068 by percent weight. Therefore, a low potential for sulfate attack on concrete placed in contact with the soils is anticipated.

From a geotechnical standpoint, the site is suitable for the proposed construction with regard to support of shallow spread foundations and concrete slabs-on-grade, provided the recommendations contained in this preliminary report are followed. The primary geotechnical concerns are: 1) the presence of undocumented fill soils; 2) the presence of disturbed, highly compressible and collapsible, native, near surface soils encountered from the ground surface extending to about 3 feet BSG; 3) the potential to incorporate over-sized material (gravel and cobbles) within the footing zone; and 4) the potential to encounter over-sized materials (gravel and cobbles) during grading operations.

Groundwater was not encountered in the test borings drilled at the time of the field exploration (September 1 and 2, 2004). Review of maps prepared by the Department of Water Resources (DWR) indicates that there are no wells in the nearby Morgan Hill area that provides groundwater elevations. Groundwater was not encountered in any of our borings, with the deepest boring being drilled to 51½ feet.

EXECUTIVE SUMMARY (con't)

The project site is not located in an Alquist-Priolo Earthquake Fault Zone. The nearest known active or potentially active fault is the Calaveras Fault (South of the Calavaras Reservoir segment), located about 3 miles (4¾ km) east of the site. Therefore, the potential for fault rupture at the site is considered low.

Based on the site topography, depth to groundwater below the site, and the high resistance to standard penetration testing (N values), the potential for liquefaction to impact the site due to loss of foundation bearing capacity, surface manifestations, and lateral spreading is considered low. Considering the shallow depth to dense to very dense gravel soils, total seismic settlement of not more than 1/4-inch would be expected to occur under shaking from the design-basis earthquake (0.89g and a magnitude of 7.9). Considering the size of the proposed structures, the recommended site preparation, and the soil conditions encountered, a differential seismic settlement of ¼-inch in 40 feet should be anticipated for design.

However, it should be noted that the northern portion of the site (approximately ¼ of the site) is located within an area of potential liquefaction as identified by the CGS on the State of California Seismic Hazard Zones, Morgan Hill Quadrangle, dated April 17, 2004, available on their website at (http://gmw.consrv.ca.gov/shmp/download/pdf/pzn_morgh.pdf). The map shows areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Code Section 2693©) would be required. However, based on the results of the preliminary evaluation included herein, the risk of liquefaction at this site is considered low. Due to the potential variability of the subsurface soils and depth to groundwater across the site, it is recommended that the proposed structures be evaluated on a case by case basis as part of future design level geotechnical engineering investigations.

Over-excavation and placement of engineered fill below foundations are recommended to limit static settlements to 1 inch total and ½ inch differential over a horizontal distance of 40 feet. Site preparation should include stripping and removal of the existing structures, trees, grasses, organic debris, as well as over-excavation and placement of engineered fill below foundations, slabs and flatwork areas. Stripping should be conducted prior to over-excavation. Stripping depths should be sufficient to remove trees, vegetation, organic matter, etc. Limbs, tree branches, roots, etc. should not be disced into the near-surface soils. These materials should be raked and hand-picked, as necessary, to ensure proper removal. For estimating purposes, a minimum stripping depth of 6 inches should be used for the site in general. However, it should be anticipated that tree roots exceeding ¼ inch in diameter will extend below the minimum stripping depth.

The proper removal of trees and their associated root structures is an import aspect of this project and should be properly planned and monitored. A demolition plan should be developed by the contractor and should include a survey of the site. The plan should specify how the contractor

EXECUTIVE SUMMARY (con't)

proposes to remove the building structures, septic tanks and leach lines, irrigation lines and other underground utilities, trees, roots, and organic matter generated during the removal process and how the excavations and loose soils generated during this process will be addressed.

ant

The depth of excavations should be sufficient to remove roots larger than ¼ inch in diameter. It is anticipated that roots, root balls, and loose soils and voids resulting from tree removal operations will extend to depths on the order of 3 to 4 feet BSG. Therefore, a minimum excavation depth of 4 feet is estimated to be required to remove roots larger than 1/4 inch in diameter for the trees. The actual depth of stripping should be reviewed by Twining at the time of construction based on loss-on-ignition tests conducted to determine organic content in the soil (note: maximum limit of 3 percent organics by weight). Deeper excavations may be required in localized areas to remove tree roots.

It is assumed that the proposed construction can tolerate total and differential static settlements of approximately 1-inch and ½-inch, respectively. There are several options available to reduce the estimated total and differential static settlements to 1-inch and ½-inch in 40 feet, respectively. Over-excavation of the near surface soils and replacement of these soils as engineered fill is one of the more common methods of dealing with compressible soils. To reduce the differential static settlements from the static loads to within ½-inch in 40 feet, the on-site soils beneath the proposed structures and for a distance of 10 feet beyond the perimeter of the structures should be over-excavated to provide a minimum of 24 inches of engineered fill beneath the proposed foundations and slab-on-grade floor areas, at least 36 inches of engineered fill below preconstruction site grades, or at least 12 inches of engineered fill below improvements to be removed, whichever is greater. In addition, the building pad area, including the over-build zone 10 feet beyond the building perimeter, should be over-excavated to the same depth that is required for over-excavation underneath the footings. Exterior slab-on-grade floor areas and pavement areas should be underlain by engineered fill extending to at least 12 inches below the slab or pavement, at least 18 inches below preconstruction site grades, or at least 12 inches below improvements to be removed, whichever is greater. Improvements to be removed for building pads, exterior slabs-on-grade, and pavement areas include the two residential structures and their associated barns, sheds, garages, septic tanks and leach lines, as well as any irrigation lines or other underground utilities that may exist on site. It may be more economical to backfill with engineered fill areas with improvements to be removed prior to conducting over-excavation for building pads, exterior slab-on-grade floor areas, or pavement areas. Exterior flatwork should be underlain by a minimum of 12 inches of granular non-expansive soils which include a minimum of four (4) inches of aggregate base directly below the slab-on-grade.

One of the primary geotechnical concerns is the potential to encounter oversized, greater than 3 inches in overall diameter, gravel and cobble material during the grading operations (from the surface to depths of about 7 feet BSG). If these larger materials are encountered during the over-excavation for the building pads, they should be broken up/crushed into fragments that are three (3) inches or less in size along the largest dimension. If the cobbles cannot be broken up into fragments

EXECUTIVE SUMMARY (con't)

that are three (3) inches or less in size along the largest dimension, the contractor should remove the over sized fragments from the fill material by screening or other techniques approved by Twining. The screening activity would be anticipated to increase the costs of the earthwork Neatly cut footings may be difficult to obtain due to the presence of oversized materials.

In order to better determine the requirements for screening of the on-site materials, it is recommended test pits be excavated at this site under the direction of Twining. In addition, potential grading, excavating and underground contractors should be present during these explorations to make their own observations of the gravels and cobbles in the soils exposed in the test pits. This activity will assist the contractors in preparation of bids. It has been reported by one of the property owners that fill soils were hauled into the site as a part of an adjacent pipeline project. However, the extent of fill soils was not discernable upon visual observation of the surface features of the site nor review of a low elevation aerial photograph. Therefore, as part of the backhoe exploration, the potential presence and limits of onsite fill soils (if any) can be further evaluated.

Footings should have a minimum depth of 18 inches (note: 24 inches for major stores and two-story structures) and a minimum width of 12 inches (note: 15 inches for major stores and two-story structures), regardless of load. The foundations may be designed for a maximum net allowable soil bearing pressure of 2,500 pounds per square foot for dead plus live loads assuming compliance with the site preparation earthwork recommendations presented in this report.

Preliminary asphaltic concrete pavement and Portland cement concrete sections are presented in the recommendations section of this report. The structural sections were designed using the gravel equivalent method in accordance with Chapter 600 of the California Department of Transportation Highways Design Manual (fourth edition). The structural vehicle loadings were based on typical traffic loadings for this type and size of facility. The analyses were based on a range of traffic index values from 5.0 to 8.0. Traffic indices for the project should be selected by the project Civil Engineer or as required by the applicable tenants. If the pavements are placed prior to construction, the additional construction traffic should be considered in the selection of the design traffic index. If more frequent truck traffic is anticipated than that indicated by the maximum traffic index, Twining should be contacted to re-evaluate the traffic index values.

Based on the ASTM Special Technical Publication 741 and the analytical results of one (1) soil sample analysis, the soil has a "mildly corrosive" corrosion potential to ferrous alloy pipes, as indicated by a resistivity value of 16,000 ohms/centimeter and a pH value of 5.8. Buried metal objects should be protected in accordance with the manufacturer's recommendations based on the "mildly corrosive" corrosion potential of the soil. The evaluation was limited to the effects of soils to metal objects; corrosion due to other potential sources, such as stray currents and groundwater, was not evaluated.

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PRELIMINARY GEOTECHNICAL ENGINEERING INVESTIGATION

PROPOSED RETAIL SHOPPING CENTER

NORTHEAST CORNER OF STATE HIGHWAY 101 AND COCHRANE ROAD

MORGAN HILL, CALIFORNIA

Project Number: A07261.03-01

1.0 INTRODUCTION

This report presents the results of a preliminary geotechnical engineering investigation for the general project planning for the proposed retail shopping center development to be located at the northeast corner of the intersection of State Highway 101 and Cochrane Road in Morgan Hill, California. The Twining Laboratories, Inc. (Twining) was authorized by Mr. Jerry Neighbors with Browman Development Company, Inc., to conduct this preliminary geotechnical engineering investigation, as outlined in our proposal dated August 24, 2004.

The contents of this report include the purpose of the study and the scope of services provided. The site history, previous studies, existing site features, and anticipated construction are discussed. In addition, a description of the investigative procedures used and the subsequent findings obtained are presented. Finally, the report provides an evaluation of the findings, general conclusions, and related recommendations. The three report appendices contain the drawings (Appendix A), the logs of borings (Appendix B), and the results of laboratory tests (Appendix C).

The Geotechnical Engineering Division of Twining, headquartered in Fresno, California, performed the investigation.

2.0 PURPOSE AND SCOPE OF INVESTIGATION

2.1 Purpose: The purpose of this study was to conduct a field exploration and laboratory testing program, evaluate the data collected during the field and laboratory portions of the investigation, and provide the following information for preliminary design purposes:

2.1.1 Geotechnical parameters for use in design of foundations and slabs-on-grade, and development of lateral resistance;

2.1.2 Recommendations for site preparation including over-excavation, fill placement, moisture conditioning, and compaction of engineered fill soils;

2.1.3 Recommendations for the design and construction of asphaltic concrete and Portland Cement Concrete (PCC) pavements;

2.1.4 Recommendations for temporary excavations and trench backfill; and

2.1.5 Conclusions regarding soil corrosion potential.

This report is provided specifically for the Browman Development Company, Inc. for the proposed retail development referenced in the Anticipated Construction section of this report.

This investigation did not include a flood plain investigation, compaction tests, environmental investigation, or environmental audit.

2.2 **Scope:** Our proposal, dated August 24, 2004, outlined the scope of our services. The actions undertaken during the investigation are summarized as follows.

2.2.1 A preliminary site plan for the proposed retail development, provided by Browman Development Company, Inc., dated July 28, 2003, was reviewed.

2.2.2 A low elevation aerial photograph of the site was reviewed.

2.2.3 A preliminary draft of a report entitled "Phase I Environmental Site Assessment; Northeast Corner of State Highway 101 and Cochrane Road, Morgan Hill, California," herein referred to as the preliminary Environmental Report (our reference A07261.01), dated June 11, 2004, prepared by Twining, was reviewed.

2.2.4 The State of California Seismic Hazard Zone map of the Morgan Hill Quadrangle, dated April 17, 2004, was reviewed.

2.2.5 Site reconnaissance, drilling test borings, and soil sampling were conducted.

2.2.6 Laboratory tests were conducted to determine selected physical and engineering properties of the subsurface soils.

2.2.7 Mr. Jerry Neighbors (Browman Development Company, Inc.) and Mr. Rowan C. Punchihewa (JP DiNapoli Companies, Inc.) were consulted during the investigation.

2.2.8 The data obtained from the investigation were evaluated to develop an understanding of the subsurface conditions and engineering properties of the subsurface soils.

2.2.9 This preliminary geotechnical engineering investigation report was prepared to present the purpose and scope, background information, field exploration procedures, findings, evaluation, conclusions, and recommendations.

3.0 BACKGROUND INFORMATION

The site history, previous studies, existing site features, and the anticipated construction are summarized in the following subsections.

3.1 **Site History**: According to the preliminary Environmental Report, the project site has been used for agricultural purposes since at least the 1910's, with the exception of scattered rural residences on the site. Based on conversations with Ms. Jean Millard-Low, property owner of one of the on-site parcels (APN 728-37-001), imported fill soil, generated during construction of a Santa Clara Water District pipeline project approximately one mile north of the site, was placed throughout the site. The preliminary Environmental Report states it is believed that the fill soil was derived from rangeland and agricultural land.

3.2 **Previous Studies:** The preliminary Environmental Report, prepared by The Twining Laboratories, Inc., for the site, was reviewed. No other previous geotechnical engineering, geological, or environmental studies conducted for this site were provided for our review. If these documents are, or become available, they should be provided to Twining for review.

3.3 **Site Description:** The project site is an approximate 56-acre area located on the northeast corner of the intersection of State Highway 101 and Cochrane Road in Morgan Hill, California. A site location map is presented as Drawing No. 1 in Appendix A of this report. The site is bound to the north by agricultural land which includes orchards, greenhouses, and barns; to the east by the agricultural land including orchards; to the west by a canal and Highway 101,and commercial property beyond; and to the south by Cochrane Road with single family residences and agricultural land beyond. According to the 7½ minute series topographic map (Morgan Hill, California), produced by the United States Geological Survey (USGS), the elevation of the site varies east to west from approximately 390 feet to 380 feet above mean sea level (AMSL).

At the time of the field exploration, the project site was predominantly used for agricultural purposes. In addition, two (2) residential dwellings and seven (7) additional buildings were present at the time of the field exploration. The seven additional buildings included barns, a garage, tack rooms, pump houses, and restrooms. On-site septic systems were reported in the preliminary Environmental Report in association with the existing residential dwellings. Based on visual observations, areas of existing fill generated from the Santa Clara Water District pipeline project mentioned above were not readily identifiable. Also, domestic and irrigation wells were observed on site.

At the time of the field exploration, the southern and southeastern portions of the site were in agricultural use for pepper crops, the western and southwestern portions of the site generally consisted of dried grasses, the northwestern portion of the site consisted of a small vineyard, and the northeastern portion of the site generally consisted of sparse dried grasses and a horse boarding facility. Numerous trees were located along the western portion of the site. Also, several trees were located on the northeastern portion of the site.

3.4 **Anticipated Construction:** Based on the July 28, 2003 preliminary site plan provided to our firm, the proposed construction will include the following structures: 1) nine (9) retail store buildings (8 major tenants and 1 marketplace) will comprise approximately 492,943 square feet in plan dimensions;
2) one (1) store area will comprise approximately 14,000 square feet in plan dimensions; and 3) eight (8) pads will comprise approximately 44,500 square feet in plan dimensions.

The proposed retail development will comprise approximately 56 acres. It is anticipated that the proposed Major Retail Store buildings and other building construction will consist of single story structures with concrete masonry unit, steel, wood, or concrete tilt-up walls, steel and/or wood frame roofs, and concrete slab-on-grade floors. Basements are not anticipated, however, depressed truck ramps and loading docks are anticipated at the retail stores. The project will also include asphaltic concrete and PCC parking and drive areas.

It should be noted that the scope of work requested and provided for this investigation will not meet the geotechnical report requirements for major store tenants, nor does it include evaluation or recommendations for any off-site street improvements. It is anticipated that the column and line loads will vary for each building anticipated within the proposed shopping center. In any case, for purposes of this preliminary geotechnical engineering investigation, maximum column and line loads of 150 kips and 5 kips per lineal foot, respectively, have been assumed for the proposed retail development. It should be noted that once a definitive site plan with specific building types is developed, a design level geotechnical engineering investigation report will be required to address major store requirements, specific design building loads, and building pad earthwork requirements for the different loading and subsurface site conditions.

Since the existing ground surface elevation varies by approximately 10 feet across the site, maximum earthwork cuts and fills of about two (2) to ten (10) feet are expected to achieve level building pads and provide positive site drainage. These depths do not include the depth of over-excavation recommended in this report to provide the recommended depth of engineered fill below foundations. When final grading plans have been prepared, Twining should be provided the opportunity to review the grading plans and provide additional recommendations if necessary.

4.0 INVESTIGATIVE PROCEDURES

The field exploration and laboratory testing program conducted for this investigation are summarized in the following subsections.

4.1 **Field Exploration:** The field exploration consisted of a site reconnaissance, drilling test borings, soil sampling, and standard penetration tests.

4.1.1 **Site Reconnaissance:** The site reconnaissance consisted of walking the site and noting visible surface features. The reconnaissance was conducted by Mr. Dean Ledgerwood (Twining) on September 1, 2004, Mr. Harry Wise (Twining) and Mr. Barry Annis (Twining) on September 2, 2004. The features noted are described in the background information.

4.1.2 **Drilling Test Borings:** The depths and locations of test borings were selected based on direction by the client, the size of the proposed structures, type of construction, depth of influence of surface loads, and subsurface soil conditions.

On September 1 and 2, 2004, a total of twelve (12) test borings were drilled in the areas proposed for development to depths ranging from 10 to 51½ feet below site grade (BSG). In addition, six (6) bulk samples of soil were obtained for Resistance (R)-values, expansion index tests, and moisture-density relationship tests. The test boring and bulk sample locations are shown on Drawing No. 2 in Appendix A of this report. Under the direction of a Twining staff geologist, the test borings were drilled using a CME-75 drill rig equipped with 6⅝-inch outside diameter (O.D.) hollow stem augers. The soils encountered in the test borings were logged by the staff geologist. The soil samples collected from the borings were classified in the field in accordance with the Unified Soil Classification System. This classification consisted of particle size, color, and other distinguishing features of the soil.

The presence and elevation of free water, if any, in the borings were noted and recorded during drilling and immediately following completion of the borings.

Test boring locations were determined by pacing with reference to the existing site features delineated on the preliminary site plan. Elevations of the test borings were not measured as a part of the investigation. The locations of the test borings are described on the boring logs in Appendix B. The test borings were loosely backfilled with material excavated during the drilling operations; thus, some settlement should be anticipated.

4.1.3 **Soil Sampling:** Standard penetration tests were conducted, and both disturbed and relatively undisturbed soil samples were obtained. The standard penetration resistance, N-value, is defined as the number of blows required to drive a standard split barrel sampler into the soil. The standard split barrel sampler has a 2-inch O.D. and a 1⅜-inch inside diameter (I.D.). The sampler is driven by a 140-pound weight free falling 30 inches. The sampler is lowered to the bottom of the bore hole and set by driving it an initial 6 inches. It is then driven an additional 12 inches and the number of blows required to advance the sampler the additional 12 inches is recorded as the N-value.

Relatively undisturbed soil samples for laboratory tests were obtained by pushing or driving a California modified split barrel ring sampler into the soil. The soil was retained in brass rings, with a 2.5 inch O.D. and 1-inch in height. The lower 6-inch portions of the samples were placed in close-fitting, plastic, airtight containers which, in turn, were placed in cushioned boxes for transport to the laboratory.

Soil samples obtained were taken to Twining's laboratory for classification and testing.

4.2 **Laboratory Testing:** The laboratory testing was programmed to determine selected physical and engineering properties of the soils underlying the site. The tests were conducted on disturbed and relatively undisturbed samples representative of the subsurface material.

The results of laboratory tests are summarized on Figures Numbers 1 through 30 in Appendix C of this report. These data, along with the field observations, were used to prepare the final test boring logs included in Appendix B of this report.

5.0 FINDINGS AND RESULTS

The findings and results of the field exploration and laboratory testing are summarized in the following subsections.

5.1 Soil Profile: In two (2) borings (B-3 and B-11) out of the twelve (12) borings drilled, near surface, very stiff, sandy lean clays were encountered from the ground surface to depths of about 3 feet below site grade (BSG). However, in general, the near surface soils encountered at the boring locations consisted of very stiff to hard sandy silts interbedded with medium dense to dense silty sand extending from the ground surface to depths of about 3 feet BSG. From about 3 feet to about 20 feet BSG, the very stiff to hard silts and medium dense to dense silty sands were interbedded with medium dense to very dense silty to clayey gravels. Below a depth of about 20 feet BSG, the interbedded hard silts and medium dense to very dense sands and gravels extended to the maximum depth explored of 51½ feet BSG, with the exception of one (1) boring (B-8) where very stiff to hard sandy clay was encountered between depths of 20 and 25½ feet BSG.

The foregoing is a general summary of the soil conditions encountered in the test borings drilled for this preliminary geotechnical investigation. Detailed descriptions of the soils encountered at each test boring are presented on the logs of borings in Appendix B of this report. The stratification lines shown on the logs represent the approximate boundary between soil types; the actual in-situ transition may be gradual.

5.2 Soils Engineering Properties: The near surface sandy lean clays, encountered in two (2) out of the twelve (12) borings, extending from the ground surface to depths of approximately 3 feet BSG, are very stiff, as indicated by standard penetration resistance, N-values, of 23 blows per foot. The natural moisture contents of the sandy lean clays ranged from 4 to 8 percent. One (1) in-place density test performed on the near surface sandy lean clays indicated a dry density of 103 pounds per cubic foot. The results of two (2) Atterberg Limits tests indicated that the near surface sandy lean clays had liquid limits of 36 and 21,and plasticity indices of 21 and 5, respectively. Two expansion index (EI) tests indicated that the near surface sandy lean clays had very low to low potential for expansion (EI=11 and EI=23).

The near surface sandy silts interbedded with silty sands, encountered in ten (10) of the twelve (12) borings to depths of approximately 3 feet BSG, are medium dense to dense sands and very stiff to hard silts, as indicated by standard penetration resistance, N-values, ranging from 23 to 40 blows per foot and 18 to 54 blows per foot, respectively. The natural moisture contents of the near surface silty sands and sandy silts ranged from 3 to 10 percent. Three (3) in-place density tests performed on the near surface sandy silts interbedded with silty sands indicated dry densities ranging from 108 to 113 pounds per cubic foot. The interbedded soils exhibited high compressibility characteristics as indicated by two consolidation tests (about 13.8 and 14.3 percent consolidation under a load of

8 kips per square foot). Upon inundation, the near surface soils exhibited high apparent collapse potential (about 6.5 and 7.0 percent collapse under a load of 2 kips per square foot). However, upon review of the dry densities, field blow counts, moisture contents and considering the gravel content of the soils, the apparent collapse potential appears to be due to disturbance of the sample caused by driving the sampler. Direct shear tests were conducted on two (2) near surface samples (interbedded silts and sands). The near surface soils had angles of internal friction of 34.3 and 38.2 degrees, and cohesion values of 0 and 95 pounds per square, respectively.

In general, the near surface interbedded soils were underlain by medium dense to very dense gravels interbedded with very stiff to hard sandy silts between the depths of 3 feet and 20 feet BSG as indicated by standard penetration resistance, N-values, ranging from 23 to 73 blows per foot and 18 to 60 blows per foot, respectively. The natural moisture contents of the interbedded gravels and silts ranged from 2 to 11 percent. One (1) in-place density test performed on the interbedded gravels and silts indicated a dry density of 125 pounds per cubic foot.

In general, below a depth of about 20 feet BSG, the interbedded sands and silty soils were underlain by medium dense to very dense gravels interbedded with hard sandy silts and dense to very dense silty sands from about 20 feet to the maximum depth explored of 51½ feet BSG. In one (1) boring (B-8), very stiff to hard sandy clays were encountered between 20 and 25½ feet BSG. The gravels were medium dense to very dense as indicated by standard penetration resistance, N-values, ranging from 27 to 85 blows per foot; the silts were hard as indicated by an N-value of 60 blows per foot; and the sands were dense to very dense as indicated by N-values ranging from 47 to greater than 50 blows per foot. The natural moisture contents of the interbedded gravels, silts, and sands ranged from 1 to 12 percent.

A maximum density/optimum moisture determination test performed on one near-surface silty sand sample collected from the site, indicated a maximum dry density of 125.7 pounds per cubic foot at an optimum moisture content of 9.5 percent.

R-value tests were conducted on two (2) near surface soil samples collected between the depths of ½ and 3 feet BSG. The results of the tests indicate R-values of 17 and 34.

Chemical tests performed on one (1) near surface soil sample indicated a minimum resistivity value of 16,000 ohms/centimeter, a pH value of 5.8, and 0.0008 percent by weight concentrations of chloride and 0.00068 percent by weight concentrations of sulfate.

5.3 Groundwater Conditions: Groundwater was not encountered in the test borings drilled at the time of the field exploration (September 1 and 2, 2004). Review of groundwater maps prepared by the Department of Water Resources (DWR) indicates that there are no records of water wells in the nearby Morgan Hill area that would provide information relative to historic groundwater depth. Groundwater was not encountered in any of our borings, with the deepest boring being drilled to 51½ feet. However, the Seismic Hazard Zone Report of the Morgan Hill Quadrangle prepared by the State of California indicates the historic high groundwater depth in the northern portion of the property is 40 feet below the present ground surface.

It should be recognized however, that water table elevations fluctuate with time, since they are dependent upon seasonal precipitation, irrigation, land use, and climatic conditions as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered both during the construction phase and the design life of the project. The evaluation of such factors was beyond the scope of this investigation and report.

6.0 EVALUATION

The data and methodology used to develop conclusions and recommendations for project design and preparation of geotechnical construction specifications are summarized in the following subsections. The evaluation was based upon the subsurface conditions determined from the investigation and our understanding of the proposed construction.

6.1 **Surface Conditions:** At the time of the field exploration, the project site was predominantly used for agricultural purposes and included a horse boarding facility. In addition, two (2) residential dwellings and seven (7) additional buildings were present at the time of the field exploration. The seven additional buildings included barns, a garage, tack rooms, pump houses, and restrooms. On-site septic systems are reportedly present on the subject property in association with the residential dwellings. It has been reported by one of the property owners that fill soils were imported to the site as a part of an adjacent pipeline project. However, the extent of fill soils was not discernable upon visual observation of the surface features of the site nor review of a low elevation aerial photograph. Also, domestic and irrigation wells were observed on site.

Vegetation in the southern and southeastern portion of the site generally consisted of pepper crops, the western and southwestern portion of the site generally consisted of dried grasses, the northwestern portion of the site consisted of a small vineyard, and the northeastern portion of the site generally consisted of sparse dried grasses. Numerous trees were located along the western portion of the site, separating the western most parcel from the remainder of the site. Also, several trees were located on the northeastern portion of the site in the area of the horse boarding facilities.

The soils in areas of barns and like facilities, the trees, grasses, etc. will need to be assessed to determine appropriate stripping depths. The soils with excessive organic contents, i.e., greater than 3 percent by dry weight, will need to be stripped from the site in accordance with the recommendations of this report. Additional testing in the form of loss on ignition tests should be performed to determine the minimum stripping depths for the project to reduce costs associated with this activity.

The subsurface structures associated with the existing site improvements (i.e., houses, barns, foundations, wells, septic tanks, leach fields, etc.) will need to be identified and shown on a demolition plan. The resulting excavations will need to be prepared in accordance with the recommendations of this report.

The presence of the undocumented will require that these soils be evaluated to determine their horizontal and vertical extent. These soils will need to be over-excavated and compacted as engineered fill as part of the preparation of the site.

6.2 **Soil Conditions:** The near surface soils exhibited high compressibility and high collapse potential, high shear strength, and poor to fair pavement support characteristics. Also, the near surface sandy clay to sandy silt soils exhibited a very low to low potential for expansion (EI=11 and 23). Based on the compressible nature of the native near surface soils, the near surface soils will not provide adequate support for the proposed improvements in their present condition. Therefore, ground improvement such as over-excavation and compaction will be required to provide adequate support for the proposed structures.

From a geotechnical standpoint, the site is suitable for the proposed construction with regard to support of shallow spread foundations and concrete slabs-on-grade, provided the recommendations contained in this preliminary report are followed. The primary geotechnical concerns are: 1) the presence of undocumented fill soils; 2) the presence of disturbed, highly compressible and collapsible, native, near surface soils encountered from the ground surface extending to about 3 feet BSG; 3) the potential to incorporate over-sized material (gravel and cobbles) within the footing zone; and 4) the potential to encounter over-sized materials (gravel and cobbles) during grading operations.

One of the primary geotechnical concerns is the potential to encounter over-sized material (gravel and cobbles) within the planned excavation depths. If these over sized materials (greater than 3 inches along the largest dimension) are encountered during the over-excavation for the building pads, additional excavating equipment may be necessary to excavate the soils with gravels and cobbles. It also may be difficult to break up large fragments for compaction efforts of over-excavated and scarified areas. If the cobbles cannot be broken up into fragments that are three (3) inches or less in size along the largest dimension, the contractor should remove the over sized fragments from the fill material by screening or other techniques approved by Twining. The screening activity would be anticipated to increase the cost of the earthwork. Neatly cut footings will be difficult to obtain due to the presence of oversized materials unless materials placed in the foundation zone are screened to remove oversize materials. In order to better determine the requirements for screening, it is recommended that test pits be excavated at this site under the direction of Twining. Potential grading, excavating and underground contractors should be present onsite to make their own observations of the gravels and cobbles in the soils exposed in the test pits. This activity will assist the contractors in preparation of bids. It has been reported by one of the property owners that fill soils were imported to the site as a part of an adjacent pipeline project. However, the extent of fill soils was not discernable upon visual observation of the surface features of the site nor review of a low elevation aerial photo. Therefore, as part of the backhoe exploration, the extent of onsite fill soils should be further evaluated.

6.3 **Site Preparation:** Over-excavation and placement of engineered fill below foundations are recommended to limit static settlements to 1 inch total and ½ inch in 40 feet differential. Site preparation should include stripping and removal of the existing structures and associated improvements, trees, grasses, organic debris, as well as over-excavation and placement of engineered fill below foundations, slabs and flatwork areas. Stripping should be conducted prior to over-excavation. The proper removal of trees and their associated root structures is an important aspect of this project and should be properly planned and monitored. A demolition plan should be prepared for the project.

An implementation plan for demolition should be developed by the contractor and should include surveying the site. The plan should specify how the contractor proposes to remove the building structures, septic tanks and leach lines, wells and irrigation lines, and other underground utilities, trees, roots, and organic matter generated during the removal process, and how the excavations and loose soils generated during this process will be addressed.

If large roots are allowed to remain in the soils and organically decay over time, voids could develop and/or an organic stench of decaying vegetation could permeate overlying structures, pavements, and exterior slabs.

In addition to removing structures on site (i.e. two residences, barns, sheds, garages), the contractor should also locate and remove foundations, septic tanks and leach lines, including gravel, to at least 1 foot below the bottom of the subsurface feature to be removed. Site preparation should also include removal or relocation of any irrigation systems present at the site. Irrigation pipe should be completely removed and not crushed in-place and buried.

After stripping and removal of surface and subsurface structures, over-excavation is recommended to remove disturbed soils and reduce the potential for static settlement of the new structures. The overbuild zone should extend to a minimum of 10 feet beyond the building perimeters. This area should be over-excavated to the same depth that is required for over-excavation underneath the footings, adjacent flatwork, exterior columns, and canopies or overhangs.

Over-excavation should also be conducted in pavement and exterior flatwork (e.g., parking areas, drive areas and sidewalks) to over-excavate compressible soils and establish a firm, compacted subgrade as recommended herein. The zone of over-excavation and compaction should extend laterally a minimum of 3 feet outside the perimeters of the proposed flatwork and pavements.

Water wells were noted on site. The water wells (if not to be preserved or used after construction) should be abandoned in accordance with state and local requirements as well as the recommendations contained in this report.

6.4 **Foundations:** Considering the nature of the near surface soils encountered at the boring locations, the potential for excessive settlement of proposed foundations and slabs is considered moderate. Settlement estimates were made based on a bearing pressure of 2,500 pounds

per square foot. Twining should be retained to provide a supplemental evaluation and recommendations when the building loads become available. All foundations for the project should be supported on at least 24 inches of engineered fill in order to provide a uniform bearing surface for the foundations and slabs, and limit total and differential static settlements to 1-inch and ½-inch in 40 feet, respectively.

The maximum allowable soil bearing pressure of 2,500 pounds per square foot was selected to satisfy both the settlement criteria and Terzaghi bearing capacity equations for spread foundations. A factor of safety of 3 was used to determine the allowable bearing capacity based on Terzaghi equations. Schmertmann's method was used to estimate foundation settlements.

6.5 **Interior Slabs-on-Grade:** Interior floor slabs should be supported on at least six (6) inches of Class 2 aggregate base (AB) over 12 inches of granular non-expansive engineered over engineered fill extending to the minimum depth of fill recommended under foundations indicated in this report. The Class 2 AB material is recommended for structural purposes, to provide a capillary break, and to provide a working surface during construction.

Several issues need to be considered to avoid damaging slabs during construction. These issues include: 1) using perimeter pour-strips at tilt-wall locations (if used) to avoid damage to slab-wall connections if tilt-up construction is used; 2) differential slab movement at interior columns; 3) aggregate base sections below the slabs; and 4) crane and heavy equipment loads on the slabs.

For tilt wall construction, depending on the sequence of slab loading and the location of wall panel casting, damage to slabs from differential loading conditions could occur. It has been our experience that a concentrated amount of differential movement and damage at the slab-to-perimeter footing location can occur as wall panels are placed and the footing is loaded. This typical procedure results in cracking of slabs and foundations due to differential movement. This potential damage can be reduced by leaving a perimeter pour strip between the wall footing and the adjacent slabs. After the walls are erected and a majority of the differential movement has occurred; the pour strip can be placed.

Often interior column construction can damage the overlying slabs. In some cases, the subgrade preparation for the slab is not continuous across the top of spread footings. Often the zone above the top of structural footings is backfilled with concrete during slab placement. This results in a differential slab support condition which often causes cracking at the soil/base-to-concrete transition. This crack appears as an outline of the underlying footing at the floor surface. The potential for this type of slab cracking can be reduced by backfilling the zone above the top of the footing with an approved backfill material and/or an aggregate base section below the floor slab. This procedure will provide more uniform support for the slabs which should reduce the potential for cracking.

It has been our experience that placing concrete for the concrete slabs by the tailgating method can cause subgrade instability due to the high frequency of concrete trucks which travel across the prepared subgrade. Compacted subgrade can experience instability under high traffic loads resulting

in heaving and depressions in the subgrade during critical pours. This condition becomes more critical during wet winter and spring months. Six (6) inches of aggregate base can reduce the potential for instability under the high frequency loading of concrete trucks. Also, the improved support characteristics of the aggregate base can be used in the design of the slab sections. Therefore, it is recommended to utilize a slab design with at least 6 inches of aggregate base for constructability and design purposes.

Finally, it is expected that erection of concrete tilt-up wall panels and roof steel will require cranes and heavy equipment. It should be noted that larger cranes impart intense loads on slabs and pavements. The loaded track pressure of any crane which will operate on slabs or pavements should be considered in the design.

Fine grained native and engineered fill soils may become unstable during grading; and therefore, could require stabilization. Stabilization may include placing a geotextile fabric and aggregate base materials, and/or chemical treatment, or a combination of these to stabilize soils. For bidding purposes, costs for chemical treatment, including 5 percent by weight high calcium quick lime should be provided as a bid alternate.

Interior floor slabs should be supported on 6 inches of Class 2 aggregate base (AB) over 12 inches of non-expansive engineered fill. The Class 2 AB material is recommended for structural purposes, to provide a capillary break, and to provide a working surface during construction.

6.6 **Ground Rupture and Seismic Ground Motion:** The project site is not located in an Alquist-Priolo Earthquake Fault Zone. The nearest presently known active or potentially active fault is the Calaveras Fault (South of the Calavaras Reservoir segment), located about 3 miles (4¾ km) east of the site. Therefore, the potential for fault rupture at the site is considered low.

Seismic ground motion parameters were developed for use in the liquefaction hazard analyses. The "design basis ground motion," Section 1627 of the California Building Code (CBC), is defined as the seismic ground motion having a 10 percent probability of being exceeded in a 50-year period. The probabilistic analyses described in this section was used to determine the design basis ground motion.

Probabilistic ground motion evaluation requires use of a seismicity model and ground motion attenuation functions to approximate the modification of seismic waves between the earthquake hypocenter (source) and the site. The seismicity model, including the fault locations and fault parameters (such as slip rate, fault length, magnitude and rupture area) of faults capable of impacting the site, was based on published geologic papers and corresponds with those listed in the California Geological Survey (CGS) database entitled "California Fault Parameters." Multiple probabilistic evaluations were conducted using the FRISKSP computer program and the faults indicated as those active and potentially active faults listed in the "California Fault Parameters" database.

As an initial step, our evaluation utilized the Boore (1997) attenuation relationship and included faults located within approximately 100 kilometers of the site. The resultant peak horizontal ground acceleration with a 10% probability of being exceeded in 50 years (the design basis ground motion) was 0.83g. The next step of our evaluation considered the average of the predicted design basis ground motions for four separate analyses incorporating four ground motion attenuation relationships including Boore (1997), Sadigh (1997), Idriss (1994), and Abrahamson and Silva (1997) and the faults within 100 kilometers of the site. The average of the design basis site accelerations based on the above attenuation relationships was determined to be 0.89g. Accordingly, a ground motion of 0.89g was selected for use in the liquefaction analyses. This represents a value not weighted for magnitude. Magnitude weighting is conducted in the liquefaction analysis.

Hazard deaggregation was conducted using the FRISKSP computer program. The results indicate that an earthquake magnitude of 7.9 represents the predominant earthquake magnitude for the site. This earthquake magnitude was used with the above ground motion estimate for the liquefaction analyses.

It is expected that the 2001 CBC will be used for structural design, and that seismic site coefficients are needed for design. Based on the CBC, the site classification is estimated to be a stiff soil S_D site with standard penetration resistance N-values averaging between 15 and 50 blows per foot in the upper 100 feet BSG.

The site coefficients for acceleration and velocity are based on the distance and activity of the local faults. Digitized seismic models published by the CGS indicate that two active faults are located within 15 kilometers of the site. These faults are the South of the Calaveras reservoir segment of the Calaveras Fault (distance about 4.8 km, M_m=6.2, slip rate 15.0 mm/year) and the Sargent Fault (distance 12.2 km, M_m=6.8, slip rate 3.0 mm/year). Based on the magnitudes and slip rates, these faults are classified as Source Type B faults by the CBC.

A table providing the recommended seismic coefficients for the project site is included in the Foundation Recommendations Section of this report.

6.7 **Liquefaction and Seismic Settlement:** Liquefaction describes a phenomenon in which a saturated, cohesionless soil loses strength during an earthquake as a result of excessive pore water pressure induced by shearing strains. Lateral and vertical movement of the soil mass, combined with loss of bearing usually results in the liquified zone. Research has shown that liquefaction potential of soil deposits induced by earthquake activity depends on soil types, void ratio, groundwater conditions, duration of shaking, and confining pressure over the potentially liquefiable soil mass. Fine, well sorted, loose sand, high groundwater conditions, higher intensity earthquakes, and relatively long duration of ground shaking are the requisite conditions for liquefaction. It should be noted that the northern portion of the site (approximately ¼ of the site) is located in a liquefaction hazard zone delineated in response to the Seismic Hazards Mapping Act. Therefore, a preliminary liquefaction/seismic settlement analyses was conducted as a part of this report.

Liquefaction and seismic settlement analyses were conducted based on the soils encountered in the test borings and the results of laboratory testing. The analyses were conducted based on the computer program LIQUEFY2 developed by Mr. Thomas F. Blake. A design basis earthquake horizontal ground acceleration of 0.89g and a design earthquake magnitude of 7.9 were used in the analysis. The N-values generated based on the SPT results were used to determine the cyclic stress ratio needed to initiate liquefaction. Soil parameters, such as wet unit weight, N-value, fines content, and depth of N-value tests, were input for the soils layers encountered throughout the depths explored (see test boring logs, Appendix B).

One of the most common phenomena that occurs during seismic shaking is the induced settlement of loose, unconsolidated sediments. This can occur in unsaturated and saturated granular soils, however, seismic settlements are typically largest where liquefaction occurs (i.e., in saturated soils). Estimates of total and differential seismic settlements on the order of 0.25 inches and 0.25 inches in 40 feet, respectively, were predicted. In addition, static total and differential settlements on the order of 1 inch and ½ inch in 40 feet, respectively, are anticipated at the subject site. Therefore, combined settlements (static and seismic) of 1.25 inches total and 0.75 inches in 40 feet differential should be anticipated for design.

Based on the depth to groundwater below the site (not encountered in test borings drilled to 50 feet), the potential for impact to the site from liquefaction effects due to loss of foundation bearing capacity, surface manifestations, and lateral spreading is considered negligible. Considering the shallow depth to dense to very dense gravelly soils, a total seismic settlement on the order of 1/4-inch would be expected to occur under shaking from the design-basis earthquake (0.89g and a magnitude of 7.9).

However, it should be noted that the northern portion of the site (approximately ¼ of the site) is located within an area of potential liquefaction as identified by the CGS on the State of California Seismic Hazard Zones, Morgan Hill Quadrangle, dated April 17, 2004, available on their website at (http://gmw.consrv.ca.gov/shmp/download/pdf/pzn_morgh.pdf). The map shows areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Code Section 2693©) would be required. However, based on the results of the preliminary evaluation included herein, the risk of liquefaction at this site is considered low. Due to the potential variability of the subsurface soils and depth to groundwater across the site, it is recommended that the proposed structures be evaluated on a case by case basis as a part of future design level geotechnical engineering investigations.

6.8 Asphaltic Concrete Pavements: Preliminary asphaltic concrete pavement structural sections are presented in the recommendations section of this report. The structural sections were designed using the gravel equivalent method in accordance with Chapter 600 of the California Department of Transportation Highways Design Manual (fourth edition). The structural vehicle loadings were based on typical traffic loadings for this type and size of facility. The analyses were based on a range of traffic index values from 5.0 to 8.0. Traffic indices for the project should be

selected by the project Civil Engineer. If the pavements are placed prior to construction, the additional construction traffic should be considered in the selection of the design traffic index. If more frequent truck traffic is anticipated than that indicated by the maximum traffic index, Twining should be contacted to re-evaluate the traffic index values.

The anticipated subgrade soils are silty sands and sandy silts. The subgrade support characteristics of the native soils were evaluated by Resistance (R)-value tests. The results of two tests, obtained within the upper 3 feet BSG, indicated the soils had R-values of 17 and 32. For the purpose of design, an R-value of 17 was used.

6.9 **Portland Cement Concrete (PCC) Pavements:** Recommendations for Portland cement concrete pavement structural sections are presented in this report. The structural section was determined based primarily on the methods detailed in the Portland Cement Association "Thickness Design of Highway and Street Pavements." PCC sections for exterior or interior hard rubber or steel wheel forklifts were not considered in the scope of this investigation.

The anticipated range of traffic selected for the PCC pavement sections ranged from 3 trucks per day to 30 trucks per day (all vehicle counts are one direction).

The PCC pavement sections were designed for a life of 20 years, a load safety factor of 1.1, a single axle weight of 16,000 pounds, a tandem axle weight of 36,000 pounds, and a modulus of rupture of 550 pounds per square inch (compressive strength of 4,000 psi) at 28 days for concrete. The design R-value resulted in a k-value of 80 psi/in. A higher k-value than the subgrade k-value is provided for this pavement section, based on a 6-inch layer of Class 2 aggregate base material (minimum R-value of 78) recommended below PCC slabs. Therefore, a k-value of 150 psi/in at the top of the aggregate base was used in design, and can be used for slab-on-grade design for interior floors subject to vehicle loads which are underlain by 6-inches of AB.

6.10 **Corrosion Protection:** The risk of corrosion of construction materials relates to the potential for soil-induced chemical reaction. The rate of deterioration depends on soil resistivity, texture, acidity, and chemical concentration. The evaluation was based on the results of an analysis of one (1) near-surface soil sample collected from the surface to depths of about 5 feet BSG. The chemical analyses results indicate a resistivity value of 16,000 ohms/centimeter and a pH value of 5.8. Based on the resistivity value, the soils exhibit "mildly corrosive" corrosion potential. In addition, the results of soil sample analyses indicate 0.00068 percent by dry weight concentrations of sulfate and 0.0008 percent by dry weigh concentrations of chloride. If piping or concrete are placed in contact with deeper soils or imported engineered fills, these soils should be analyzed to evaluate their corrosion potential.

7.0 CONCLUSIONS

Based on the subsurface soils data collected during the field and laboratory investigations, our geotechnical experience in the vicinity of the project site, and our understanding of the anticipated construction, we present the following general conclusions.

7.1 The site is considered suitable for the proposed construction with regard to support of foundations and concrete slabs-on-grade, provided the recommendations contained in this report are followed. It should be noted that the recommended design consultation and construction monitoring by Twining are integral to this conclusion.

7.2 In two (2) borings (B-3 and B-11) out of the twelve (12) borings drilled, near surface, very stiff, sandy lean clays were encountered from the ground surface extending to depths of about 3 feet below site grade (BSG). However, in general, the near surface soils encountered at the boring locations consisted of very stiff to hard sandy silts interbedded with medium dense to dense silty sand extending from the ground surface to a depth of about 3 feet BSG. From about 3 feet to about 20 feet BSG, the very stiff to hard silts and medium dense to dense silty sands were interbedded with medium dense to very dense silty to clayey gravels. Below a depth of about 20 feet BSG, the interbedded hard silts and medium dense to very dense sands and gravels extended to the maximum depth explored of 51½ feet BSG, with the exception of one (1) boring (B-8) where very stiff to hard sandy clay was encountered between 20 and 25½ feet BSG.

7.3 The near surface soils exhibited high compressibility and high collapse potential, high shear strength, and poor to fair pavement support characteristics. Near surface sandy lean clay soils were encountered in two (2) of the twelve (12) borings. Atterberg Limits tests conducted on two soil samples indicated that the near surface sandy lean clays had liquid limits of 36 and 21,and plasticity indices of 21 and 5, respectively. Also, the near surface sandy clay to sandy silt soils exhibited a very low to low potential for expansion (EI=11 and 23).

7.4 One of the primary geotechnical concerns is the potential to encounter over-sized material (gravel and cobbles) within the planned excavation depths. If these over-sized materials (greater than 3 inches along the largest dimension) are encountered during the over-excavation for the building pads, additional excavating equipment may be necessary to excavate the soils with gravels and cobbles. It also may be difficult to break up large fragments for compaction efforts of over-excavated and scarified areas. If the cobbles cannot be broken up into fragments that are three (3) inches or less in size along the largest dimension, the contractor should remove the over-sized fragments from the fill material by screening or other techniques approved by Twining. The screening activity would be anticipated to increase the costs of the earthwork. Neatly cut footings will be difficult to obtain due to the presence of over-sized materials. In order to better determine the requirements for screening, it is recommended that test pits be excavated at this site under the direction of Twining. Potential grading, excavating and underground contractors should be present onsite to make their own observations of the gravels and cobbles in the soils exposed in the test pits. This activity will assist the contractors in preparation of bids. It has been reported by one of the property owners that fill soils were imported to the site as a part of an adjacent pipeline project. However, the extent of fill soils was not

discernable upon visual observation of the surface features of the site nor review of a low elevation aerial photograph. Therefore, as part of the test pit exploration, the extent of onsite fill soils can be further evaluated.

7.5 To reduce the potential for static total and differential settlements of the foundations, shallow spread footings placed entirely on at least 24 inches of engineered fill, engineered fill which extends to at least 36 inches below preconstruction site grades, or engineered fill which extends to at least 12 inches below improvements to be removed, whichever is deeper, should reduce the potential total and differential static settlements to 1-inch and ½-inch in 40 feet, respectively.

7.6 One of the most common phenomena that occurs during seismic shaking is the induced settlement of loose, unconsolidated sediments. This can occur in unsaturated and saturated granular soils, however, seismic settlements are typically largest where liquefaction occurs (i.e., in saturated soils). Estimates of total and differential seismic settlement on the order of 0.25 inches and 0.25 inches in 40 feet, respectively, were predicted. In addition, static total and differential settlements on the order of 1 inch and ½ inch, respectively, are anticipated at the subject site. Therefore, combined settlements (static and seismic) of 1.25 inches total and 0.75 inches in 40 feet differential should be anticipated for design.

7.7 The results of a soil sample analysis indicate that the near-surface soils exhibit a "mildly corrosive" corrosion potential to buried metal objects.

7.8 The results of soil sample analyses indicate sulfate concentrations of 0.00068 by percent weight. Therefore, a low potential for sulfate attack on concrete placed in contact with near-surface soils is anticipated.

7.9 The near-surface soils exhibit poor to fair characteristics for pavements. The subgrade support characteristics of the native soils were evaluated by Resistance (R)-value tests. The results of two tests, obtained within the upper 3 feet BSG, indicated the soils had R-values of 17 and 32. For the purpose of design, an R-value of 17 was used. Pavement section recommendations for various traffic indexes are included in the recommendations section of this report.

7.10 Groundwater was not encountered in the test borings drilled to a maximum depth of 51½ feet BSG. However, the State of California Seismic Hazard Zone report indicates historic high groundwater below the northern portion of the site is 40 feet. It should be recognized however, that water table elevations fluctuate with time, since they are dependent upon seasonal precipitation, irrigation, land use, and climatic conditions as well as other factors.

7.11 The northern portion of the site (approximately ¼ of the site) is identified by the State of California as being in an area of potential risk of liquefaction. The southern portion of the site is not located within a liquefaction hazard area identified by the State of California considering that the historic groundwater depth is greater than 50 feet. Based on the results of the preliminary evaluation included herein, the risk of liquefaction impacts at this site are considered low. It is recommended that the proposed structures be evaluated on a case by case basis as a part of future design level geotechnical engineering investigations.

7.12 The site is not located in an Alquist-Priolo Earthquake Fault Zone. The nearest mapped active fault is located about 3 miles east of the site. Therefore, the potential for fault rupture at the site is considered low.

8.0 RECOMMENDATIONS

Based on the evaluation of the field and laboratory data and our geotechnical experience in the vicinity of the project site, we present the following preliminary recommendations for use in preliminary project design and construction. However, this report should be considered in its entirety as a preliminary geotechnical engineering investigation. Additional design level geotechnical engineering investigation reports will be required in the future. When applying the preliminary recommendations for design, the background information, procedures used, findings, evaluation, and conclusions should be considered. The recommended design consultation and construction monitoring by Twining are integral to the proper application of the preliminary recommendations.

8.1 General

8.1.1 Grading and structural plans were not available at the time this report was prepared. Thus, an assumption was made that the proposed finished grade would not change from the existing site grade by more than about 5 feet. If the finished grade is higher or lower, the recommendations presented in this report may not be appropriate for the changed conditions. Twining should be provided the opportunity to review the grading plans and foundation plans before the plans are released for bidding purposes so that any relevant recommendations can be presented.

8.1.2 A preconstruction meeting including, as a minimum, the owner, general contractor, foundation and paving subcontractors, civil engineer, and Twining should be scheduled at least one week prior to the start of clearing and grubbing. The purpose of the meeting should be to discuss critical project issues, concerns and scheduling.

8.1.3 Contractors should be aware that areas proposed for pavements and slabs-on-grade adjacent to the proposed building and/or within the overbuild zone should incorporate the more stringent requirements for aggregate base, non-expansive soils and native soil moisture conditioning recommended in this report for interior slabs-on-grade, and AC pavements.

8.1.4 If any city, county, and/or state standards are cited on the plans or specifications, these standards should be followed in addition to the recommendations in this report.

8.1.5 A demolition plan should be developed by the contractor and should include a survey of the site. The plan should specify how the contractor proposes to remove the building structures, septic tanks and leach lines, irrigation lines and other underground utilities, trees, roots, and organic matter generated during the removal process and how the excavations and loose soils generated during this process will be addressed. Demolition of the existing structures present at the site should be observed and monitored by a representative of Twining in order to verify and document complete removal of any subsurface structures or foundations.

8.2 Site Grading and Drainage

8.2.1 It is critical to develop and maintain site grades which will drain surface and roof runoff away from foundations and floor slabs - both during and after construction. Adjacent exterior finished grades which are not covered by pavements or walkways should be sloped a minimum of two (2) percent for a distance of at least five (5) feet away from the structure to preclude ponding of water adjacent to foundations. Adjacent exterior grades which are paved should be sloped at least one (1) percent away from the foundations.

8.2.2 Surface water must not be allowed to pond adjacent to the building foundations. To preclude this, it is recommended to provide rain gutters and direct all water from roof drains into closed conduits that are connected to an acceptable discharge area away from the building foundations, or directly into the site storm drain system. Excessive irrigation must be avoided. Minimal irrigation such as low volume sprinklers are highly recommended.

8.2.3 Landscape and planter areas should be irrigated using low flow irrigation (such as drip, bubblers or mist type emitters). It is recommended to use plants with low water requirements.

8.2.4 Perimeter curbs should be extended into the subgrade (below the base section) where irrigated landscape areas meet pavements or other measures taken to reduce the potential for moisture from migrating into the aggregate base sections.

8.2.5 It is not recommended to place landscape or planted areas adjacent to the structure. Trees should be setback from the proposed structure at least 10 feet or a distance equal to the anticipated drip line radius of the mature tree. For example, if a tree has an anticipated drip-line diameter of 30 feet, the tree should be planted at least 15 feet away (radius) from the proposed building.

8.3 Site Preparation

8.3.1 All topsoil, trees, vegetation, organic material, irrigation lines, water lines, water wells, sump pumps, and debris should be removed from the proposed building and pavement areas. The general depth of stripping should be sufficiently deep to remove the root systems and organic material. For estimating purposes, a minimum stripping depth of 6 inches should be used. The actual depth of stripping should be reviewed by Twining at the time of construction. It is possible that deeper stripping may be required if any roots larger than ¼-inch are encountered during grading and in localized areas, such as low areas where water may pond. Stripping should extend laterally a minimum of 10 feet outside the building and pavement perimeters. These materials will not be suitable for use as engineered fill; however, stripped topsoil may be stockpiled and reused in landscape areas at the discretion of the owner. All underground utility lines, pipes and other structures associated with the existing improvements (not to be used) should be removed. The future disposition of existing utilities on the site are currently unknown. If these utilities are to be abandoned, it is recommended to remove these utilities and the associated backfill unless documentation is provided that the backfill was placed as engineered fill. If these utilities are to remain in service, the backfill should be tested to determine if the existing backfill is properly compacted and capable of supporting the improvement proposed to be constructed in these areas. These areas should be designated on the project civil drawings.

8.3.2 Stripping should be observed by Twining. Roots larger than ¼-inch, and any accumulation of roots that result in an organic content greater than 3 percent by weight as determined by loss-on-ignition tests, should be removed. The exposed subgrade in the excavations should be scarified and compacted as engineered fill to a depth of 8 inches and the excavation backfilled with engineered fill. It is recommended that additional testing be performed during the design level studies to better define the depth of stripping required for this project.

8.3.3 All existing structures, foundations, floor slabs, underground utilities, leach lines, septic tanks, wells, pits, etc. should be shown on a demolition plan, located during construction, and entirely removed. Also, any other subsurface structure or accumulation of organic material not identified on the demolition plan but encountered during construction should be removed. The

resulting excavations, which should extend to at least 12 inches below the structure to be removed, should be cleaned of all loose or organic material to exposed native soils, then scarified to a depth of 8 inches, conditioned, and compacted as engineered fill and the excavation backfilled with engineered fill.

8.3.4 As a minimum, the existing features to be removed include (but are not limited to) the existing residential structures, storage structures, associated sewage disposal systems, leach lines, wells, irrigation lines, and water wells. All foundations, floor slabs, fence posts, underground utilities, septic tanks, leach lines, etc. should be located and entirely removed. Septic systems and leach lines should be removed in accordance with state and county regulations. The resulting excavations, which should extend to at least 12 inches below the structure to be removed, should be cleaned of all loose or organic material to exposed native soils, then scarified to a depth of 8 inches, conditioned, and compacted as engineered fill and the excavation backfilled with engineered fill.

8.3.5 Wells were observed during the field investigation. All wells scheduled for demolition should be abandoned per state and local requirements. The contractor should obtain an abandonment permit from the local environmental health department, and issue certificates of destruction to the owner and Twining upon completion. At a minimum, wells in building areas (and within 5 feet of building perimeters), should have their casings removed to a depth of at least 10 feet below site grade or finished pad grade. In parking lot or landscape areas, the casings should be removed to a depth of at least 7 feet below site grade or finished grade. The wells should be capped with concrete and the resulting excavations should be backfilled as engineered fill. If the wells are related to an environmental investigation regulated by a local, state, or federal agency, the removal of these wells should be performed under the oversight of the regulatory agency.

8.3.6 After stripping, removal of structures, and removal of loose soils, the building pad areas should be over-excavated so that the foundations will be supported on engineered fill to reduce settlement. The minimum depths of engineered fill recommended are provided in subsection 8.5. The zone of over-excavation should include all the building interiors and extend laterally a minimum of ten (10) feet beyond the buildings, vestibules, utility pads, and sidewalks, stairs, ramps, etc. Any soft or unstable areas identified during compaction of the bottom of the over-excavation should be removed and compacted as engineered fill.

8.3.7 Contractors should be aware that areas proposed for pavements and slabs-on-grade adjacent to the proposed building and/or within the overbuild zone should incorporate the more stringent requirements for non-expansive soils and native soil moisture conditioning recommended in this report for interior slabs-on-grade, AC pavements, and PCC pavements.

8.3.8 It is recommended that pavement sections and exterior flatwork outside the over-build zone be underlain by at least 12 inches of non-expansive engineered fill, engineered fill extending to at least 18 inches below preconstruction site grades, or engineered fill extending to at least 12 inches below improvements to be removed, whichever provides the deeper fill. Prior to placement of fill, proof rolling, under the observation of Twining, should be performed. The zone of over-excavation should include all the pavement areas and extend laterally a minimum of three (3) feet beyond the edge of pavements or curbs. Exterior flatwork should be underlain by at least four (4) inches of aggregate base over eight (8) inches of non-expansive engineered fill directly below the concrete.

8.3.9 It is recommended that extra care be taken by the contractor to ensure that the horizontal and vertical extent of the over-excavation and compaction conform to the site preparation recommendations presented in this report. Twining is not responsible for measuring and verifying the horizontal and vertical extent of over-excavation and compaction. The contractor should verify in writing to the owner and to Twining that the horizontal and vertical over-excavation limits were completed in conformance with the recommendations of this report, the project plans, and the specifications (the most stringent applies). It is recommended that this verification be performed by a licensed surveyor. This verification should be provided prior to requesting pad certification from Twining or excavating for foundations.

8.3.10 All fill required to bring the site to final grade should be placed as engineered fill. In addition, all native soils over-excavated from the site should be moisture conditioned and compacted as engineered fill.

8.3.11 It is anticipated that some subgrade instability may occur if earthwork operations are conducted in wet weather or if the in-situ soils are over optimum moisture content. The degree of instability will depend on the actual moisture content of the soils at the time of construction. Fine grained native and engineered fill soils may become unstable during grading; and therefore, could require stabilization. Stabilization may include placing a geotextile fabric and aggregate base materials, and/or chemical treatment, or a combination of these to stabilize soils. For bidding purposes, costs for chemical treatment, including 5 percent by weight high calcium quick lime should be provided as a bid alternative. The actual method employed to stabilize the bottom of the excavation or pavement subgrade should be

selected at the time of construction. In addition, Twining should evaluate individual subgrade instability situations and provide specific recommendations on an as needed basis.

8.4 Engineered Fill

8.4.1 The on-site soils encountered are predominantly sandy silts and gravels. The silt soils will be suitable for use as fill material to support the structural loads, provided they are free of oversized particles greater than 3 inches, organic materials and debris and moisture conditioned to between optimum moisture content and three (3) percent above the optimum moisture content at the time of placement. These soils should not be used within 12 inches of the bottom of slabs-on-grade. The soils in the upper 12 inches should be imported granular soils and/or aggregate base. If soils other than those considered in this report are encountered, Twining should be notified to provide alternate recommendations.

8.4.2 The compactibility of the native soils is dependent upon the moisture contents, subgrade conditions, degree of mixing, type of equipment, as well as other factors. The evaluation of such factors was beyond the scope of this report; therefore, we recommend that they be evaluated by the contractor during preparation of bids and construction of the project.

8.4.3 Import fill soil should be nonexpansive and granular in nature with the following acceptance criteria recommended.

Percent Passing 3-Inch Sieve	100
Percent Passing No. 4 Sieve	50 - 100
Percent Passing No. 200 Sieve	10 - 30
Plasticity Index	Less than 10
Expansion Index (UBC 29-2)	Less than 10
Organics	3% maximum by dry weight
R-Value	Minimum 30
Sulfates	< 0.05 % by weight
Minimum Resistivity	> 5,000 ohm/cm

Prior to being transported to the site, the import fill material should be tested and approved by Twining. Prior to being transported to the site, the import material shall be approved by Twining; and certified by the contractor or suppliers (to the satisfaction of the owner) that the soils do not contain any environmental contaminants. Documentation should be provided to Twining as well as to the client that the imported soils are free of any substance regulated by local, state, or federal agency, or any contaminant which may adversely affect the proposed development.

8.4.4 Recycled materials (such as asphaltic concrete or Portland cement concrete) should not be used within 5 feet of any improvement without approval by the owner and Twining. Contractors should not assume that recycled materials can be used in preparing bids for the project without approval by the owner and Twining.

8.4.5 Engineered fill soil should be placed in loose lifts approximately 8 inches thick, moisture-conditioned to between optimum moisture content and three (3) percent above the optimum moisture content, and compacted to a dry density of at least 92 percent of the maximum dry density as determined by ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable. For fills placed deeper than 5 feet below finished grades, these soils should be placed in loose lifts approximately 8 inches thick, moisture-conditioned as required, and compacted to a dry density of at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

8.4.6 Any open graded gravel or rock material such as ¾-inch crushed rock or ½-inch crushed rock used as backfill should be placed in 6-inch lifts and compacted using a vibratory compactor to a non-yielding condition as determined by Twining. Each lift must be approved prior by Twining to placing the next lift. All open graded materials should be encased in a geotextile filter fabric to prevent migration of fine grained soils into the porous material. The contractor shall obtain a certification from the fabric manufacturer that the fabric is suitable for the intended use.

8.5 Foundations

8.5.1 It is assumed that the maximum column and continuous footing loads for the development will be 150 kips and 5 kips per lineal foot, respectively. Structural loads for the proposed structures may be supported on spread or continuous footings placed entirely on at least 24 inches of engineered fill, engineered fill that extends to at least 36 inches below preconstruction site grades, or engineered fill that extends to at least 12 inches below improvements to be removed and undocumented fill, whichever provides the deeper fill. The building pad areas, including the over-build zone extending 10 feet beyond the building perimeter, should be over-excavated to the same depth that is required for over-excavation beneath the bottom of the footings. Spread and continuous footings may be designed for a maximum net allowable soil bearing pressure of 2,500 pounds per square foot for dead-plus-live loads. This value may be increased by one-third for short duration wind or seismic loads.

8.5.2 One of the primary geotechnical concerns is the potential to encounter oversized, greater than 3 inch, gravel and cobble material from the surface to depths of about 5 feet BSG. If these larger materials are encountered during the over-excavation for the building pads, they should be broken up/crushed into fragments that are three (3) inches or less in size along the largest dimension. If the cobbles cannot be broken up into fragments that are three (3) inches or less in size along the largest dimension, the contractor should remove the over sized fragments from the fill material by screening or other techniques approved by Twining. Neatly cut footings will be difficult to obtain due to the presence of oversized materials. In order to better determine the requirements for prescreening, it is recommended that test pits be excavated at this site under the direction of Twining. Potential grading, excavating and underground contractors should be present onsite to make their own observations of the gravels and cobbles in the soils exposed in the test pits. This activity will assist the contractors in preparation of bids. It has been reported by one of the property owners that fill soils were hauled in to the site as a part of an adjacent pipeline project. However, the extent of fill soils was not discernable upon visual observation of the surface features of the site nor review of a low elevation aerial photo. Therefore, as part of the backhoe exploration, the limits of onsite fill soils should be further evaluated.

8.5.3 The footings should have a minimum depth of 18 inches below rough pad grade (note: 24 inches for major stores or two-story buildings) or below the lowest adjacent exterior grade, whichever is lower. Footings should have a minimum width of 12 inches (note: 15 inches for major stores or two-story buildings), regardless of load. Perimeter footings should be continuous around the entire building perimeters.

8.5.4 Total and differential static settlements of 1-inch and ½-inch, respectively, over a horizontal distance of 40 feet should be anticipated for design. Combined static and seismic total and differential settlements of 1 1/4 inch and 3/4 inch, respectively, over a horizontal distance of 40 feet should be anticipated for design

8.5.5 The assumed building loads cited in this report should be confirmed by the structural engineer. If the assumed loads are different than the actual design loads, Twining should be contacted to provide supplemental recommendations. It should be noted that design level geotechnical reports will be required for all the buildings.

8.5.6 Twining should observe the bottoms and sides of the foundation excavations to verify that the excavations are properly moisture conditioned, and comply with the recommendations of the final geotechnical report prior to placement

of plumping, reinforcement, and concrete. If loose soils or soils with moisture contents below optimum are encountered, the contractor should request written recommendations from Twining to address the loose soils and moisture conditions the foundation excavations.

8.5.7 The foundations should be designed and reinforced for the anticipated differential settlements. A structural engineer experienced in foundation design should recommend the reinforcement, thickness, design details and concrete specifications for the foundations based on: 1) a total settlement of 1-inch, 2) a differential settlement of ½-inch in 40 linear feet of continuous footings; 3) a differential settlement of ½-inch between isolated column footings; and) combined static and seismic total and differential settlements of 1 1/4 inch and 3/4 inch, respectively over a horizontal distance of 40 feet.

8.5.8 Structural loads for miscellaneous foundations (such as retaining walls, sound walls, screen walls, pylon signs, monument signs, etc.) should be evaluated on a case by case basis to develop supplemental recommendations for site preparation and foundation design. In lieu of a case by case evaluation, miscellaneous foundations may be supported on spread or continuous footings placed entirely on at least 24nches of engineered fill, engineered fill to a depth of at least 36 inches below preconstruction site grade, or at least 12 inches below improvements to be removed, whichever is deeper. Subgrade preparation should be conducted below the structures and extend throughout the over-build zone as described in this report. The resulting excavations should be cleaned of all loose or organic material, and the exposed native soils should be scarified to a depth of 8 inches, moisture conditioned, compacted as engineered fill, and the excavation then backfilled with engineered fill. Spread and continuous footings may be designed for a maximum allowable soil bearing pressure of 2,500 pounds per square foot for dead-plus-live loads. This value may be increased by one-third for short duration wind or seismic loads.

8.5.9 The following factors were developed based on the tables in Chapter 16 of the 2001 California Building Code (CBC) and the digitized active fault locations published by CGS.

Seismic Factor	UBC Value
Soil Type	S_D
Source Types	B
Near Source Acceleration Factor, Na	1.0
Near Source Velocity Factor, Nv	1.2
Seismic Acceleration Coefficient, Ca	0.45
Seismic Velocity Coefficient, Cv	0.78

8.5.10 If soft or unstable soils are encountered during excavation or compaction operations, proof rolling, under the observation of Twining, should be performed to examine the soil conditions and provided additional recommendations, as needed.

8.6 Frictional Coefficient and Earth Pressures

8.6.1 The bottom surface area of concrete footings or concrete slabs in direct contact with engineered fill can be used to resist lateral loads (areas of slabs underlain by a synthetic moisture barrier cannot be considered). An ultimate coefficient of friction of 0.50, reduced by an appropriate factor of safety, can be used for design.

8.6.2 The ultimate passive resistance of the native soils and engineered fill may be assumed to be equal to the pressure developed by a fluid with a density of 265 pounds per cubic foot. This value should be reduced by an appropriate factor of safety.

8.6.3 The passive pressure was calculated based on a minimum soil unit weight of 100 pounds per cubic foot. The soils within the passive zone at the foot of retaining walls (one footing width in front of the wall to a depth equal to the footing depth) should be tested to verify that the soils have the minimum unit weight of 100 pounds per cubic foot (with moisture). If the soils have a unit weight of less than 100 pounds per cubic foot, the soils within this zone should be over-excavated and replaced as engineered fill. These soils should be tested prior to backfilling behind the wall.

8.6.4 A minimum factor of safety of 1.5 should be used when combining the frictional and passive resistance of the soil to determine the total lateral resistance. The upper 12 inches of subgrade should be neglected in determining the total passive resistance.

8.6.5 The active and at-rest pressures of the native soils and engineered fill may be assumed to be equal to the pressures developed by a fluid with a density of 50 and 75 pounds per cubic foot, respectively. These pressures assume level ground surface and do not include the surcharge effects of construction equipment, loads imposed by nearby foundations and roadways and hydrostatic water pressure.

8.6.6 The active and at-rest pressures were calculated based on a maximum soil unit weight of 135 pounds per cubic foot. The compacted soils behind the retaining walls should not have a compacted unit weight above 135 pounds per cubic foot (with moisture). If the soils have a unit weight of greater than 135 pounds per cubic foot, the soils should be over-excavated and replaced at a lower degree of compaction. If the backfill soils must be placed at a unit weight of over 135 pounds per cubic foot to achieve minimum compaction requirements the material should not be used as backfill behind retaining walls.

8.6.7 The at-rest pressure should be used in determining lateral earth pressures against walls which are not free to deflect. For walls which are free to deflect at least one percent of the wall height at the top, the active earth pressure may be used.

8.6.8 The wall designer should determine if seismic increments are required. If seismic increments are required, contact Twining for recommendations for seismic geotechnical design considerations for the retaining structures.

8.6.9 The above earth pressures assume that the backfill soils will be drained. Therefore, all retaining walls should incorporate the use of a drain, either a filter fabric encased gravel section or a geo-composite drain, to prevent hydrostatic pressures from acting on the walls. Drainage should be collected in a perforated pipe which can carry drainage from behind the walls.

8.6.10 It is recommended that lighter hand operated or walk behind compaction equipment be used to compact soils within 5 feet of retaining walls to reduce the potential for wall damage during construction. Heavier compaction equipment could cause loads in excess of design loads which could result in cracking, excessive rotation, or failure of a retaining structure.

8.7 Retaining Walls

8.7.1 Retaining wall plans, if used and when available, should be reviewed by Twining to evaluate the actual backfill materials, proposed construction, drainage conditions, and other design geotechnical parameters.

8.7.2 Retaining walls should be supported on spread or continuous footings placed entirely on at least 24 inches of engineered fill or engineered fill which extends to a minimum depth of 36 inches below preconstruction site grades, whichever is deeper. Footings should have a minimum width of 15 inches, regardless of load.

8.7.3 Spread and continuous footings may be designed for a maximum allowable soil bearing pressure of 2,500 pounds per square foot for dead-plus-live loads. This value may be increased by one-third for short duration wind or seismic loads.

8.7.4 Shallow spread footings should have a minimum depth of 24 inches below rough pad grades or adjacent exterior grades, whichever is lower.

8.7.5 Retaining walls should be constructed with non-expansive granular free-draining backfill placed within the zone extending from a distance of 1 foot laterally from the bottom of the wall footing at a 1 horizontal to 1 vertical gradient to the surface. This requirement should be detailed on the construction drawings. Granular backfill will reduce the effects of shrink and swell on the wall.

8.7.6 Segmented wall design (mechanically stabilized walls) should be conducted by a California licensed geotechnical engineer familiar with segmented wall design and having successfully designed at least three walls at sites with similar soil conditions. None of the data included in this report should be used for wall design. A design level geotechnical report should be conducted to provide wall design parameters. If the designer uses the data in this report for wall design, the designer assumes the sole risk for this data.

8.7.7 Retaining walls may be subject to lateral loading from pressures exerted from the soils, groundwater, slabs-on-grade, and pavement traffic loads, adjacent to the walls. In addition to earth pressures, lateral loads due to slabs-on-grade, footings, or traffic above the base of the walls should be included in design of the walls. The designer should take into consideration the allowable settlements for the improvements to be supported by the retaining wall.

8.7.8 Retaining walls should be constructed with a drain system including at least drain pipes surrounded by at least 5 cubic feet of crushed ¾ inch or ½ inch rock backfill fully encapsulated in Mirafi 140 N, or equivalent. Drain pipes near the wall to adequately reduce the potential for hydrostatic pressures behind the wall. Drainage should be directed to pipes which gravity drain to closed pipes of the storm drain or subdrain system. Drain pipe outlet invert elevations should be sufficient (a bypass should be constructed if necessary)

to preclude hydrostatic surcharge to the wall in the event the storm drain system did not function properly. Clean out and inspection points should be incorporated into the drain system. Drainage should be directed to the site storm drain system.

8.7.9 The fill side of retaining walls should be fully covered with a Miradrain material, or as shown on the project plans, whichever is more stringent (highest water carrying capacity).

8.7.10 If open graded materials such as crushed rock are used as drain material, these materials should be fully encased in filter fabric and compacted to a non-yielding condition under the observation of the geotechnical engineer. A Caltrans Class 2 permeable material, installed without the use of filter fabric, is preferable to open graded material as it presents a lower potential for clogging than the filter fabric. Class 2 permeable material should be compacted to 95 percent relative compaction in accordance with ASTM D1557.

8.7.11 The contractor should use light hand operated or walk behind compaction equipment in the zone equal to one wall height behind the wall to reduce the potential for damage to the wall during construction. Heavier compaction equipment could cause loads in excess of design loads which could result in cracking, excessive rotation, or failure of a retaining structure. The contractor is responsible for damage to the wall caused by improper compaction methods behind the wall.

8.7.12 If retaining walls are to be finished with dry wall, plaster, decorative stone, etc., waterproofing measures such as manufactured drainage boards (i.e., Miradrain 6000 or 6200 or approved alternative) should be applied to moisture proof the exterior of the walls. Waterproofing should also be used if effervescence (discoloration of wall face) is not acceptable. The waterproofing system should be designed by a qualified professional.

8.8 Interior Slabs-on-Grade

The recommendations provided herein are intended only for the design of interior concrete slabs-on-grade and their proposed uses, which do not include construction traffic (i.e., cranes, concrete trucks, and rock trucks, etc.). The building contractor should assess the slab section and determine its adequacy to support any proposed construction traffic.

8.8.1 The floor slabs should be reinforced for the anticipated temperature and shrinkage stresses. A structural engineer experienced in slab-on-grade design should recommend the thickness, design details and concrete specifications for the proposed slabs-on-grade for a differential vertical movement (total and differential) of the floor slabs of ½-inch in 40 feet horizontal distance.

8.8.2 Interior floor slabs should be supported on 6 inches of Class 2 aggregate base (AB) over 12 inches of non-expansive fill over engineered fill extending to a depth of at least 24 inches below the deepest foundation bearing grade, or at least 36 inches below preconstruction site grades, or at least 12 inches below improvements to be removed, whichever provides the deeper fill. The AB should comprise the top of the non-expansive section. The Class 2 AB material is recommended for structural purposes, to provide a capillary break, and to provide a working surface during construction. In addition, the engineered fill should be tested and should be within optimum moisture content and three (3) percent above the optimum moisture content prior to placement of the base course. If the moisture content does not meet these requirements, the engineered fill should be moisture conditioned and re-compacted immediately prior to placement of the AB section.

8.8.3 The slabs and underlying subgrade should be constructed in accordance with current American Concrete Institute (ACI) standards.

8.8.4 ACI recommends that the interior slab-on-grade should be placed directly on a vapor retarding membrane when the potential exists that the underlying subgrade or sand layer could be wet or saturated prior to placement of the slab-on-grade. We recommend that Stegowrap 15 or equivalent should be used where floor coverings, such as carpet and tile, are anticipated or where moisture could permeate into the interior and create problems. The layer of Stegowrap 15 should overlay a minimum of 4 inches of compacted Class 2 AB. It should be noted that placing the PCC slab directly on the vapor barrier will increase the potential for cracking and curling; however, ACI recommends the placement of the vapor barrier directly below the slab to reduce the amount vapor emission through the slab-on-grade. Based on discussions with Mr. Eric Gerst with Stego Industries, L.L.C. (telephone 949-493-5460), the Stegowrap can be placed directly on the Class 2 AB and the concrete can be placed directly on the Stegowrap. It is recommended that the design professional obtain written confirmation from Stego Industries that this product is suitable for the specific project application. It is recommended that the slab be moist cured for a minimum of 7 days to reduce the potential for excessive cracking. The underslab membrane should have a high puncture resistance (minimum of approximately 2,400 grams of puncture resistance), high abrasion resistance, rot resistant, and mildew resistant. We recommend the membrane be selected in accordance with ASTM C 755-02, Standard Practice For Selection of Vapor Retarder For Thermal Insulation and conform to ASTM E 154-99 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Waters, or as Ground Cover. It is recommended that the vapor barrier selection and installation conform to the ACI Manual of Concrete Practice, Guide for Concrete Floor and Slab Construction (302.1R-96), Addendum, Vapor Retarder Location and ASTM E 1643-98, Standard Practice for Installation of Water Vapor Retarders Used In Contact with Earth or Granular Fill Under

Concrete Slabs. In addition, it is recommended that the manufacturer of the floor covering and floor covering adhesive be consulted to determine if the manufacturers have additional recommendations regarding the design and construction of the slab-on-grade, testing of the slab-on-grade, slab preparation, application of the adhesive, installation of the floor covering and maintenance requirements.

8.8.5 The membrane should be installed so that there are no holes or uncovered areas. All seams should be overlapped and sealed with manufacturer approved tape continuous at the laps so they are vapor tight. All perimeter edges of the membrane, such as pipe penetrations, interior and exterior footings, joints, etc.) should be caulked per manufacturer's recommendations.

8.8.6 Tears or punctures that may occur in the membrane should be repaired prior to placement of concrete per manufacturer's recommendations. Once repaired, the membrane should be inspected by the contractor and the owner to verify adequate compliance with manufacturer's recommendations.

8.8.7 The manufacturer's requirements vary regarding the surface and cover material around the placed membrane. Vapor retarding membranes should be installed in accordance with the manufacturers' specifications.

8.8.8 The vapor retarding membrane is not required beneath exposed concrete floors, such as warehouses and garages, provided that moisture intrusion into the structure are permissible for the design life of the structure.

8.8.9 Additional measures to reduce moisture migration should be implemented for floors that will receive moisture sensitive coverings (such as wood or vinyl). These include: 1) constructing a less pervious concrete floor slab by maintaining a water-cement ratio of 0.45 lb./lb. or less in the concrete for slabs-on-grade, 2) ensuring that all seams and utility protrusions are sealed with tape to create a "water tight" moisture barrier, 3) placing concrete walkways or flatwork adjacent to the structure, 4) providing adequate drainage away from the structure, 5) moist cure the slabs for at least 7 days, and 6) locating lawns, irrigated landscape areas, and flower beds away from the structure.

8.8.10 The moisture vapor transmission through the slab should be tested at a frequency and method as specified by the flooring manufacturer. Vapor transmission results should be within floor manufacturer's specifications prior to placing flooring.

8.8.11 To avoid damaging slabs during construction, the following recommendations are presented: 1) design for the anticipated settlements presented in this report; 2) provide at least 6 inches of aggregate base below

the slabs; and 3) design for anticipated construction equipment loading such as cranes. If cranes are to be used, the contractor should provide slab loading information to the slab design engineer to determine if the slab is adequate.

8.8.12 If tilt wall construction is used, a perimeter pour strip between the wall footing and the adjacent interior slab should be incorporated into the project design. After the walls are erected and a majority of the differential movement has occurred, the pour strip should be placed.

8.8.13 Backfill the zone above the top of footings at interior column locations, building perimeters, and below the bottom of slabs with an approved backfill and/or an aggregate base section as recommended herein for the area below interior slabs-on-grade. This procedure should provide more uniform support for the slabs which may reduce the potential for cracking.

8.8.14 If near surface soils are subjected to precipitation or moisture conditioned to above about 5 to 6 percent above optimum moisture content, these soils may be unstable during grading; and therefore, could require stabilization. Stabilization could include a geotextile fabric and aggregate base backfill, and/or chemically treating the unstable soils. The contractor is responsible for stabilization of unstable soils due to moisture.

8.8.15 To provide a design modulus of subgrade reaction of 150 psi/in, the slabs should be supported on a minimum of 6 inches of Class 2 aggregate base material (R-value of 78). In addition, if concrete trucks will be traveling over the aggregate base material or the aggregate base will be used as a working surface, the contractor should determine an adequate aggregate base section thickness for the type and methods of construction proposed for the project. The aggregate base section may be included in the non-expansive engineered fill recommended below the floor slabs. The proposed compacted subgrade can experience instability under high frequency concrete truck loads during slab construction resulting in heaving and depressions in the subgrade during critical pours. This condition becomes more critical during wet winter and spring months. A layer of AB can reduce the potential for instability under the high frequency loading of concrete trucks. The improved support characteristics of the AB can be used in the design of the slab sections. Therefore, it is recommended to utilize a slab design with at least 6 inches of AB for constructability purposes and structural purposes.

8.9 Exterior Slabs-On-Grade

The recommendations for exterior slabs provided below are not intended for use for slabs subjected to vehicular traffic. These recommendations are intended for rather lightly loaded sidewalks, curbs, and planters, etc. Recommendations for concrete slabs subjected to vehicular traffic are included in a later section of this report.

8.9.1 Exterior concrete slabs-on-grade should be underlain by four(4) inches of aggregate base over eight (8) inches of non-expansive engineered fill over engineered fill to a depth of 12 inches below the slab or 18 inches below the preconstruction site grade, whichever is greater. In areas where exterior concrete slabs-on-grade are anticipated, the exposed ground surface to receive the slabs should be over-excavated to a depth of at least 12 inches below the slab level, at least 18 inches below preconstruction site grades, or at least 12 inches below improvements to be removed, whichever provides the deeper fill. The exposed subgrade soils should then be scarified to a depth of 8 inches, moisture conditioned, and compacted. The over-excavation should then be backfilled with engineered fill soils which have been moisture conditioned and compacted to a minimum of 92 percent of the maximum dry density as determined by ASTM Test MethodD1557. Exterior concrete slabs-on-grade should be include deepened edges to act as cutoff for lateral migration of moisture. The deepened edges should extend to a depth of 4 inches below the non-expansive section, or to a minimum of 12 inches below the bottom of the slab, whichever is greater.

8.9.2 If the subgrade is prepared, and then disturbed by equipment workers, weather or another source, we recommend that the exposed subgrade to receive slabs be tested to verify adequate compaction. If adequate compaction is not verified, the disturbed subgrade should be over-excavated, scarified, and compacted to a minimum of 92 percent of the maximum dry density as determined by ASTM Test Method D1557. This condition should be verified prior to installation of plumbing, footing excavation, and construction of the slabs-on-grade.

8.10 Asphaltic Concrete (AC) Pavements

8.10.1 It is recommended that pavement sections be underlain by at least 12 inches of engineered fill, engineered fill extending to at least 18 inches below preconstruction site grades, or to at least 12 inches below improvements to be removed, whichever provides the deeper fill. The exposed subgrade soils should then be scarified to a depth of 8 inches, moisture conditioned and compacted to a minimum of 92% relative compaction prior to placing engineered fill to grade. Any soft or unstable areas identified during compaction of the bottom of the over-excavation should be removed and compacted as engineered fill. Prior to placement of fill, proof rolling, under the observation of Twining, should be performed. The zone of over-excavation should include all the pavement areas and extend laterally a minimum of three (3) feet beyond the edge of pavements or curbs.

8.10.2 The 12 inches of subgrade soils below the pavement section (asphaltic concrete and aggregate based) should be compacted to at least 95 percent relative compaction (ASTM D-1557).

8.10.3 The following pavement sections are based on an R-value of 17 and traffic index values ranging from 5.0 to 8.0. Traffic indices for the project should be selected by the project Civil Engineer. A design professional should select the appropriate pavement section based on the anticipated truck traffic expected for the site. It should be noted that if pavements are constructed prior to the building construction, the selected traffic index values may be too low and need to be increased. If the pavements are placed prior to construction, or if more frequent truck traffic is anticipated the design professional who selected the pavement sections should be contacted to re-evaluate the traffic index values.

Traffic Index	AC thickness (inches)	AB thickness, (inches)	Compacted Subgrade (inches)
5	3	8	12
5.5	3	9.5	12
6	3	11	12
6.5	3.5	12	12
7	3.5	13.5	12
7.5	4	14.5	12
8	4.5	15	12

AC - Asphaltic Concrete
AB - Aggregate Base compacted to at least 95 percent relative compaction (CAL test 216)
Subgrade - Subgrade soils compacted to at least 95 percent relative compaction (ASTM D-1557)

8.10.4 The curbs where pavements meet irrigated landscape areas or uncovered open areas should be extended at least four (4) inches below the aggregate base section into native subgrade soils. This should reduce subgrade moisture from irrigation and runoff from migrating into the base section and reducing the life of the pavements.

8.10.5 If actual pavement subgrade materials are significantly different from those tested for this study due to unanticipated grading or soil importing, the pavement section should be re-evaluated for the changed subgrade conditions.

8.10.6 If the paved areas are to be used during construction, or if the type and frequency of traffic are greater than assumed in design, the pavement section should be re-evaluated for the anticipated traffic.

8.10.7 Pavement section design assumes that proper maintenance, such as sealing and repair of localized distress, will be performed on an as needed basis for longevity and safety.

8.10.8 Pavement materials and construction method should conform to Sections 25, 26, and 39 of the State of California Standard Specification Requirements.

8.10.9 The asphaltic-concrete should be compacted to an average relative compaction of 97 percent, with no single test value being below a relative compaction of 95 percent based on a 50-blow Marshall maximum density.

8.10.10 The asphalt concrete should comply with Type "B" asphalt concrete as described in Section 39 of the State of California Standard Specification Requirements. We recommend that an asphalt concrete mix design be prepared and approved prior to construction.

8.10.11 It is recommended that the base course of asphaltic concrete consist of a 3/4" maximum, medium gradation. The top course, or wear course should consist of a ½" maximum, medium gradation. Mix designs should be provided to the owner and Twining for review and approval prior to placement of asphaltic concrete. All asphaltic concrete should be compacted as noted above.

8.11 Portland Cement Concrete (PCC) Pavements

Recommendations for Portland cement concrete pavement structural sections are presented in the following subsections. The PCC pavement design assumes a minimum modulus of rupture of 550 psi. The design professional should specify where heavy duty and standard duty slabs are used based on the anticipated type and frequency of traffic (both trucks and forklifts).

8.11.1 In new PCC pavement areas, the exposed subgrade should be over-excavated to at least 18 inches below the bottom of the proposed aggregate base layer. The exposed soils should be scarified, moisture conditioned, and compacted as engineered fill, and the pavement areas filled to pavement subgrade elevations as engineered fill. The upper 12 inches of subgrade soils should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557.

8.11.2 The "light duty" pavement section was designed based on an Average Daily Truck Traffic (ADTT) of three 5-axle trucks and forklifts per day (equivalent axial loads of 15 per day). A design k-value of 150 psi/in was used assuming 6-inches of Class 2 aggregate base material (minimum R-value of 78) is placed over the compacted native soils (the estimated k-value of the native soils equals 70 psi/in).

Pavement Component	Thickness, Inches
Portland Cement Concrete	6.5
Class 2 Aggregate Base (95% Minimum Relative Compaction)	6.0
Compacted Subgrade (95% Minimum Relative Compaction)	12.0 minimum

8.11.3 The "heavy duty" pavement section was designed based on an ADTT of 30 trucks and forklifts, and a k-value of 150 psi/in was used assuming 6-inches of Class 2 aggregate base material (minimum R-value of 78) is placed over the compacted native soils (the k-value of the native soils equals 70 psi/in).

Pavement Component	Thickness, Inches
Portland Cement Concrete	7.0
Class 2 Aggregate Base (95% Minimum Relative Compaction)	6.0
Compacted Subgrade (95% Minimum Relative Compaction)	12.0 minimum

8.11.4 For interior or exterior slabs subject to non-pneumatic tire forklift traffic, a PCC section should be designed by others considering the loads, tire patterns, spacing etc. A design modulus of subgrade reaction of 70 psi/in should be used for slabs supported on native soils (R-value 17). A design k-value of 150 psi/in was used assuming 6-inches of Class 2 aggregate base material (minimum R-value of 78) is placed over the compacted native soils (the estimated k-value of the native soils equals 70 psi/in). This assumes that subgrade and base materials are compacted as recommended in the PCC section provided.

8.11.5 It is suggested to place a geotextile fabric of Tensar BX1200 or Mirafi BASX Grid 12, or equivalent, on a compacted subgrade below the AB section for PCC pavement sections. A geotextile fabric would help prolong the life of the pavements by preventing fine grained subgrade soils from migrating into the AB section.

8.11.6 Stresses are anticipated to be greater at the edges and construction joints of the pavement section. A thickened edge is recommended on the outside of slabs subjected to wheel loads.

8.11.7 Joint spacing in feet should not exceed twice the slab thickness in inches, e.g., 12 feet by 12 feet for a 6-inch slab thickness. Regardless of slab thickness, joint spacing should not exceed 15 feet.

8.11.8 Lay out joints to form square panels. When this is not practical, rectangular panels can be used if the long dimension is no more than 1.5 times the short.

8.11.9 Control joints should have a depth of at least one-fourth the slab thickness, e.g., 1.5-inch for a 6-inch slab.

8.11.10 Isolation (expansion) joints should extend the full depth and should be used only to isolate fixed objects abutting or within paved areas. Construction joint location should be determined by the contractor's equipment and procedures.

8.11.11 Pavement section design assumes that proper maintenance such as sealing and repair of localized distress will be performed on a periodic basis.

8.11.12 Pavement construction should conform to Sections 40 and 80 of the State of California Standard Specifications.

8.11.13 Fine grained native and engineered fill soils may become unstable during grading; and therefore, could require stabilization. Stabilization may include placing a geotextile fabric and aggregate base materials, and/or chemical treatment (i.e., chemical treatment) or a combination of these to stabilize soils. For bidding purposes for chemical treatment, 5 percent by weight high calcium quick lime should be used. Laboratory testing is not required for lime treatment intended for subgrade stabilization purposes.

8.12 Temporary Excavations

8.12.1 It is the responsibility of the contractor to provide safe working conditions with respect to excavation slope stability.

8.12.2 Temporary excavations should be constructed in accordance with CAL OSHA requirements. Temporary cut slopes should not be steeper than 1½ to 1, horizontal to vertical, and flatter if possible. If excavations cannot meet these criteria, the temporary excavations should be shored.

8.12.3 Shoring systems, if used, should be designed by an engineer with experience in designing shoring systems and registered in the State of California.

8.13 Utility Trenches

8.13.1 The trench width, type of pipe bedding, the type of initial backfill, and the compaction requirements of bedding and initial backfill material for utility trenches (storm drainage, sewer, water, electrical, gas, irrigation, etc.) should be specified by the project Civil Engineer or applicable design professional compliance with the manufacturer's requirements, governing requirements and this report, whichever is more stringent. For flexible polyvinylchloride (PVC) pipes, these requirements should be in accordance with the manufacturer's requirements or ASTM D-2321, whichever is more stringent. The width of the trench should provide sufficient space between the sidewall of the trench and the pipe to allow testing with a nuclear density gage (minimum 12 inches). However, as a minimum, the pipe bedding should consist of 4 inches of compacted (92 percent relative compaction) ASTM C-33 sand. The bottom of the trench should be compacted prior to placement of the pipe bedding. The haunches and initial backfill (12 inches above the top of pipe) should consist of ASTM C-33 sand that is placed in maximum 6-inch thick lifts compacted to a minimum relative compaction of 92 percent using hand equipment. The final fill (12 inches above the pipe to the surface) should be non-expansive material compacted to a minimum of 92 percent relative compaction. All materials should be placed at between one (1) percent and four (4) percent above optimum moisture content. The project civil engineer should take measures to control migration of moisture in the trenches such as slurry collars, etc.

8.13.2 If ribbed or corrugated pipes are used on the project, then the backfill should extend to at least 1 foot above the top of pipe or as required by the manufacturer, whichever is greater, to prevent damage to the pipe by the compaction operations above the pipe. Crushed gravel should be used below (bedding) and around the pipe and should be entirely encased in an approved geotextile fabric such as Mirafi 140 N or equivalent. However, a geotextile fabric would not be required if the granular materials consist of Caltrans Class 2 Permeable material. In either case, the sand, gravel, and/or Class 2 Permeable material should be densified using both vibratory and compaction equipment to achieve a non-yielding condition and a minimum relative compaction of 92 percent. The haunches should be hand tamped to achieve the required relative compaction. The maximum lift thickness shall be 6 inches unless approved in writing by Twining. The backfill within the pipe zone should be a crushed gravel material placed and compacted in a manner to fill the irregular exterior surface of the pipe. The gravel should be compacted to a non-yielding condition under the observation of Twining. As an alternative, the pipe zone can be backfilled with a sand-cement slurry.

8.13.3 Utility trench backfill placed in or adjacent to building areas, exterior slabs or pavements should be moisture conditioned to between one (1) percent and four (4) percent above the optimum moisture content and compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. The contractor should use appropriate equipment and methods to avoid damage to utilities and/or structures during placement and compaction of the backfill materials.

8.13.4 On-site soils and approved imported engineered fill may be used as final backfill in trenches.

8.13.5 Jetting of trench backfill will not be allowed to compact the backfill soils.

8.13.6 Where utility trenches extend from the exterior to the interior limits of a building, lean concrete should be used as backfill material for a minimum distance of 2 feet laterally on each side of the exterior building line to prevent the trench from acting as a conduit to exterior surface water.

8.13.7 Storm drains and/or utility lines should be designed to be "watertight." If encountered, leaks should be immediately repaired. Leaking storm drain and/or utility lines could result in trench failure, sloughing and/or soil heave causing damage to surface and subsurface structures, pavements, flatwork, etc. In addition, landscaping irrigation systems should be monitored for leaks. It is recommended that the pipelines be inspected and pressure tested prior to placement of foundations, slabs-on-grade or pavements to verify that the pipelines are constructed properly and are "watertight."

8.13.8 The plans should note that utility trench backfill for electrical lines, irrigation lines, etc. should be compacted to a minimum relative compaction of 95 percent per ASTM D1557.

8.13.9 Utility trenches should not be constructed within a zone defined by a line that extends at an inclination of 2 horizontal to 1 vertical downward from the bottom of building foundations.

8.13.10 The project Civil Engineer should include slurry type cutoff collars along utility trenches at critical locations to prevent the migration of surface water into the trench and along the trench backfill material.

8.13.11 Granular soils and approved imported engineered fill may be used as final backfill in trenches provided they meet the approved project plans and specifications.

8.14 Corrosion Protection

8.14.1 Based on the ASTM Special Technical Publication 741 and the analytical results of one (1) soil sample analysis, the soil has a "mildly corrosive" corrosion potential to ferrous alloy pipes, as indicated by a resistivity value of 16,000 ohms/centimeter and a pH value of 5.8. Buried metal objects should be protected in accordance with the manufacturer's recommendations based on the "mildly corrosive" corrosion potential of the soil. The evaluation was limited to the effects of soils to metal objects; corrosion due to other potential sources, such as stray currents and groundwater, was not evaluated.

8.14.2 A low potential for corrosion of concrete due to sulfate attack is anticipated based on the 0.00068 concentrations (by dry weight) of sulfates determined for the near-surface soils. According to Table 19-A-3 of the CBC, this concentration of sulfates falls in the negligible classification (0.00 to 0.10 percent by weight) for concrete. The ACI Manual of Concrete Practice, Section 201.22-12, recommends using Type I and II cement for foundations placed in these soils.

8.14.3 These soil corrosion data should be provided to the manufacturers or suppliers of materials that will be in contact with soils (pipes or ferrous metal objects, etc.) to provide assistance in selecting the protection and materials for the proposed products or materials. If the manufacturers or suppliers cannot determine if materials are compatible with the soil corrosion conditions, a professional consultant, i.e., a corrosion engineer, with experience in corrosion protection should be consulted to design parameters. Twining does not practice corrosion engineering.

9.0 DESIGN CONSULTATION

9.1 Twining should be provided the opportunity to review those portions of the contract drawings and specifications that pertain to earthwork operations, slabs-on-grade, pavement areas, and foundations prior to finalization to determine whether they are consistent with our recommendations. This service is part of this current contractual agreement.

9.2 It is the client's responsibility to provide plans and specification documents for our review prior to their issuance for construction bidding purposes.

9.3 If Twining is not afforded the opportunity for review, we assume no liability for the misinterpretation of our conclusions and recommendations. This review is documented by a formal plan/specification review report provided by Twining.

10.0 CONSTRUCTION MONITORING

10.1 It is recommended that Twining be retained to observe the excavation, earthwork, and foundation phases of work to determine that the subsurface conditions are compatible with those used in the analysis and design.

10.2 Twining can provide observation and field testing to determine if the recommendations of the project geotechnical report are achieved. Upon completion of the work, we will provide a written summary of our observations, field testing and conclusions regarding the conformance of the completed work to the intent of the project geotechnical report. This service is not, however, part of this current contractual agreement.

10.3 Compaction tests should be conducted at a frequency of at least:

Area	Minimum Test Frequency
Mass Fills or Subgrade	1 test per 2,000 square feet per compacted 6-inch lift
Pavement Subgrade	1 test per 5,000 square feet per compacted 6-inch lift
Utility Lines	1 test per 150 feet per 6-inch lift

The above testing frequencies are suggested rates for tests. Testing frequency should be adjusted by the field technician and the engineer as needed based on continuous earthwork observation considering the methods used for compaction and the soil conditions.

10.4 In the event that the earthwork operations for this project are conducted such that the construction sequence is not continuous, (or if construction operations disturb the surface soils) we recommend that the exposed subgrade to receive floor slabs be tested to verify adequate compaction and/or moisture conditioning. If adequate compaction or moisture contents are not verified, the fill soils should be over-excavated, scarified, moisture conditioned and compacted are recommended in the Recommendations section of this report.

10.5 The construction monitoring is an integral part of this investigation. This phase of the work provides Twining the opportunity to verify the subsurface conditions interpolated from the soil borings and make alternative recommendations if the conditions differ from those anticipated.

10.6 If Twining is not afforded the opportunity to provide engineering observation and field-testing services during construction activities related to earthwork, foundations, pavements and trenches; then, Twining will not be responsible for compliance of any aspect of the construction with our recommendations or performance of the structures or improvements if the recommendations of this report are not followed. We recommend that if a firm other than Twining is selected to conduct these services that they provide evidence of professional liability insurance of at least $3,000,000 and review this report. After their review, the firm should, in writing, state that they understand and agree with the conclusions and recommendations of this report and agree to conduct sufficient observations and testing to ensure the construction complies with this report's recommendations. Twining should be notified, in writing, if another firm is selected to conduct observations and field-testing services prior to construction.

10.7 Upon the completion of work, a final report should be prepared by Twining per the requirements of the California Building Code, Chapter 33A, "Excavation and Grading," Section 3318.1, "Final Reports." This report is essential to ensure that the recommendations presented are incorporated into the project construction, and to note any deviations from the project plans and specifications. The client should notify Twining upon the completion of work to provide this report. This service is not, however, part of this current contractual agreement.

11.0 NOTIFICATION AND LIMITATIONS

11.1 The conclusions and recommendations presented in this report are based on the information provided regarding the proposed construction, and the results of the field and laboratory investigation, combined with interpolation of the subsurface conditions between boring locations.

11.2 The nature and extent of subsurface variations between borings may not become evident until construction.

11.3 If variations or undesirable conditions are encountered during construction, Twining should be notified promptly so that these conditions can be reviewed and our recommendations reconsidered where necessary. It should be noted that unexpected conditions frequently require additional expenditures for proper construction of the project.

11.4 If the proposed construction is relocated or redesigned, or if there is a substantial lapse of time between the submission of our report and the start of work (over 12 months) at the site, or if conditions have changed due to natural cause or construction operations at or adjacent to the site, the conclusions and recommendations contained in this report should be considered invalid unless the changes are reviewed and our conclusions and recommendations modified or approved in writing.

11.5 Changed site conditions, or relocation of proposed structures, may require additional field and laboratory investigations to determine if our conclusions and recommendations are applicable considering the changed conditions or time lapse.

11.6 The conclusions and recommendations contained in this report are valid only for the project discussed in the Anticipated Construction section of this report. The use of the information and recommendations contained in this report for structures on this site not discussed herein or for structures on other sites not discussed in the Site Description section of this report, is not recommended. The entity or entities that use or cause to use this report or any portion thereof for another structure or site not covered by this report shall hold Twining, its officers and employees harmless from any and all claims and provide Twining's defense in the event of a claim.

11.7 This report is issued with the understanding that it is the responsibility of the client to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, designers, contractors, subcontractors, and other parties having interest in the project so that the steps necessary to carry out these recommendations in the design, construction and maintenance of the project are taken by the appropriate party.

11.8 This report presents the results of our preliminary geotechnical engineering investigation report only and should not be construed as an environmental audit or study.

11.9 Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally-accepted engineering principles and practices in the City of Morgan Hill as of the date of this report. This warranty is in lieu of all other warranties either expressed or implied.

11.10 This investigation report should not be used in the preparation of a Storm Water Pollution Prevention Plan (SWPPP). Use of this report or any data included in the report in preparation of a SWPPP would be at the owner's sole risk.

11.11 Reliance on this report by a third party (i.e., that is not a party to our written agreement) is at the party's sole risk. If the project and/or site are purchased by another party, the purchaser must obtain written authorization and sign an agreement with Twining in order to rely upon the information provided in this report for design or construction of the project.

We appreciate the opportunity to be of service to Browman Development Company, Inc. If you have any questions regarding this report, or if we can be of further assistance, please contact us at your convenience.

Sincerely,
THE TWINING LABORATORIES, INC.

DRAFT

Harry C. Wise
Monterey Area Engineering Manager
Geotechnical Engineering Division

DRAFT

Read L. Andersen, RCE
Division Manager
Geotechnical Engineering Division

HCW/RLA/ah/amh

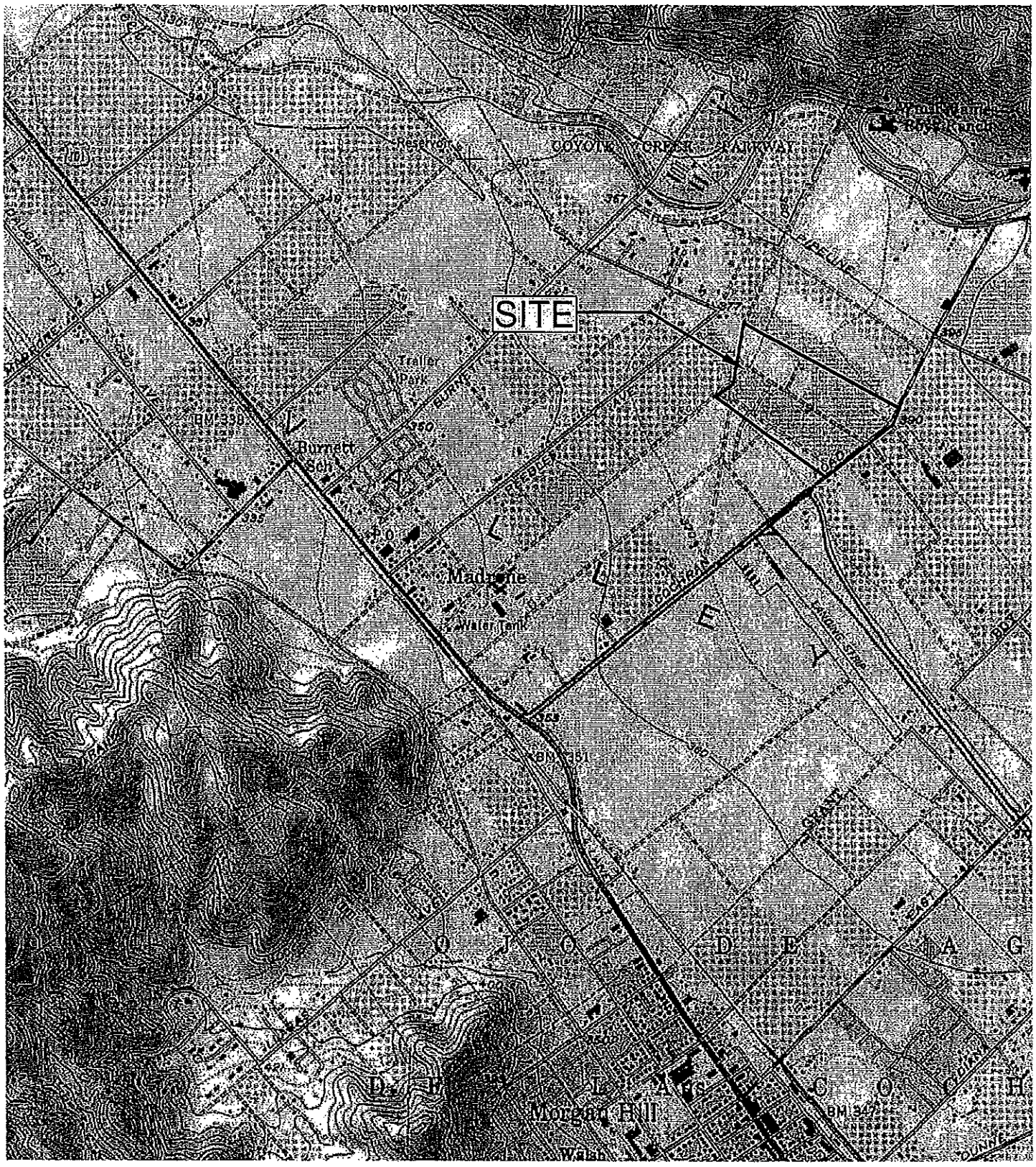
FILEPATH:F:\ENG\Geotech\A07261.03 Browman Morgan Hill\A07261.03-01ProposedRetailShoppingCenterMorganHill110104.wpd

APPENDIX A

DRAWINGS

Drawing No. 1 - Site Location Map

Drawing No. 2 - Test Boring and R-Value Location Map



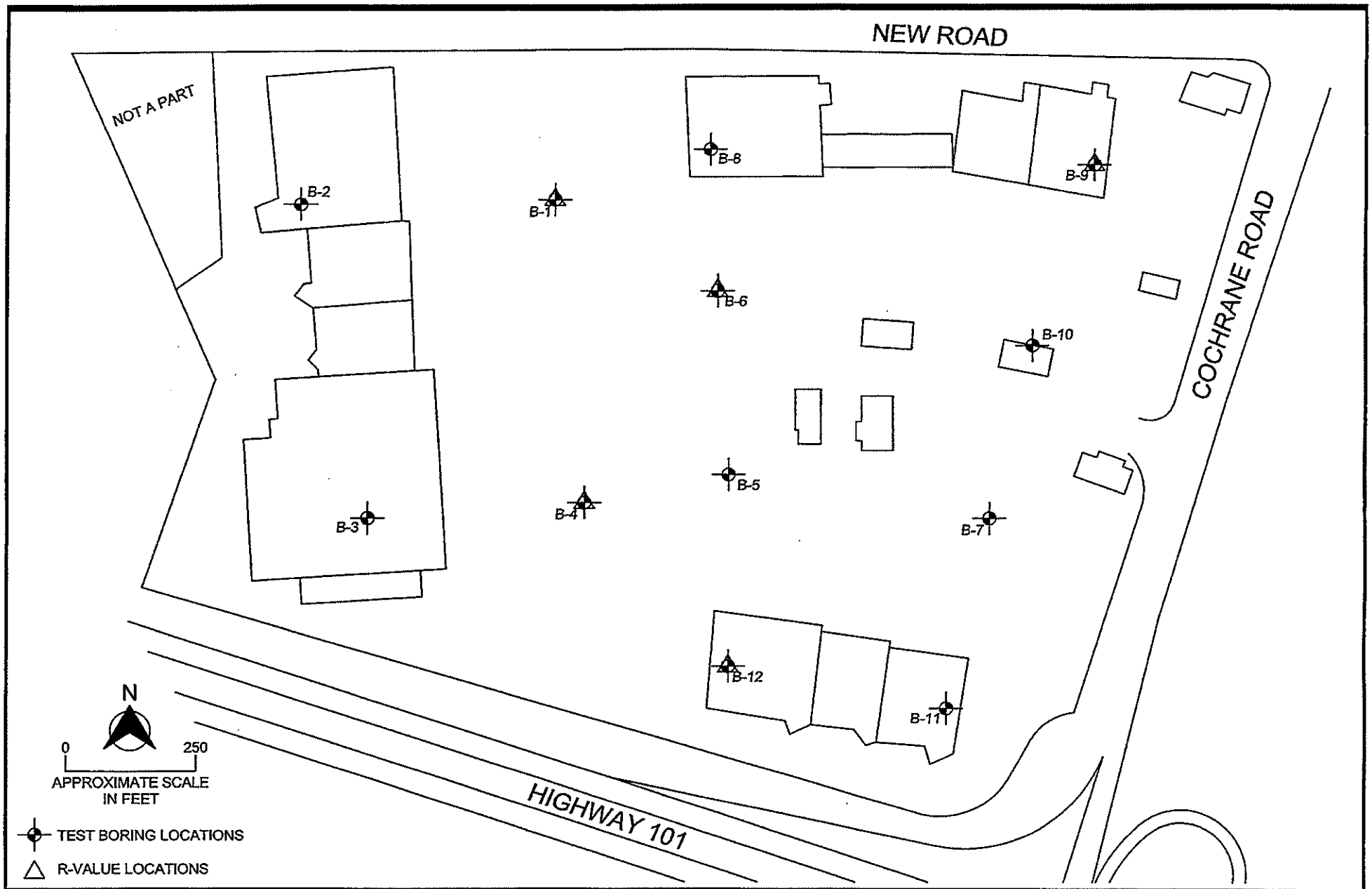
SOURCE: U.S.G.S. TOPOGRAPHIC MAP, 7 ½ MINUTE SERIES
MORGAN HILL, CALIFORNIA QUADRANGLE, PHOTOREVISED 1980

APPROXIMATE SCALE IN FEET

SITE LOCATION MAP
BROWMAN DEVELOPMENT
MORGAN HILL SHOPPING CENTER
MORGAN HILL, CALIFORNIA

FILE NO.:	DATE:
07261-01-01	06/10/04
DRAWN BY: WME	APPROVED BY:
PROJECT NO. A07261.03	DRAWING NO. 1

THE TWINING LABORATORIES, INC.
EST. 1958
FRESNO/MODESTO/VISALIA/BAKERSFIELD/MONTEREY



TEST BORING AND R-VALUE LOCATION MAP
PROPOSED BROWMAN DEVELOPMENT SHOPPING CENTER
MORGAN HILL, CALIFORNIA

FILE NO. 07261-03-02	DATE DRAWN: 10/06/04
DRAWN BY: WME	APPROVED BY:
PROJECT NO. A07261.03	DRAWING NO. 2

THE TWINING LABORATORIES, INC.
EST. 1898
FRESNO/MODESTO/VISALIA/BAKERSFIELD/MONTEREY

APPENDIX B

LOGS OF BORINGS

This appendix contains the final logs of borings. These logs represent our interpretation of the contents of the field logs and the results of the field and laboratory tests.

The boring logs and related information depict subsurface conditions only at these locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at these test boring locations. Also, the passage of time may result in changes in the soil conditions at these test boring locations.

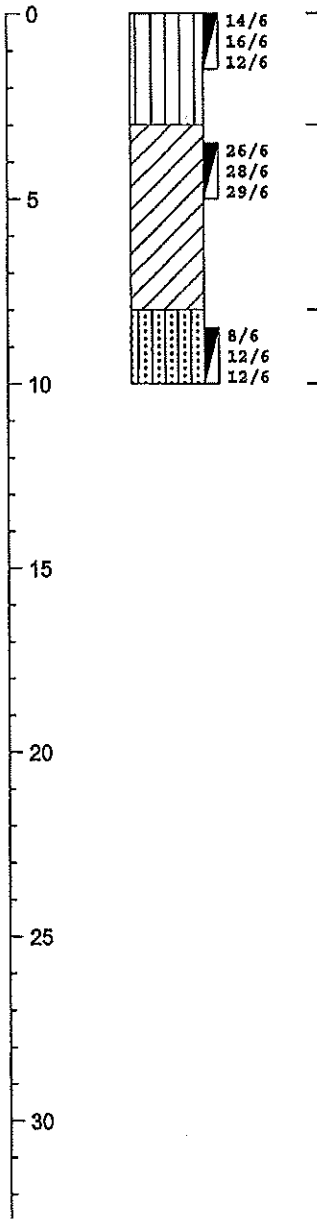
In addition, an explanation of the abbreviations used in the preparation of the logs and a description of the Unified Soil Classification System are provided at the end of Appendix B.

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-1

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		ML	SILT, Sandy; very stiff, damp, slight plasticity, light brown		28	3
		CL	LEAN CLAY, Sandy; hard, damp, low plasticity, brown to olive brown, with coarse gravel		57	5
		SM	SAND, Silty; medium dense, moist, fine to medium, brown, trace clay, trace fine subangular gravel		24	8
			Bottom of Boring at 10 Feet			

Notes:

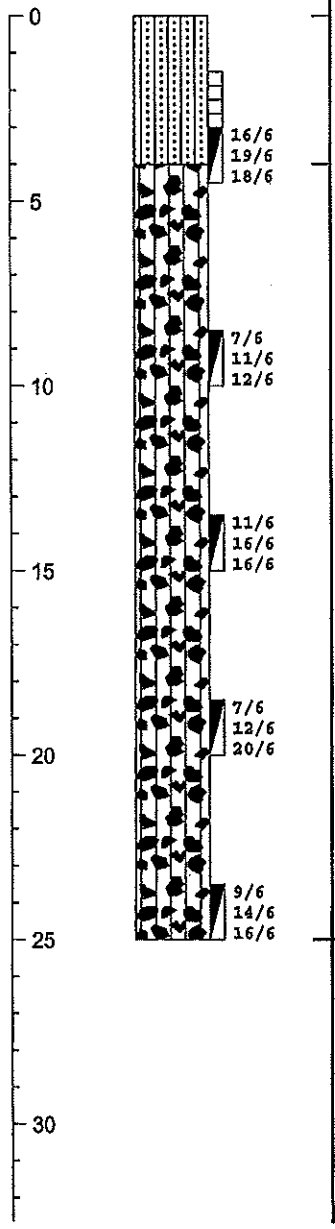
Figure Number B-1

SOIL TEST BORING SYMBOLIC LOG

THE TWINING LABORATORIES, INC. EST. 1893

BORING B-2

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-value	Moisture Content %
	SM	SAND, Silty; dense, damp, fine, brown to reddish brown, with fine to coarse subangular gravel, trace clay	DD = 113 -4 = 35% -200 = 25%	--	5
	GM	GRAVEL, Sandy; dense, damp, fine subangular, brown		37	5
		Increase in percent sand			
		Increase in coarse gravels Medium dense, moist, brown, increase in coarse sands		23	6
		Dense gravel layer encountered in drilling			
		Dense, olive brown with dark reddish brown		32	10
		Moist, brown, increase in fine subangular gravel	-4 =35% -200 = 19%	32	9
				30	9
		Bottom of Boring at 25 Feet			

Notes:

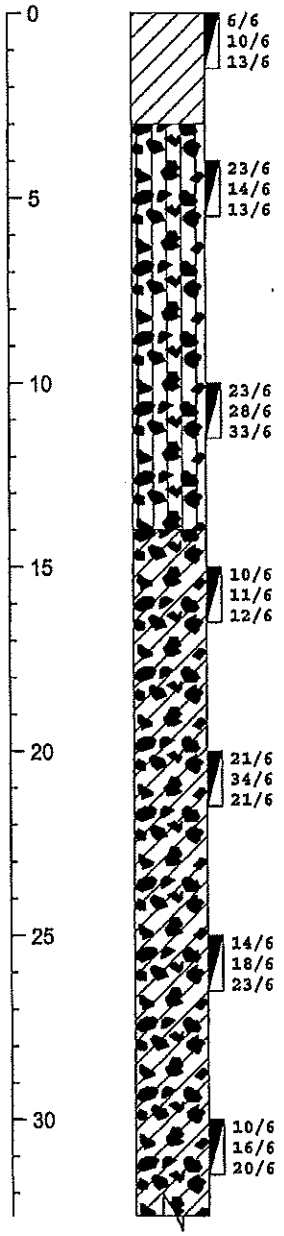
Figure Number B-2

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-3

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0	6/6, 10/6, 13/6	ML	LEAN CLAY, Sandy; very stiff, damp, low plasticity, light brown, trace fine to coarse angular gravel	DD = 110 pcf -4 = 9% -200 = 58%	23	3
5	23/6, 14/6, 13/6	GM	GRAVEL, Sandy with Clay; medium dense, damp, fine to coarse, subangular, brown		27	5
			Increase in gravels			
10	23/6, 28/6, 33/6		Very dense, moist, some fine cobbles		51	5
15	10/6, 11/6, 12/6	GC GM	GRAVEL, Clayey; medium dense, moist, fine to coarse subangular, olive brown, with dark reddish brown clay lens	-4 = 45% -200 = 14%	23	11
20	21/6, 34/6, 21/6		Very dense, increase in coarse gravel, trace fine cobbles		55	5
25	14/6, 18/6, 23/6				41	1
			Increase in cobbles			
30	10/6, 16/6, 20/6				36	9

Notes:

Figure Number B-3

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-3

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			Drill refusal at 34 Feet			
35						
40						
45						
50						
55						
60						
65						

Notes:

Figure Number B-3

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-4

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0	8/6 15/6 13/6	ML	SILT, Sandy; very stiff, damp, non-plastic to low plastic, some fine gravel and cobbles, light brown		28	5
5	14/6 11/6 21/6	GM	GRAVEL, Sandy; dense, damp, fine subangular, brown		32	4
10	39/6 36/6 23/6		Increase in percentage of gravel, dark brown mottled with gray		59	4
			Bottom of Boring at 10 Feet			
15						
20						
25						
30						

Notes:

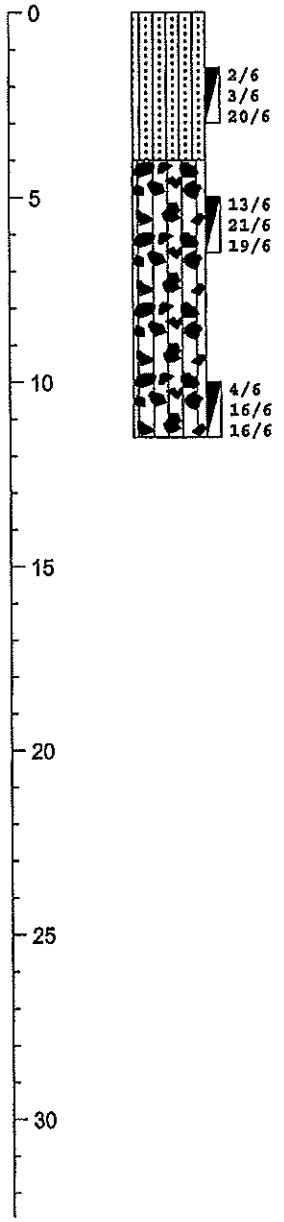
Figure Number B-4

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-5

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; medium dense, damp, fine, some fine gravel, light brown to yellow orange		23	5
		GM	GRAVEL, Sandy; dense, dry, fine subangular, light brown		40	2
			Damp		32	6
			Bottom of Boring at 11.5 Feet			

Notes:

Figure Number B-5

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-6

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0	9/6 10/6 10/6	ML	SILT, Sandy; very stiff, damp, some fine subangular gravel, reddish brown		20	5
5	19/6 31/6 20/6	GM	GRAVEL, Sandy with Silt; very dense, damp, fine subangular gravel, light brown		51	5
10	12/6 29/6 27/6		some clay, light brown mottled with gray		56	5
			Bottom of Boring at 10 Feet			
15						
20						
25						
30						

Notes:

Figure Number B-6

SOIL TEST BORING SYMBOLIC LOG

THE TWINING LABORATORIES, INC. EST. 1898

BORING B-7

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/01/04
Logged By: D. Ledgerwood
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0	11/6 12/6 12/6	ML	SILT, Sandy; very stiff, slightly moist, non to low plastic, some clay, some fine subangular gravels, reddish brown		24	10
5	11/6 22/6 15/6		Hard, moist, dark brown mottled with tan and gray		37	10
10	12/6 20/6 26/6		Increase in percentage of gravel, yellow brown		46	7
			Bottom of Boring at 11.5 Feet			
15						
20						
25						
30						

Notes:

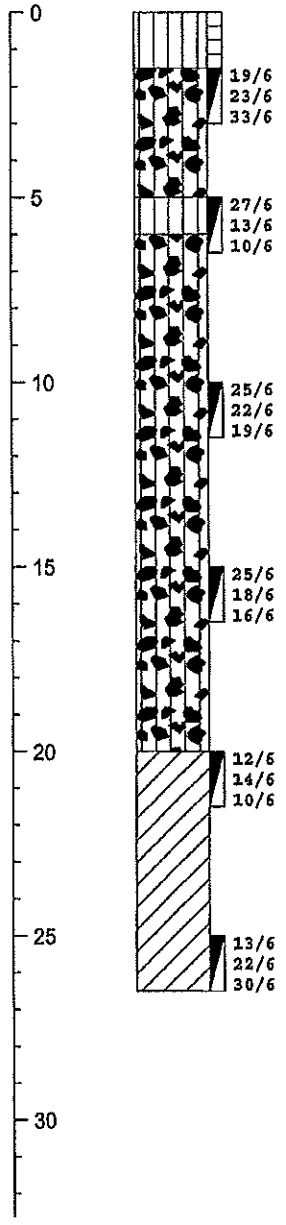
Figure Number B-7

SOIL TEST BORING SYMBOLIC LOG

THE TWINING LABORATORIES, INC. EST. 1898

BORING B-8

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/02/04
Logged By: B. Annis
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-value	Moisture Content %
	ML	SILT, Sandy; medium to fine grained, dry, slightly plastic,	DD = 109 pcf C = 95 psf	--	6
	GM	soft, light brown	ø = 34°	56	6
		GRAVEL, Cemented Sands; coarse to medium grained, very dense, non plastic, light gray			
	ML	SILT, Sandy; coarse to fine		23	4
	GM	grained, dry, very stiff, oranges brown			
		Gravels (3 to 1 inch thick), silt mixtures, medium dense, dry, light gray			
		Decrease in gravel size		41	6
		Slightly plastic, moist, increase in clay content		34	4
	CL	CLAY, Sandy with Gravel; very stiff, moist, low plasticity, dark brown		24	8
		Hard, increase in cobbles (3 to 1 inch)		52	5
		Bottom of Boring at 26.5 Feet			

Notes:

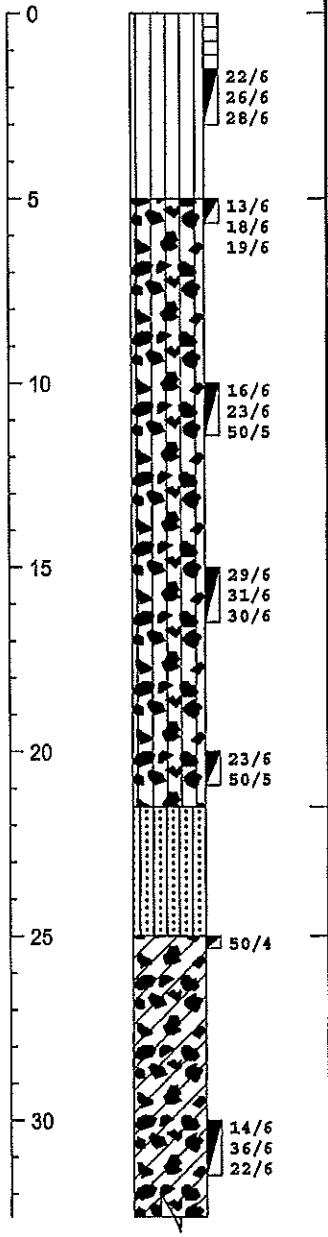
Figure Number B-8

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-9

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/02/04
Logged By: B. Annis
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-value	Moisture Content %
	ML	SILT, Sandy; fine grained, few gravel mixtures, dry, light orange brown, very stiff	DD = 108 pcf -4 = 7% -200 = 65%	-- 54	7 5
		Increase in grain size to medium			
	GM	GRAVEL, Sandy; dense, damp, fine subangular, some clay, light brown	-4 = 44% -200 = 17%	37	7
				73	5
		Decrease in gravel size to pea gravel, (fine gravel)		61	
		Light gray		>50	6
	SM	Increase in gravel size to cobbles SAND, Silty; medium to fine grained, gravel mixtures, slightly moist, very dense, slightly cemented, dark brown		>50	--
	GC	GRAVEL, SAndy; medium dense, moist, fine to coarse, subangular, some clay			
		Increase in sands (medium to coarse grained)		58	9

Notes:

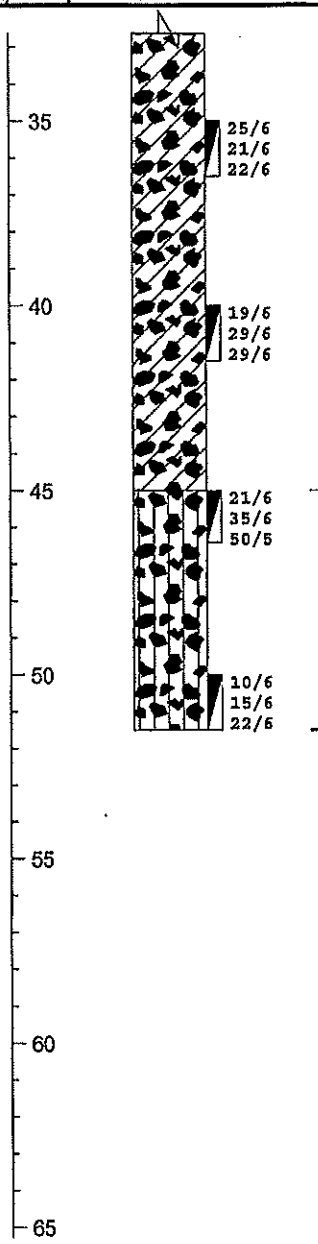
Figure Number B-9

SOIL TEST BORING SYMBOLIC LOG

THE TWINING LABORATORIES, INC. EST. 1893

BORING B-9

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/02/04
Logged By: B. Annis
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			Decrease in sands, increase in clay content		43	9
					58	11
		GM	GRAVEL, Sandy; very dense, moist, subangular, olive brown		85	12
			Increase in clay content		37	11
			Bottom of Boring at 51.5 Feet			

Notes:

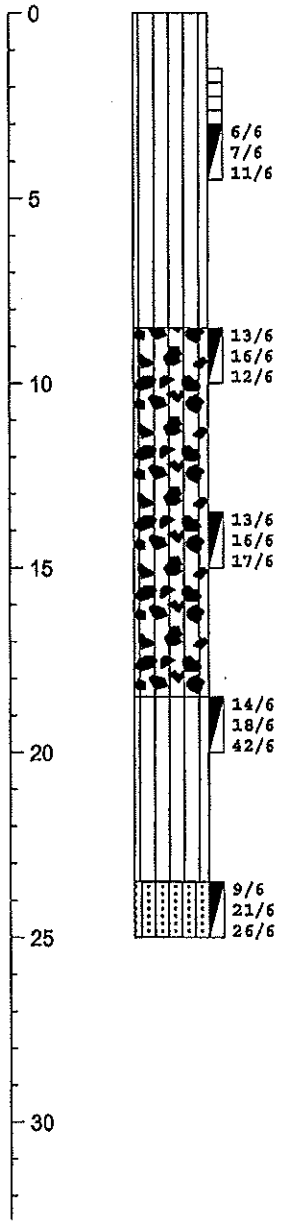
Figure Number B-9

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-10

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/02/04
Logged By: B. Annis
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		ML	SILT; little or no sands, fine grained, slightly moist, stiff, light brown		--	8
			Increase in clay content, slightly plastic, very stiff		18	14
		GM	medium dense, moist, fine to coarse subangular, olive brown		28	7
			Brown		33	7
		ML	SILT, Sandy; hard, moist, slightly plastic, some fine to coarse subangular gravel, dark olve brown		60	7
		SM	SAND, Silty; gravels, dense, moist, fine to medium, angular gravels, some clay, orangish brown		47	6
			Bottom of Boring at 25 Feet			

Notes:

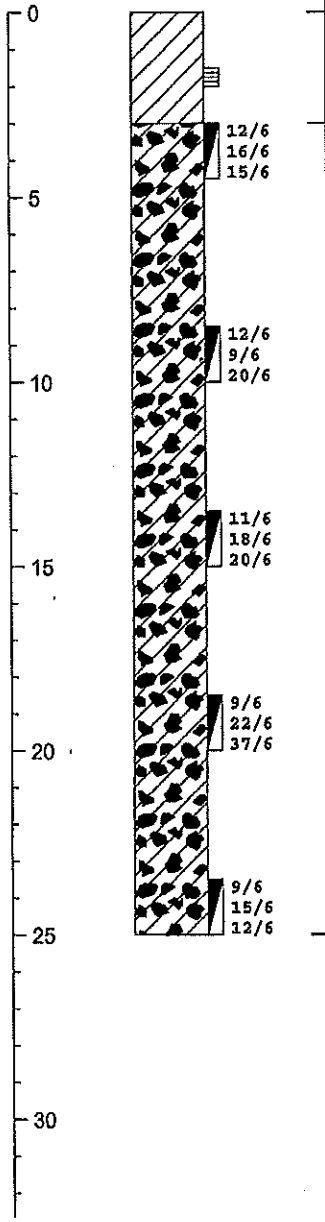
Figure Number B-10

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-11

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/021/04
Logged By: B. Annis
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		CL	LEAN CLAY, Sandy; dry, low plasticity, some fine subangular gravel, light brown	DD = 103 pcf C = 0 psf ø = 38°	--	4
		GC	GRAVEL, Clayey; dense, dry, fine subangular, light olive brown		31	3
					29	5
					38	7
					59	7
					27	10
			Bottom of Boring at 25 Feet			

Notes:

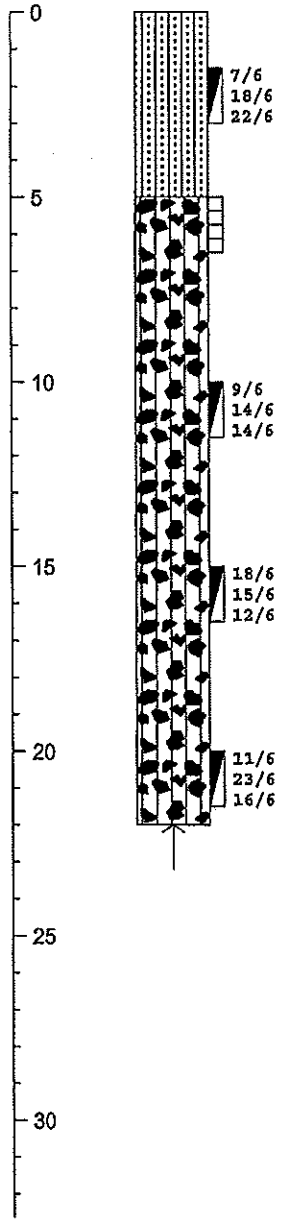
Figure Number B-11

SOIL TEST BORING SYMBOLIC LOG

THE TWINING LABORATORIES, INC. EST. 1893

BORING B-12

Project: Proposed Retail Shopping Center
Project Number: TL A07261.03
Location: Morgan Hill, CA
Date: 09/021/04
Logged By: B. Annis
Elevation: N/A
Drilled By: T. Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8" O.D. Hollow Stem Auger
Hammer Type: Trip

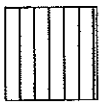
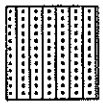


ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; medium to fine grained, some angular gravels, dense, light brown		40	5
			Increase gravel			
		GM	GRAVEL, Sandy; damp, fine subangular, light brown	DD = 125 pcf	--	7
			Medium dense, increase in clay content		28	7
					27	6
			Cobbles encountered		39	6
			Drill refusal at 22 Feet			

Notes:

Figure Number B-12

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	SILT, Sandy (ML)
	LEAN CLAY (CL)
	SAND, Silty (SM)
	GRAVEL, Silty (GM)
	GRAVEL, Clayey (GC)
Misc. Symbols	
	Boring continues

Symbol	Description
	Drill rejection
Soil Samplers	
	Standard penetration test
	California Modified split barrel ring sampler

Notes:

1. Test borings were drilled on 02/09/04 and 02/11/04 using a CME 75 equipped with Hollow Stem Auger.

2. Groundwater was encountered during excavation of the test borings.

3. Test boring locations were located by measuring wheel with reference to the existing site features.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs. Abbreviations used are:

DD =	Natural dry density	LL =	Liquid limit (%)
UC =	Unconfined compression (psf)	PI =	Plasticity index (%)
-4 =	Percent passing #4 sieve (%)	pH =	Soil pH
-200 =	Percent passing #200 sieve (%)	SS =	Soluble sulfates (%)
SR =	Soil resistivity (ohm-cm)	Cl =	Soluble chlorides (%)
c =	Cohesion (psf)	ø =	Angle of internal friction (degrees)
TS =	Field Torvane Shear Strength test (tsf)	N/A =	Not applicable
		N/E =	None encountered

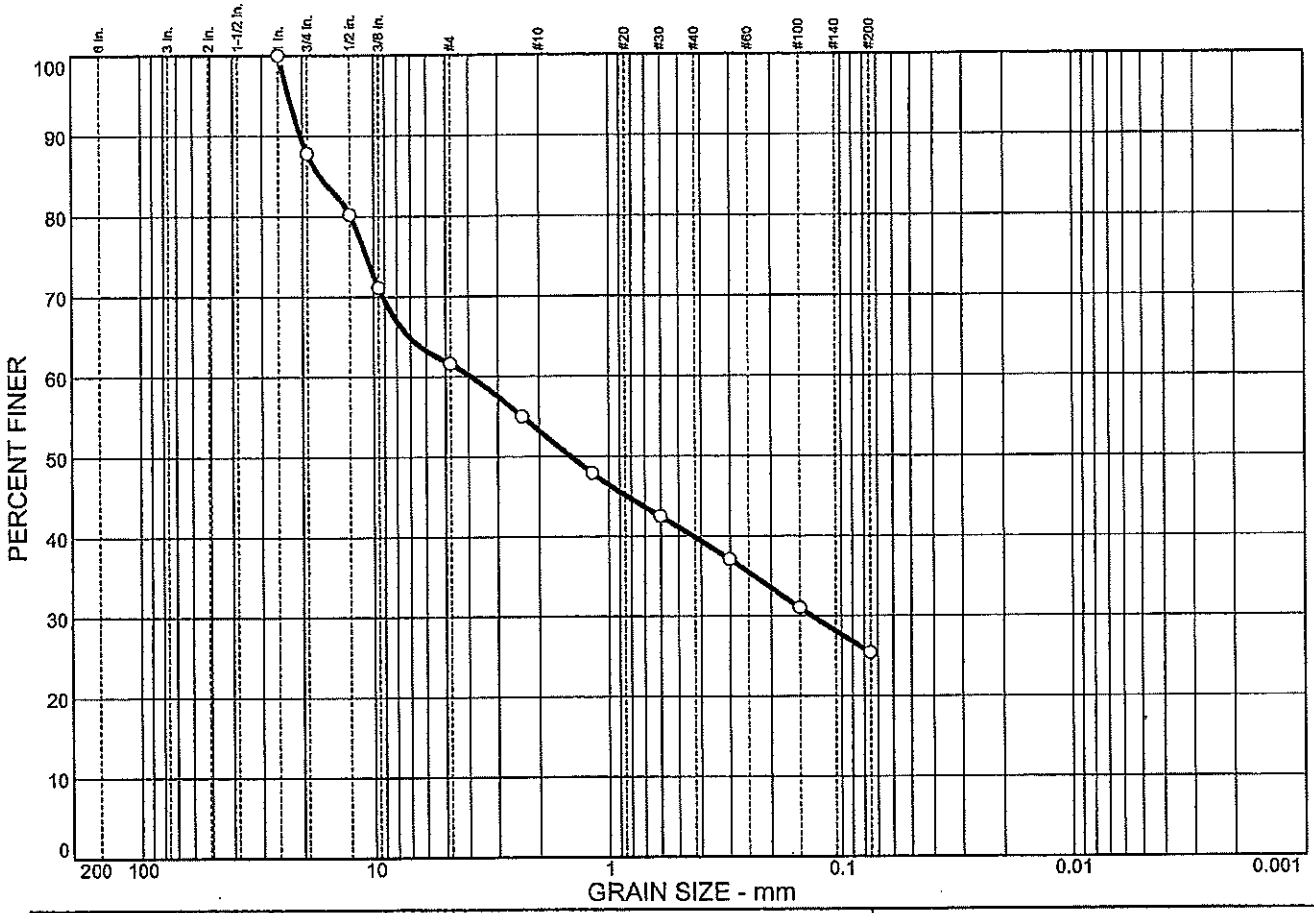
APPENDIX C

RESULTS OF LABORATORY TESTS

This appendix contains the individual results of the following tests. The results of the moisture content and dry density tests are included on the test boring logs in Appendix B. These data, along with the field observations, were used to prepare the final test boring logs in Appendix B.

These Included:	Number of Tests:	To Determine:
Natural Moisture (ASTM D2216)	63	Moisture contents representative of field conditions at the time the sample was taken.
Natural Density (ASTM D2216)	6	Dry unit weight of sample representative of in-situ or in-place undisturbed condition.
Direct Shear (ASTM D3080)	2	Soil shearing strength under varying loads and/or moisture conditions.
Consolidation (ASTM D2435)	2	The amount and rate at which a soil sample compresses when loaded, and the influence of saturation on its behavior.
R-Value (ASTM D2844)	2	The capacity of a subgrade or subbase to support a pavement section designed to carry a specified traffic load.
Moisture-Density Relationship (ASTM D1557)	1	The optimum (best) moisture content for compacting soil and the maximum dry unit weight (density) for a given compactive effort.

These Included:	Number of Tests:	To Determine:
Atterberg Limits (ASTM D4318)	2	The consistency and "stickiness," as well as the range of moisture contents within which the material is "workable."
Expansion Index (UBC (29-2) content.	2	Swell potential of soil with increases in moisture
Sulfate Content (ASTM D4327)	1	Percentage of water-soluble sulfate as (SO_4) in soil samples. Used as an indication of the relative degree of sulfate attack on concrete and for selecting the cement type.
Chloride Content (ASTM D4327)	1	Percentage of soluble chloride in soil. Used to evaluate the potential attack on encased reinforcing steel.
Resistivity (ASTM D1125)	1	The potential of the soil to corrode metal.
pH (ASTM D4972)	1	The acidity or alkalinity of subgrade material.



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
O	0.0	12.2	26.2	8.4	13.3	14.5	25.4	

SOIL DATA

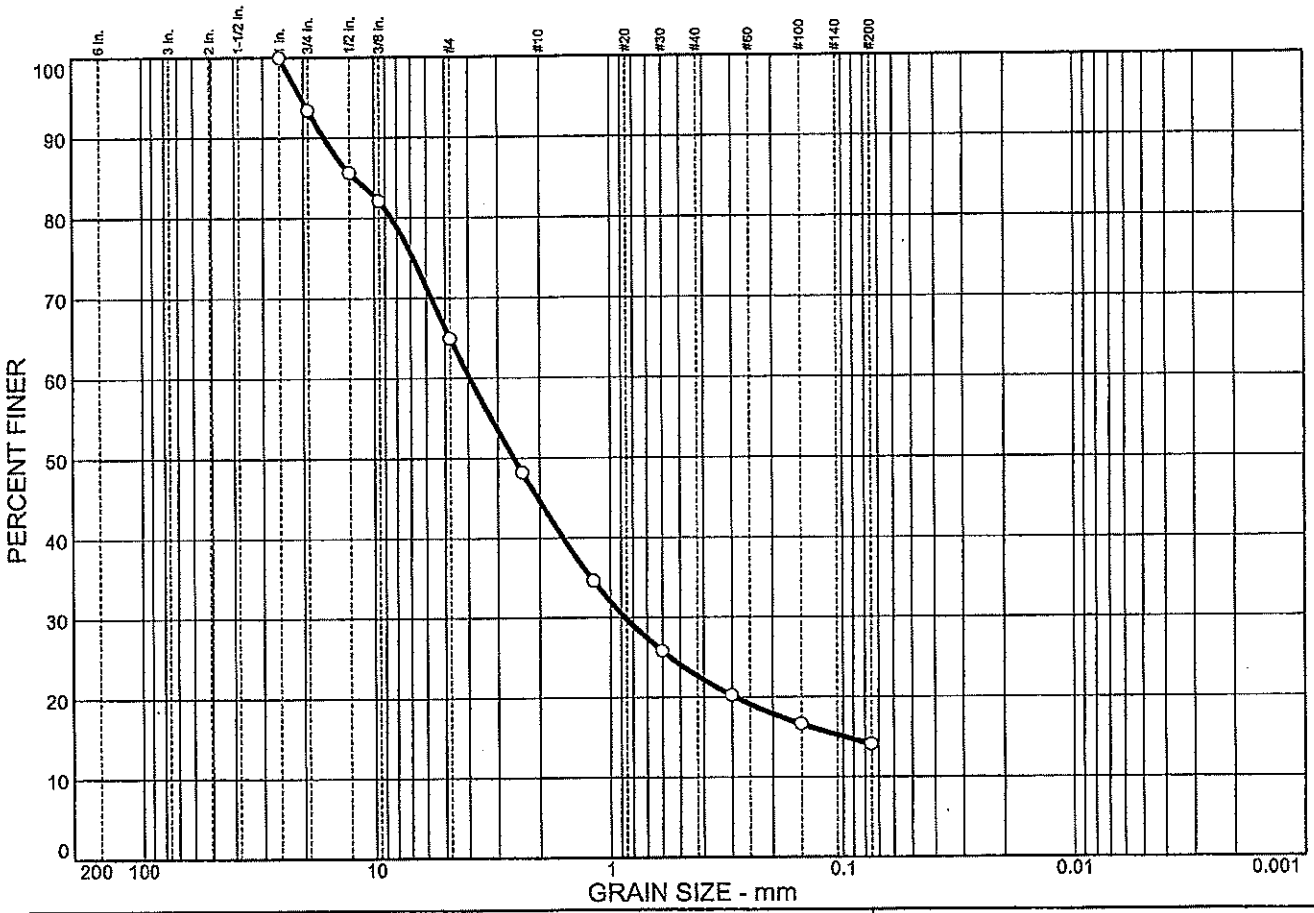
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
O	B-2		1.5		GM

THE TWINING LABORATORIES, INC.

Client: Browman Development

Project: Proposed Browman Development Shopping Center

Project No.: A07261.03 **Figure No.**



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
O	0.0	6.6	28.5	20.2	22.0	8.6	14.1	

SOIL DATA

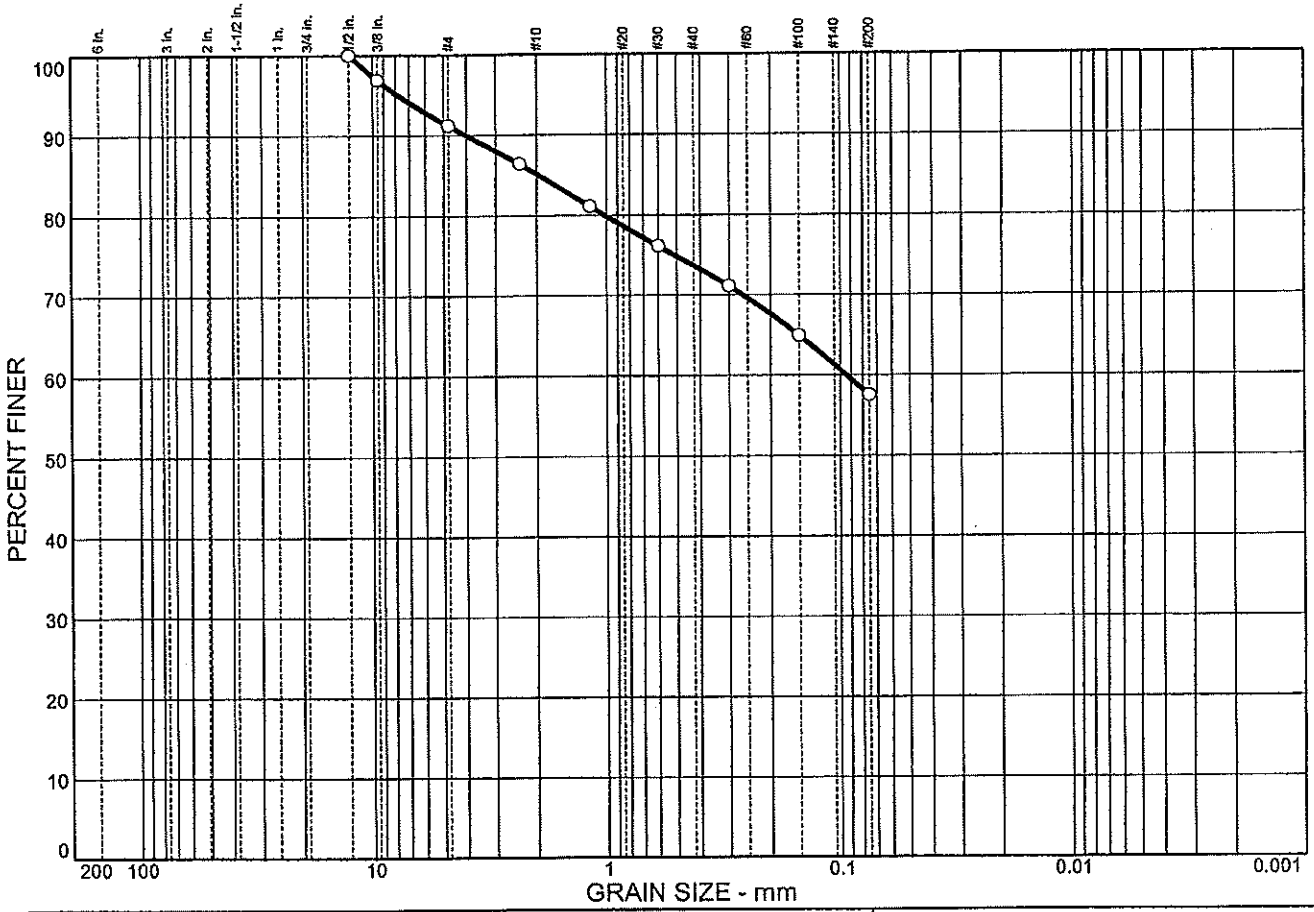
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
O	B-2		18.5	SAND, silty	SM

THE TWINING LABORATORIES, INC.

Client: Browman Development

Project: Proposed Browman Development Shopping Center

Project No.: A07261.03 **Figure No.**



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
O	0.0	0.0	8.8	6.0	11.5	16.2	57.5	

SOIL DATA

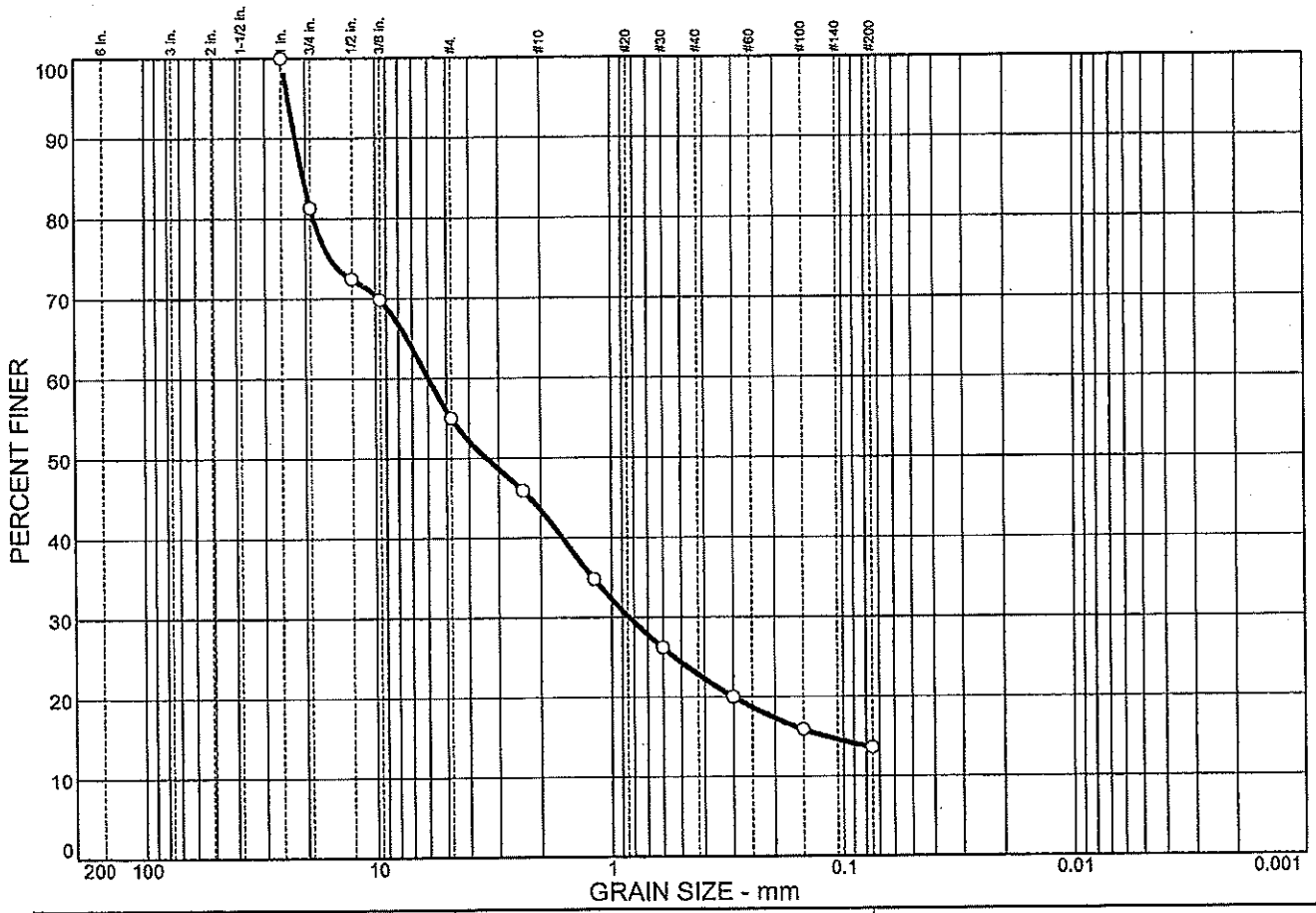
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
O	B-3		0	LEAN CLAY, Sandy; very stiff, damp, low plasticity, light brown,	ML
				trace fine to coarse angular gravel	

THE TWINING LABORATORIES, INC.

Client: Browman Development

Project: Proposed Browman Development Shopping Center

Project No.: A07261.03 **Figure No.**



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
O	0.0	18.7	26.3	11.5	20.7	9.2	13.6	

SOIL DATA

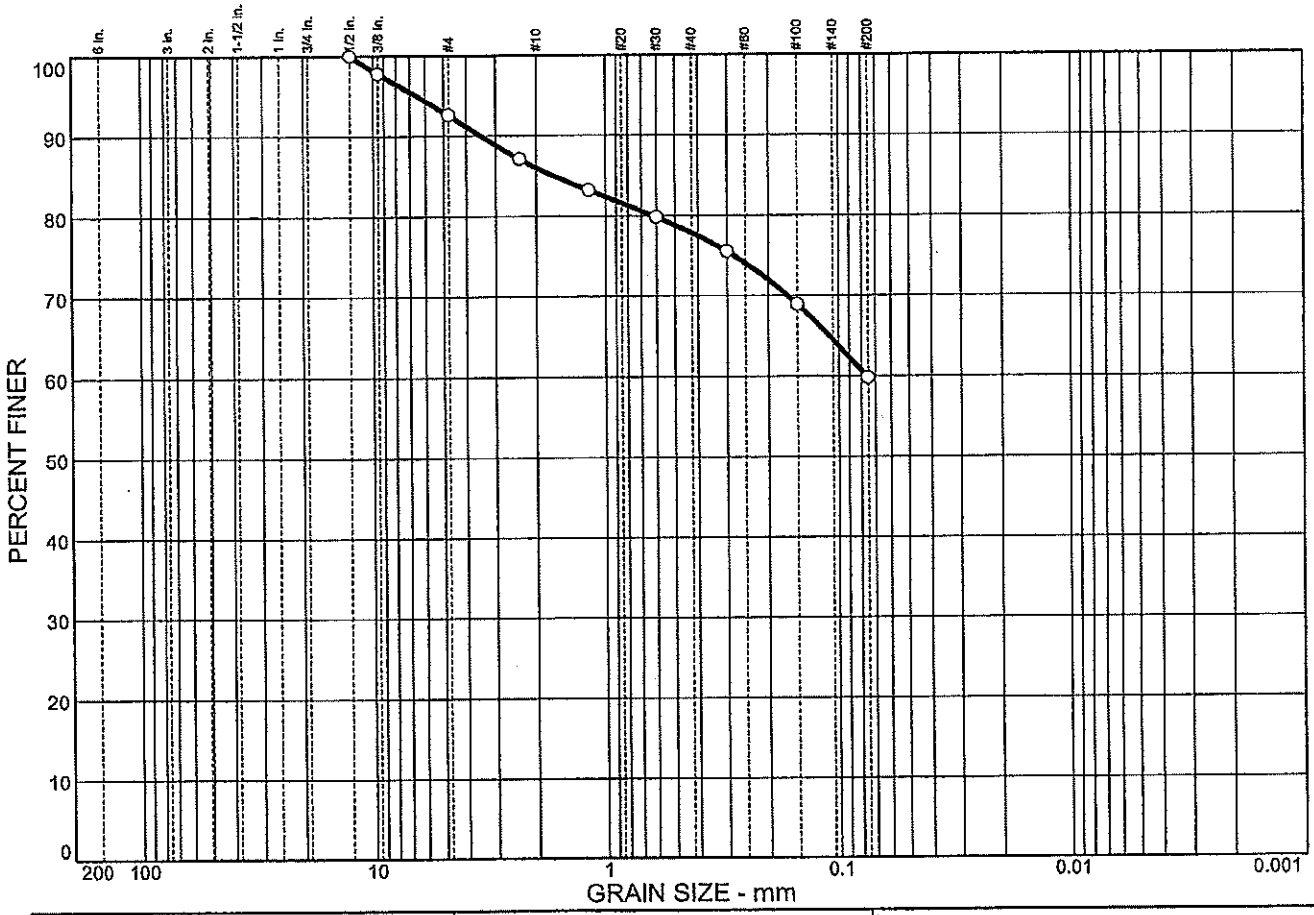
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
O	B-3		15		GM

THE TWINING LABORATORIES, INC.

Client: Browman Development

Project: Proposed Browman Development Shopping Center

Project No.: A07261.03 **Figure No.**



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
O	0.0	0.0	7.4	6.6	8.2	18.0	59.8	

SOIL DATA

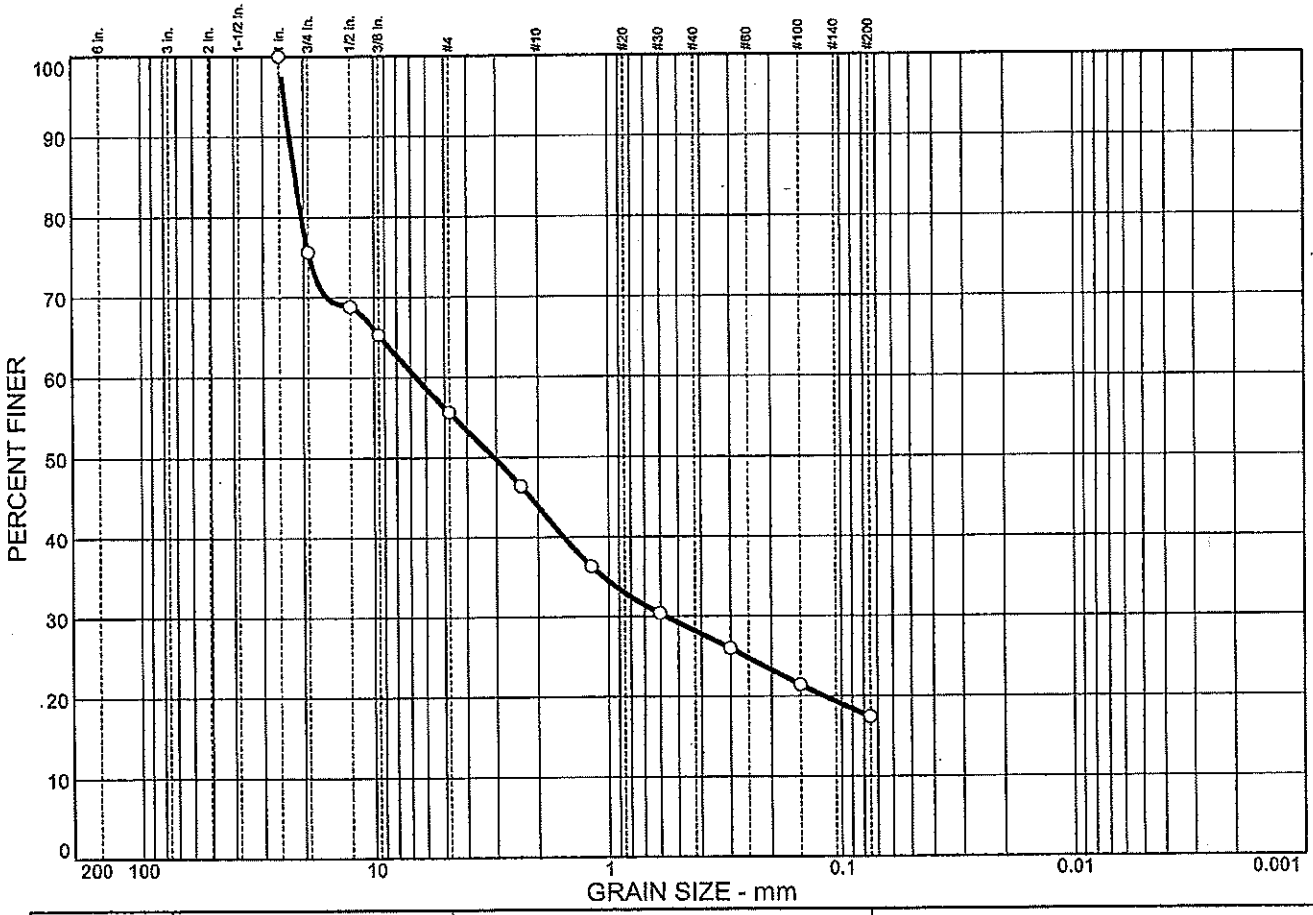
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
O	B-9		0	SILT, Sandy; fine grained, few gravel mixtures, dry, light orange	ML
				brown, very stiff	

THE TWINING LABORATORIES, INC.

Client: Browman Development

Project: Proposed Browman Development Shopping Center

Project No.: A07261.03 **Figure No.**



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
O	0.0	24.4	20.0	11.7	15.7	10.8	17.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
O	B-9		5	Increase in gravels, slightly moist	GM

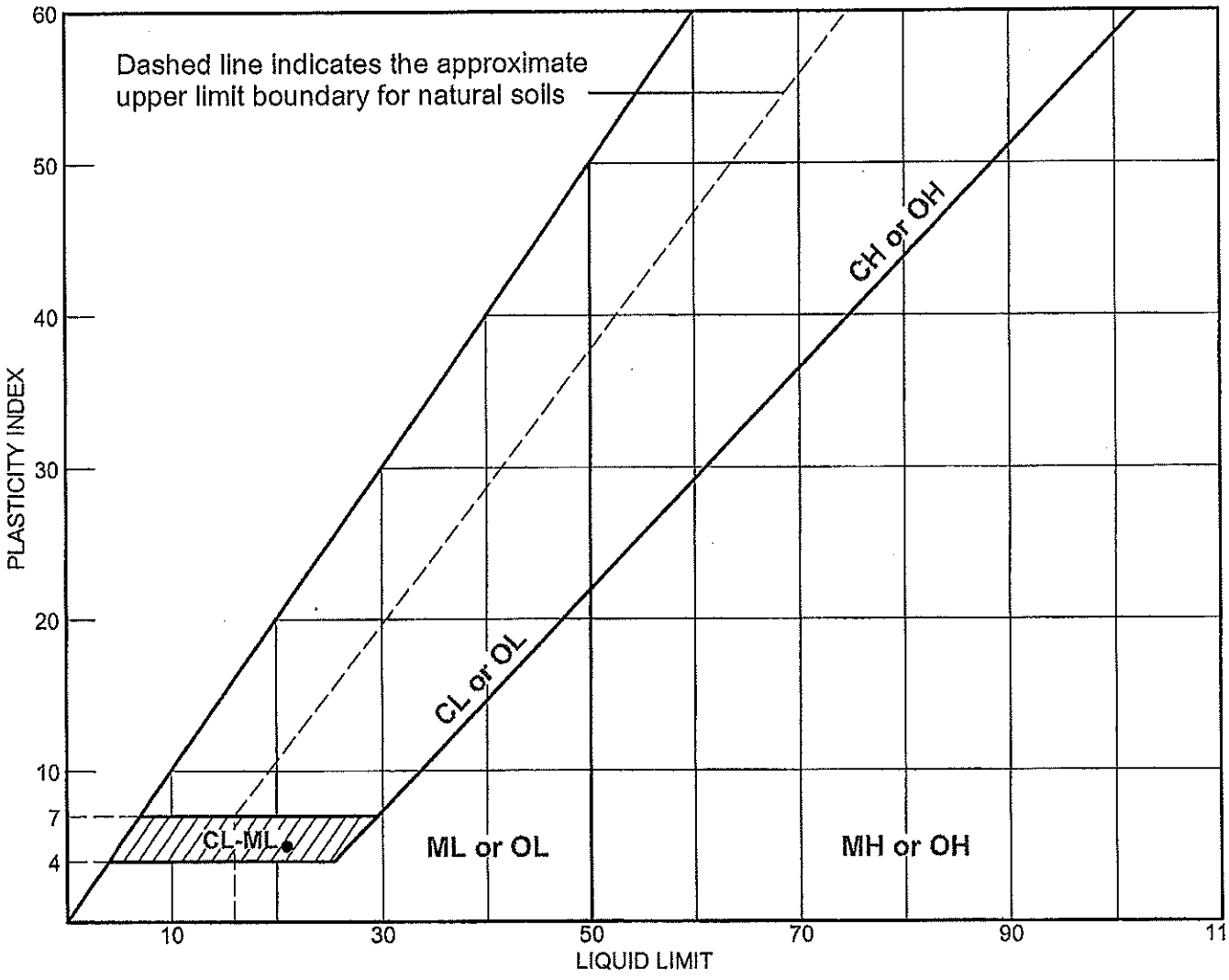
THE TWINING LABORATORIES, INC.

Client: Browman Development

Project: Proposed Browman Development Shopping Center

Project No.: A07261.03 **Figure No.**

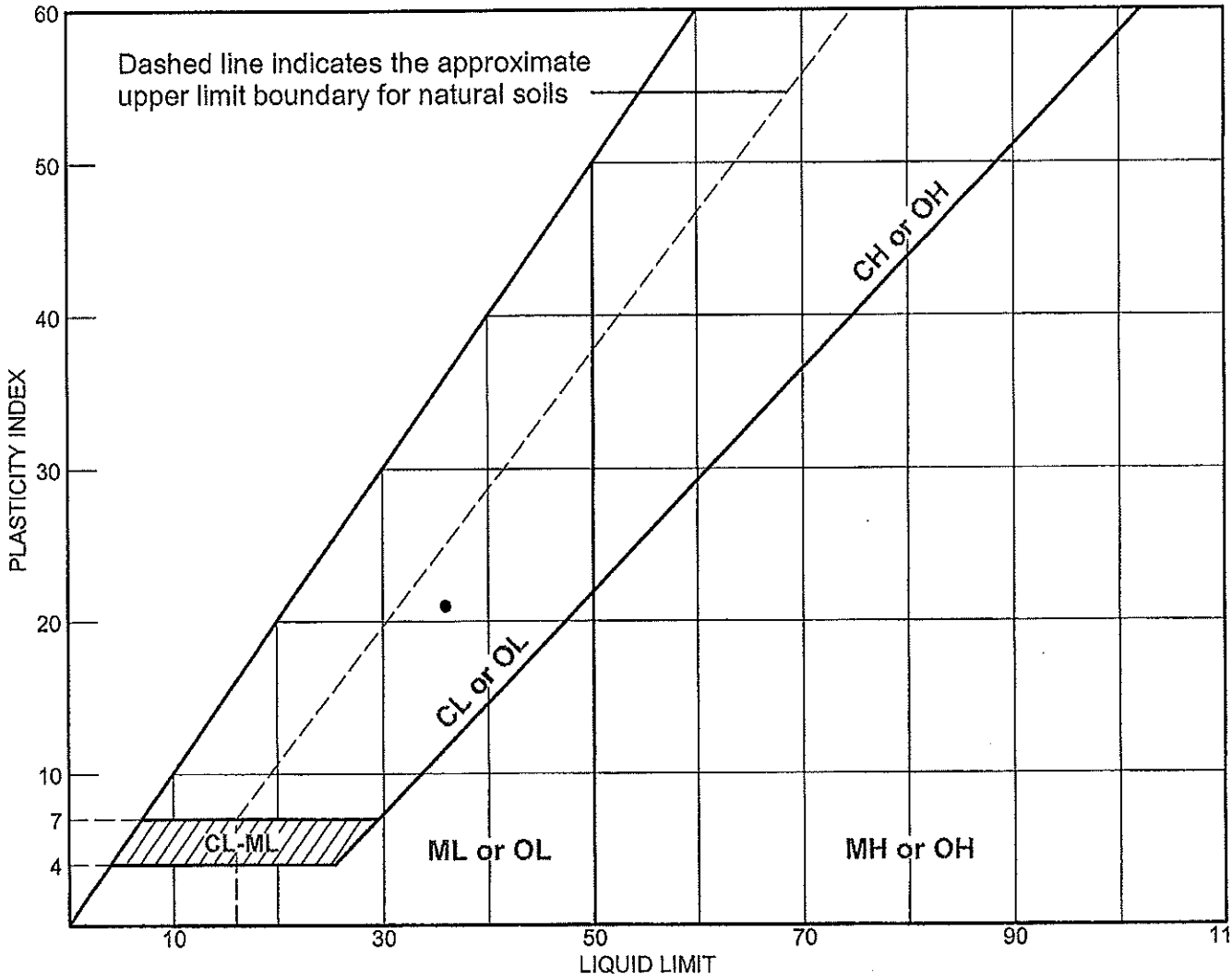
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-8		0		16	21	5	ML

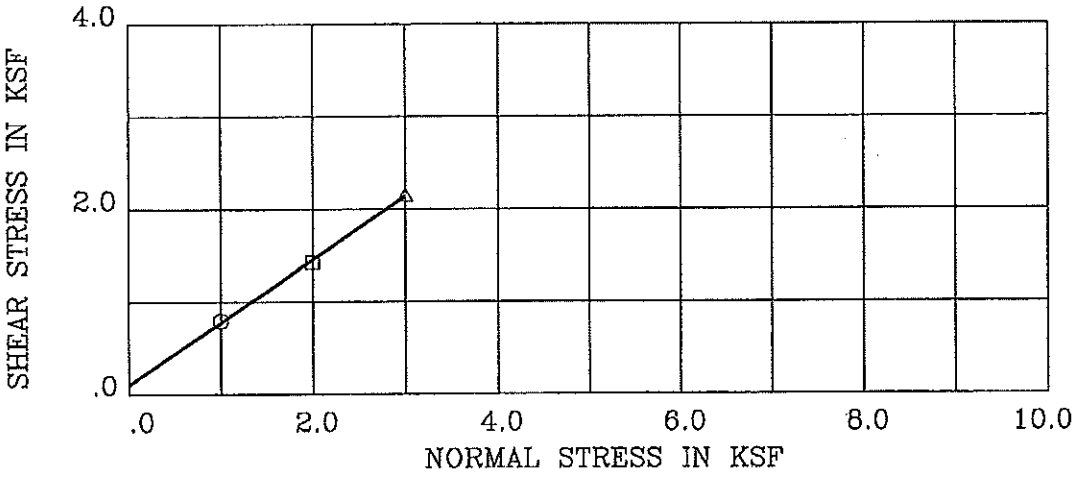
LIQUID AND PLASTIC LIMITS TEST REPORT **THE TWINING LABORATORIES, INC.**	**Client:** Browman Development **Project:** Proposed Browman Development Shopping Center **Project No.:** A07261.03 **Figure No.**

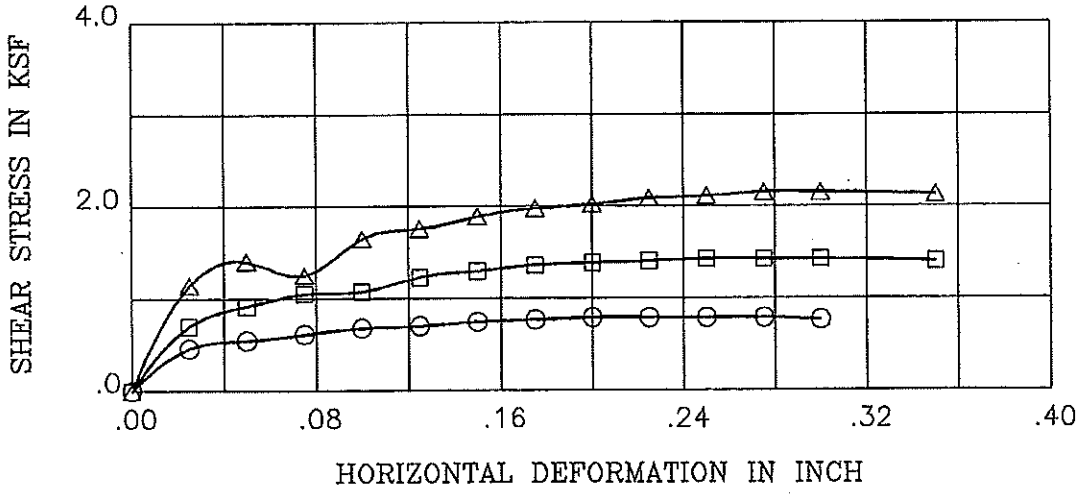
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-11		1.5		15	36	21	

LIQUID AND PLASTIC LIMITS TEST REPORT **THE TWINING LABORATORIES, INC.**	**Client:** Browman Development **Project:** Proposed Browman Development Shopping Center **Project No.:** A07261.03 **Figure No.**





BORING/SAMPLE : B-8 DEPTH (ft) : 0 - 1.5'

DESCRIPTION :

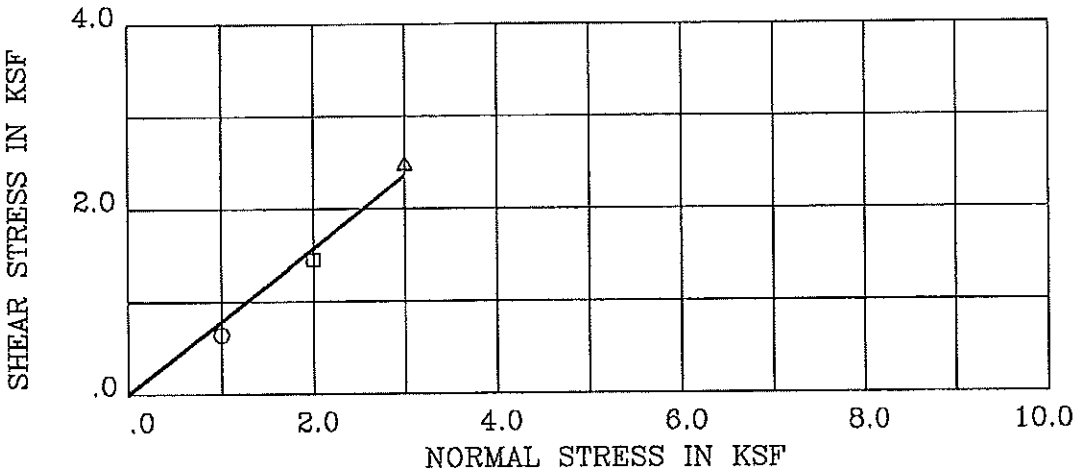
STRENGTH INTERCEPT (C) : .095 KSF

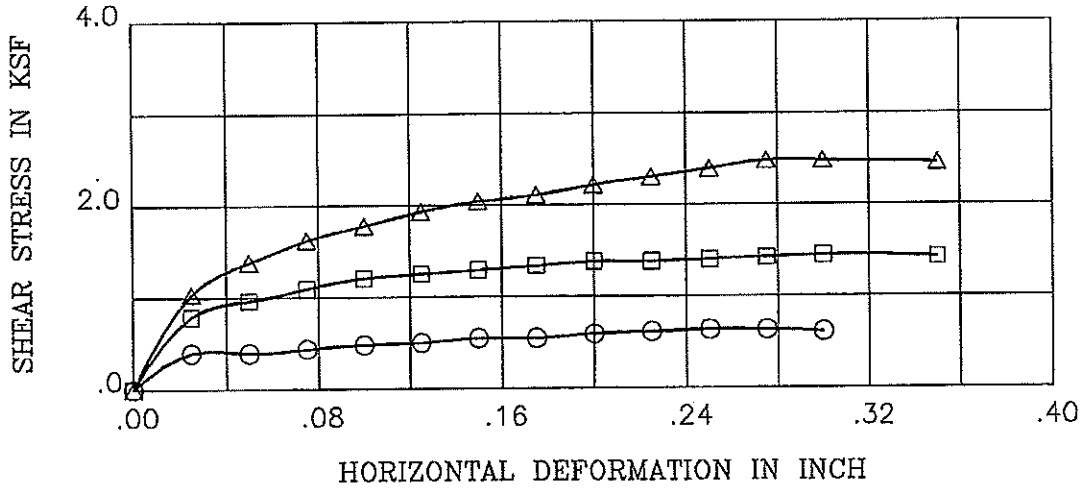
FRICTION ANGLE (PHI) : 34.3 DEG (PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	19.9	105.7	.565	1.00	.79	.77
□	20.9	110.4	.498	2.00	1.43	1.40
△	21.1	109.4	.512	3.00	2.16	2.13

Remark :

Proj A07261.03	Browman Morgan Hill
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No.





BORING/SAMPLE : B-11 DEPTH (ft) : 1.5 - 3.0'

DESCRIPTION :

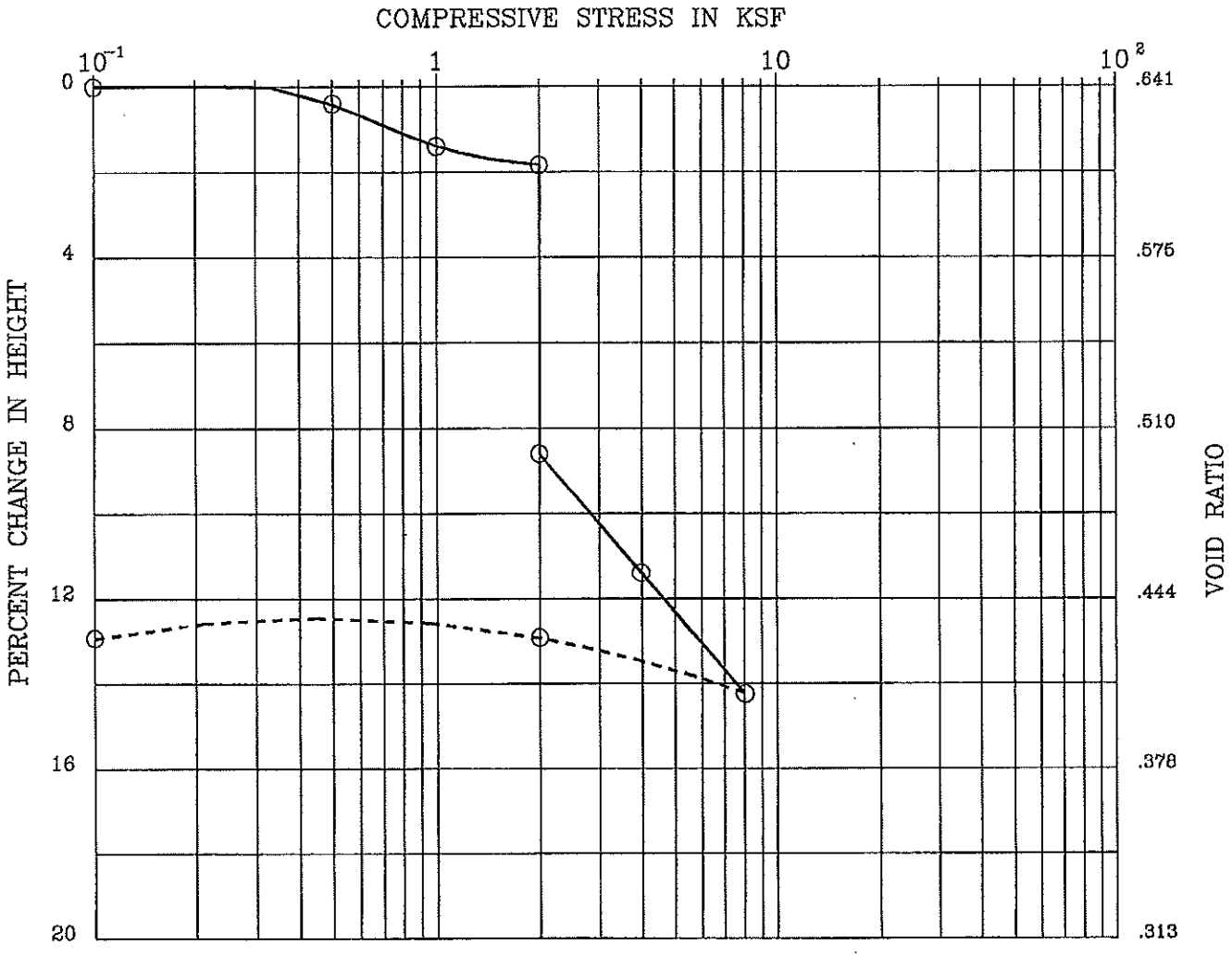
STRENGTH INTERCEPT (C) : .000 KSF (PEAK STRENGTH)

FRICTION ANGLE (PHI) : 38.2 DEG

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	18.8	93.8	.762	1.00	.64	.61
□	18.4	102.8	.609	2.00	1.45	1.43
△	18.8	99.2	.667	3.00	2.49	2.46

Remark :

Proj A07261.03	Browman Morgan Hill
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No.



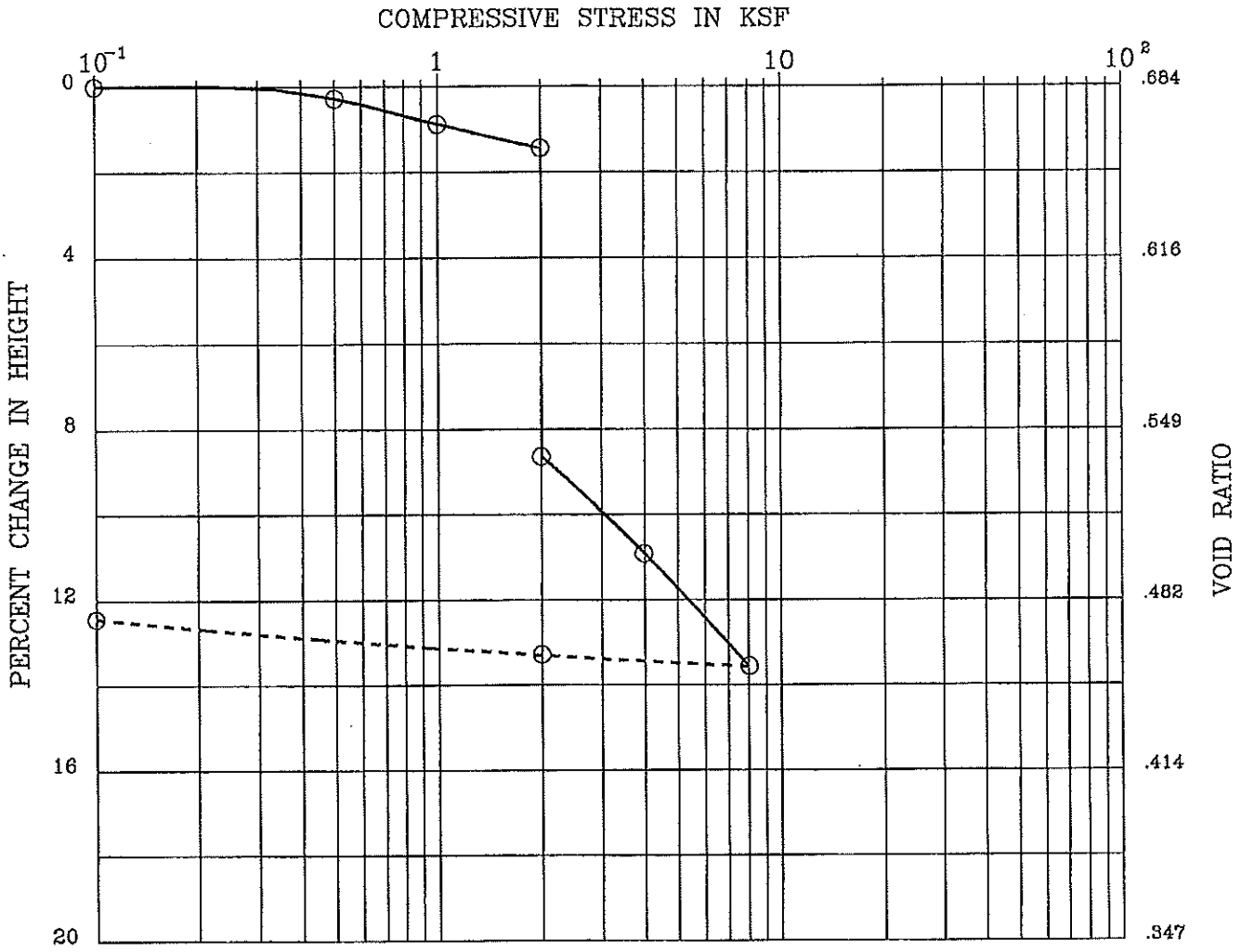
BORING : B-8
DEPTH (ft) : 0 - 1.5'
SPEC. GRAVITY : 2.65

DESCRIPTION :
LIQUID LIMIT :
PLASTIC LIMIT :

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	7.6	100.9	32	.641
FINAL	16.0	115.8	99	.429

Remark : Saturated at 2 kfs

Proj A07261.03	Browman Morgan Hill
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No.



BORING : B-9
DEPTH (ft) : 0 - 1.5'
SPEC. GRAVITY : 2.65

DESCRIPTION :
LIQUID LIMIT :
PLASTIC LIMIT :

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	7.6	98.3	30	.684
FINAL	16.5	112.4	93	.473

Remark : Saturated at 2 kfs

Proj A07261.03	Browman Morgan Hill
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No.

COMPACTION TEST REPORT

Project No.: A07261.03 **Date:**

Project: Proposed Browman Development Shopping Center

Location: B-12

Elev./Depth: 0.5 - 3.0' **Sample No.** Bulk Sample

Remarks:

MATERIAL DESCRIPTION

Description:

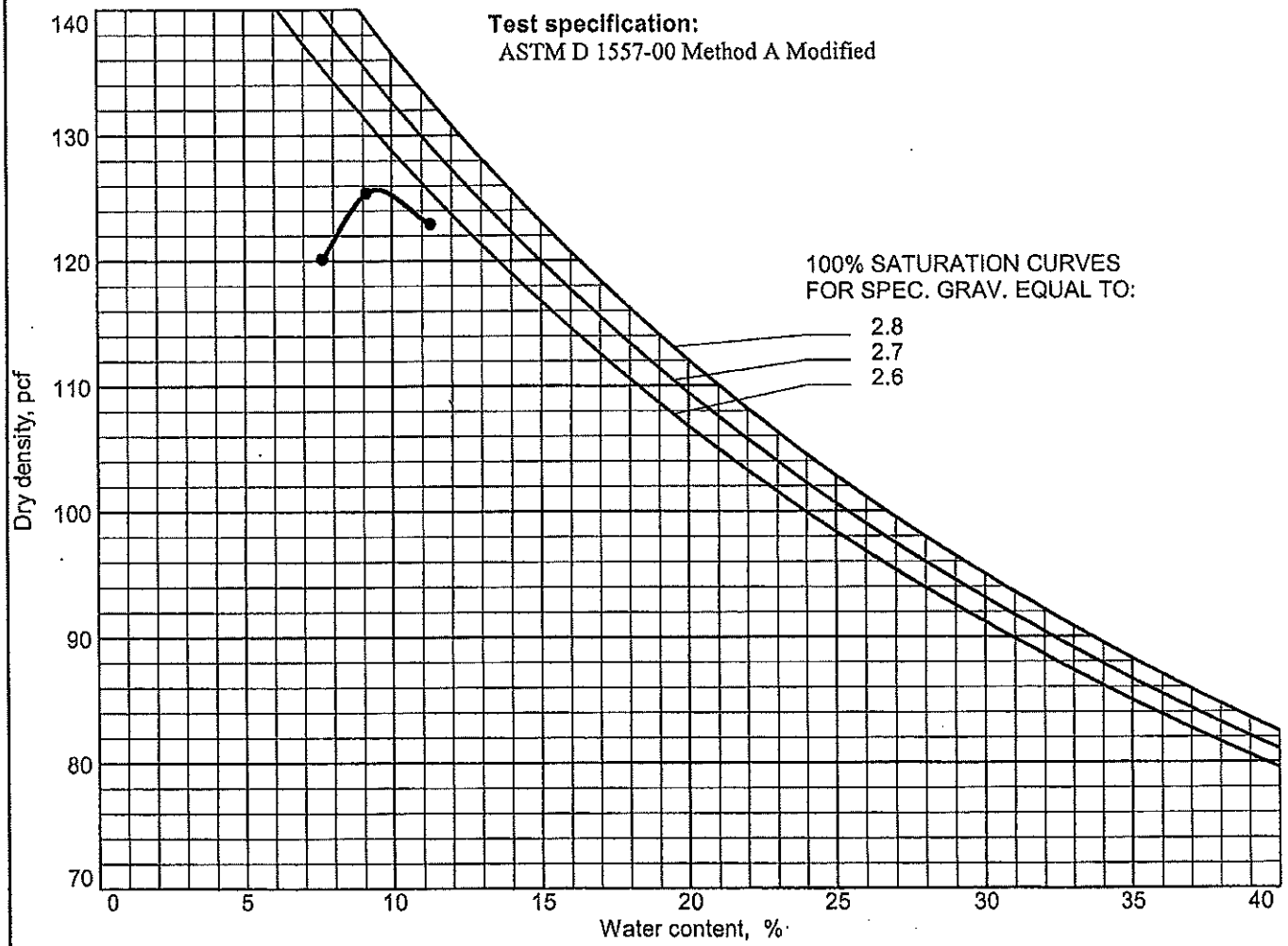
Classifications - **USCS:** **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% > No.4 = % **% < No.200 =**

TEST RESULTS
Maximum dry density = 125.7 pcf
Optimum moisture = 9.5 %



Figure

THE TWINING LABORATORIES, INC.

EXPANSION INDEX TEST

Uniform Building Code (UBC) 29-2

Project Number: A07261.03

Project: Browman Development

Sample Location: B-1

Depth:0.5 - 3.0

Date Sampled:

Sampled by:

Sample Number	Molding Moisture Content	Final Moisture Content	Dry Density (γ d)
	8.2	11.7	117.7

Initial Thickness: 1.0000

Final Thickness: 1.0109

Expansion Index (EI): 11

Expansion Soil Classification: Very Low

TABLE NUMBER 29-C
EXPANSIVE SOIL CLASSIFICATION

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

Figure No.

SEC.29.206 (a)

EXPANSION INDEX TEST

Uniform Building Code (UBC) 29-2

Project Number: A07261.03

Project: Browman Development

Sample Location: B-12

Depth: 0 - 3.0

Date Sampled:

Sampled by: Barry Annis

Sample Number	Molding Moisture Content	Final Moisture Content	Dry Density (γ d)
	7.2	11.1	120.23

Initial Thickness: 1.0000

Final Thickness: 1.0231

Expansion Index (EI): 23

Expansion Soil Classification: Low

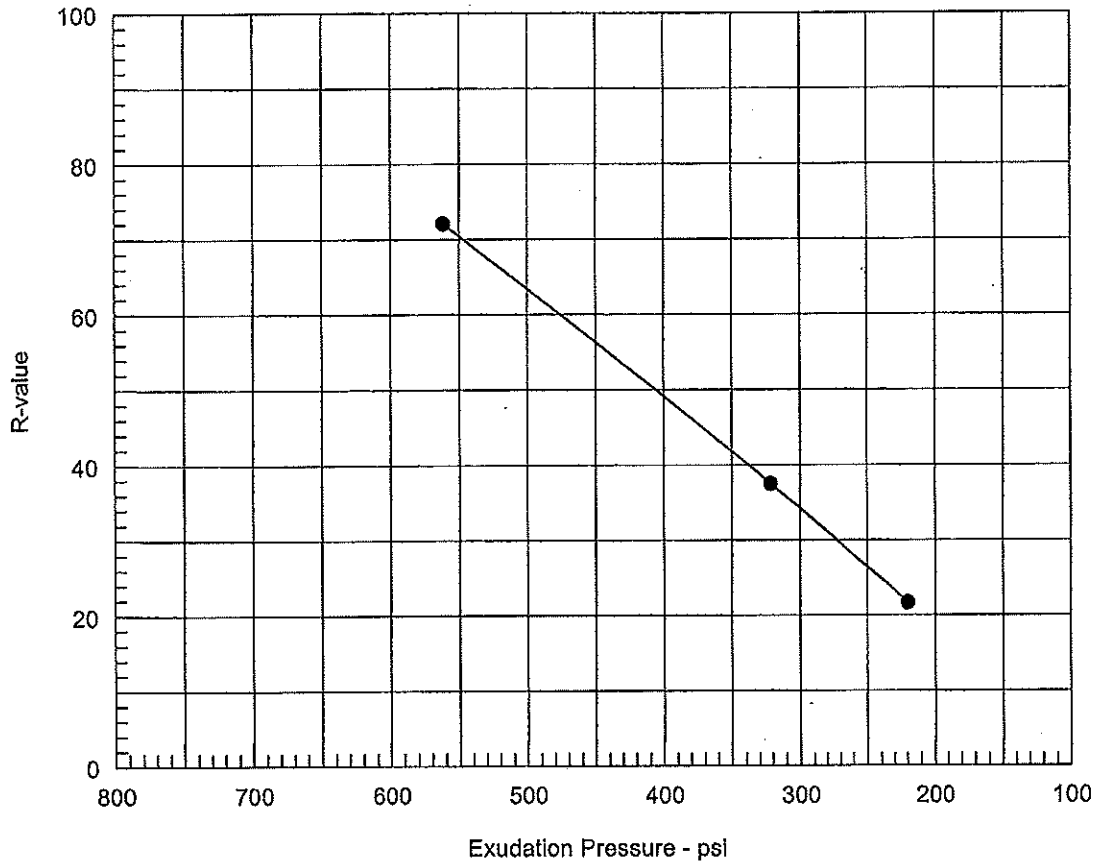
TABLE NUMBER 29-C
EXPANSIVE SOIL CLASSIFICATION

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

Figure No.

SEC.29.206 (a)

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Valu Cor
1	275	132.4	5.8	0.00	74	2.44	321	39.0	37.
2	160	130.7	6.3	0.00	97	2.45	220	21.7	21.
3	350	133.6	5.5	0.00	30	2.50	562	72.1	72.

Test Results	Material Description
R-value at 300 psi exudation pressure = 34.2	

Project No.: A07261.03
Project: Morgan Hill
Location: B-4
Sample Number: Bulk Sample **Depth:** 0.5 - 3.0
Date: 9/9/2004

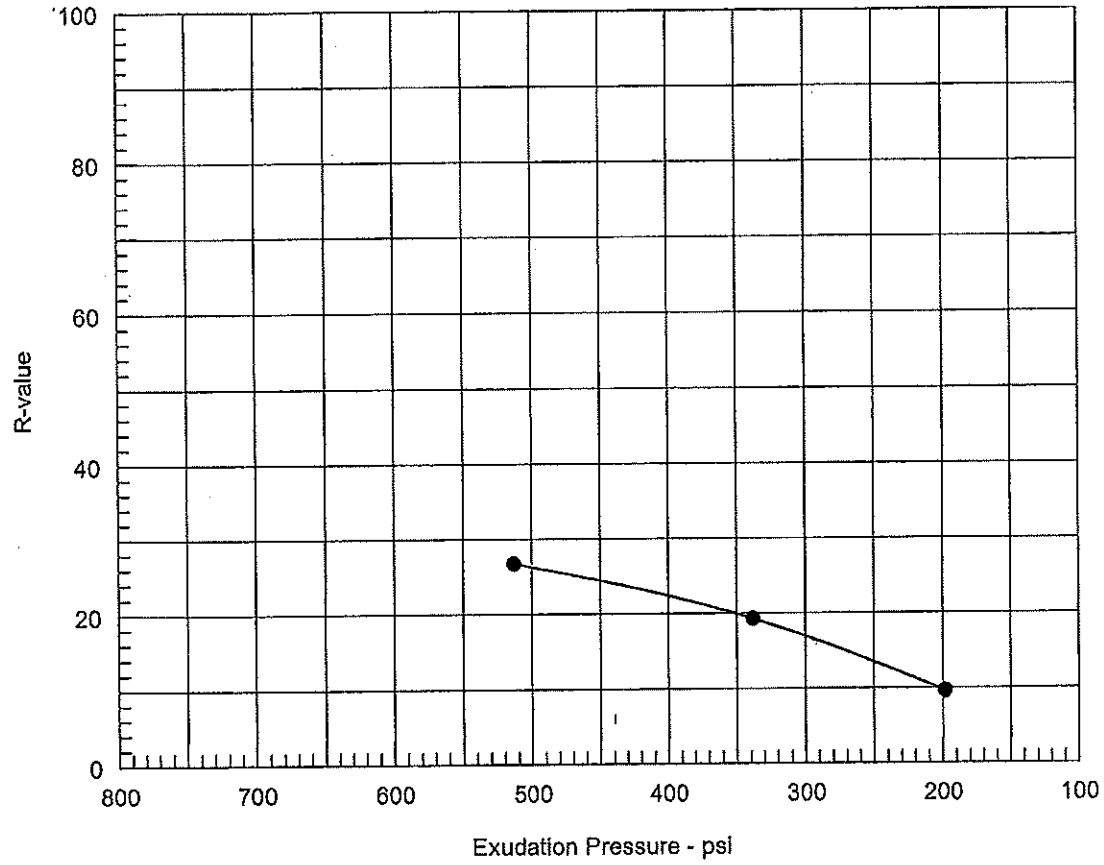
Tested by:
Checked by:
Remarks:

R-VALUE TEST REPORT

THE TWINING LABORATORIES, INC.

Figure No. ____

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Valu Cor
1	120	127.2	7.8	0.00	110	2.51	338	19.3	19.
2	60	125.9	8.2	0.00	130	2.51	198	9.6	9.6
3	300	129.0	7.4	0.00	102	2.46	513	26.7	26.

Test Results	Material Description
R-value at 300 psi exudation pressure = 16.9	

Project No.: A07261.03
Project: Morgan Hill
Location: B-7
Sample Number: Bulk Sample **Depth:** 0.5 - 2.0
Date: 9/8/2004

R-VALUE TEST REPORT

THE TWINING LABORATORIES, INC.

Tested by:
Checked by:
Remarks:

Figure No. _____

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

September 14, 2004

Work Order #: 4I07008

Harry Wise
Twining Geotechnical Department
2527 Fresno Street
Fresno, CA 93721

RE: Browman Morgan Hill

Enclosed are the analytical results for samples received by our laboratory on 09/07/04 . For your reference, these analyses have been assigned laboratory work order number 4I07008.

All analysis have been performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, The Twining Laboratories, Inc. (TL) is not responsible for use of less than complete reports. Results apply only to samples analyzed.

If you have any questions, please feel free to contact us at the number listed above.

Sincerely,

The Twining Laboratories, Inc.

Ronald J. Boquist
Director of Analytical Chemistry

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Geotechnical Department 2527 Fresno Street	Project: Browman Morgan Hill Project Number: A07261.03	Reported:
Fresno CA, 93721	Project Manager: Harry Wise	09/14/04

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-12	4I07008-01	Soil	09/02/04 00:00	09/07/04 12:03
B-2 (1.5-3)	4I07008-02	Soil	09/02/04 00:00	09/07/04 12:03

The Twining Laboratories Inc.

Ronald J. Boquist, Director of Analytical Chemistry
Joseph A. Ureno, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Geotechnical Department 2527 Fresno Street	Project: Browman Morgan Hill Project Number: A07261.03	Reported:
Fresno CA, 93721	Project Manager: Harry Wise	09/14/04

B-12
4I07008-01 (Soil)

Analyte	Result	Reporting Limit	Units	Batch	Prepared	Analyzed	Method
Inorganics							
Chloride	**8.0**	6.0	mg/kg	T4I0809	09/08/04	09/08/04	ASTM D-4327-84
Chloride	**0.00080**	0.00060	% by Weight	[CALC]	09/08/04	09/08/04	ASTM D4327-84
Sulfate as SO4	**0.00068**	0.00060	% by Weight	[CALC]	09/08/04	09/08/04	ASTM D4327-84
pH	**5.8**		pH Units	T4I0809	09/08/04	09/08/04	ATSM D4972-89 Mod
Resistivity	**16000**		ohms/cm	T4I0809	09/08/04	09/08/04	ASTM D1125-82
Sulfate as SO4	**6.8**	6.0	mg/kg	T4I0809	09/08/04	09/08/04	ASTM D4327-84

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Geotechnical Department 2527 Fresno Street	Project: Browman Morgan Hill Project Number: A07261.03	Reported:
Fresno CA, 93721	Project Manager: Harry Wise	09/14/04

B-2 (1.5-3)

4I07008-02 (Soil)

Analyte	Result	Reporting Limit	Units	Batch	Prepared	Analyzed	Method
Inorganics							
Chloride	7.7	6.0	mg/kg	T4I0809	09/08/04	09/08/04	ASTM D-4327-84
Chloride	0.00077	0.00060	% by Weight	[CALC]	09/08/04	09/08/04	ASTM D4327-84
Sulfate as SO4	0.0024	0.00060	% by Weight	[CALC]	09/08/04	09/08/04	ASTM D4327-84
pH	6.2		pH Units	T4I0809	09/08/04	09/08/04	ATSM D4972-89 Mod
Resistivity	16000		ohms/cm	T4I0809	09/08/04	09/08/04	ASTM D1125-82
Sulfate as SO4	24	6.0	mg/kg	T4I0809	09/08/04	09/08/04	ASTM D4327-84

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
RPD	Relative Percent Difference

Quality Control Data Available Upon Request

The Twining Laboratories Inc.

Ronald J. Boquist, Director of Analytical Chemistry
Joseph A. Ureno, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Technical Appendices

Appendix G – Hazards and Hazardous Materials

Twining Laboratories, Inc. Phase I Environmental Site Assessment, Northeast of Interstate 101 and Cochrane Road, Morgan Hill, Santa Clara County, California. June 2004.

Twining Laboratories, Inc. Results of Phase II Assessment at Site Located Northeast of the Intersection of Interstate 101 and Cochrane Road, Morgan Hill, California. February 2005.

Twining Laboratories, Inc. Supplemental Letter Regarding Morgan Hill Site. February 2005.

Bovee Environmental Management, Inc. Asbestos and Lead-Based Paint Reconnaissance, 66-Acre Property: NEC Hwy 101 & Cochrane Road, Morgan Hill, California. February 2005.

DRAFT

PHASE I ENVIRONMENTAL SITE ASSESSMENT

NORTHEAST OF INTERSTATE 101 AND COCHRANE ROAD

MORGAN HILL, SANTA CLARA COUNTY, CALIFORNIA

Prepared For:

Browman Development Company
100 Swan Way, Suite 206
Oakland, California 94621

Prepared By:

The Twining Laboratories, Inc.
2527 Fresno Street
Fresno, California 93721

A07261.01

June 21, 2004

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ACRONYMS

AST(s)	Aboveground Storage Tank(s)
AWP	Annual Workplan
CAL-EPA	State of California, Environmental Protection Agency
CERCLIS	Comprehensive Environmental Responsibility, Compensation, and Liability Information System
CIWMB	California Integrated Waste Management Board
CRWQCB-CVR	California Regional Water Quality Control Board, Central Valley Region
DTSC	Department of Toxic Substances Control
ERNS	Emergency Response and Notification System
SCCAO	Santa Clara County Assessor's Office
SCCEHD	Santa Clara County Environmental Health Department
SCCRO	Santa Clara County Recorder's Office
LUST	Leaking Underground Storage Tank
NPL	National Priority List
RCRA	Resource Conservation and Recovery Act
SWIS	Solid Waste Information System
SWRCB	State Water Resource Control Board
TSD	Hazardous Waste Transport, Storage, or Disposal Facilities
US EPA	United States Environmental Protection Agency
UST(s)	Underground Storage Tanks(s)

1.0 INTRODUCTION

The Twining Laboratories, Inc. (Twining) was retained by Browman Development Company to conduct a Phase I Environmental Site Assessment (Phase I) for the property located northeast of the intersection of Interstate 101 and Cochrane Road, in the city of Morgan Hill, Santa Clara County, California (Site). This Phase I was conducted in general conformance with the methods and procedures described in the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (Standard Designation E 1527-00), published July 2000, and in accordance with Twining's proposal to Browman Development Company, dated February 25, 2004.

1.1 Objective

The objective of this assessment is to identify recognized environmental conditions located at the Site or on adjacent properties which could present material risk of harm to public health or to the environment. Recognized environmental conditions are defined within ASTM Designation E-1527-00 as the presence or likely presence of any hazardous wastes and/or substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.

1.2 Scope of Services

The Phase I Scope of Services included the following tasks:

- A review of the current and past uses of the Site since 1917.
- A Site reconnaissance to assess evidence of current and/or past use or storage of toxic or hazardous materials; on-Site ponds, landfills, drywells, waste streams or other disposal units; visible soil discoloration; aboveground or underground storage tanks; electrical transformers containing polychlorinated biphenyls (PCBs); and drums, barrels and other storage containers.
- A visual review of adjacent properties to assess their potential to adversely impact the Site.
- A review of available federal and state Environmental Protection Agency (EPA) lists of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations in the Site area. Using area-profile services, Twining cataloged sites in the vicinity of the Site that have been identified on regulatory agency lists. Search criteria were in conformance with ASTM Standard E 1527-00.
- Contact with relevant municipal, county and state agencies to review readily available records and permits.
- Preparation of this written report to present the findings and conclusions.

The Scope of Services specifically excluded sampling and analysis for the potential presence of asbestos containing building materials, or an assessment for radon gas. In addition, the Scope of Services did not include the collection and/or analysis of air, soil, groundwater, or other environmental samples.

1.3 Limitations

The purpose of an environmental assessment is to reasonably assess the potential for, or actual impact of, past practices on a given site which may pose an environmental impairment to it. No assessment is thorough enough to identify all potential environmental impairments at a given site. If environmental impairments have not been identified during the assessment, such a finding should not, therefore, be construed as a guarantee of the absence of such conditions on the site, but rather the result of the services performed within the scope, limitations, and cost of the work performed.

The conclusions presented in this report are solely professional opinions based on information provided regarding the Site and the findings of the reconnaissance and records search. Information obtained from the aerial photographs is an interpretation of features observed in the photographs. Actual conditions at the Site may have been different from those interpreted. Conclusions presented are based on conditions as they existed at the time the work was performed. Changes in existing conditions of the Site due to time lapse, natural causes, or operations adjacent to the Site may deem conclusions presented invalid, unless the changes are reviewed and the conclusions reevaluated. Such conditions may require additional field and laboratory investigations to assess if the conclusions are applicable considering the changed conditions.

This work was performed for the sole use of our client, Browman Development Company. Any reliance on this report by a third party is at such party's sole risk. Others who seek to rely on the findings have a duty to determine the adequacy of this report for their intended use, time, and location. Twining does not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report. No other warranty, either express or implied, is made. The standard of practice is time-dependent. Services provided were performed consistent with generally-accepted professional consulting principles and practices for environmental assessors in Santa Clara County, California at the time the work was performed. The findings and conclusions presented in this report are solely professional opinions derived in accordance with current standards of professional practice. There were no limiting conditions encountered during the completion of this Phase I, with the exception of the garage, pump houses, tack rooms, and sheds which were locked and unaccessible at the time of the Site reconnaissance.

2.0 SITE DESCRIPTION

Information concerning the Site was obtained from a Site reconnaissance conducted by Mr. Timothy Thomas of Twining, on June 3, 2004. Additional information was acquired from an interview with one of the Site owners, a review of environmental questionnaires completed by two of the owners, and a review of the documents referenced in this report.

2.1 Location and Description of the Site

The Site is located on the northeast corner of the intersection of Interstate 101 and Cochrane Road, in the city of Morgan Hill, Santa Clara County, California, on five irregular shaped parcels which encompass approximately 60 acres. The Santa Clara County Assessor's Office has assigned the following Assessor's Parcel Numbers (APN) and, and listed the owner as:

APN 728-37-004	**Richard Sullivan** **100 Molina Drive** **Santa Cruz, California 95060**
APN 728-37-001	**Jean Millerd-Low** **1195 Cochrane Road** **Morgan Hill, California 95037**
APNs 728-37-002 **728-37-005** **728-37-007**	**George Guglielmo** **1480 East Main Avenue** **Morgan Hill, California 95037**

Parcel (APN 728-37-001) is located at the northeast corner of the Site and is developed as a horse boarding facility. Parcels (APNs 728-37-002, 005, and 007) are located at the center of the Site and are occupied by row crops. Parcel (APN 728-37-004) is located on the western portion of the Site and is being dry farmed to grow wheat. A Site location map is presented as Drawing 1, and a Site plan is presented as Drawing 2 in Appendix A.

2.2 Physical and Environmental Setting of the Site

Physical and environmental characteristics of the Site including topography, geology, soil and hydrogeology were evaluated based on Site observations, published literature, and maps.

Topography

Topographic map coverage of the Site is provided by the United States Geological Survey (USGS), Morgan Hill, California, 7.5-minute quadrangle map dated 1955, photo revised 1980. The Site lies within the OJO DE AGUA Lands of Morgan Hill, Township 1 South, Range 1 East, Mount Diablo Baseline and Meridian. According to the map, the Site is located at an elevation of approximately 390 feet above mean sea level, and the land surface slopes toward the west. Areas to the east of the Site appear to be topographically upgradient.

Geology

The Site is located at the northeastern edge of the Santa Clara valley between the Santa Cruz mountains to the west and the Diablo Range to the east. The Santa Clara valley is a broad northwesterly trending alluvial basin. The older mesozoic rocks of the Santa Cruz mountains and the Diablo range have been buried in the Santa Clara valley by thick deposits of younger alluvial sediments. These sediments are divided into the lower Santa Clara formation, which is somewhat consolidated, and the upper quaternary alluvium, which is poorly consolidated. Both units consist of interbedded gravel, sand, and clay, and they cannot be reliably differentiated in well logs.

Near the hills, these sediments are typically coarser grained alluvial fan deposits with a high permeability. Toward the valley center, these fan deposits are integrated with finer grained gravel, sand, silt, and clay stream deposits.

Hydrogeology

The northeastern area of the Santa Clara valley contains a thick laterally extensive layer laid down during a period of time when the water of the San Francisco bay inundated the valley. This layer has divided the valley into a confined area with a thick aquitard separating shallow from deep aquifers and a recharge area closer to the hills. Shallow groundwater is typically found below surface grade (bsg) at less than 100 feet. Deeper aquifers (greater than 200 feet) are used for domestic water purposes. The depth of first encountered groundwater underlying the Site has not been assessed.

Soils

According to the Soil Survey of Santa Clara County, California, native soil in the vicinity of the Site is Arbuckle gravelly loam. Runoff is very slow, and the available water holding capacity is about 5 to 7 inches. The hazard to erosion is slight to none.

3.0 INFORMATION FROM THE SITE RECONNAISSANCE

The objective of the Site reconnaissance was to observe the Site for specific indicators of environmental concern. The methodology used during the Site reconnaissance included a systematic search of practically accessible areas of the Site and adjacent properties. A Site location map is presented as Drawing 1 in Appendix A, and a Site Plan depicting the Site, adjoining property use, and observed on-Site features is presented as Drawing 2 in Appendix A. Additionally, photographs were taken during the Site walk and selected photographs of the Site are presented in Appendix B. Twining's Site reconnaissance was conducted on June 3, 2004, by Mr. Thomas, a Twining environmental assessor. There were no significant limitations encountered, with the exception that the garage, pump houses, tack rooms, and sheds were locked and unaccessible at the time of the Site reconnaissance. The findings of the Site reconnaissance are summarized in the following sections.

3.1 Site Reconnaissance - Description of Structures, Roads, & Other Site Improvements

Numerous unpaved roads traverse the Site. The Site can be accessed from the south from Cochrane Road. The Site reconnaissance is described by parcel in the following paragraphs.

APN 728-37-001

This portion of the Site is a rectangular shaped parcel that is developed as a horse boarding facility with two residences. There are also seven out-buildings on this parcel which include a garage, tack rooms, a pump house, a restroom, and a hay barn. The remainder of this parcel consists of fenced pasture land.

APNs 728-37-002, 005, and 007

This portion of the Site consists of three irregularly shaped parcels that are agriculturally developed and occupied by row crops. There is a small vineyard located at the northern portion of APN 728-37-002. A residence is located near the center of APN 28-37-002. A well pump house and barn are located adjacent to this residence.

APN 728-37-004

This portion of the Site consists of one irregularly shaped parcel that is agriculturally developed with wheat. There were no structures, roads or other Site improvements on this parcel observed during the Site reconnaissance.

3.2 Current Uses of the Site

The Site is currently developed as rural residential properties occupied by a horse boarding facility, agricultural row and wheat crops.

3.3 Current Uses of the Adjoining Properties

The adjoining property to the north is residentially and agriculturally developed. Cochrane Road adjoins the Site to the south. Beyond Cochrane Road is residentially and agriculturally developed land. Adjoining the Site to the west is a Santa Clara Valley Water District (SCVWD) irrigation canal and beyond the irrigation canal is Interstate 101. Beyond Interstate 101 is agriculturally developed land.

3.4 Site Reconnaissance - Specific Indicators of Environmental Concern

Specific indicators of environmental concern were evaluated for the Site and adjacent properties during the Site reconnaissance. The environmental indicators evaluated included the following:

Evidence of hazardous substances and/or wastes were observed at the Site on the day of the Site reconnaissance. Four aboveground storage tanks containing agricultural chemicals were observed adjacent to the residence located on APN 728-37-002 (See ASTs below).

Solid Waste

Solid waste disposal for the Site is by a commercial hauler.

Drums

No drums or containers on-Site that contained hazardous wastes or substances were observed during the Site reconnaissance. However, four ASTs were identified on-Site (See ASTs below)

Underground Storage Tanks (USTs) / Aboveground Storage Tanks (ASTs)

No evidence of USTs were observed at the Site during the Site reconnaissance. However, four 400-gallon ASTs were located adjacent to the residence located on APN 728-37-002. The ASTs were labeled with AN-20, Driphlo acid, Thioal, and KTS. The ASTs are located on pallets on an unpaved surface. No visible contamination was observed beneath the ASTs during the Site reconnaissance. Additionally, one 10,000-gallon AST which contained water for fire safety, was observed west of the barn on APN 728-37-001.

Potential Polychlorinatedbiphenyl (PCB)-Containing Equipment

Twining observed seven pole-mounted transformers throughout the Site (See Site Plan in Appendix A for locations). The transformers are owned and operated by Pacific Gas and Electric Company. No leakage or staining associated with the transformers was observed. Twining did not observe any other equipment located on-Site which might contain PCBs.

Drains and Sumps

No drains or sumps were observed on the Site.

Utilities

Potable water is provided by on-Site water wells. According to the property owners, sewage disposal occurs by way of four on-Site septic tanks. However, the owners were unable to identify the locations of the septic tanks. Electricity for the area is provided by the Pacific Gas and Electric Company. Natural gas is not provided to the Site. Individual propane tanks are located near the residences. Details concerning the on-Site well is described below (See Water Wells below).

Wastewater

Wastewater is not generated at the Site.

Water Wells

Four water wells were observed at the Site. One domestic water well is located on the western portion of APN 728-37-001. A second domestic water well was located in the pump house on the northern portion of APN 728-37-002. Additionally, there is an irrigation water well located south of the pump house on APN 728-37-002. An abandoned irrigation well was observed between APNs 728-37-002 and 728-37-004. The pump was still attached to the abandoned well. However, the electricity for the pump had been disconnected.

Oil and Gas Wells

No on-Site oil or gas wells were identified during the Site reconnaissance or within California Department of Conservation - Division of Oil & Gas maps reviewed during this assessment.

Pits, Ponds, and Lagoons

No pits, ponds, and lagoons were identified on the Site.

Pipelines and Pipes of unknown use or origin.

No pipelines or pipes of unknown use or origin were observed on the Site.

Agriculture Chemicals

Evidence suggesting that agricultural chemicals were stored and formulated was observed during the Site reconnaissance, which is consistent with information provided in the environmental questionnaires. Because agriculture chemicals have been formulated on-Site and applied to portions of the Site, the possibility exists for environmentally persistent agriculture chemicals to remain in Site soils. Without the collection and analysis of soil samples, the environmental concern due to agricultural chemicals is unknown.

Other Physical Evidence of Contamination

No indications of contamination (i.e., stressed vegetation, stained soil and/or unusual odors) were observed on the Site the day of the Site reconnaissance.

4.0 HISTORICAL INFORMATION OF THE SITE AND ADJOINING PROPERTIES.

The history of land-use on and near the Site was determined from interviews, review of historic aerial photographs and topographic maps, Sanborn Fire Insurance maps, building permits, and historic city directories.

4.1 Aerial Photograph and Topographic Map Review

Available historical aerial photographs of the Site and vicinity for the years 1937, 1941, 1957, 1973, and 1999, were reviewed for indications of past use and/or activities which may have involved the manufacture, generation, use, storage, and/or disposal of hazardous materials. Additionally, historical topographic maps for the years 1917, and 1980 were reviewed for indications of past use of the Site. The aerial photographs and topographic maps were reviewed at the Earth Science Library, at the University of California, Berkeley, on Thursday, March 18, 2004.

- The 1917 topographic map reviewed for the Site identified two structures on-Site surrounded by agricultural land. The adjoining properties also appear to be in agriculture production.

- The 1937, 1941, 1957, and 1973 aerial photographs depict the Site with two rural residences surrounded by agricultural land. The adjoining properties also appear to be in agricultural production.

- The 1999 aerial photograph depicts the Site as it appeared during the Site reconnaissance. The adjoining properties to the north and south are residentially and agriculturally developed. The adjoining properties to the east and west are agriculturally developed.

- The 1980 topographic map reviewed for the Site identified two structures on-Site surrounded by agricultural land. The adjoining properties also appear to be in agriculture production.

4.2 Sanborn Fire Insurance Map Review

Twining reviewed Sanborn Fire Insurance Maps online at http://sanborn.umi.com, sponsored by Bell & Howell UMI. Sanborn Maps can provide historical information regarding a site. The available Sanborn Fire Insurance Maps for the city of San Jose do not include the Site.

4.3 Historical City Directory Review

City directories published by R.L. Polk Company (Polk) were reviewed at the Santa Clara County Library, located in San Jose, California. City directories can provide information concerning past and current occupancy of the Site. No city directories were identified for the Site.

4.4 Building Permit Review

The city of Morgan Hill Building Department (CMHBD), in Morgan Hill, California was contacted for information regarding the Site. No building permits were on file with the CMHBD for the Site.

4.5 Interviews and Discussion of Environmental Questionnaire and Disclosure Statement

Environmental Questionnaire and Disclosure Statements were submitted to the Site owners. Prior to the completion of this report, the questionnaire submitted to Mr. Sullivan had not been returned.

One questionnaire was completed and returned to Twining by Ms. Millard-Low. Additionally, Ms. Millard- Low was interviewed by Twining via telephone for information regarding the Site. Ms. Millard-Low, indicated during the telephone interview that she has owned APN 728-37-001 since 1977 and had no knowledge of any on-Site hazardous material storage, nor information regarding releases, or spills of hazardous materials at the Site as a result of illegal dumping, or traffic accidents along the adjoining roadways. Additionally, Ms. Millard-Low indicated that fill soil was placed throughout the Site. According to Ms. Millard-Low, imported fill soil was generated as a result of a Santa Clara Water District pipeline project that was installed approximately one mile north of the Site. The portion of the pipeline from which imported fill soil was derived was rangeland and agricultural land. No chemical analytical information for the imported fill soil was available. Ms. Millard-Low, further indicated that she had no knowledge of any current or former AST or USTs on her portion of the Site.

The second questionnaire was completed and returned to Twining by Mr. Guglielmo. Mr. Guglielmo, indicated in the questionnaire that he has owned APNs 728-37-002, 728-37-007, and 728-37-005 since 1940 and that the Site has been in agricultural use since. Mr. Guglielmo, knew of no spills of hazardous materials at the Site as a result of illegal dumping, or traffic accidents along the adjoining roadways. Mr. Guglielmo, further indicated that he had no knowledge of any current or former AST or USTs on his portion of the Site.

A copy of the questionnaires completed by Mr. Guglielmo and Ms. Millard-Low are presented in Appendix C.

4.6 Previous Investigations

Twining was not supplied with previous environmental investigations pertaining to the Site, nor were any identified during this Phase I.

4.7 Past Uses of the Site

Based on the historical information acquired during this Phase I, the following summarizes the past uses of the Site: The Site appears to have been agriculturally developed with rural residences from at least 1917, to the present.

4.8 Past Uses of the Adjoining Properties

Based on the historical information acquired during this Phase I, the following summarizes the past uses of the adjoining properties: All adjoining properties appear to have been agriculturally developed with scattered rural residences since at least 1917 to the present.

5.0 RECORDS REVIEW

Twining contracted Track Info Services (TIS) to search available federal, state, and local database information systems for the purpose of identifying known recognized environmental conditions present on the Site and nearby properties which have the potential to adversely impact the Site being assessed in this study. Information regarding the list, record, and permit review findings is summarized in Table 1. The complete report furnished by TIS is included in Appendix D.

TABLE 1
SUMMARY OF REGULATORY LISTS SEARCHED BY TIS AND RECORDS REVIEWED

SOURCE	SEARCH RADIUS (mile)	PROXIMITY TO SITE (miles)				
		ON-SITE	Within ¼	¼-½	½-1	½-1
FEDERAL, NPL	1	NONE	NONE	NONE	NONE	NONE
FEDERAL, CERCLIS List	½	NONE	NONE	NONE	NONE	NA
FEDERAL, RCRA CORRACTS Facilities	1	NONE	NONE	NONE	NONE	NONE
FEDERAL, RCRA, Non-CORRACTS TSD Facilities	½	NONE	NONE	NONE	NONE	NONE
FEDERAL, RCRA Generators	Site and adjoining	NONE	NONE	NA	NA	NA
FEDERAL, ERNS List	Site	NONE	NONE	NONE	NA	NA
STATE (AWP, Cal Sites, CHMIRS, Notify 65 and Toxic Pits)	1	NONE	NONE	NONE	NONE	1
STATE (Cortese, CA Bond EXP. Plan)	1	NONE	NONE	NONE	NONE	NONE
STATE, Landfill, WMUDS/SWAT, VCP	½	NONE	NONE	NONE	NONE	NA
STATE, SWRCB List of Registered USTs	1/4	NONE	NONE	NONE	NA	NA
STATE, RWQCB Facilities with Leaking USTs	½	NONE	NONE	NONE	NONE	NA
Oil/Gas Wells, Munger Map Book	Site	NONE	NONE	NA	NA	NA

NA = Not Applicable

5.1 Facilities Identified in the Regulatory Lists and Record Review

One facility, located with a half mile of the Site, was listed on the Cal State database. The listed facility was Madrine land Corporation, San Jose Trap and Sheet located at 645 Cochrane Road, approximately 0.44 miles south west of the Site. Based on distance and direction this facility is not considered to pose an environmental threat to the Site. Therefore, it is Twining's opinion that the environmental concern presented to the Site from off-Site sources appears low.

6.0 SUMMARY OF FINDINGS

The findings of the Phase I are summarized in the following sections:

6.1 On-Site

Based on the historical information acquired during this Phase I, the following summarizes the past uses of the Site: The Site appears to have been agriculturally developed with rural residences from at least 1917, to the present. Agricultural chemicals have reportedly been applied to the Site. Mr. Guglielmo provided a list of permitted agricultural chemicals applied to the Site. In addition four ASTs which appeared to contain agricultural chemicals (AN-20, Driphlo acid, Thioal, and KTS) were observed on-Site during the site reconnaissance. According to Ms. Millard-low, imported fill soil was applied to portions of her property. Ms. Millard-low, further indicated that the imported fill soil was derived was rangeland and agricultural land. No chemical analytical information for the imported fill soil was available. Mr. Guglielmo and Ms. Millard-low, had no knowledge of current or former USTs on-Site. Additionally, no USTs were identified during the Site reconnaissance. Although no USTs were identified during the Site reconnaissance and none were indicated from the current owners, the possibility exists that heating oil tanks may be present at the residence built in 1912. Additionally, USTs related to farming activities may also be present and unknown to the current owners.

6.2 Off-Site

Based on the historical information acquired during this Phase I, the following summarizes the past uses of the adjoining properties: All adjoining properties appear to have been agriculturally developed with rural residences since at least 1917 to the present. Investigations regarding facilities in the vicinity of the Site are either closed, or based on distance and direction are not considered to pose an environmental threat to the Site. Therefore, it is Twining's opinion that the environmental concern presented to the Site from off-Site sources appears low.

7.0 CONCLUSIONS

On behalf of Browman Development Company, Twining has performed a Phase I for the property located at the northeast corner of the intersection of Interstate 101 and Cochrane Road, in the city of Morgan Hill, Santa Clara County, California. This Phase I was performed during June 2004, and includes property that has been agriculturally and residentially developed since at least 1917. This Phase I has not identified any recognized environmental conditions in connection with the Site with the exception of the following:

- Because agriculture chemicals have been formulated and used on-Site the possibility exists that Site soils may have been impacted by environmentally persistent agricultural chemicals. Without the collection and analyses of soil samples, the impact to the Site is unknown.

- Fill soil was imported throughout Ms. Millard-Lows property. The imported fill soil was generated as a result of a Santa Clara Water District pipeline project that was installed approximately one mile north of the Site. The portion of the pipeline from which imported fill soil was derived was rangeland and agricultural land. Without the collection and analyses of soil samples, the impact to the Site form the imported fill soil is unknown.

The following is considered to be an environmental concern:

- Four water wells were observed at the Site during the Site reconnaissance. Although the water wells are not considered recognized environmental conditions, they are considered a concern if they are not to be used in the future and are not properly abandoned. In the event that hazardous materials are spilled or dumped in, or near water wells, the wells can act as direct conduits for these contaminants to enter the groundwater beneath the Site. Therefore, if these wells are taken out of service, Twining recommends properly abandoning the wells in accordance with State of California Department of Water Resources standards for water well abandonment.

Twining recommends that if the on-Site water wells are not being utilized for future use at the Site, they should be destroyed in accordance with the State of California Department of Water Resources and county regulations.

8.0 CLOSING

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-00 of the Site. Any exceptions to, or deletions from, this practice are described in the following paragraph.

The material content of this report is intended to be consistent with a standard of practice as defined by ASTM practice E 1527-00. However, the report format differs in style, arrangement, and presentation of material facts from the format described by ASTM.

We appreciate the opportunity to be of service to you on this project. If you have questions regarding this report, please feel free to contact us at (559) 268-7021.

Sincerely,

THE TWINING LABORATORIES, INC.
Environmental Services Division

DRAFT

Timothy W. Thomas
Environmental Assessor

DRAFT

William R. Cooper
Senior Environmental Assessor

DRAFT

Jason R. Paul
Environmental Services Division Manager

9.0 REFERENCES

American Society for Testing and Materials, 2000, *ASTM Standards on Environmental Site Assessments for Commercial Real Estate*, 2nd ed., E 1527-00, Philadelphia, Pennsylvania.

Munger, Averill H., Ed. 1994. *Munger Map Book, California-Alaska Oil and Gas Fields*. Munger: Los Angeles, California.

United Sates Department of Agriculture, 1971, *Soil Survey of Santa Clara County, California,* SoilConservation Service in cooperation with the California Agricultural Experiment Station, U.S. Government Printing Office, Washington D.C.

United States Geological Survey, 1917 photorevised 1980, Moran Hill, California Quadrangle, 7.5 Minute Series Topographic Map.

10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

The Twining Laboratories, Inc. Phase I Environmental Site Assessment staff is composed of a group of environmental professionals that perform Environmental Site Assessments on a routine basis. The Phase I staff is managed and supervised by individuals who conduct, prepare, oversee, and/or review Environmental Site Assessments on a daily basis. Qualification profiles for these individuals are provided in the following section.

Timothy W. Thomas
Environmental Assessor

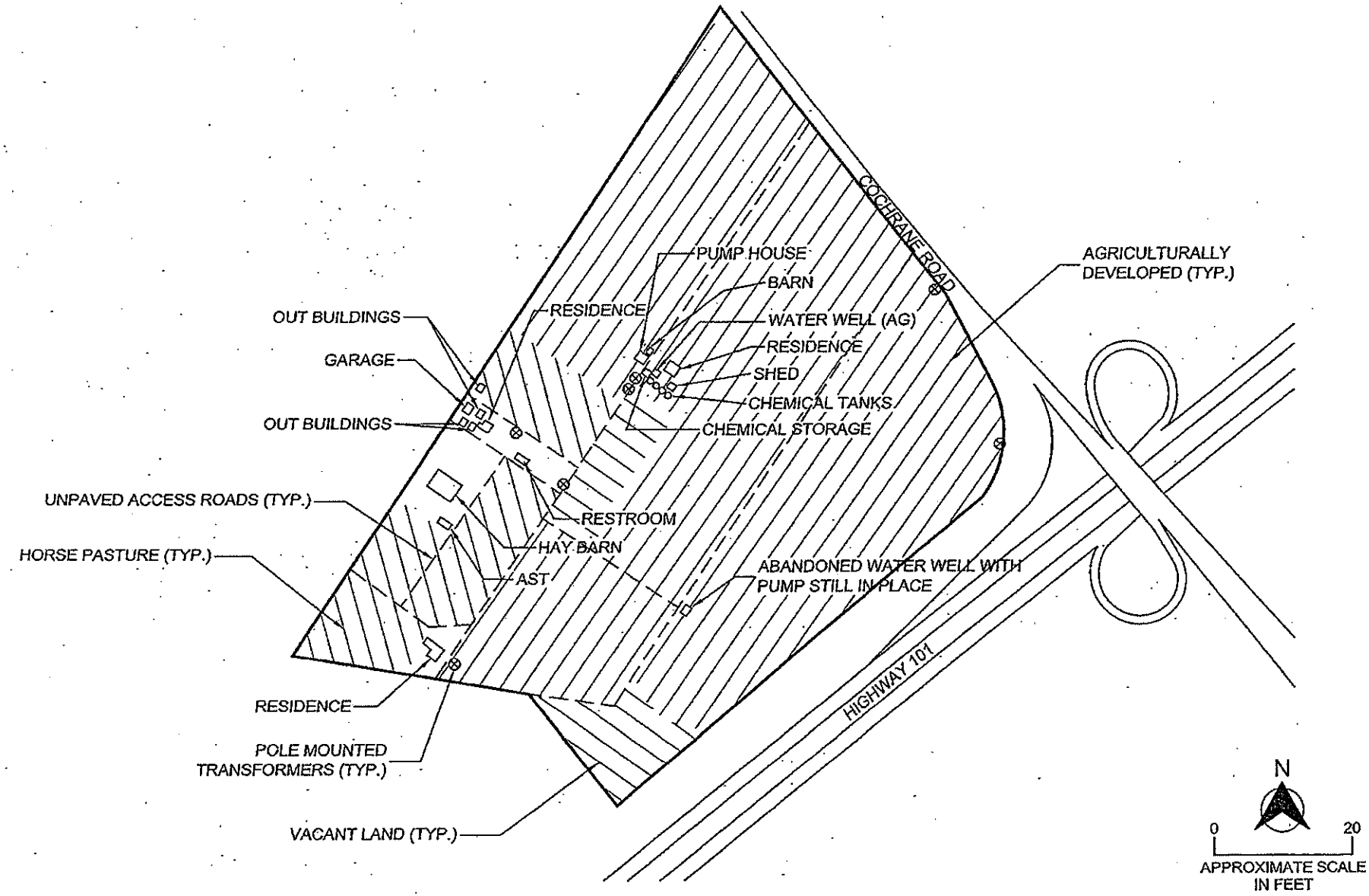
Mr. Thomas joined Twining's Environmental Division in May of 2002. Since joining Twining, Mr. Thomas has attended training courses for conducting Phase I environmental site assessments, and asbestos surveys. Mr. Thomas has successfully completed these courses and has received a site surveillance technician certification for conducting asbestos surveys. Mr. Thomas has performed more than fifty Phase I Environmental Site Assessments, Updates, and Real Estate Transaction Screens since May of 2002.

William R. Cooper
Manager/Environmental Site Assessments

Mr. Cooper received a Bachelor of Arts degree in Geology from California State University Fresno in 1979, and is a State of California Registered Geologist, # 7427. He was professionally engaged in the petroleum industry in various capacities from 1980 through 1994. Mr. Cooper joined the environmental industry in 1994, and has been engaged as a project geologist and environmental assessor for several environmental services companies specializing in Preliminary Site Assessments, UST programs, soil and groundwater assessment, and cleanup programs. Mr. Cooper has performed numerous Phase I Environmental Site Assessments. Since joining Twining in 2001, he has participated in over three-hundred Environmental Site Assessments on diverse properties throughout California and Washington.

APPENDIX A

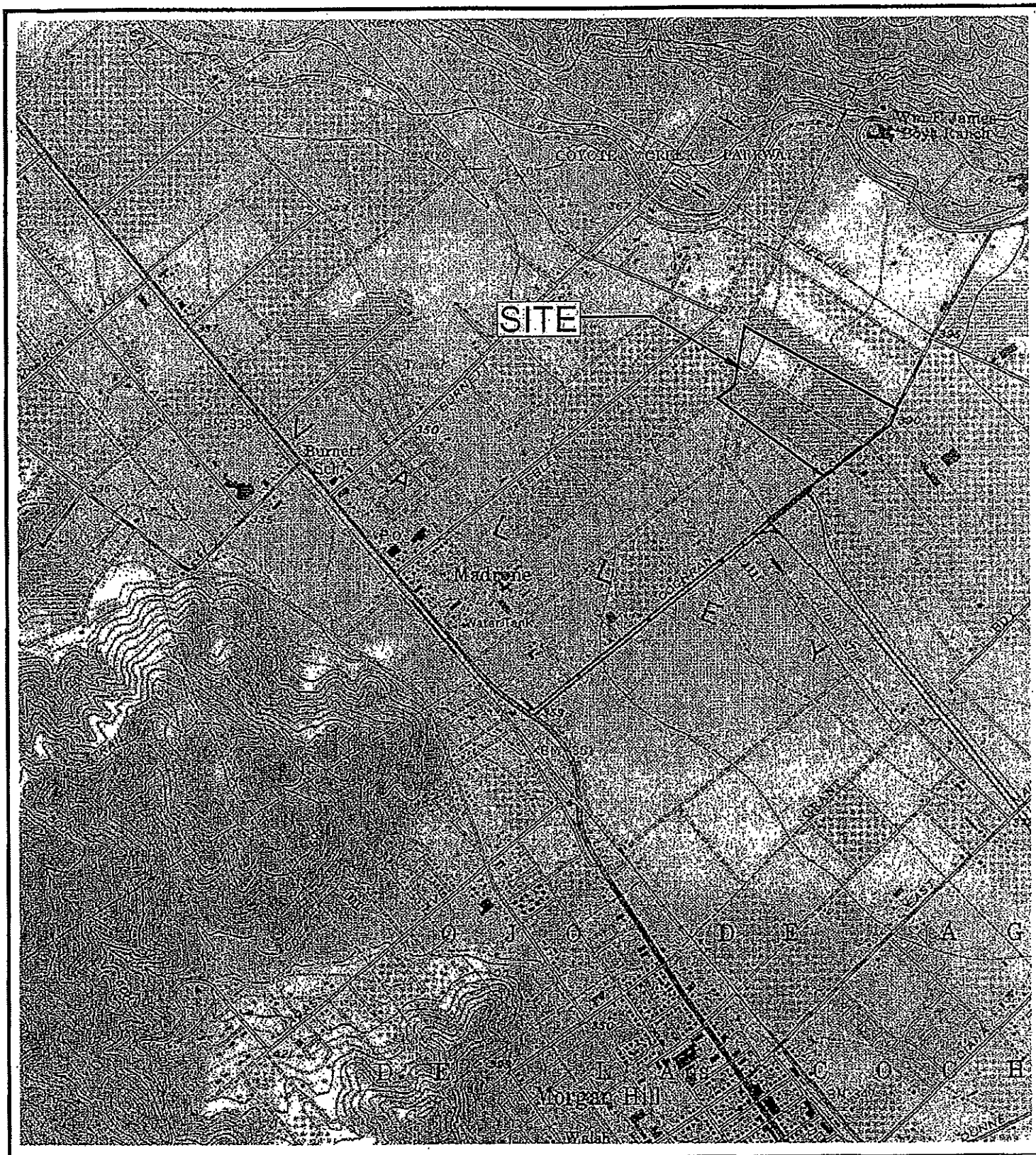
DRAWINGS



SITE PLAN
BROWMAN DEVELOPMENT
MORGAN HILL SHOPPING CENTER
MORGAN HILL, CALIFORNIA

FILE NO. 07261-01-02	DATE DRAWN: 06/10/04
DRAWN BY: WME	APPROVED BY:
PROJECT NO. A07261.01	DRAWING NO. 2

THE TWINING LABORATORIES, INC.
EST. 1898
FRESNO/MODESTO/VISALIA/BAKERSFIELD/MONTEREY



SOURCE: U.S.G.S. TOPOGRAPHIC MAP, 7 ½ MINUTE SERIES
MORGAN HILL, CALIFORNIA QUADRANGLE, PHOTOREVISED 1980

0 2000
APPROXIMATE SCALE IN FEET

SITE LOCATION MAP
BROWMAN DEVELOPMENT
MORGAN HILL SHOPPING CENTER
MORGAN HILL, CALIFORNIA

FILE NO.: 07261-01-01	DATE: 06/10/04
DRAWN BY: WME	APPROVED BY:
PROJECT NO. A07261.01	DRAWING NO. 1

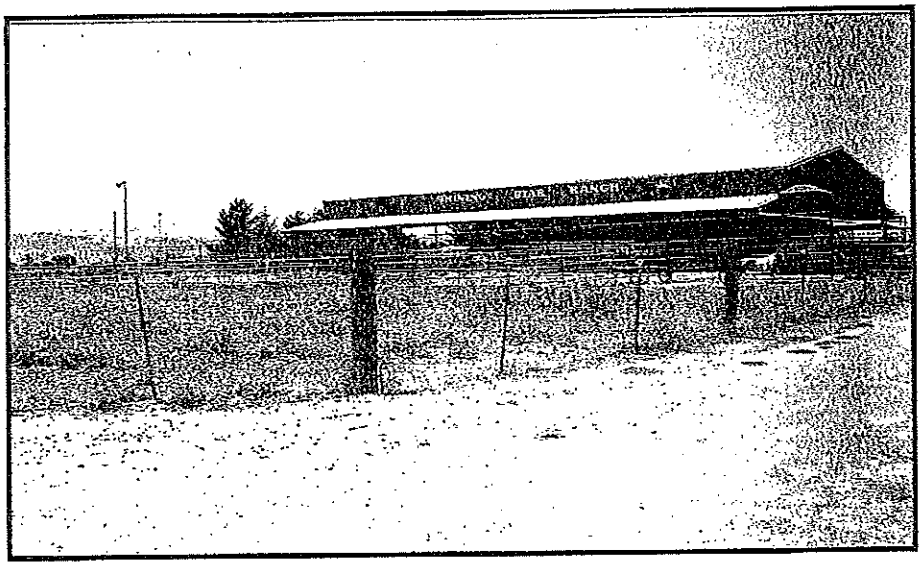
THE TWINING LABORATORIES, INC.
EST. 1898
FRESNO/MODESTO/VISALIA/BAKERSFIELD/MONTEREY

APPENDIX B

SITE PHOTOGRAPHS

PHOTOGRAPH 1

(Millerd-Low Property) Typical view of the hay barn looking northwest.



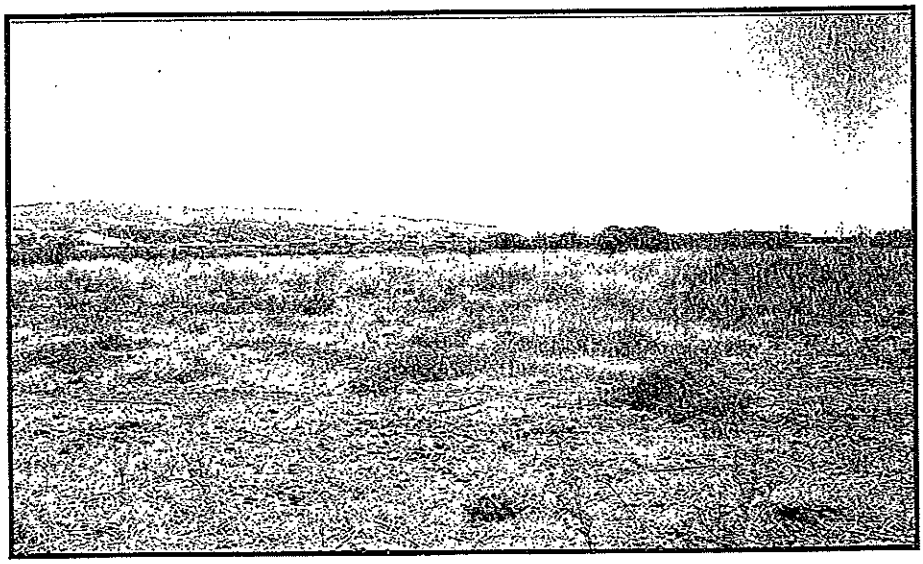
PHOTOGRAPH 2

(Millerd-Low Property) Typical view of the residence located at the southeastern portion of the property.



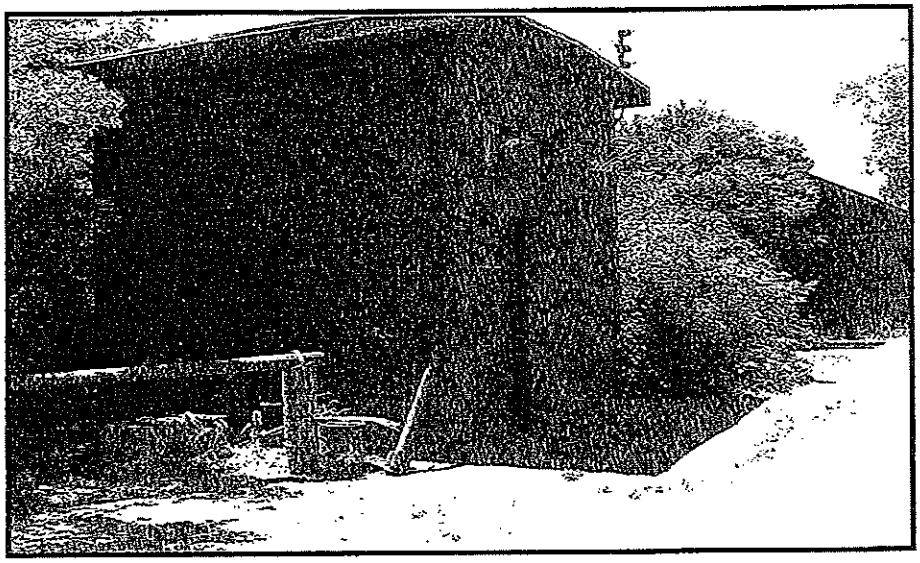
PHOTOGRAPH 3

(Millerd-Low Property) Typical view of the property looking south from the eastern portion of the Site.



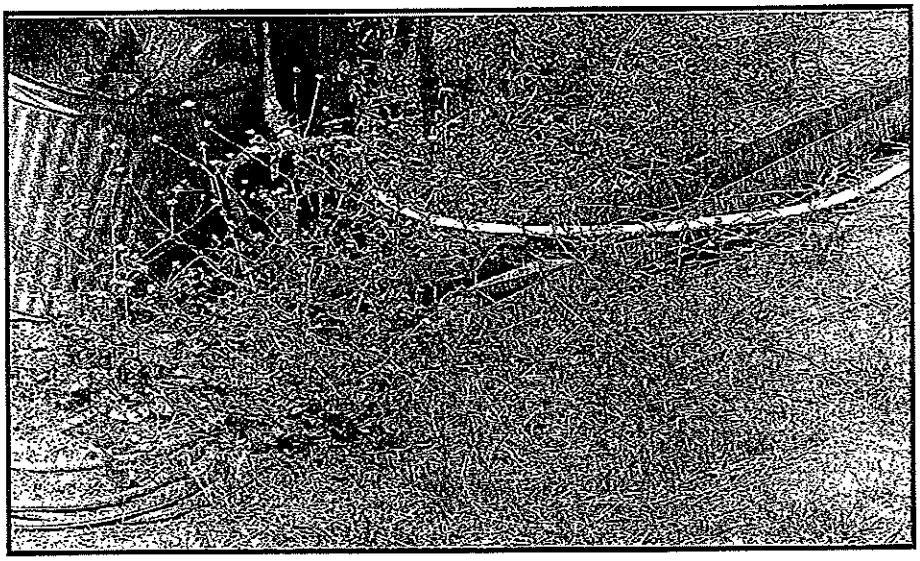
PHOTOGRAPH 4

(Millerd-Low Property) View of the pump house located on the eastern portion of the property.



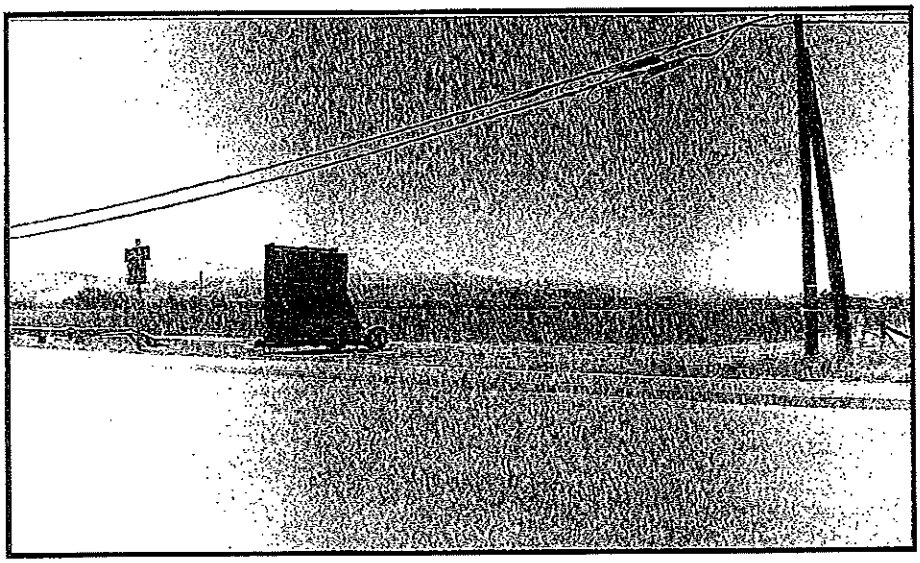
PHOTOGRAPH 5

(Millerd-Low Property) View the septic tank drain located west of the exterior restroom.



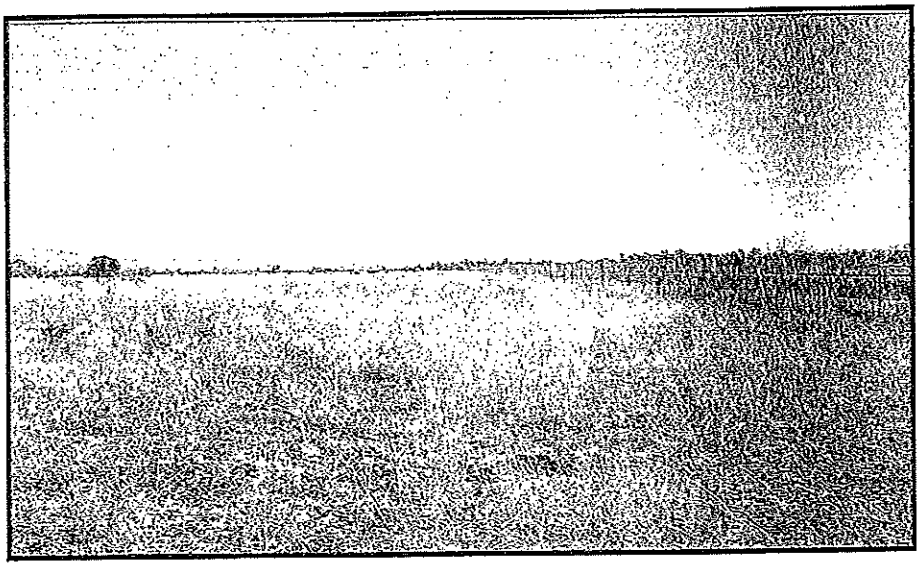
PHOTOGRAPH 6

(Guglielmo Property) Typical view of the property looking northwest from the southeast corner of the Site.



PHOTOGRAPH 7

(Guglielmo Property) Typical view of the property looking south from the northwest corner of the Site.



PHOTOGRAPH 8

(Guglielmo Property) Typical view of the vineyard.



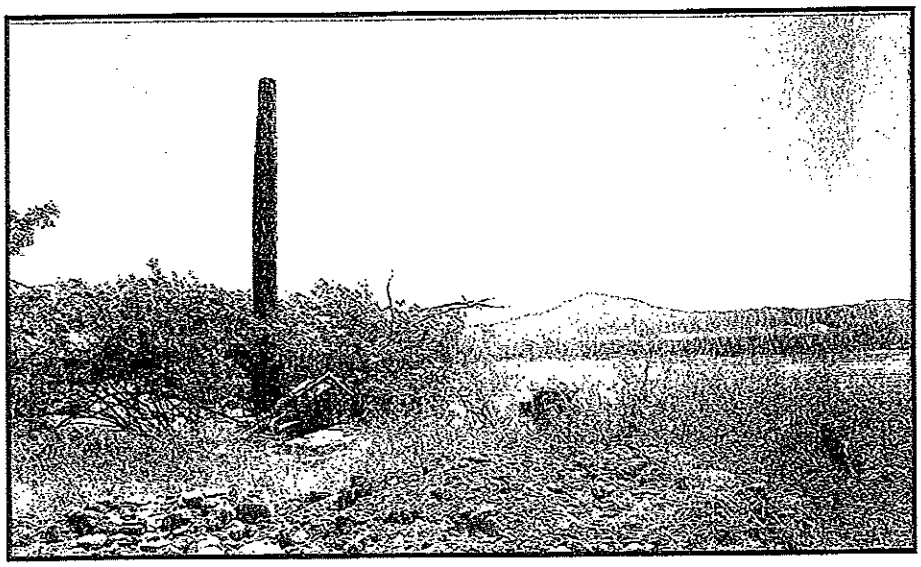
PHOTOGRAPH 9

(Guglielmo Property) Typical view of the property looking east from the pump house.



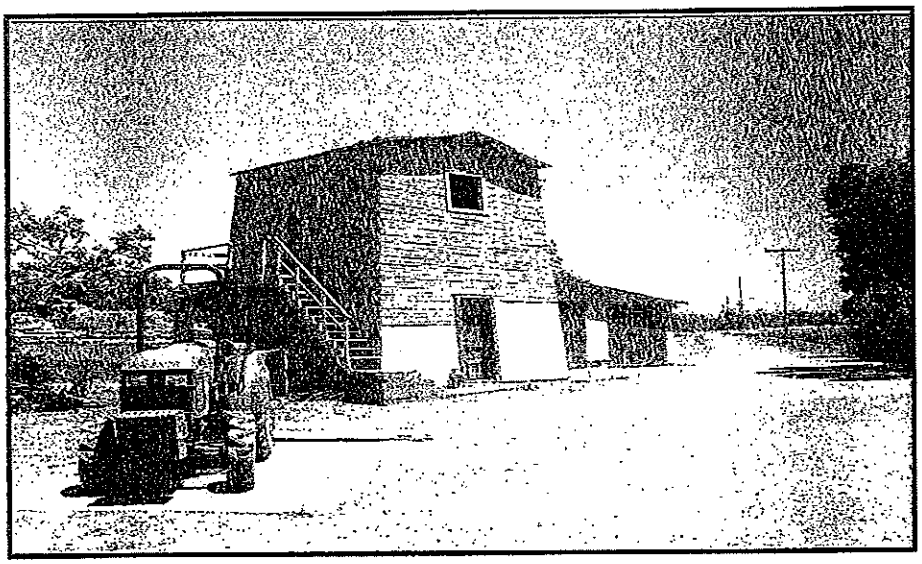
PHOTOGRAPH 10

(Between Guglielmo Property and Sullivan Property) View of the abandoned irrigation well.



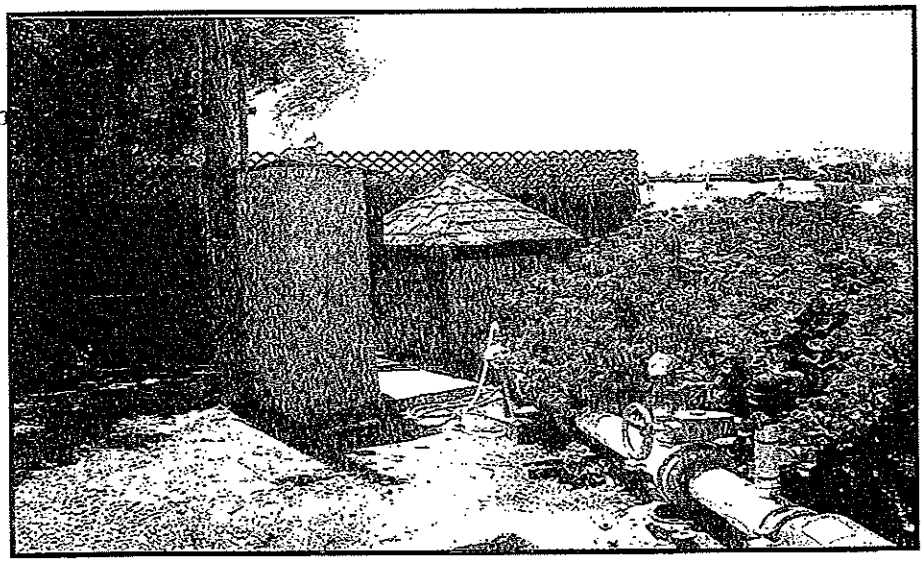
PHOTOGRAPH 11

(Guglielmo Property) Typical view of pump house looking south.



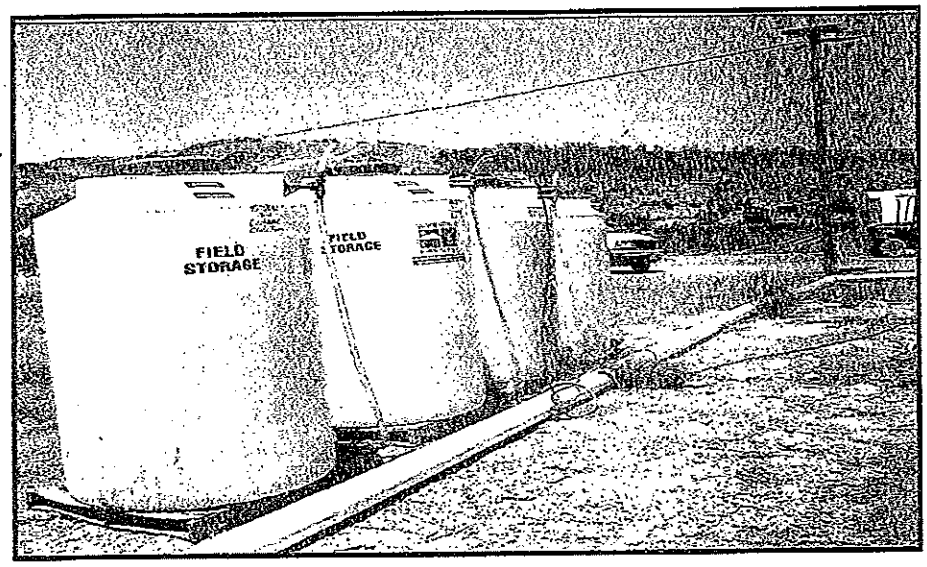
PHOTOGRAPH 12

(Guglielmo Property) View of irrigation well looking west.



PHOTOGRAPH 13

(Guglielmo Property) View of the agriculture chemical tanks looking east.



PHOTOGRAPH 14

(Sullivan Property) Typical view of the property looking north from the southwestern portion of the Site



PHOTOGRAPH 15

(Sullivan Property) Typical view of the property looking west from Cochrane Road.



APPENDIX C

ENVIRONMENTAL QUESTIONNAIRE

AND DISCLOSURE STATEMENTS

ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT

GENERAL INSTRUCTIONS: Please fill-in the blanks to the best of your ability. If you do not know the answer, please check the "DON'T KNOW" box. If you answer "YES" or the answer requires explanation please use additional pages and reference the table. Thank you, for your time and cooperation.

SITE INFORMATION	
Current Site Address	1195 COCHRANE RD.
Current Site Use	EQUINE FACILITY
Current Site Zoning	REG; RETAIL
Current Assessor's Parcel Number	
Addresses Formerly Assigned to Site (if any)	N/A

SITE OWNERSHIP AND PAST USE			
	OWNER NAME, ADDRESS & PHONE	PERIOD OF OWNERSHIP/USE	TYPE OF USE
CURRENT	JOHN MILLER-Lou	27 YRS	EQUINE FACILITY
FORMER	TEX CARMICHAEL ~~UNKNOWN~~		EQUINE FACILITY
FORMER	DOOLEY		PRUNES

ADJACENT PROPERTY USE		
DIRECTION	TYPE OF USE	LENGTH OF USE
North	HORSE PASTURE	27+ YRS.
East	VINEYARD	100 YRS.
South	ROW CROPS PEPPER FIELDS	" "
West	VINEYARD	" "

EXISTING SITE STRUCTURES			
STRUCTURE DESCRIPTION	LOCATION	USE	DATE OF CONSTRUCTION
HOUSE		HOME	1912
HOUSE		HOME	1940
STEEL BARN SHED POLE BARN GARAGE / WELL HOUSE			UNKNOWN

FORMER SITE STRUCTURES			
STRUCTURE DESCRIPTION	FORMER LOCATION	USE	DATE OF DEMOLITION
UNKNOWN			
UNKNOWN			

SITE ADDRESSES		
NAME, ADDRESS & PHONE #	LENGTH OF LEASE	TYPE OF USE
PRESENT: 1195 COCHRANE ROAD	N/A	N/A
FORMER:		
FORMER:		

SITE UTILITIES	
UTILITY	PROVIDER
Electricity TO SITE	P.G.&E
Natural Gas ~~NONE~~ NONE	
Drinking Water WELL	PRIVATE WELL ON SITE
Storm water Drainage NONE	
Solid Waste Disposal NONE	
Sanitary Sewer SEPTIC 3 TANKS	
Emergency Power Source NONE	

********** *PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS* **********

	SPECIFIC USES OF SITE OR ADJACENT PROPERTY	SITE			ADJACENT		
		YES	NO	DON'T KNOW	YES	NO	DON'T KNOW
1	Agricultural chemical formulation, distribution, or application		X		X		
2	Airport and/or airplane maintenance		X			X	
3	Automotive wrecking yard		X			X	
4	Bulk chemical or fuel storage		X			X	
5	Commercial printing		X			X	
6	Dry cleaning		X			X	
7	Landfill		X			X	
8	Metal plating or finishing		X			X	
9	Mining or minerals processing		X			X	
10	Motor vehicle or equipment repair and/or maintenance		X			X	
11	Photographic laboratory		X			X	
12	Service station		X			X	
13	Skeet shooting or gun club		X			X	
14	Releases, or spills of hazardous materials as a result of illegal dumping, or traffic accidents along the adjoining roadways.		X			X	
15	Waste treatment, storage, disposal, processing or recycling, other than a landfill		X			X	

* "Adjacent Property" includes those properties that border the immediate site and properties located across the street from the site.

********** *PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS* **********

	ON-SITE HAZARDOUS MATERIALS USE, STORAGE AND DISPOSAL	YES	NO	DON'T KNOW
1	Are asbestos-containing materials present in on-site structures?		X	X
2	Has an asbestos survey been conducted for on-site structures?		X	
3	Are any electrical transformers or capacitors on-site?			X
4	Are any electrical transformers or capacitors on-site not owned by an electrical utility?		X	
5	Has an Environmental Audit or Assessment been conducted for the site?	X		
6	Do you know of any current or former aboveground storage tanks?	X		
7	Do you know of any current or former underground storage tanks (not septic)?		X	
8	Do you know of any fill dirt having been imported to the site?	X		
9	Do you know of any current or former wells on site, including, domestic drinking water, irrigation water, disposal, oil and/or abandoned wells?	X		X
10	Do you know of any pesticides/herbicides permits for the site?		X	
11	Do you know of any pesticides/herbicides stored or used on-site?		X	
12	Are solvents, petroleum products, or paint products stored on-site? CANS	X		
13	Are ~~you aware~~ of any permits having been issued for the site by the local fire, environmental health, or air pollution control agencies? WATER TANK	X		

DONE BY CITY OF MORGAN HILL IN MID-90 FOR AUTO MALL

********** *PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS* **********

#	SITE WASTE GENERATION, STORAGE AND DISPOSAL	YES	NO	DON'T KNOW
1	Is liquid waste disposed of to a septic tank on-site?	X	X	
2	Is liquid waste disposed of elsewhere on-site?		X	
3	Are any ponds, sumps, basins, lagoons, or clarifiers used on-site to collect, treat, or dispose of liquid?		X	
4	If liquid waste is disposed of on-site, is a waste discharge permit required?		X	
5	Is liquid waste disposed of to an off-site treatment works?		X	
6	Is solid waste disposed of on-site (burned or buried)?		X	
7	Does any solid or liquid off-site waste disposal require a waste manifest or disposal permit?		X	
8	Is any hazardous waste generated, stored, or treated on-site?		X	
9	Are any spills or releases of hazardous materials known or suspected to have occurred at the site?		X	
10	Is there another individual who may have additional or more complete information regarding the former use and activities at the site?		X	

Please provide details of any investigations of an environmental or geotechnical nature that have been performed by you or by others related to the subject property. If you are not aware of any investigation(s) that have been performed in the past regarding the subject property, whether or not a report was ever prepared and/or issued to you, please so state in the space below.

EIR DONE BY CITY OF MORGAN HILL 90'S

Please provide details of any conditions known to you that could represent an environmental impairment to the subject property other than those items previously noted in this questionnaire. If you are not aware of any conditions, please so state in the space below.

DON'T KNOW OF ANY

To your knowledge, has the property been subject to any regulatory action related to environmental conditions, whether or not a report was issued to you or filed with a regulatory agency. If you are not aware of any actions, please so state in the space below.

NOT AWARE OF ANY REGULATORY

THIS ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT WAS PREPARED BY:

NAME ROBERT LANGLOIS TITLE

FIRM GRUBB & ELLIS CO. RELATIONSHIP TO SITE

ADDRESS

TELEPHONE NUMBER 408.453.2318 DATE

PREPARER REPRESENTS THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE THE ABOVE STATEMENTS AND FACTS ARE TRUE AND CORRECT AND THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE NO MATERIAL FACTS HAVE BEEN SUPPRESSED OR MISSTATED.

Signed _____ Date 6/4/04

OWNER Jean Millendorf DATE 6-4-04

PHONE # 408-779-9240

ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT

GENERAL INSTRUCTIONS: Please fill-in the blanks to the best of your ability. If you do not know the answer, please check the "DON'T KNOW" box. If you answer "YES" or the answer requires explanation please use additional pages and reference the table. Thank you, for your time and cooperation.

SITE INFORMATION	
Current Site Address	
Current Site Use	Agriculture
Current Site Zoning	?
Current Assessor's Parcel Number	?
Addresses Formerly Assigned to Site (if any)	

SITE OWNERSHIP AND PAST USE			
	OWNER NAME, ADDRESS & PHONE #	PERIOD OF OWNERSHIP/USE	TYPE OF USE
CURRENT	Bugliarmo	1940→	Ag
FORMER	X		
FORMER	X		

ADJACENT PROPERTY USE		
DIRECTION	TYPE OF USE	LENGTH OF USE

North	AG	
East	Ag	
South	Hospital	
West	Ag	

EXISTING SITE STRUCTURES			
STRUCTURE DESCRIPTION	LOCATION	USE	DATE OF CONSTRUCTION
Dwelling		Rented	1930
Tank House		Well	1930

FORMER SITE STRUCTURES			
STRUCTURE DESCRIPTION	FORMER LOCATION	USE	DATE OF DEMOLITION
Barn	Next to Tank House	storage	1980

SITE LESSEES		
NAME, ADDRESS & PHONE #	LENGTH/YEARS OF LEASE	TYPE OF USE
PRESENT: Chiala Farms	1 yr	Agriculture
779-0562		

SITE UTILITIES	
UTILITY	**PROVIDER**
Electricity yes	PG&E
Natural Gas NO	
Drinking Water Yes	Well
Storm water Drainage No	
Solid Waste Disposal	
Sanitary Sewer yes	Septic Tank
Emergency Power Source No	

********** *PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS* **********
Additional space is provided on page 7

#	SPECIFIC USES OF SITE AND ADJACENT PROPERTY*	SITE			ADJACENT		
		YES	NO	DON'T KNOW	YES	NO	DON'T KNOW
1A	Agricultural chemical formulation, distribution, or application	✓					✓
2A	Airport and/or airplane maintenance		✓			✓	
3A	Automotive wrecking yard		✓			✓	
4A	Bulk chemical or fuel storage		✓			✓	
5A	Commercial printing		✓			✓	
6A	Dry cleaning		✓			✓	
7A	Landfill		✓			✓	
8A	Metal plating or finishing		✓			✓	
9A	Mining or minerals processing		✓			✓	
10A	Motor vehicle or equipment repair and/or maintenance		✓			✓	
11A	Photographic laboratory		✓			✓	
12A	Service station		✓			✓	

13A	Skeet shooting or gun club		✓				✓
14A	Releases, or spills of hazardous materials as a result of illegal dumping, or traffic accidents along the adjoining roadways.		✓				✓
15A	Waste treatment, storage, disposal, processing or recycling, other than a landfill		✓			✓	

* "Adjacent Property" includes those properties that border the immediate site and properties located across the street from the site.

1A Grapes were Grown on this property
Herbicides + Fungicides were used
1) Roundup 2) Wettable Sulfer

********** *PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS* **********
Additional space is provided on page 7

#	ON-SITE HAZARDOUS MATERIALS USE, STORAGE AND DISPOSAL	YES	NO	DON'T KNOW
1B	Are asbestos-containing materials present in on-site structures?		✓	
2B	Has an asbestos survey been conducted for on-site structures?		✓	
3B	Are any electrical transformers or capacitors on-site?	✓		
4B	Are any electrical transformers or capacitors on-site not owned by an electrical utility?		✓	
5B	Has an Environmental Audit or Assessment been conducted for the site?			✓
6B	Do you know of any current or former aboveground storage tanks?		✓	
7B	Do you know of any current or former underground storage tanks (not septic)?		✓	
8B	Do you know of any fill dirt having been imported to the site?		✓	
9B	Do you know of any current or former wells on site, including, domestic drinking water, irrigation water, disposal, oil and/or abandoned wells?	✓		
10B	Do you know of any pesticides/herbicides permits for the site?	✓		
11B	Do you know of any pesticides/herbicides stored or used on-site?	✓		
12B	Are solvents, petroleum products, or paint products stored on-site?		✓	
13B	Are you aware of any permits having been issued for the site by the local fire, environmental health, or air pollution control agencies?	✓		

9B 1. Domestic Well
1 Ag Well
1 Abandon. Well

********** *PLEASE PROVIDE DETAILS FOR ALL YES ANSWERS* **********
Additional space is provided on page 7

#	SITE WASTE GENERATION, STORAGE AND DISPOSAL	YES	NO	DON'T KNOW
1C	Is liquid waste disposed of to a septic tank on-site?	✓		
2C	Is liquid waste disposed of elsewhere on-site?		✓	
3C	Are any ponds, sumps, basins, lagoons, or clarifiers used on-site to collect, treat, or dispose of liquid?		✓	
4C	If liquid waste is disposed of on-site, is a waste discharge permit required?			✓
5C	Is liquid waste disposed of to an off-site treatment works?		✓	
6C	Is solid waste disposed of on-site (burned or buried)?		✓	
7C	Does any solid or liquid off-site waste disposal require a waste manifest or disposal permit?			✓
8C	Is any hazardous waste generated, stored, or treated on-site?		✓	
9C	Are any spills or releases of hazardous materials known or suspected to have occurred at the site?		✓	
10C	Is there another individual who may have additional or more complete information regarding the former use and activities at the site?		✓	

Please provide details of any investigations of an environmental or geotechnical nature that have been performed by you or by others related to the subject property. If you are not aware of any investigation(s) that have been performed in the past regarding the subject property, whether or not a report was ever prepared and/or issued to you, please so state in the space below.

None to my knowledge

Please provide details of any conditions known to you that could represent an environmental impairment to the subject property other than those items previously noted in this questionnaire. If you are not aware of any conditions, please so state in the space below.

None known

To your knowledge, has the property been subject to any regulatory action related to environmental

conditions, whether or not a report was issued to you or filed with a regulatory agency. If you are not aware of any actions, please so state in the space below.

PLEASE INDICATE IN THE BOXES BELOW IF THE FOLLOWING ITEMS EXIST AND IF YOU ARE ABLE TO PROVIDE THEM
Additional space is provided on page 7

	DOCUMENTS, REPORTS, LISTS, PLANS AND MAPS	Exists/Will Provide Copy	Exists/Will Not Provide Copy	Does Not Exist	Don't Know
1D	Site plans and/or maps that include legal property boundaries				✓
2D	Building plans (architectural, utilities and structural)				
3D	Hazardous materials inventory			✓	
4D	Hazardous waste inventory			✓	
5D	Previously conducted Environmental Site Assessments				✓
6D	Reports of subsurface investigations performed on the site including analytical data				✓
7D	Reports of subsurface investigations performed on adjacent properties including analytical data				✓
8D	Previously conducted geotechnical/ soil investigations at the Site				✓
9D	Permits and location of USTs, sumps, pits, and drainage systems				✓
10D	Environmental permits and plans, including hazardous materials management plans, UST closure, etc.				✓

11D	Agricultural Chemical Permits		✓		
12D	Literature or other sources of information regarding operations at the site				
13D	Individual who may have additional or more complete information regarding uses and activities at the site				

PLEASE PROVIDE DETAILED INFORMATION FOR YES ANSWERS TO QUESTIONS (1A-15A), (1B-13B), (1C-10C)

ADDITIONALLY, PLEASE PROVIDE AN EXPLANATION WHY YOU ARE UNABLE TO PROVIDE (1D-13D) IF THEY EXIST

THIS ENVIRONMENTAL QUESTIONNAIRE AND DISCLOSURE STATEMENT WAS PREPARED BY:

NAME George E Guglielmo TITLE

FIRM EG Winery RELATIONSHIP TO SITE

ADDRESS

TELEPHONE NUMBER 408 779-2145 DATE 6-2-04

PREPARER REPRESENTS THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE THE ABOVE STATEMENTS AND FACTS ARE TRUE AND CORRECT AND THAT TO THE BEST OF THE PREPARER'S KNOWLEDGE NO MATERIAL FACTS HAVE BEEN SUPPRESSED OR MISSTATED.

George E Guglielmo
Signed

Date 6-2-04

APPENDIX D

TIS REPORT

TRACK ➤ INFO SERVICES, LLC

Environmental FirstSearch™ Report

TARGET PROPERTY:

COCHRANE ROAD

MORGAN HILL CA 95037

Job Number: 34040208

PREPARED FOR:

Twining Labratories

2527 Fresno Street

Fresno, Ca, 93721

03-09-04



Tel: (323) 664-9981 *Fax: (323) 664-9982*

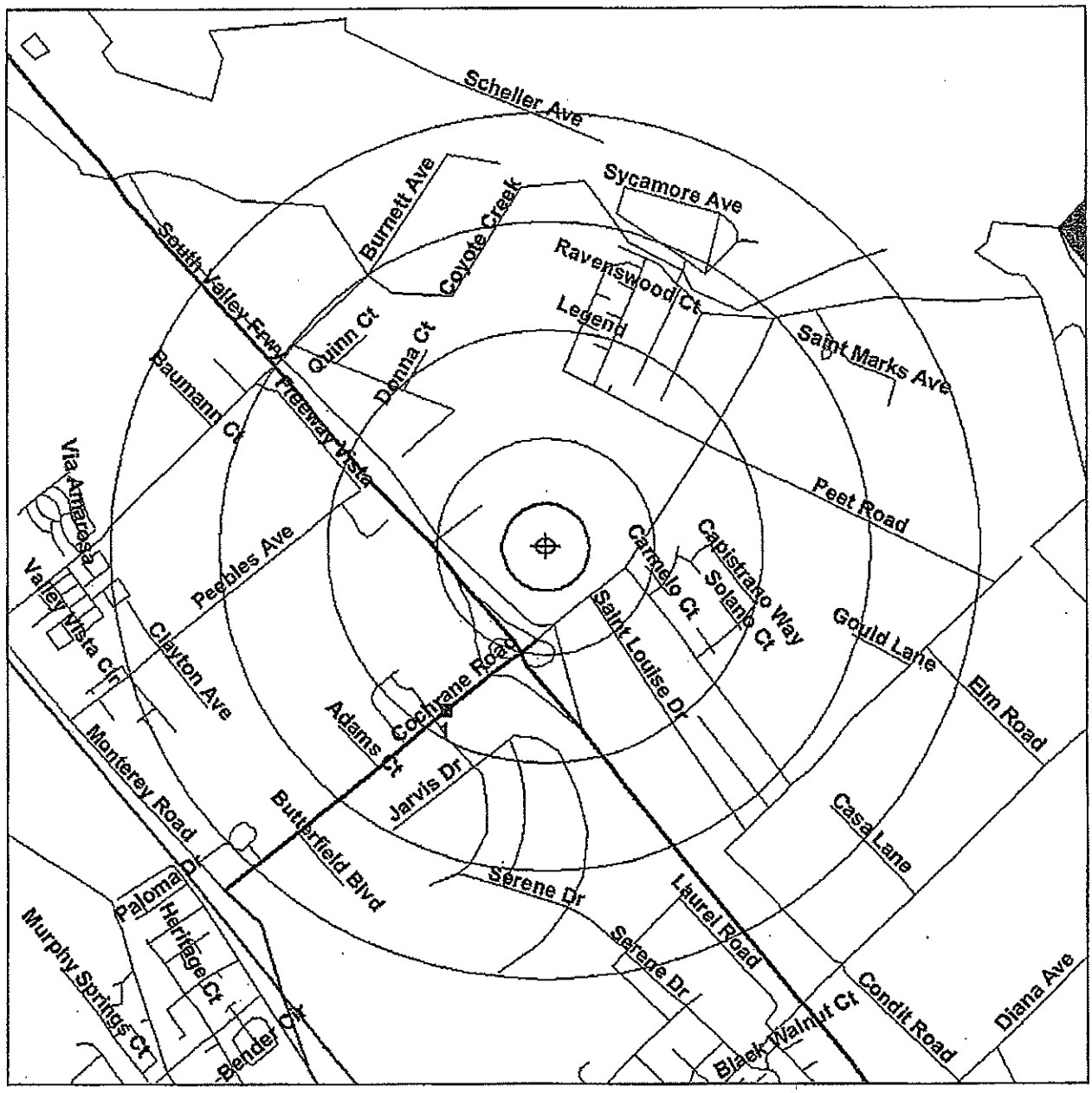
Environmental FirstSearch is a registered trademark of FirstSearch Technology Corporation. All rights reserved.

Environmental FirstSearch

1 Mile Radius

ASTM: All Databases

COCHRANE ROAD, MORGAN HILL CA 95037



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 37.156342 Longitude: -121.65173) .....

Identified Site, Multiple Sites, Receptor .....

NPL, Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

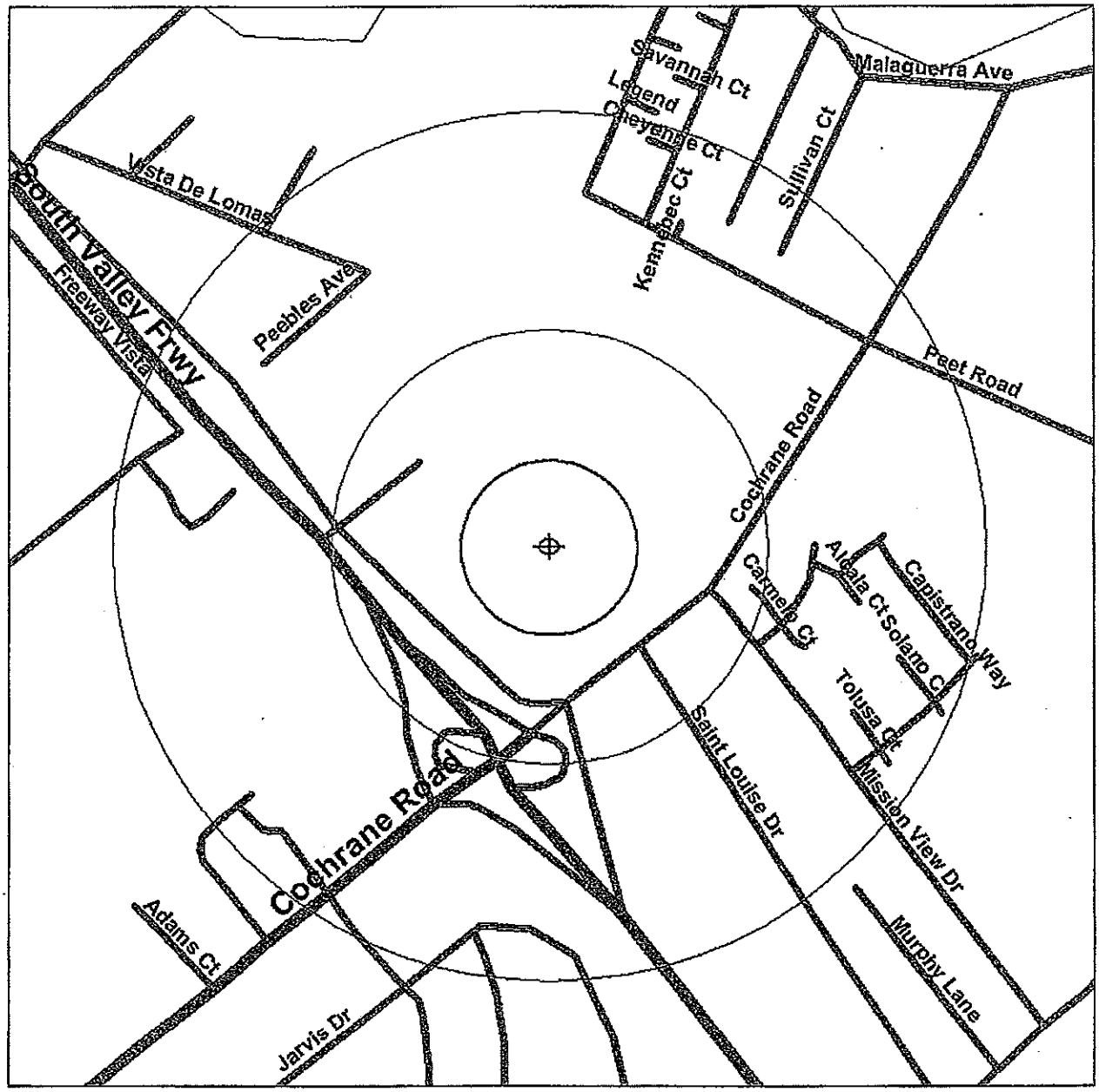
Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius

Environmental FirstSearch

.5 Mile Radius

ASTM: CERCLIS, RCRATSD, LUST, SWL

COCHRANE ROAD, MORGAN HILL CA 95037



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 37.156342 Longitude: -121.65173) .....

Identified Site, Multiple Sites, Receptor .....

NPL, Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

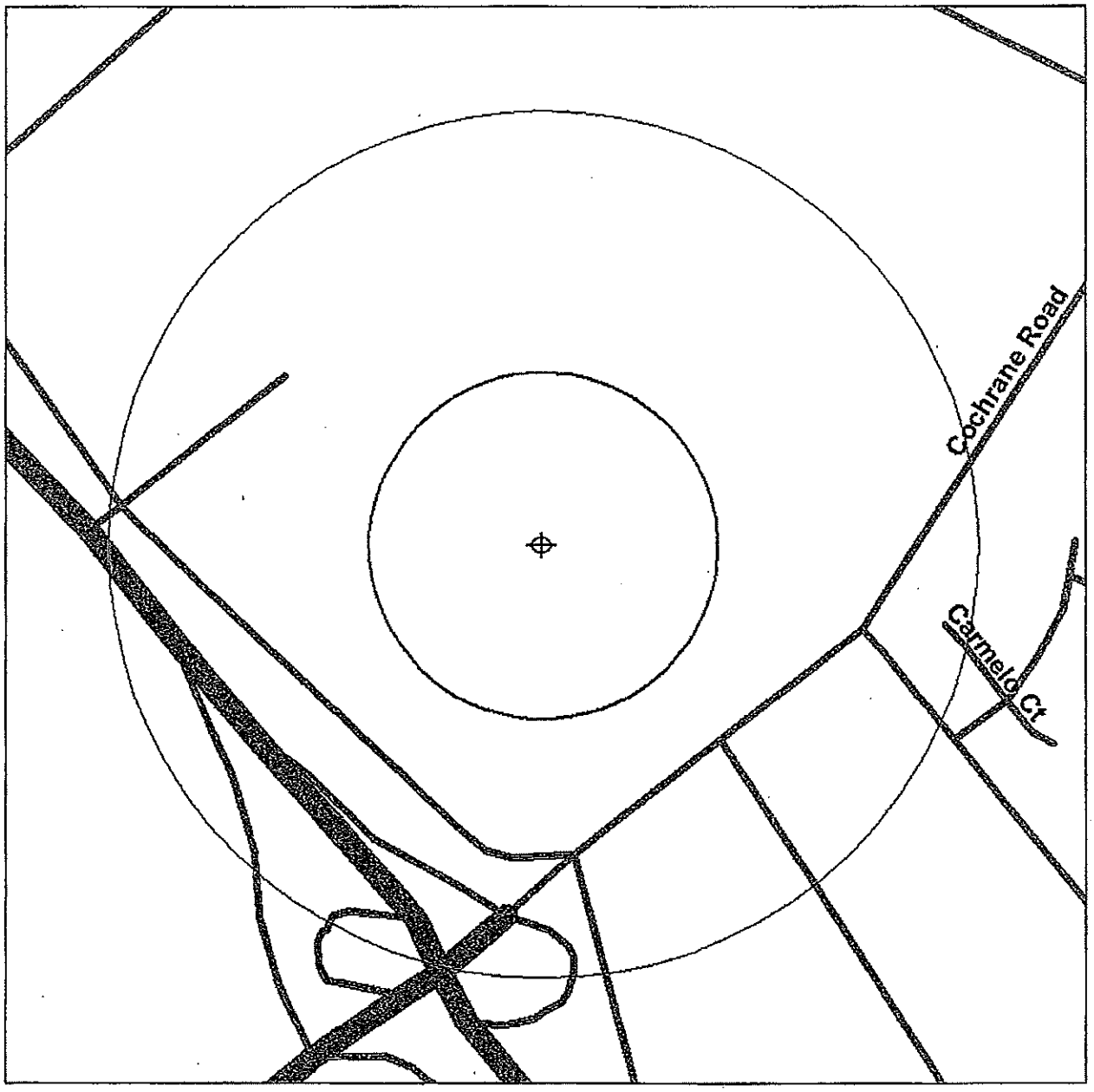
Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius

Environmental FirstSearch

.25 Mile Radius

ASTM: RCRAGEN, UST

COCHRANE ROAD, MORGAN HILL CA 95037



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 37.156342 Longitude: -121.65173) .....

Identified Site, Multiple Sites, Receptor .....

NPL, Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

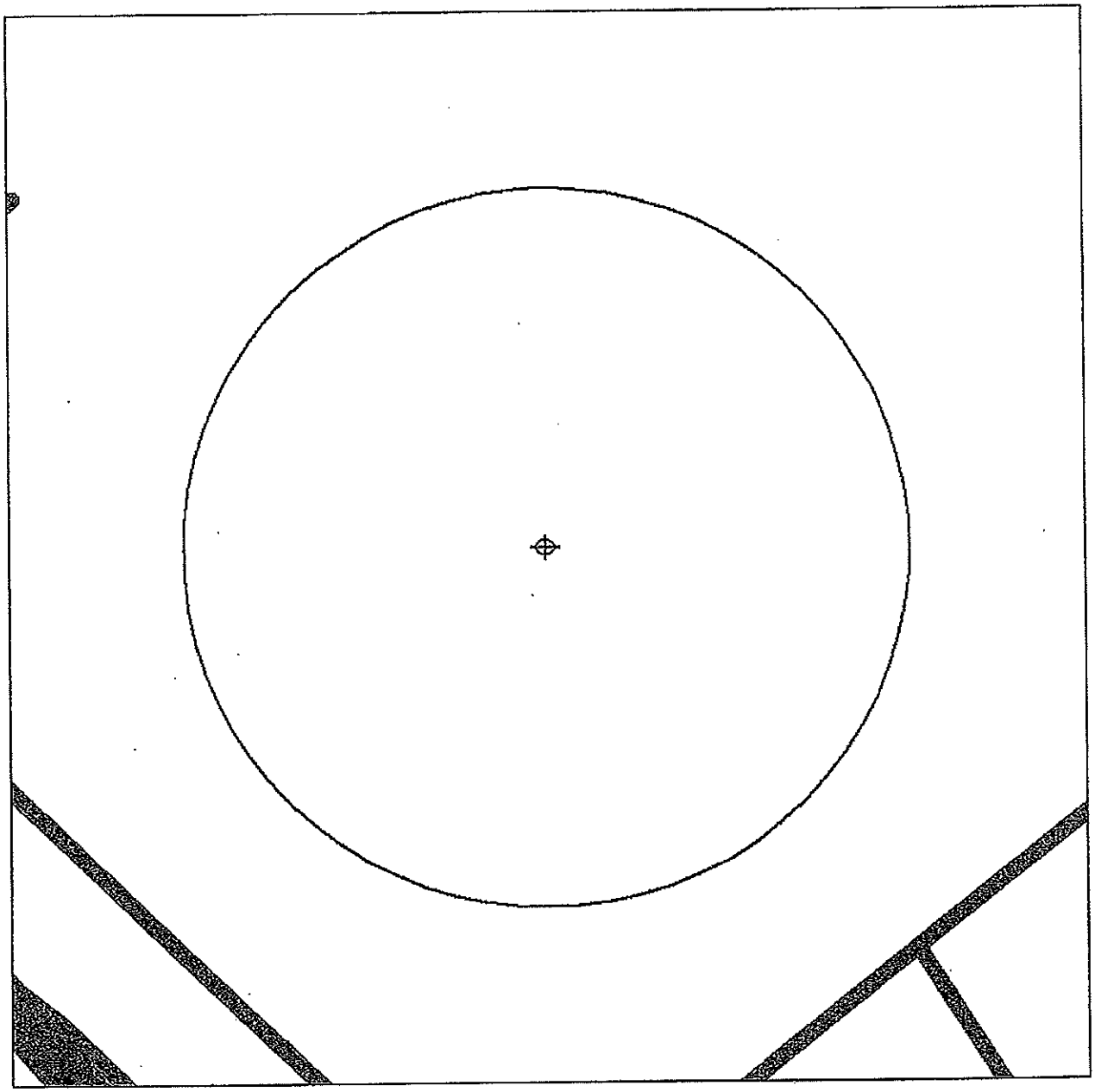
Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius

Environmental FirstSearch

.12 Mile Radius

ASTM: Multiple Databases

COCHRANE ROAD, MORGAN HILL CA 95037



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 37.156342 Longitude: -121.65173) .....

Identified Site; Multiple Sites, Receptor .....

NPL, Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius

Environmental FirstSearch
Search Summary Report

Target Site: COCHRANE ROAD
MORGAN HILL CA 95037

FirstSearch Summary

Database	Sel	Updated	Radius	Site	1/8	1/4	1/2	1/2>	ZIP	TOTALS
NPL	Y	02-09-04	1.00	0	0	0	0	0	0	0
CERCLIS	Y	02-09-04	0.50	0	0	0	0	-	0	0
NFRAP	Y	12-08-03	0.12	0	0	-	-	-	0	0
RCRA TSD	Y	11-09-03	0.50	0	0	0	0	-	0	0
RCRA COR	Y	11-09-03	1.00	0	0	0	0	0	0	0
RCRA GEN	Y	11-09-03	0.25	0	0	0	-	-	0	0
RCRA NLR	Y	11-09-03	0.12	0	0	-	-	-	0	0
ERNS	Y	12-31-03	0.12	0	0	-	-	-	0	0
State Sites	Y	09-30-03	1.00	0	0	0	1	0	1	2
Spills-1990	Y	07-01-03	0.12	0	0	-	-	-	0	0
SWL	Y	03-08-04	0.50	0	0	0	0	-	0	0
Permits	Y	02-11-04	0.12	0	0	-	-	-	0	0
Other	Y	09-30-03	0.12	0	0	-	-	-	0	0
REG UST/AST	Y	02-19-04	0.25	0	0	0	-	-	0	0
Leaking UST	Y	12-11-02	0.50	0	0	0	0	-	0	0
- TOTALS -				0	0	0	1	0	1	2

Notice of Disclaimer

Due to the limitations, constraints, inaccuracies and incompleteness of government information and computer mapping data currently available to TRACK Info Services, certain conventions have been utilized in preparing the locations of all federal, state and local agency sites residing in TRACK Info Services's databases. All EPA NPL and state landfill sites are depicted by a rectangle approximating their location and size. The boundaries of the rectangles represent the eastern and western most longitudes; the northern and southern most latitudes. As such, the mapped areas may exceed the actual areas and do not represent the actual boundaries of these properties. All other sites are depicted by a point representing their approximate address location and make no attempt to represent the actual areas of the associated property. Actual boundaries and locations of individual properties can be found in the files residing at the agency responsible for such information.

Waiver of Liability

Although TRACK Info Services uses its best efforts to research the actual location of each site, TRACK Info Services does not and can not warrant the accuracy of these sites with regard to exact location and size. All authorized users of TRACK Info Services's services proceeding are signifying an understanding of TRACK Info Services's searching and mapping conventions, and agree to waive any and all liability claims associated with search and map results showing incomplete and or inaccurate site locations.

Environmental FirstSearch
Site Information Report

Request Date:	03-09-04	**Search Type:**	COORD
Requestor Name:	Bill Cooper.	**Job Number:**	34040208
Standard:	ASTM		**Filtered Report**

TARGET ADDRESS: COCHRANE ROAD
MORGAN HILL CA 95037

Demographics

Sites:	2	**Non-Geocoded:**	1	**Population:**	NA
Radon:	-0.3 PCI/L				

Site Location

	Degrees (Decimal)	**Degrees (Min/Sec)**		**UTMs**
Longitude:	-121.65173	-121:39:6	**Easting:**	619723.645
Latitude:	37.156342	37:9:23	**Northing:**	4112863.448
			Zone:	10

Comment

Comment:

Additional Requests/Services

Adjacent ZIP Codes: 0 Mile(s)

ZIP Code	City Name	ST	Dist/Dir	Sel

Services:

	Requested?	Date
Sanborns	No	
Aerial Photographs	No	
Topographical Maps	No	
City Directories	No	
Title Search	No	
Municipal Reports	No	
Online Topos	No	

Environmental FirstSearch
Sites Summary Report

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

TOTAL: 2 **GEOCODED:** 1 **NON GEOCODED:** 1 **SELECTED:** 0

ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Map ID
1	STATE	MADRONE LAND CORP./SAN JOSE TRAP & CAL43010016/PROPERTY/SITE REFERR	645 COCHRANE RD. MORGAN HILL CA 95037	0.44 SW	1

Environmental FirstSearch
Sites Summary Report

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

TOTAL: 2 **GEOCODED:** 1 **NON GEOCODED:** 1 **SELECTED:** 0

ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Map ID
2	STATE	NEW MORGAN HILL HIGH SCHOOL CAL43010029/CERTIFIED	BURNETT AVENUE MORGAN HILL CA 95037	NON GC	

Environmental FirstSearch
Site Detail Report

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

STATE SITE

SEARCH ID: 1 **DIST/DIR:** 0.44 SW **MAP ID:** 1

NAME:	MADRONE LAND CORP./SAN JOSE TRAP & SKEET	**REV:**	07/03/00
ADDRESS:	645 COCHRANE RD.	**ID1:**	CAL43010016
	MORGAN HILL CA 95037	**ID2:**	
	Santa Clara	**STATUS:**	PROPERTY/SITE REFERRED TO RWQC
CONTACT:		**PHONE:**	

OTHER SITE NAMES (blank below = not reported by agency)
MADRONE LAND CORP./SAN JOSE TRAP & SKEET

GENERAL SITE INFORMATION

File Name (if different than site name):	*MADRONE LAND CORP./SAN JOSE TRAP & SKEET*
Status:	*PROPERTY/SITE REFERRED TO RWQCB (REFRW)*
AWP Site Type:	*N/A*
NPL Site:	
Fund:	
Status Date:	*08211996*
Lead:	
Staff:	*RJONES1*
Senior Supervisor:	*DCOX1*
DTSC Region & RWQCB #:	*2 / BERKELEY*
Branch:	*NORTH COAST*
RWQCB:	*SAN FRANCISCO BAY*
Site Access:	*Controlled*
On Cortese List:	*Listed*
Groundwater Contamination:	*Suspected*
Haz Ranking Score:	
Haz Ranking Score:	

Number of Sources Contributing to Contamination at the Site: *0*

PROJECTED ACTIVITIES (blank below = not reported by agency)

Activity:	*(SS)*
Activity Status:	*PROPERTY/SITE REFERRED TO RWQCB*
Completion Due Date:	
Revised Completion Due Date:	
Date Activity Actually Completed:	*11101992*
Yards of Solids Removed:	*0*
Yards of Solids Treated:	*0*
Gallons of Liquid Removed:	*0*
Gallons of Liquid Treated:	*0*

DTSC COMMENTS REGARDING THIS SITE (blank below = not reported by agency)

DATE	COMMENT
11121992	*The site is covered with led shot and a drinking*

DATE	COMMENT
11121992	*water well is 1,000 feet away.*

DATE	COMMENT
11121992	*The site is at the intersection of Hwy. 101 and*

- Continued on next page -

Environmental FirstSearch
Site Detail Report

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

STATE SITE

SEARCH ID: 1 **DIST/DIR:** 0.44 SW **MAP ID:** 1

NAME: MADRONE LAND CORP./SAN JOSE TRAP & SKEET
ADDRESS: 645 COCHRANE RD.
MORGAN HILL CA 95037
Santa Clara
CONTACT:

REV: 07/03/00
ID1: CAL43010016
ID2:
STATUS: PROPERTY/SITE REFERRED TO RWQC
PHONE:

DATE	COMMENT
11121992	*Cochrane Rd., has been used as a skeet shooting range*
DATE	COMMENT
11121992	*by the small San Jose Trap & Skeet Club. Morgan Hill s*
DATE	COMMENT
11121992	*Haz Mat Pgrm Mgr., Sharon Kohlmannslehner, writes,*
DATE	COMMENT
11121992	*The adjacent property owners (Sullivan APN 727-15-38)*
DATE	COMMENT
11121992	*discovered high lead levels (STLC & TTLC) while doing*
DATE	COMMENT
11121992	*soil sampling prior to developing the property. She*
DATE	COMMENT
11121992	*then requested the site owners, Madrone Land Corp. to*
DATE	COMMENT
11121992	*test the site for lead. Levels well over the TTLC are*
DATE	COMMENT
11121992	*present from the used lead shot tha covers portions*
DATE	COMMENT
11121992	*of the site. Morgan Hill s drinking water comes from*
DATE	COMMENT
11121992	*a well less than 1,000 feet away. This town is the*
DATE	COMMENT
11121992	*recharge zone for the basin supplying it, Gilroy and San*
DATE	COMMENT
11121992	*Martin s drinking water. Sharon has written several*
DATE	COMMENT
11121992	*letters to the area s RP s on lead residential cleanup*
DATE	COMMENT
11121992	*levels and added that such advice is not binding on other*
DATE	COMMENT
11121992	*regulatory agencies. She notes that although groundwater*
DATE	COMMENT

Environmental FirstSearch
Site Detail Report

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

STATE SITE

SEARCH ID: 2 **DIST/DIR:** NON GC **MAP ID:**

NAME: NEW MORGAN HILL HIGH SCHOOL
ADDRESS: BURNETT AVENUE
MORGAN HILL CA 95037
SANTA CLARA
CONTACT:

REV: 09/30/03
ID1: CAL43010029
ID2:
STATUS: CERTIFIED
PHONE:

OTHER SITE NAMES (blank below = not reported by agency)
NEW MORGAN HILL HIGH SCHOOL

MORGAN HILL UNIFIED SCHOOL DISTRICT

GENERAL SITE INFORMATION

File Name (if different than site name):	*NEW MORGAN HILL HIGH SCHOOL*
Status:	*CERTIFIED*
AWP Site Type:	*PROPOSED SCHOOL SITE PROPERTY*
NPL Site:	
Fund:	
Status Date:	*06212003*
Lead:	*DEPT OF TOXIC SUBSTANCES CONTROL*
Staff:	*KSIGLOWI*
DTSC Region & RWQCB #:	*BERKELEY*
Branch:	*SCHOOL EVALUATION*
RWQCB:	
Site Access:	
Groundwater Contamination:	

Number of Sources Contributing to Contamination at the Site: *0*

OTHER AGENCY ID NUMBERS (blank below = not reported by agency)
ID SOURCE NAME, & VALUE: *CALSTARS CODE 204091-11*

BACKGROUND INFORMATION (blank below = not reported by agency)
Site is adjacent to the Anne Sobrato Site. Site was historically used for agriculture.

INFORMATION ON SPECIAL PROGRAMS THE SITE IS ASSOCIATED WITH (blank below = not reported by agency)

PROJECTED ACTIVITIES (blank below = not reported by agency)

Activity:	*I/SE, IORSE, FFA, FFSRA, VCA, EA*
Activity Status:	*VOLUNTARY CLEANUP PROGRAM*
Completion Due Date:	
Revised Completion Due Date:	
Date Activity Actually Completed:	*01232002*
Yards of Solids Removed:	*0*
Yards of Solids Treated:	*0*
Gallons of Liquid Removed:	*0*
Gallons of Liquid Treated:	*0*
Activity:	*CEQA INCLUDING NEGATIVE DECS*

- Continued on next page -

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

STATE SITE

SEARCH ID: 2 **DIST/DIR:** NON GC **MAP ID:**

NAME: NEW MORGAN HILL HIGH SCHOOL
ADDRESS: BURNETT AVENUE
MORGAN HILL CA 95037
SANTA CLARA
CONTACT:

REV: 09/30/03
ID1: CAL43010029
ID2:
STATUS: CERTIFIED
PHONE:

Activity Status: *VOLUNTARY CLEANUP PROGRAM*
Completion Due Date:
Revised Completion Due Date:
Date Activity Actually Completed: *03272003*
Yards of Solids Removed: *0*
Yards of Solids Treated: *0*
Gallons of Liquid Removed: *0*
Gallons of Liquid Treated: *0*

Activity: *PRELIMINARY ENDANGERMENT ASSESSMENT*
Activity Status: *VOLUNTARY CLEANUP PROGRAM*
Completion Due Date:
Revised Completion Due Date:
Date Activity Actually Completed: *11272002*
Yards of Solids Removed: *0*
Yards of Solids Treated: *0*
Gallons of Liquid Removed: *0*
Gallons of Liquid Treated: *0*

Activity: *REMOVAL ACTION WORKPLAN*
Activity Status: *VOLUNTARY CLEANUP PROGRAM*
Completion Due Date:
Revised Completion Due Date:
Date Activity Actually Completed: *03272003*
Yards of Solids Removed: *0*
Yards of Solids Treated: *0*
Gallons of Liquid Removed: *0*
Gallons of Liquid Treated: *0*

Activity: *REMOVAL ACTION*
Activity Status: *VOLUNTARY CLEANUP PROGRAM*
Completion Due Date:
Revised Completion Due Date:
Date Activity Actually Completed: *06102003*
Yards of Solids Removed: *0*
Yards of Solids Treated: *0*
Gallons of Liquid Removed: *0*
Gallons of Liquid Treated: *0*

Activity: *CERTIFICATION*
Activity Status: *VOLUNTARY CLEANUP PROGRAM*
Completion Due Date:
Revised Completion Due Date:
Date Activity Actually Completed: *06212003*
Yards of Solids Removed: *0*
Yards of Solids Treated: *0*
Gallons of Liquid Removed: *0*
Gallons of Liquid Treated: *0*

- Continued on next page -

Environmental FirstSearch
Site Detail Report

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

STATE SITE

SEARCH ID: 2 **DIST/DIR:** NON GC **MAP ID:**

NAME:	NEW MORGAN HILL HIGH SCHOOL	**REV:**	09/30/03
ADDRESS:	BURNETT AVENUE	**ID1:**	CAL43010029
	MORGAN HILL CA 95037	**ID2:**	
	SANTA CLARA	**STATUS:**	CERTIFIED
CONTACT:		**PHONE:**	

Activity:	*SUPPLEMENTAL SITE INVESTIGATION (SCHOOLS ONLY)*
Activity Status:	*VOLUNTARY CLEANUP PROGRAM*
Completion Due Date:	
Revised Completion Due Date:	
Date Activity Actually Completed:	*10092002*
Yards of Solids Removed:	*0*
Yards of Solids Treated:	*0*
Gallons of Liquid Removed:	*0*
Gallons of Liquid Treated:	*0*

DTSC COMMENTS REGARDING THIS SITE (blank below = not reported by agency)

Comments Date: *01232002*

: *DTSC entered into an Environmental Oversight Agreement (EOA) (Docket # HSA-A 01/02-079) with Morgan Hill Unified Schl Dist to provide oversight for a Preliminary Endangerment Assessment (PEA) for the New Morgan Hill High School Site. CEQA/RAW The cluster of buildings on this property are identi-fied as the Central Building Cluster and the Eastern Shed Area. Excavation will continue until the arsenic, cadmium, lead, chlordan, dieldrin and endrin concentrations in the soil are found to be less than the health based risk cleanup levels. RAW - Approval of the plan ro remove 150 cubic yards of soil and dispose of the contaminated in a Class II landfill. RA - Approximately 150 cubic yards (5-10 truckloads) of soil impacted with arsenic, cadmium, lead, chlordane, dieldrin and endrin was excavated to achieve concentrations less than the approved health-based risk cleanup levels, which are; 12 mg/kg for arsenic, 1.7 mg/kg for cadmium, 255 mg/kg for lead, 0.3 mg/kg for chlordane; 0.18 mg/kg for dieldrin, and 0.2 mg/kg for endrin. The depth of excavation typically ranges from 6 to 18 inches below ground surface (bgs). CERT - During the removal action, approximately 150 cubic yards of non-hazardous soil was generated and taken to a Class II landfill. Post removal confirmation sampling results indicates the removal action standards and objectives were achieved. SSI - The New Morgan Hill is approximately 17 acres and has been used for agricultural and residential purposes for at least 50 years. No agricultural land used since 2002. A cluster of three buildings in the eastern portion of the site, is the subject of this removal. The PEA indicated that elevated levels of chlordane, dieldrin, endrin, lead, arsenic, and cadmium, detected in soil. Additional sampling was conducted to determine the extent of the contamination. DTSC issued a Preliminary Endangerment Assessment determination, requiring further action at the proposed school site.*

Environmental FirstSearch
Federal Databases and Sources

ASTM Databases:

CERCLIS: ***Comprehensive Environmental Response Compensation and Liability Information System.*** The EPA's database of current and potential Superfund sites currently or previously under investigation. Source: Environmental Protection Agency.

Updated quarterly.

CERCLIS-NFRAP (Archive): ***Comprehensive Environmental Response Compensation and Liability Information System Archived Sites.*** The Archive designation means 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). 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.

Updated quarterly.

ERNS: ***Emergency Response Notification System.*** The EPA's database of emergency response actions. Source: Environmental Protection Agency. Data since January, 2001, has been received from the National Response Center as the EPA no longer maintains this data.

Updated quarterly.

FINDS: ***The Facility Index System.*** The EPA's Index of identification numbers associated with a property or facility which the EPA has investigated or has been made aware of in conjunction with various regulatory programs. Each record indicates the EPA office that may have files on the site or facility. Source: Environmental Protection Agency.

Updated semi-annually.

NPL: ***National Priority List.*** The EPA's list of confirmed or proposed Superfund sites. Source: Environmental Protection Agency.

Updated quarterly.

RCRIS: ***Resource Conservation and Recovery Information System.*** The EPA's database of registered hazardous waste generators and treatment, storage and disposal facilities. Included are RAATS (RCRA Administrative Action Tracking System) and CMEL (Compliance Monitoring & Enforcement List). Source: Environmental Protection Agency.

RCRA TSD: ***Resource Conservation and Recovery Information System Treatment, Storage, and Disposal Facilities.*** The EPA's database of RCRIS sites which treat, store, dispose, or incinerate hazardous waste. This information is also reported in the standard RCRIS detailed data.

ASTM Databases (continued):

RCRA COR: *Resource Conservation and Recovery Information System Corrective Action Sites.* The EPA's database of RCRIS sites with reported corrective action. This information is also reported in the standard RCRIS detailed data.

RCRA GEN: *Resource Conservation and Recovery Information System Large and Small Quantity Generators.* The EPA's database of RCRIS sites that create more than 100kg of hazardous waste per month or meet other RCRA requirements. Included are RAATS (RCRA Administrative Action Tracking System) and CMEL (Compliance Monitoring & Enforcement List).

RCRA NLR: *Resource Conservation and Recovery Information System sites No Longer Regulated.* The EPA's database of RCRIS sites that create less than 100kg of hazardous waste per month or do not meet other RCRA requirements.

All RCRA databases are Updated quarterly

Environmental FirstSearch
Federal Databases and Sources

Non-ASTM Databases:

HMIRS: ***Hazardous Materials Incident Response System.*** This database contains information from the US Department of Transportation regarding materials, packaging, and a description of events for tracked incidents.

Updated quarterly.

NCDB: ***National Compliance Database.*** The National Compliance Data Base System (NCDB) tracks regional compliance and enforcement activity and manages the Pesticides and Toxic Substances Compliance and Enforcement program at a national level. The system tracks all compliance monitoring and enforcement activities from the time an inspector conducts and inspection until the time the inspector closes or the case settles the enforcement action. NCDB is the national repository of the 10 regional and Headquarters FIFRA/TSCA Tracking System (FTTS). Data collected in the regional FTTS is transferred to NCDB to support the need for monitoring national performance of regional programs.

Updated quarterly

NPDES: ***National Pollution Discharge Elimination System.*** The EPA's database of all permitted facilities receiving and discharging effluents. Source: Environmental Protection Agency.

Updated semi-annually.

NRDB: ***National Radon Database.*** The NRDB was created by the EPA to distribute information regarding the EPA/State Residential Radon Surveys and the National Residential Radon Survey. The data is presented by zipcode in Environmental FirstSearch Reports. Source: National Technical Information Service (NTIS)

Updated Periodically

Nuclear: The Nuclear Regulatory Commission's (NRC) list of permitted nuclear facilities.

Updated Periodically

PADS: PCB Activity Database System.
The EPA's database PCB handlers (generators, transporters, storers and/or disposers) that are required to notify the EPA, the rules being similar to RCRA. This database indicates the type of handler and registration number. Also included is the PCB Transformer Registration Database.

Updated semi-annually.

Receptors: 1995 TIGER census listing of schools and hospitals that may house individuals deemed sensitive to environmental discharges due to their fragile immune systems.

Updated Periodically

Non-ASTM Databases (continued):

RELEASES: ***Air and Surface Water Releases.*** A subset of the EPA's ERNS database which have impacted only air or surface water.

Updated semi-annually.

Soils: This database includes the State Soil Geographic (STATSGO) data for the conterminous United States. It contains information regarding soil characteristics such as water capacity, percent clay, organic material, permeability, thickness of layers, hydrological characteristics, quality of drainage, surface, slope, liquid limit, and the annual frequency of flooding. Source: United States Geographical Survey (USGS).

Updated quarterly

TRIS: ***Toxic Release Inventory System.*** The EPA's database of all facilities that have had or may be prone to toxic material releases. Source: Environmental Protection Agency.

Updated semi-annually.

ENVIRONMENTAL FIRST SEARCH
CALIFORNIA DATABASES (DB) AND SOURCES

CAL SITES: DB TYPE = ST (STATE SITES)
Source: The CAL EPA, Depart. Of Toxic Substances Control
Phone: (916) 323-3400

The CAL EPA Department of Toxic Substances Control (DTSC) maintains a database of information on properties (or sites) in California where hazardous substances have been released, or where the potential for such release exists. The types of properties in the CALSITES database are categorized as: Annual Work Plan, Backlogged Properties, Certified / De-listed Sites, No Further Action, Preliminary Endangerment Assessment in Progress, Preliminary Endangerment Assessment Required, Removal Action Required, Expedited Remedial Action Program, Voluntary Cleanup Program, Deed Restricted Properties, and Referred Properties. For more information on individual sites call the number listed above.

CORTESE: DB TYPE = ST (STATE SITES)
Source: The CAL EPA, Department of Toxic Substances Control
Phone: (916) 445-6532

Pursuant to Government Code Section 65962.5, the Hazardous Waste and Substances Sites List has been compiled by Cal/EPA, Hazardous Materials Data Management Program. The CAL EPA Dept. of Toxic Substances Control compiles information from subsets of the following databases to make up the CORTESE list:

1. The Dept. of Toxic Substances Control; contaminated or potentially contaminated hazardous waste sites listed in the CAL Sites database. Formerly known as ASPIS are included (CALSITES formerly known as ASPIS).
2. The California State Water Resources Control Board; listing of Leaking Underground Storage Tanks are included (LTANK)
3. The California Integrated Waste Management Board; Sanitary Landfills which have evidence of groundwater contamination or known migration of hazardous materials (formerly WB-LF, now AB 3750).

Note: Track Info Services collects each of the above data sets individually and lists them separately in the following First Search categories in order to provide more current and comprehensive information: CALSITES: SPL, LTANK: LUST, WB-LF: SWL

SWIS SOLID WASTE INFORMATION SYSTEM: DB TYPE = SW
(SOLID WASTE RELATED SITES)
Source: The Integrated Waste Management Board
Phone: (916) 255-2331

The California Integrated Waste Management Board maintains a database on solid waste facilities, operations, and disposal sites throughout the state of California. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites. For more information on individual sites call the number listed above.

Note: This database contains poor site location information for many sites in the First Search reports; therefore, it may not be possible to locate or plot some sites in First Search reports.

WMUDS: DB TYPE = SW (SOLID WASTE RELATED SITES)
Source: The State Water Resources Control Board
Phone:(916) 227-4365

The State Water Resources Control Board maintained the Waste Management Unit Database System (WMUDS). It is no longer updated. It tracked management units for several regulatory programs related to waste management and its potential impact on groundwater. Two of these programs (SWAT & TPCA) are no longer on-going regulatory programs as described below. Chapter 15 (SC15) is still an on-going regulatory program and information is updated periodically but not to the WMUDS database. The WMUDS System contains information from the following agency databases: Facility, Waste Management Unit (WMU), Waste Discharger System (WDS), SWAT, Chapter 15, TPCA, RCRA, Inspections, Violations, and Enforcement's.

Note: This database contains poor site location information for many sites in the First Search reports; therefore, it may not be possible to locate or plot some sites in First Search reports.

ORANGE COUNTY LANDFILLS: DB TYPE = SW (SOLID WASTE RELATED SITES)
Source: Orange County Health Dept.
Phone:(714) 834-3536

LUSTIS: DB TYPE = LU (LEAKING UNDERGROUND STORAGE TANKS)
Source: The State Water Resources Control Board
Phone:(916) 227-4416

The State Water Resources Control Board maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks. Information for this database is collected from the states regional boards quarterly and integrated with this database.

SAN DIEGO COUNTY LEAKING TANKS: DB TYPE = LU
(LEAKING UNDERGROUND STORAGE TANKS)
Source: San Diego County Dept. of Environmental Health
Phone:(619) 338-2242

Maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks within its HE17/58 database. For more information on a specific file call the HazMat Duty Specialist at phone number listed above.

SLIC REGIONS 1 - 9: DB TYPE = SP (SPILLS-90)
Source: The CAL EPA Regional Water Quality Control Boards 1 - 9

The California Regional Water Quality Control Boards maintain report of sites that have records of spills, leaks, investigation, and cleanups. For phone number listings of departments within each region visit their web sites at: http://www.swrcb.ca.gov/regions.html

SAN DIEGO COUNTY HE17 PERMITS: DB TYPE = PE (PERMITS)

Source: The San Diego County Depart. Of Environmental Health
Phone:(619) 338-2211

The HE17/58 database tracks establishments issued permits and the status of their permits in relation to compliance with federal, state, and local regulations that the County oversees. It tracks if a site is a hazardous waste generator, TSD, gas station, has underground tanks, violations, or unauthorized releases. For more information on a specific file call the HazMat Duty Specialist at the phone number listed above.

SAN BERNARDINO COUNTY HAZARDOUS MATERIALS PERMITS: DB TYPE = PE (PERMITS)
Source: San Bernardino County Fire Dept.
Phone: (909) 387-3080

Handlers and Generators Permit Information Maintained by the Hazardous Materials Div.

LA COUNTY SITE MITIGATION COMPLAINT CONTROL LOG: DB TYPE = OT (OTHER UNIQUE DATABASES)
Source: The Los Angeles County Hazardous Materials Division
Phone: (323) 890-7806

The County of Los Angeles Public Health Investigation Compliant Control Log

ORANGE COUNTY INDUSTRIAL SITE CLEANUPS: DB TYPE = OT (OTHER UNIQUE DATABASES)
Source: Orange County Environmental Health Agency
Phone: (714) 834-3536

AST ABOVEGROUND STORAGE TANKS: DB TYPE = US (UNDERGROUND STORAGE TANKS)
Source: The State Water Resources Control Board
Phone: (916) 227-4364

The Above Ground Petroleum Storage Act became State Law effective January 1, 1990. In general, the law requires owners or operators of AST's with petroleum products to file a storage statement and pay a fee by July 1, 1990 and every two years thereafter, take specific action to prevent spills, and in certain instances implement a groundwater monitoring program. This law does not apply to that portion of a tank facility associated with the production oil and regulated by the State Division of Oil and Gas of the Dept. of Conservation.

SWEEPS / FIDS STATE REGISTERED UNERGOROUND STORAGE TANKS: DB TYPE = US
Source: CAL EPA Dept of Toxic Substances Control
Phone: (916) 227-4404

Until 1994 the State Water Resources Control Board maintained a database of registered underground storage tanks statewide referred to as the SWEEPS System. The SWEEPS UST information was integrated with the CAL EPA's Facility Index System database (FIDS) which is a master index of information from numerous California agency environmental databases. That was last updated in 1994. Track Info Services included the UST information from the FIDS database in its First Search reports for historical purposes to help its clients identify where tanks may possibly have existed. For more information on specific sites from individual paper files archived at the State Water Resources Control Board call the number listed above.

CUPA DATABASES & SOURCES
(DB TYPE = US (UNDERGROUND STORAGE TANKS)

DEFINITION OF A CUPA: A Certified Unified Program Agency (CUPA) is a local agency that has been certified by the CAL EPA to implement six state environmental programs within the local agency's jurisdiction. These can be a county, city, or JPA (Joint Powers Authority). This program was established under the amendments to the California Health and Safety Code made by SB 1082 in 1994.

A Participating Agency (PA) is a local agency that has been designated by the local CUPA to administer one or more Unified Programs within their jurisdiction on behalf of the CUPA. A Designated Agency (DA) is an agency that has not been certified by the CUPA but is the responsible local agency that would implement the six unified programs until they are certified.

Please Note: Track Info Services, LLC collects and maintains information regarding Underground Storage Tanks from majority of the CUPAS and Participating Agencies in the State of California. These agencies typically do not maintain nor release such information on a uniform or consistent schedule; therefor, currency of the data may vary. Please look at the details on a specific site with a UST record in the First Search Report to determine the actual currency date of the record as provided by the relevant agency. Numerous efforts are made on a regular basis to obtain updated records.

ALAMEDA COUNTY CUPA'S
* County of Alameda Department of Environmental Health
* Cities of Berkeley, Fremont, Hayward, Livermore / Pleasanton, Newark, Oakland, San Leandro, Union

ALPINE COUNTY CUPA
* Health Department (Only updated by agency annually)

AMADOR COUNTY CUPA
* County of Amador Environmental Health Department

BUTTE COUNTY CUPA
* County of Butte Environmental Health Division (Only updated by agency biannually)

CALAVERAS COUNTY CUPA
* County of Calaveras Environmental Health Department

COLUSA COUNTY CUPA
* Environmental Health Dept.

CONTRA COSTA COUNTY CUPA
* Hazardous Materials Program

DEL NORTE COUNTY CUPA (US)
* Department of Health and Social Services

EL DORADO COUNTY CUPA'S
* County of El Dorado Environmental Health - Solid Waste Div (Only updated by agency annually)
* County of El Dorado EMD Tahoe Division
(Only updated by agency annually)

FRESNO COUNTY CUPA
* Haz. Mat and Solid Waste Programs

GLENN COUNTY CUPA
* Air Pollution Control District

HUMBOLDT COUNTY CUPA (US)
* Environmental Health Division

IMPERIAL COUNTY CUPA (US)
* Department of Planning and Building

INYO COUNTY CUPA (US)
* Environmental Health Department

KERN COUNTY CUPA (US)
* County of Kern Environmental Health Department
* City of Bakersfield Fire Department
KINGS COUNTY CUPA (US)
* Environmental Health Services
LAKE COUNTY CUPA (US)
* Division of Environmental Health
LASSEN COUNTY CUPA (US)
* Department of Agriculture
LOS ANGELES COUNTY CUPA'S (US)
* County of Los Angeles Fire Department
* County of Los Angeles Environmental Programs Division
* Cities of Burbank, El Segundo, Glendale, Long Beach/Signal Hill, Los Angeles,Pasadena, Santa Fe Springs, Santa Monica, Torrance, Vernon
MADERA COUNTY CUPA (US)
* Environmental Health Department
MARIN COUNTY CUPA (US)
* County of Marin Office of Waste Management
* City of San Rafael Fire Department
MARIPOSA COUNTY CUPA (US)
* Health Department
MENDOCINO COUNTY CUPA (US)
* Environmental Health Department
MERCED COUNTY CUPA (US)
* Division of Environmental Health
MODOC COUNTY CUPA (US)
* Department of Agriculture
MONO COUNTY CUPA (US)
* Health Department
MONTEREY COUNTY CUPA (US)
* Environmental Health Division
NAPA COUNTY CUPA (US)
* Hazardous Materials Section
NEVADA COUNTY CUPA (UST)
* Environmental Health Department
ORANGE COUNTY CUPA'S (US)
* County of Orange Environmental Health Department
* Cities of Anaheim, Fullerton, Orange, Santa Ana
* County of Orange Environmental Health Department
PLACER COUNTY CUPA (US)
* County of Placer Division of Environmental Health Field Office
* Tahoe City
* City of Roseville Roseville Fire Department
PLUMAS COUNTY CUPA (UST)
* Environmental Health Department
RIVERSIDE COUNTY CUPA (US)
* Environmental Health Department
SACRAMENTO COUNTY (US)
* County Environmental Mgmt Dept, Haz. Mat. Div.
SAN BENITO COUNTY CUPA (US)
* City of Hollister Environmental Service Department
SAN BERNARDINO COUNTY CUPA'S (US)
* County of San Bernardino Fire Department, Haz. Mat. Div.
* City of Hesperia Hesperia Fire Prevention Department
City of Victorville Victorville Fire Department
SAN DIEGO COUNTY CUPA (US)
* The San Diego County Dept. of Environmental Health HE 17/58
SAN FRANCISCO COUNTY CUPA (US)
* Department of Public Health
SAN JOAQUIN COUNTY CUPA (US)
* Environmental Health Division

SAN LUIS OBISPO COUNTY CUPA'S (US)
* County of San Luis Obispo Environmental Health Division
* City of San Luis Obispo City Fire Department
SAN MATEO COUNTY CUPA (US)
* Environmental Health Department
SANTA BARBARA COUNTY CUPA (US)
* Co Fire Dept Protective Services Div
SANTA CLARA COUNTY CUPA'S (US)
* County of Santa Clara Hazardous Materials Compliance Division
* Santa Clara Co Central Fire Prot. Dist. (Covers Campbell, Cupertino, Los Gatos, & Morgan Hill)
* Cities of Gilroy, Milpitas, Mountain View, Palo Alto, San Jose Fire, Santa Clara, Sunnyvale
SANTA CRUZ COUNTY CUPA (US)
* Environmental Health Department
SHASTA COUNTY CUPA (US)
* Environmental Health Department
SIERRA COUNTY CUPA (US)
* Health Department
SISKIYOU COUNTY CUPA (US)
* Environmental Health Department
SONOMA COUNTY CUPA'S (US)
* County of Sonoma Department Of Environmental Health
* Cities of Healdsburg / Sebastapol, Petaluma, Santa Rosa
STANINSLAUS COUNTY CUPA (US)
* Dept. of Env. Rsrcs. Haz. Mat. Div.
SUTTER COUNTY CUPA (US)
* Department of Agriculture
TEHAMA COUNTY CUPA (US)
* Department of Environmental Health
TRINITY COUNTY CUPA (US)
* Department of Health
TULARE COUNTY CUPA (US)
* Environmental Health Department
TUOLUMNE COUNTY CUPA (US)
* Environmental Health
VENTURA COUNTY CUPA'S (BWT UST'S & CERTIFIED UST'S)
* County of Ventura Environmental Health Division
* Cities of Oxnard, Ventura
YOLO COUNTY CUPA (US)
* Environmental Health Department
YUBA COUNTY CUPA (US)
* Yuba County of Emergency Services

Environmental FirstSearch
Street Name Report for Streets within .25 Mile(s) of Target Property

TARGET SITE: COCHRANE ROAD
MORGAN HILL CA 95037

JOB: 34040208

Street Name	Dist/Dir	Street Name	Dist/Dir
Cochrane Rd	0.15 SE		
Peet Ln	0.19 SE		
Saint Louise Dr	0.15 SE		
South Valley Fwy	0.20 SW		

THE TWINING LABORATORIES, INC.
EST. 1898
ANALYTICAL CHEMISTRY · ENVIRONMENTAL SERVICES
GEOTECHNICAL ENGINEERING · SAMPLING SERVICES
CONSTRUCTION INSPECTION & MATERIALS TESTING

February 9, 2005 A07261.02

Browman Development Company
100 Swan Way Suite 206
Oakland, California 94621-1459

Attention: Mr. Jerry Neighbors

Subject: Results of Phase II Assessment at a Site located Northeast of the Intersection of Interstate 101 and Cochrane Road, Morgan Hill, California

Dear Mr. Neighbors:

This report presents the results of a Phase II investigation consisting of sampling and analysis of soil samples collected from a property located northeast of Interstate 101 and Cochrane Road in Morgan Hill, California. Soil samples were collected from the site based on the information contained in a Phase I environmental site assessment report dated June 2004 and prepared by The Twining Laboratories, Inc. (Twining). This assessment was authorized by Browman Development Company.

PROJECT HISTORY

The subject site (Site) is located on the northeast corner of the intersection of Interstate 101 and Cochrane Road in the city of Morgan Hill, California. The Site comprises five parcels totaling approximately 60 acres. Parcel APN No. 728-37-001 was being used as an active horse ranch at the time of our assessment. Parcel 728-37-002 consisted of an actively farmed land and a developed area with a residence, barn, shed, chemical tanks and chemical storage at the time of our assessment. Parcels 728-37-004, 005, and 007 were not developed with structures and were actively being farmed at the time of our assessment.

A Phase I, prepared by Twining in June 2004, identified a limited number of concerns and recommended further assessment of the site with respect to those concerns. The Twining Phase I contained the following conclusions:

- Because agricultural chemicals have been formulated and used on-Site, the possibility exists that site soils have been impacted by environmentally persistent chemicals; and
- Fill has been placed throughout the site occupied by the active horse ranch. The fill was taken from a Santa Clara Water District pipeline project and chemical analytical data are not available regarding the imported fill.

Based on the results of the Phase I and Twining's recommendations, Twining was authorized by Browman Development Company to collect and analyze soil samples from selected areas of the site.

PURPOSE AND SCOPE

The purpose of this Phase II report is to document the collection and analysis of soil samples collected from the subject site and assess whether soil samples collected from the site contain concentrations of selected constituents which could be of environmental concern. The following work scope was performed:

- Hand-augered soil borings and collected soil samples from 12 locations at the site;
- Analyzed soil samples for selected constituents including metals, pesticides, herbicides and TRPH;
- Evaluated the soils data received from the analytical laboratory; and
- Prepared this report to document the collection of the soil samples and summarize the findings of this assessment.

INVESTIGATIVE PROCEDURES AND FINDINGS

This assessment consisted of a field investigation, a laboratory testing program, and preparation of this report. Standard operating procedures (SOPs), relevant to the field and laboratory activities, are described in Appendix A.

Soil Sampling

Soil samples were collected at twelve locations at the site. Four samples were collected at the horse ranch located on the north end of the site (Parcel 728-37-001), two samples were collected at a farm chemical mixing (Parcel 728-37-002) and storage area and the remaining samples were collected from farmed areas at the site. Soil samples were collected at a depth of one foot in the horse ranch area and at the surface and at two feet below ground surface (bgs) in the remaining sampling locations. Surface samples were collected by first scraping off any organic matter at the surface and then driving a stainless steel sampling sleeve into the soil. A hand auger was then used to advance the boring approximately two feet into the soil, at which depth the two foot deep sample was collected by driving a stainless steel sampling sleeve into the soil. Each sample was labeled, covered with teflon sheets on both ends of the sleeve and capped with plastic end caps. The samples were stored in an ice chest cooled with blue ice to approximately four degrees centigrade for transport to Twining's analytical laboratory. Soil sampling locations are shown on Drawing 2.

Laboratory Analysis

All samples were analyzed by Twining's State of California certified analytical laboratory. Samples collected from the horse ranch were analyzed for arsenic, cadmium, chromium, lead, nickel, zinc (EPA method 6010), pH and total recoverable petroleum hydrocarbons (TRPH) by EPA method 5520. Samples collected at the remaining sampling locations were analyzed for copper, lead, arsenic, zinc, TRPH, organophosphate pesticides (EPA method 8141), chlorinated phenoxy acid herbicides (EPA 8151) and organochlorine pesticides (8081).

FINDINGS

The results of the soil assessment are summarized in the following sections.

Soil Profile

Soil samples were collected to a depth of two feet. Soils encountered were brown sandy silts to silty sands with occasional gravels and cobbles from one to six centimeters in size.

Soil Sample Analytical Results

Laboratory analytical results for the soil samples are summarized in Table 1. Laboratory analytical data sheets and chain-of-custody documentation are attached to this report.

EVALUATION

A total of twelve (12) soil samples were tested. The pesticide 4,4 - DDE was found in the surface samples at sample locations S5 and S6 at concentrations of 0.092 milligrams per kilogram (mg/kg) and 0.07 mg/kg, respectively. These concentrations are below the applicable Total Threshold Limit Concentration (TTLC) and Soluble Threshold Limit Concentration (STLC) values for this constituent, i.e., 1 mg/kg and 0.1 milligrams per liter (mg/l), respectively. These concentrations are also below the Preliminary Remediation Goal (PRG) of 1.7 mg/kg set by the United States Environmental Protection Agency Region 9 (EPA). Diazinon was detected in the two foot deep sample at sample location S12 at a concentration of 0.97 mg/kg. This concentration is below the PRG concentration of 55 mg/kg. The remaining ten (10) soil samples were not-detected for the pesticides included in the soil sample analysis.

Chromium concentrations ranged from 43 mg/kg to 75 mg/kg. Soil samples with chromium concentrations greater than 50 mg/kg were analyzed for soluble chromium using the Waste Extraction Test (WET) method to assess whether these samples were above the hazardous STLC chromium concentration of 5 mg/l. The analytical results indicated that the soluble chromium concentrations were less than 0.2 mg/l. The total chromium concentrations were all also below the chromium TTLC of 500 mg/kg. All other constituents analyzed for had concentrations below applicable PRG, TTLC (total threshold limit concentrations) and/or STLC concentrations. Applicable PRG, STLC and TTLC limits are summarized in Table 1.

CONCLUSIONS

Twining makes the following conclusions based on the data developed during this assessment:

- Soil samples collected throughout the site had concentrations which were below the laboratory detection limit or which were below applicable PRG, TTLC and/or STLC concentrations for the constituents included in the soil sample analysis;

- The concentrations of chromium, ranging from 43 mg/kg to 75 mg/kg, appear to be background. The concentrations of chromium detected in the soil samples were below applicable TTLC and STLC values and appeared to be naturally occurring;

- Low concentrations of DDE were detected in soil samples collected near the farm chemical storage and mixing area. The concentrations of DDE were below applicable TTLC, STLC and PRG levels; and

- A low concentration of Diazinon was detected in one soil sample. This concentration of Diazinon is below applicable PRG levels.

LIMITATIONS AND NOTIFICATIONS

The purpose of a geologic/hydrogeologic study is to reasonably characterize existing site conditions based on the geology/hydrogeology of the area. In performing such a study, it is understood that a balance must be struck between a reasonable inquiry into the site conditions and an exhaustive analysis of each conceivable environmental characteristic. No investigation is thorough enough to describe all geologic/hydrogeologic conditions of interest at a given site.

Conditions of interest may exist at the site that cannot be identified by visual observation alone. Where subsurface exploratory work is performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions or unsampled locations. If conditions of interest are not identified during performance of the work, such a finding should not be construed as a guarantee that such conditions do not exist at the site. No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with the property. Performance of this investigation is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions with a property.

Our professional services were performed, our findings obtained, and our conclusions prepared consistent with generally-accepted environmental assessment practices in California at the time the work is performed. Our findings and the resulting report are solely for the use of our client and appropriate government regulatory agencies. Any use of our report by a third party is at that third party's sole risk.

CLOSING

Twining is pleased to provide environmental services to Browman Development Company. Please feel free to contact at Twining at (800) 268-7021 if you have any questions regarding this report or the project in general.

Sincerely,
THE TWINING LABORATORIES, INC.
Environmental and Geological Services Division



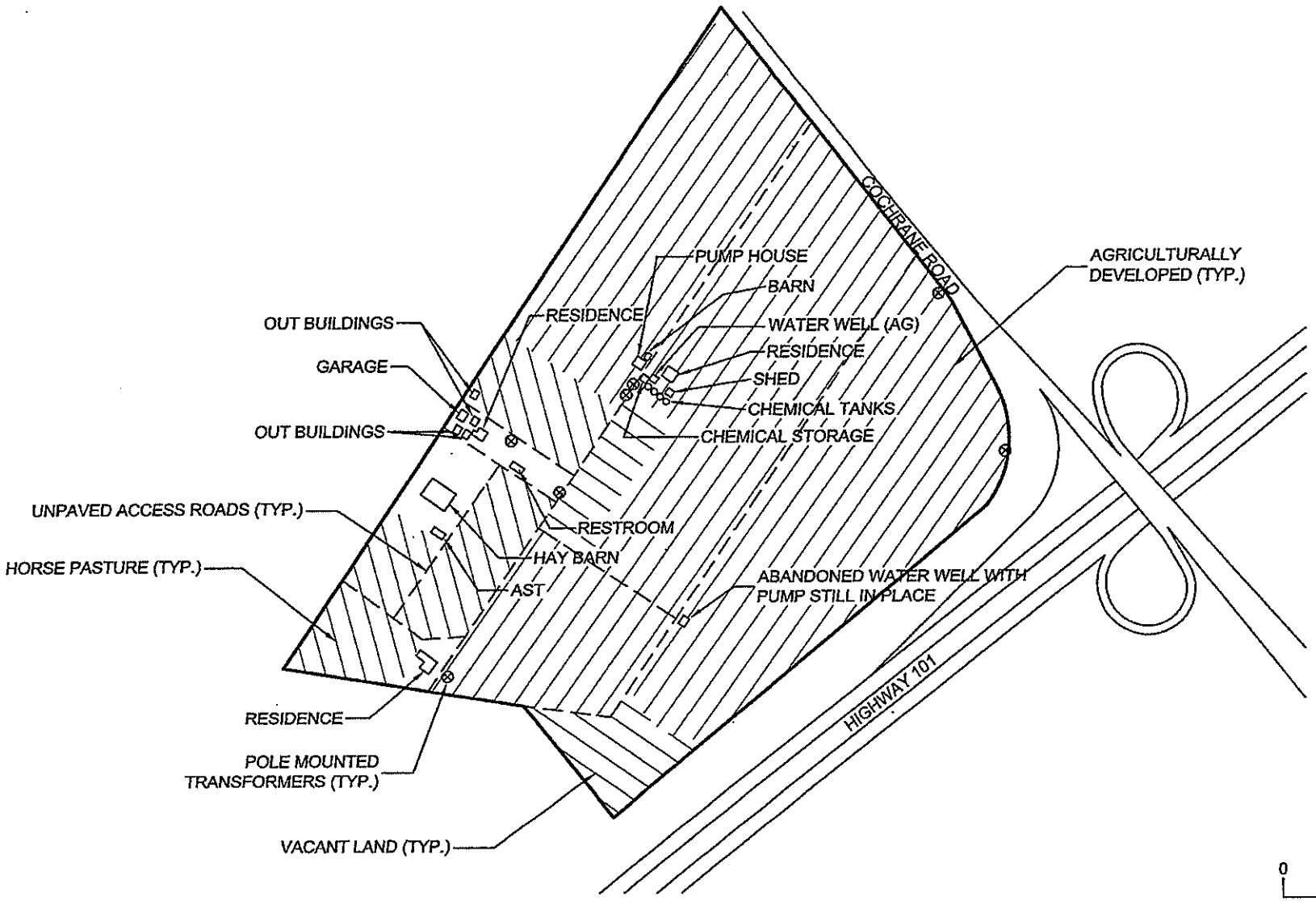
Ján Alfson, RG No. 4435
Senior Geologist

J:\phase II\Browman Morgan Hill\Browman Morgan Hill Phase II revised wpd.wpd

TABLE 1
SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
BROWMAN DEVELOPMENT - MORGAN HILL PROPERTY
Results in milligrams per kilogram

Sample/depth (feet)	As	As MDL	Cd	Cr	Cr (soluble) mg/l	Pb	Ni	Zn	Cu	pH	Pesticides	TRPH
S1-1'	ND	13	<5	52	0.075	<25	66	68	na	6.1	na	<10
S2-1'	6.6	nap	<1	54	0.098	7.7	63	79	na	5.5	na	<10
S3-1'	6.1	nap	<1	49	na	<25	61	71	na	5.6	na	<10
S4-1'	7.7	nap	<1	75	0.11	9.5	100	76	na	5.5	na	<10
S5-S	6.3	nap	na	na	na	15	na	81	34	na	4,4-DDE 0.092	<10
S5-2'	5.9	nap	na	na	na	9.6	na	74	31	na	nd	<10
S6-S	9.5	nap	na	na	na	14	na	90	29	na	4,4-DDE 0.070	14
S6-2'	<5	nap	na	na	na	10	na	78	29	na	nd	<10
S7-S	6.5	nap	na	50	na	10	na	68	30	na	nd	<10
S7-2'	5.2	nap	na	na	na	7.5	na	66	29	na	nd	<10
S8-S	ND	13	na	na	na	9.4	na	59	25	na	nd	<10
S8-2'	ND	13	na	na	na	6.8	na	60	30	na	nd	<10
S9-S	ND	13	na	na	na	12	na	74	29	na	nd	<10
S9-2'	ND	13	na	na	na	7.6	na	67	29	na	nd	<10
S10-S	ND	13	na	43	na	11	na	58	25	na	nd	<10
S10-2'	5.1	nap	na	na	na	7	na	60	25	na	nd	<10
S11-S	ND	13	na	45	na	13	na	74	25	na	nd	<10
S11-2'	ND	13	na	na	na	6.4	na	56	22	na	nd	<10
S12-S	6.7	nap	na	45	na	11	na	71	27	na	nd	<10
S12-2'	ND	13	na	na	na	10	na	64	24	na	Diazinon - 0.97	<10
Preliminary Remediation Goals - residential	22*		37	210	na	150	1600	23000	3100		DDE - 1.7 Diazinon - 55	
TTLC	500	nap	100	500		1000	2000	5000	2500		DDE 1	
STLC	5	nap	1	5		5	20	250	25		DDE 0.1 Diazinon - not available	

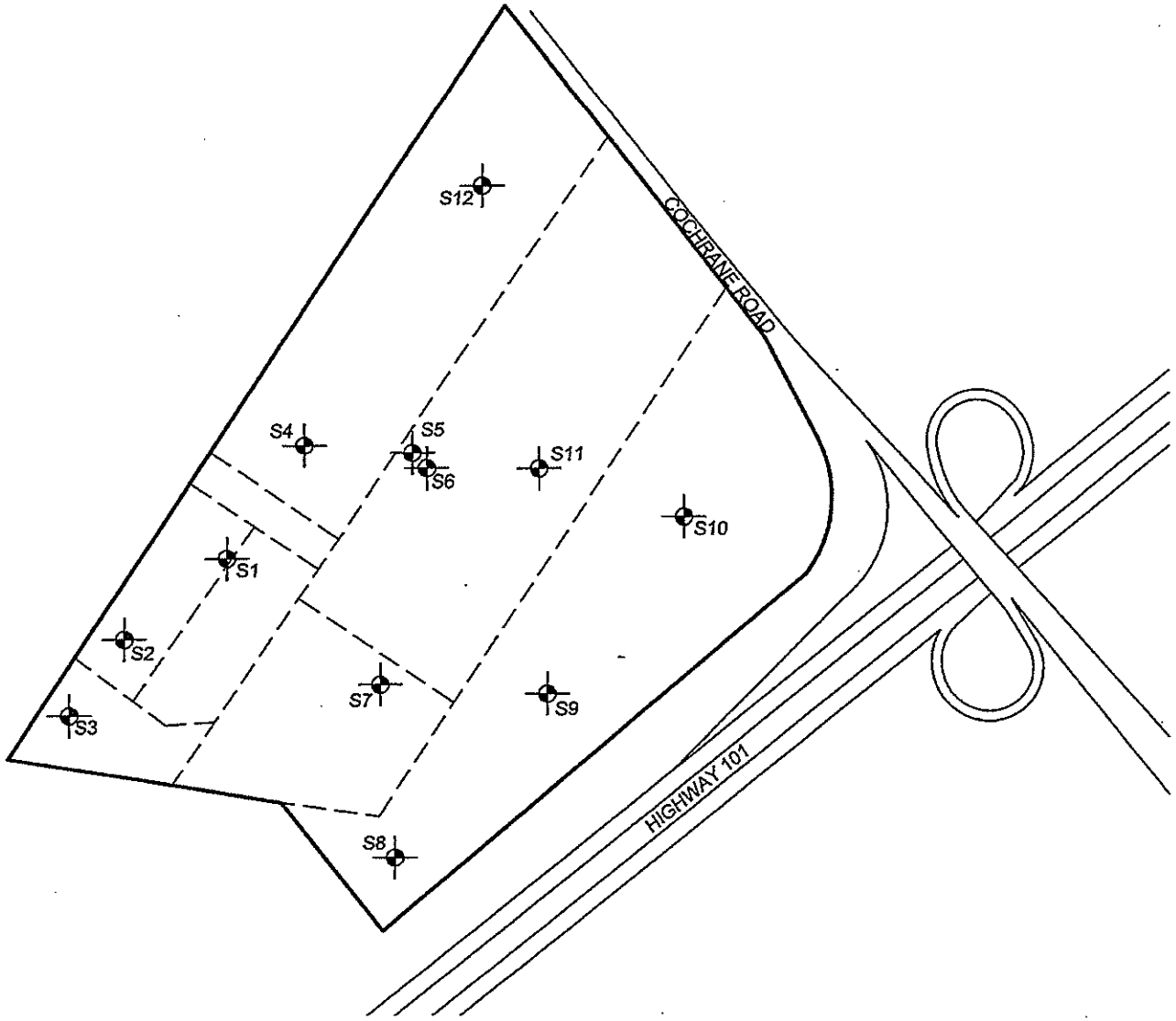
na - not analyzed
nd - not detected above method detection limits
* - non cancer endpoint
nap - not applicable
As - arsenic Cd - Cadmium Cr - Chromium Pb - Lead Ni - Nickel Zn - Zinc Cu - Copper TRPH - total recoverable petroleum hydrocarbons



SITE PLAN
BROWMAN DEVELOPMENT COMPANY
MORGAN HILL SHOPPING CENTER
MORGAN HILL, CALIFORNIA

FILE NO. 07261-01-02	DATE DRAWN: 06/10/04
DRAWN BY: WME	APPROVED BY:
PROJECT NO. A07261.02	DRAWING NO. 1

THE TWINING LABORATORIES, INC.
EST. 1898
FRESNO/MODESTO/VISALIA/BAKERSFIELD/MONTEREY



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APPROXIMATE SCALE
IN FEET

SAMPLE LOCATION MAP
HIGHWAY 101 AND COCHRANE ROAD
MORGAN HILL, CALIFORNIA

FILE NO. 07261-01-02	DATE DRAWN: 09/02/04
DRAWN BY: WME	APPROVED BY:
PROJECT NO. A07261.02	DRAWING NO. 2

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APPENDIX A

THE TWINING LABORATORIES, INC. STANDARD OPERATING PROCEDURES

This appendix contains the standard operating procedures used by Twining in performing the investigation. Twining observes these procedures in order to obtain consistent, reliable data.

- **Standard Operating Procedures for Hand Augering and Soil Sampling**

Subsurface assessment permits, if required, are filed with the appropriate regulatory agencies prior to conducting field operations. Field activities are performed under the supervision of a California registered environmental assessor II. Sampling equipment is thoroughly cleaned before, during, and after each use according to Twining's "Standard Operating Procedures for Equipment Decontamination".

Hand auger soil borings are between 1.5 and 3.0 inches in diameter depending upon the size of the auger. These soil borings are advanced by turning the hand auger handle repeatedly which causes the auger bit to cut into the soil. After approximately 6 inches of advance, the bucket of the auger fills with soil cuttings and it is then removed from the borehole and the cuttings are emptied. The auger is then replaced in the borehole to advance another 6-inch interval. In this manner the borehole is extended to the designated sampling depth.

Soil samples are collected from hand auger soil borings by lowering a soil sampler equipped with a stainless-steel retention sleeve into the undisturbed soil at the bottom of the borehole. The soil sampler is then driven approximately 6 inches using a slide hammer.

The soil borings are abandoned by grouting with a 6-sack cement slurry containing 3 to 5 percent bentonite, or backfilling with clean soil. Abandonment procedures depend upon the boring depth, depth to groundwater, project objectives, and regulatory requirements.

Soil cuttings generated during hand augering are either replaced in the borings, or stockpiled, depending upon project requirements. Stockpiled soil is containerized in United States Department of Transportation-approved drums, or placed on and covered with plastic sheeting, and stored on site in an area inaccessible to the general public. Typically, the stockpiled soil is characterized by collecting and analyzing composite samples from the stockpile. Twining can recommend an appropriate method for disposition of stockpiled soil based on the analytical results. Disposal will be the responsibility of the client.

A-2 **Standard Operating Procedures for Equipment Decontamination**: Proper decontamination procedures reduce the potential for: cross-contamination among sample locations; and introduction of contamination from outside sources.

Before, during, and following drilling operations, drilling equipment is thoroughly cleaned using a high pressure hot water (steam) washer. Steam cleaning condensate will be containerized for later disposal. Generally, disposal will be the client's responsibility.

Sampling equipment and any tools, measuring devices, or other equipment which will contact soil or any media being assessed will be washed in a low-phosphate soap and water solution, and rinsed in clean water before each use. The type of soap used will depend upon project requirements.

A-3 **Standard Operating Procedures for Sample Handling and Chain-of-Custody**: Records are developed for samples which include: sampling date, sample type, location, job number, name of sampling personnel, and method of preservation. Each sample container is labelled immediately following collection. Chain-of-custody protocol, as described in United States Environmental Protection Agency, 1986, Test Methods for Evaluating Solid Waste, SW-846, Third Edition, is followed. Samples will be maintained at approximately 4°C. Upon arrival at the laboratory, the samples will be preserved for analysis as appropriate.

Samples may be delivered to Twining's chemistry laboratory in Fresno, California. The Twining representative in charge of the field work transport or direct the transportation of the samples and custody forms to the laboratory, where the samples are transferred to the sample control department. A receiving clerk, or an authorized analyst, signs the custody forms, present a duplicate copy to the Twining representative, and transfers the samples to a laboratory analyst. The laboratory manager retains possession of the custody forms during analyses of the samples.

The laboratory manager's responsibilities include monitoring the sample integrity within the laboratory. This involves assigning each sample a laboratory number and maintaining cross-reference between the sample's field and laboratory identifications. The analysts' responsibilities include maintaining accurate records of the samples analyzed along with the analytical data produced. This involves labelling chromatograms and maintaining the laboratory numbers on sub-samples taken from the submitted samples, labelling glassware used in the analyses, and properly labelling sample extract containers with each sample's laboratory number.

Following analyses, the samples are transferred to a limited-access storage room. Chain-of-custody forms, chromatograms, and other pertinent information are filed for future reference. Splits of samples analyzed are kept for 30 days. Samples containing hazardous concentrations will be returned to the client for disposal.

A-4 **Standard Operating Procedures for Laboratory Quality Assurance/Quality Control**: These laboratory QA/QC procedures were developed to reduce outside interferences during analyses of samples. The laboratory director is responsible for creating and maintaining the program. General QA/QC procedures follow:

- Analytical instruments are serviced on a regular basis to assure accurate calibration;
- Organic-free water is monitored daily for quality;
- Gas chromatographs are calibrated daily;

Method blanks are run to check whether the glassware and reagents are free of interference from chemicals that would invalidate the analyses;

- Standards are prepared using the applicable reference materials;
- Matrix spikes are analyzed in duplicate to validate the accuracy and precision of the method; and
- During groundwater sampling, a travel blank sample consisting of organic-free water is prepared and containerized in the laboratory, transported to the site, and handled and transported in the same manner as the groundwater samples.

APPENDIX B

LABORATORY ANALYTICAL DATA SHEETS

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

January 03, 2005

Work Order #: 4H24029

Jan Alfson
Twining Environmental Department
2527 Fresno Street
Fresno, CA 93721

RE: Morgan Hill Browman

Enclosed are the analytical results for samples received by our laboratory on 08/24/04 . For your reference, these analyses have been assigned laboratory work order number 4H24029.

All analyses have been performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, The Twining Laboratories, Inc. (TL) is not responsible for use of less than complete reports. Results apply only to samples analyzed.

If you have any questions, please feel free to contact us at the number listed above.

Sincerely,

The Twining Laboratories, Inc.

Ronald J. Boquist
Director of Analytical Chemistry

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S1@1'	4H24029-01	Soil	08/24/04 05:45	08/24/04 15:08
S2@1'	4H24029-02	Soil	08/24/04 06:20	08/24/04 15:08
S3@1'	4H24029-03	Soil	08/24/04 06:34	08/24/04 15:08
S4@1'	4H24029-04	Soil	08/24/04 07:07	08/24/04 15:08
S5@Surface	4H24029-05	Soil	08/24/04 07:23	08/24/04 15:08
S5@2'	4H24029-06	Soil	08/24/04 07:41	08/24/04 15:08
S6@Surface	4H24029-08	Soil	08/24/04 08:09	08/24/04 15:08
S6@2'	4H24029-09	Soil	08/24/04 08:38	08/24/04 15:08
S7@Surface	4H24029-10	Soil	08/24/04 09:09	08/24/04 15:08
S7@2'	4H24029-11	Soil	08/24/04 09:21	08/24/04 15:08
S8@Surface	4H24029-12	Soil	08/24/04 09:45	08/24/04 15:08
S8@2'	4H24029-13	Soil	08/24/04 10:07	08/24/04 15:08
S9@Surface	4H24029-14	Soil	08/24/04 10:24	08/24/04 15:08
S9@2'	4H24029-15	Soil	08/24/04 10:37	08/24/04 15:08
S10@Surface	4H24029-16	Soil	08/24/04 10:51	08/24/04 15:08
S10@2'	4H24029-17	Soil	08/24/04 11:01	08/24/04 15:08
S11@Surface	4H24029-18	Soil	08/24/04 11:17	08/24/04 15:08
S11@2'	4H24029-19	Soil	08/24/04 11:27	08/24/04 15:08
S12@Surface	4H24029-20	Soil	08/24/04 11:44	08/24/04 15:08
S12@2'	4H24029-21	Soil	08/24/04 11:51	08/24/04 15:08

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S1@1'

4H24029-01 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH	**6.1**			pH Units	1	T4I0810	09/08/04	09/08/04	EPA 9045C
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H2606	08/26/04	09/01/04	EPA 6010B
Cadmium	ND	5.0		mg/kg	5	T4H2606	08/26/04	09/01/04	EPA 6010B
Chromium	**52**	25		mg/kg	5	T4H2606	08/26/04	09/01/04	EPA 6010B
Lead	ND	25		mg/kg	5	T4H2606	08/26/04	09/01/04	EPA 6010B
Nickel	**66**	25		mg/kg	5	T4H2606	08/26/04	09/01/04	EPA 6010B
Zinc	**68**	25		mg/kg	5	T4H2606	08/26/04	09/01/04	EPA 6010B
Semi-Volatile Organics									
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S2@1'

4H24029-02 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH	**5.5**			pH Units	1	T4I0810	09/08/04	09/08/04	EPA 9045C
Metals									
Arsenic	6.6	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Cadmium	ND	1.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Chromium	54	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	7.7	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Nickel	63	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	79	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S3@1'

4H24029-03 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH	5.6			pH Units	1	T4I0810	09/08/04	09/08/04	EPA 9045C
Metals									
Arsenic	6.1	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Cadmium	ND	1.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Chromium	49	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	ND	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Nickel	61	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	71	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S4@1'

4H24029-04 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH	5.5			pH Units	1	T4I0810	09/08/04	09/08/04	EPA 9045C
Metals									
Arsenic	7.7	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Cadmium	ND	1.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Chromium	75	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	9.5	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Nickel	100	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	76	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S5@Surface

4H24029-05 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	**6.3**	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Copper	**34**	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	**15**	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	**81**	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	**0.092**	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*75.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*63.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S5@Surface

4H24029-05 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*73.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*62.3 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S5@2'

4H24029-06 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	**5.9**	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Copper	**31**	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	**9.6**	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	**74**	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*75.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*81.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

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Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S5@2'

4H24029-06 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*76.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*62.3 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898 CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S6@Surface

4H24029-08 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	**9.5**	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Copper	**29**	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	**14**	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	**90**	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	**0.070**	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*78.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*72.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898 CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
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(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S6@Surface

4H24029-08 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*72.0 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*34.1 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	**14**	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S6@2'

4H24029-09 (Soil)

Analyte	Result	Reporting Limit		MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals										
Arsenic	**4.9**	**5.0**	**J**	**2.6**	**mg/kg**	**1**	**T4H2733**	**08/27/04**	**09/03/04**	**EPA 6010B**
Copper	**29**	**5.0**			**mg/kg**	**1**	**T4H2733**	**08/27/04**	**09/03/04**	**EPA 6010B**
Lead	**10**	**5.0**			**mg/kg**	**1**	**T4H2733**	**08/27/04**	**09/03/04**	**EPA 6010B**
Zinc	**78**	**25**			**mg/kg**	**5**	**T4H2733**	**08/27/04**	**09/03/04**	**EPA 6010B**
Semi-Volatile Organics										
alpha-BHC	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50			mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)				*66.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)				*87.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0			mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50			mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10			mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0			mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10			mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25			mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S6@2'

4H24029-09 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*72.0 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*45.5 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S7@Surface

4H24029-10 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	6.5	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Copper	30	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	10	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	68	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*75.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*75.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898 CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S7@Surface

4H24029-10 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*70.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*52.1 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S7@2'

4H24029-11 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	5.2	5.0	2.6	mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Copper	29	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Lead	7.5	5.0		mg/kg	1	T4H2733	08/27/04	09/03/04	EPA 6010B
Zinc	66	25		mg/kg	5	T4H2733	08/27/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*78.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*57.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S7@2'

4H24029-11 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*73.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*69.5 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S8@Surface

4H24029-12 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**25**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**9.4**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**59**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*60.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*84.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

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2527 Fresno Street
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S8@Surface

4H24029-12 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*69.0 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*74.3 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S8@2'

4H24029-13 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	30	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	6.8	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	60	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*69.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*42.0 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S8@2'

4H24029-13 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*72.0 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*48.5 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S9@Surface

4H24029-14 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**29**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**12**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**74**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*90.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*48.0 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898 CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S9@Surface

4H24029-14 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*78.0 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*73.7 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S9@2'

4H24029-15 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**29**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**7.6**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**67**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*78.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*84.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S9@2'

4H24029-15 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*73.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*48.5 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S10@Surface

4H24029-16 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**25**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**11**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**58**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*90.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*84.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S10@Surface

4H24029-16 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*73.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*31.7 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898 CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S10@2'

4H24029-17 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	**5.1**	5.0	2.6	mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**25**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**7.0**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**60**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*66.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*90.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
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2527 Fresno Street
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S10@2'

4H24029-17 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*72.0 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*70.7 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S11@Surface

4H24029-18 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**25**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**13**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**74**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*75.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*93.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898 CALIFORNIA ELAP CERTIFICATE #1371

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Fresno, CA 93721
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S11@Surface

4H24029-18 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*73.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*46.7 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S11@2'

4H24029-19 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**22**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**6.4**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**56**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*60.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*78.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S11@2'

4H24029-19 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*75.0 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*25.1 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S12@Surface

4H24029-20 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	6.7	5.0	2.6	mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	27	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	11	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	71	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*45.0 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*102 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S12@Surface

4H24029-20 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*73.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*27.5 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S12@2'

4H24029-21 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Metals									
Arsenic	ND	25	13	mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Copper	**24**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Lead	**10**	5.0		mg/kg	1	T4H3121	08/31/04	09/03/04	EPA 6010B
Zinc	**64**	25		mg/kg	5	T4H3121	08/31/04	09/03/04	EPA 6010B
Semi-Volatile Organics									
alpha-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-BHC (Lindane)	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Aldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
beta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
delta-BHC	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Heptachlor epoxide	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan I	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
gamma-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
alpha-Chlordane	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDE	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Dieldrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDD	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan II	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
4,4'-DDT	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin aldehyde	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endosulfan sulfate	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Methoxychlor	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Endrin ketone	ND	0.050		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Toxaphene	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Chlordane	ND	0.50		mg/kg	1	T4H3104	08/30/04	09/02/04	EPA 8081A
Surrogate: Tetrachloro-meta-xylene (TMX)			*72.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Surrogate: Decachlorobiphenyl (DCB)			*90.1 %*	*70-130*		*T4H3104*	*08/30/04*	*09/02/04*	*EPA 8081A*
Thionazin	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phosdrin	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethoprop	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Naled	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Phorate	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Dimethoate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A

THE TWINING LABORATORIES, INC.
EST. 1898 CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
Fresno, CA 93721
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

S12@2'

4H24029-21 (Soil)

Analyte	Result	Reporting Limit	MDL	Units	Dilution	Batch	Prepared	Analyzed	Method
Semi-Volatile Organics									
Simazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Atrazine	ND	0.025		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-o	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Demeton-s	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Disulfoton	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Diazinon	**0.97**	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-methyl	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ronnel	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Malathion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fenthion	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Parathion-ethyl	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Chlorpyrifos	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Trichloronate	ND	0.25		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Stirophos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Fensulfothion	ND	0.50		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Ethion	ND	0.10		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Bolstar	ND	1.3		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Azinphos-methyl	ND	5.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Coumaphos	ND	1.0		mg/kg	1	T4H3107	08/31/04	09/01/04	EPA 8141A
Surrogate: Triphenyl phosphate			*43.5 %*	*70-130*		*T4H3107*	*08/31/04*	*09/01/04*	*EPA 8141A*
Dalapon	ND	1.0		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dicamba	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPP	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
MCPA	ND	30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dichloroprop	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-D	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-TP (Silvex)	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4,5-T	ND	0.030		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
2,4-DB	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Dinoseb	ND	0.30		mg/kg	1	T4I0212	09/01/04	09/02/04	EPA 8151A
Surrogate: 2,4-Dichlorophenylacetic acid			*56.3 %*	*29-115*		*T4I0212*	*09/01/04*	*09/02/04*	*EPA 8151A*
TRPH	ND	10		mg/kg	1	T4H2611	08/26/04	08/26/04	SM 5520F

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CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	01/03/05

Notes and Definitions

S-LOW	Low surrogate recovery confirmed as a matrix effect by a second analysis
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
ug/L	micrograms per liter(parts per billion concentration unit)
mg/L	milligrams per kilogram(parts per million concentration unit)
mg/kg	milligrams per liter(parts per million concentration unit)
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference

Inorganics - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4I0810 - No Prep										
LCS (T4I0810-BS1)				Prepared & Analyzed: 09/08/04						
pH	7.00			pH Units	7.00		100	80-120		
LCS Dup (T4I0810-BSD1)				Prepared & Analyzed: 09/08/04						
pH	7.00			pH Units	7.00		100	80-120	0.00	20

Metals - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4H2606 - EPA 3050B										
Blank (T4H2606-BLK1)				Prepared: 08/26/04 Analyzed: 09/01/04						
Nickel	ND	5.0		mg/kg						
Cadmium	ND	1.0		mg/kg						
Arsenic	ND	5.0	2.6	mg/kg						
Zinc	ND	5.0		mg/kg						
Lead	ND	5.0		mg/kg						
Chromium	ND	5.0		mg/kg						
LCS (T4H2606-BS1)				Prepared: 08/26/04 Analyzed: 09/01/04						
Chromium	20.2	5.0		mg/kg	20.0		101	75-125		
Zinc	19.3	5.0		mg/kg	20.0		96.5	75-125		
Arsenic	53.9	5.0	2.6	mg/kg	60.0		89.8	75-125		
Lead	19.1	5.0		mg/kg	20.0		95.5	75-125		
Cadmium	3.88	1.0		mg/kg	4.00		97.0	75-125		
Nickel	19.6	5.0		mg/kg	20.0		98.0	75-125		
LCS Dup (T4H2606-BSD1)				Prepared: 08/26/04 Analyzed: 09/01/04						
Nickel	19.5	5.0		mg/kg	20.0		97.5	75-125	0.512	20
Zinc	19.1	5.0		mg/kg	20.0		95.5	75-125	1.04	20
Chromium	20.1	5.0		mg/kg	20.0		100	75-125	0.496	20
Lead	19.0	5.0		mg/kg	20.0		95.0	75-125	0.525	20
Arsenic	54.2	5.0	2.6	mg/kg	60.0		90.3	75-125	0.555	20
Cadmium	3.84	1.0		mg/kg	4.00		96.0	75-125	1.04	20
Matrix Spike (T4H2606-MS1)		Source: 4H24029-01		Prepared: 08/26/04 Analyzed: 09/01/04						
Zinc	89.1	25		mg/kg	20.0	68	106	75-125		
Cadmium	3.58	5.0		mg/kg	4.00	ND	89.5	75-125		
Chromium	70.4	25		mg/kg	20.0	52	92.0	75-125		
Lead	28.0	25		mg/kg	20.0	8.5	97.5	75-125		
Arsenic	64.3	25	13	mg/kg	60.0	ND	107	75-125		
Nickel	88.1	25		mg/kg	20.0	66	110	75-125		
Matrix Spike Dup (T4H2606-MSD1)		Source: 4H24029-01		Prepared: 08/26/04 Analyzed: 09/01/04						
Arsenic	64.9	25	13	mg/kg	60.0	ND	108	75-125	0.929	20
Cadmium	3.69	5.0		mg/kg	4.00	ND	92.2	75-125	3.03	20
Nickel	90.0	25		mg/kg	20.0	66	120	75-125	2.13	20
Lead	27.7	25		mg/kg	20.0	8.5	96.0	75-125	1.08	20
Zinc	88.6	25		mg/kg	20.0	68	103	75-125	0.563	20
Chromium	69.4	25		mg/kg	20.0	52	87.0	75-125	1.43	20
Batch T4H2733 - EPA 3050B										
Blank (T4H2733-BLK1)				Prepared: 08/27/04 Analyzed: 09/03/04						
Arsenic	ND	5.0	2.6	mg/kg						
Copper	ND	5.0		mg/kg						
Lead	ND	5.0		mg/kg						
Chromium	ND	5.0		mg/kg						
Nickel	ND	5.0		mg/kg						
Zinc	ND	5.0		mg/kg						
Cadmium	ND	1.0		mg/kg						
LCS (T4H2733-BS1)				Prepared: 08/27/04 Analyzed: 09/03/04						

Metals - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4H2733 - EPA 3050B										
LCS (T4H2733-BS1)				Prepared: 08/27/04 Analyzed: 09/03/04						
Arsenic	53.0	5.0	2.6	mg/kg	60.0		88.3	75-125		
Chromium	19.8	5.0		mg/kg	20.0		99.0	75-125		
Copper	20.2	5.0		mg/kg	20.0		101	75-125		
Cadmium	3.78	1.0		mg/kg	4.00		94.5	75-125		
Lead	18.8	5.0		mg/kg	20.0		94.0	75-125		
Nickel	19.2	5.0		mg/kg	20.0		96.0	75-125		
Zinc	18.9	5.0		mg/kg	20.0		94.5	75-125		
LCS Dup (T4H2733-BSD1)				Prepared: 08/27/04 Analyzed: 09/03/04						
Zinc	18.9	5.0		mg/kg	20.0		94.5	75-125	0.00	20
Nickel	19.2	5.0		mg/kg	20.0		96.0	75-125	0.00	20
Chromium	19.8	5.0		mg/kg	20.0		99.0	75-125	0.00	20
Copper	20.2	5.0		mg/kg	20.0		101	75-125	0.00	20
Lead	18.7	5.0		mg/kg	20.0		93.5	75-125	0.533	20
Cadmium	3.79	1.0		mg/kg	4.00		94.8	75-125	0.264	20
Arsenic	53.2	5.0	2.6	mg/kg	60.0		88.7	75-125	0.377	20
Matrix Spike (T4H2733-MS1)		Source: 4H24029-03		Prepared: 08/27/04 Analyzed: 09/03/04						
Lead	28.4	25		mg/kg	20.0	8.7	98.5	75-125		
Zinc	94.4	25		mg/kg	20.0	71	117	75-125		
Nickel	85.3	5.0		mg/kg	20.0	61	122	75-125		
Copper	54.1	5.0		mg/kg	20.0	31	116	75-125		
Arsenic	59.2	5.0	2.6	mg/kg	60.0	6.1	88.5	75-125		
Cadmium	3.60	1.0		mg/kg	4.00	ND	90.0	75-125		
Chromium	70.2	5.0		mg/kg	20.0	49	106	75-125		
Matrix Spike Dup (T4H2733-MSD1)		Source: 4H24029-03		Prepared: 08/27/04 Analyzed: 09/03/04						
Arsenic	60.5	5.0	2.6	mg/kg	60.0	6.1	90.7	75-125	2.17	20
Chromium	71.9	5.0		mg/kg	20.0	49	114	75-125	2.39	20
Cadmium	3.62	1.0		mg/kg	4.00	ND	90.5	75-125	0.554	20
Lead	28.1	25		mg/kg	20.0	8.7	97.0	75-125	1.06	20
Nickel	82.6	5.0		mg/kg	20.0	61	108	75-125	3.22	20
Zinc	91.6	25		mg/kg	20.0	71	103	75-125	3.01	20
Copper	53.4	5.0		mg/kg	20.0	31	112	75-125	1.30	20
Batch T4H3121 - EPA 3050B										
Blank (T4H3121-BLK1)				Prepared: 08/31/04 Analyzed: 09/03/04						
Arsenic	ND	5.0	2.6	mg/kg						
Zinc	ND	5.0		mg/kg						
Copper	ND	5.0		mg/kg						
Lead	ND	5.0		mg/kg						
LCS (T4H3121-BS1)				Prepared: 08/31/04 Analyzed: 09/03/04						
Zinc	18.9	5.0		mg/kg	20.0		94.5	75-125		
Arsenic	54.0	5.0	2.6	mg/kg	60.0		90.0	75-125		
Copper	20.3	5.0		mg/kg	20.0		102	75-125		
Lead	18.8	5.0		mg/kg	20.0		94.0	75-125		
LCS Dup (T4H3121-BSD1)				Prepared: 08/31/04 Analyzed: 09/03/04						
Copper	20.0	5.0		mg/kg	20.0		100	75-125	1.49	20
Zinc	18.8	5.0		mg/kg	20.0		94.0	75-125	0.531	20

Metals - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4H3121 - EPA 3050B										
LCS Dup (T4H3121-BSD1)				Prepared: 08/31/04 Analyzed: 09/03/04						
Lead	18.8	5.0		mg/kg	20.0		94.0	75-125	0.00	20
Arsenic	53.6	5.0	2.6	mg/kg	60.0		89.3	75-125	0.743	20
Matrix Spike (T4H3121-MS1)			Source: 4H24029-13	Prepared: 08/31/04 Analyzed: 09/03/04						
Copper	49.4	5.0		mg/kg	20.0	30	97.0	75-125		
Lead	25.2	5.0		mg/kg	20.0	6.8	92.0	75-125		
Zinc	78.8	25		mg/kg	20.0	60	94.0	75-125		
Arsenic	59.0	5.0	2.6	mg/kg	60.0	ND	98.3	75-125		
Matrix Spike (T4H3121-MS2)			Source: 4H24029-20	Prepared: 08/31/04 Analyzed: 09/03/04						
Arsenic	64.8	25	13	mg/kg	60.0	6.7	96.8	75-125		
Copper	45.7	5.0		mg/kg	20.0	27	93.5	75-125		
Lead	29.0	5.0		mg/kg	20.0	11	90.0	75-125		
Zinc	86.0	25		mg/kg	20.0	71	75.0	75-125		
Matrix Spike Dup (T4H3121-MSD1)			Source: 4H24029-13	Prepared: 08/31/04 Analyzed: 09/03/04						
Lead	25.6	5.0		mg/kg	20.0	6.8	94.0	75-125	1.57	20
Copper	50.6	5.0		mg/kg	20.0	30	103	75-125	2.40	20
Arsenic	59.0	5.0	2.6	mg/kg	60.0	ND	98.3	75-125	0.00	20
Zinc	79.8	25		mg/kg	20.0	60	99.0	75-125	1.26	20
Matrix Spike Dup (T4H3121-MSD2)			Source: 4H24029-20	Prepared: 08/31/04 Analyzed: 09/03/04						
Lead	29.4	5.0		mg/kg	20.0	11	92.0	75-125	1.37	20
Arsenic	64.2	25	13	mg/kg	60.0	6.7	95.8	75-125	0.930	20
Zinc	87.2	25		mg/kg	20.0	71	81.0	75-125	1.39	20
Copper	46.6	5.0		mg/kg	20.0	27	98.0	75-125	1.95	20

Semi-Volatile Organics - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4H2611 - Default Prep GC-Semi										
Blank (T4H2611-BLK1)				Prepared & Analyzed: 08/26/04						
TRPH	ND	10		mg/kg						
LCS (T4H2611-BS1)				Prepared & Analyzed: 08/26/04						
TRPH	498	10		mg/kg	500		99.6	70-130		
LCS Dup (T4H2611-BSD1)				Prepared & Analyzed: 08/26/04						
TRPH	498	10		mg/kg	500		99.6	70-130	0.00	20
Matrix Spike (T4H2611-MS1)			Source: 4H24029-01	Prepared & Analyzed: 08/26/04						
TRPH	498	10		mg/kg	500	ND	99.6	70-130		
Matrix Spike Dup (T4H2611-MSD1)			Source: 4H24029-01	Prepared & Analyzed: 08/26/04						
TRPH	498	10		mg/kg	500	ND	99.6	70-130	0.00	20
Batch T4H3104 - EPA 3550B										
Blank (T4H3104-BLK1)				Prepared: 08/30/04 Analyzed: 09/02/04						
Surrogate: Tetrachloro-meta-xylene (TMX)	*0.0220*	*0.050*		*mg/kg*	*0.0333*		*66.1*	*70-130*		
alpha-BHC	ND	0.050		mg/kg						
gamma-BHC (Lindane)	ND	0.050		mg/kg						
Heptachlor	ND	0.050		mg/kg						
Aldrin	ND	0.050		mg/kg						
beta-BHC	ND	0.050		mg/kg						
delta-BHC	ND	0.050		mg/kg						
Heptachlor epoxide	ND	0.050		mg/kg						
Endosulfan I	ND	0.050		mg/kg						
gamma-Chlordane	ND	0.050		mg/kg						
alpha-Chlordane	ND	0.050		mg/kg						
4,4'-DDE	ND	0.050		mg/kg						
Dieldrin	ND	0.050		mg/kg						
Endrin	ND	0.050		mg/kg						
4,4'-DDD	ND	0.050		mg/kg						
Endosulfan II	ND	0.050		mg/kg						
4,4'-DDT	ND	0.050		mg/kg						
Endrin aldehyde	ND	0.050		mg/kg						
Endosulfan sulfate	ND	0.050		mg/kg						
Methoxychlor	ND	0.050		mg/kg						
Endrin ketone	ND	0.050		mg/kg						
Toxaphene	ND	0.50		mg/kg						
Chlordane	ND	0.50		mg/kg						
LCS (T4H3104-BS1)				Prepared: 08/30/04 Analyzed: 09/02/04						
Surrogate: Tetrachloro-meta-xylene (TMX)	*0.0240*	*0.050*		*mg/kg*	*0.0333*		*72.1*	*70-130*		
gamma-BHC (Lindane)	0.0420	0.050		mg/kg	0.0417		101	60-130		
Heptachlor	0.0420	0.050		mg/kg	0.0417		101	55-130		
Dieldrin	0.0440	0.050		mg/kg	0.0417		106	60-130		
Endrin	0.0510	0.050		mg/kg	0.0417		122	60-130		
LCS Dup (T4H3104-BSD1)				Prepared: 08/30/04 Analyzed: 09/02/04						
Surrogate: Tetrachloro-meta-xylene (TMX)	*0.0240*	*0.050*		*mg/kg*	*0.0333*		*72.1*	*70-130*		
gamma-BHC (Lindane)	0.0430	0.050		mg/kg	0.0417		103	60-130	2.35	20
Heptachlor	0.0430	0.050		mg/kg	0.0417		103	55-130	2.35	20

Semi-Volatile Organics - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4H3104 - EPA 3550B										
LCS Dup (T4H3104-BSD1)				Prepared: 08/30/04 Analyzed: 09/02/04						
Dieldrin	0.0440	0.050		mg/kg	0.0417		106	60-130	0.00	20
Endrin	0.0530	0.050		mg/kg	0.0417		127	60-130	3.85	20
Matrix Spike (T4H3104-MS1)		Source: 4H24029-05		Prepared: 08/30/04 Analyzed: 09/02/04						
Surrogate: Tetrachloro-meta-xylene (TMX)	*0.0270*	*0.050*		*mg/kg*	*0.0333*		*81.1*	*70-130*		
gamma-BHC (Lindane)	0.0210	0.050		mg/kg	0.0417	ND	50.4	60-130		
Heptachlor	0.0290	0.050		mg/kg	0.0417	ND	69.5	55-130		
Dieldrin	0.00700	0.050		mg/kg	0.0417	ND	16.8	60-130		
Endrin	0.00700	0.050		mg/kg	0.0417	ND	16.8	60-130		
Matrix Spike Dup (T4H3104-MSD1)		Source: 4H24029-05		Prepared: 08/30/04 Analyzed: 09/02/04						
Surrogate: Tetrachloro-meta-xylene (TMX)	*0.0280*	*0.050*		*mg/kg*	*0.0333*		*84.1*	*70-130*		
gamma-BHC (Lindane)	0.0220	0.050		mg/kg	0.0417	ND	52.8	60-130	4.65	20
Heptachlor	0.0280	0.050		mg/kg	0.0417	ND	67.1	55-130	3.51	20
Dieldrin	0.00700	0.050		mg/kg	0.0417	ND	16.8	60-130	0.00	20
Endrin	0.00700	0.050		mg/kg	0.0417	ND	16.8	60-130	0.00	20
Batch T4H3107 - EPA 3550B										
Blank (T4H3107-BLK1)				Prepared: 08/31/04 Analyzed: 09/01/04						
Surrogate: Triphenyl phosphate	*0.0510*	*5.0*		*mg/kg*	*0.0667*		*76.5*	*70-130*		
Thionazin	ND	1.0		mg/kg						
Phosdrin	ND	0.50		mg/kg						
Ethoprop	ND	0.10		mg/kg						
Naled	ND	5.0		mg/kg						
Phorate	ND	0.10		mg/kg						
Dimethoate	ND	0.25		mg/kg						
Simazine	ND	0.025		mg/kg						
Atrazine	ND	0.025		mg/kg						
Demeton-o	ND	0.25		mg/kg						
Demeton-s	ND	0.25		mg/kg						
Disulfoton	ND	0.10		mg/kg						
Diazinon	ND	0.25		mg/kg						
Parathion-methyl	ND	0.50		mg/kg						
Ronnel	ND	0.50		mg/kg						
Malathion	ND	0.25		mg/kg						
Fenthion	ND	0.25		mg/kg						
Parathion-ethyl	ND	0.25		mg/kg						
Chlorpyrifos	ND	0.25		mg/kg						
Trichloronate	ND	0.25		mg/kg						
Stirophos	ND	1.0		mg/kg						
Fensulfothion	ND	0.50		mg/kg						
Ethion	ND	0.10		mg/kg						
Bolstar	ND	1.3		mg/kg						
Azinphos-methyl	ND	5.0		mg/kg						
Coumaphos	ND	1.0		mg/kg						
LCS (T4H3107-BS1)				Prepared: 08/31/04 Analyzed: 09/01/04						
Surrogate: Triphenyl phosphate	*0.0870*	*5.0*		*mg/kg*	*0.0667*		*130*	*70-130*		

Semi-Volatile Organics - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4H3107 - EPA 3550B										
LCS (T4H3107-BS1)				Prepared: 08/31/04 Analyzed: 09/01/04						
Thionazin	0.0650	1.0		mg/kg	0.0667		97.5	70-130		
Dimethoate	0.0560	0.25		mg/kg	0.0667		84.0	70-130		
Disulfoton	0.0580	0.10		mg/kg	0.0667		87.0	70-130		
Diazinon	0.0740	0.25		mg/kg	0.0667		111	70-130		
Parathion-methyl	0.0670	0.50		mg/kg	0.0667		100	70-130		
LCS Dup (T4H3107-BSD1)				Prepared: 08/31/04 Analyzed: 09/01/04						
Surrogate: Triphenyl phosphate	*0.0850*	*5.0*		*mg/kg*	*0.0667*		*127*	*70-130*		
Thionazin	0.0630	1.0		mg/kg	0.0667		94.5	70-130	3.12	20
Dimethoate	0.0500	0.25		mg/kg	0.0667		75.0	70-130	11.3	20
Disulfoton	0.0550	0.10		mg/kg	0.0667		82.5	70-130	5.31	20
Diazinon	0.0730	0.25		mg/kg	0.0667		109	70-130	1.36	20
Parathion-methyl	0.0630	0.50		mg/kg	0.0667		94.5	70-130	6.15	20
Matrix Spike (T4H3107-MS1)			Source: 4H24029-16	Prepared: 08/31/04 Analyzed: 09/01/04						
Surrogate: Triphenyl phosphate	*0.0790*	*5.0*		*mg/kg*	*0.0667*		*118*	*70-130*		
Thionazin	0.0510	1.0		mg/kg	0.0667	ND	76.5	70-130		
Dimethoate	0.0310	0.25		mg/kg	0.0667	ND	46.5	70-130		
Disulfoton	0.0420	0.10		mg/kg	0.0667	ND	63.0	70-130		
Diazinon	ND	0.25		mg/kg	0.0667	ND		70-130		
Parathion-methyl	0.0470	0.50		mg/kg	0.0667	ND	70.5	70-130		
Matrix Spike Dup (T4H3107-MSD1)			Source: 4H24029-16	Prepared: 08/31/04 Analyzed: 09/01/04						
Surrogate: Triphenyl phosphate	*0.0830*	*5.0*		*mg/kg*	*0.0667*		*124*	*70-130*		
Thionazin	0.0520	1.0		mg/kg	0.0667	ND	78.0	70-130	1.94	20
Dimethoate	0.0330	0.25		mg/kg	0.0667	ND	49.5	70-130	6.25	20
Disulfoton	0.0440	0.10		mg/kg	0.0667	ND	66.0	70-130	4.65	20
Diazinon	ND	0.25		mg/kg	0.0667	ND		70-130		20
Parathion-methyl	0.0480	0.50		mg/kg	0.0667	ND	72.0	70-130	2.11	20
Batch T4I0212 - EPA 3550B										
Blank (T4I0212-BLK1)				Prepared: 09/01/04 Analyzed: 09/02/04						
Surrogate: 2,4-Dichlorophenylacetic acid	*0.0940*			*mg/kg*	*0.0833*		*113*	*29-115*		
Dalapon	ND	1.0		mg/kg						
Dicamba	ND	0.030		mg/kg						
MCPP	ND	30		mg/kg						
MCPA	ND	30		mg/kg						
Dichloroprop	ND	0.30		mg/kg						
2,4-D	ND	0.30		mg/kg						
2,4,5-TP (Silvex)	ND	0.030		mg/kg						
2,4,5-T	ND	0.030		mg/kg						
2,4-DB	ND	0.30		mg/kg						
Dinoseb	ND	0.30		mg/kg						
LCS (T4I0212-BS1)				Prepared: 09/01/04 Analyzed: 09/02/04						
Surrogate: 2,4-Dichlorophenylacetic acid	*0.0730*			*mg/kg*	*0.0833*		*87.6*	*29-115*		
2,4-D	0.0540	0.30		mg/kg	0.0667		81.0	45.6-115		
2,4,5-TP (Silvex)	0.0400	0.030		mg/kg	0.0667		60.0	40.4-109		
Dinoseb	0.0370	0.30		mg/kg	0.0667		55.5	24.3-119		

Semi-Volatile Organics - Quality Control

Analyte	Result	Reporting Limit	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch T4I0212 - EPA 3550B										
LCS Dup (T4I0212-BSD1)				Prepared: 09/01/04 Analyzed: 09/02/04						
Surrogate: 2,4-Dichlorophenylacetic acid	*0.0780*			*mg/kg*	*0.0833*		*93.6*	*29-115*		
2,4-D	0.0510	0.30		mg/kg	0.0667		76.5	45.6-115	5.71	20
2,4,5-TP (Silvex)	0.0420	0.030		mg/kg	0.0667		63.0	40.4-109	4.88	20
Dinoseb	0.0370	0.30		mg/kg	0.0667		55.5	24.3-119	0.00	20
Matrix Spike (T4I0212-MS1)			**Source: 4H24029-15**	Prepared: 09/01/04 Analyzed: 09/02/04						
Surrogate: 2,4-Dichlorophenylacetic acid	*0.118*			*mg/kg*	*0.0833*		*142*	*29-115*		
2,4-D	0.0280	0.30		mg/kg	0.0667	ND	42.0	45.6-115		
2,4,5-TP (Silvex)	0.00200	0.030		mg/kg	0.0667	ND	3.00	40.4-109		
Dinoseb	0.0360	0.30		mg/kg	0.0667	ND	54.0	24.3-119		
Matrix Spike Dup (T4I0212-MSD1)			**Source: 4H24029-15**	Prepared: 09/01/04 Analyzed: 09/02/04						
Surrogate: 2,4-Dichlorophenylacetic acid	*0.117*			*mg/kg*	*0.0833*		*140*	*29-115*		
2,4-D	0.0280	0.30		mg/kg	0.0667	ND	42.0	45.6-115	0.00	20
2,4,5-TP (Silvex)	0.0220	0.030		mg/kg	0.0667	ND	33.0	40.4-109	167	20
Dinoseb	0.0350	0.30		mg/kg	0.0667	ND	52.5	24.3-119	2.82	20

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

2527 Fresno Street
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September 17, 2004

Work Order #: 4I08028

Jan Alfson
Twining Environmental Department
2527 Fresno Street
Fresno, CA 93721

RE: Morgan Hill Browman

Enclosed are the analytical results for samples received by our laboratory on 09/08/04 . For your reference, these analyses have been assigned laboratory work order number 4I08028.

All analysis have been performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, The Twining Laboratories, Inc. (TL) is not responsible for use of less than complete reports. Results apply only to samples analyzed.

If you have any questions, please feel free to contact us at the number listed above.

Sincerely,

The Twining Laboratories, Inc.

Ronald J. Boquist
Director of Analytical Chemistry

THE TWINING LABORATORIES, INC.
EST. 1898
CALIFORNIA ELAP CERTIFICATE #1371

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	**Reported:**
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S1 at 1'	4I08028-01	Soil	08/24/04 05:45	09/08/04 15:07
S2 at 1'	4I08028-02	Soil	08/24/04 06:20	09/08/04 15:07
S4 at 1'	4I08028-03	Soil	08/24/04 07:07	09/08/04 15:07
S7 at S	4I08028-04	Soil	08/24/04 09:09	09/08/04 15:07
S10 at S	4I08028-05	Soil	08/24/04 10:51	09/08/04 15:07
S11 at S	4I08028-06	Soil	08/24/04 11:17	09/08/04 15:07
S12 at S	4I08028-07	Soil	08/24/04 11:44	09/08/04 15:07

The Twining Laboratories Inc.

Ronald J. Boquist, Director of Analytical Chemistry
Joseph A. Ureño, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

S1 at 1'

4I08028-01 (Soil)

Analyte	Result	Reporting Limit	Units	TTLC	STLC	Dilution	Batch	Prepared	Analyzed	Method
Metals - STLC										
Chromium	**0.075**	0.025	mg/L	**2500**	**5**	1	T4I1313	09/13/04	09/14/04	EPA 6010B

THE TWINING LABORATORIES, INC.
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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

S2 at 1'

4I08028-02 (Soil)

Analyte	Result	Reporting Limit	Units	TTLC	STLC	Dilution	Batch	Prepared	Analyzed	Method
Metals - STLC										
Chromium	**0.098**	0.025	mg/L	**2500**	**5**	1	T4I1313	09/13/04	09/14/04	EPA 6010B

The Twining Laboratories Inc.
Ronald J. Boquist, Director of Analytical Chemistry
Joseph A. Ureño, Quality Assurance Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

S4 at 1'
4I08028-03 (Soil)

Analyte	Result	Reporting Limit	Units	TTLC	STLC	Dilution	Batch	Prepared	Analyzed	Method
Metals - STLC										
Chromium	**0.11**	0.025	mg/L	**2500**	**5**	1	T4I1313	09/13/04	09/14/04	EPA 6010B

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

S7 at S

4I08028-04 (Soil)

Analyte	Result	Reporting Limit	Units	TTLC	STLC	Dilution	Batch	Prepared	Analyzed	Method
Metals										
Chromium	**50**	5.0	mg/kg	**2500**	**5**	1	T4I1310	09/13/04	09/15/04	EPA 6010B

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

S10 at S

4I08028-05 (Soil)

Analyte	Result	Reporting Limit	Units	TTLC	STLC	Dilution	Batch	Prepared	Analyzed	Method
Metals										
Chromium	**43**	5.0	mg/kg	**2500**	**5**	1	T4I1310	09/13/04	09/15/04	EPA 6010B

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

S11 at S

4I08028-06 (Soil)

Analyte	Result	Reporting Limit	Units	TTLC	STLC	Dilution	Batch	Prepared	Analyzed	Method
Metals										
Chromium	**45**	5.0	mg/kg	**2500**	**5**	1	T4I1310	09/13/04	09/15/04	EPA 6010B

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Twining Environmental Department 2527 Fresno Street	Project: Morgan Hill Browman Project Number: A07261.02	Reported:
Fresno CA, 93721	Project Manager: Jan Alfson	09/17/04

S12 at S

4I08028-07 (Soil)

Analyte	Result	Reporting Limit	Units	TTLC	STLC	Dilution	Batch	Prepared	Analyzed	Method
Metals										
Chromium	**45**	5.0	mg/kg	**2500**	**5**	1	T4I1310	09/13/04	09/15/04	EPA 6010B

Notes and Definitions

MCL Maximum Contaminant Level, as per California Title 22 Drinking Water Standards for public well systems.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

QM-04 RPD out of range due to non-homogeneous sample matrix.

TTLC (Total Threshold Limit Concentration) and STLC (Soluble Threshold Limit Concentration) levels are listed. If the concentration of any parameter exceeds any level, it is a considered a hazardous waste per CCR §2266261.24.

If a TTLC is performed on a solid sample, and the TTLC result does not exceed the TTLC level but does exceed the STLC level by a factor of 10 or more, it is recommended that the STLC procedure be conducted on the solid sample to determine if the sample is a hazardous waste by the STLC regulatory level.

Liquid samples are subject to STLC levels.

Quality Control Data Available Upon Request

TWINING LABORATORIES, INC. EST. 1898

ANALYTICAL CHEMISTRY • ENVIRONMENTAL SERVICES
GEOTECHNICAL ENGINEERING • SAMPLING SERVICES
CONSTRUCTION INSPECTION & MATERIALS TESTING

CHAIN OF CUSTODY/ANALYSIS REQUEST

2527 FRESNO STREET • FRESNO, CA 93721 • PHONE (559) 268-7021 • FAX: (559) 268-0740

WORK ORDER #: A108028
PAGE OF

REPORT TO:	INVOICE and/or COPY TO:	REPORTING:
ATTENTION: Env	ATTENTION: Env	☐ STANDARD FORMAT
NAME:	NAME:	☐ WRITE-ON (STATE FORM)
ADDRESS:	ADDRESS:	☐ GEOTRACKER/COELT (LUFT)
		☐ PDF ☐ SPREADSHEET
PHONE:	PHONE:	☐ COUNTY DHS : ☐FRESNO ☐KINGS ☐MADERA ☐MERCED ☐TULARE
FAX:	FAX:	☐ OTHER:

SAMPLE INFORMATION

SAMPLED BY (PRINT):

SIGNATURE:

☐ PUBLIC SYSTEM ☐ ROUTINE
☐ PRIVATE WELL ☐ REPEAT
☐ OTHER ☐ REPLACEMENT

TURN AROUND TIME: ☒ RUSH, DUE ON: 9/15
☐ STANDARD

SAMPLE TYPES:

SOLID:
☐ BS – BIOSOLID
☐ CR – CERAMIC
☐ SL – SOIL/SOLID

LIQUID:
☐ DW - DRINKING WATER
☐ GW - GROUND WATER
☐ OL - OIL
☐ SF - SURFACE WATER
☐ ST - STORM WATER
☐ WW – WASTE WATER

PROJECT INFORMATION

CONTRACT/P.O. NO.:

SITE: Morgan Hill

PROJECT NUMBER: A07261.02

PROJECT MANAGER: Jay

ANALYSIS REQUESTED

NOTES ON RECEIVED CONDITION:

☐ CUSTODY SEAL(S) BROKEN ☐ SAMPLE(S) DAMAGED
☐ ON ICE ☐ AMBIENT TEMP. ☐ INCORRECT PRESERVATION

LAB USE

CLIENT SAMPLE ID	DATE	TIME	TYPE	STLC-Chromium	total Chromium								LAB USE
S1 at 1'	8/24/04	5:45a	SL	X									
S2 at 1'	8/24/04	6:20a		X									
S4 at 1'		7:07a		X									
S7 at S		9:09			X								
S10 at S		10:51			X								
S11 at S		11:17			X								
S12 at S		11:44			X								

MC Ø10

COMMENTS/ADDITIONAL INSTRUCTIONS: Re Further analysis of 4#24029

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY
Jay		9-8-08	1507	MO	TL

Bovee Environmental Management, Inc.
P.O. Box 4816, Modesto, CA 95352
Phone 209.847.3800 Fax 209.847.3830

February 8, 2005

Mr. Gary Ward
Browman Development Company
100 Swan Way, Suite 206
Oakland, CA 94621

RE: Asbestos and Lead-Based Paint Reconnaissance
66 Acre Property: NEC Hwy 101 & Cochrane Road
Morgan Hill, California

Mr. Ward:

On February 2, 2005 our firm performed a reconnaissance of existing buildings on the subject property referenced above. During our visit BEM observed structures on the subject property that were obviously constructed prior to 1978. Buildings constructed prior to 1978 have been constructed with materials that contain asbestos, such as flooring materials, plaster, sheetrock/joint compound, insulators, exterior siding materials and roofing materials. As well, the painted surfaces of the structures located on the subject property were observed in a deteriorated manner (chipping, flaking and peeling). Because these structures were built prior to 1978 the paint definitely contains lead in detectable amounts. The structures on the subject property were built with these hazardous materials and should be treated as such.

Based on our observations, BEM recommends that at the appropriate future time, prior to demolition of any on-site structures, a California Certified Asbestos Consultant and a California Department of Health Services Lead Inspector/Assessor perform a full site assessment for asbestos-containing building materials and lead-based paint. In accordance with state and federal regulations, all asbestos and deteriorating lead-based paint identified must be removed from the site by licensed professionals and properly disposed of at facilities certified to accept such waste. Such remediation will be required to be completed proper to general demolition, site clearing, grading, vegetation removal, and all other development activates.

Sincerely,

Brett L. Bovee

Brett Bovee, REA
California Certified Asbestos Consultant No. 95-1643
California DHS Lead Inspector/Assessor ID # 11

Technical Appendices

Appendix H – Surface Water Hydrology and Water Quality

Schaaf & Wheeler. NEC Hwy. 101 & Cochrane Road – Hydrology Report. May 2005.

NEC Hwy. 101 & Cochrane Road

Hydrology Report

Prepared by:

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS
100 N. Winchester
Suite 200
Santa Clara, CA 95050

Prepared for:

Browman Development Company, Inc.
100 Swan Way
Suite 206
Oakland, CA 94621

May 2005

1. SETTING

a. Existing Drainage

(1) Coyote Creek

The approximately 66-acre project site is located within the Coyote Creek watershed. Coyote Creek drains an approximately 420 square mile watershed, approximately half of which drains into Anderson Reservoir. Coyote Creek flows out of Anderson Reservoir and travels northwest to the San Francisco Bay. As shown on Figure 1, Coyote Creek is approximately one half mile east of the project site.

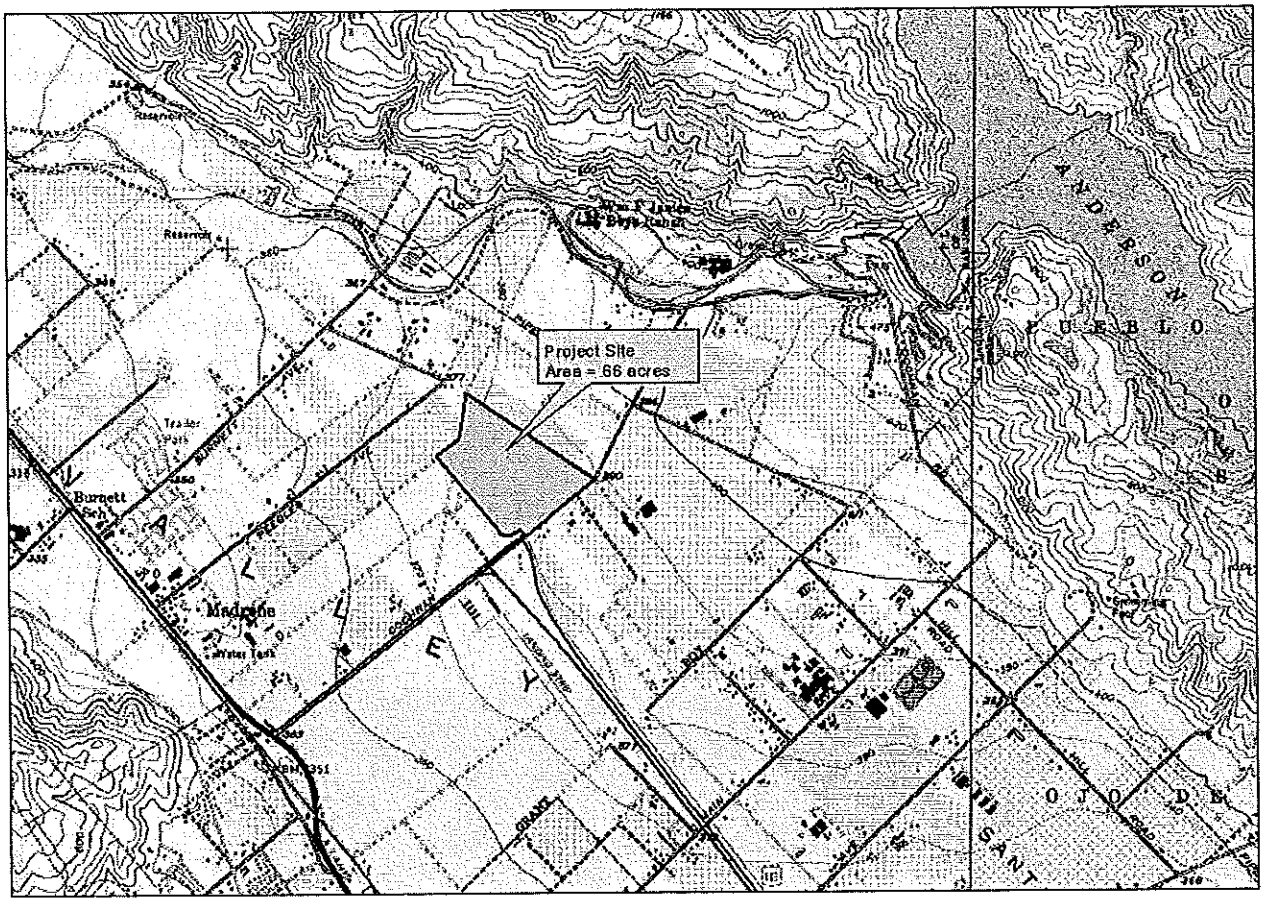

Figure 1 – Project Site Location Map

The Water Quality Control Plan (Basin Plan)[1] prepared by the San Francisco Bay Regional Water Quality Control Board (Regional Board, Region 2) defines the existing and potential beneficial uses of Coyote Creek, which must be protected from pollution and nuisance as a result of waste discharge, as: cold freshwater habitat, fish migration, preservation of rare and endangered species, contact and non-contact water recreation, fish spawning, warm freshwater habitat, and wildlife habitat. The current version of the Basin Plan can be found on the Regional

[1] San Francisco Bay Regional Water Quality Control Board. *San Francisco Bay Basin Plan – Chapter 2: Beneficial Uses*, Table 2-5, Basin 5 – Santa Clara Basin.

Board's website at http://www.waterboards.ca.gov/sanfranciscobay/basinplan.htm.

The 2002 Clean Water Act (CWA) 303(d) List of Water Quality Limited Segments[2] identifies Coyote Creek as not meeting applicable water quality standards for the pollutant Diazinon. Concentrations of Diazinon in Coyote Creek are higher in the South Bay primarily due to its use in agriculture. The Regional Board's current list of impaired water bodies can be found on their website at http://www.swrcb.ca.gov/tmdl/docs/2002reg2303dlist.pdf.

(2) Site Drainage

The project site contains no natural drainage channels or man made drainage facilities. All surface water leaving the site does so in the form of overland flow generally in the north and northwest direction. Stormwater runoff from the project site is minimal because of flat topography and the presence of B-type soils which are characterized as providing good drainage and moderate permeability. Precipitation from shorter duration and more frequent return period storms infiltrates into the permeable soils without generating appreciable runoff. Longer duration and less frequent storms generate enough precipitation to saturate the soils and produce on-site ponding and excess stormwater runoff. The project site is shown in Figure 2, looking south from the north end of the site.



Figure 2 – Project Site

[2] San Francisco Bay Regional Water Quality Control Board. *2002 CWA Section 303(d) List of Water Quality Limited Segments.* Approved by USEPA: July 2003.

(3) Cochrane Channel

The Cochrane Channel is a Santa Clara Valley Water District (District) owned facility that starts at the southwestern corner of the project site at the intersection of Hwy. 101 and Cochrane Road and flows north to Coyote Creek between the project site and Hwy. 101. The approximately 8 foot deep trapezoidal channel has a 4 foot bottom width and 2:1 side slopes, with the bottom 3 feet lined with concrete. The channel was constructed as part of the Hwy. 101 extension project and was intended to intercept surface water runoff from the east as well as drainage from Hwy. 101 via multiple Caltrans storm drainage pump stations located along the length of the channel. The channel empties into Coyote Creek approximately 2,800 feet north of Burnett Ave. overpass at Hwy. 101. The Cochrane Channel is shown in Figure 3, looking north toward Coyote Creek.

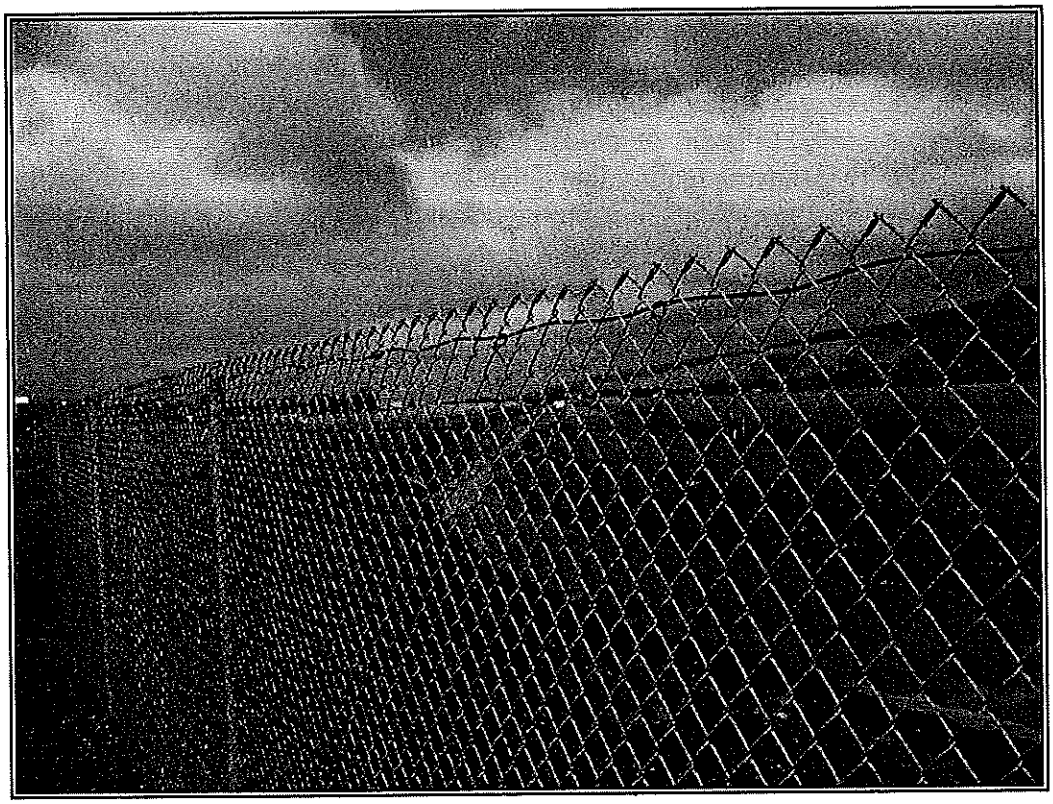

Figure 3 – Cochrane Channel (looking North toward Coyote Creek)

(4) Cross Valley Pipeline[3]

The District's 78-inch Cross Valley Pipeline is located adjacent to the Cochrane Channel and within an easement adjoining Cochrane Road. The pipe carries raw water from the Santa Clara Conduit to the Calero Pipeline at Calero Reservoir as part of the Central Valley Project (CVP), a project undertaken by the U.S. Bureau of Reclamation beginning in 1935 to bring water from the Sacramento River basin to the San Francisco Bay Area. Additional information about the Santa

[3] Excerpted from the Drainage and Water Quality section of the Draft EIR prepared for the Morgan Hill Auto Mall/Retail Center dated July 1, 1993.

Clara Conduit, Calero Reservoir and Pipeline and the Central Valley Project can be found on the Santa Clara Valley Water District's website at http://www.valleywater.org.

b. Existing Storm Drainage System

The City's existing storm drainage system consists of curb and gutter facilities, curb inlets, and underground pipelines draining into creek, detention and retention ponds. Underground storm drainage pipes range from 12 to 60 inches in diameter, with most pipes being 18 inches in diameter.

In 1982, the City adopted subdivision design standards requiring new development to construct interim on-site detention or retention ponds to avoid increased runoff levels and associated exacerbation of downstream flooding. A *detention pond* is required when there is a municipal storm drain outlet available to receive storm runoff generated by development of a project site. Alternatively, projects on properties without an outlet to the existing drainage system are required to include *retention pond(s)* to avoid the potential for increased flood peaks on downstream areas. Current City standards require that detention ponds be sized to accommodate the 25-year, 24-hour storm and that retention ponds be sized for the 100-year, 24-hour storm.

A letter dated December 10, 2004 from the Santa Clara Valley Water District (Ms. Yvonne Arroyo) to the City of Morgan Hill (Ms. Rebecca Tolentino) confirms that the project site is located within the Cochrane Channel watershed and as such drainage from the site should be directed to the channel.

c. Flooding Hazards

(1) FEMA 100-Year Floodplain (Coyote Creek)

The effective Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Morgan Hill, California (Community-Panel Number: 060346-0003C, effective December 22, 1998) shows that the project site is located within a Special Flood Hazard Area (SFHA) designated as Zone X (shaded). The Zone X (shaded) designation identifies areas that are outside the 100-year floodplain, and areas subject to 100-year flooding with average depths less than one foot, areas subject to 100-year flooding where the drainage area is less than one (1) square mile, or areas protected from the 100-year flood by levees.

(2) Dam Failure Inundation Area (Anderson Reservoir)

Anderson Reservoir is retained by an earth and rock dam built in 1950. Owned and operated by the District, the reservoir is located approximately one mile east of the project site. The 1,271 acre reservoir has a storage capacity is 90,373 acre-feet. The entire project site is located within the dam failure inundation area resulting from the catastrophic failure of Anderson Reservoir. Areas affected by such catastrophes have been mapped by the District. The current version of the *Hazard Map* showing the inundation area is available from the Association of Bay Area Governments (ABAG) website at http://www.abag.ca.gov and is generalized from the map prepared by the Santa Clara Valley Water District for studies completed for the Federal Energy

Regulatory Commission (FERC) and the California State Department of Water Resources, Division of Safety of Dams (DSOD)and on file with the State Office of Emergency Services. The *Hazard Maps* are subject to the following caveats:

- The maps were developed by dam owners to fulfill state law requirements and are intended for emergency planning purposes;
- The maps were developed using engineering hydrology principles and represent the **best estimate** of where the water would flow if the dam completely failed with a full reservoir. The inundation area is based completely emptying the reservoir and does not include runoff from storms; and,
- Many of the maps were developed in the 1970's. Had the maps been developed more recently, different assumptions and map-making methods would have been used.

According to the Health and Safety element of the Santa Clara County General Plan[4], *"...dam failure may occur suddenly, such as in the event of major earthquake, releasing thousands of acre-feet of water with the force to create major life and property losses in the area immediately downstream from the dam. Flooding can also occur due to overtopping of the dam structure during periods of intense precipitation."* A separate discussion of dam failure inundation contained in the County's General Plan goes on to say *"...strengthening and modifications to dams and spillways that will ensure the structural safety of the reservoirs in Santa Clara County is an ongoing effort of the Water District."* The County General Plan can be found on their website at http://www.sccgov.org.

2. IMPACTS

a. Site Drainage

Development of the project site would result in an increase in storm water runoff volumes from the site because the project site is currently undeveloped, consisting largely of bare soils. The discharge from the site is a function of the rainfall intensity, the runoff coefficients and the tributary drainage area. In the pre- and post- development conditions, the rainfall intensity and tributary drainage area will be the same. The variable will therefore be the runoff coefficients, which are dependent upon the amount of impervious surfaces. Increases in the amount of impervious surfaces result in loss of permeable surfaces available for infiltration of rainfall falling on the project site.

The project may be required to comply with Provision C.3 of the Santa Clara Valley Urban Runoff Pollution Prevention Program's (SCVURPPP) NPDES Permit for stormwater discharges to South San Francisco Bay and its tributaries. The SCVURPPP is an association of thirteen cities and towns in the Santa Clara Valley, together with Santa Clara County and the Santa Clara Valley Water District. Program participants share a common NPDES permit issued by the San Francisco Bay Regional Water Quality Control Board (Region 2) to discharge stormwater to South San Francisco Bay and its tributaries.

[4] County of Santa Clara, Planning Office. *Santa Clara County General Plan.* Adopted: December 20, 1994.

The City of Morgan Hill is not a member of the SCVURPPP. In addition, the City's NPDES permit is issued by the Central Coast Region (Region 3). Although the City of Morgan Hill is not a member of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), the project will be discharging stormwater to South San Francisco Bay and its tributaries and will require a permit to outfall to a Santa Clara Valley Water District facility; therefore the project may be held to the C.3 Provisions contained in the NPDES discharge permit issued by Region 2 to the 13 SCVURPPP participants.

Under Provision C.3, post-development peak stormwater runoff discharge rates and durations cannot exceed pre-development rates and durations if the increased peak stormwater discharge rates and/or durations would result in increased potential for erosion or other adverse impacts to designated beneficial uses. However, this requirement does not apply to projects that discharge stormwater runoff into creeks or storm drains where the potential for erosion is minimal, including discharges to creeks that are concrete-lined or significantly hardened to their outfall in San Francisco Bay, as well as construction of infill projects in highly developed watersheds.

Based on these criteria, no additional reduction in stormwater runoff volumes would be required because the project is discharging to the concrete-lined Cochrane Channel and because the potential for increased erosion in Coyote Creek is considered minimal because of the large size of its watershed and because the low-flow discharges are controlled by releases from Anderson Reservoir.

(1) Existing Discharge Rate

Per City design standards, the Rational Method shall be used to determine the quantity of stormwater runoff from a project site. The County manual also recommends use of the Rational Method to provide reasonable estimates of peak discharge for drainage areas less than 200 acres. The Rational Method relates peak discharge (Q) to rainfall intensity (i) by:project site. The exact volume of flood water to be retained during the design storm conditions will be finalized during final design of the project, in concert with the landscape architect. Further increases in t

$$Q = CiA$$

Where:

Q	=	peak discharge, cfs
C	=	runoff coefficient, dimensionless
i	=	rainfall intensity, in/hr[5]
A	=	drainage area, acres

Runoff Coefficient, C

City standards suggest a runoff coefficient, C-value, of 0.1 for "parks and natural ground." The County manual suggests a C-value of 0.15 for B-type soils and "agricultural" land use, a

[5] Assumes that storm duration is equal to the time of concentration (t_c) for the drainage basin.

description more suitable for the existing land use condition; therefore, a C-value of 0.15 was used to estimate the existing condition runoff.

Time of Concentration, t_c

Site topography obtained from Kier & Wright was used to estimate the maximum length of overland flow from the most remote point in the watershed to the basin outlet as well as the slope of the land, primarily in a northwesterly direction. The Kirpich formula was used to estimate the time of concentration for the overland flow across the site. The formula is given by:

$$t_c = 0.0078\ (L^2/S)^{0.385} + 10$$

Where:

t_c	=	time of concentration, minutes
L	=	maximum length of travel from headwater to outlet, feet
S	=	effective slope, ft/ft

Based on the site topography, the maximum length of overland flow is estimated to be 2500 feet and the effective slope is approximately 0.004 ft/ft, resulting in a time of concentration of approximately 36 minutes (0.6 hours).

Rainfall Intensity, i

Rainfall intensities for various storm durations and return intervals were obtained using the District's Return Period-Duration Specific (TDS) Regional Equation contained in the District's *Hydrology Procedures* and the County manual. This equation was developed to establish a relationship between precipitation depth and Mean Annual Precipitation (MAP) for various return period storms and is given by:

$$X_{T,D} = A_{T,D} + (B_{T,D} * MAP)$$

Where:

$X_{T,D}$	=	precipitation depth for a specific return period and duration, inches
T	=	return period, years
D	=	storm duration, hours
$A_{T,D}$	=	coefficient from District and County manuals, dimensionless
$B_{T,D}$	=	coefficient from District and County manuals, dimensionless
MAP	=	mean annual precipitation, inches

The precipitation intensity, $i_{T,D}$, is given by:

$$i_{T,D} = x_{T,D}/D$$

The Mean Annual Precipitation (MAP) at the project site is roughly 20 inches as excerpted from the District's *Mean Annual Precipitation Map, San Francisco and Monterey Bay Region.* Additionally, values for $A_{T,D}$ and $B_{T,D}$ were excerpted from tables contained in the District's

Hydrology Procedures. The District's tables only contained values for these variables corresponding to storm durations of 0.5 and 1.0 hours; therefore, the values for a storm duration of 0.6 hours (see Time of Concentration above) were interpolated from the values contained in the tables. The values for the 2-, 10-, 25-, 100-year return period storms excerpted from the District's tables and used in the precipitation depth and intensity calculations are shown in Table 1 below:

Table 1 - Precipitation Depth and Intensity Coefficients

Storm Duration (hours)	Return Period							
	2-Year		10-Year		25-Year		100-Year	
	$A_{T,D}$	$B_{T,D}$	$A_{T,D}$	$B_{T,D}$	$A_{T,D}$	$B_{T,D}$	$A_{T,D}$	$B_{T,D}$
0.6	0.220775	.006918	0.379833	0.009264	0.456767	0.010311	0.568469	0.011726

The calculated values for the precipitation depth and intensity, as well as the stormwater runoff calculated using the Rational Method equation are shown for the 2-, 10-, 25-, 100-year return period storms in Table 2 below:

Table 2 - Precipitation Depth and Intensity Calculations

Storm Duration (hours)	2-Year		10-Year		25-Year		100-Year	
	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)
0.6	0.359	0.598	0.565	0.942	0.663	1.105	0.803	1.338

Existing Condition Discharge Rate, Q

The results of the Rational Method calculations for the existing condition are shown on Table 3 below:

Table 3 - Rational Method Parameters & Existing Condition Discharge

C	A (acres)	2-Year		10-Year		25-Year		100-Year	
		$i_{T,D}$ (in/hr)	Q (cfs)	$i_{T,D}$ (in/hr)	Q (cfs)	$i_{T,D}$ (in/hr)	Q (cfs)	$i_{T,D}$ (in/hr)	Q (cfs)
0.15	66	0.598	5.9	0.942	9.3	1.105	10.9	1.338	13.2

Based on the calculations performed using the District's TDS equations and the Rational Method, the 2-, 10-, 25- and 100-year discharges from the project site for the existing condition are estimated to be 5.9 cfs, 9.3 cfs, 10.9 cfs and 13.2 cfs, respectively.

(2) Project Discharge Rate

The same procedures were used to calculate the project condition stormwater runoff from the project site as were used to calculate the existing condition; however, several of the values used in the Rational Method formula were changed to reflect the developed condition.

Runoff Coefficient, C

City standards suggest a runoff coefficient, C-value, of 0.8 for "commercial" land use. The County manual suggests the same value be used; therefore, a C-value of 0.80 was used to estimate the project condition runoff.

Time of Concentration, t_c

The time of concentration for the project condition is the sum of the roof-to-gutter time and the pipe flow time. The roof-to-gutter time is an estimate of the amount of time for runoff to collect on impervious surface such as rooftops or parking lots and make its way across the roofs or parking lots, through roof gutters and downspouts or parking lot catch basins and into the underground storm drain pipe system. This value is assumed to be 10 minutes per the County manual.

The pipe flow time is calculated by dividing the distance that flow must travel in the pipe system from the most upstream catch basin to the outlet point by the average flow velocity in the pipe, assumed to be approximately 4 feet per second. Site topography obtained from Kier & Wright, along with a proposed site layout schematic obtained from the project owner was used to estimate the probable layout of the storm drain system and to approximate the length of storm drain pipe necessary to connect the most upstream storm drain inlet to the probable location of one or more stormwater detention ponds assumed to be located at the northern end of the project site. Using an estimated pipe length of 2,500 feet and an assumed velocity of 4 feet per second results in a pipe flow time of about 10 minutes. Combined with the roof-to-gutter of 10 minutes, the approximate time of concentration for the project condition is equal to 20 minutes (0.33 hours).

Rainfall Intensity, i

The decrease in the time of concentration from the existing condition to the project condition results in an increase in the rainfall intensity used in the Rational Method calculations; therefore, rainfall intensities corresponding to the shorter time of concentration are required. The District's tables only contained values for these variables corresponding to storm durations of 0.5 and 1.0 hours; therefore, the values for a storm duration of 0.33 hours (see Time of Concentration above) were interpolated from the values contained in the tables. The values for the 2-, 10-, 25-, 100-year return period storms excerpted from the District's tables and used in the precipitation depth and intensity calculations are shown in Table 4 below:

Table 4 - Precipitation Depth and Intensity Coefficients

Storm Duration (hours)	Return Period							
	2-Year		10-Year		25-Year		100-Year	
	$A_{T,D}$	$B_{T,D}$	$A_{T,D}$	$B_{T,D}$	$A_{T,D}$	$B_{T,D}$	$A_{T,D}$	$B_{T,D}$
0.33	0.188578	0.004104	0.319159	.005766	0.379934	0.006636	0.465551	0.007924

The calculated values for the precipitation depth and intensity, as well as the stormwater runoff calculated using the Rational Method equation are shown for the 2-, 10-, 25-, 100-year return period storms in Table 5 below:

Table 5 - Precipitation Depth and Intensity Calculations

Storm Duration (hours)	2-Year		10-Year		25-Year		100-Year	
	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)	$x_{T,D}$ (in)	$i_{T,D}$ (in/hr)
0.33	0.271	0.820	0.434	1.317	0.513	1.553	0.624	1.891

Project Condition Discharge Rate, Q

The results of the Rational Method calculations for the project condition are shown on Table 6 below:

Table 6 - Rational Method Parameters & Existing Condition Discharge

C	A (acres)	2-Year		10-Year		25-Year		100-Year	
		$i_{T,D}$ (in/hr)	Q (cfs)	$i_{T,D}$ (in/hr)	Q (cfs)	$i_{T,D}$ (in/hr)	Q (cfs)	$i_{T,D}$ (in/hr)	Q (cfs)
0.8	66	0.820	43.3	1.317	69.5	1.553	82.0	1.891	99.8

Based on the calculations performed using the District's TDS equations and the Rational Method, the 2-, 10-, 25- and 100-year discharges from the project site for the project condition are estimated to be 43.3 cfs, 69.5 cfs, 82.0 cfs and 99.8 cfs, respectively. The project condition discharges are significantly greater than the existing condition discharges primarily due to the increase in impervious coverage and subsequent loss of on-site infiltration and the decrease in the time of concentration for the 66 acre drainage area represented by the project site. ***These increases constitute a significant adverse impact that can be mitigated*** (see Section 3, Mitigations, beginning on page 13 of this report).

b. Proposed Storm Drainage Improvements

(1) Underground Pipe System

An underground pipe system will be required to pick up the stormwater runoff from the buildings and parking lots at multiple catch basins to be located in the parking lot area(s) and convey the runoff to one or more stormwater detention ponds proposed to be located at the northern end of the project site. The size of the storm drain pipes will be dependent on the slope and tributary area for the subject reach of pipe. The underground pipe system, including catch basins shall make every possible effort to integrate stormwater quality best management practices as discussed in Section 3, Mitigation. In addition, City standards, including pipe material, pipe size, maximum slopes, minimum flow velocities, etc. shall be adhered to in designing the on-site storm drainage system.

(2) Detention Facilities

The City of Morgan Hill requires that stormwater detention be included in the project to mitigate the increase in stormwater runoff from the project site. The City's detention criteria, as well as the sizing of detention facilities for the project are discussed in Section 3, *Mitigation.*

The City of Morgan Hill requires that detention facilities be equipped with a reasonable outlet to drain them. The Water District requires that the detention pond(s) maintain the post-development discharges to the Cochrane Channel at or below predevelopment levels for the 2-, 10-, and 100-year return period storms (see letter dated December 9, 2004 from Yvonne Arroyo, Santa Clara Valley Water District, to Christopher Eggers, Schaaf & Wheeler). The City and Water District detention pond sizing and allowable discharge criteria are further discussed in Section 3, *Mitigation.*

c. Local Flooding Impacts

(1) Coyote Creek Flooding

The project site is located within a Special Flood Hazard Area (SFHA) designated as Zone X (shaded) by the Federal Emergency Management Agency (FEMA)[6]. The Zone X (shaded) designation identifies areas that are outside the 100-year floodplain, and areas subject to 100-year flooding with average depths less than one foot, areas subject to 100-year flooding where the drainage area is less than one (1) square mile, or areas protected from the 100-year flood by levees. The decision of whether to require flood insurance for properties located within Zone X (shaded) designated areas is left to the individual lenders; however, to minimize the risk of flood damage to properties and to demonstrate to lenders that efforts have been made to reduce such risk, finished floor elevations should be raised a minimum of 1 foot above existing grade.

(2) Anderson Reservoir

The entire project site is located within the dam failure inundation area resulting from the failure of Anderson Reservoir; therefore, the development of the proposed project would create additional exposure to dam failure risk and the associated potential loss of life and property. As stated in the County General Plan, the Water District maintains on-going efforts to strengthen and modify dams and spillways to ensure the structural safety of reservoirs in Santa Clara County. The Water District's design goals are to design or retrofit their dams to withstand seismic events up to an 8.5 magnitude earthquake. Mr. Richard Volpe at the Water District confirmed that studies completed for the Federal Energy Regulatory Commission (FERC) and the California State Department of Water Resources, Division of Safety of Dams (DSOD) have predicted that Anderson Reservoir is capable of withstanding 7.25 and 8.25 magnitude earthquakes occurring on the Calaveras Fault and San Andreas Fault, respectively. The difference in the level of protection is based on the physical distance that the dam is located from the identified fault lines. Mr. Volpe indicated that the Water District is satisfied that the level of safety required to meet the requirements of both FERC and DSOD meets the District's desire to

[6] Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM), Morgan Hill, California, Community-Panel Number: 060346-0003C, effective December 22, 1998.

ensure the structural safety of reservoirs in Santa Clara County. ***The District's confidence in the safety of Anderson Reservoir as supported by their studies, combined with the probability of catastrophic dam failure being small, is sufficient to characterize the additional exposure as less-than-significant.*** It should be noted that the EIR prepared for the County General Plan also characterized the impact from dam failure to be less-than-significant based on its low probability of occurrence.

d. Water Quality

(1) Construction and Post-Construction Impacts

Urban contaminants in runoff from the project site could lower the quality of stormwater runoff and infiltrating groundwater both during and after construction. Erosion and sedimentation are major visible water quality impacts attributable to construction activities. Sediment impact on water quality includes interference with photosynthesis, oxygen exchange, and respiration, growth, and reproduction or aquatic species. Other pollutants such as nutrients, trace metals, and hydrocarbons can attach to sediment and be transported by it. Development of the project site would include construction activities, such as excavation and trenching for foundations and utilities, grubbing and clearing, soil compaction and moving, cut and fill activities, and grading that would disturb soil and could decrease permeability. Unprotected disturbed soil is susceptible to high rates of erosion from wind and rain, resulting in sediment transport from the site. Increased runoff from the site resulting from decreased permeability both during and after construction would further exacerbate the amount of sediment transport. Sediment-laden runoff resulting from construction and post-construction operations at the site could enter the Cochrane Channel and Coyote Creek and degrade water quality.

Delivery, handling and storage of construction materials and wastes; as well as use of construction equipment onsite during the construction phase of the project also introduce a risk for stormwater contamination which could impact water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination of stormwater. Some hydrocarbon compound pollution associated with oil and grease can be toxic to aquatic organisms at low concentrations. Staging areas, or building sites can be the source of pollution due to paints, solvents, cleaning agents, and metals contained in the surface of equipment and materials. The impacts associated with metal pollution of stormwater include toxicity to aquatic organisms, bioaccumulation of metals in aquatic animals, and potential contamination of drinking supplies. Pesticide use (including herbicides, fungicides, and rodenticides) associated with site preparation work is another potential source of stormwater contamination. Pesticide impact to water quality includes toxicity to aquatic species and bioaccumulation in larger species through the food chain. Gross pollutants such as trash, debris, and organic matter are additional potential pollutants associated with the construction phase of the project. Impacts include health hazards and aquatic ecosystem damage associated with bacteria, viruses and vectors which can be harbored by gross pollutants.

In the post construction phase of the project, the major source of pollution to runoff and infiltrating groundwater will be contaminants which have accumulated on the land surface over which storm water passes. In developed areas, driveways, parking lots, sidewalks, streets and

gutters are often connected directly to storm drains that collect and guide stormwater runoff. Between rainstorms materials are deposited on these surfaces from debris dropped or scattered by individuals, street sweepings, debris and other particulate matter washed into roadways from adjacent areas, wastes and dirt from construction and renovation or demolition, fecal droppings from animals, remnants of household refuse dropped during collection or scattered by animals or wind, oil and various residues contributed by automobiles, and fallout of air-borne particles. Pollutants associated with the post construction phase of the project include nutrients, oil and grease, metals, organics, pesticides, and gross pollutants. Nutrients which may be contributed to stormwater in the post construction phase include nitrogen and phosphorous resulting from fertilizers applied to landscaping in the project area. Excess nutrients can impact water quality by promoting excessive and/or rapid growth of aquatic vegetation; reducing water clarity, and resulting in oxygen depletion. Pesticides also may enter into stormwater after application on landscaping areas of the project. Pesticides impact on water quality because they are toxic to aquatic organisms and can bioaccumulate in larger species such as birds and fish. Oil and grease may be contributed to stormwater in the post construction phase of the project from automobile leaks, car washing, restaurants, and waste oil disposal. Metals may enter stormwater in the post construction phase of the project as surfaces corrode, decay or leach. Potential gross pollutants associated with the post construction phase include clippings from with landscape maintenance, street litter, and animal excrement. Impacts due to oil and grease, metal contamination, and gross pollutants are discussed as part of construction phase impacts above.

During rainfall, a film of water builds up on impermeable surfaces. Once this film is of sufficient depth (about 0.1 inch), the water collecting on the impermeable surface begins to flow. The initial flow of each storm often contains the highest concentrations of pollutants, but this is not always the case because the phenomenon is dependent on the duration of the preceding dry weather period, rainfall patterns, rainfall intensity, the chemistry of individual pollutants, and other site-specific conditions.

If uncontrolled, the accumulation of urban pollutants could have a detrimental cumulative effect during both the construction and post construction phases of the project because overland flow from paved surfaces and landscaped areas transport many of the above-mentioned constituents, thereby contributing to the deterioration of the quality of stormwater runoff and infiltrating groundwater. The cumulative result could be the incremental deterioration of water quality in the Cochrane Channel, Coyote Creek and the San Francisco Bay.

(2) Channel Erosion

Increased stormwater runoff from the project site is proposed to be mitigated through the construction of one or more detention ponds that will maintain stormwater runoff at or below the existing 10-year discharge rate of 9.3 cfs; however, discharges up to this threshold value to the Cochrane Channel and ultimately to Coyote Creek will occur more frequently and for longer durations that they would without the development of the project. These more frequent and longer duration releases have the potential to increase erosion in Coyote Creek, particularly because they exceed the "channel forming" flow, typically defined as the 2-year flow or less. However, the 2-year and more frequent return period discharges in Coyote Creek are controlled by releases from Anderson Reservoir which is owned and operated by the District. Erosion

would not be an issue for the Cochrane Channel as the bottom 3 feet of the channel is lined with concrete. Furthermore, operational changes in the way Anderson Reservoir is regulated could easily increase the magnitude and duration of the 2-year flow in Coyote Creek regardless of the release rate from the project site; therefore, the potential impact to erosion in Coyote Creek from the project site is considered to be negligible.

3. MITIGATIONS

a. Storm Drainage Impacts of Project Development

(1) Detention Facilities

Detention Ponds

City of Morgan Hill Storm Drainage Design Standards require that detention basins on private property be designed using a 24-hour, 25-year storm with a total rainfall depth of 4.79 inches if a reasonable outlet is provided. In addition, the City requires that 25% of the total basin volume be available for freeboard and that fencing be provided around all basins greater than 3 feet in depth.

A depth of 4.79 inches of rainfall spread over 66 acres and multiplied by 0.65 (the difference between the existing condition runoff coefficient (C=0.15) and the project condition runoff coefficient (C=0.8)) equates to approximately 17.1 acre-feet, representing the minimum size of detention storage required by the City to mitigate for increased stormwater runoff from the project site. An additional 4.3 acre-feet is required for freeboard, bringing the total volume required for detention to 21.4 acre-feet.

Construction of a single, or multiple detention ponds with a volume of 21.4 acre feet would meet the City standards and would reduce the impact of increased stormwater runoff from the project site to a less than significant level.

The proposed site plan includes two triangular shaped detention ponds to be located at the northern end of the project site. The larger pond, located at the northeast corner of the project site has a surface area of approximately 78,508 square feet (1.80 acres) and is proposed to be 13 feet deep with 2:1 (H:V) turfed sideslopes. The total volume of the larger pond is approximately 18.1 acre-feet.

The smaller pond, located at the northeast corner of the project site has a surface area of approximately 22,935 square feet (0.53 acres) and is proposed to be 13 feet deep with 2:1 (H:V) turfed sideslopes. The total volume of the smaller pond is approximately 3.9 acre-feet. The total volume provided by both ponds is approximately 22.0 acre-feet. Table 7 provides a breakdown of the amount of storage provided by the large pond, small pond, and the two ponds combined at 1.0 foot depth increments.

Table 7 - Detention Pond Stage-Storage Relationship

Pond Stage (ft)	Large Pond Volume (ac-ft)	Small Pond Volume (ac-ft)	Combined Pond Volume (ac-ft)
0	0	0	0
1	1.0	0.1	1.2
2	2.1	0.3	2.4
3	3.3	0.5	3.8
4	4.5	0.7	5.2
5	5.8	0.9	6.7
6	7.1	1.2	8.2
7	8.5	1.4	9.9
8	9.9	1.8	11.7
9	11.4	2.1	13.5
10	13.0	2.5	15.5
11	14.6	2.9	17.6
12	16.3	3.4	19.7
13	18.1	3.9	22.0

Outlet Structure(s)

The City of Morgan Hill requires that detention facilities be equipped with a reasonable outlet to drain them. The Water District requires that the detention pond(s) maintain the post-development discharges to the Cochrane Channel at or below predevelopment levels for the 2-, 10-, and 100-year return period storms (see letter dated December 9, 2004 from Yvonne Arroyo, Santa Clara Valley Water District, to Christopher Eggers, Schaaf & Wheeler).

The stormwater detention ponds will drain to the Cochrane Channel via a stormwater pump station consisting of multiple pumps designed to switch on and off at different pond stages to maintain post-development discharges for the 2-, 10- and 100-year return period storms at or below predevelopment levels shown on Table 3 in Section 2, *Impacts*. There is no minimum requirement for the amount of time that stormwater needs to be held in the ponds.

Per City standards, the detention ponds have been designed for the 25-year storm event; however, an additional 25% of detention volume is required for freeboard. This additional 25% for freeboard will provide increased storage for larger storm events such as the 50-year and 100-year return period storms. In addition, the outlet facility shall incorporate an emergency release to direct overtopping flows toward the west directly into the Cochrane Channel. Finally, the parking lots shall be graded to provide additional detention storage within the parking lot for events greater than the 25-year event. For design purposes, the grading shall allow a maximum of one foot of ponding within the parking lot before releasing toward the north and northwest in the direction that the site currently drains.

b. Flooding Impacts

The potential public safety threat associated with the failure of Anderson Reservoir (see Section 1.c, Flooding Hazards) is less-than-significant; however, in the interest of public safety, an emergency evacuation plan should be developed for the proposed development and its tenants. The plan's procedures should be developed jointly with the project owner, City public safety staff, and potential tenants to identify appropriate emergency response procedures and to ensure the efficient and safe evacuation of employees and customers in the unlikely event of dam failure and subsequent flooding. The emergency evacuation plan would also be beneficial in minimizing the impact from minor structural damage resulting from a major event (such as an earthquake) that would allow for sufficient time for evacuation from the project site.

The potential risk of damage to property associated with flooding of depths less than one foot (see Section 1.c, Flooding Hazards) could be reduced to a less than significant level by setting finished floor elevations for properties located within the project site a minimum of 1 foot above existing grade.

c. Water Quality

The project is required by California law to comply with the State General Construction Activity Stormwater Permit (NPDES requirement) because the project would disturb more than one acre of land. If any element of the project were developed in increments of less than one acre, permit compliance still would be required because the construction activity would be part of the larger plan of development.

Compliance with the permit involves filing a Notice of Intent (NOI) with Region 3 and preparing a Surface Water Pollution Prevention Plan (SWPPP) prior to construction activities. The SWPPP is required to identify the sources of sediment and other pollutants on-site, and to ensure the reduction of sediment and other pollutants in stormwater discharged from the site. A monitoring program is required to aid the implementation of, and assure compliance with, the SWPPP. The Region 3 permit requirements must be satisfied prior to project construction (see also the discussion below under the title Streamflow and Erosion). As part of the SWPPP, an Erosion and Sedimentation Control Plan must be prepared for the project prior to grading. Implementation of the SWPPP, as required by California law to comply with construction management procedures stipulated in Region 3's General Construction Activity Stormwater Permit, the City's General Plan, Municipal Code, and Urban Runoff Management Plan, and related policies adopted by the City and County, would ensure potential water quality effects associated with the project implementation would be less than significant.

Adherence to and implementation of the following minimum requirements, including site planning, construction, and post construction Best Management Practices (BMPs) and construction of one or more water quality ponds would mitigate the potential water quality impacts associated with the project development to less than significant levels:

(1) Site Planning

Pollutant transport into the storm drain system and ultimately into receiving waters shall be mitigated through the construction of retention/detention ponds at the northern end of the project site to infiltrate stormwater into the soil or temporarily store post-development runoff and release it to receiving waters at predevelopment flow rates. Additional site planning BMPs, equal or equivalent to those listed in the Bay Area Stormwater Management Agency's (BASMA) Design Guidance Manual, shall be incorporated into the project, to the maximum extent practicable, to improve the quality of stormwater before it reaches the storm drainage system and/or reduce stormwater runoff volumes from the project site.

(2) Construction BMPs

Construction BMPs that shall be implemented include measures to prevent and control erosion and sedimentation; source control of pollution from construction site materials, chemicals, and waste; control and treatment of runoff from any graded or otherwise disturbed areas; limiting of construction access roads; and monitoring and maintaining BMPs. Specific minimum construction phase BMPs to be incorporated in the project shall be included in the SWPPP prepared for the project.

(3) Post-Construction BMPs

Post construction operation of the project will include long-term BMPs to ensure continued mitigation of potential impacts to water quality resulting from the project. Post construction BMPs will address prevention and control of erosion and sedimentation, source control of potential pollutants, control and treatment of runoff, and protection of water quality resources. Minimum post construction BMPs that will be incorporated in the project are listed below:

1. Construction of stormwater detention/retention ponds at the northern end of the project site;

2. Impervious surfaces such as roads, parking lots, and driveways shall be routinely cleaned during both the "wet" and "dry" seasons to limit the accumulation of "first flush" contaminants. If the City does not agree to accept responsibility for street sweeping, the developer will arrange for this service within the project area for developed portions of the project;

3. If practicable, utilization of natural features such as grassy swales to capture pollutants before the stormwater runoff enters the storm drainage system;

4. If practicable, utilization of engineered products, such as storm drain inlet filters, oil/water separators, etc., to capture pollutants before the stormwater runoff enters the storm drainage system;

5. The developer shall distribute educational materials to the first tenants of properties included in the project development. These materials shall address good housekeeping

practices relating to stormwater quality, prohibited discharges, and proper disposal of hazardous materials;

6. The party responsible for any common landscaped areas shall implement a program of efficient irrigation and proper maintenance including minimizing use of fertilizer, herbicides and pesticides. This practice will mitigate impacts from nutrients and pesticides;

7. The tenants shall implement a trash management and litter control program to mitigate the impacts of gross pollutants on storm water quality. This program shall include litter patrol, emptying trash receptacles in common areas, and reporting and investigating and trash disposal violations;

8. Storm drain inlets shall be labeled with the phrase "No dumping – flows to Bay", or a similar phrase to mitigate the impact of potential for discharges of pollutants to the storm drain system; and,

9. Restaurants incorporated in the development will be designed with contained areas for cleaning mats, containers and sinks connected to the sanitary sewers. Grease shall be collected and stored in a contained area and will be removed regularly by a disposal recycling service. To this end, sinks shall be equipped with grease traps to provide for its collection. This BMP will mitigate potential impacts due to oil and grease.

There are no City requirements for a Planned Unit Development (PUD) to submit an Erosion Control Plan to obtain a grading permit. This requirement applies only to Residential Planned Developments (RPDs).

(4) Water Quality Pond(s)

Although the City of Morgan Hill is not a member of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), the project will be discharging stormwater to South San Francisco Bay and its tributaries and will require a permit to outfall to a Santa Clara Valley Water District facility; therefore the project may be held to the C.3 Provisions contained in the NPDES discharge permit issued by Region 2 to the 13 SCVURPPP participants.

In 2001, Region 2 re-issued WDRs under the NPDES program for the discharge of stormwater runoff (NPDES Permit No. CAS0299718, Regional Board Order No. 01-024), through the implementation of a Storm Water Management Plan (SWMP), which describes a framework for management of stormwater discharges.

The Urban Runoff Management, Comprehensive Control Program section of the Basin Plan requires dischargers to address existing water quality problems and prevent new problems associated with urban runoff through the development and implementation of a comprehensive control program focused on reducing current levels of pollutant loadings to storm drains to the maximum extent practicable. The SCVURPPP members are responsible for complying with Basin Plan requirements via the implementation of the SWMP.

Order No. 01-124 has been amended to include Provision C.3, concerning new and redevelopment performance standards to address post-construction impacts on stormwater quality. Provision C.3 calls for enhancement of the performance standard to increase the implementation effectiveness, primarily by:

- setting volume- and flow-based hydraulic sizing criteria for stormwater treatment measures;
- setting minimum sizes of new development and redevelopment projects which must employ the treatment measures;
- creation of a program to assure the adequate operation and maintenance occurs;
- creation of standards for source control measures and site design measures which can lead to reduced impervious surfaces for a given equivalent land use; and
- requires that the Dischargers develop a process and criteria to limit changes in the runoff hydrograph for new and redevelopment, where those changes could have a harmful effect on downstream beneficial uses.

For the reasons cited in Section 2, *Impacts*, the project should not be subject to requirements limiting changes in the runoff hydrograph; however, the EPA NPDES Phase II permit requires that stormwater runoff from a development site be treated to the Maximum Extent Practicable (MEP). In accordance with this requirement, a water quality analysis was performed to project water quality treatment needs associated with the proposed development

Detention ponds used for water quality treatment have been sized using a volume hydraulic design basis, which is the same for Extended Detention Basin or Constructed Wetland design. Section C.3. of the Phase 2 NPDES Permit requires that permittees implement BMPs that reduce pollutants in storm water to the technology-based standard of MEP. According to fact sheet TC-22 of the California Stormwater Best Management Practices Handbook (1993) (BMP Handbook), the MEP of treatment for these ponds is considered to be achieved with capture and infiltration of the 85th percentile annual runoff volume from the development area. The required treatment runoff volume is determined using the methodology of the BMP Handbook, using local rainfall data.

Following the BMP Handbook approach, the 85th percentile annual runoff is determined using a set of locally representative Capture Curves for a 48-hour drawdown period. The first steps in the approach are to select the appropriate capture curve and to calculate the composite runoff coefficient C for the development site. Next, a unit basin storage volume is read off the curve. Finally, the required BMP volume is calculated according to the equation:

BMP Volume = Unit Basin Storage Volume * Tributary Area

Based on the proposed land use and a weighted C-value of 0.8 for the proposed project, one or more treatment pond(s) would need to have a minimum capacity of 2.8 acre-ft. Capture Curves for the San Jose area were used for sizing the water quality ponds and were assumed to be appropriate for use in the Morgan Hill area. Table 8 shows the parameters used to estimate the required BMP volume.

Table 8 – Required Stormwater Treatment Volume

Required capture	Drawdown Period (hr)	Runoff C-value	Unit basin storage (in)	Tributary Area (acres)	Required Storage (ac-ft)
85th percentile of annual runoff volume	48	0.8	0.514	66.3	2.8

(5) Dual Purpose Detention and Water Quality Pond(s)

The detention ponds previously sized to mitigate for increased stormwater runoff from the proposed project could be constructed to meet both the City requirements for providing on-site storage for increased stormwater runoff and water quality treatment Stormwater detention ponds providing a minimum of 21.4 acre-ft. of storage with a minimum of 2.8 acre-ft for retention (dead storage) below the basin outlet works would provide sufficient volume to not only meet the detention pond sizing requirements of the City, including the requirement for 25% freeboard, but would also provide water quality benefits to satisfy NPDES Phase II Permit requirements that stormwater be treated to the maximum extent practicable, regardless of whether the C.3 provisions of Region 2 are deemed applicable to the project. Based on the proposed size of the detention ponds, the 2.8 acre-ft of retention storage would occupy approximately the bottom 2.3 feet of the ponds and could be drained over a period of 48 hours using a sump pump with an approximately 320 gpm capacity. With the exception of infiltration and/or evaporation, the sump pump would be the only way to drain the bottom 2.3 feet of the pond. The remainder of the pond would be drained using larger pumps as previously discussed in Section 3.a.1, Detention Facilities. Design standards and maintenance information for the recommended ponds are available in BMP Handbook Fact Sheets TC-21 – Constructed Wetlands, and TC-22 – Extended Detention Basin.

In the event of a second large storm event following closely behind the first storm, portions of the minimum storage required by City standards (21.4 acre-ft) would be taken up by any remaining retention storage provided for water quality (2.8 acre-ft) that had yet to be pumped out by the sump pump. This loss of storage capacity would be overcome by the 25% freeboard requirement built into the ponds per City standards.

The purpose of the 2.8 acre-ft of dead storage to be located at the bottom of the ponds is to allow sufficient volume to settle out sediments before discharging runoff from small storm events. The accumulation of sediments in the bottom of the ponds will decrease the amount of storage available for both detention and water quality treatment; therefore, maintenance provisions shall be adopted to clean out the ponds at a minimum whenever one (1) foot of sediment (measured by depth from the bottom of the ponds) has accumulated. In addition, the sump pump shall be equipped with an adequate intake to prevent sediment accumulation from effecting its performance.

Construction of dual purpose detention and water quality ponds would simultaneously reduce the impacts of increased stormwater runoff from the project site and potential water quality impacts associated with the project development to less than significant levels.

Technical Appendices

Appendix I – Land Use and Planning

Bay Area Economics. Retail Impact Market Analysis for Proposed Retail Shopping Center in Morgan Hill, CA. June 2005.

bae

PUBLIC REVIEW DRAFT
RETAIL MARKET IMPACT ANALYSIS
FOR
PROPOSED RETAIL SHOPPING CENTER
IN MORGAN HILL, CA

Prepared for:
City of Morgan Hill

Prepared by:
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Executive Summary

Background and Study Purpose

DiNapoli Browman Guglielmo Development has submitted a proposal to the City of Morgan Hill for a large new retail center. The City of Morgan Hill has retained Bay Area Economics (BAE) to undertake an economic impact analysis as part of the EIR process for this project. BAE aims to use the best available information to assess the economic impacts and then establish whether these economic impacts might result in a negative effect on the physical environment of Morgan Hill as manifested by urban decay and physical deterioration of existing retail centers.

Project Description

The retail project (as yet unnamed, referred to in this report as the "Proposed Project") is proposed as an approximately 650,000 square-foot retail center at the Cochrane Road exit from U.S. Highway 101, to the east of the highway and the north of Cochrane Road. The Proposed Project consists of a mix of retail space configurations in several large buildings and free-standing pads, including two anchor spaces of more than 100,000 square feet, a movie theater complex of 63,200 square feet, additional store space ranging from 4,000 to 30,000 square feet, and several pad spaces suitable primarily for fast-food restaurants. At this time, the committed tenant is Target, slated to be a major anchor in a 123,800 square-foot space. A large anchor space adjacent to Target is configured for a large home improvement store, but no retailer is committed to this space. An alternative for the site plan has a 50,000 square-foot food store taking space currently shown as separate 20,000 and 30,000 square-foot spaces. A fuel station is shown as an alternative for a 6,000 square-food pad.

The developers have expressed an interest in developing this project as a "lifestyle center," with an emphasis on higher-end stores, dining, and entertainment (as indicated by the movie theater complex), creating a destination retail experience that might draw shoppers and movie-goers from outside Morgan Hill. However, at the time of this analysis there are no committed tenants in these categories.

Definition of Trade Areas

The Target Trade Area has been defined as the area from which the Target anchor tenant is likely to draw most of its customers and is bounded based primarily on the location of other Target stores nearby, on the assumption that shoppers will go to the Target closest to their residence. The Target Area consists primarily of Morgan Hill and surrounding unincorporated areas, but also includes the Coyote Valley area of San Jose. This Trade Area is also used for most of the other center tenants, including the undefined retail uses, since there are no commitments at this time from specific tenants whose market area might not be constrained by the significant region-serving retail concentrations in Gilroy and San Jose.

The Cinema Trade Area has been defined based on the area likely to provide most of the customers for a multiscreen theater complex as proposed. The Cinema Trade Area encompasses all of the Target Trade Area and extends south through Gilroy to the Santa Clara County borders with Santa Cruz and San Benito Counties. To the north, while a large new complex in a well-designed center would garner some movie-goers from San Jose, the major theater complexes in South San Jose will still capture most of the customer base due to their proximity. To the south, the presence of other screens in Hollister and Watsonville as well as sheer distance will preclude the capture of significant numbers of customers.

Summary of Demographic and Economic Overview

The Target Trade Area is undergoing moderate population and household growth, keyed largely to the residential growth caps in place in Morgan Hill. It is estimated the Target Trade Area will have a population of 53,486 and 17,117 households by 2010. The Cinema Trade Area has shown stronger growth, based on the faster growth rate of Gilroy. The Cinema Trade area is expected to reach an estimated 115,888 persons and 35,178 households by 2010. Long term, these trends are expected to continue, with Gilroy's growth outpacing Morgan Hill's.

A key factor affecting long-term population growth potential in the Trade Area is the development of Coyote Valley in San Jose. Current plans call for 50,000 "driving industry" jobs and 25,000 total residential units housing 80,000 people. Along with a stable fiscal condition for the City, job creation is the "trigger" for City adoption of the Specific Plan, which will then allow other uses to move forward. As currently envisioned, Coyote Valley will not have any region-serving retail; if the final plans maintain this pattern, it could considerably benefit Morgan Hill in drawing customers seeking region-serving retail and trying to avoid congestion elsewhere in San Jose. However, in the current slow job market in San Jose, market analysis completed for the City indicates that total jobs will not reach 5,000 until 2012, at which point limited residential development can commence. Full buildout is not expected for 30 to 40 years. Recently San Jose's Mayor has suggested that residential development should be permitted first. At this time, no approvals (including amending San Jose's General Plan) have been given for this approach, so the analysis here assumes that the current planning process will move forward. Any change in development timing or relaxing of the job creation "trigger" is speculative at this time. This report assumes that substantial development in Coyote Valley will be a long-term prospect, and is unlikely to be a source of retail customers for Morgan Hill in the time frame of this analysis.

The Target Trade Area and to a lesser extent the Cinema Trade Area exhibit strong demographics for retail trade, with high home ownership and high household incomes in comparison to the state. However, the regional economy has been in a sustained downturn following the collapse of the high-tech economy, with a decline in employed

residents in Santa Clara County in every year since 1999. This has been reflected in declines in retail sales in the county.

Commuter flows indicate that Morgan Hill has more employed residents than jobs. Nearly three-fourths of the city's workers commute in from elsewhere, but the potential for additional dollars to be captured with an increase in retail is extremely limited.

Because of the demographic profile for the Trade Areas, Morgan Hill is well-suited for family-oriented retail geared toward households with moderate to high incomes. Target is geared toward this market, and lifestyle retail may also be well-suited, if the population base is sufficient to support it.

Summary of Retail Sales Trends

Historic retail sales trends in south Santa Clara County can be seen as a "Tale of Two Cities," with Morgan Hill's retail sales trends in stark contrast to sales trends in nearby Gilroy. Morgan Hill's retail sales have not kept pace with population, unlike Gilroy's. Morgan Hill per capita retail sales are actually below countywide levels, a strong indicator of retail leakage. In contrast, Gilroy's per capita sales are far above countywide levels, with the gap increasing over time, showing Gilroy's strengthening position as a regional retail destination.

Morgan Hill retail sales trends have matched the downward trend countywide of the last few years in the general merchandise, food store, building materials, and restaurant categories, although the opening of Home Depot in 2004 has led to a sharp increase in sales in the building materials store category. Sales data from 2004 also indicate a sharp drop in general merchandise store sales following the opening of Gilroy's Costco early in 2004 and the Target and Kohl's in Gilroy Crossing prior to the holiday shopping season that year. Gilroy has shown a steady increase in all of these categories, with the exception of food stores, where sales levels are more closely tied to the local population and its growth.

The Target Trade Area can support additional retail in most relevant retail categories for a large retail center, with potential capture of approximately $88 million in sales leakages and an additional $34 million in growth through 2010, supporting 378,000 square feet of new retail space. However, the additional sales in some categories, including building materials stores, bookstores, and home appliance stores, is not enough to support large-format national chain retail stores. One exception to this is office supply stores. The limitations of local demand in combination with the large size requirements for national retailers further exacerbates Morgan Hill's weakness in competing with Gilroy, which has a larger and more quickly growing population base, and can more easily capture additional sales from San Benito County to the south.

The developers have stated that they are seeking to position this center as a "lifestyle center," providing a shopping experience unique to Morgan Hill with a combination of

entertainment, dining, and upscale tenants. With the presence of two big-box anchors, the entire center could be classified as "hybrid center" with lifestyle components and components typical of more conventional shopping centers. Such a center might draw from beyond the Target Trade Area, but would have to draw from a very broad area to match the population base of two major existing lifestyle centers in the Bay Area, Santana Row and Bay Street. In any case the other tenants in the Proposed Center have not been designated, so this economic impact analysis assumes a more generic tenant mix, with many of the tenants in an overall unspecified category. With the exception of the movie theater complex, the analysis assumes that demand will come from the Target Trade Area for potential tenants other than the movie theater complex, since at this time it cannot be assumed with certainty that the other tenants will have a broader regional draw. If the Proposed Project succeeds in signing tenants fitting the upscale lifestyle center profile, they may attract significant numbers of shoppers from a larger area, lessening some of the impacts discussed here.

Summary of Retail Impacts Analysis

The Proposed Project represents a significant increase in the amount of retail space in Morgan Hill, with a center size larger than any of the existing centers. The most apparent immediate impact will be the creation of a large vacant space in Cochrane Plaza due to the relocation of Target to the proposed project. Among other retail categories, the opening of a new home improvement style store similar to but larger than Home Depot may lead to market saturation in Morgan Hill and the Target Trade Area, which does not have a sufficient customer base to support two such stores at industry average performance levels. The opening of a major multiplex will create overcapacity in both Morgan Hill and the Cinema Trade Area, with the impacts likely to be greatest in Morgan Hill. Additional restaurant retail might be supportable, and the overall performance at the local supermarkets is strong enough that another competitor might enter the market, especially if it has a more region-serving focus.

The impacts would be lessened to some degree if the Proposed Project is successfully positioned as a lifestyle center and serves a broader market area. However, market areas for the two largest users of the proposed project (general merchandise and home improvement) face significant competition outside Morgan Hill from existing and planned general merchandise stores and home improvement warehouses in Gilroy and San Jose. Movie theaters might draw from a larger area due to their convenient highway location and large number of offerings available due to the number of screens. However, the Proposed Project adds more screens than are supportable in a larger area, doubling the number of screens in the Cinema Trade Area.

The most obvious local impact will be at Cochrane Plaza, where the Target anchor will be relocating to the project and vacating the center. The loss of Target is likely to lead to reduced traffic at the other stores in the center, many of which are complementary to the Target, offering similar apparel and household items. Some of these tenants may choose to move to the new center to remain close to the Target and the customer traffic it

generates. The restaurants such as McDonald's in Cochrane Plaza will also face new nearby competition from restaurants at the Proposed Project, which is likely to capture some of their share of pass-by highway traffic looking for convenient dining or takeout even as it captures new pass-by traffic and regional business generated by a movie theater complex.

The Lawrence Oaks Center could be significantly impacted if the Proposed Project includes a large home improvement store as planned. As discussed above, the local trade area is not capable of supporting two large home improvement stores performing at industry average sales levels. However, this center's two anchors, Safeway and Home Depot, are not particularly complementary and thus the loss of either is not likely to significantly affect the other. In fact, the Safeway and an adjacent Longs Drugs continued to operate successfully after the Kmart previously occupying the Home Depot space closed. Furthermore, since this center is not as focused as Cochrane Plaza, re-tenanting may not prove as difficult, with one possibility being an office supply store, a category for which Morgan Hill shows significant additional capturable sales.

Tennant Station could ultimately see the loss of the Cinelux movie theater complex if the new multiplex opens as proposed, since the Cinema Trade Area's population base does not support additional screens. The major anchors, Safeway and Rosso's Furniture, however, report strong sales, and the loss of a movie theater would not likely impact their sales significantly; nor are these two anchors at risk from the Proposed Project.

The analysis indicates that the other retail nodes in Morgan Hill are not likely to lose major tenants or stores and thus will not be impacted in a way that might lead to urban decay or physical deterioration. With respect to downtown, the Proposed Project serves a different niche for both consumers and retailers in Morgan Hill, and as such, should not see major impacts from the Proposed Project.

The one under-construction, planned, or proposed development of significance with respect to potential cumulative impacts is the Wal-Mart Supercenter in Gilroy, slated for opening later this year. The addition of a full grocery department to the store will capture supermarket sales going to competitors in Gilroy, Morgan Hill, and elsewhere, with stores in Gilroy bearing the brunt of the impact due to their proximity. The additional sales likely to be captured from Morgan Hill stores in combination with a grocery store at the Proposed Project would not be likely to lead to closures, as each of the major supermarkets is performing at levels capable of sustaining this level of additional sales loss, assuming the losses are shared somewhat equally. The vacancy created by Wal-Mart's closure of their existing store is another significant retail real estate event related to the opening of the Supercenter. As an older existing space designed for a certain user, it is unlikely to attract the kinds of prime tenants seeking new space in a center such as the Proposed Project. However, mitigation measures required as part of the approvals for the Supercenter require the demolition of this space if it is not re-leased within a certain period of time.

Conclusions Regarding Urban Decay and Physical Deterioration

The analysis considered the potential for urban decay and physical deterioration for each of the competing Morgan Hill retail nodes, taking into account the impacts of the Proposed Project and possible cumulative impacts due to other retail development in Morgan Hill, South San Jose, and Gilroy. No large anchor retail spaces are currently vacant in Morgan Hill, and BAE's tour of the existing centers found no current evidence of urban decay or physical deterioration resulting from vacancy, deferred maintenance, or disinvestment. None of the existing centers could be seen as being at risk of urban decay if the Proposed Project is not built.

Cochrane Plaza. The proposed center will lead to the loss of one of two large anchors at Cochrane Plaza. This center and its other large anchor, Mervyn's, face strong new competition from Gilroy Crossing and its new Target and Kohl's. Mervyn's faces an uncertain future following its sale in 2004 by the Target Corporation, with some indications that the underlying value is in its real estate holdings rather than in its operations. At this time, however, the new ownership has continued with existing management and has not announced any major changes such as store closures. A representative of Cochrane Plaza indicated that other stores in the center are faring poorly even with the existing Target in place, with prospective tenants for a vacant space reportedly requesting a cancellation clause if the Target closes. Other tenants may close entirely or relocate to the Proposed Project seeking the continued synergy of locating near a Target. Cochrane Plaza is further constrained by land use regulations that do not allow re-tenanting of the Target space as a grocery store without voter approval. Re-leasing of the Target space might also require a subdivision or redevelopment of the existing store, as the market analysis indicates no support for a space of that size for any category of retail outlet. One possible reuse for at least part of the space is as an office supply store; the analysis indicates support for a sizable store in this category in Morgan Hill. However, this use does not complement the remaining tenant base nearly as well as Target, would not fill the entire vacant Target space, and might be more suitable for another location in Morgan Hill; if the Proposed Project seeks additional tenants outside the lifestyle retail niche, an office supply store could even be located there. Another factor to consider is the multiple ownership of this center; any attempt to redevelop the entire center must be approved by the separate owners of the vacated Target space (currently owned by Target), Mervyn's, and the owner of the remainder of the center. Given the lack of viable large-scale tenants for the Target space, the loss of synergy with the remaining tenants if the Target closes, and an uncertain future for Mervyn's, the center is likely to undergo secondary closures of smaller businesses. Therefore, Cochrane Plaza faces the possibility of entering a cycle leading to urban decay and physical deterioration resulting from long-term vacancies, secondary business closures, and the inability to re-tenant existing stores.

The actual potential for physical deterioration to occur will be dependent on the commitment from the current property owners to maintain the property, which will be

made more challenging due to the multiple ownerships. Although it may be reasonable to assume that the owners would maintain the plaza in a condition suitable for re-tenanting, there is no evidence or indication that such upkeep would continue indefinitely in the face of long-term vacancies under oversaturated market conditions if the prospect of significant re-tenanting of the existing spaces is remote. Therefore, it is concluded that there is a high likelihood that the Cochrane Plaza would be subject to a causal chain ultimately resulting in urban decay. This potential for urban decay may be reduced or avoided through mitigation measures discussed below.

Lawrence Oaks Center. If the Proposed Project includes a home improvement center, it could result in market saturation in this retail sector, leading ultimately to closure of Home Depot. However, Home Depot and its largest competitor, Lowe's, are currently in a phase of opening stores to gather additional market share. Any consolidation and elimination of unprofitable stores may be several years away. This center survived the closure of its Kmart store, with the other anchor store, Safeway, as wells as the Longs Drugs sustained by a customer base not driven by synergies with Home Depot. As a result, this center is unlikely to enter a cycle of additional vacancy leading to urban decay, even if the Home Depot is closed in a future consolidation of stores by its parent company.

Tennant Station. The main occupant at risk in Tennant Station is the Cinelux theatre complex, since the market area does not appear to be able to support additional screens in Morgan Hill. However, the two primary anchors of this center are a Safeway and a furniture store, neither of them at significant risk of closure due to the Proposed Project or other known future retail development. Additionally, the bowling alley is now slated for reopening later this year. This center has undergone major changes over the last several years, including the departure and reopening of Safeway, that indicate that vacant spaces will see reuse rather than long-term vacancy and decay.

Other Retail Nodes. For the other major retail nodes discussed above (Vineyard Town Center, Morgan Hill Plaza, the Nob Hill Center, and Downtown) the analysis does not indicate significant economic impacts related to the Proposed Project. As a result urban decay and physical deterioration are also not indicated as secondary impacts.

Mitigation Measures to Reduce or Avoid Potential Urban Decay

BAE recommends the following mitigations measures to lessen the potential for urban decay and physical deterioration.

General Mitigations. These measures are recommended to be implemented either citywide or for all potentially impacted retail nodes.

1. *Ordinances to enforce maintenance to prevent urban decay/physical deterioration of vacant retail spaces.* The analysis above indicates that there is a likelihood of closure for major tenants in Lawrence Oaks (Home Depot), Tennant Station (Cinelux theater

complex), and Cochrane Plaza (Target, with the likelihood of other tenants following). If these centers (or others) face vacancies following the opening of the Proposed Project, the City of Morgan Hill will monitor maintenance of the vacated spaces and their centers for the first signs of disinvestment or deterioration, and require that these properties continue to be maintained to standards as stated in Section 15.56.020 of the Morgan Hill Municipal Code, such that the building will not endanger life, limb, health, property, safety, or welfare of the general public or its occupants. These standards are based on the International Conference of Building Officials "Uniform Code of the Abatement of Dangerous Buildings, 1997 Edition," except where otherwise noted in the Section 15.56.020 of the Morgan Hill Municipal Code. The property shall be maintained in accordance with Morgan Hill Municipal Code Section 8 regarding Health and Safety, including but not limited to keeping premises free of litter, weeds, graffiti, and abandoned vehicles.

2. *Funding of programs to assist small retail businesses in Morgan Hill.* To help small local businesses compete with likely national chain retailers in the Proposed Project, the City will fund programs aimed at assisting locally-owned small retailers. This could take the form of a business seminar sponsored by Target and the project developers to educate local retailers, or other programs geared toward small retail business assistance, such as a kiosk at the Proposed Project providing information on shopping opportunities in Downtown Morgan Hill or other centers. Such a program could be funded by the City committing a percentage of the sales tax revenue generated by the Proposed Project.

3. Utilization of Redevelopment Agency Resources. The City of Morgan Hill will ensure the Target Corporation, the other owners of Cochrane Plaza, and the owners of Tennant Station, Vineyard Town Center, and the Lawrence Oaks Shopping Center are aware that their centers are in the City's Redevelopment Area, and as a result they are eligible to apply for programs administered by the City's Business Assistance Division, including the Facade Improvement Program, Impact Fee Financing Programs, and Business Assistance Guidelines.

Cochrane Plaza. The following mitigations are specific to Cochrane Plaza and the existing Target store slated for vacancy.

1. Maintenance of Vacant Target Store. As a condition of approval for the Proposed Project, the Target Corporation will make a written commitment, using a mechanism such as a restriction or notice on their deed to the existing store property, to maintain their vacated existing store per the guidelines set out above regarding abatement of physical decay and deterioration of buildings per the Morgan Hill Municipal Code. This maintenance will include but not be limited to prompt removal of trash and graffiti and upkeep of the vacant building to leasable standards for a modern community shopping center. This commitment will extend to successors in ownership if the Target Corporation sells the property prior to re-tenanting. This commitment will extend until a majority of the space in the vacant store is re-occupied for a period of at least 12 consecutive months.

2. Façade Easement. As an additional measure to assure proper maintenance of the vacated store, the Target Corporation will provide the City of Morgan Hill with a façade easement on the existing Target space. The facade easement will make it easier for the City and its Redevelopment Agency to step in and clean up the site and lien the property for reimbursement, if needed. The easement language can establish the maintenance standards to be followed. For this property, the easement language should give the City the right to enter onto the property and perform any deferred maintenance thereon as may be necessary to keep the property in good condition and repair, if the Target Corporation or successor in ownership (the "owner") does not perform such maintenance itself within a set period of time after receiving notice of the need for maintenance. Such notice shall identify each item of maintenance and repair required to restore the landscaping and exterior facade on the Property to good condition and repair. All costs of maintenance performed by the City of Morgan Hill shall be paid directly by the owner or be reimbursed to the City by the owner. The owner's obligation to reimburse the City shall be secured by a lien encumbering the Property, which lien shall be enforceable in accordance with the provisions of California Civil Code Section 2924 et seq., as amended. This façade easement will be granted for a period not to exceed five years, or until a majority of the space is re-occupied for a period of at least 12 consecutive months.

3. Commitment to Re-Tenanting of Vacant Target Store. The Target Corporation shall provide the City with a written re-tenanting plan for the vacant store. Every six months until the majority of the space is leased to a tenant(s) with a lease commitment of at least 12 months, or sold to another independent party, the Target Corporation shall provide to the City of Morgan Hill a progress report on efforts to re-lease the vacant space. The Target Corporation shall not put restrictions on the types of retailers permitted, e.g., they will not refuse to lease to a Target competitor. Permitted activities and land uses shall be solely governed by the City's General Plan and Zoning Ordinance

Level of Significance Remaining After Mitigation

Based on the analysis here, BAE believes that urban decay is not a likely outcome for centers and retail nodes other than Cochrane Plaza, especially if the citywide mitigations described above are implemented. However, in the case of Cochrane Plaza, these mitigations and those that are center-specific may be somewhat effective, but it cannot be stated with any degree of certainty that they would prevent urban decay in that center. Thus, it is possible that the construction of the Proposed Project might lead to a significant and unavoidable impact with respect to urban decay and physical deterioration for Cochrane Plaza.

Introduction

Background and Study Purpose

DiNapoli Browman Guglielmo Development has submitted a proposal to the City of Morgan Hill for a large new retail center. As part of its evaluation of the proposed project, the City of Morgan Hill has retained Pacific Municipal Consultants to complete an Environmental Impact Report (EIR). Recent California court decisions (*Bakersfield Citizens for Local Control v. City of Bakersfield, Panama 99 Properties LLC, and Castle & Cooke Commercial-CA, Inc.*, as well as *Dolan Ingram, et al. v. City of Redding and Wal-Mart, Inc, et al.*) have made clear that for large retail developments, an economic impact analysis should be undertaken to assess the possibility of "urban decay" and deterioration and indirect physical impacts on the environment. In the Bakersfield decision, the Appellate Court made clear that such an impact needed to be given "meaningful consideration." Both cases indicate that to fully satisfy the requirements of an EIR, the economic analysis must start with the economic impacts, but also follow the causal chain to assess the likelihood of new retail space causing existing space to become vacant, and following that outcome, determine the potential for urban decay and physical deterioration of existing retail centers and nodes. The City of Morgan Hill has retained Bay Area Economics (BAE) to undertake an economic impact analysis as part of the EIR process for this project. BAE aims to use the best available information to assess the economic impacts and then establish whether these economic impacts might result in a negative effect on the physical environment of Morgan Hill as manifested by urban decay and physical deterioration of existing retail centers.

Project Description

The retail project (as yet unnamed, referred to in this report as the "Proposed Project") is proposed as an approximately 650,000 square-foot retail center at the Cochrane Road exit from U.S. Highway 101, to the east of the highway and the north of Cochrane Road. The Proposed Project consists of a mix of retail space configurations in several large buildings and free-standing pads, including two anchor spaces of more than 100,000 square feet, a movie theater complex of 63,200 square feet, additional store spaces ranging from 4,000 to 30,000 square feet, and several pad spaces suitable primarily for fast-food restaurants. At this time, the committed tenant is Target, slated to be a major anchor in a 123,800 square-foot space. A large anchor space adjacent to Target is configured for a large home improvement store, but no retailer is committed to this space. The conceptual site plan for the Proposed Project indicates two alternative land uses for portions of the project, as follows: a 50,000 square-foot food store in place of two adjacent 20,000 and 30,000 square-foot retail spaces; and a fuel station in place of a 6,000 square-foot pad.

The developers have expressed an interest in developing this center as a "lifestyle center," with an emphasis on higher-end stores, dining, and entertainment (as indicated by the movie theater complex), creating a destination shopping experience drawing from outside Morgan Hill. However, at the time of this analysis there are no committed tenants in these categories. For the purposes of this analysis, the Proposed Project is configured as shown in Table 1, which includes the Target, a home improvement center, the theater complex, a supermarket, a fuel station, restaurants, and unspecified retail.

Table 1: Proposed Project Property Information

Location	Type	Square Feet	Tenant
Major 1	Retail	123,800	Target
Major 2	Retail	18,600	
Major 3	Retail	18,000	
Major 4	Retail	20,000	
Major 5	Retail	18,000	
Major 6	Retail	20,000	Food Store (Alternative)
Major 7	Retail	30,000	Food Store (Alternative)
Major 8	Retail	140,000	Home Improvement
Major 9	Retail	18,175	
Major 10	Retail	16,000	
Major 11	Retail	16,000	
Major 12	Retail	18,175	
Total Major Area		**456,750**	
Shops A	Retail	7,400	
Shops B	Retail	6,000	
Shops C	Retail	12,000	
Shops D	Retail	8,000	
Shops E	Retail	6,400	
Shops F	Retail	4,000	
Shops G	Retail	5,000	
Shops H	Retail	6,000	
Shops I	Retail	4,500	
Shops J	Retail	8,850	
Shops K	Retail	8,000	
Shops L	Retail	7,125	
Shops M	Retail	7,125	
Total Shops Area		**90,400**	
Pad 1	Restaurant	4,000	Fast Food
Pad 2	Restaurant	6,000	Fuel Station (Alternative)
Pad 3	Restaurant	3,500	Fast Food
Pad 4	Restaurant	4,000	Fast Food
Pad 5	Restaurant	3,500	Fast Food
Pad 6	Restaurant	3,500	Fast Food
Pad 7	Restaurant	4,500	Fast Food
Pad 8	Restaurant	7,500	Restaurant
Total Pad Area		**36,500**	
Cinemas	Movie Theater	63,200	Movie Theater
Total Building Area		**646,850**	
Garden Center		10,400	With Major 8
Total Center Store Area		**657,250**	

All sizes are approximate.

Sources: DiNapoli Browman Guglielmo Development; City of Morgan Hill; CA State Board of Equalization; Bay Area Economics.

Approach. For purposes of this analysis it is assumed that the project will be fully developed and occupied within a few years. The purpose of this report is not to assess whether the retail market area can support this project, but to assess the impacts of the proposed project assuming that it is constructed as planned. The analysis assumes that this will be a fully functioning center, with all of the project's outlets achieving a level of revenue reflective of the national averages for each sector represented in the project. This is considered a reasonable and defensible basis upon which to evaluate the potential economic impacts of the proposed project. However, if this leads to the conclusion that the center will capture an unrealistic share of local sales in a given category, the analysis considers more likely outcomes, such as both the new outlet and the existing outlets performing below industry benchmarks.

Population and Employment Overview

Introduction

This section presents background information on current and projected demographic and economic conditions in Morgan Hill, a Target Trade Area, and a Cinema Trade Area. A trade area is the geographic region that encompasses most of a retail outlet's customers, or can be defined as including all the outlets that serve a particular market niche. These Trade Areas have been defined based on the geographic area likely to be the primary source of customers for the uses as discussed in the following Trade Area definitions. As explained below, the Target Trade Area encompasses all uses aside from the movie theaters. Developing an economic and demographic profile of these areas will provide background information that will assist in estimating future retail sales in the areas and in assessing the potential impacts of the Proposed Project on other retail outlets and centers. Data sources include the U.S. Census Bureau, including the 1990 and 2000 Census, the California Employment Development Department (EDD), the Association of Bay Area Governments (ABAG), and Claritas, a private vendor providing estimates of current and future demographic conditions.

Definition of the Target Trade Area

The Target Trade Area has been defined as the area from which the Target anchor tenant is likely to draw most of its customers. This area has been bounded based primarily on the location of other Target stores in nearby population centers, on the assumption that shoppers would tend to go to the Target closest to their residence (see Figure 1). The Target Area consists primarily of Morgan Hill and surrounding unincorporated areas, but also includes the Coyote Valley area of San Jose. This Trade Area is also used for most of the other center tenants. It was used for the home improvement land use and the restaurant uses since the area is similarly surrounded by other large home improvement centers and fast food restaurants in San Jose and Gilroy. For food stores, Morgan Hill and its immediate environs can be seen as one market, although the individual stores may have even smaller market areas. This Trade Area was also used for the undefined retail uses in the absence of detailed information on specific tenants whose market area might not be constrained by the significant region-serving retail concentrations in Gilroy and San Jose.

Definition of Cinema Trade Area

The Cinema Trade Area has been defined based on the area likely to provide most of the customers for a multiscreen theater complex as proposed. As shown in Figure 2, the Cinema Trade Area encompasses all of the Target Trade Area and extends south through Gilroy to the Santa Clara County borders with Santa Cruz and San Benito Counties. To the north, while a large new complex in a well-designed center would garner some movie-goers from San Jose, the major theater complexes in South San Jose will still capture most of the customer base due to their proximity. To the south, the presence of other screens in Hollister and Watsonville as well as sheer distance will preclude the capture of significant numbers of customers.

Both Trade Areas are defined using Census Block Groups, and a listing of the Block Groups can be found in AppendicesA-1 and A-2.

Figure 1: Target Market Area

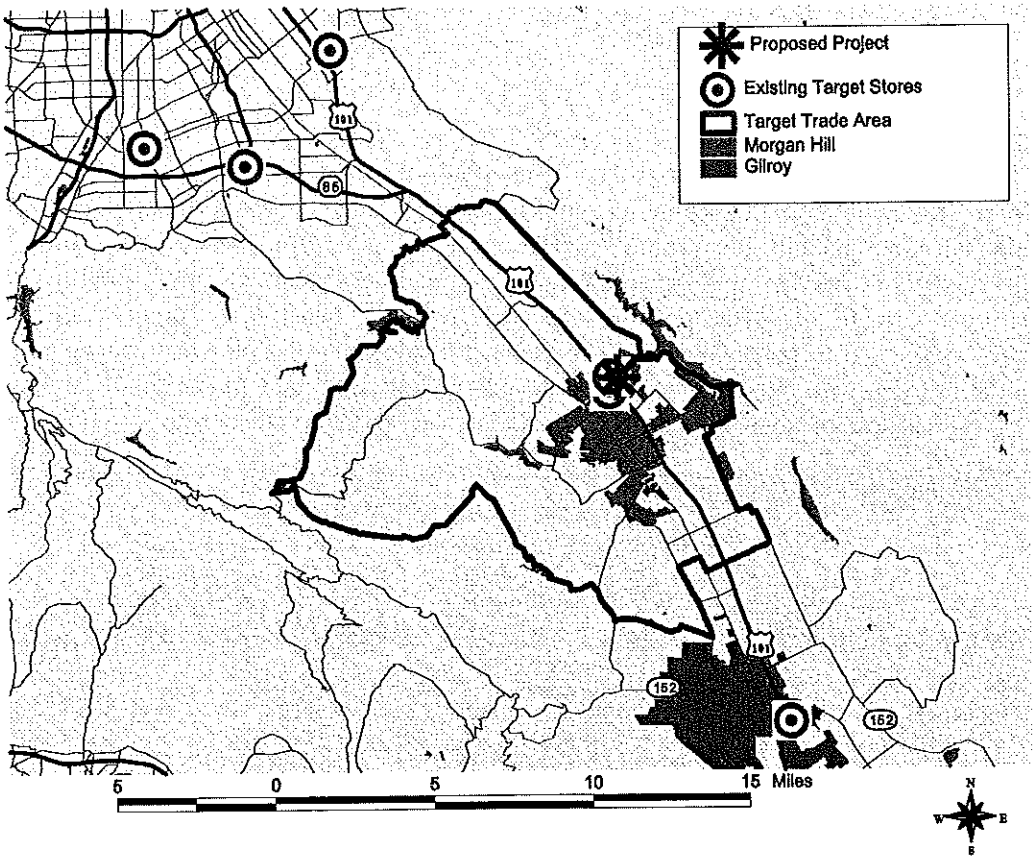
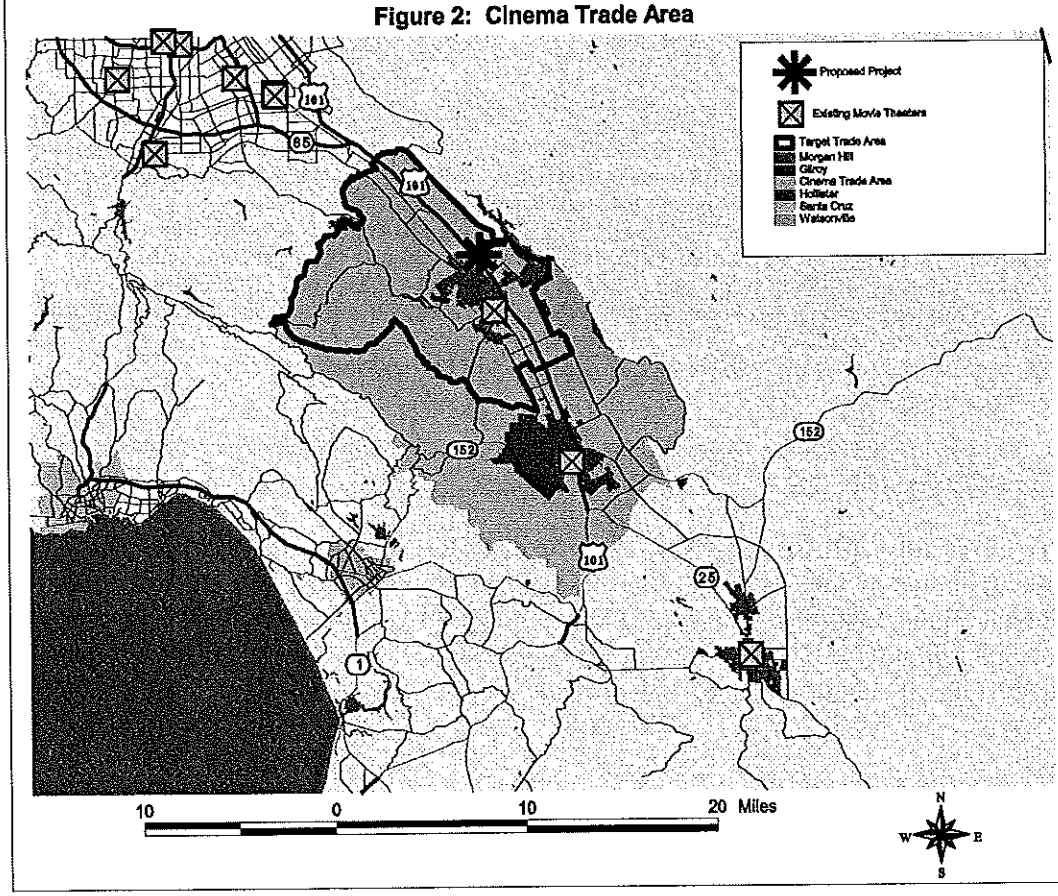


Figure 2: Cinema Trade Area



Population Trends

Short-Term Trends. The Target Trade Area is undergoing moderate population growth, keyed largely to the residential growth caps in place in Morgan Hill, which permits construction of only 250 residential units annually (see Table 2). Based on estimates from the Association of Bay Area Governments (ABAG), the Target Trade Area gained 2,844 persons from 2000 to 2005, with additional growth of 4,100 persons expected by 2010, when the Target Trade Area population is projected to reach 53,486. The Cinema Trade Area has shown stronger growth, based on the faster growth rate of Gilroy. Between 2000 and 2005 the Cinema Trade Area grew from 97,009 to 105,288 persons, with an additional increase of 10,600 persons projected by 2010.

Table 2: Population Trends, 1990-2010

Population	1990	2000	Average Annual Change 1990-2000	2005	Average Annual Change 2000-2005	2010	Average Annual Change 2005-10
Morgan Hill Sphere of Influence	30,077	38,156	2.4%	41,000	1.4%	45,100	1.9%
Target Trade Area (a)	36,957	46,542	2.3%	49,386	1.2%	53,486	1.6%
Cinema Trade Area (b)	76,902	97,009	2.3%	105,288	1.7%	115,888	1.9%
Santa Clara County (c)	1,497,577	1,682,585	1.2%	1,750,100	0.8%	1,855,500	1.2%
State of California (d)	29,760,021	33,871,648	1.3%	36,810,358	1.7%	39,246,767	1.3%

(a) Target Trade Area is 22 Census Block Groups as shown in Figure 1 and Appendix A-1. Population increase has been estimated by assuming all growth in Target Trade Area occurs in Morgan Hill Sphere of Influence, which includes the City of Morgan Hill and immediately surrounding areas. Population of remainder of Target Trade Area assumed to remain unchanged. This reflects a conservative approach as well as a lack of data for the remainder of the defined area.
(b) Cinema Trade Area is 45 Census Block Groups as shown in Figure 2 and Appendix A-2. Population has been estimated assuming all growth in the Lifestyle Trade Area is occuring in the Morgan Hill and Gilroy Spheres of Influence. Population in the remainder of the Lifestyle Trade Area is assumed to remain unchanged. This reflects a conservative approach as well as a lack of data for the remainder of the defined area. Morgan Hill and Gilroy Sphere of Influence population estimates from ABAG.
(c) 2005 and 2010 from ABAG. 2005 number is within one percent of DOF estimate.
(d) 2005 and 2010 from DOF.

Sources: 1990 & 2000 U.S. Census; Association of Bay Area Governments (ABAG) *Projections 2000* and *Projections 2005*; California State Department of Finance (DOF), 2005; BAE, 2005.

Long-Term Trends. ABAG projections estimate that Morgan Hill will continue to grow slowly with growth limited by the city's growth caps, while Gilroy will grow at a faster rate (see Table 3). Morgan Hill's population is projected to reach 50,000 in 2030 and Gilroy's is expected to reach 66,400.[1] Similar projections are not available for the Trade Areas, but most of the Trade Area populations are in the two cities' spheres of influence.

[1] Population projections for City Spheres of Influence, which include surrounding unincorporated areas that may ultimately become part of the cities.

Table 3: Population Projections

	2000	2005	2010	2020	2030	Annual % Change 2005-2030
Morgan Hill Sphere of Influence	38,156	41,000	45,100	48,900	50,000	0.8%
Gilroy Sphere of Influence	48,065	53,500	60,000	64,600	66,400	0.9%
Santa Clara County	1,682,585	1,750,100	1,855,500	2,073,300	2,267,100	1.0%

Source: Association of Bay Area Governments *Projections 2005*.

A key factor affecting long-term population growth potential in the Trade Area is the development of Coyote Valley in San Jose. The City of San Jose is currently developing a Specific Plan for this area, and is attempting to apply "Smart Growth" concepts to its development. One key element of the growth plan is to begin to develop an employment base prior to commencing residential construction. Current plans call for 50,000 "driving industry" jobs and 25,000 total residential units housing 80,000 people. Along with a stable fiscal condition for the City, job creation is the "trigger" for City adoption of the Specific Plan, which will then allow other uses to move forward.[2] As currently envisioned, Coyote Valley will not have any region-serving retail; if the final plans maintain this pattern, it could considerably benefit Morgan Hill in drawing customers seeking region-serving retail and trying to avoid congestion elsewhere in San Jose.

According to market analysis completed by EPS,[3] total jobs will not reach 5,000 until 2012, at which point limited residential development can commence. Full buildout is not expected for 30 to 40 years. Given the requirements for substantial job creation prior to the initiation of residential development, the prospects for housing in the near term are limited. Santa Clara County is still in the midst of a substantial economic slowdown, with over 150,000 fewer employed residents in 2004 than in 2000 (see Appendix B). As a result of this slowdown, there is substantial vacant space available in the industrial market, with Silicon Valley showing a vacancy rate of 10.6 percent out of over 100 million square feet of space.[4] Similar conditions prevail in the R&D and office real estate markets.[5] Under these conditions, there is little incentive to build new space, since existing space is often available for less than the cost of construction.

[2] http://www.sanjoseca.gov/coyotevalley/docs/FAQ/FAQ_Sec7.pdf

[3] *Draft Report, Market Analysis for Workspace Development in Coyote Valley*, Economic and Planning Systems, Inc., August 4, 2004.

[4] CBRE, *Silicon Valley Industrial Market View*, First Quarter 2005

[5] CBRE, *Silicon Valley R&D Market View*, First Quarter 2005, *Silicon Valley Office Market View*, First Quarter 2005

There have been suggestions from San Jose's Mayor recently that residential development should be permitted prior to the job development. At this time, no approvals (including amending San Jose's General Plan) have been given for this approach, and it is likely to prove controversial if pursued. As a result, the analysis here assumes that the current planning process will move forward in the context of existing General Plan Guidelines. Any change in development timing or relaxing of the job creation "trigger" is speculative at this time – for instance, if residential development does not follow the current planning process, retail development may also follow, with creation of a region-serving center in Coyote Valley to serve its residents and others. This report assumes that substantial development in Coyote Valley will be a long-term prospect, and is unlikely to be a source of retail customers for Morgan Hill in the time frame of this analysis.

Household Trends

Household Growth. As shown in Table 4, the rates of household growth in the two Trade Areas mirror the respective population growth rates. The Target Trade Area contains an estimated 15,857 households as of 2005, with an additional 1,260 households expected by 2010. The Cinema Trade Area has an estimated 2005 population of 32,068, with an increase of 3,110 households by 2010.

Table 4: Household Trends, 1990-2010

Households	1990	2000	Average Annual Change 1990-2000	2005	Average Annual Change 2000-2005	2010	Average Annual Change 2005-10
Morgan Hill Sphere of Influence	9,880	12,226	2.2%	13,330	1.7%	14,590	1.8%
Target Trade Area (a)	11,694	14,753	2.4%	15,857	1.5%	17,117	1.5%
Cinema Trade Area (b)	23,638	29,209	2.1%	32,068	1.9%	35,178	1.9%
Santa Clara County (c)	520,180	565,863	0.8%	595,550	1.0%	628,670	1.1%

(a) Target Trade Area is 22 Census Block Groups as shown in Figure 1 and Appendix A-1. Increase in households has been estimated by assuming all growth in Target Trade Area occurs in Morgan Hill Sphere of Influence, which includes the City of Morgan Hill and immediately surrounding areas. Number of households in remainder of Target Trade Area assumed to remain unchanged. This reflects a conservative approach as well as a lack of data for the remainder of the defined area.
(b) Cinema Trade Area is 45 Census Block Groups as shown in Figure 2 and Appendix A-2. Population has been estimated assuming all growth in the Lifestyle Trade Area is occuring in the Morgan Hill and Gilroy Spheres of Influence. Population in the remainder of the Lifestyle Trade Area is assumed to remain unchanged. This reflects a conservative approach as well as a lack of data for the remainder of the defined area. Morgan Hill and Gilroy Sphere of Influence population estimates from ABAG.
(c) 2005 and 2010 from ABAG. 2005 number is within one percent of DOF estimate.

Sources: 1990 & 2000 U.S. Census; Association of Bay Area Governments (ABAG) *Projections 2000* and *Projections 2005*; California State Department of Finance (DOF), 2005; BAE, 2005.

Tenure. Owner and renter households have differing purchasing patterns, and this can be reflected by the retail mix found in an area. The Target Trade Area has over 70 percent of households in owner units, and the Cinema Trade Area has over 65 percent in owner units, in contrast to less than 60 percent in Santa Clara County and statewide (see Table 5). The Target Trade Area and Santa Clara County showed little change in these proportions during the 1990s, while the Cinema Trade Area showed a slight increase, likely due to the construction of new homes in Gilroy. Typically, owners have higher incomes, have larger households, and tend to spend more on home repair and home furnishings and other durable goods and less on dining out.

Table 5: Tenure of Households

	1990	2000
City of Morgan Hill		
Owner	71.5%	72.5%
Renter	28.5%	27.5%
Target Trade Area		
Owner	72.1%	73.0%
Renter	27.9%	27.0%
Cinema Trade Area		
Owner	65.5%	68.2%
Renter	34.5%	31.8%
Santa Clara County		
Owner	59.1%	59.8%
Renter	40.9%	40.2%
California		
Owner	55.6%	56.9%
Renter	44.4%	43.1%

Sources: 1990 & 2000 U.S. Census; BAE, 2005.

Household Income. Household incomes and resulting consumer buying power are key factors in assessing the potential for additional retail development. Relative to Santa Clara County with a median household income of $85,096, the Target Trade Area shows relatively high incomes, with a 2004 median household income estimated at $95,417 (see Table 6). Nearly half of Target Trade Area households had incomes of $100,000 or more. The Cinema Trade Area shows a median annual household income similar to the county's, at $83,688, and has 40 percent of households with annual incomes of $100,000 or more. All of these geographies reflect a strong income base, as the statewide median household income for 2004 is estimated at only $52,349. The higher incomes in the Trade Areas may be manifested in higher retail expenditures and a preference among many households for upscale shopping.

Table 6: Estimated 2004 Household Income Distribution

2004 Income	Morgan Hill	Target Trade Area	Cinema Trade Area	Santa Clara County
Less than $15,000	5.6%	5.3%	6.2%	6.7%
$15,000 - $24,999	4.4%	4.1%	5.0%	5.1%
$25,000 - $34,999	5.8%	6.2%	7.0%	6.1%
$35,000 - $49,999	8.4%	8.3%	10.1%	9.5%
$50,000 - $74,999	13.0%	14.1%	16.4%	16.5%
$75,000 - $99,999	15.1%	14.7%	15.3%	15.0%
$100,000 - $149,999	20.4%	19.9%	19.4%	18.9%
$150,000 or more	27.3%	27.4%	20.6%	22.1%
Total	100%	100%	100%	100%
Median Income	**$96,225**	**$95,417**	**$83,688**	**$85,096**

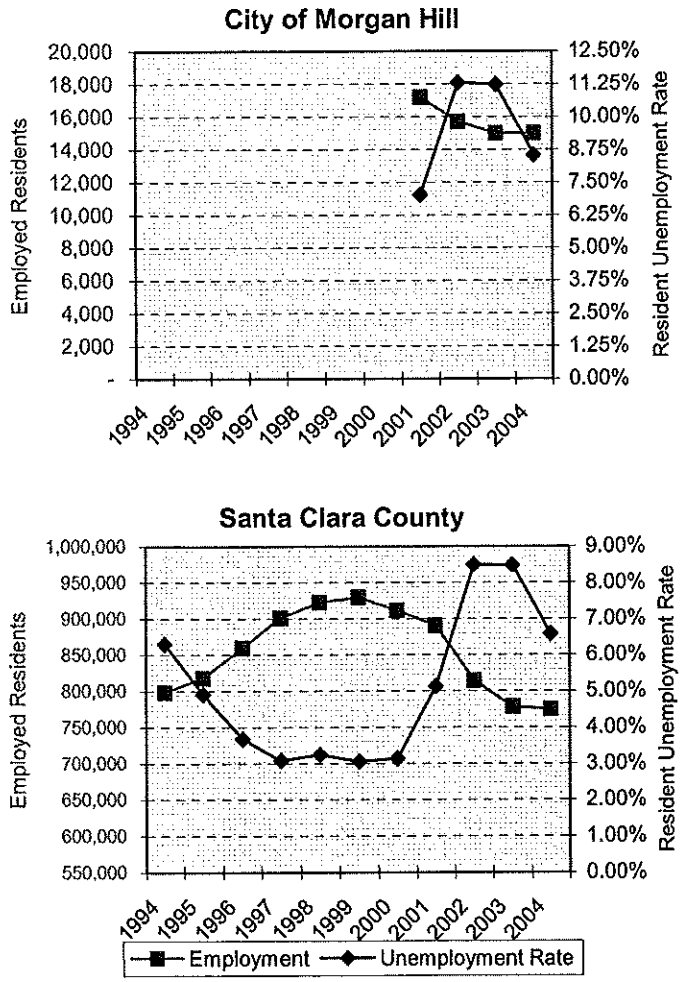
Sources: Claritas, Inc., 2004; Bay Area Economics, 2005.

Labor Force Trends

Employed Residents and Unemployment. Employment can be an indicator of regional buying power; unemployed workers and their households will have reduced incomes and lower expenditures. Growth in the employed labor force of an area can indicate increased buying

power. Santa Clara County has undergone a serious decline since the height of the "dot-com" bubble in 1999 and 2000. As shown in Figure 3 and Appendix B, unemployment climbed from 3.1 percent to 8.5 percent in 2002 and 2004, with a recent decline to 6.6 percent. The number of employed residents has declined every year from a peak of 929,300 in 1999 to 774,800 in 2004. This is a smaller number of employed workers than in 1993. Morgan Hill has followed countywide trends, with a higher proportion of unemployed. Annual average unemployment in 2004 in Morgan Hill is estimated at 8.5 percent, with 15,000 employed residents. These economic trends have had a significant impact on sales in the city and county, as discussed below.

Figure 3: Employed Residents and Unemployment Rate



Data presented are for residents of the area by place of residence, not workers by place of work. Annual data are annual averages. For detailed data, see Appendix B.

Sources: California Employment Development Department; Bay Area Economics, 2005.

Morgan Hill Commuter Flows. In addition to local residents, workers in an area can generate retail sales as they spend money near their place of work, particularly on meals eaten during the

work day. Based on 2000 Census commuter data,[6] Morgan Hill has approximately 16,000 employed residents, and slightly less than 13,000 persons employed in the city (see Table 7). However, there are considerable flows in both directions, with 76.5 percent of the employed residents working outside the city (mostly elsewhere in Santa Clara County, especially San Jose).

Table 7: Morgan Hill Commuter Flows, 2000

Morgan Hill Residents by Place of Work

Place of Work (a)	Number	Percent
Santa Clara County	14,635	92.0%
San Jose	*5,290*	*33.2%*
Morgan Hill	*3,740*	*23.5%*
Santa Clara	*1,155*	*7.3%*
Gilroy	*825*	*5.2%*
Sunnyvale	*765*	*4.8%*
Palo Alto	*385*	*2.4%*
Mountain View	*345*	*2.2%*
Cupertino	*330*	*2.1%*
Milpitas	*325*	*2.0%*
Campbell	*250*	*1.6%*
Other Cities	*475*	*3.0%*
Unincorporated	*750*	*4.7%*
Alameda County	312	2.0%
San Mateo County	303	1.9%
Elsewhere in California	661	4.2%
GRAND TOTAL	15,911	100.0%
Residents Commuting out of Morgan Hill	**12,171**	**76.5%**

Morgan Hill Workers by Place of Residence

Place of Residence (b)	Number	Percent
Santa Clara County	10,863	84.4%
Morgan Hill	*3,740*	*29.0%*
San Jose	*2,875*	*22.3%*
Gilroy	*1,740*	*13.5%*
Other Cities	*839*	*6.5%*
Unincorporated	*1,669*	*13.0%*
San Benito County	675	5.2%
Hollister	*420*	*3.3%*
Remainder, San Benito County	*255*	*2.0%*
Monterey County	329	2.6%
Alameda County	282	2.2%
Santa Cruz County	276	2.1%
Elsewhere in California	450	3.5%
GRAND TOTAL	12,875	100.0%
Workers Commuting into Morgan Hill	**9,135**	**71.0%**

(a) All places showing 250 or more workers commuting from Morgan Hill are shown.
(b) All places showing more than 250 workers commuting into Morgan Hill are shown.

Tables exclude a small number of residents who commute out of state, and a small number of workers who commute in from out of state.

Source: 2000 Census Transportation Planning Package.

Of those working in Morgan Hill, 71.0 percent come from outside the city, with approximately 36 percent of all workers coming from San Jose or Gilroy. There are many persons working in Morgan Hill who are not residents, representing a potential source of additional retail expenditures in the city, but there are more residents commuting outside the city, and they will also be likely to frequent restaurants and shops near their place of work. Effectively, the two groups may cancel each other out as far as retail expenditures, with no net gain in sales in Morgan Hill. However, the presence of additional retail options might lead to additional expenditures near the place of work in Morgan Hill. *Office Worker Retail Spending Patterns*, published in 2004 by the International Council of Shopping Centers, addresses this question to some extent. While comparative data for suburban workers are not available, data for downtown workers with and without ample retail nearby indicate that workers with ample retail near the place of work spend

[6] 2000 Census Transportation Planning Package. It should be noted that given current economic conditions, the number of workers living in Morgan Hill or working in Morgan Hill may be lower than in 2000.

$231 more annually near their place of work than those without ample retail. Given the number of workers commuting into Morgan Hill, this translates into roughly $2.1 million in additional capturable retail sales, or only approximately 8,440 square feet of retail space at $250 per square foot in annual sales.[7] While these numbers are good guesses at best, they are evidence that the impact of worker expenditures given additional retail opportunities are likely to be of a very small order of magnitude.

Summary of Demographic and Economic Overview

The Target Trade Area is undergoing moderate population and household growth, keyed largely to the residential growth caps in place in Morgan Hill. It is estimated the Target Trade Area will have a population of 53,486 and 17,117 households by 2010. The Cinema Trade Area has shown stronger growth, based on the faster growth rate of Gilroy. The Cinema Trade area is expected to reach an estimated 115,888 persons and 35,178 households by 2010. Long term, these trends are expected to continue, with Gilroy's growth outpacing Morgan Hill's.

A key factor affecting long-term population growth potential in the Trade Area is the development of Coyote Valley in San Jose. Current plans call for 50,000 "driving industry" jobs and 25,000 total residential units housing 80,000 people. Along with a stable fiscal condition for the City, job creation is the "trigger" for City adoption of the Specific Plan, which will then allow other uses to move forward. As currently envisioned, Coyote Valley will not have any region-serving retail; if the final plans maintain this pattern, it could considerably benefit Morgan Hill in drawing customers seeking region-serving retail and trying to avoid congestion elsewhere in San Jose. However, in the current slow job market in San Jose, that city's market analysis indicates that total jobs will not reach 5,000 until 2012, at which point limited residential development can commence. Full buildout is not expected for 30 to 40 years. Recently San Jose's Mayor has suggested that residential development should be permitted first. At this time, no approvals (including amending San Jose's General Plan) have been given for this approach, so the analysis here assumes that the current planning process will move forward. Any change in development timing or relaxing of the job creation "trigger" is speculative at this time. This report assumes that substantial development in Coyote Valley will be a long-term prospect, and is unlikely to be a source of retail customers for Morgan Hill in the time frame of this analysis.

The Target Trade Area and to a lesser extent the Cinema Trade Area exhibit strong demographics for retail trade, with high home ownership and high household incomes in comparison to the state. However, the regional economy has been in a sustained downturn following the collapse of the high-tech economy, with a decline in employed residents in Santa Clara County in every year since 1999. This has been reflected in declines in retail sales in the county.

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[7] This analysis is about the increment in retail sales that might be generated by the additional retail provided by the Proposed Project; this should not be mistaken for total worker expenditures which is a much higher number. The workers commuting from outside Morgan Hill are already making retail purchases in the city; these cannot be attributed to the Proposed Project. It will generate only the difference due to new retail offerings.

Commuter flows indicate that Morgan Hill has more employed residents than jobs. Nearly three-fourths of the city's workers commute in from elsewhere, but the potential for additional dollars to be captured with an increase in retail is extremely limited.

Because of the demographic profile for the Trade Areas, Morgan Hill is well-suited for family-oriented retail geared toward households with moderate to high incomes. Target is geared toward this market, and lifestyle retail may also be well-suited, if the population base is sufficient to support it.

Retail Sales Analysis

This section examines retail trends in Morgan Hill, Gilroy, and Santa Clara County. The analysis covers the major uses considered for the Proposed Project. While the specific retailers for much of the center are undetermined, other categories of retail use that might locate in the Proposed Project are discussed. Overall retail sales trends in Morgan Hill and Gilroy are examined, as are trends for general merchandise stores, food stores, restaurants, and building materials stores. Movie theaters are discussed in more general terms due to the limited local data available. Summing up this analysis is a leakage and supportable square footage analysis for the Target Trade Area, focusing on the store categories above and on other store types that might locate in the Proposed Project. Finally, Lifestyle Retail Centers are discussed separately.

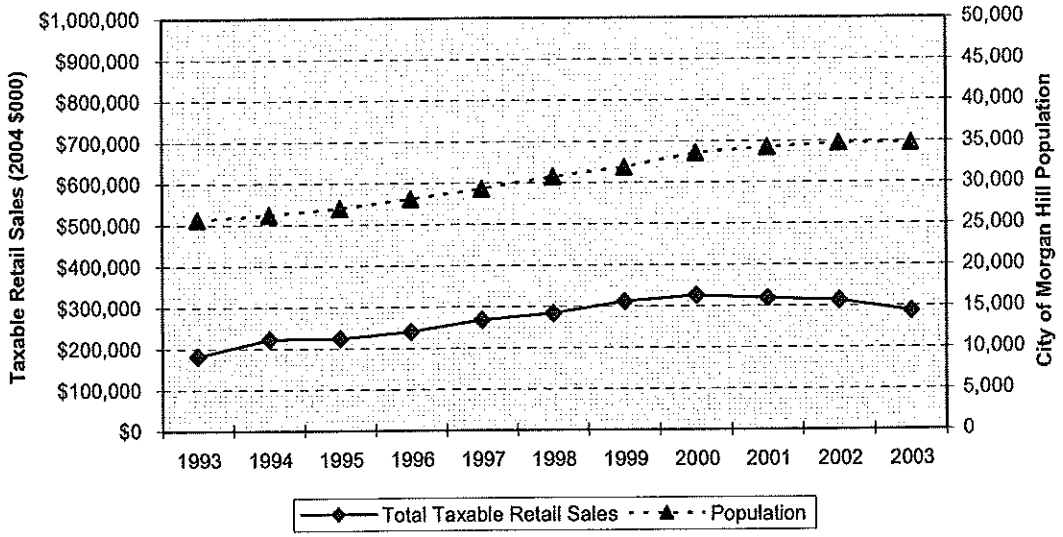
Overall Retail Sales

As shown in Figure 4, Morgan Hill's taxable retail sales[8] have grown at a higher rate than the city's modest population growth, but total taxable retail sales have been declining on an inflation-adjusted basis since 2000. Taxable retail sales in 1993 were approximately $192 million (in 2004 dollars), and grew to approximately $326 million in 2000. Sales declined to $287 million in 2003, for a net increase of 58 percent over the 1993 to 2003 study period. This increase was greater than population growth, which was 35 percent during the same period.

In contrast, Gilroy had a similar percentage increase in population (albeit from a larger base), but taxable retail sales climbed 90 percent from $437 million in 1993 to $832 million in 2003 (see Figure 5). Gilroy's 2003 sales were only slightly below their peak in 2001. Trends in Gilroy reflect its emergence as a region-serving retail center, including the opening of Costco in early 2003, the Gilroy Crossing center with Target, Mervyn's, and other region-serving big-box retail in 2004, and the upcoming Wal-Mart Supercenter later this year. Some of this increase may represent sales captured from Morgan Hill. For instance, general merchandise store sales in Morgan Hill dropped approximately $12 million (or 16 percent) between 2002 and 2003, following the opening of Costco, and dropped another $11 million (or 18 percent) between 2003 and 2004.

[8] In California, the State Board of Equalization provides retail sales data by store type for most counties and for larger cities. This is the most up-to-date and reliable source available, but it only includes taxable sales. Most food items, prescription drugs, and certain other items are exempt from sales tax, so the reported taxable sales data excludes these non-taxable sales. Later in this section of the report, taxable sales as a proportion of total sales in supermarkets will be assessed.

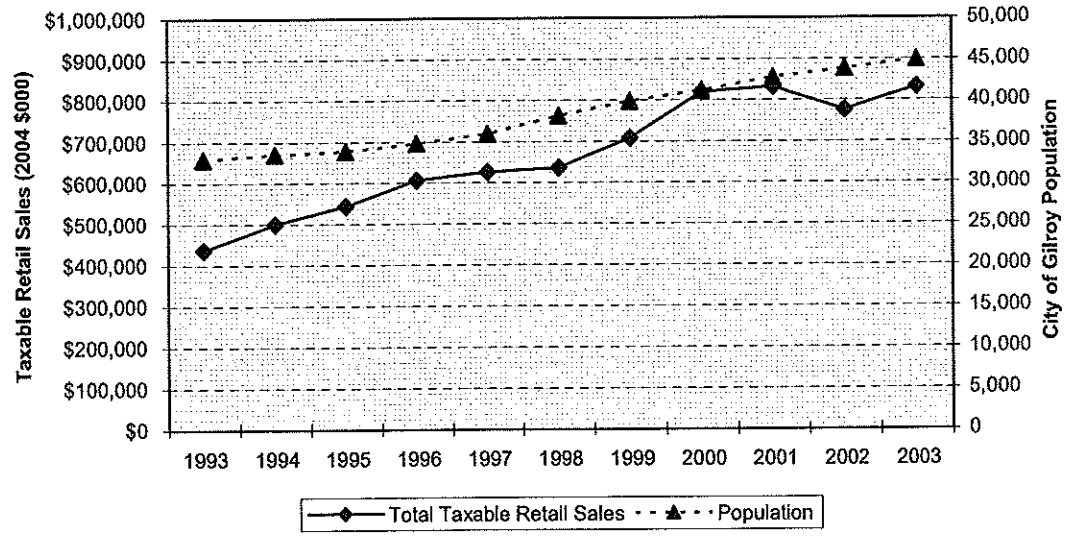
Figure 4: Morgan Hill Taxable Retail Sales and Population, 1993-2003



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. Sales are presented in 2004 dollars. For details, see Appendix C.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2005.

Figure 5: Gilroy Taxable Retail Sales and Population, 1993-2003



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. Sales are presented in 2004 dollars. For details, see Appendix C.

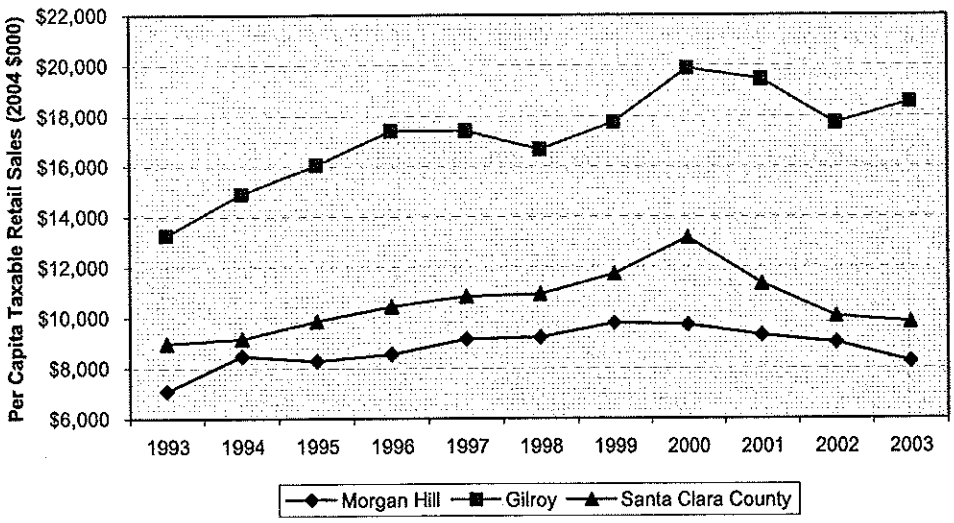
Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2005.

Per Capita Taxable Retail Sales

Per capita retail sales are an indicator of the relative strength of a city as a retail destination; other factors being equal, higher per capita sales relative to the region point toward attraction of shoppers from outside the city. As shown in Figure 6, Morgan's Hill's per capita sales are another indicator of the city's weakness as a retail destination. Morgan Hill lags Santa Clara County in per capita sales, with 2003 per capita taxable retail sales of $8,260, while countywide per capita taxable retail sales were $9,816. This is especially noteworthy in light of the higher income levels in Morgan Hill (see Table 6 above). Both Morgan Hill and the county have seen a significant drop-off in per capita sales from peaks of several years ago.

In contrast, Gilroy had 2003 per capita taxable retail sales of $18,531, more than twice Morgan Hill's level. While Gilroy per capita sales are off their peak of $19,890 in 2000, they have increased nearly 40 percent since 1993. It should be noted that Gilroy's figure is skewed upward by sales at the factory outlet mall, especially in apparel stores, but much of the increase since 1993 has been in other categories, particularly general merchandise stores and building materials stores.

Figure 6: Comparative Analysis, Per Capita Taxable Retail Sales



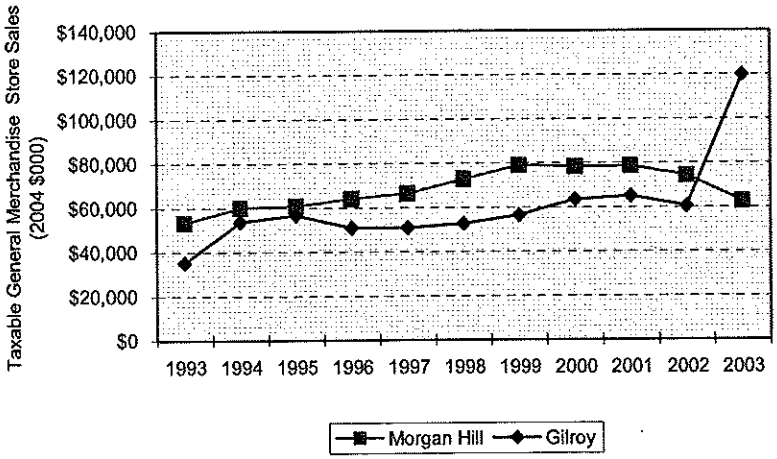
Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. For details, see Appendices C, D, & E.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2005.

General Merchandise Store Sales

As shown in Figure 7, general merchandise taxable sales in Morgan Hill increased through the 1990s, but declined between 2001 and 2003, with a significant decline of $12 million (or 16 percent) between 2002 and 2003, to approximately $63 million. As noted above, this loss may be due to the opening of Costco in Gilroy in early 2003. This is further indicated by the steep rise in general merchandise sales in Gilroy in 2003, as shown also in Figure 7. In fact, in 2003 general merchandise store sales in Gilroy surpassed Morgan Hill for the first time since at least 1993.

Figure 7: Taxable Sales Trends for General Merchandise Stores in Morgan Hill and Gilroy, 1993-2003



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. For details, see Appendix C.
Gilroy data for 2002 imputed based on the average of the difference between Other Retail Stores that year and the previous and following year.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2005.

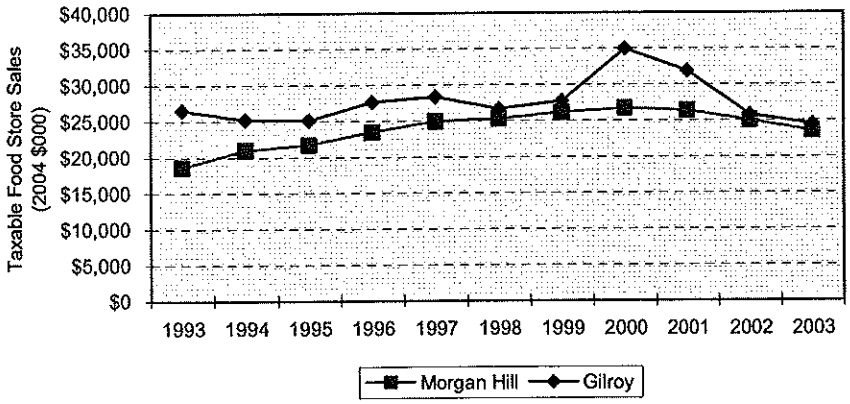
Food Store Sales

Historically, food store sales tended to be locally driven, with stores often located in a neighborhood-serving retail center and serving a trade area limited largely by proximity to consumers seeking everyday convenience purchases.[9] This has changed as supermarkets have become larger, and as more specialized stores such as warehouse-format stores have developed. Stores such as Costco, Wal-Mart, and WinCo tend to encourage more pantry-loading, with customers coming from a larger trade area. In fact, the rise of stores such as Costco and major discount general merchandise stores are probably shifting sales away from conventional food stores entirely. Further changing the food store retailing environment is the rise of specialty supermarkets such as Whole Foods and Trader Joe's, which cater to an upscale clientele from a larger region.

[9] According to the Urban Land Institute's *Shopping Center Development Handbook*, a neighborhood shopping center is usually anchored by a supermarket, requires three to 10 acres of land, and has gross leasable area of 30,000 to 100,000 square feet. Such centers typically serve a trade area population of 3,000 to 40,000 people.

Taxable Food Store Sales. As shown in Figure 8, taxable food store sales in Morgan Hill rose from $18.6 million annually in 1993 to a peak of $26.7 million in 2000, and since then have declined slightly to $23.5 million. Gilroy's sales have been more volatile; taxable food store sales were $26,528 in 1993, rose to $35.0 million in 2000, and have since declined to $24.5 million. This change is likely related to Gilroy's transition to a region-serving center. Grocery stores may see additional decline after 2003 due to Costco and the Wal-Mart Supercenter slated to open later this year.

Figure 8: Taxable Sales Trends for Food Stores in Morgan Hill and Gilroy, 1993-2003



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. For details, see Appendices C & D.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2005.

Taxable vs. Non-Taxable Sales in Food Stores. One difficulty in quantifying food store sales is that in California, the annual data are only available for taxable items, and food items are for the most part non-taxable. To analyze total sales and assess impacts of a new project on existing supermarkets, it is necessary to estimate the percentage of a supermarket's sales that are non-taxable. One way to do this is to compare the taxable sales data with data from the Economic Census, which covers nontaxable sales as well as taxable sales; the most current Economic Census data are from 2002. Also useful in estimating total sales are stores that self-report, sales estimates from other independent sources such as Dun & Bradstreet, documented experience in other locales, and site visits to obtain a sense of the level of shopping activity. In making estimates of supermarket sales in an area, it is best to "triangulate" based on as many sources as possible.

A comparison of taxable sales data and Economic Census data (see Table 8) indicates that in Morgan Hill in 1997, an estimated 31 percent of food store sales were taxable, the same proportion as for California in 2002[10]. Santa Clara County in 2002 shows 25 percent of food store

[10] It should be noted that this is a comparison of two data sources that rely on different collection methods, and that may not define food stores as precisely the same universe. Hence, the proportions should be seen

sales as being taxable. It should be noted that leakage analysis is very sensitive to changes in this assumption.

Table 8: Comparison of Total and Taxable Food Store Sales

	Morgan Hill (d)	Santa Clara County	State
Total Sales, from Economic Census (a) (b):			
Food and beverage stores	$70,618	$3,270,229	$60,243,253
Taxable Sales, from State Board of Equalization (c):			
Food Store Taxable Sales	$21,550	$833,852	$18,951,412
Percent Taxable Sales:	**31%**	**25%**	**31%**

Notes:
(a) Sales in $1,000s.
(b) Sales expressed in uninflated dollars.
(c) These are the best matches available for type of store. Because they are not necessarily exact matches, and because the Economic Census and the State Board of Equalization rely on different data gathering methodologies, the percentages calculated here should be seen as general guides rather than hard and fast rules for food stores. Individual stores may vary widely due to product mix and other factors.
(d) Morgan Hil data from 1997; data for food and beverage store category not disclosed in 2002.

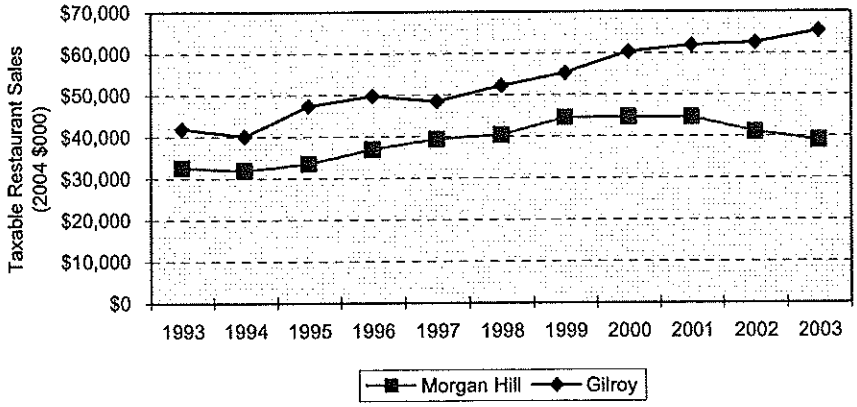
Sources: 1997 and 2002 Economic Census; California State Board of Equalization; Bay Area Economics, 2005.

Restaurant Sales

Another retail use indicated by the project site plan is restaurants, with some pads oriented toward fast food and others spaces available for sit-down dining. Taxable Sales at Eating and Drinking Places in Morgan Hill mirror food store taxable sales as far as change; in 1993, taxable sales in this category were $32.6 million (see Figure 9). Sales peaked at $44,661 in 2001, and declined to $39,010 in 2003. In contrast, Gilroy sales have shown considerable growth with no significant annual declines, rising from $41,931 to $65,408 in 2003.

as generally informative and not as exact proportions. Also, the Morgan Hill data are from 1997 since the 2002 data were suppressed due to disclosure rules. It is possible that the proportions have changed since 1997.

Figure 9: Taxable Sales Trends for Eating & Drinking Places in Morgan Hill and Gilroy, 1993-2003



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. For details, see Appendix C & D.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2005.

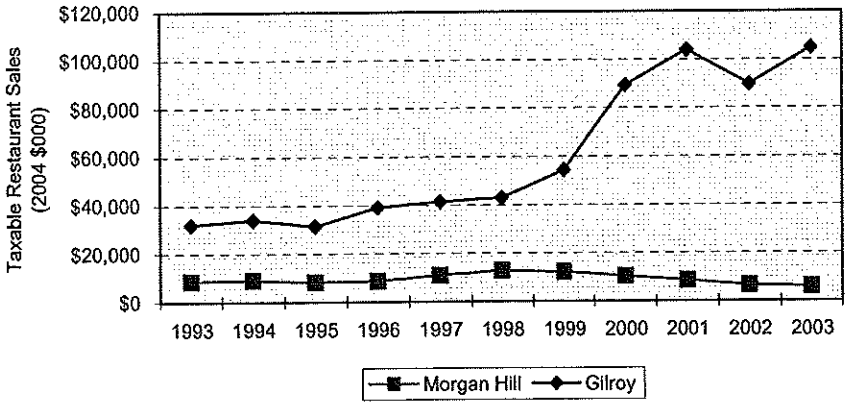
Analysis of more detailed data for subcategories indicates that Morgan Hill's restaurant sales are disproportionately in eating and drinking places not serving alcohol relative to Santa Clara County. Only 11 percent of the city's restaurants serve all kinds of alcohol, compared with 29 percent countywide. This may indicate a potential underserved market niche. On a per capita basis, Morgan Hill is only slightly below the county, with 2003 restaurant sales of $1,123 compared to $1,272 countywide. Some of these differences from the county may be a reflection of the more family-oriented nature of Morgan Hill, with less singles and childless couples frequenting sit-down restaurants and bars.

Building Materials Stores

Figure 10 shows trends in sales for building materials stores[11] in Morgan Hill and Gilroy. This sector has had very poor sales in Morgan Hill relative to Gilroy, and the gap widened considerable between 1993 and 2003. In 1993, Morgan Hill and Gilroy had sales in this category of $8.6 million and $32.0 million, respectively; in 2003, Morgan Hill's sales had declined to $5.8 million, while Gilroy's had increased to $104,927. This increase in Gilroy is linked to the opening of a Home Depot and Lowe's home improvement stores. More recently, Home Depot has opened a store in Morgan Hill, and unpublished taxable sales data indicates a major improvement in sales in this category as a result.

[11] This total includes stores in the following subcategories: Lumber and Building Materials; Hardware Stores; Plumbing and Electrical; Paint, Glass, and Wallpaper; and Farm Implements. It should be noted that this does not include wholesale lumber yards, which is the classification for Hale Lumber Co. and Johnson Lumber Co., even though those outlets also have retail sales.

Figure 10: Taxable Sales Trends for Building Materials Stores in Morgan Hill and Gilroy, 1993-2003



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. For details, see Appendices C & D.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2005.

Movie Theaters

The Proposed Project includes a 63,200 square-foot space for a movie theater complex. As proposed, this would consist of a "megaplex" of 14 screens. In Morgan Hill, there is one operating movie theater complex, a "multiplex" of eight screens in the Tennant Station shopping center. Following a period of bankruptcy and consolidation in the industry, the number of screens nationally has stabilized in recent years, indicating a reasonably good fit between supply and demand at this time. While business level data for the Morgan Hill multiplex are not available, based on national sales data[12] and number of screens, the current eight screens would generate $2.5 million annually if performing at average national levels.

Demand for New Retail Space in the Target Trade Area

Demand from Existing Population. Using 2004 taxable sales data with a finer-grained set of retail categories,[13] BAE has estimated the additional amount of retail space that could be supported by the current population in the Target Trade Area. The results of this analysis are shown in aggregated form in Table 9. The analysis, shown in more detail in Appendix G, has delineated categories where there is estimated "leakage"[14] of retail sales out of the trade area, applied a capture rate to that leakage, and estimated the supportable square footage in that category based on typical store performance in that category. The notes in Table 9 provide a more complete discussion of the methodology used. The analysis has been limited to retail sales types that could be located in the Proposed Project; for example, auto dealers have been excluded from the analysis. However, the analysis has not been limited to "lifestyle retail" store types.

[12] 2002 Economic Census for the Information sector.

[13] From City of Morgan Hill.

[14] Retail sales are said to be "leaking" from an area sales data indicate that residents are spending their money outside the trade area. If the data indicate sales above what would be expected from residents, the area is said to have sales "injections."

This analysis shows a total of 271,000 additional square feet of retail store space that could be supported across a number of categories. The total additional sales dollars capturable is estimated at approximately $88 million annually, or approximately 36 percent of estimated existing retail sales in the selected categories shown in Table 9.

Table 9: Additional Supportable Square Feet of Retail Space in Selected Categories

Store Category	Total Sales $000		Per Capita Retail Sales		Total Injection/ (Leakage) $000	Capture	Average Sales per Square Foot	Additional Support-able SF	Additional Sales $000
	Morgan Hill	SC County	Morgan Hill	SC County					
Apparel	$11,658	$953,908	$242	$554	($15,046)	25.0%	$376	10,000	$3,762
General Merchandise/Drug	$51,294	$2,828,499	$1,064	$1,642	($27,888)	25.0%	$249	28,000	$6,975
Gifts, Art, Novelties	$1,164	$91,507	$24	$53	($1,397)	49.4%	$345	2,000	$690
Sporting Goods	$4,993	$220,424	$104	$128	($1,178)	74.7%	$220	4,000	$880
Florists	$562	$50,886	$12	$30	($863)	91.2%	$262	3,000	$787
Musical Equipment	$269	$103,047	$6	$60	($2,616)	74.7%	$244	8,000	$1,954
Stationery and Books	$832	$215,358	$17	$125	($5,197)	75.1%	$279	14,000	$3,905
Office, Store and School Supply	$3,053	$1,193,856	$63	$693	($30,368)	50.0%	$276	55,000	$15,180
Food Stores	$82,673	$3,365,835	$1,714	$1,954	($11,552)	50.0%	$385	15,000	$5,772
Supermarkets	*$75,000*		*$1,537*		*($10,480)*	*50.0%*	*$374*	*14,000*	*$5,240*
Eating & Drinking Places	$42,101	$2,195,508	$873	$1,274	($19,361)	76.0%	$525	28,000	$14,706
Home Furnishings and Appliances	$7,723	$819,613	$160	$476	($15,222)	75.1%	$423	27,000	$11,430
Building Materials	$24,983	$1,349,205	$518	$783	($12,787)	90.0%	$256	45,000	$11,510
Other Retail	$12,387	$1,109,903	$257	$644	($18,684)	56.3%	$329	32,000	$10,513
Total	$243,692				($162,159)			271,000	$88,064

Notes:
Data on supportable square footage by more detailed categories can be found in Appendix G. Additional supportable square feet here rounded to nearest thousand.
Per capita sales calculated based on reported taxable sales and population estimates and projections for the Target Trade Area from Table 2, prorated to 2003 as follows:

	2000	2003	2005	Annual Change
Target Trade Area	46,542	48,228	49,386	1.2%
County	1,682,585	1,722,775	1,750,100	0.8%

County per capitas sales have been assumed as baseline against which to compare Morgan Hill. Sales assumed to be "leaking" from Morgan Hill if Morgan Hill has per capita sales below county benchmark. While Morgan Hill's higher income levels may support additional retail, the relationship between total household income and purchases of certain goods in certain stores is not linear, and previous analysis by BAE indicates a complex relationship between many household characteristics and expenditures, with income being only one of the variables, along with household size, age, number of children, house cost, and other factors that can affect the availability of actual disposable income and what expenditures are made. Thus, to be conservative, BAE has used the broader county area, which is likely has limited leakage and still has a higher income than statewide, as a benchmark to estimate leakage. Assumptions have been made regarding possible capture by Morgan Hill of leakage in each category; for instance, Morgan Hill is unlikely to achieve high capture of apparel sales in the foreseeable future, because some apparel shopping is mall-based, and because of the factory outlet stores in Gilroy. Sales per square foot derived from several sources of industry benchmarks, including a Hinterliter de Lamas analysis of sales per square foot in California by store type, BizStats.com, and Urban Land Institute's *Dollars & Cents of Shopping Centers, 2004*. Analysis is limited to retail store types likely to be found in the proposed center (e.g., automobile dealers have been excluded). Also excludes all non-retail outlets (business and personal services) reporting taxable sales. Sales amounts rounded to nearest thousand dollars. Other Retail includes Photo Equipment, Musical Equipment, and Other Specialty.

Sources: Bay Area Economics 2005, based on information from the CA State Board of Equalization, 2000 U.S. Census, Association of Bay Area Governments, Urban Land Institute, BizStats.com, Home Depot and Lowe's 2004 Annual Reports, and Hinterliter de Lamas.

Demand from Population Growth. Table 10 shows an estimate of the growth in demand for retail space in key categories in the Target Trade Area. According to this estimate, the Target Trade Area is able to support approximately 107,000 square feet of new retail space in the selected categories between 2005 and 2010.

Table 10: Additional Supportable Square Feet of Retail Space from Population Growth

Store Category	Total Additional Sales	Capture	Captured Additional Sales	Average Sales per Square Foot	Additional Supportable SF
Apparel	$2,270,000	100%	$2,270,000	$378	6,000
General Merchandise/Drug	$6,731,000	100%	$6,731,000	$280	24,000
Gifts, Art, Novelties	$218,000	100%	$218,000	$218	1,000
Sporting Goods	$525,000	100%	$525,000	$175	3,000
Florists	$121,000	100%	$121,000	$121	1,000
Musical Equipment	$245,000	100%	$245,000	$245	1,000
Stationery and Books	$513,000	100%	$513,000	$257	2,000
Office, Store and School Supply	$2,841,000	100%	$2,841,000	$284	10,000
Food Stores	$8,010,000	100%	$8,010,000	$381	21,000
Eating & Drinking Places	$5,225,000	100%	$5,225,000	$523	10,000
Home Furnishings and Appliances	$1,951,000	100%	$1,951,000	$390	5,000
Building Materials	$3,211,000	100%	$3,211,000	$292	11,000
Other Retail	$3,176,000	100%	$3,176,000	$265	12,000
Total Additional Supportable Square Feet, 2010					**107,000**

Notes:
See Table 2 for population data. County per capita sales used as benchmark. Assumes 100 percent capture of sales from increased population growth. Sales per square foot derived from several sources of industry benchmarks, including a Hinterliter de Lamas analysis of sales per square foot in California by store type, BizStats.com, and Urban Land Institute's *Dollars & Cents of Shopping Centers, 2004*. Some sales per square foot averages represent weighted averages of several categories not disclosed due to confidentiality rules. Analysis is limited to retail store types likely to be found in the proposed center (e.g., automobile dealers have been excluded). Also excludes all non-retail outlets (business and personal services) reporting taxable sales. Sales amounts rounded to nearest thousand dollars. Other Retail includes Photo Equipment, Musical Equipment, and Other Specialty. Additional supportable square feet rounded to nearest thousand.

Sources: Bay Area Economics 2005, based on information from the CA State Board of Equalization, 2000 U.S. Census, Association of Bay Area Governments, Urban Land Institute, BizStats.com, Home Depot and Lowe's 2004 Annual Reports, and Hinterliter de Lamas.

Total Additional Supportable Retail Square Footage. Table 11 sums the total sales and square footages for capture of existing leakage as well as from population growth through 2010. By category, sizes range from 3,000 square feet for gift/art/novelty stores to 65,000 square feet for office/store/school supplies. For general merchandise stores, the additional supportable square footage is 52,000 square feet, not enough for a large new general merchandise store, but more than the proposed Target expansion. There is estimated demand for 38,000 square feet of restaurant space, with the detailed analysis shown in Appendices G and H indicating that most of this demand is for eating and drinking places service some kind of alcohol (i.e., not fast food restaurants). In the building materials store category, there is estimated support for 56,000 square feet of new space, considerably less than the 140,000 square feet of potential store space in the project. Additionally, detailed analysis indicates that this support is mostly for hardware stores, paint, glass, and wallpaper stores, and plumbing and electrical supply stores, although to some extent a home improvement/building materials center could absorb this demand through store substitution on the part of consumers. For stationery and books, the total supportable square footage is estimated at 16,000 square feet, smaller than the 25,000 to 35,000 square feet typical of Barnes & Noble or Borders stores. In other categories, the estimates indicate potential support for some smaller apparel stores and also in the home furnishings and appliances store category,

with the detailed analysis shown in Appendices G and H indicating that most of this demand is in the home furnishings store subcategory. The household appliances category, which includes retailers such as Best Buy, shows only an estimated 7,100 square feet of additional supportable space, far below the typical size for this store type. In total, there is estimated support for 378,000 square feet of additional retail space in Morgan Hill by 2010. The Proposed Project contains 577,650 square feet of retail space (excluding the movie complex).

Table 11: Summary of Additional Supportable Square Footage

Store Category	Additional Sales from Leakage $000	Additional SF from Leakage	Additional Sales from Growth $000	Additional SF from Growth	Total Additional Supportable SF (a)
Apparel	$3,762	10,000	$2,270	6,000	16,000
General Merchandise/Drug	$6,975	28,000	$6,731	$24,000	52,000
Gifts, Art, Novelties	$690	2,000	$218	$1,000	3,000
Sporting Goods	$880	4,000	$525	$3,000	7,000
Florists	$787	3,000	$121	$1,000	4,000
Musical Equipment	$1,954	8,000	$245	$1,000	9,000
Stationery and Books	$3,905	14,000	$513	$2,000	16,000
Office, Store and School Supply	$15,180	55,000	$2,841	$10,000	65,000
Food Stores	$5,772	15,000	$8,010	$21,000	36,000
Eating & Drinking Places	$14,706	28,000	$5,225	$10,000	38,000
Home Furnishings and Appliances	$11,430	27,000	$1,951	$5,000	32,000
Building Materials	$11,510	45,000	$3,211	$11,000	56,000
Other Retail	$10,513	32,000	$3,176	$12,000	44,000
Total Additional Retail Square Feet Supportable by Leakage and Growth through 2010					**378,000**

Notes:
Detail in Tables 9 and 10.
(a) Rounded to nearest 1,000.

Sources: Bay Area Economics 2005, based on information from the CA State Board of Equalization, 2000 U.S. Census, Association of Bay Area Governments, Urban Land Institute, BizStats.com, Home Depot and Lowe's 2004 Annual Reports, and Hinterliter de Lamas.

Demand for New Retail Space from beyond the Target Trade Area

The developers of the project have a stated goal to position this center as a "lifestyle center," drawing patrons from a market area extending beyond that of the Target anchor store itself. Smaller than regional malls, built around open-air designs, and lacking traditional department store anchors, the lifestyle center is the current "state-of-the-art" in retail development. With nearly 130 in existence nationwide and approximately 30 planned over the next three years, there is considerable diversity in what developers describe as a lifestyle center. Lifestyle centers often feature plazas, fountains and other landscaping elements and attempt to recreate a village square, marketplace, or Main Street atmosphere. Layouts vary, with some developers placing retailers in a horseshoe configuration and others using building clusters. Lifestyle centers are open-air developments that attempt to create a pedestrian friendly environment.

Based on research by the International Council of Shopping Centers (ICSC), lifestyle centers were originally conceived of as a vehicle for growth in the specialty retail sector, a fact reflected in the current tenant mix of most lifestyle centers. Today, approximately three-quarters of tenants

in lifestyle centers fall into the specialty retail category, making up 35 of the nearly 50 tenants in an average center. The top three specialty retail categories are women's ready to wear, family apparel, and home furniture and furnishings. At or near the bottom of the list are athletic shoe stores and automotive tool stores, not seen as a good fit for the image of a lifestyle center. After specialty retail, sit-down restaurants are the next most common lifestyle tenant, making up twelve percent of all lifestyle tenants, and averaging six per center. Other major tenant groups include fast food restaurants, personal services, personal care, and business services. Approximately one-third of lifestyle centers have movie theaters. Department stores are still relatively uncommon in lifestyle centers, making up less than one percent of all tenants. In lifestyle centers a combination of sit-down and fast-casual restaurants are an important draw. Entertainment uses are common in lifestyle centers. These include multiplex movie theaters, skating rinks, bowling alleys, bars, and clubs. Entertainment facilities help to make lifestyle centers into destinations and serve to extend operating hours.

In lifestyle centers opened during the past two years, large stores are dominated by four categories: books (particularly Borders and Barnes & Noble), sporting goods (e.g., Dick's Sporting Goods, Galyan's) home furnishings (e.g., Linens 'N Things) and family apparel (e.g., Old Navy). Overall, the top retailers in lifestyle centers by number of outlets are Chico's, Talbots, and Williams-Sonoma. For a complete list of the top ten lifestyle retailers, see Appendix I.

Lifestyle centers vary considerably in gross leasable area (GLA) from less than 100,000 square feet to over 1,000,000 square feet. The median GLA of all lifestyle centers is 325,000 square feet with most centers between 190,000 and 500,000 square feet. Recent centers tend to be larger. The median GLA of centers built since 2001 is 386,500 square feet with most ranging between 230,000 and 575,000 square feet. The trend toward larger retail centers is expected to continue in coming years, with the median GLA of proposed lifestyle centers reaching 500,000 square feet.

According to the (ICSC), the median age of the typical shopper over age 18 is 40 years of age at a lifestyle center. Compared to regional malls, lifestyle centers tend to draw fewer people in younger and older age groups. Sixty-eight percent of lifestyle center shoppers are between the ages of 25 and 54 compared to 59 percent at regional malls. Lifestyle center shoppers tend to be affluent, with a median household income just under $85,000 nationwide. Compared to the U.S. population as a whole, these numbers are particularly high given that median household income was $47,000 in 2003. The market areas for lifestyle centers tend to be quite large, drawing shoppers from a distance for the shopping experience they represent.

The lifestyle center closest to Morgan Hill is Santana Row in San Jose. Santana Row combines shopping, dining, entertainment, a hotel, and residences to create an urban shopping and living environment. Retail uses total 660,000 square feet, and include a range from typical lifestyle tenants such as Chico's and Ann Taylor to big box uses such as Best Buy and the Container Store. After a slow start due to the economic downtown and a major fire that delayed opening, Santana Row has rebounded considerably, with 92 percent of retail space leased as of September

2004.[15] Management estimates that sales are currently at $600 per square foot, with restaurants at $800 per square foot and retailers at $500.

Because of the recent emergence of lifestyle centers and their continuing evolution, the size of market area necessary to support such a center varies considerably depending on tenant mix and size of center. There are approximately 1.45 million persons living within a 10 mile radius of Santana Row and 1.27 million within a 10 mile radius of Bay Street, another lifestyle center in Emeryville. By comparison, there are approximately 94,000 persons living within 10 miles of the Proposed Project site, and 456,000 within 15 miles.[16]

As currently configured, the Proposed Project includes uses atypical of a conventionally defined lifestyle center, and the site plan appears to be more conventional. Unlike Santana Row, Bay Street in Emeryville, or many lifestyle centers, the Proposed Project bears little resemblance to a "main street" layout, although it has walkways linking its major subcomponents in order to create a more pedestrian-friendly atmosphere. The Proposed Project does have entertainment and restaurant uses typical of lifestyle centers, with additional space that could potentially be used by lifestyle center-type tenants, in two inline shopping strips separated from each other and the two "big box" spaces by parking lot space. One of these strips is dominated by the proposed theater space. Thus the center as proposed may represent a mixed center type called a "hybrid center" that combines lifestyle center components with big box uses or an enclosed mall space.

The typical stores in lifestyle centers fall in several of the general categories of retail as shown in Table 9 above, with an emphasis on apparel and specialty retail. Since they are part of a larger category, they must differentiate themselves from and compete with other stores in the Lifestyle Trade Area. Of particular note are the factory outlet stores in Gilroy, which successfully draw shoppers from a broad region and skew apparel sales far above expected levels, making it difficult to assess demand for additional apparel stores regionally. Other competitive outlets in Gilroy include some of the tenants at the new Gilroy Crossing center, such as Barnes & Noble, Lane Bryant, and Pier 1 Imports.

The major lifestyle center use that is specifically designated in the site plan is the movie theater complex. This space comprises 63,200 square feet, suitable for an estimated 14 screens. Specialty grocery stores such as Trader Joe's sometimes locate in these centers, but conventional supermarkets are not typical tenants. The restaurants evident on the site plan are mostly pads suitable in size and layout for fast food restaurants, but some of the other retail space could be utilized by larger sit-down restaurants to bring a wider variety of eating options to the center, or perhaps the pad spaces could be configured for sit-down restaurants. Because the other tenants in the Proposed Center have not been designated, this economic impact analysis assumes a more generic tenant mix based on the categories discussed in Table 9, using the design information provided by the site plan as a guide. As a result, the analysis focuses on demand from the Target Trade Area for potential tenants other than the movie theater complex, since at this time it cannot be assumed with certainty that the other tenants will have a broader regional draw. If the

[15] http://retailtrafficmag.com/mag/retail_maxeduse/

[16] 2004 population estimated from Claritas. May vary from other sources used in this report.

Proposed Project succeeds in signing tenants fitting the upscale lifestyle center profile, they may draw shoppers from a larger area, lessening some of the impacts discussed here. However, the population base is spread over a broad geographic area and does not have the population density surrounding lifestyle centers elsewhere in the Bay Area.

Summary of Retail Sales Trends

Historic retail sales trends in south Santa Clara County can be seen as a "Tale of Two Cities," with Morgan Hill's retail sales trends in stark contrast to sales trends in nearby Gilroy. Morgan Hill's retail sales have not kept pace with population, unlike Gilroy's. Morgan Hill per capita retail sales are actually below countywide levels, a strong indicator of retail leakage. In contrast, Gilroy's per capita sales are far above countywide levels, with the gap increasing over time, showing Gilroy's strengthening position as a regional retail destination. Morgan Hill retail sales trends have matched the downward trend countywide of the last few years in the general merchandise, food store, building materials, and restaurant categories, although the opening of Home Depot in 2004 has led to a sharp increase in sales in the building materials store category. Sales data from 2004 also indicate a sharp drop in general merchandise store sales following the opening of Gilroy's Costco early in 2004 and the Target and Kohl's in Gilroy Crossing prior to the holiday shopping season that year. Gilroy has shown a steady increase in all of these categories, with the exception of food stores, where sales levels are more closely tied to the local population and its growth.

The Target Trade Area can support additional retail in most relevant retail categories for a large retail center, with potential capture of approximately $88 million in sales leakages and an additional $34 million in growth through 2010, supporting 378,000 square feet of new retail space. However, the additional sales in some categories, including building materials stores, bookstores, and home appliance stores, is not enough to support large-format national chain retail stores. One exception to this is office supply stores. The limitations of local demand in combination with the large size requirements for national retailers further exacerbates Morgan Hill's weakness in competing with Gilroy, which has a larger and more quickly growing population base, and can more easily capture additional sales from San Benito County to the south.

The developers have stated that they seek to position this center as a "lifestyle center," providing a shopping experience unique to Morgan Hill with a combination of entertainment, dining, and upscale tenants. With the presence of two big-box anchors, the entire center could be classified as "hybrid center" with lifestyle components combined with stores found in more conventional shopping centers. Such a center might draw from beyond the Target Trade Area, but would have to draw from a very broad area to match the population base of two major existing lifestyle centers in the Bay Area, Santana Row and Bay Street. Since the other tenants in the Proposed Center have not been designated, this economic impact analysis assumes a more generic tenant mix, with many of the tenants of unspecified categories. With the exception of the movie theater complex, the analysis assumes that demand will come from the Target Trade Area for potential tenants other than the movie theater complex, since at this time it cannot be assumed with certainty that the other tenants will have a broader regional draw. If the Proposed Project succeeds in signing tenants fitting the upscale lifestyle center profile, they may attract significant numbers of shoppers from a larger area, lessening some of the impacts discussed here.

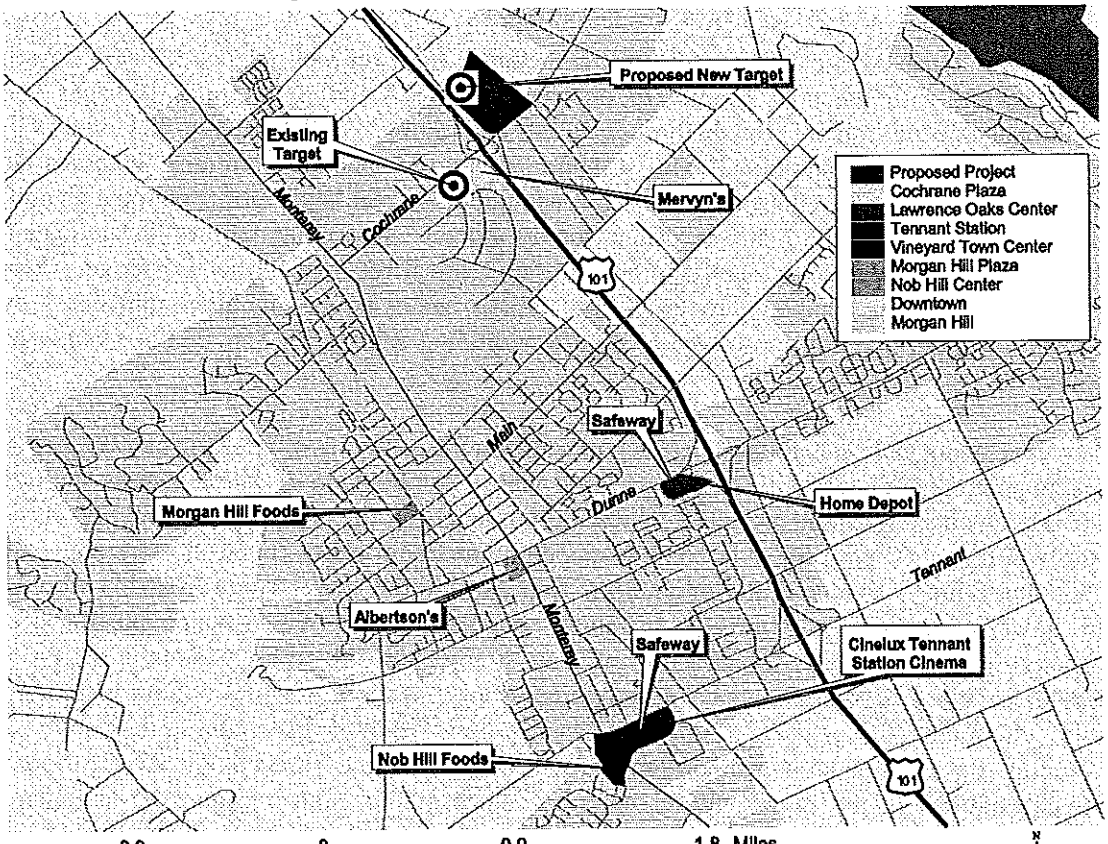
Impacts on Competing Retail Nodes

This chapter compiles an inventory of competing retail nodes, and using the information on general sales volumes by store type and the supportable square footage analysis, estimates the impacts of the Proposed Project on sales of existing retailers in Morgan Hill. The analysis covers the major uses considered for the Proposed Project as well as considering other types retail that might locate in the Proposed Project.

Inventory of Competitive Outlets

Currently, the only tenant designated by name in the Proposed Project is Target. Other potential uses that can be discerned from the site plan include a large home improvement store, a movie theater complex, and restaurants. Additionally, the site plan shows a grocery store and a fuel station as alternative uses. BAE has identified and inventoried major competitors for the Proposed Project in the general merchandise, supermarket, home improvement center, and movie theater categories. Restaurants and gas stations have not been inventoried. Figure 11 shows the competing retail nodes and primary competitive outlets in Morgan Hill.

Figure 11: Key Retail Outlets and Competing Nodes



Major General Merchandise Outlets. There are two existing major general merchandise stores in Morgan Hill, the existing Target and Mervyn's. The Target is 80,441 square feet, and is slated for closure if the Proposed Project is built. The Mervyn's is 77,161 square feet. Mervyn's is more of a traditional department store, with a focus on apparel and housewares.

Beyond Morgan Hill, Gilroy has its own recently opened 123,709 square-foot Target in the Gilroy Crossing center. This store offers a wider range of products than the smaller Morgan Hill store, with additional frozen and dry foods grocery items and a pharmacy. Also in the Gilroy Crossing center is Kohl's, a store similar to Mervyn's in focus. Currently under construction in Gilroy is a 220,000 square-foot Wal-Mart Supercenter, slated to replace the existing Wal-Mart. Gilroy has a Costco warehouse club store of 148,663 square feet. Additional detail on the Morgan Hill and Gilroy stores can be found in Appendix J.

In San Jose, there are several Target stores, with the two closest to Morgan Hill at 3155 Silver Creek Road east of U.S. 101 off the Capitol Expressway, and the Oakridge store at 879 Blossom Hill Road. Wal-Mart has a store at 5502 Monterey Road approximately 12 miles from the Proposed Project Site. There is also a Target in Watsonville.

Major Supermarkets. Morgan Hill has four major full-service supermarkets. These include the 60,000 square-foot Safeway in Lawrence Oaks on East Dunne Avenue, the 53,985 square-foot Safeway in Tennant Station, the 32,440 square-foot Nob Hill Foods in the Vineyard Town Center, and the 23,200 square-foot Albertson's in Morgan Hill Plaza. The Albertson's and Safeway stores seem to cater to a broad mix of customers, while the Nob Hill Foods has a more upscale orientation. Safeway, as a corporate strategy, is also trying to develop a more upscale image as it seeks to reposition itself in the face of Wal-Mart competition on the lower end of the market. The Albertson's store is somewhat dated and small, and city staff indicates that in the past Albertson's has considered moving to a larger space, but they have stated to city staff that they are not currently planning to move or close.

These stores were all moderately busy at the time of BAE's site visit. Also of note is the 19,500 square-foot Morgan Hill Foods at 225 W Main. This store is oriented toward Latino shoppers, and currently is underutilizing their space, with a large area of the store not in use, and some kiosk space used by subtenants in the front of the store. Customer traffic was slow at the time of BAE's site visit. Detail on these stores can be found in Appendix K.

Gilroy has its own full-service supermarkets including Safeway and Nob Hill Foods, likely precluding much food shopping by its residents in Morgan Hill. Additionally, Gilroy has the Costco competing for pantry loading shoppers and the Wal-Mart Supercenter which will be opening later this year will offer significant competition to supermarkets in Gilroy and Morgan Hill.

Home Improvement Centers. Morgan Hill has its recently opened Home Depot, which took over a 104,000 square-foot space previously occupied by Kmart in the Lawrence Oaks center. Additionally, Johnson Lumber, while oriented toward contractors, also offers building materials and hardware items to the general public. Gilroy has its own Home Depot, along with a Lowe's.

In South San Jose, there are Home Depot stores on West Capitol Expressway near Highway 87, and at 920 Blossom Hill Road. Additionally, Lowe's is pursuing plans to build a store at the former IBM property on Cottle Road in the Edenvale area. If completed, this store will be San Jose's major home improvement store closest to Morgan Hill.

Movie Theaters. There is one operating movie theater complex in Morgan Hill, the Tennant Station Stadium Cinema. This multiplex complex currently has eight screens, and has plans for adding three additional screens. Morgan Hill also has the Granada Theatre (with two screens) in downtown, which is currently closed. BAE located six additional operating screens in the Cinema Trade Area, at the Platinum Theaters complex in Gilroy, for a total of 14 operating screens in the Cinema Trade Area. Moving beyond the Cinema Trade Area, there are two indoor movie theater complexes in San Jose within five miles of the northern end of the Cinema Trade Area: the Century Capital 16 at 3690 Hillcap Avenue, with 16 screens, and the Almaden Cinema at 2306 Almaden Road, with five screens. Overall, an inventory of screens in San Jose indicates over 75 screens scattered throughout the city. There are also five screens at the Premiere Cinemas in Hollister.

Restaurants. BAE did not attempt to identify every restaurant in Morgan Hill, but the city has a broad range of major chain restaurants as well as independent restaurants. Chain restaurants include major fast-food franchises and sit-down restaurants. As discussed above, the restaurant sector has seen a slight decline in sales in Morgan Hill in the last few years.

Impacts of Proposed Projects on Existing Retail Nodes and Outlets

Overview. This section assesses the impacts on sales at existing retail outlets in Morgan Hill. Impacts assessed include those on general merchandise stores, supermarkets, home improvement centers, restaurants, and movie theaters. Next, this section assesses how this proposed project might affect the other major retail nodes retailers in Morgan Hill, including the downtown area. Finally, the chapter considers cumulative impacts relating to other planned and proposed retail development in Morgan Hill and surrounding communities. Potential resulting physical impacts are discussed subsequently in the Urban Decay Analysis chapter.

Approach. The analysis that follows begins by assuming that this will be a fully functioning center, with outlets performing at industry norms for sales. However, this leads to the conclusion that the center will capture virtually all the sales in the categories of building materials stores and movie theaters. Table 14 below shows total potential impact as though all retail in the center were performing at industry norms, but for the retail types where assuming industry-average sales would lead to more capture than is realistic, the discussion in the text indicates the more likely short-term outcome of the new outlet and the existing outlets performing below par. The capture assuming the new outlet is performing at industry standards is particularly problematic for building materials stores and movie theaters.

Estimated Impacts of Proposed Project on Existing General Merchandise Outlets. The primary impact of the Proposed Project in this sector is the closure of the existing Target store. The analysis above indicates that there is demand to support an additional 52,000 square feet of general merchandise store space. The new Target represents an expansion of 43,359 square feet, and thus will capture most of the additional capturable demand. As a result, and since Target

owns the existing store property, this space is very unlikely to be re-tenanted as another competing general merchandise space. In addition, the presence of the new Target and Wal-Mart Supercenter in Gilroy, as well as the presence of these two chains in south San Jose, limits the ability of any general merchandise store in Morgan Hill to survive by capturing from a larger trade area.

Estimated Impacts on Existing Supermarkets. Rather than relying on leakage analysis alone in analyzing supermarket sales trends, this study assesses the actual performance of the stores by estimating sales per square feet, comparing that to industry benchmarks, and looking at likely outcomes if additional retail space is added to the Trade Area. Total estimated sales are divided by square footage to provide estimates of average store performance based on sales per square foot under existing conditions and following the opening of a new supermarket at the Proposed Project. These measures of sales per square foot can then be used to evaluate store performance relative to industry benchmarks. The analysis in this section considers aggregate store performance; individual store performance may vary, with some stores doing considerably better than the community average, and some doing worse. Furthermore, industry benchmarks are not an indicator of the level of profitability of individual stores; some stores might be profitable at a lower sales level, while others may require greater market support. Retail operators have varying standards regarding satisfactory store performance and profit margins. Also to be taken into consideration is the ability of shoppers to switch store types in search of certain types of goods. For example, paper products can be purchased at a general merchandise stores such as Target as well as at supermarkets, or food sales can occur at a supermarket, a convenience store, or at a general merchandise store or drug store stocking the desired food items. One key assumption is that the Proposed Project's food store sales will primarily impact the major supermarkets, their most direct competitors. To the extent that sales would be captured from other types of stores, this estimate may therefore overstate the impacts on the supermarkets.

It should also be noted that the Trade Area growth in population will be gradual, while growth in retail space such as supermarkets or discount stores is "lumpy," with any new major store opening typically adding a large amount of square footage to the Trade Area. As a result, any new addition of retail space will have a negative short-term impact on sales at existing stores, with the impact decreasing over time as population growth continues (assuming no more new stores are opened). The analysis has been performed for two future points in time: 2007, the estimated opening date for the Proposed Project; and 2010, assumed to represent buildout of the proposed project.

Based on taxable sales data, Economic Census data, and on sales data from proprietary sources, BAE estimates 2004 supermarket sales in the four major outlets described above at approximately $75 million (see Table 12). Given an estimated Trade Area population of 48,804 in 2004, supermarket sales per capita are estimated at $1,537.

Store sales are estimated at an average of $442 annually per square foot for these existing supermarkets. This overall average is somewhat above a median industry benchmark derived from Urban Land Institute's *Dollars & Cents of Shopping Centers: 2004*. ULI's extensive national surveys show median annual supermarket sales per square foot of $390 for all

supermarkets in U.S. community shopping centers, with national chains performing slightly better with a median of $398, and local chains below the overall median at $358 per square foot.

Table 12: Estimated Sales at Existing Supermarkets in Target Trade Area

	2005
Trade Area Population (a)	48,804
Estimated Supermarket Sales (b) (c)	$75,000,000
Per Capita Supermarket Sales	$1,537
Existing Supermarket Square Feet	169,625
Average Annual Sales per Square Foot	$442
ULI Median, All Supermarkets (d)	$390

(a) Trade area is constructed from 2000 Census Block Groups, as listed in Appendix A. Population estimates for 2000 and 2005 derived from ABAG projections as shown in Table 2. 2004 population is estimated by pro-rating population growth from 2000 through 2005 using the annual compound average growth rate.
(b) Based on estimates by BAE based on confidential sources, self-reporting, published taxable sales data, Census of Retail Trade, site visits and industry benchmarks. Rounded to nearest hundred thousand.
(c) All estimates throughout table in 2004 dollars.
(d) Urban Land Institute's Dollars & Cents of Shopping Centers: 2004. Median for all supermarkets in community shopping centers nationwide. ULI's extensive national surveys show median annual supermarket sales per square foot of $390 for all supermarkets in U.S. community shopping centers, with national chains performing slightly better with a median of $398, and local chains below the overall median at $358 per square foot.

Sources: U.S. Census Bureau; U.S. Bureau of Labor Statistics; CA State Department of Finance; CA State Board of Equalization; ABAG; Urban Land Institute; BizStats.com; Bay Area Economics, 2005.

Table 13 provides specific analysis of food store impacts as focused on supermarkets. In addition to the current sales, the leakage analysis (see Table 9 above) estimates that there are an additional $5.2 million potentially capturable from leakage, indicating a total current sales potential of $1,643 annually in supermarket sales. This per capita sales number is used to assess potential future sales in the Target Trade Area on the assumption that the leakage as noted can be captured by a new store and the existing supermarkets. As currently proposed, the Proposed Project includes an alternative land use consisting of a 50,000 square-foot supermarket. If the store opens in 2007, average annual sales per square foot at the Target Trade Area's existing supermarkets that year would decline by 14 percent from 2004 levels of $442 per square foot, to an estimated $379. With projected population growth, sales at the existing outlets would recover to $400 per square foot in 2010, above the ULI benchmark of $390. The available store-by-store sales data were derived from confidential and in some cases proprietary sources, thus limiting the discussion of specific stores, but the major chain supermarkets are all performing at a level of sales where this loss of sales can likely be absorbed. The remaining smaller supermarket, Morgan Hill Foods, caters primarily to a Latino niche market and is less likely to be directly affected by a supermarket located at the Proposed Project. More precise impacts cannot be assessed without knowing the actual tenant or market niche of a grocery store at the proposed project. An upscale market such as Trader Joe's or Whole Foods, which would be the best fit for a grocery store in a lifestyle center, would compete most directly with Nob Hill Foods, but a mid-

market conventional chain store might have more of an impact on the Safeway and Albertson's stores.

Table 13: Impacts of Proposed Project on Sales at Existing Supermarkets in Trade Area

	2004	2007	2010
Trade Area Population (a)	48,804	50,987	53,486
Current Sales per Capita (b)	$1,537		
Current Supermarket Sales	$75,000,000		
Capture from Leakage (c)	$5,200,000		
Supermarket Sales Potential (a) (b)	$80,200,000	$83,800,000	$87,900,000
Potential Sales per Capita	$1,643	$1,643	$1,643
Existing Supermarket Square Feet	169,625	169,625	169,625
Additional Grocery Store in Project (d)		50,000	50,000
Sales per Square Foot in New Supermarket (e)		$390	$400
Estimated Supermarket Sales in New Store (b)		$19,500,000	$20,000,000
Sales in Existing Outlets (b)	$75,000,000	$64,300,000	$67,900,000
Average Annual Sales per Square Foot at Existing Stores	**$442**	**$379**	**$400**
Percent Change from 2005		**-14%**	**-9%**
Capture of Morgan Hill Supermarket Sales by Gilroy Wal-Mart Supercenter		$5,625,000	$5,625,000
Sales in Existing Outlets		$58,675,000	$62,275,000
Average Annual Sales per Square Foot at Existing Stores		**$346**	**$367**
Percent Change from 2005		**-22%**	**-17%**

(a) From Table 12.
(b) All estimates throughout table in 2004 dollars. All total sales estimates rounded to nearest hundred thousand.
(c) From Table 9.
(d) From site plan.
(e) Sales per square foot based on average sales per square foot per ULI, or estimated average sales per square foot in combined new store and existing stores, whichever is higher.
(f) Assumes 25 percent of Wal-Mart grocery sales are captured from Morgan Hill. Assumes 50,000 square feet of space attributable to grocery items. Assumes sales of $450 per square foot at Supercenter.

Sources: U.S. Census Bureau; U.S. Bureau of Labor Statistics; CA State Department of Finance; CA State Board of Equalization; ABAG; Urban Land Institute; BizStats.com; Bay Area Economics, 2005.

More generally, Table 14 below shows the impacts on the overall food store sector. At buildout in 2010, a 50,000 square-foot grocery store in the Proposed Project would capture only eight percent of existing sales in the overall food store sector (nine percent when all impacts are assumed to fall on supermarkets, as discussed above).

Table 14: Estimated Sales at Buildout and Capture from Existing Retailers, 2010

	Current Sales (a)	Additional Capture from Leakage Sales	Additional Capture Population Growth	Total Potential Sales (b)
General Merchandise	$51,294,000	$6,975,000	$6,731,000	$65,000,000
Building Materials	$28,266,000	$11,510,000	$3,745,000	$43,521,000
Food Store	$82,673,000	$5,772,000	$8,010,000	$96,455,000
Fast Food	$20,792,000	$950,000	$950,000	$22,692,000
Sitdown Restaurant	$21,310,000	$13,756,000	$3,369,000	$38,435,000
Unclassified	$42,641,000	$49,101,000	$11,326,000	$103,068,000
Service Station	$59,771,000	$0	$0	$59,771,000
Total	**$306,746,000**	**$88,064,000**	**$34,131,000**	**$428,941,000**

Type of Store	Square Footage	Sales per SF	Estimated Sales in Proposed Project	Potential Center Sales from Current (c)	Proposed Center % Potential Capture of Current (d)
General Merchandise	123,800	$250	$30,950,000	$17,244,000	34%
Building Materials	140,000	$295	$41,300,000	$26,045,000	92%
Food Store	50,000	$400	$20,000,000	$6,218,000	8%
Fast Food	23,000	$475	$10,925,000	$9,025,000	43%
Sitdown Restaurant	7,500	$525	$3,937,500		0%
Unclassified	233,350	$313	$72,979,000	$12,552,000	29%
Service Station	n/a	n/a	$419,000	$419,000	1%
Total	**577,650**		**$180,510,500**	**$71,503,000**	**23%**

(a) From 2004. Rounded to nearest thousand. May not sum to total due to independent rounding.
(b) Total potential sales in Morgan Hill equals current sales plus additional capture from leakage plus additional capture from population growth.
(c) Potential capture from current sales equals estimated sales in project less sales captured from leakage and increased sales from population growth. Assumes that the Proposed Project performs at typical industry sales levels.
(d) This potential capture is based on the assumption that the Proposed Project will perform at industry norms for each retail store type. An alternative outcome might be that existing outlets and the outlets in the new center would both perform below par. For example, in the building materials store sector, the capture indicates oversaturation of the market, and both the new home improvement store and the existing competitors (primarily Home Depot) would likely have sales well below their typical corporate averages.

Sources: DiNapoli Browman Guglielmo Development; City of Morgan Hill; Urban Land Institute; U.S. Dept. of Labor, Bureau of Labor Statistics; CA State Board of Equalization; CA Dept. of Finance; HdL Corporation; Bay Area Economics.

In summary, it is highly unlikely that any existing supermarkets would face potential closure due to loss of business resulting from the opening of a new supermarket at the proposed project.

Estimated Impacts in Building Materials Sector. The recently opened Home Depot has added significantly to sales in the building materials store category in Morgan Hill, based on sales data provided by the city to BAE. It has absorbed much of any previous sales leakage for this category in Morgan Hill, through recapture of sales in Gilroy, which has a Home Depot, a Lowe's, and an Orchard Supply Hardware. The remaining leakage is primarily in subcategories other than home improvement centers, but a large home improvement center could capture some of this leakage through local consumers shifting their shopping to the outlets available in Morgan Hill. Overall, there is currently support for an additional 45,000 square feet in this category, growing to 56,000 square feet by 2010 (see Table 11 above). This is still significantly below the 140,000 square-foot size of a possible home improvement center in the Proposed Project, so it is likely that sales will be cannibalized from existing outlets, in particular the recently opened Home Depot. If a home improvement center at the Proposed Project were to perform at the average nationwide sales level for a Lowe's store[17] as shown in Table 14, the store would capture over 90 percent of the sales of existing outlets in the building materials sector, with most of the capture likely to come from the most similar competitor, Home Depot. Rather than capturing most of that store's sales, though, both stores would probably end up performing well below company per square foot averages. Whether two such stores can compete in Morgan Hill and meet long-term goals for market share and profitability depends largely on the cost structure and goals of the Lowe's and Home Depot companies, which are now building stores to compete for market share, with consolidation and closure of unprofitable stores perhaps to follow later.[18] However, there is high likelihood that the existing Home Depot would ultimately close due to competitive disadvantages relative to the newer and larger home improvement store proposed for the project.

Estimated Impacts for Restaurants. Morgan Hill shows support for an estimated additional 38,000 square feet of restaurant space by 2010 (see Table 11 above). This is of the same order of magnitude as the estimated 30,500 square feet of restaurant space in the Proposed Project, indicating that there is market support for this use. However much of this space demand is for sit-down restaurants, and the configuration and size of the restaurant pads in the site plan is primarily for fast food outlets. As a result, there may be impacts on the existing fast food outlets in Morgan Hill. This impact may be focused on outlets such as McDonald's or Panda Express in Cochrane Plaza, where the existing Target is slated for closure if the Proposed Project is built, or on the Lawrence Oaks center, where sales at Home Depot are likely to decrease significantly. However, the sales impact of new fast-food restaurants is likely to be spread over a number existing fast-food outlets, with the percentage of lost business at any given restaurant being relatively small. As such, it is not anticipated that any existing restaurants will face closure as a result of lost business due to the opening of new restaurants at the proposed project.

Estimated Impacts for Movie Theaters. As discussed above, there is one operating movie theater complex at Tennant Station in Morgan Hill with eight screens and plans for three

[17] According to the information provided to BAE, no particular retailer has committed to the spaced planned for a home improvement center; Lowe's is being used here for illustrative purposes only; there are few other Home Depot competitors building large home improvement centers.

[18] While few Home Depot or Lowe's stores have closed in recent years, Home Depot recently announced the closing of 15 of their EXPO Design centers nationwide, and reconfiguration of five more as conventional Home Depots.

additional screens. Morgan Hill also has the Granada Theatre downtown, which is configured as two screens but is currently closed. BAE located six additional operating screens in the Cinema Trade Area in Gilroy.

National data for movie theaters indicates that as of 2002, there were 35,170 screens in the U.S.,[19] or roughly one per 8,200 persons. Based on this benchmark, the estimated 2005 Cinema Trade Area population of 105,288 can support 13 screens currently, and with growth through 2010 could support one additional screen. Since there are currently 14 screens, this indicates that the market is currently in equilibrium. The demand from the Cinema Trade Area is insufficient to support a doubling in the number of screens. Lessening this impact somewhat would be capture of some movie-goers from South San Jose who might be attracted by a new theater complex in a complex with several restaurants and other shopping, but these consumers already have available to them multiple nearby movie complexes in San Jose itself.

The theater complex most likely to bear the brunt of impacts is the existing movie theater complex at Tennant Station; its proximity will make it the most direct competitor. Gilroy movie-goers might come to a new complex at the Proposed Project, but the convenience of the local complex in Gilroy will still likely draw most of its local movie audience. The Granada Theatre, if it is re-opened, will likely seek a market niche such as foreign and art films where it will not compete directly with either the existing theater complex or the proposed one.

According to the operators of the Tennant Station multiplex and other sources, first-run movies are allocated randomly to the up-to-date complexes in an area, and the existing Tennant Station complex with its stadium seating and a megaplex at the Proposed Project would both qualify. The larger complexes often fill their rooms by offering multiple screenings of major new releases. There are, however, limitations on the number of available movies capable of selling well, as indicated by the plateau in the number of screens nationwide in recent years as older screens were phased out in the face of competition from large new multiplexes and megaplexes. Since the existing multiplex will continue to offer first-run movies in competition with the new complex, neither complex will be able to dominate the local market. However, there are likely to be too many screens and seats for the available offerings, and the excess capacity may make either or both complexes unprofitable. Which complex would close would depend on a number of factors; the newer complex may offer a higher-amenity viewing experience to its viewers, will have more screens offering more options, and has a superior region-serving location, but may also face higher costs of operations as a new complex in a new building. Ultimately, the chain with deeper pockets and the willingness to hold out in the hopes of gaining more market share later may be the one that outlasts the competition. However, there is a strong potential that the existing cinemas at Tennant Station would ultimately close due to competitive disadvantages relative to the proposed cinemas at the project.

Impacts on Other Retail Sectors and Overall Impact in Morgan Hill. Table 14 above presents an overview of potential impacts in Morgan Hill if the Proposed Project is built and its outlets perform at industry standards. Assuming these standards and excluding the movie theater

[19] *The Motion Picture & Theatre Industry Overview*, Cushman & Wakefield Valuation Services Retail Industry Group, December, 2004.

complex, this project would generate an estimated $181 million in retail sales at buildout. Current sales in Morgan Hill in these categories total approximately $307 million; $88 million in additional sales could be captured from leakage, and population growth to 2010 would generate $34 million in additional sales. Summing up, total potential sales in Morgan Hill are slightly below $429 million annually in 2010. At stabilized levels assuming industry-standard performance, the Proposed Project would capture an estimated $72 million in sales from existing outlets in Morgan Hill, assuming it accounts for all supportable square footage capturing growth in retail sales and all supportable square footage from leakage, except in the sit-down restaurant category, where the combination of leakage and additional potential sales is greater than the estimated sales generated in the Proposed Project. The impacts in the known potential store categories of general merchandise, building materials, food stores, restaurants, and movie theaters are discussed above. Among the remaining stores in other categories likely to provide tenants for the Proposed Project,[20] sales at buildout are estimated at approximately $73 million. After factoring out capture of leakage and sales from growth, the stores would take an estimated $13 million in sales from existing outlets, representing a loss of 29 percent of existing store sales. Since the specific store types which will fill out the project are unknown, the impacts on particular retail nodes cannot be ascertained, but this is a large share of existing retail in Morgan Hill. As with building materials stores and movie theaters, another possible outcome in such an oversaturated market would be lower sales performance in the Proposed Project in combination with a smaller loss from existing outlets. Given the absence of information on the full range of proposed store types at the project, and considering also the uncertainty of market dynamics in an oversaturated market, it is not possible to identify any additional retail stores which may face closure due to the project, and any effort to do so would be speculative.

The impacts on these sectors and overall will be lessened to some degree if the center is successfully positioned as a lifestyle center and serves a broader market area. However, market areas for the two largest users of the proposed project (general merchandise and home improvement) face significant competition outside Morgan Hill from existing and planned general merchandise stores and home improvement warehouses in Gilroy and San Jose. Movie theaters might draw from a larger area due to their convenient highway location and large number of offering available due to the number of screens. However, even in the case of movie theaters, the Proposed Project adds more screens than are supportable, doubling the number of screens in the Cinema Trade Area.

Impacts by Retail Node in Morgan Hill. The most obvious local impact will be at Cochrane Plaza, where the Target anchor will be relocating to the project and vacating the center. As indicated by the decline in general merchandise store sales in Morgan Hill since 2002, this center and its two anchors have already experienced impacts from the opening of Gilroy Crossing with its Target and Kohl's. The loss of Target is likely to lead to reduced traffic at the other stores in the center, many of which are complementary to the Target, offering similar apparel and household items. Some of these tenants, especially Big 5 Sporting Goods, Ross Dress for Less, or Payless Shoe Source may choose to move to the new center to remain close to the Target and the customer traffic it generates, or they might simply close in the face of new competition if

[20] These store categories include apparel, specialty retail, household and home furnishings, and household appliances.

similar tenants locate in the Proposed Project. The restaurants such as McDonald's in Cochrane Plaza will also face new nearby competition from restaurants at the Proposed Project, which is likely to capture some of their share of pass-by highway traffic looking for convenient dining or takeout even as it captures new pass-by traffic and regional business generated by a movie theater complex. Additionally, the other major anchor in this center, Mervyn's, is part of a chain previously owned by Target, but spun off in to an investment consortium of Sun Capital Partners, Cerberus Capital, and Lubert-Adler/Klaff. One of the key assets considered was Mervyn's real estate holdings rather than its operations, which have been negatively affected by competition from both higher-end and lower-end stores. While no major consolidations or closures have taken place to date, the potential exists that the chain will be dismantled for the value of its real estate holdings. In summary, the proposed project would directly result in the closure of the existing Target due to its relocation to the project, and could indirectly contribute to the ultimate closures of the existing Mervyns as well as several ancillary retailers in the household goods and apparel sectors. [21]

The Lawrence Oaks Center could be significantly impacted if the Proposed Project includes a large home improvement store as planned. As discussed above, the local trade area is not capable of supporting two large home improvement stores performing at industry average sales levels. Neither Home Depot nor its primary competitor, Lowe's, are currently consolidating their competing operations, but are still in expansion mode seeking greater market share, at the expense of their own stores nearby and each other's stores. However, this center's two anchors, Safeway and Home Depot, are not particularly complementary and thus the loss of either is not likely to significantly affect the other. In fact, the Safeway and an adjacent Longs Drugs continued to operate successfully after the Kmart previously occupying the Home Depot space closed. Furthermore, since this center is not as focused on a particular retail store type as Cochrane Plaza is on apparel and household items, re-tenanting may not prove as difficult, with one possibility being an office supply store, a category for which Morgan Hill shows significant additional capturable sales. As discussed, above, the Safeway store in this center is not likely to close even if a new grocery store opens in the Proposed Project. In summary, although the project is highly likely to result in the ultimate closure of the existing Home Depot, the remaining stores in the center should be minimally affected since they do not depend on the Home Depot to attract pass-by customers. The possible exceptions to this are restaurants in the Center (e.g., Burger King), and nearby (e.g., Lyons) which would likely experience some lost revenue, but not enough to result in closure.

Tennant Station could ultimately see the loss of the Cinelux movie theater complex if the new multiplex opens as proposed, since the Cinema Trade Area's population base does not support demand additional screens. However, this theater complex was recently upgraded from six to eight screens, with additional improvements such as stadium seating and an improved lobby, so

[21] Target has indicated via correspondence with the developers of the Proposed Project that the current store "is no longer adequate for our merchandising needs," and that the existing store cannot be "economically expanded," nor is adequate parking available. As a result, Target states that if they cannot relocate in Morgan Hill, that "it is very likely that Target will choose to close this existing store and no longer have a presence in Morgan Hill." (Letter of June 20, 2005, from Brian D. Treber, Regional Real Estate Manager for the Target Corporation, to Darryl Browman of the Browman Development Company).

the operators have shown a strong commitment to the space. They have also reported plans to expand by three screens. The entire center is still in the midst of a makeover that began with the construction of the new Safeway and other changes, and just recently found a new operator for the bowling alley[22] and some other spaces as the property owners try to bring in tenants willing to pay higher rents, especially national chains. The major anchors, Safeway and Rosso's Furniture, however, report strong sales, and the loss of a movie theater would not likely impact their sales significantly; nor are these two anchors at risk from the Proposed Project. There are limited restaurants in the center, and any downturn in sales from loss of the theater complex may be countered by the re-opening of the bowling alley, and in any case, the losses would likely be minimal. In summary, while there is a strong potential that the project would result in the ultimate closure of the existing cinemas, the remaining businesses would be minimally affected because they do not depend on the cinemas for pass-by business.

The Vineyard Town Center is co-anchored by Nob Hill Foods and T.J. Maxx. While an upscale market or specialty food store such as Trader Joe's or Whole Foods at the Proposed Project might affect sales at Nob Hill Foods, this supermarket is achieving current sales levels that make it unlikely to close, especially given the ability of the Target Trade Area to support additional grocery store space. A specialty food store would also be more likely to capture sales from outside Morgan Hill, particularly due to the lack of a similar outlet in Gilroy. Any restaurants in the center might see a downturn in sales, but not enough to cause closure. Other stores at the center may be somewhat affected depending on the ultimate tenant mix proposed for the project. In summary, it is not anticipated that any of the businesses at the center would lose significant sales or face closure as a result of the proposed project.

Morgan Hill Plaza is home to Albertson's, one of the major supermarkets potentially impacted by a possible grocery store in the Proposed Project. While some of those involved in the local real estate market who were interviewed for this study indicate that Albertson's could relocate to the Proposed Project, communications with City officials indicated that the company has no current plans to move or close and is not actively seeking to relocate. Sales levels at this store are sufficient that it is likely to survive any additional competition at the Proposed Project. Morgan Hill Plaza is an older center, and the anchor supermarket space is smaller than newer supermarket spaces such as the two Safeways in Morgan Hill. Additionally, a drug store space has been re-tenanted as a Dollar Tree; overall the center has smaller local businesses as the remaining tenants, and reportedly has a 10 percent vacancy. However, the major anchor spaces are both occupied, and the center appears to be well-maintained. As a more downscale local-serving center, it is not likely to lose much market share to the Proposed Project. In summary, it is unlikely that the project would result in any store closures at this plaza.

Nob Hill Center (named after the local landmark, as is Nob Hill Foods, which is not in this center) is home to Morgan Hill Foods, which is a small supermarket catering to the local Latino population. While this store appeared to be less busy than other supermarkets, its position serving an ethnic niche market makes it less vulnerable to impacts. The other tenants in the center include a church and small local-serving businesses, none of them likely to be impacted by

[22] According to the *Morgan Hill Times*, a new operator has been found and the bowling alley should reopen later this year. See "Bowling Alley to Reopen," *Morgan Hill Times*, June 21, 2005

the Proposed Project. While this older center is low-end in terms of its tenants, it appears to be well-maintained, having undergone a major renovation in 2004. In summary, it is unlikely that the proposed project would result in any store closures at this center

With respect to downtown, the Proposed Project presents potential restaurant competition, but the restaurants downtown tend to be smaller locally-based restaurants that are already coexisting with the kinds of large chain restaurants likely to locate in the Proposed Project. According to the City, any plans to reopen the Granada Theatre for movies will position it as an art house, repertory theater, or venue for foreign and other non-mainstream films, so it will be in a different market niche and unlikely to be affected by a movie theater complex at the Proposed Project. Given the limited tenant information available at this time for the Proposed Project, any additional discussion of impacts on downtown businesses would be speculative. As with most downtowns, Downtown Morgan Hill has already changed its market niche as other shopping centers have developed in Morgan Hill, offering an option for a different kind of shopping/dining/entertainment experience, along with lower rents allowing small local start-up businesses.

Cumulative Impacts. Per CEQA requirements, the impacts of the Proposed Project must also be assessed in the context of other likely retail developments in the market area or affecting the market area.

In Morgan Hill, there are several sites designated for future retail development, but the only one besides the Proposed Project in the development process at this time is a site to the west of 101 on Cochrane Road at Madrone Parkway, across from Cochrane Plaza. This development involves the rezoning of an eight-acre parcel for a neighborhood commercial center totaling 72,000 square feet. Current plans call for a number of smaller pads and one 50,000 square-foot store. No tenants are committed to this project at this time. As a neighborhood center, the uses are not likely to compete directly with the planned region-serving uses at the Proposed Project. A proposed expansion of consequence in Morgan Hill is Cinelux's plans to add three more screens to their existing eight at Tennant Station. This would lead to even more oversaturation of movie screens in Morgan Hill and the Cinema Trade Area, but how this would impact the viability of the existing multiplex and Tennant Station are unclear. It could make it more competitive and lead to lower movie attendance in the Proposed Project, but also might further erode the profitability of Cinelux's multiplex as it operates more screens but fails to gain enough additional patrons due to the competition from the Proposed Project.

In Gilroy, the most significant additional development is the opening of the 220,000 square-foot Wal-Mart Supercenter, which will expand the existing Gilroy Wal-Mart to include grocery offerings equivalent to a large supermarket. This capture would be spread among all the supermarkets affected, with stores in Gilroy bearing the brunt of the impact due to their proximity. Table 13 above includes an estimate of potential cumulative impacts on Morgan Hill's supermarkets from the Wal-Mart Supercenter and the Proposed Project. As indicated, additional capture of Morgan Hill supermarket sales is estimated at $5.625 million, and average sales per square foot would decline to $346 in 2007, with a recovery to $367. This average figure is within industry norms, and the additional loss should not lead to closures, as each of the major supermarkets is performing at levels capable of sustaining this level of additional sales loss. With

respect to general merchandise, those Morgan Hill shoppers who seek the Wal-Mart shopping experience rather than Target are likely shopping there already, so the number of additional shoppers attracted by the relatively small expansion of space for those items is probably negligible.

The vacancy created by Wal-Mart's closure of their existing store is another significant retail event related to the opening of the Supercenter. As an older existing space designed for a certain user, it is unlikely to attract the kinds of prime tenants seeking new space in a center such as the Proposed Project.

BAE research found one other proposed project in Gilroy with a potential region-serving focus, Gilroy Commons, a 117,000 square foot center on slightly over 10 acres adjacent to Gilroy Crossing. According to Gilroy planning staff, one major store in this space will be occupied by an electronics store such as Circuit City, and another potential tenant was a store such as Marshall's or TJ Maxx. The analysis in this report uses the Target Trade Area for these store types, and thus already excludes Gilroy, and assumes that the Proposed Project will not capture from the Gilroy area. If the Proposed Project has competitors to the stores in this center, it is assumed already only to capture leakage out of Morgan Hill, and the presence of this new center will not present any new cumulative impacts in combination with the Proposed Project. This finding is reinforced by the fact that the center is configured as an in-line center rather than with the more pedestrian-oriented lifestyle center design of the Proposed Project.

In San Jose, the development currently in process that may result in cumulative impacts is the development at the IBM site of a Lowe's home improvement center in a 222,000 square foot center with other tenants not currently known. This development would make it much less likely that San Jose shoppers would frequent a similar store in Morgan Hill, since most of them would drive by this center to get to Morgan Hill. This development is currently working its way through the EIR process, albeit with some difficulty and controversy due to the potential loss of historic structures at the site. Moreover, the San Jose Lowe's project lies outside the Target Trade Area (used also for the potential home improvement center), and as such would result in little if any additional loss of business (at the Morgan Hill Home Depot), and therefore would not contribute to a cumulative project impact.

Urban Decay Analysis

Introduction

Following is analysis and findings regarding potential urban/suburban decay and physical deterioration resulting from the impacts of the Proposed Project. As stated in the Introduction to this report, recent California court decisions have made clear that for large retail developments CEQA requires, as part of the EIR process, that an economic impact analysis to assess the possibility of "urban decay" and deterioration and indirect physical impacts on the environment. To fully satisfy the requirements of an EIR, the economic analysis must start with the economic impacts, but also follow the causal chain to assess the likelihood of new retail space causing long-term vacancies in existing retail space and ultimately leading to urban decay and physical deterioration of existing retail centers and nodes. In the words of *Bakersfield Citizens for Local Control v. City of Bakersfield, Panama 99 Properties LLC, and Castle & Cooke Commercial-CA, Inc.,* the analysis is required to assess whether a new retail development "could cause a ripple of store closures and consequent long-term vacancies that would eventually result in general deterioration and decay within and outside the market area" of the proposed development. Further, "[t]hese effects include, but are not limited to, physical decay and deterioration resulting from store closures in the same market area or in established areas of the community (i.e., the 'traditional downtown area') due to competitive pressures, followed by an inability to easily re-lease the vacated premises." One concern is that large retailers that dominate sales in their merchandise lines "will displace older, smaller retail stores and shopping centers, leaving long-term vacancies that deteriorate and encourage graffiti and other unsightly conditions." The EIR "must analyze the cumulative impacts resulting from construction and operation of the proposed shopping center in conjunction with all other past, present or reasonably foreseeable retail projects that are or will be located within the proposed project's market area" and determine the likelihood that a project "individually and/or cumulatively, indirectly could trigger the downward spiral of retail closures and consequent long-term vacancies that ultimately result in decay."

Direct Economic Impacts

Based on the retail analysis in the previous chapter, the Proposed Project may have significant impacts at three retail centers in Morgan Hill.[23] Cochrane Plaza would see closure of the Target when it relocates, and possibly Mervyn's and other smaller retailers. Lawrence Oaks could face closure of the Home Depot store at some time in the future. Tennant Station could eventually lose its multiplex. Additional vacancies scattered throughout Morgan Hill could result from defections of tenants to the new center as they seek out the newest space available, and from closure of existing businesses competing with the new center. However, in the absence of a defined tenant mix for most of the project, any attempt to identify such potential vacancies would be speculative. The project impacts might be lessened to some degree to the extent the center develops with a lifestyle retail center concept and draws in higher-end tenants, since these tenants could draw from a larger trade area and would represent new retail types not as directly

[23] The analysis above considered full buildout of the Proposed Project with sales at the new center at industry standards as shown in Table 16. However, where there is insufficient demand to support both the new retail use and existing stores, the new center may not reach these levels of sales, but instead the demand might lead to sub-par performance at both the new and existing retail, at least in the short-term.

competitive with existing stores, and thus would not have to capture as much market share directly from those stores in order to succeed. However, there are currently no such tenants committed to the center, and as a result this analysis assumes a more generic tenant mix; these tenants are assumed primarily to serve the Morgan Hill and the Target Trade Area since competing retail outlets in Gilroy and San Jose would preclude capture of significant market share from those areas.

Retail Real Estate Market Conditions in Morgan Hill

Given the potential for retail vacancies as stated above, the next step is to assess the strength of the overall retail real estate market. In a strong market, long-term vacancies are less likely and the causal chain of events leading to urban decay is less likely. At the time of BAE's site visit, there were no large vacant retail properties, indicating that the market is currently in equilibrium. It is noted that the former Kmart store was successfully reused as a Home Depot. The Nob Hill Center with Morgan Hill Foods is somewhat antiquated, and the food store is underutilizing its space and other non-retail tenants including a church in some of its space, but the center has recently been renovated and is in physically good condition. None of the major retail nodes discussed above is experiencing the vacancy of a large anchor space or significant numbers of smaller spaces.

BAE contacted retail real estate brokers and other representatives of retail properties in Morgan Hill to better understand market conditions. These brokers (listed in Appendix L) indicated a great deal of concern over the loss of Target for Cochrane Plaza, and indicated other tenants in that center were struggling. The owner of Tennant Station believes an additional movie complex would eventually drive the multiplex in his center out of business. He also pointed out how the former Rite-Aid store in Morgan Hill Plaza was re-tenanted by a Dollar Tree, and indicated that this was the kind of tenant likely to backfill older vacant spaces in Morgan Hill. This indicates a potential lack of depth in prime tenants for re-tenanting existing centers should vacancies increase substantially. Overall, the picture was of a market with stable conditions currently, but facing significant impacts if the Proposed Project moves forward. Given the certainty that Target would move if the Proposed Project is built, the greatest concern was with the impacts on Cochrane Plaza.

Conclusions Regarding Urban Decay and Physical Deterioration

Overview. The following discussion considers the potential for urban decay and physical deterioration for each of the competing retail nodes discussed above, taking into account the impacts of the Proposed Project and possible cumulative impacts due to other retail development in Morgan Hill, South San Jose, and Gilroy. As indicated above, no large anchor retail spaces are currently vacant in Morgan Hill, and BAE's tour of the existing centers found no current evidence of urban decay or physical deterioration resulting from vacancy, deferred maintenance, or disinvestment. None of the existing centers could be seen as being at risk of urban decay if the Proposed Project is not built.

Cochrane Plaza. The proposed center will lead to the loss of one of the two large anchors at Cochrane Plaza. This center and its other large anchor, Mervyn's, face strong new competition from Gilroy Crossing and its new Target and Kohl's. Mervyn's was recently spun off by the Target Corporation, with some indications that the underlying value to potential purchasers is in

its real estate holdings (e.g., Mervyn's owns its space in Cochrane Plaza, as does Target) rather than in its operations. However, the buyers include firms specializing in reviving leading retail chains rather than firms with a real estate focus. At this time, the new ownership has continued with existing management and not announced any major changes such as store closures. A representative of Cochrane Plaza indicated that other stores in the center are faring poorly even with the existing Target in place. Currently, the center is trying to find a replacement tenant for a 7,500 square-foot Miller's Outpost space, and potential tenants are reportedly requesting a cancellation clause if the Target closes. Other tenants may close entirely or relocate to the Proposed Project seeking the continued synergy of locating near a Target. Cochrane Plaza is further constrained by land use regulations that do not allow re-tenanting of the Target space as a grocery store without voter approval. Re-leasing of the Target space might also require a subdivision or redevelopment of the existing store, as the market analysis indicates no support for a space of that size for any category of retail outlet. One possible reuse for at least part of the space is as an office supply store; the analysis indicates support for a sizable store in this category in Morgan Hill. However, this use does not complement the remaining tenant base nearly as well as Target, would not fill the entire vacant Target space, and might be more suitable for another location in Morgan Hill; if the Proposed Project seeks additional tenants outside the lifestyle retail niche, an office supply store could even be located there. Another factor to consider is the multiple ownership of this center; any attempt to redevelop the entire center must be approved by the separate owners of the vacated Target space (currently owned by Target), Mervyn's, and the owner of the remainder of the center. Given the lack of viable large-scale tenants for the Target space, the loss of synergy with the remaining tenants if the Target closes, and an uncertain future for Mervyn's, the center is likely to undergo secondary closures of smaller businesses. Therefore, Cochrane Plaza faces the likelihood of entering a cycle leading to urban decay and physical deterioration resulting from long-term vacancies, secondary business closures, and the inability to re-tenant existing stores.

The actual potential for physical deterioration to occur will be dependent on the commitment from the current property owners to maintain the property, which will be made more challenging due to the multiple ownerships. Although it may be reasonable to assume that the owners would maintain the plaza in a condition suitable for re-tenanting, there is no evidence or indication that such upkeep would continue indefinitely in the face of long-term vacancies in oversaturated market conditions, especially if the prospect of significant re-tenanting of the existing spaces is remote. Therefore, it is concluded that there is a high likelihood that the Cochrane Plaza would be subject to a causal chain ultimately resulting in urban decay. This potential for urban decay may be reduced or avoided through mitigation measures discussed in the following section.

Ultimately, if the market proves unable to provide sufficient retail tenants for this space, the property owners may have to redevelop the center in some other use. While other aspects of the regional commercial market are weak (e.g., industrial, office, and R&D), the site has strong locational advantages with highway access and visibility on a highly traveled highway corridor.

Lawrence Oaks Center. If the Proposed Project includes a home improvement center, it could result in market saturation in this retail sector, leading ultimately to closure of Home Depot. However, Home Depot and its largest competitor Lowe's are currently in a phase of opening stores to gather additional market share. Any consolidation and elimination of unprofitable stores

may be several years away. This center survived the closure of its Kmart store, with the other anchor store, Safeway, as well as the Longs Drugs sustained by a customer base not driven by synergies with Home Depot. As a result, this center is unlikely to enter a cycle of additional vacancy leading to urban decay, even if the Home Depot is closed in a future consolidation of stores by its parent company.

Tennant Station. The main occupant at risk in Tennant Station is the Cinelux theatre complex, since the market area does not appear to be able to support additional screens in Morgan Hill. However, the two primary anchors of this center are a Safeway and a furniture store, neither of them at significant risk of closure due to the Proposed Project or other known future retail development. Additionally, the bowling alley is now slated for reopening later this year. This center has undergone major changes over the last several years, including the departure and reopening of Safeway, that indicate that vacant spaces will see reuse rather than long-term vacancy and decay.

Other Retail Nodes. For the other major retail nodes discussed above (Vineyard Town Center, Morgan Hill Plaza, and the Nob Hill Center) the analysis concludes that the project is unlikely to result in store closures at any of these centers. As a result urban decay and physical deterioration are also not indicated as secondary impacts of the project at these centers.

Mitigation Measures to Reduce or Avoid Potential Urban Decay

BAE recommends the following mitigations measures to lessen the potential for urban decay and physical deterioration.

General Mitigations. These measures are recommended to be implemented either citywide or for all potentially impacted retail nodes.

1. *Ordinances to enforce maintenance to prevent urban decay/physical deterioration of vacant retail spaces.* The analysis above indicates that there is a likelihood of closure for major tenants in Lawrence Oaks (Home Depot), Tennant Station (Cinelux theater complex), and Cochrane Plaza (Target, with the likelihood of other tenants following). If these centers (or others) face vacancies following the opening of the Proposed Project, the City of Morgan Hill will monitor maintenance of the vacated spaces and their centers for the first signs of disinvestment or deterioration, and require that these properties continue to be maintained to standards as stated in Section 15.56.020 of the Morgan Hill Municipal Code, such that the building will not endanger life, limb, health, property, safety, or welfare of the general public or its occupants. These standards are based on the International Conference of Building Officials "Uniform Code of the Abatement of Dangerous Buildings, 1997 Edition," except where otherwise noted in the Section 15.56.020 of the Morgan Hill Municipal Code. The property shall be maintained in accordance with Morgan Hill Municipal Code Section 8 regarding Health and Safety, including but not limited to keeping premises free of litter, weeds, graffiti, and abandoned vehicles.

2. *Funding of programs to assist small retail businesses in Morgan Hill.* To help small local businesses compete with likely national chain retailers in the Proposed Project, the City will fund programs aimed at assisting locally-owned small retailers. This could take the form of a business seminar sponsored by Target and the project developers to educate local retailers, or other

programs geared toward small retail business assistance, such as a kiosk at the Proposed Project providing information on shopping opportunities in Downtown Morgan Hill or other centers. Such a program could be funded by the City committing a percentage of the sales tax revenue generated by the Proposed Project.

3. Utilization of Redevelopment Agency Resources. The City of Morgan Hill will ensure the Target Corporation, the other owners of Cochrane Plaza, and the owners of Tennant Station, Vineyard Town Center, and the Lawrence Oaks Shopping Center are aware that their centers are in the City's Redevelopment Area, and as a result they are eligible to apply for programs administered by the City's Business Assistance Division, including the Facade Improvement Program, Impact Fee Financing Programs, and Business Assistance Guidelines.

Cochrane Plaza. The following mitigations are specific to Cochrane Plaza and the existing Target store slated for vacancy.

1. Maintenance of Vacant Target Store. As a condition of approval for the Proposed Project, the Target Corporation will make a written commitment, using a mechanism such as a restriction or notice on their deed to the existing store property, to maintain their vacated existing store per the guidelines set out above regarding abatement of physical decay and deterioration of buildings per the Morgan Hill Municipal Code. This maintenance will include but not be limited to prompt removal of trash and graffiti and upkeep of the vacant building to leasable standards for a modern community shopping center. This commitment will extend to successors in ownership if the Target Corporation sells the property prior to re-tenanting. This commitment will extend until a majority of the space in the vacant store is re-occupied for a period of at least 12 consecutive months.

2. Façade Easement. As an additional measure to assure proper maintenance of the vacated store, the Target Corporation will provide the City of Morgan Hill with a façade easement on the existing Target space. The facade easement will make it easier for the City and its Redevelopment Agency to step in and clean up the site and lien the property for reimbursement, if needed. The easement language can establish the maintenance standards to be followed. For this property, the easement language should give the City the right to enter onto the property and perform any deferred maintenance thereon as may be necessary to keep the property in good condition and repair, if the Target Corporation or successor in ownership (the "owner") does not perform such maintenance itself within a set period of time after receiving notice of the need for maintenance. Such notice shall identify each item of maintenance and repair required to restore the landscaping and exterior facade on the Property to good condition and repair. All costs of maintenance performed by the City of Morgan Hill shall be paid directly by the owner or be reimbursed to the City by the owner. The owner's obligation to reimburse the City shall be secured by a lien encumbering the Property, which lien shall be enforceable in accordance with the provisions of California Civil Code Section 2924 et seq., as amended. This façade easement will be granted for a period not to exceed five years, or until a majority of the space is re-occupied for a period of at least 12 consecutive months.

3. Commitment to Re-Tenanting of Vacant Target Store. The Target Corporation shall provide the City with a written re-tenanting plan for the vacant store. Every six months until the majority

of the space is leased to a tenant(s) with a lease commitment of at least 12 months, or sold to another independent party, the Target Corporation shall provide to the City of Morgan Hill a progress report on efforts to re-lease the vacant space. The Target Corporation shall not put restrictions on the types of retailers permitted, e.g., they will not refuse to lease to a Target competitor. Permitted activities and land uses shall be solely governed by the City's General Plan and Zoning Ordinance

Level of Significance Remaining After Mitigation

Based on the analysis here, BAE believes that urban decay is not a likely outcome for centers and retail nodes other than Cochrane Plaza, especially if the citywide mitigations described above are implemented. However, in the case of Cochrane Plaza, these mitigations and those that are center-specific may be somewhat effective, but it cannot be stated with any degree of certainty that they would prevent urban decay in that center. Thus, it is possible that the construction of the Proposed Project might lead to a significant and unavoidable impact with respect to urban decay and physical deterioration for Cochrane Plaza.

Appendices

Appendix A-1: Target Trade Area Census Block Groups

County	Tract	Group
Santa Clara	5121.00	1
Santa Clara	5121.00	2
Santa Clara	5121.00	3
Santa Clara	5122.00	1
Santa Clara	5123.04	1
Santa Clara	5123.04	2
Santa Clara	5123.05	1
Santa Clara	5123.05	2
Santa Clara	5123.06	1
Santa Clara	5123.06	2
Santa Clara	5123.06	3
Santa Clara	5123.06	4
Santa Clara	5123.07	1
Santa Clara	5123.07	2
Santa Clara	5123.08	1
Santa Clara	5123.08	2
Santa Clara	5123.09	1
Santa Clara	5123.09	2
Santa Clara	5124.01	2
Santa Clara	5124.01	3
Santa Clara	5124.02	1
Santa Clara	5124.02	2

Appendix A-2: Cinema Trade Area Census Block Groups

County	Tract	Block Group
Santa Clara	5121.00	1
Santa Clara	5121.00	2
Santa Clara	5121.00	3
Santa Clara	5122.00	1
Santa Clara	5122.00	2
Santa Clara	5123.04	1
Santa Clara	5123.04	2
Santa Clara	5123.05	1
Santa Clara	5123.05	2
Santa Clara	5123.06	1
Santa Clara	5123.06	2
Santa Clara	5123.06	3
Santa Clara	5123.06	4
Santa Clara	5123.07	1
Santa Clara	5123.07	2
Santa Clara	5123.08	1
Santa Clara	5123.08	2
Santa Clara	5123.09	1
Santa Clara	5123.09	2
Santa Clara	5124.01	1
Santa Clara	5124.01	2
Santa Clara	5124.01	3
Santa Clara	5124.02	1
Santa Clara	5124.02	2
Santa Clara	5124.02	3
Santa Clara	5125.03	1
Santa Clara	5125.03	2
Santa Clara	5125.05	1
Santa Clara	5125.05	2
Santa Clara	5125.06	1
Santa Clara	5125.06	2
Santa Clara	5125.07	1
Santa Clara	5125.07	2
Santa Clara	5125.07	3
Santa Clara	5125.07	4
Santa Clara	5125.08	1
Santa Clara	5125.08	2
Santa Clara	5125.08	3
Santa Clara	5125.08	4
Santa Clara	5126.01	1
Santa Clara	5126.01	2
Santa Clara	5126.01	3
Santa Clara	5126.01	4
Santa Clara	5126.02	1
Santa Clara	5126.02	2

Appendix B: Unemployment and Labor Force Trends in Civilian Labor Force

	Morgan Hill				Santa Clara County			
	Labor Force (a)	Employ-ment	Unemploy-ment	Unem-ployment Rate	Labor Force (a)	Employ-ment	Unemploy-ment	Unem-ployment Rate
1994	n/a	n/a	n/a	n/a	852,300	798,600	53,700	6.3%
1995	n/a	n/a	n/a	n/a	860,700	818,400	42,300	4.9%
1996	n/a	n/a	n/a	n/a	892,400	859,600	32,800	3.7%
1997	n/a	n/a	n/a	n/a	929,900	901,200	28,700	3.1%
1998	n/a	n/a	n/a	n/a	953,200	922,300	30,900	3.2%
1999	n/a	n/a	n/a	n/a	958,600	929,300	29,300	3.1%
2000	18,400	17,600	800	4.3%	940,900	911,400	29,500	3.1%
2001	18,500	17,200	1,300	7.0%	938,800	890,600	48,200	5.1%
2002	17,700	15,700	2,000	11.3%	890,400	814,800	75,600	8.5%
2003	16,900	15,000	1,900	11.2%	850,500	778,300	72,200	8.5%
2004	16,400	15,000	1,400	8.5%	829,400	774,800	54,600	6.6%
Change, 2000-2003					**Change, 1994-2004**			
Number	(2,000)	(2,600)	600		(22,900)	(23,800)	900	
Percent	-11%	-15%	75%		-3%	-3%	2%	

Notes: Civilian Labor Force refers to workers by place of residence. Sum may not equal parts due to independent rounding. Data represent annual averages of monthly employment data.

Sources: California Employment Development Department; Bay Area Economics, 2005.

Appendix C: Morgan Hill Taxable Retail Sales Trends, 1993 to 2003 (Adjusted for Inflation)

City of Morgan Hill Sales in 2004 $000 (a) (b)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores (c)	$10,300	$9,295	$8,711	$8,813	$8,026	$4,517	$2,063	$2,193	$4,012	$7,627	#
General Merchandise Stores (d)	$53,180	$60,112	$60,867	$64,044	$66,437	$72,841	$79,023	$78,350	$78,756	$74,298	$62,640
Food Stores	$18,600	$21,007	$21,741	$23,490	$24,990	$25,302	$26,169	$26,708	$26,381	$25,022	$23,537
Eating and Drinking Places	$32,624	$31,908	$33,544	$37,000	$39,379	$40,428	$44,523	$44,654	$44,661	$41,109	$39,010
Home Furnishings and Appliances	$3,318	$4,102	$3,713	$4,266	$6,876	$9,911	$11,356	$14,998	$12,335	$10,496	$9,238
Building Materials and Farm Implements	$8,617	$9,138	$8,316	$8,664	$11,010	$12,826	$12,183	$10,419	$8,468	$6,636	$5,841
Auto Dealers and Auto Supplies (c)	$10,767	$9,089	$10,076	$10,705	$20,594	$25,185	$31,619	$36,354	$42,187	#	#
Service Stations	$21,584	$20,316	$22,495	$29,484	$33,855	$29,254	$34,953	$38,860	$35,891	$43,129	$47,337
Other Retail Stores (c)	$22,960	$57,211	$53,979	$53,640	$56,798	$63,296	$69,573	$73,245	$65,946	$104,524	$99,417
Retail Stores Total	**$181,950**	**$222,177**	**$223,443**	**$240,105**	**$267,965**	**$283,560**	**$311,462**	**$325,780**	**$318,636**	**$312,839**	**$287,021**

Morgan Hill Sales per Capita in 2004$ (e)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores (c)	$402	$355	$323	$314	$274	$147	$65	$57	$117	$219	#
General Merchandise Stores (d)	$2,073	$2,294	$2,254	$2,279	$2,267	$2,369	$2,481	$2,053	$2,299	$2,138	$1,803
Food Stores	$725	$802	$805	$836	$853	$823	$822	$700	$770	$720	$677
Eating and Drinking Places	$1,272	$1,218	$1,242	$1,317	$1,344	$1,315	$1,398	$1,170	$1,304	$1,183	$1,123
Home Furnishings and Appliances	$129	$157	$138	$152	$235	$322	$357	$393	$360	$302	$266
Building Materials and Farm Implements	$336	$349	$308	$308	$376	$417	$383	$273	$247	$191	$168
Auto Dealers and Auto Supplies (c)	$420	$347	$373	$381	$703	$819	$993	$953	$1,232	#	#
Service Stations	$841	$775	$833	$1,049	$1,155	$951	$1,097	$1,018	$1,048	$1,241	$1,362
Other Retail Stores (c)	$895	$2,184	$1,999	$1,909	$1,939	$2,058	$2,184	$1,920	$1,925	$3,008	$2,861
Retail Stores Total (b)	**$7,094**	**$8,480**	**$8,276**	**$8,545**	**$9,146**	**$9,221**	**$9,779**	**$8,538**	**$9,303**	**$9,003**	**$8,260**
Population	**25,650**	**26,200**	**27,000**	**28,100**	**29,300**	**30,750**	**31,850**	**38,156**	**34,250**	**34,750**	**34,750**

(a) Retail sales have been adjusted to 2004 dollars using the California Consumer Price Index for All Urban Consumers, published by the State Dept. of Finance, based on data from the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) A "#" sign indicates data supressed to preserve confidentiality due to four or fewer outlets or sales of more than 80% of the category in one store. Suppressed sales have been combined with Other Retail Stores, so evaluation of changes in the Other Retail category should take this into consideration.
(d) For 1993, 1995, and 1996, Drug Store sales were not available due to disclosure rules; for these years, drug sales were assumed to be equivalent to 1994 (adjustment made before inflation factor applied).
(e) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization, U.S. Bureau of Labor Statistics; 1990 and 2000 U.S. Census; State Department of Finance; Bay Area Economics, 2005.

Appendix D: Gilroy Taxable Retail Sales Trends, 1993 to 2003 (Adjusted for Inflation)

City of Gilroy Sales in 2004 $000 (a) (b)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores	$75,948	$84,929	$99,355	$119,747	$131,703	$127,842	$129,885	$135,721	$132,199	$132,613	$135,414
General Merchandise Stores (c)	$35,279	$53,594	$56,663	$50,853	$50,844	$52,653	$56,456	$63,419	$64,958	#	$119,929
Food Stores	$26,528	$25,219	$25,152	$27,647	$28,359	$26,686	$27,733	$34,969	$31,874	$25,837	$24,496
Eating and Drinking Places	$41,931	$40,120	$47,397	$49,795	$48,448	$52,263	$55,277	$60,328	$61,877	$62,550	$65,408
Home Furnishings and Appliances	$15,179	$15,292	$16,239	$18,220	$19,152	$20,703	$23,859	$27,009	$28,541	$25,579	$23,768
Building Materials and Farm Implements	$31,983	$34,027	$31,464	$39,141	$41,469	$43,024	$54,327	$89,376	$103,880	$89,794	$104,927
Auto Dealers and Auto Supplies	$135,281	$170,373	$186,686	$208,987	$214,816	$220,930	$246,637	$272,441	$273,257	$241,673	$215,665
Service Stations	$41,502	$41,622	$42,478	$48,492	$47,388	$44,591	$52,216	$58,645	$59,323	$60,859	$65,151
Other Retail Stores (c)	$33,111	$34,091	$37,801	$42,709	$43,805	$47,091	$61,787	$77,573	$76,009	$137,010	$77,076
Retail Stores Total	**$436,744**	**$499,266**	**$543,235**	**$605,592**	**$625,984**	**$635,782**	**$708,176**	**$819,482**	**$831,919**	**$775,914**	**$831,833**

Gilroy Sales per Capita in 2004$ (c)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores	$2,308	$2,535	$2,935	$3,441	$3,664	$3,351	$3,255	$3,294	$3,092	$3,026	$3,017
General Merchandise Stores (c)	$1,072	$1,600	$1,674	$1,461	$1,414	$1,380	$1,415	$1,539	$1,519	#	$2,672
Food Stores	$806	$753	$743	$794	$789	$700	$695	$849	$745	$590	$546
Eating and Drinking Places	$1,275	$1,198	$1,400	$1,431	$1,348	$1,370	$1,385	$1,464	$1,447	$1,427	$1,457
Home Furnishings and Appliances	$461	$456	$480	$524	$533	$543	$598	$656	$667	$584	$529
Building Materials and Farm Implements	$972	$1,016	$930	$1,125	$1,154	$1,128	$1,362	$2,169	$2,429	$2,049	$2,337
Auto Dealers and Auto Supplies	$4,112	$5,086	$5,515	$6,005	$5,975	$5,791	$6,181	$6,613	$6,390	$5,515	$4,804
Service Stations	$1,261	$1,242	$1,255	$1,393	$1,318	$1,169	$1,309	$1,423	$1,387	$1,389	$1,451
Other Retail Stores (c)	$1,006	$1,018	$1,117	$1,227	$1,218	$1,234	$1,549	$1,883	$1,777	$3,127	$1,717
Retail Stores Total (b)	**$13,275**	**$14,903**	**$16,048**	**$17,402**	**$17,413**	**$16,665**	**$17,749**	**$19,890**	**$19,455**	**$17,707**	**$18,531**

Population	**32,900**	**33,500**	**33,850**	**34,800**	**35,950**	**38,150**	**39,900**	**41,200**	**42,762**	**43,820**	**44,889**

(a) Retail sales have been adjusted to 2004 dollars using the California Consumer Price Index for All Urban Consumers, published by the State Dept. of Finance, based on data from the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) A "#" sign indicates data supressed to preserve confidentiality due to four or fewer outlets or sales of more than 80% of the category in one store. Suppressed sales have been combined with Other Retail Stores, so evaluation of changes in the Other Retail category should take this into consideration.
(e) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization, U.S. Bureau of Labor Statistics; 1990 and 2000 U.S. Census; State Department of Finance; Bay Area Economics, 2005.

Appendix E: Santa Clara County Taxable Retail Sales Trends, 1993 to 2003 (Adjusted for Inflation)

Santa Clara County Sales in 2004 $000 (a) (b)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores	$782,882	$812,858	$834,740	$897,130	$933,537	$900,751	$890,653	$979,742	$950,005	$925,991	$953,908
General Merchandise Stores	$2,566,204	$2,599,198	$2,667,639	$2,694,006	$2,875,672	$2,940,782	$3,055,350	$3,191,586	$2,925,465	$2,697,999	$2,657,321
Food Stores	$827,837	$807,281	$812,019	$849,628	$871,287	$892,347	$911,778	$942,551	$925,759	$875,522	$841,459
Eating and Drinking Places	$1,819,017	$1,850,264	$1,970,313	$2,097,509	$2,206,901	$2,267,170	$2,360,159	$2,562,455	$2,407,852	$2,243,675	$2,195,508
Home Furnishings and Appliances	$761,297	$809,269	$886,326	$934,425	$917,678	$961,210	$1,093,605	$1,316,387	$1,041,208	$894,040	$819,613
Building Materials and Farm Implements	$995,766	$1,040,896	$1,116,107	$1,223,189	$1,336,159	$1,400,250	$1,456,399	$1,587,761	$1,479,486	$1,395,774	$1,401,769
Auto Dealers and Auto Supplies	$2,360,187	$2,417,286	$2,729,695	$3,018,987	$3,282,122	$3,435,755	$3,780,753	$4,399,940	$3,829,743	$3,360,689	$3,225,689
Service Stations	$1,085,480	$1,079,516	$1,048,237	$1,211,764	$1,198,929	$1,068,216	$1,320,234	$1,616,140	$1,492,271	$1,301,493	$1,450,339
Other Retail Stores	$2,635,070	$2,855,269	$3,383,299	$3,627,883	$3,865,041	$4,039,114	$4,592,181	$5,507,206	$4,237,325	$3,550,818	$3,403,183
Retail Stores Total	**$13,833,739**	**$14,271,837**	**$15,448,375**	**$16,554,521**	**$17,487,326**	**$17,905,595**	**$19,461,112**	**$22,103,769**	**$19,289,114**	**$17,246,002**	**$16,948,789**

Santa Clara County Sales per Capita in 2004$ (c)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores	$508	$522	$532	$566	$579	$550	$537	$583	$558	$540	$552
General Merchandise Stores	$1,664	$1,668	$1,701	$1,698	$1,783	$1,795	$1,843	$1,901	$1,720	$1,573	$1,539
Food Stores	$537	$518	$518	$536	$540	$545	$550	$561	$544	$510	$487
Eating and Drinking Places	$1,180	$1,187	$1,256	$1,322	$1,368	$1,384	$1,423	$1,526	$1,416	$1,308	$1,272
Home Furnishings and Appliances	$494	$519	$565	$589	$569	$587	$660	$784	$612	$521	$475
Building Materials and Farm Implements	$646	$668	$712	$771	$829	$855	$878	$946	$870	$814	$812
Auto Dealers and Auto Supplies	$1,531	$1,551	$1,741	$1,903	$2,035	$2,097	$2,280	$2,620	$2,251	$1,960	$1,868
Service Stations	$704	$693	$668	$764	$743	$652	$796	$962	$877	$759	$840
Other Retail Stores	$1,709	$1,832	$2,157	$2,287	$2,397	$2,465	$2,770	$3,280	$2,491	$2,070	$1,971
Retail Stores Total (b)	**$8,971**	**$9,157**	**$9,851**	**$10,435**	**$10,844**	**$10,929**	**$11,738**	**$13,163**	**$11,339**	**$10,056**	**$9,816**
Population	**1,542,100**	**1,558,500**	**1,568,200**	**1,586,400**	**1,612,700**	**1,638,300**	**1,658,000**	**1,679,200**	**1,701,060**	**1,715,051**	**1,726,628**

(a) Retail sales have been adjusted to 2004 dollars using the California Consumer Price Index for All Urban Consumers, published by the State Dept. of Finance, based on data from the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization, U.S. Bureau of Labor Statistics; 1990 and 2000 U.S. Census; State Department of Finance; Bay Area Economics, 2005.

Appendix F: California Taxable Retail Sales Trends, 1993 to 2003 (Adjusted for Inflation)

California Sales in 2004 $000 (a)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores	$13,606,684	$13,697,162	$13,285,255	$13,769,955	$14,037,601	$14,002,400	$13,287,522	$14,361,422	$14,397,919	$14,730,283	$15,578,337
General Merchandise Stores	$42,230,303	$43,197,179	$43,185,384	$43,136,255	$44,468,225	$46,286,527	$49,340,398	$51,230,307	$50,749,172	$50,909,933	$51,878,308
Food Stores	$19,107,090	$18,472,797	$18,358,124	$18,884,159	$19,386,950	$19,234,549	$19,920,233	$20,539,802	$20,242,867	$19,898,473	$19,917,482
Eating and Drinking Places	$31,040,910	$31,639,974	$32,306,182	$33,283,299	$34,397,520	$35,864,349	$37,638,106	$39,640,859	$39,627,586	$39,982,798	$41,101,424
Home Furnishings and Appliances	$11,162,561	$12,108,930	$12,491,468	$12,103,350	$11,727,528	$12,575,143	$13,888,860	$15,194,814	$14,337,408	$14,682,076	$15,500,861
Building Materials and Farm Implements	$18,235,620	$18,914,567	$19,157,147	$19,783,627	$21,422,039	$23,112,758	$25,805,401	$27,728,594	$28,456,399	$29,477,210	$31,499,788
Auto Dealers and Auto Supplies	$37,898,356	$40,214,467	$42,418,950	$44,419,702	$46,288,448	$50,612,545	$56,892,860	$63,413,353	$65,358,284	$67,010,489	$68,812,964
Service Stations	$21,612,158	$21,425,678	$21,686,253	$23,686,378	$23,518,702	$20,710,014	$23,560,436	$28,180,111	$26,481,743	$25,124,126	$28,442,435
Other Retail Stores	$39,239,176	$41,629,573	$43,744,236	$46,839,874	$49,241,408	$51,432,039	$56,058,860	$60,609,068	$56,469,175	$54,869,430	$55,894,515
Retail Stores Total	**$234,132,859**	**$241,300,327**	**$246,632,999**	**$255,906,599**	**$264,488,420**	**$273,830,324**	**$296,392,677**	**$320,898,329**	**$316,120,551**	**$316,684,818**	**$328,626,115**

California Sales per Capita in 2004$ (c)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apparel Stores	$437	$436	$420	$433	$436	$429	$401	$425	$418	$420	$436
General Merchandise Stores	$1,356	$1,375	$1,366	$1,355	$1,381	$1,417	$1,489	$1,518	$1,473	$1,451	$1,454
Food Stores	$613	$588	$581	$593	$602	$589	$601	$609	$588	$567	$558
Eating and Drinking Places	$996	$1,007	$1,022	$1,045	$1,068	$1,098	$1,136	$1,174	$1,151	$1,139	$1,152
Home Furnishings and Appliances	$358	$385	$395	$380	$364	$385	$419	$450	$416	$418	$434
Building Materials and Farm Implements	$585	$602	$606	$621	$665	$708	$779	$822	$826	$840	$883
Auto Dealers and Auto Supplies	$1,217	$1,280	$1,342	$1,395	$1,437	$1,550	$1,717	$1,879	$1,898	$1,910	$1,928
Service Stations	$694	$682	$686	$744	$730	$634	$711	$835	$769	$716	$797
Other Retail Stores	$1,260	$1,325	$1,384	$1,471	$1,529	$1,575	$1,692	$1,796	$1,640	$1,564	$1,566
Retail Stores Total (b)	**$7,516**	**$7,680**	**$7,801**	**$8,038**	**$8,212**	**$8,385**	**$8,944**	**$9,507**	**$9,178**	**$9,025**	**$9,207**
Population	**31,150,000**	**31,418,000**	**31,617,000**	**31,837,000**	**32,207,000**	**32,657,000**	**33,140,000**	**33,753,000**	**34,441,561**	**35,088,671**	**35,691,442**

(a) Retail sales have been adjusted to 2004 dollars using the California Consumer Price Index for All Urban Consumers, published by the State Dept. of Finance, based on data from the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization, U.S. Bureau of Labor Statistics; 1990 and 2000 U.S. Census; State Department of Finance; Bay Area Economics, 2005.

Appendix G: Detail of Additional Supportable Retail Square Feet from Current Population

Store Category	Taxable Sales $000		Total Sales $000		Per Capita Retail Sales		Per Capita Injection/ (Leakage)	Capture	Average Sales per Square Foot	Additional Supportable SF	Additional Sales
	Morgan Hill	SC County	Morgan Hill	SC County	Morgan Hill	SC County					
Apparel	$11,658	$953,908	$11,658	$953,908	$242	$554	(312)	25%	$369	10,200	$3,762,000
General Merchandise		$2,309,778		$2,309,778		$1,341					
Drugs		$347,543		$518,721		$301					
Gifts, Art, Novelties	$1,164	$91,507	$1,164	$91,507	$25	$53	(29)	50%	$300	2,300	$690,000
Sporting Goods	$4,993	$220,424	$4,993	$220,424	$107	$128	(24)	75%	$200	4,400	$880,000
Florists	$562	$50,886	$562	$50,886	$12	$30	(18)	90%	$238	3,300	$787,000
Photo Equipment		$46,883		$46,883		$27			$238	2,700	$644,000
Musical Equipment	$269	$103,047	$269	$103,047	$6	$60	(54)	75%	$238	8,200	$1,954,000
Stationery and Books	$832	$215,358	$832	$215,358	$18	$125	(108)	75%	$275	14,200	$3,905,000
Jewelry		$184,174		$184,174		$107			$1,225	2,900	$3,553,000
Office, Store and School Supply	$3,053	$1,193,856	$3,053	$1,193,856	$65	$693	(630)	50%	$275	55,200	$15,180,000
Other Specialty		$878,846		$878,846		$510			$238	26,500	$6,316,000
Food Stores	$24,802	$841,459	$82,673	$3,365,835	$1,769	$1,954	(240)	50%	$390	14,800	$5,772,000
Eating Places (No Alcohol)	$20,792	$779,902	$20,792	$779,902	$445	$453	(22)	90%	$475	2,000	$950,000
Eating Places (Beer & Wine)	$15,292	$777,670	$15,292	$777,670	$327	$451	(134)	75%	$525	9,300	$4,883,000
Eating & Drinking (All Types of Liquor)	$6,018	$637,936	$6,018	$637,936	$129	$370	(246)	75%	$525	16,900	$8,873,000
Household and Home Furnishings		$568,548		$568,548		$330			$338	20,800	$7,020,000
Household Appliance Dealers		$251,064		$251,064		$146			$700	6,300	$4,410,000
Building Materials	$24,983	$1,349,205	$24,983	$1,349,205	$518	$783	(265)	90%	$257	44,700	$11,510,000

Notes:

Cells in gray indicate no disclosure due to confidentiality rules covering taxable sales data.

Per capita sales calculated based on reported taxable sales and population estimates and projections for the Target Trade Area from Table 2, prorated to 2003 as follows:

	2000	2003	2004	Annual Change
Target Trade Area	46,542	46,744	46,811	0.1%
County	1,682,585	1,694,955	1,699,098	0.2%

County per capitas sales have been assumed as baseline against which to compare Morgan Hill. Sales assumed to be "leaking" from Morgan Hill if Morgan Hill has per capita sales below county benchmark. Assumptions have been made regarding possible capture by Morgan Hill of leakage in each category; for instance, Morgan Hill is unlikely to achieve high capture of apparel sales in the foreseeable future, because some apparel shopping is mall-based, and because of the factory outlet stores in Gilroy. Sales per square foot derived from several sources of industry benchmarks, including a Hinterliter de Lamas analysis of sales per square foot in California by store type, BizStats.com, and Urban Land Institute's *Dollars & Cents of Shopping Centers, 2004*. Analysis is limited to retail store types likely to be found in the proposed center (e.g., automobile dealers have been excluded). Also excludes all non-retail outlets (business and personal services) reporting taxable sales. Sales amounts rounded to nearest thousand dollars.

Sources: State Board of Equalization, 2000 U.S. Census; Claritas; Urban Land Institute; BizStats.com; Hinterliter de Lamas; Bay Area Economics, 2005.

Appendix H: Detail of Additional Supportable Retail Square Feet from Population Growth through 2010

Store Category	Trade Area Population Increase	Per Capita Retail Sales County	Additional Sales	Capture	Additional Sales	Average Sales per Square Foot	Additional Supportable SF
Women's Apparel	4,100	$165	$675,000	100%	$675,000	$463	1,459
Men's Apparel	4,100	$39	$159,000	100%	$159,000	$288	553
Family Apparel	4,100	$272	$1,117,000	100%	$1,117,000	$400	2,793
Shoes	4,100	$78	$319,000	100%	$319,000	$260	1,227
Apparel	4,100	$554	$2,270,000	100%	$2,270,000	$369	6,155
General Merchandise	4,100	$1,341	$5,497,000	100%	$5,497,000	$250	21,988
Drugs	4,100	$301	$1,234,000	100%	$1,234,000	$500	2,468
Gifts, Art, Novelties	4,100	$53	$218,000	100%	$218,000	$300	727
Sporting Goods	4,100	$128	$525,000	100%	$525,000	$200	2,625
Florists	4,100	$30	$121,000	100%	$121,000	$238	508
Photo Equipment	4,100	$27	$112,000	100%	$112,000	$238	470
Musical Equipment	4,100	$60	$245,000	100%	$245,000	$238	1,028
Stationery and Books	4,100	$125	$513,000	100%	$513,000	$275	1,865
Jewelry	4,100	$107	$438,000	100%	$438,000	$1,225	357
Office, Store and School Supply	4,100	$693	$2,841,000	100%	$2,841,000	$275	10,331
Other Specialty	4,100	$510	$2,092,000	100%	$2,092,000	$238	8,777
Food Stores	4,100	$1,954	$8,010,000	100%	$8,010,000	$390	20,538
Eating Places (No Alcohol)	4,100	$453	$1,856,000	100%	$1,856,000	$475	3,907
Eating Places (Beer & Wine)	4,100	$451	$1,851,000	100%	$1,851,000	$525	3,526
Eating & Drinking (All Types of Liquor)	4,100	$370	$1,518,000	100%	$1,518,000	$525	2,891
Households and Home Furnishings	4,100	$330	$1,353,000	100%	$1,353,000	$338	4,009
Household Appliance Dealers	4,100	$146	$598,000	100%	$598,000	$700	854
Lumber and Building Materials	4,100	$553	$2,269,000	100%	$2,269,000	$329	6,897
Hardware Stores	4,100	$122	$502,000	100%	$502,000	$238	2,106
Plumbing and Electrical	4,100	$73	$299,000	100%	$299,000	$238	1,255
Paint, Glass, and Wallpaper	4,100	$34	$141,000	100%	$141,000	$300	470
Auto Supplies and Parts	4,100	$130	$534,000	100%	$534,000	$214	2,501

Notes:

Population increase from Table 2:

	2005	2010	Annual Change
Target Trade Area	49,386	53,486	1.6%

County per capitas sales have been assumed as baseline against which to compare Morgan Hill. Sales assumed to be "leaking" from Morgan Hill if Morgan Hill has per capita sales below county benchmark. Assumptions have been made regarding possible capture by Morgan Hill of leakage in each category; for instance, Morgan Hill is unlikely to achieve high capture of apparel sales in the foreseeable future, because some apparel shopping is mall-based, and because of the factory outlet stores in Gilroy. Sales per square foot derived from several sources of industry benchmarks, including a Hinterliter de Lamas analysis of sales per square foot in California by store type, BizStats.com, and Urban Land Institute's *Dollars & Cents of Shopping Centers, 2004*. Analysis is limited to retail store types likely to be found in the proposed center (e.g., automobile dealers have been excluded). Also excludes all non-retail outlets (business and personal services) reporting taxable sales. Sales amounts rounded to nearest thousand dollars.
Sales amounts rounded to nearest thousand dollars.

Sources: State Board of Equalization, 2000 U.S. Census; Claritas; Urban Land Institute; BizStats.com; Hinterliter de Lamas; Bay Area Economics, 2005.

Appendix I: Top Ten Lifestyle Retailers by Number of Locations, 2004

2004 Rank	Retailer	Number of Lifestyle Center Locations	Avg. Lifestyle Center Sq Ft. per Store
1	Chico's	46	2,500
2	Talbots	41	6,800
3	Williams-Sonoma	35	5,100
4	Ann Taylor	34	4,400
4	Banana Republic	34	6,800
4	Victoria's Secret	34	5,500
5	Starbuck's	29	1,900
6	Pottery Barn	28	12,100
7	Gap	27	9,700
8	Bath & Body Works	25	2,900
9	Ann Taylor Loft	24	5,200
9	Claire's Accessories	24	1,200
10	Coldwater Creek	23	7,100
10	Jos A. Bank Clothier	23	4,700
10	White House/Black Market	23	2,300

Source: National Research Bureau

Appendix J: Competitive General Merchandise Stores in Morgan Hill and Gilroy

Store	Total Square Feet	Offerings	Adjacent Retail
Mervyn's 990 Cochrane Rd. Morgan Hill, CA 95037 (408)779-7800	77,161	Men's, women's, children's apparel. Miscellaneous appliances	Target, Cingular Wireless, Payless, Ross, Big 5, assorted restaurants.
Target 170 Cochrane Plaza Morgan Hill, CA 95037 (408) 778-1366	80,441	Apparel, general merchandise, snack bar.	Mervyn's, Cingular Wireless, Payless, Ross, Big 5, assorted restaurants.
Target 6705 Camino Arroyo , Gilroy, CA 95020-7075 USA (408) 848-6466	123,709	Grocery (frozen, dry foods), Pizza Hut, pharmacy Opened late 2004.	Bed Bath & Beyond, Kohl's Petsmart, Michaels, Sportmart, Ross and Barnes & Noble.
Wal-Mart 7900 Arroyo Circle Gilroy, CA 95020 (408) 848-8161	125,600	Garden centery, grocery, pharmacy, photo center, tire & lube. New 220,000 Supercenter replacement store under construction.	None
Kohl's 6765 Camino Arroyo Drive Gilroy, CA 95020-7075 (408)848-2032	88,408	Apparel, small appliances Opened Oct 2004	Target, Bed Bath & Beyond
Costco 7251 Camino Arroyo Gilroy, California 95020 United States	148,663	Photo lab, Auto Buying Program, Food Court, Gas Station, Optical Department, Pharmacy, Tire Service Center Opened March 2003	

Sources: BAE, based on site visits, interviews with store representatives, online research, and information provided by City of Morgan Hill.

Appendix K: Competitive Supermarkets

Store Name	Size (sf)	Year Opened	Offerings	Customer Base
Morgan Hill Foods 225 W Main Ave Morgan Hill, CA 95037 (408) 779-2156	19,500		Latino grocery. Ethnic as well as general foods.	
Albertson's 16955 Monterey St Morgan Hill, CA 95037 (408) 779-1420	23,200		Includes deli and Bakery	
Nob Hill Foods 451 Vineyard Town Ctr Morgan Hill, CA 95037 (408) 779-8485	32,440	1995	Bakery, deli, hot food, florist, large wine collection, Starbucks	Regional, extending into Gilroy
Safeway 100 Tennant Ave. Morgan Hill, CA 95037	53,985	2003	Bank, pharmacy, butcher, fuel large wine collection.	
Safeway 840 E Dunne Ave Morgan Hill, CA 95037 (408) 776-8720	60,000		Bank, pharmacy, butcher	

Sources: BAE, based on site visits, interviews with store representatives, online research, and information provided by City of Morgan Hill.

Appendix L: Broker Interviews

Lisa Rabello – Sequoia Management
(408) 559-9227

- Definitely does not want Target to move from current location to proposed center. It would draw people away from current tenants.
- Does not deal with tenants who would be interested in big box space. No idea who would occupy it. Maybe some nationals who are not in Morgan Hill yet.
- Current tenants have voiced concern over older Target closing down (Mervyn's).
- Primarily deals with month to month leases. Currently looking to lease 7,500 sq/ft space in Cochrane Plaza.
- Thinks an upscale grocer like Whole Foods or Trader Joe's would be a great addition to Morgan Hill.
- Commercial real estate market is "pretty good" right now, doesn't know what the vacancy rate is.
- Referred BAE to owner of Cochrane Plaza for more information on who could take large space if Target leaves.

Mack Morris – Owner, Cochrane Plaza
(408) 309 -1075

- If Target leaves the entire center would die. Target is by far the main draw for the center.
- Current businesses in Cochrane Plaza doing very poorly. Miller's Outpost barely holding on. Renting space at currently $0.60-$0.70 sq/ft. Asking $2.00-$2.25 sq/ft for current space. Offering $20,000 in tenant improvements.
- Looking for smaller specialty shop to fill current 7,500 sq space occupied by Miller's Outpost. Prospective tenants demand clause that enables them to void lease if Target leaves.
- Previously looked at property in Salem, OR where there is a law mandating any left box space be filled before the previous tenant can relocate in city. Recommends a similar law for Morgan Hill
- Making only 3% return from investment on Cochrane Plaza
- Recent improvements to signage and landscaping in effort to bring more people.
- Spoke to Trader Joe's reps: Morgan Hill does not have a large enough population base to support
- No idea on who would occupy the box space if vacant. Recommends Target expand to Mervyn's building and occupy two spaces if desire to expand is so great.
- Morgan Hill is jumping the gun. Shouldn't put in a new shopping center unless other centers are doing very well. If new center puts others out of business, then the city doesn't gain at all.
- Not allowed to lease to a grocery store due to city ordinance requiring vote.

Pat – Duckett Wilson Development
(800) 327-3019

- Market is pretty soft right now. Current tenants don't do a lot of business.
- Would only compete with new center if a supermarket is included. Albertson's is small and would like to grow. Most likely would move to new space or close if new grocery is built.
- Grocery anchored center, would be destroyed if supermarket left.
- Rite-Aid left and was replaced by a Dollar-Tree. Those are the types of tenants who would fill large vacant space like that.
- Can't speak for the city, but they are currently 10% vacant.

Mike La Barbera (Terracommercial)– Owner Tennant Station
(408) 947-1166

- Cinelux eight-screen theater is a current tenant. A new theater would eventually drive his out of business.
- Too much competition between theaters - nobody would make money sharing such a small population base.
- Current theater is already state of the art, so film distributors would decide at random which theater gets which movie.
- An eight screen theater requires a population of 50,000. Current theater is drawing people from South SJ and Gilroy.
- Heard that Century Theaters said they were uninterested in the proposed project.
- Doesn't think that businesses would be drawn to new center because there aren't enough people in Morgan Hill. In the end it would just be a new Target that would definitely bring about the closing of the entire Cochrane Plaza shopping center.
- Current theater owner looking to expand to 11 screens.

Technical Appendices

Appendix J – Noise

Illingworth and Rodkin, Inc. Cochrane Road Retail Development Environmental Noise Assessment, Morgan Hill, California. May 17, 2005.

COCHRANE ROAD RETAIL DEVELOPMENT ENVIRONMENTAL NOISE ASSESSMENT MORGAN HILL, CALIFORNIA

May 17, 2005

□ □ □

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Job No.: 04-190

INTRODUCTION

This report presents the results of our environmental noise assessment for a 657,250 square foot shopping center on an approximately 66.49-acre site located on the corner of Cochrane Road and U.S. Highway 101 in the City of Morgan Hill, California (Figure 1,below). This analysis provides a discussion of noise policies and standards applicable to the project, results of ambient noise measurements conducted at adjacent noise sensitive land uses, an evaluation of the project's compatibility with these adjacent noise sensitive land uses, and measures designed to reduce project generated noise below standards established by the City of Morgan Hill. Persons not familiar with environmental noise analysis or the City of Morgan Hill's noise standards are referred to Appendix A and B of this report for additional information.

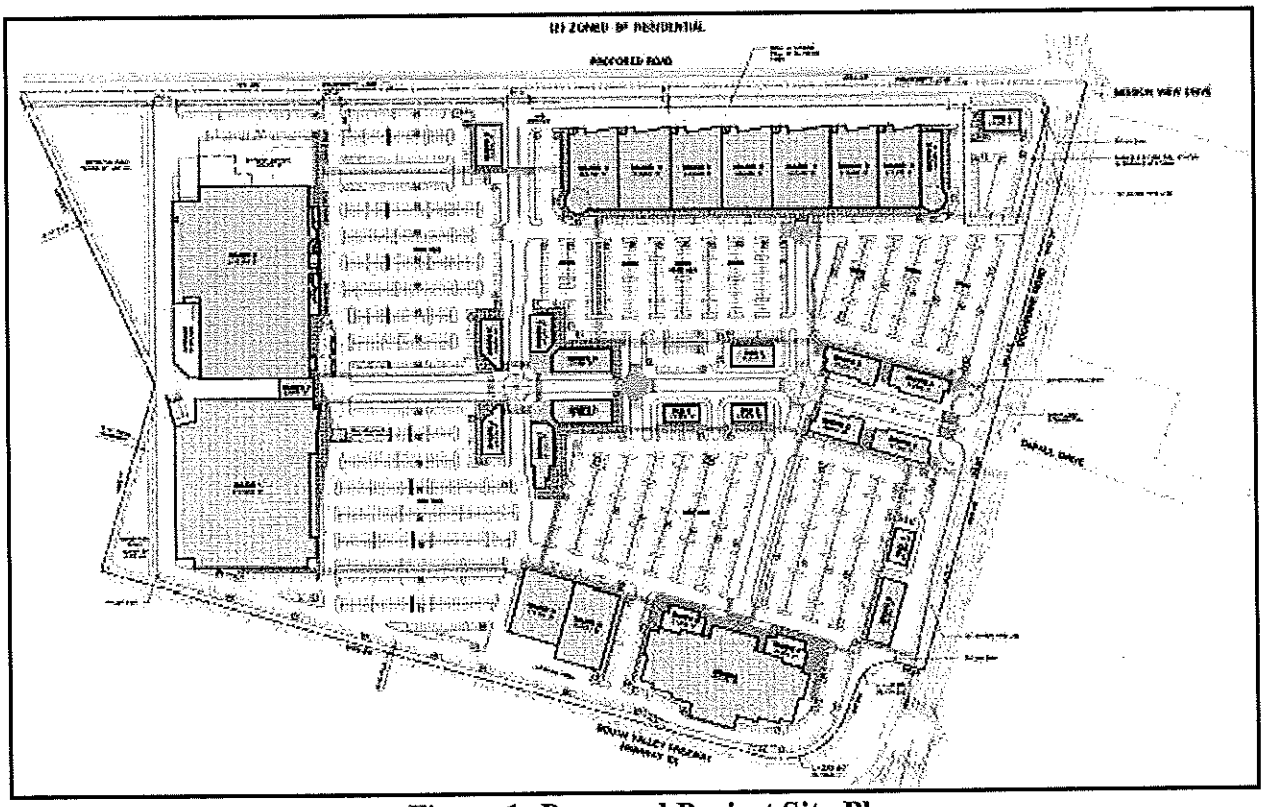


Figure 1: Proposed Project Site Plan

EXISTING NOISE ENVIRONMENT

Land uses surrounding the project site include two single-family homes, vacant land planned for commercial uses and the former Saint Louise Hospital south of the project site; County land zoned for single-family residential uses east of the project site; agricultural lands with scattered residential uses north of the project site; and U.S. Highway 101 west of the project site. The closest noise sensitive receptors to the site are the two single-family homes south of Cochrane Road. Other, existing, noise sensitive uses are located at the southeast corner of Mission View Drive and Cochrane Road, approximately 1000 feet north of areas proposed for development on Peebles Avenue, and approximately 1300 feet east of areas proposed for development off of Peet Road.

The noise environment on the project site and the nearby noise sensitive receptors results primarily from vehicular traffic on Highway 101 and Cochrane Road. To evaluate the existing noise environment on and adjacent to the site one (1) twenty-four (24) hour (LT-1) and two (2) short-term spot (ST-1 & ST-2) noise measurements were made between 11 a.m. Thursday, January 19th and 11 a.m. Friday, January 20th, 2005 (see Figure 2). The long term measurement (LT-1, figure 2) was conducted a utility pole 130 feet south of the Cochrane Road centerline and west of the existing single family home at the corner of St. Louis Drive and Cochrane Road. The hourly trend in noise levels at the measurement site including the energy equivalent noise level (L_{eq}), maximum (L_{max}), minimum (L_{min}), and the noise level exceeded 10, 50, and 90 percent of the time (indicated as L_{10}, L_{50} and L_{90}) is shown on Chart 1,below.

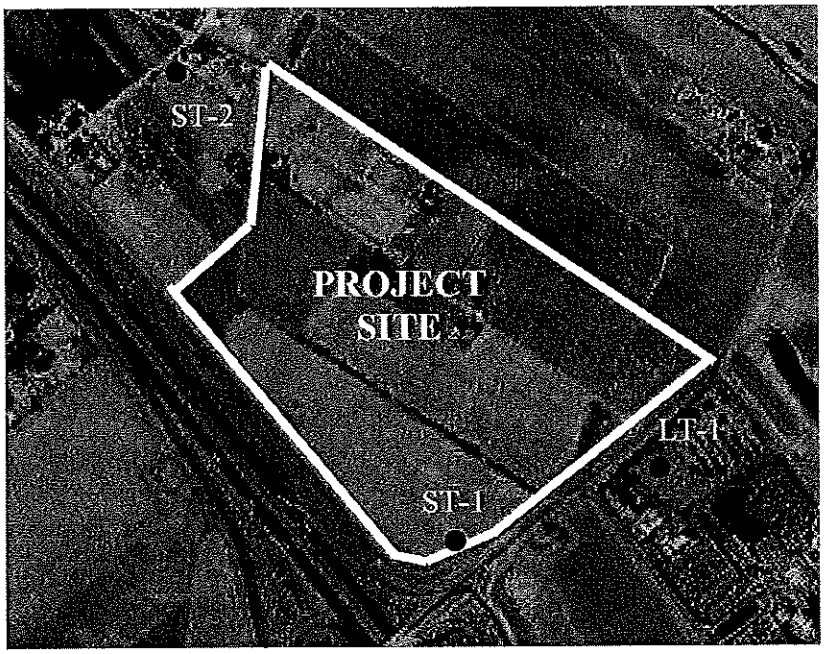
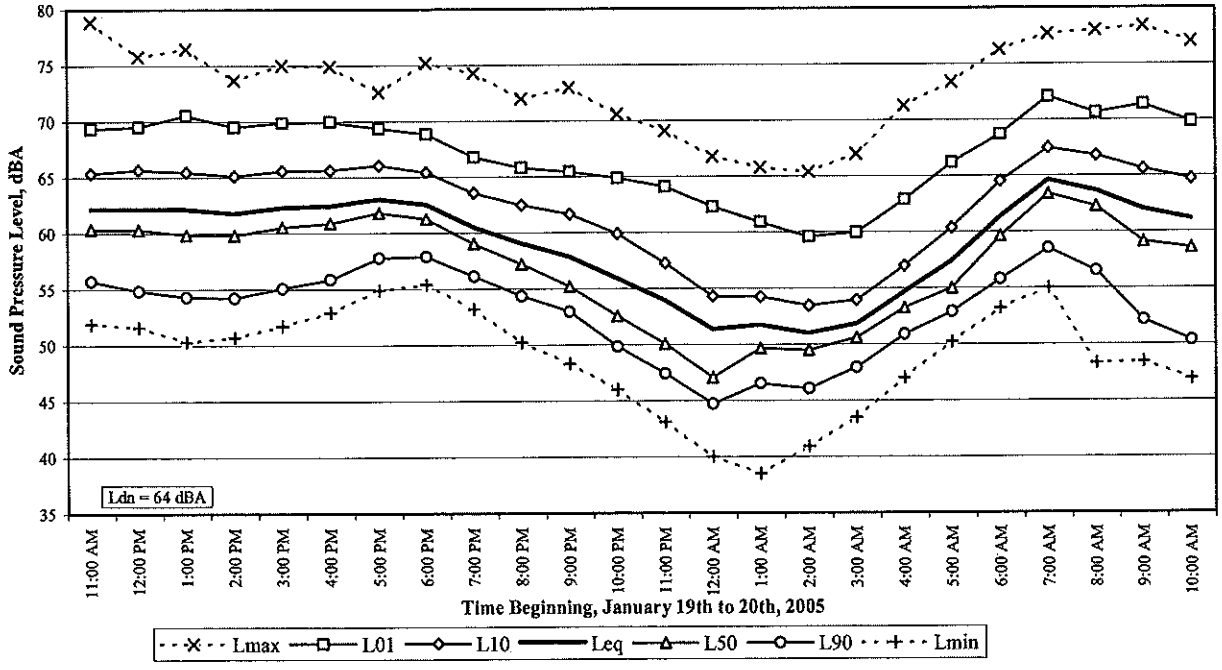


Figure 1: Project Site with Measurement Locations

Chart 1: Long term Measurement Results
130 feet from the centerline of Cochrane Road



A review of Chart 1 shows that average (L_{eq}) noise levels ranged from 58 to 65 dBA daytime and 51 to 61 dBA nighttime. The overall average daytime and nighttime L_{eq} levels were found to be 62 and 56 dBA, respectively. The L_{dn} measured at this location was calculated to be 64 dBA.

The first short term noise measurement (ST-1, see Figure 2) was conducted simultaneously with the long-term measurement in the southwest portion of the project site approximately 200 feet west of the Hwy 101 right of way line and 200 feet from the centerline of Cochrane Road. The results of this measurement show that due to the shielding provided by the existing terrain of Hwy 101 traffic noise, (i.e. Hwy 101 is below the site grade for the entirety of the project site) the average noise level at ST-1 wasere 3 dBA below those at the long term position. The estimated L_{dn} at this location is ~~therefore~~ 61 dBA.

The second short term noise measurement (ST-2, see Figure 1) was conducted in the rural residential area along Peebles Avenue north of the project site. The results of this measurement show that the average daytime sound levels away from major sources of the noise such as Hwy 101 and Cochrane Road range from 52 to 56 dBA, yielding an estimated L_{dn} of 56 dBA.

Founded on the results of the traffic study conducted by Fehr & Peers for the project and abased o a consideration that the project traffic mix would be similar to that currently using area roadways, the relative increases in decibel levels on all area roadways have been recalculated based on the logarithmic relationship between differing peak hour traffic volumes. This method, which is expressed as:

Decibel Increase = 10xLOG(future traffic vol./existing traffic vol.)

With this method of predicting future traffic noise levels, a 25% increase in future traffic volumes results in an approximate increase in traffic noise of 1 dBA. This analysis showed that under existing conditions with the project in place traffic noise levels on Cochrane Road will increase by 2 to 6 decibels between Hwy 101 and east of Mission View Drive, with an increase of 4 dBA at the two homes on the south side of Cochrane Road across from the project. This would increase the L_{dn} at these homes to 68 dBA under existing conditions with the contribution of project related traffic. Homes southeast of the corner of Cochrane Road and Mission View Drive would experience a 1 dBA increase along the Cochrane Road frontage and a 4 dBA increase along Mission View Drive frontage. Based on a comparison of the existing traffic volumes on these roadway to the traffic on Cochrane Road past the long term noise measurement site and without considering the benefit of the sound wall built along these roadways, the current L_{dn}'s at the Cochrane Road and Mission Vive Drive frontages of the homes southeast of the corner of Cochrane Road and Mission View Drive are estimated at 60 dBA. When the sound reduction provided by a typical 6 foot high soundwall is considered then the L_{dn} at the homes in this area are estimated at 54 dBA. With the above increases in existing volumes due to the project related traffic, the L_{dn} at the homes on the Cochrane Road frontage is estimated at 55 dBA, while those on the Mission View Drive frontage is estimated at 58 dBA. -The noise environment in the vicinity of the noise sensitive receptors north and east of the project site would be expected to remain relatively constant under existing conditions with the project since these areas removed from major traffic noise sources.

FUTURE NOISE ENVIRONMENT

Our analysis of the traffic study for future (cumulative) conditions showed that traffic noise levels on Cochrane Road will increase by 2 to 5 decibels between Hwy 101 and east of Mission View Drive,

with an increase of 3 dBA at the two homes on the south side of Cochrane Road without the project in place. This would increase the L_{dn} at these homes to 67 dBA without the contribution of project related traffic.

For future (cumulative) conditions with project traffic noise levels on Cochrane Road will increase by 2 to 4 decibels above the cumulative increases between Hwy 101 and east of Mission View Drive, with an additional increase of 3 dBA at the two homes on the south side of Cochrane Road without the project in place. This would increase the L_{dn} at these homes to 70 dBA under future conditions with project-generated traffic. Cumulative increases alone will increase sound levels at the Cochrane Road frontage and the Mission View Drive frontage of the homes southeast of the corner of Cochrane Road respectively by 2 dBA and 1 dBA. Homes southeast of the corner of Cochrane Road and Mission View Drive would experience an additional 1 dBA increase along the Cochrane Road frontage and an additional 4 dBA increase along Mission View Drive frontage above these cumulative (non-project related) increases due to project related traffic. Based on a comparison of the cumulative and existing traffic volumes on these roadways, the above increases in project related traffic, and considering the benefit of the sound wall built along these roadways the future L_{dn} with the project in place at the homes on the Cochrane Road frontage is estimated at 57 dBA, while those on the Mission View Drive frontage is estimated at 59 dBA. The future noise environment in the vicinity of the noise sensitive receptors removed from Cochrane Road north and east of the project site due to project-generated traffic would be expected to remain relatively constant under future conditions with~~out~~ the project since these areas are removed from major traffic noise sources.

The major noise sources associated with the operation of the proposed retail development would be parking lot activity, truck delivery, loading dock activity, activity at the outdoor garden center, and noise generated by fixed mechanical equipment typically located on top of large and small retail stores. The following summarizes noise levels generated by these activities as measured by Illingworth & Rodkin, Inc. at typical large-scale retail developments:

(1) *Delivery Truck Traffic.* Noise generated by delivery trucks depends primarily on the truck. Maximum noise levels generated by diesel trucks pulling into and out of loading docks ranges from 73 to 80 dBA measured at a distance of 50 feet. The maximum instantaneous A-weighted noise levels generated by step vans and smaller gasoline-powered delivery trucks ranges from 60 to 69 dBA at a distance of 50 feet.
(2) *Loading Dock Activity.* Maximum noise levels generated at loading docks typically reach 80 dBA at a distance of 50 feet. These maximum noise levels were generated by banging and clanging of metal containers and loud voices.
(3) *Outdoor Garden Centers.* Noise source associated with the outdoor garden center include a public address system. The typical noise level of a garden center PA is about 50 dBA at a distance of 50 feet (this level may need to be increased to around 60 dBA at 50 feet due to the higher existing ambient noise). Forklifts typically generate a level of 60 to 70 dBA at a distance of 50 feet. Carts and voices typically generate noise levels of 50 to 55 dBA at a distance of 50 feet.
(4) *Rooftop-Mounted Mechanical Equipment.* Noise generated by rooftop-mounted mechanical equipment varies significantly depending on the type of equipment and the size. Based on measurements made at similar stores, a noise level of 60 to 70 dBA at a distance of 50 feet from the mechanical equipment would be typical.
(5) *Trash Compactors.* Trash compactors typically generate maximum noise levels of 45 to 50 dBA at 150 feet, depending on the power rating and enclosure characteristics.

(6) *Parking Lot Cleaning.* Typically, the parking area surface at a shopping center is periodically cleaned using small mechanical parking lot sweepers and handheld back-mounted leaf blowers. Noise measurements conducted of this type of operation at a distance of 150 feet determined that the noise levels generated by the parking lot sweepers was not measurable but that the noise levels generated by leaf blowers ranged from 60 to 70 dBA at a distance of 150 feet.
(7) *Parking Lot Activity.* Noise measurements conducted at parking lots indicate that at a distance of 150 feet, maximum noise levels generated by cars or trucks passing by, doors slams, and engines starting range from about 47 to 52 dBA.

Based on the layout of the proposed retail development, the relative distances from surrounding noise sensitive land-uses, and the use of line source (for truck passbys) and point source (for loading and unloading trucks, mechanical equipment, trash compactors, and parking lot noises) sound attenuation models, we have determined that noise levels generated by the operation of the retail development would be at or below the existing average (Leq) noise levels at all adjacent noise sensitive receptors.

IMPACTS AND MITIGATION MEASURES

Significance Criteria
Noise impacts associated with the proposed retail development would be considered significant if the noise levels generated by activity on the site would exceed the noise level performance standards contained in the City of Morgan Hill's General Plan Noise Element (see Appendix B).

IMPACT 1a: Traffic Noise Impacts on ~~Adjacent~~ Noise Sensitive Land Uses across for the Project Site
The proposed project on Cochrane Road would result in traffic noise on adjacent land uses of 3dBA or more in areas exceeding an Ldn of 60 dBA. *This is a significant impact.*

Our analysis has shown that traffic related to the development and use of the retail site will result in an increase in noise levels along Cochrane Road under existing conditions of between 2 to 6 decibels between Hwy 101 and east of Mission View Drive, with an increase of 4 dBA at the two homes on the south side of Cochrane Road across from the project. This would increase the L_{dn} at these homes to 68 dBA under existing conditions.

Future noise levels with project traffic versus those without project traffic ~~project traffic~~ would be 2 to 4 decibels higher along Cochrane Road, with an increase of 3 dBA at the two homes on the south side of Cochrane Road across from the project. This would increase the L_{dn} at these homes to 70 dBA under future conditions with the project.

MITIGATION 1a: ~~Traffic Noise Impacts on Adjacent Land Uses.~~
~~The two existing residential uses south of the project site and all other noise sensitive uses adjacent to Cochrane Road should noise sensitive uses~~

~~Current~~ Nnoise levels at the existing residences south of Cochrane Road across from the project site currently exceed the City's normally acceptable noise levels of 60 dBA L_{dn}. ~~-~~Mitigation measures at the residences on the south side of Cochrane Road across from the project ~~se residences and all other noise sensitive uses adjacent to Cochrane Road~~ should be developed to reduce noise level increases due to project generated traffic. A possible mitigation measures to reduce this noise impact includes the construction of noise barriers along the roadway, however this measure may not be feasible due to the need for access to these properties or where any walls that could be effective may raise safety concerns and be visually and aesthetically intrusive. In addition, front yards are not usually the primary outdoor use areas. Acoustical treatments to the residential structures such as replacing existing windows with sound rated windows and providing mechanical ventilation could mitigate the noise increase attributable to the project. The noise reduction required of the replacement windows could be determined by field measurement, as would the need for mechanical ventilation.

IMPACT 1b: Traffic Noise Impacts on Noise Sensitive Land Uses southeast of the Cochrane Road/Mission View Drive intersection

The proposed project on would result in traffic noise level increases at the noise sensitive land uses southeast of the Cochrane Road/Mission View Drive of up to 4 dBA with a future noise level project to be less than 60 dBA at these uses with the existing sound wall in place. *This is not a significant impact.*

MITIGATION 1b: None Required

IMPACT 2: Traffic Noise Impacts on the Project

Noise levels on the site at the setback of the proposed Retail development would be considered conditionally acceptable for commercial use. *Given the existing site plan and standard building construction techniques, this would not be considered a significant impact.*

Based on the results of our noise analysis, the facades of the retail development closest to Cochrane Road and Hwy 101 would be exposed to an Ldn of 70 dBA or less. According to the noise and land use compatibility guidelines contained in the Noise Element of the City of Morgan Hill's General Plan, this level of noise would fall within the normally acceptable range for commercial uses.

MITIGATION 2: Traffic Noise Impacts on the Project

None Required

IMPACT 3: Operational Project Generated Noise

Noise levels generated by the operation of the retail development would be at or below the existing average (Leq) noise levels at all existing adjacent noise sensitive receptors. *This is not a significant impact.*

MITIGATION 3: Operational Project Generated Noise

None Required

IMPACT 4: Construction Noise

Construction activities at the project site would temporarily elevate noise levels on the project site with maximum noise levels ranging from 79-89 dB at 50 feet from the activities. *This is considered a potentially significant impact but would be less than significant with mitigation.*

During the construction phases of the proposed project, noise from construction activities would add to the noise environment in the project area affecting two single family homes located south of Cochrane Road, as well as residential uses located at the southeast corner of Mission View Drive and Cochrane Road, approximately 1,000 feet to the north, and 1,300 feet east of the project site. Noise generated during construction would differ depending on the construction phase and the type and amount of equipment used at the construction site. Construction activities would include site grading, removal of material, construction of new exterior walls and roof, exterior and interior finishing, and the installation of equipment. The highest noise levels would be generated during site grading when heavy equipment would be used to remove materials and grade the site, with somewhat lower noise levels occurring during building construction and finishing. Activities involved in construction could generate maximum noise levels, as indicated in Table 1, ranging from 71 to 89 dB at a distance of 50 feet. At the two single family homes located south of Cochrane Road, these noise levels would be reduced to between 59 to 77 dBA, while at the residential uses located approximately 1,000 feet to the north and 1,300 feet east of the project site construction noise on the site would produced levels of between 45 and 63 dBA. Noise would also be generated during the construction phase by increased truck traffic and commute trips on area roadways. A significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would likely occur primarily during daytime hours.

Table 2:Typical Ranges of Energy Equivalent Noise Levels at 50 Feet, L_{eq} in dBA, at Construction Sites

Construction Activity	Type of Project being Constructed					
	Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II
Ground Clearing	84	84	84	83	84	84
Excavation	89	79	89	71	88	78
Foundations	78	78	77	77	88	88
Erection	87	75	84	72	79	78

Finishing	89	75	89	74	84	84
I - All pertinent equipment present at site. **II** - Minimum required equipment present at site.						

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. However, because construction activities would result in periods of elevated noise levels during the evening and/or early morning hours that may exceed the thresholds for sensitive receptors in the project area, this impact is considered **potentially significant**. The following mitigation measure would reduce this potentially significant impact to a less than significant level.

MITIGATION 4: Construction Noise

In compliance with Section 8.28.040 of the *City of Morgan Hill Municipal Code*, construction at the project site shall be limited to 7:00 AM to 8:00 PM, Monday through Friday, and between the hours of 9:00 AM to 6:00 PM on Saturdays. Construction activities shall be prohibited on Sundays or Federal Holidays.

Implementation of the above measure would reduce construction related noise impacts to a **less than significant level** by requiring that construction activities take place only during specified times and that standard construction practices attenuate the affects of noise as much as possible in order to ensure that sensitive receptors in the vicinity of the project site are not adversely affected by the proposed project.

APPENDIX A

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. *A decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table A1.

Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL*, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level,* L_{dn}, is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

TERM	DEFINITIONS
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, HZ	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dB	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Definitions Of Acoustical Terms | **Table A1**

ILLINGWORTH & RODKIN, INC.*/Acoustical Engineers*

There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table A2.

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
Civil Defense Siren (100')	140		
Jet Takeoff (200')	130		
	120		
Diesel Pile Driver (100')	110	Rock Music Concert	Pain Threshold
	100		
Freight Cars (50') Pneumatic Drill (50') Freeway (100') Vacuum Cleaner (10')	90	Boiler Room Printing Press Plant	Very Loud
	80		
	70	In Kitchen With Garbage Disposal Running	
Light Traffic (100') Large Transformer (200')	60		Moderately Loud
	50	Data Processing Center	
	40	Department Store	
Soft Whisper (5')	30	Private Business Office	Quiet
	20		
	10	Quiet Bedroom	
	0	Recording Studio	Threshold of Hearing

Typical Sound Levels Measured in the Environment and Industry — **Table A2**

ILLINGWORTH & RODKIN, INC./Acoustical Engineers

The thresholds for speech interference indoors are about 45 dBA, if the noise is steady, and above 55 dBA, if the noise is fluctuating. Outdoors these thresholds are about 15 dBA higher. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}.

Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. As discussed above, this standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.

Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Therefore, with typical construction, sleep and speech interference is possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if windows are closed.

APPENDIX B
CITY OF MORGAN HILL NOISE GUIDELINES

Goal 7. Prevention of noise from interfering with human activities or causing health problems

Policies

7a. New development projects shall be designed and constructed to meet acceptable exterior noise level standards (see *Table 9*), as follows:

- The maximum exterior noise level of 60 dBA Ldn shall be applied in residential areas where outdoor use is a major consideration (e.g., backyards in single family housing developments and recreation areas in multi-family housing projects). Where the City determines that providing an Ldn of 60 dBA or lower cannot be achieved after the application of reasonable and feasible mitigation, an Ldn of 65 dBA may be permitted.
- Indoor noise levels should not exceed an Ldn of 45 dBA in new residential housing units.
- Noise levels in new residential development exposed to an exterior Ldn of 60 dBA or greater should be limited to a maximum instantaneous noise level (e.g., trucks on busy streets, train warning whistles) in bedrooms of 50 dBA. Maximum instantaneous noise levels in all other habitable rooms should not exceed 55 dBA. The maximum outdoor noise level for new residences near the railroad shall be 70 dBA Ldn, recognizing that train noise is characterized by relatively few loud events.

7b. The impact of a proposed development project on existing land uses should be evaluated in terms of the potential for adverse community response based on significant increase in existing noise levels, regardless of compatibility guidelines.

7c. Appropriate interior noise levels in commercial and industrial structures are a function of the use of the space and should be evaluated on a case-by-case basis.

7d. Interior noise levels in office buildings should be maintained at 45 dBA Leq (hourly average) or less, rather than 45 dBA Ldn (daily average).

7e. Noise level increases resulting from traffic associated with new projects shall be considered significant if: a) the noise level increase is 5 dBA Ldn or greater, with a future noise level of less than 60 dBA Ldn, or b) the noise level increase is 3 dBA Ldn or greater, with a future noise level of 60 dBA Ldn or greater.

7f. Noise levels produced by stationary noise sources associated with new projects shall be considered significant if they substantially exceed ambient noise levels.

7g. Noise levels produced by other noise sources (such as ballfields) shall be considered significant if an acoustical study demonstrates they would substantially exceed ambient noise levels.

Actions

7.1 Assess and track noise levels when specific projects are proposed to determine the continued accuracy of the Noise Contour map. If necessary, based on these assessments, update the future noise contour map to reflect changed conditions.

7.2 The Noise Contour map shall be used to screen projects to determine if acoustical studies shall be required.

7.3 Require attention to site planning and design techniques other than sound walls to reduce noise impacts, including: a) installing earth berms, b) increasing the distance between the noise source and the receiver; c) using non-sensitive structures such as parking lots, utility areas, and garages to shield noise-sensitive areas; d) orienting buildings to shield outdoor spaces from the noise source; and e) minimizing the noise at its source.

7.4 Amend the Zoning Ordinance to reflect noise limits intended to protect noise sensitive land uses from intrusion by stationary noise sources.

Goal 8. Protection from noise associated with motor vehicles and railroad activity

Policies

8a. Roadway design, traffic signalization and other traffic planning techniques (such as limiting truck traffic in residential areas) shall be used to reduce noise caused by speed or acceleration of vehicles.

8b. If noise barriers are deemed the only effective mitigation for development along major transportation corridors, an acoustical analysis shall be conducted to determine necessary dimensions.

8c. The maximum height of sound walls shall be eight feet. Residential projects adjacent to the freeway shall be designed to minimize sound wall height through location of a frontage road, use of two sound walls or other applicable measures. Sound wall design and location shall be coordinated for an entire project area and shall meet Caltrans noise attenuation criteria for a projected eight-lane freeway condition. If two sound walls are used, the first shall be located immediately adjacent to the freeway right-of-way and the second shall be located as necessary to meet Caltrans noise requirements for primary outdoor areas. The minimum rear yard setback to the second wall shall be 20 feet.

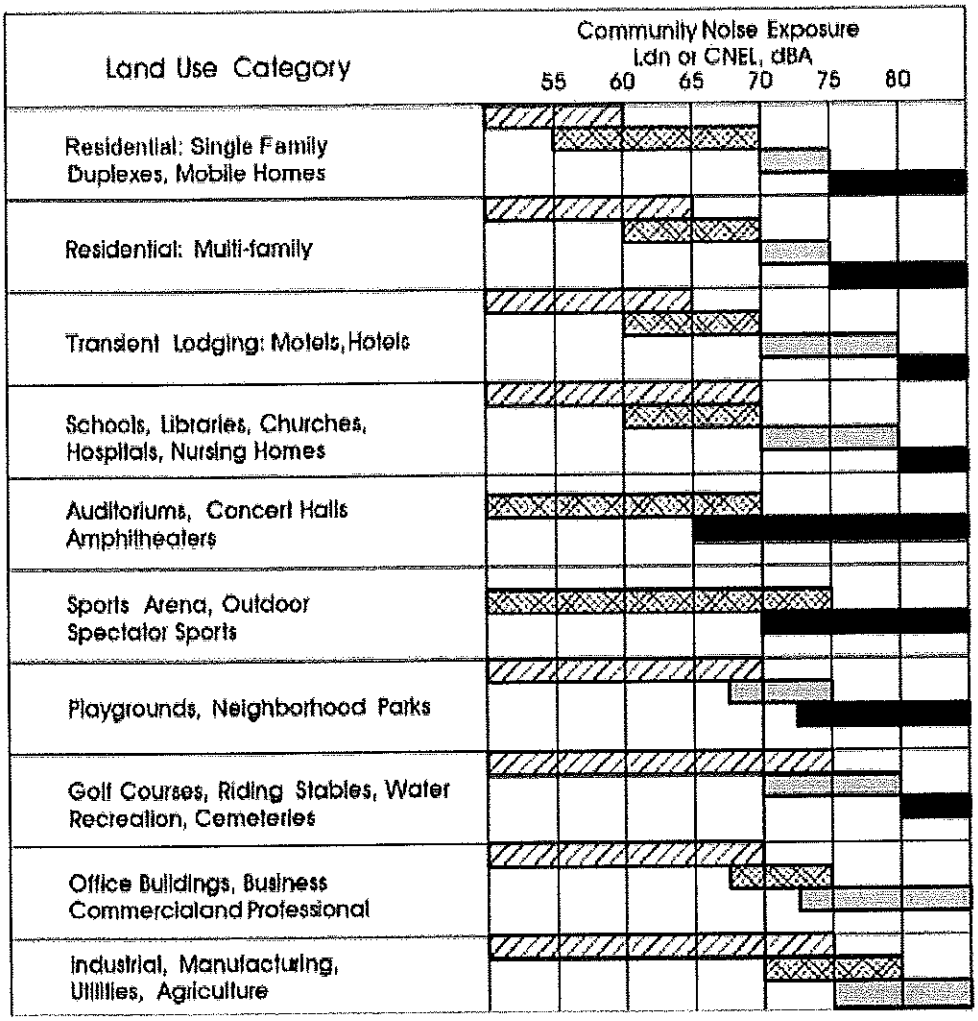
8d. Ensure that sound barriers do not become targets for vandalism.

Actions

8.1 Allow and encourage earth berms in new development projects as an alternative to sound walls if adequate space is available.

8.2 Require non-earthen sound barriers to be landscaped, vegetated or otherwise designed and/or obscured to improve aesthetics and discourage graffiti and other vandalism.

Table 9. Acceptable Noise Levels



INTERPRETATION

NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE

New construction or development should generally not be undertaken.

Source: Office of Planning and Research, State of California General Plan Guidelines, Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1990.