

2.0 SITE CHARACTERIZATION

2.0.0.0.1 This section describes the location, history, and physical features of East Elliott as well as the nature and extent of OE contamination at this site. Background information on historical activities at East Elliott was gathered from several sources, including the *Formerly Used Defense Site Camp Elliott (East Elliott), San Diego, California, Final Archives Search Report* (Montgomery Watson, 1995), and personnel interviews and site visits conducted by Montgomery Watson during the period from February 1996 to August 1999. This information has also been supplemented with data collected by CMS Environmental, Inc. (CMS) during the field investigation in late 1996 and presented in the *OE Sampling Draft Removal Report, Camp Elliott (East Elliott), California* (CMS, 1997), and with data collected by Human Factors Applications, Inc. (HFA) during the Time-Critical Removal Action performed in 1998 and 1999 and presented in the *Draft Removal Report, OE Removal Action, East Elliott, San Diego, California* (HFA, 1999).

2.1 SITE DESCRIPTION AND BACKGROUND

2.1.0.0.1 The following sections describe the location, history, physiography, geology, soils, hydrology, climate, flora, and fauna of East Elliott. Current and future land uses at the site are also presented.

2.1.1 Site Location and Description

2.1.1.0.1 East Elliott is an approximately 3,200-acre (5-square-mile), roughly rectangular area approximately 12 miles northeast of downtown San Diego, California (Figures 1-1 and 1-2) and immediately west and northwest of the City of Santee, California. East Elliott comprises the southeast corner of former USMC Camp Elliott, a training facility that was active in the 1940s and 1950s and once occupied 30,500 acres.

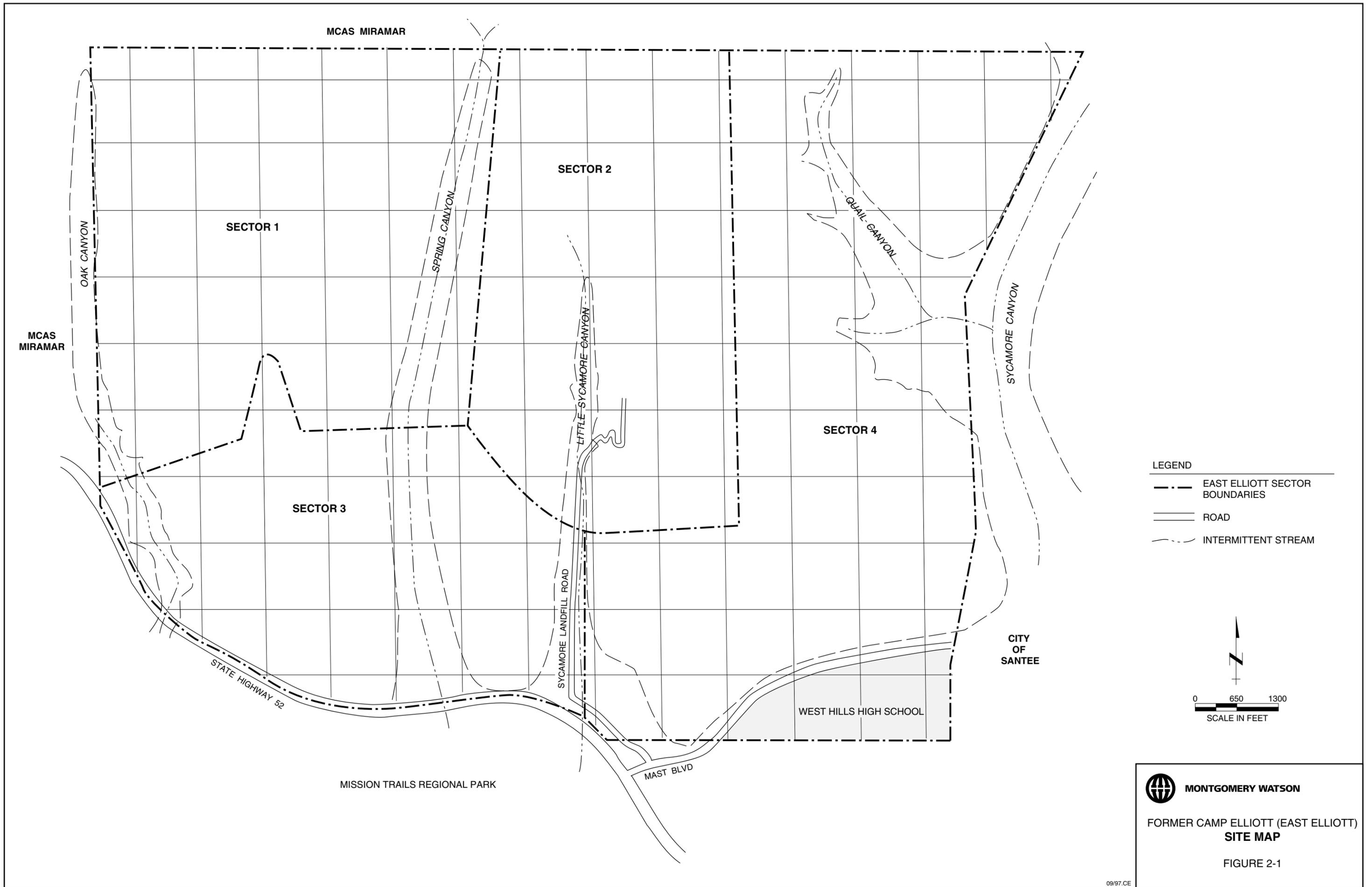
2.1.1.0.2 The site is mostly undeveloped. Narrow ridges and canyons trend north to south through the site. Intermittent streams flow southward toward the San Diego River, which is approximately 0.4 miles south of East Elliott. Topography is typified by moderate to steep slopes that are predominantly vegetated with native grassland, coastal sage or black sage habitat, or chaparral. Deciduous trees and other riparian vegetation are locally abundant in the two largest canyons in East Elliott, Oak Canyon and Spring Canyon ([Figures 2-1 and 2-2](#)). Several dirt roads and trails are located within East Elliott, particularly along ridges and within canyons. Many of these roads are accessible only by 4-wheel-drive vehicles. Most access to the site is provided by roads and trails that enter East Elliott from the south and east.

2.1.1.0.3 East Elliott lies within the San Diego city boundaries and is bordered by the following features ([Figure 2-1](#)):

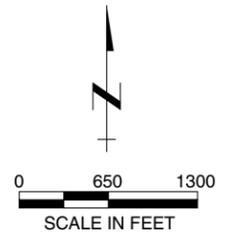
- Oak Canyon to the west;
- Marine Corps Air Station (MCAS) Miramar to the north and west;
- Sycamore Canyon to the east;
- the City of Santee to the east and south;
- State Highway 52 and Mission Trails Regional Park to the southwest.

2.1.1.0.4 The area north and west of East Elliott is owned by the DOD and is currently part of MCAS Miramar. The developed portion of MCAS Miramar is located 4 miles to the west of East Elliott. The area within MCAS and adjacent to East Elliott is largely undeveloped. The boundary between MCAS Miramar and East Elliott is not fenced, but “no trespassing signs” are posted at regular intervals. The physical features of East Elliott are described in greater detail in [Section 2.1.3](#) of this EE/CA. Current land uses are described in [Section 2.1.4](#).

2.1.1.0.5 The area immediately east and south of East Elliott is privately owned and composed of single-family residential neighborhoods within the City of Santee and public open space/recreational lands lying within the valley floor of Sycamore Canyon. Access along the eastern boundary of East Elliott is partially restricted by discontinuous residential-style fencing. Backyard gates also provide access to East Elliott from most dwellings along the site boundary.



- LEGEND**
-  EAST ELLIOTT SECTOR BOUNDARIES
 -  ROAD
 -  INTERMITTENT STREAM



 **MONTGOMERY WATSON**

FORMER CAMP ELLIOTT (EAST ELLIOTT)
SITE MAP

FIGURE 2-1

2.1.1.0.6 Mission Trails Regional Park, operated by the City of San Diego Park and Recreation Department, is southwest of East Elliott. State Highway 52, which borders Mission Trails Regional Park to the north, skirts the southwest perimeter of East Elliott. Tierrasanta, a residential community and commercial area developed in the southwest portion of the former Camp Elliott, is southwest of Mission Trails Regional Park ([Figure 2-3](#)). East Elliott is accessible to pedestrians, equestrians, or cyclists from adjacent portions of Mission Trails Regional Park by unimproved trails along Spring and Oak canyons. Motor vehicle traffic is restricted by locked gates. The site is most accessible via State Highway 52 underpasses that enter Oak and Spring canyons ([Figure 2-1](#)).

2.1.1.0.7 Access to the southern portion of East Elliott is unrestricted except for a chain-link fence along State Highway 52 and the entry gate that serves the Sycamore Landfill in the center of East Elliott. An unnamed dirt road through Spring Canyon crosses beneath an overpass for State Highway 52 and enters East Elliott from the south. Motor vehicular access to this road is restricted by a locked gate near the interchange of State Highway 52 and Mast Boulevard. Another unnamed dirt road enters East Elliott from Mast Boulevard across from West Hills High School ([West Hills Home Page, 1997](#)).

2.1.2 Camp Elliott History

2.1.2.0.1 This section presents an overview of the history of Camp Elliott. Information was derived from a number of sources, including previously published studies and investigations, archival information, newspaper articles, and information from public agencies in San Diego. The area encompassing former Camp Elliott has been used by the military since World War I. The history of Camp Elliott from 1917 to the present is summarized in [Table 2-1](#). A more detailed discussion of the history of Camp Elliott is presented in the Archives Search Report ([Montgomery Watson, 1995](#)).

2.1.2.0.2 As presented in [Table 2-1](#), the past uses of Camp Elliott have been divided into the following four general periods:

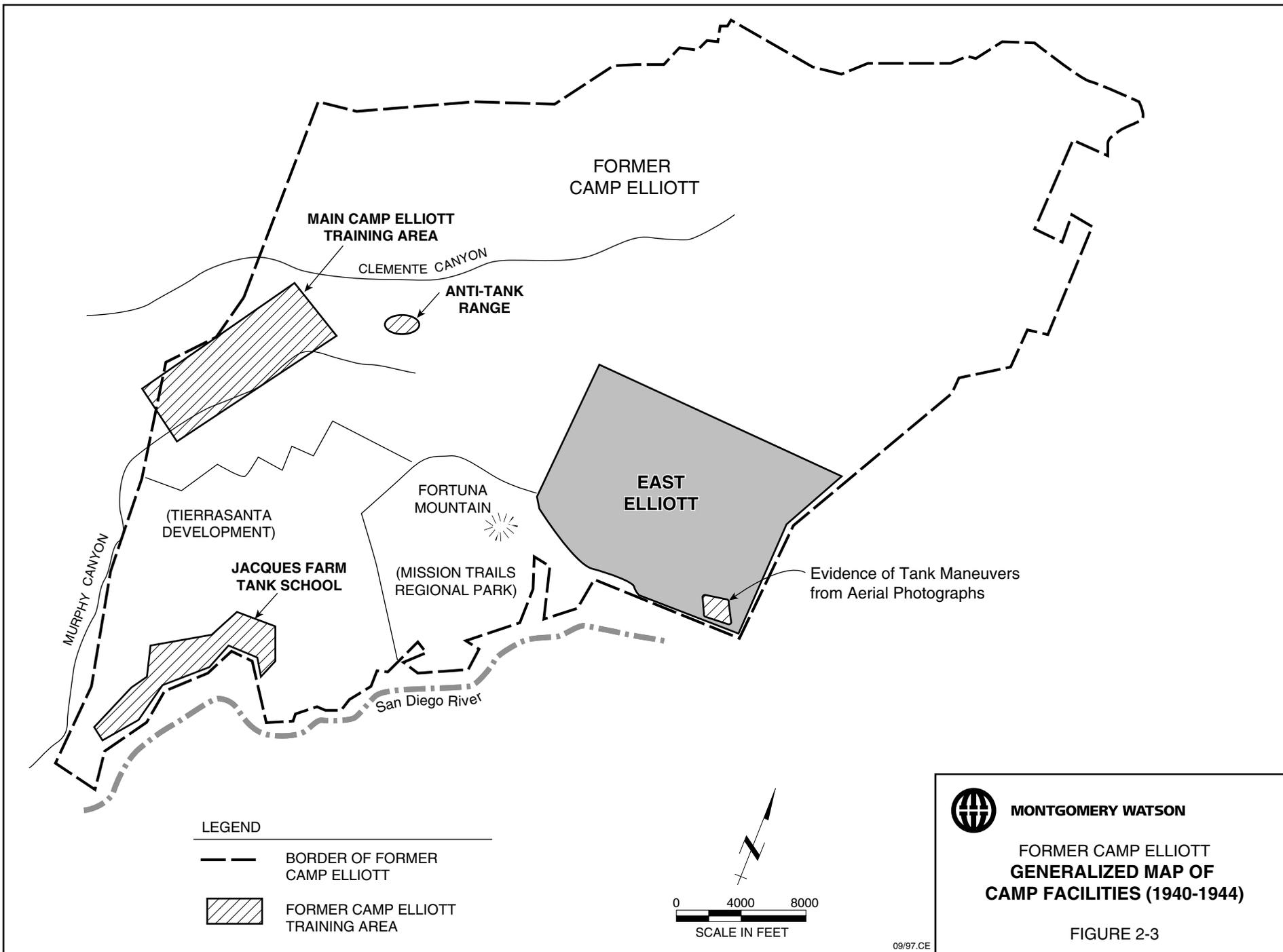


TABLE 2-1
HISTORICAL SUMMARY
FORMER CAMP ELLIOTT (EAST ELLIOTT)
(Page 1 of 3)

Date	Event/Milestone
Camp Kearney, World War I (1917 to 1940):	
1917	Camp Kearney, consisting of 8,000 acres, opened, quartering the National Guard 40 th Infantry Division, National Guard 157 th , 158 th , 159 th , & 160 th Infantry Regiments.
1917 to 1919	Gunnery training ranges established/used at Camp Kearney (located south of main portion of land that was to become Camp Elliott).
1920s & early 1930s	Camp Kearney closed and land that was to become Camp Elliott reportedly lay fallow.
1934	USMC leased 19,298 acres for training. Temporary buildings were constructed and troops reportedly practiced artillery, anti-aircraft, and machine gun firing.
Camp Elliott, World War II (1940 to 1945):	
1940 to 1944	USMC developed a training center (originally designated Camp Holcomb) and renamed Camp Elliott, which consisted of approximately 30,500 acres.
1942	Fleet Marine Force Training Center was located at Camp Elliott. Tank School at Jacques Farm (southwest corner of Camp Elliott) was activated. Operations Section, Gunnery Department training included 178 hours, with 60 percent devoted to field work including live firing. The Anti-Tank Section was activated at Camp Elliott. Equipment included half track-mounted 75-mm, and jeep-mounted 37-mm guns. Training included live firing at stationary and moving targets at tank ranges.
1943	Camp Elliott artillery drove to USMC Camp Dunlap at Niland, California (165 miles northeast of San Diego) for live-firing practice.
1944	The USMC relocated to Camp Pendleton and Camp Elliott reverted to USN use.
Camp Elliott, post-World War II (1944-1960):	

TABLE 2-1
HISTORICAL SUMMARY
FORMER CAMP ELLIOTT (EAST ELLIOTT)
(Page 2 of 3)

Date	Event/Milestone
1944 to 1953	Camp Elliott was used as a USN Training and Redistribution Center with no live-fire weapons training.
1953 to 1960	Camp Elliott served miscellaneous military uses (USN Rehabilitation/Retraining Center, USN Supply Center, USMC Reserves Training Center).
1958	USMC 1st Tank Battalion transferred to Camp Elliott. M-48 tanks were prohibited from using main 90-mm guns or machine guns because of aircraft. Tank combat training was conducted at Twentynine Palms or Camp Pendleton.
Post-closure (1960 to August 1999):	
1960	Camp Elliott was closed. 7,709 acres in the north and central portions of Camp Elliott were transferred to Naval Air Station (NAS) Miramar and 2,691 acres were transferred to the USAF.
1960	Camp Elliott was annexed by City of San Diego from the County.
1961	Approximately 15,000 acres (including East Elliott) were declared surplus land.
1962	City of San Diego prepared the Elliott Community Plan.
1962 to 1974	U.S. Government sold most of the surplus land, including East Elliott, to a number of real estate developers and private parties.
1964	San Diego County began operation of Sycamore Canyon Landfill in East Elliott (Little Sycamore Canyon).
1964	Ordnance cleared from former Camp Elliott by USN (detailed records not available).

TABLE 2-1
HISTORICAL SUMMARY
FORMER CAMP ELLIOTT (EAST ELLIOTT)
(Page 3 of 3)

Date	Event/Milestone
1965	Ordnance cleared from former Camp Elliott by USMC (detailed records not available).
April 1972	The East Elliott Community Plan was adopted by the San Diego City Council.
late 1973	U.S. Army ordnance clearance of Tierrasanta and Mission Trails areas included 5,160 acres. Ninety-three OE items found, most on the west face of Fortuna Mountain and in Tierrasanta canyons.
December 1983	Two young residents of the Tierrasanta housing community were accidentally killed after they found UXO in an adjoining canyon.
June 1984	US Army 70 th EOD East Elliott ordnance survey was conducted. Survey found moderate to heavy OE contamination on ridges in southeast portion of East Elliott.
February 1993	San Diego City Council deferred development plans for East Elliott until the city completes evaluation of possible new landfill in the Oak/Spring Canyon area. Three competing land use plans discussed including landfill, open space, or planned residential.
1997	NAS Miramar converted to MCAS Miramar. San Diego County sold Sycamore Canyon Landfill to a private corporation, Allied West Industries. Landfill expansion operations continue. San Diego Gas and Electric (SDG&E) began construction to re-route transmission lines around proposed landfill expansion.

Reference: [Montgomery Watson, 1995.](#)

- Camp Kearney, World War I (1917 to 1940);
- Camp Elliott, World War II (1940 to 1945);
- Camp Elliott, post-World War II (1945 to 1960); and
- Post-closure (1960 to August 1999).

2.1.2.0.3 The history of ordnance-related activities has been researched through a thorough review of records, maps, photographs, and interviews with personnel formerly assigned to Camp Elliott. Although documentation of the use of ordnance in East Elliott has not been found, OE, including UXO and inert ordnance (OE scrap), were found at several locations in East Elliott between 1978 and 1996. The majority of this OE appears to lie within the southeast quadrant of East Elliott (Sector 4), on a series of ridges southeast of the Sycamore Landfill, east of Little Sycamore Canyon, and west of Sycamore Canyon ([Figure 2-2](#)). Historical air photos were reviewed during preparation of the Archives Search Report ([Montgomery Watson, 1995](#)). Based on the pattern of tracks shown on the historical air photos of the site, as well as the orientation of the ordnance found during previous investigations, it was deduced that a tank training and firing area was located in the southeast corner of East Elliott in the area now occupied by West Hills High School. A copy of this air photo and an enlargement of the portion of the photo showing the probable tank training and firing area are included in [Appendix A-1](#).

2.1.2.1 World War I Era

2.1.2.1.1 Camp Kearney, an Army training installation commissioned in May 1917 on Kearney Mesa (near the present-day location of MCAS Miramar), was home to the National Guard 40th Infantry Division and four National Guard infantry regiments. Along with these regiments, at least three field artillery detachments were stationed at Camp Kearney from 1917 to 1918 ([Table 2-1](#)).

2.1.2.1.2 There is the potential for OE contamination in the general area of Camp Elliott resulting from artillery training during World War I. Troops appear to have been trained in live-fire artillery at a range southeast of Camp Kearney (near the area that was to become the center of Camp Elliott). According to the 1918 topographic map of the camp, artillery was fired toward a

target area approximately 1-3/4 miles to the northeast and just north of the head of Murphy Canyon ([Montgomery Watson, 1995](#)). This area is 6 miles west of East Elliott. However, no ordnance-related activities were conducted in the East Elliott area from 1920 to early 1940.

2.1.2.2 World War II Era

2.1.2.2.1 In 1940, the USMC established Camp Holcomb as a development and training center on 19,000 acres that were renamed Camp Elliott in June of that year. Camp Elliott, which was expanded to approximately 30,500 acres, housed the Second Marine Division and later served as home to the USMC Headquarters Command, Fleet Marine Training Center, Troop Training Unit, Marine Barracks, and Base Depot. Specialty camps were established within or near Camp Elliott for parachutists (Camp Gillespie to the southeast); scouts, snipers and officer candidates (Green's Farm in the north-central portion of Camp Elliott); replacement troops awaiting overseas posting (Linda Vista Camp); and tank training (Jacques Farm).

2.1.2.2.2 Of particular interest from the standpoint of ordnance use was the Camp Elliott Tank School at Jacques Farm, which was activated in 1942 ([Montgomery Watson, 1995](#)). Jacques Farm was approximately 6.4 miles southwest of East Elliott ([Figure 2-3](#)). The tank school training included live firing exercises with 37-mm and 75-mm guns and machine guns. Previous studies of the Tierrasanta area ([DJG, 1988](#)) compiled a firing range map based on interviews and the nature and extent of comparatively abundant ordnance contamination on the west face of Fortuna Mountain ([Figure 2-3](#)). The results of ordnance investigations suggested that most of this firing was directed toward the northeast, relying on Fortuna Mountain as a natural backstop. Stray ordnance fired over Fortuna Mountain may have resulted in ordnance contamination in the vicinity of East Elliott.

2.1.2.2.3 In November 1942, an Anti-Tank Section was activated at Camp Elliott. Anti-tank equipment included half track-mounted 75-mm guns and jeep-mounted 37-mm guns. Training included live firing at stationary and moving targets at anti-tank ranges, one of which appears to have been approximately 2 miles west of East Elliott and 2/3 mile east of the main

Camp Elliott (Figure 2-3). Firing from this range was probably toward the east in the direction of Sector 1 in East Elliott (Montgomery Watson, 1995). According to the Archives Search Report for Naval Air Station (NAS) Miramar (USACE Rock Island District, 1996), currently MCAS Miramar, live 75-mm armor-piercing cap (APC) and 37-mm slugs were found at this anti-tank range. In addition, evidence of OE in the impact area extending from the anti-tank range to the western boundary of East Elliott included 60-mm to 150-mm high explosive (HE) rounds, 60-mm to 81-mm HE mortar fins, 3.5-inch bazooka rockets, and a live M49 trip flare. Furthermore, it was reported that white phosphorus (WP) rounds were likely to have been fired by mortar and artillery crews (USACE Rock Island District, 1996).

2.1.2.3 Post-World War II Era

2.1.2.3.1 Following World War II and up to 1953, Camp Elliott was used as a United States Navy (USN) Training and Redistribution Center where, reportedly, no live-fire weapons training was conducted. From 1953 to 1960, Camp Elliott assumed a variety of military uses including the station of the USMC 1st Tank Battalion. Tanks attached to this battalion were prohibited from using their main 90-mm guns or machine guns due to proximity of the NAS Miramar flight path. DOD usage of the East Elliott area ended with the closure of Camp Elliott in 1960 (Montgomery Watson, 1995).

2.1.2.3.2 Historical air photos (1949 and 1953) reviewed for the Archives Search Report show one small building within East Elliott at the mouth of Little Sycamore Canyon. However, the lack of a well-developed access road suggests that the building was little used. The most significant features depicted on these photos were a cluster of elliptical roadways in the southeast corner of East Elliott that appear to have been used for tank maneuvers. The road along the eastern perimeter of the site also appears to be well-developed and may have been used by military vehicles. Interviews with veterans confirm that the mesas and ridges in East Elliott were used for tank training maneuvers (Montgomery Watson, 1995). Ordnance located during the 1996 site investigation (Section 2.3) further suggests that the tanks were fired toward the

northwest and west from the southeast corner of East Elliott and the eastern perimeter road (Walker, pers. comm., 1997a).

2.1.2.3.3 After Camp Elliott closed in 1960, approximately 15,000 acres, including East Elliott, were declared surplus land by the DOD in 1961 and were transferred to the General Services Administration (GSA) for disposition. In 1962, the GSA solicited bids for sale of this land, and by 1974, sold most of the surplus land, including East Elliott, to real estate developers, private parties, and municipalities. The 3,200 acres that comprise East Elliott were sold to private individuals, developers, and the City of San Diego between 1963 and 1974 (USACE, 1991).

2.1.2.3.4 Since the 1970s, OE has been found in several locations at East Elliott. Most of these items are 37- and 75-mm shells, and ordnance fragments that were most likely used during tank firing practice. The majority of this OE was located in the southeast portion of East Elliott, adjacent to the City of Santee. In addition, brush fires in the East Elliott area have reportedly detonated UXO (Montgomery Watson, 1995). A more detailed discussion of the results of several OE investigations at East Elliott is included in Section 2.2.6 of this EE/CA.

2.1.2.4 Probable Sources of OE

2.1.2.4.1 Based on all the available information, the most likely source of OE in East Elliott appears to be weapons training in the early 1940s. No documentation was found of any weapons training facilities (firing points, etc.) or weapons firing maneuvers within East Elliott proper, but suspected firing points and ranges that may have resulted in ordnance contamination at East Elliott (Figure 2-3) were found. These sites include the following potential source areas:

- Possible tank firing area in the southeast corner of East Elliott.
- Jacques Farm, approximately 6.4 miles southwest of East Elliott.
- Main Camp Elliott firing point approximately 6.3 miles west of East Elliott.
- Anti-tank range approximately 2 miles west of East Elliott.

2.1.2.4.2 A firing fan map was evaluated in the Archive Search Report to test the hypothesis that the origin of East Elliott OE may have been stray projectiles from Jacques Farm that were intended for targets on or west of Fortuna Mountain. Assuming fan radii of approximately 7 miles (within the typical range of light artillery, medium artillery, and tank guns), the firing fans were shown to intersect almost all of East Elliott. In addition, these fans are so broad that they do not permit identification of “higher OE risk” areas within East Elliott (Montgomery Watson, 1995).

2.1.3 Physical Setting

2.1.3.0.1 The following section includes a description of the physiography, geology and soils, hydrology, climate, and flora and fauna at East Elliott.

2.1.3.1 Physiography

2.1.3.1.1 East Elliott lies within the coastal plain of the Peninsular Range physiographic province of Southern California. This area is characterized by prominent marine and alluvial terraces, locally interrupted by small mountains composed of crystalline rocks (DWR, 1967). The physiography of East Elliott is characterized by a series of subparallel, north-south-trending canyons that drain southward to the San Diego River, about 1/2 mile south of East Elliott. These canyons are separated by several ridges that have been heavily dissected by erosion. The canyons include (from west to east) Oak Canyon, Spring Canyon, Little Sycamore Canyon, and Sycamore Canyon (Figure 2-2). Quail Canyon, a smaller tributary canyon in the northeast part of East Elliott, converges with Sycamore Canyon from the northwest. The northern boundary of East Elliott is near the heads of these canyons.

2.1.3.1.2 The slopes of the ridges in East Elliott are moderate to steep (greater than 30 percent) and are vegetated with native grasses, coastal sage, black sage, and chaparral. Elevations range from 900 feet above mean sea level (msl) in the northwest corner of East Elliott to less than 320 feet above msl at the mouth of Spring Canyon near the southern edge of East

Elliott. The peak of Fortuna Mountain, less than 1 mile southwest of East Elliott, is 1,291 feet above msl. The floodplains of the San Diego River and Sycamore Canyon are immediately south and east of East Elliott, respectively. Photographs that show site physiography are in [Appendix A-2](#).

2.1.3.2 Geology and Soils

2.1.3.2.1 The geology of the San Diego area that encompasses East Elliott is grouped into two major units: 1) Jurassic-Cretaceous metamorphic and granitic rocks, and 2) the overlying sedimentary rock series ([CDMG, 1975](#)). Weathered outcrops of Cretaceous quartz diorite and/or gabbro are just inside the southwest and southeast boundaries of the site.

2.1.3.2.2 Sedimentary rocks unconformably overlie the basement complex within East Elliott. The sedimentary rocks are generally flat-lying with dips of less than 6 degrees. As a consequence, topography in the area consists of dissected terraces. Descriptions of the sedimentary units (from oldest to youngest) found within East Elliott have been compiled from a variety of resources and are presented in [Table 2-2](#). Landslides, while not extensively mapped in East Elliott, are abundant based on visual observations during site visits.

2.1.3.2.3 Several soil types have been identified within the East Elliott study area based on parent rock type and slope angle. The soils are generally referred to as various types of “sandy loam” (mixtures of sand, silt, and clay) with rocks. Soils are generally thickest in the canyon areas because of accumulation of unconsolidated materials in these areas. These soils also have higher moisture content and support more abundant vegetation. Elsewhere in East Elliott, soils are generally thin (i.e., less than 3 feet thick) and rocky ([DJG, 1988](#)).

2.1.3.3 Hydrology

2.1.3.3.1 The East Elliott area is part of the Upper San Diego River Basin ([James M. Montgomery, 1973](#)). Ephemeral streams in East Elliott canyons flow southward into the

TABLE 2-2
STRATIGRAPHIC SUMMARY
FORMER CAMP ELLIOTT (EAST ELLIOTT)

Stratigraphic Unit	Description
<u>Eocene La Jolla Group:</u>	
Friars Formation:	Nonmarine and lagoonal sandstone and with local interbeds of claystone and conglomerate. Erosion has stripped away younger deposits from outcrops within Sycamore Canyon, Quail Canyon, Little Sycamore Canyon Spring Canyon.
<u>Eocene Poway Group:</u>	
Stadium Conglomerate:	Alluvial cobble conglomerate with local beds and lenses of sandstone. This formation covers the bulk of East Elliott. Found above the canyons on slopes and terraces.
Mission Valley Formation:	Marine and nonmarine sandstone with beds and lenses of conglomerate. Exposed in a narrow band between outcrops of Stadium Conglomerate and Pomerado Conglomerate in ridges between Spring and Oak canyons. Not present east of Spring Canyon.
Pomerado Conglomerate:	Nonmarine cobble conglomerate with local beds and lenses of sandstone. Lithologically identical to Stadium Conglomerate; indistinguishable from Stadium Conglomerate where the two formations are not separated by the Mission Valley Formation.
<u>Pleistocene Stream Terrace Deposits:</u>	Poorly consolidated conglomeratic sand. Found along the length of the eastern boundary of East Elliott (Sycamore Canyon).
<u>Landslides:</u>	A few small rotational landslides have been identified within the study site in Friars Formation sediments. The areal extent of these slides is very small.
<u>Alluvium and Slope Wash:</u>	Poorly consolidated silt, sand, and cobbles derived from nearby canyons. Found at the southern boundary of the site at the mouths of Spring and Little Sycamore canyons.

Reference: [CDMG, 1975](#)

westward-flowing San Diego River. Streambeds are dry for the majority of the year, and flowing water is confined to episodic storm events during the annual rainy season (November to March). Important surface water hydrologic features adjacent to East Elliott include the San Diego River and Mission Canyon Reservoir to the south and southwest, respectively, and the Santee Recreational Lakes to the east. Long-term runoff records have been maintained for the San Diego River at the Mission Dam, about 2 miles southwest of East Elliott. Mean annual runoff from 1944 to 1970 was about 3,600 acre-feet per year ([James M. Montgomery, 1973](#)). Zero-flow conditions were noted during most of the 26 years covered by these records.

2.1.3.4 Climate

2.1.3.4.1 The region surrounding Camp Elliott typically experiences mild, somewhat wet winters and dry, warm summers. As measured at MCAS Miramar, average January temperatures range from 46 degrees Fahrenheit (°F) to 66°F. Average July temperatures range from 63°F to 80°F. Annual precipitation averages 10.6 inches. Prevailing winds are from the west/northwest from March through October, and from the east from November through February. Average wind speeds are roughly 5 knots throughout the year ([Western Regional Climate Center, pers. comm., 1997](#)). The area of the San Diego River Valley, 7 miles west of East Elliott, has an annual average rainfall of 14 inches and an average temperature of 63 °F ([James M. Montgomery, 1973](#)).

2.1.3.5 Flora and Fauna

2.1.3.5.1 The ecological habitats in East Elliott are native grasslands, coastal or black sage, chaparral, and riparian. Sparse grasslands are most prevalent at lower elevations east of Little Sycamore Canyon. Riparian habitat, composed of sycamore-alder woodlands ([Dames & Moore, 1991](#)), is limited to the largest canyons in East Elliott, Oak Canyon and Spring Canyon.

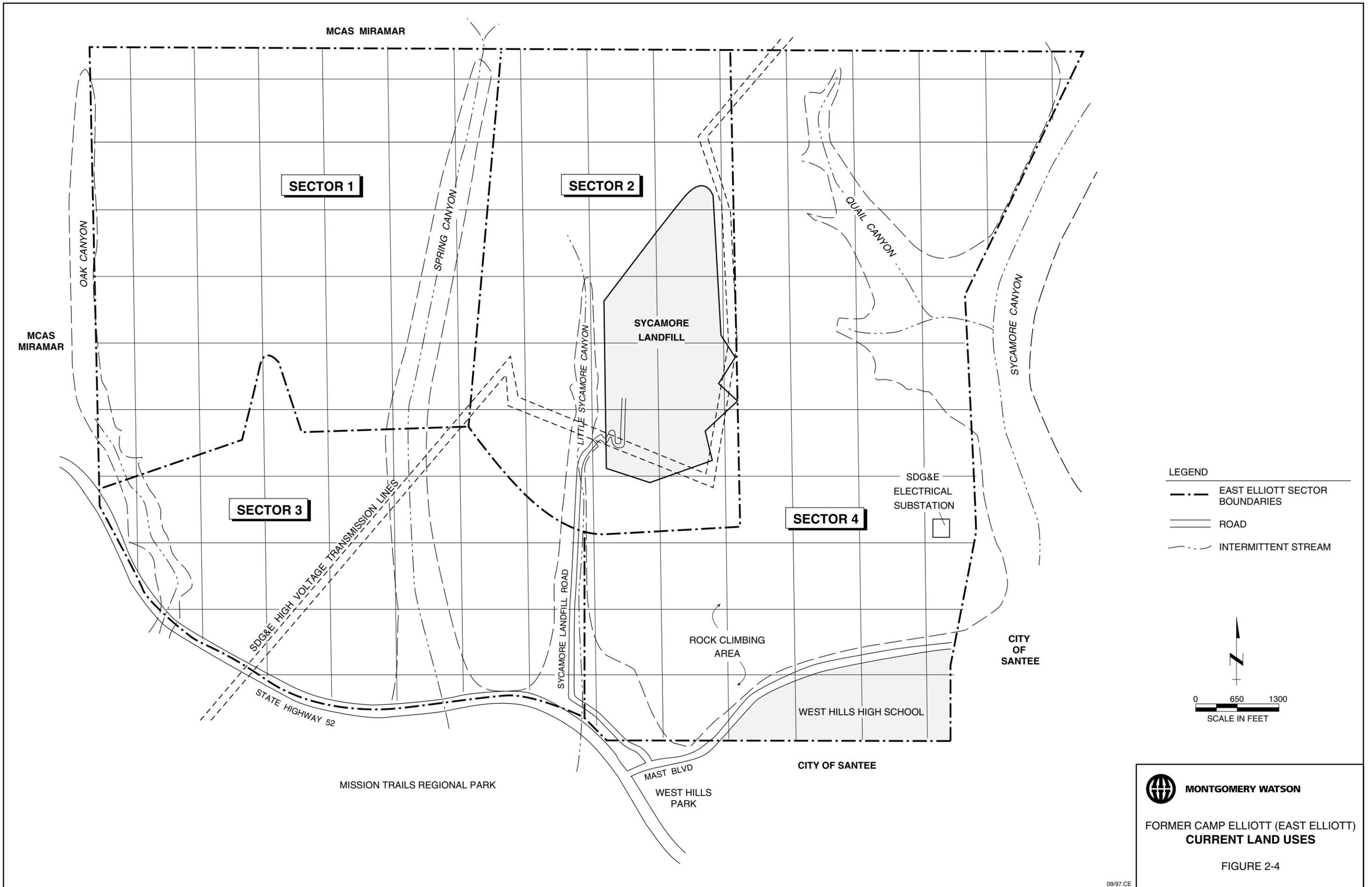
2.1.3.5.2 A variety of sensitive plant and animal species are likely to be present in the East Elliott area based on previous studies. The sensitive bird species of greatest potential concern in

East Elliott are: 1) least Bell's vireo (*Vireo bellii pusillus*, federal and state endangered status), which has been observed in the riparian habitat of Spring Canyon immediately south of East Elliott, and 2) the California gnatcatcher (*Polioptala californica californica*, federal threatened status and California species of special concern), which is a permanent resident of the coastal sage scrub habitat that is abundant in the western half of East Elliott. The coastal sage scrub habitat in which the California gnatcatcher resides is regarded as one of the rarest and most endangered habitats in the state of California. The presence of these two sensitive wildlife species within East Elliott impose seasonal restrictions on field investigations. The Environmental Assessment prepared for ordnance clearance at Mission Trails Regional Park (Dames & Moore, 1991) recommended: 1) avoidance of field work in least Bell's vireo habitat from March through September and 2) avoidance of California gnatcatcher habitat from February through August.

2.1.4 Current Land Uses

2.1.4.0.1 East Elliott consists of 165 individual parcels, including more than 85 private property owners; the cities of San Diego and Santee, California; several land development firms; two school districts; and a public utility company. Fire breaks and jeep trails across this area do not coincide with parcel boundaries. The pattern of present-day ownership is directly related to the U.S. government's efforts to dispose of East Elliott as excess land during the 1960s. All but two small parcels (comprising a narrow, 5-acre strip adjacent to MCAS Miramar) have been transferred to private (approximately 2,260 acres, or 70 percent) or municipal (approximately 940 acres, or 30 percent) ownership within East Elliott (Montgomery Watson, 1995). Based on data obtained from the County of San Diego Assessor's Office, approximately 20 percent of the privately owned parcels have been sold to other private parties in the last 3 years. A current list of property owners (as of July 1999) is provided in the East Elliott Public Involvement Plan (Montgomery Watson, 1999).

2.1.4.0.2 Current land use at East Elliott, as shown on Figure 2-4, consists of undeveloped open space and the Sycamore Landfill, a Class III sanitary landfill, formerly operated by the



County of San Diego Department of Public Works, Solid Waste Division. However, the landfill operation was sold in late 1997 to a private corporation, Allied West Industries ([Prasad, pers. comm., 1997](#)). Access to the landfill is by paved road from Mast Boulevard along State Highway 52, through an entry gate, and north up Little Sycamore Canyon to the landfill site. With a recent 53-acre expansion, the landfill currently encompasses approximately 170 acres. The landfill facilities include an operations building, regional recycling center, methane facility, and perimeter fence. The size of the landfill, upon completion of all disposal activities, will be approximately 500 acres. CEHNC and CESPL provided ordnance clearance (i.e., OE removal) in support of recent construction activities ([Section 2.4.1](#)).

2.1.4.0.3 A small electrical substation is located along the eastern boundary of East Elliott ([Figure 2-4](#)). The substation is surrounded by a chain-link fence and accessed by a short paved road extending from the residential neighborhoods to the east. Two parallel sets of high power transmission lines (in close proximity to each other) also traverse the site from the southwest to the northeast ([Figure 2-4](#)). Maintenance roads are present along the alignment of the transmission lines to provide access to the towers. Both the substation and the transmission lines are operated and maintained by San Diego Gas and Electric (SDG&E). SDG&E is also re-routing a portion of the transmission lines around the landfill expansion. CEHNC and CESPL provided ordnance clearance at the proposed locations of the transmission towers during the 1996 site investigation ([Section 2.3](#)).

2.1.4.0.4 A 76-acre parcel of land south of Mast Boulevard that is part of East Elliott has been developed by the Grossmont Union High School District as the site of the West Hills High School. A neighborhood park, West Hills Park, has also been recently constructed in the eastern portion of this parcel. The student enrollment at West Hills High School will be approximately 2,100 in Fall 1997 ([West Hills Home Page, 1997](#)).

2.1.4.0.5 The majority of East Elliott is undeveloped land, and unrestricted access along its southern boundary makes it attractive for a variety of recreational uses by hikers, motorcyclists, mountain bicyclists, etc. Several clusters of large boulders near the southeast corner of the site

are used by rock climbers (Figure 2-4) (Walker, pers. comm., 1997a). The mostly weekend recreational activities are most common in the southern and eastern areas of the site. In addition, several “children’s forts” were observed on the east side of East Elliott, including some shallow excavations (McCowan, pers. comm., 1999).

2.1.4.0.6 Based on site observations, illicit activities such as refuse dumping and underage drinking also occur at East Elliott. In addition, hunters observed at the site in December 1996 (CMS, 1997) were removed by authorities because hunting is an illegal activity in the East Elliott area.

2.1.4.0.7 While East Elliott is currently uninhabited, the neighboring residential areas in the City of Santee (to the east and southeast of East Elliott) experienced nearly two decades of continuous economic growth from the 1970s to the late 1980s, with increases in population and development pressures on land. The City of Santee, along with the entire Southern California region, experienced a sustained recession in the early 1990s. The pressure and incentive for land development lessened considerably during this recession, but may increase in response to recent economic growth.

2.1.5 Future Land Uses

2.1.5.0.1 Based on the research for the Archive Search Report, there appear to be three probable future land use scenarios for East Elliott: 1) dedicated open space (i.e., undeveloped) with habitat preserves and recreational use; 2) landfill construction; and 3) residential construction, consisting of a mix of single-family residential, institutional, and open space land uses.

2.1.5.0.2 Of the three land use scenarios described above, the combined landfill and open space scenario is judged to be the most probable, due to pressing concerns about landfill capacity for the City of San Diego, the City's evaluation of the Oak and Spring canyon areas as a new landfill site, the presence of the existing Sycamore Landfill, and concerns about habitat

preservation. However, the continued population growth and development of the San Diego area may result in increased pressure to develop privately owned parcels.

2.1.5.1 Open Space

2.1.5.1.1 The City of San Diego Planning Department has evaluated the biological resources of East Elliott in the context of its draft regional plans for open space and habitat protection. Of particular concern is the Multiple Species Conservation Program (MSCP), which seeks to preserve endangered habitat such as the coastal sage habitat, home to the California gnatcatcher. One of the land use options for East Elliott includes dedicated open space in this program.

2.1.5.1.2 The MSCP is a comprehensive habitat conservation planning program for southwestern San Diego County developed cooperatively by participating jurisdictions and special districts in partnership with the wildlife agencies, property owners, and representatives of the development industry and environmental groups. The purpose of the MSCP is to preserve a network of habitat and open space to protect biodiversity and to identify priority areas for conservation and other areas for future development. The MSCP Plan will serve as: 1) a multiple species Habitat Conservation Plan pursuant to Section 10(a) of the federal Endangered Species Act and, 2) a Natural Community Conservation Program (NCCP) pursuant to the California NCCP Act of 1991 and the state Endangered Species Act ([Ogden Environmental, 1996](#)).

2.1.5.1.3 The City of San Diego MSCP Subarea Plan includes areas of East Elliott north of Mast Boulevard, excluding the Sycamore Landfill and an area of developed land in the southwest portion of the site adjacent to the City of Santee. As part of the MSCP, the eastern portion of San Diego, including East Elliott, was surveyed for the presence of endangered, threatened or other sensitive species and habitat areas. East Elliott is included within a “core resource area,” which is defined as an area with a “high concentration of sensitive biological resources which, if lost, could not be replaced or mitigated elsewhere” ([Ogden Environmental, 1996](#)). Over 65 percent of the habitat within East Elliott is considered to be of “very high” value. Important habitats at the

site include coastal sage scrub (60 percent) and riparian scrub (2 percent). Sensitive species identified in the vicinity of East Elliott include willowy monardella, San Diego ambrosia, least Bell's vireo, and California gnatcatcher (Ogden Environmental, 1996).

2.1.5.1.4 According to the MSCP Subarea Plan, the City of San Diego proposes to preserve approximately 80 percent of the area encompassing East Elliott and Mission Trails Regional Park. The existing Sycamore Landfill would be maintained with eventual restoration as a passive preserve. If a City landfill is constructed within the Oak and Spring canyons area, the development footprint would not exceed 25 percent of the preserve area at any one time. Major issues identified for consideration for preserve management in the East Elliott area include erosion, off-road vehicle (ORV) use, incursion of exotic (non-native) species, and encroachment of existing development. Private land within East Elliott is currently considered potentially preserved. East Elliott has been identified as a Multi-Habitat Planning Area (MHPA) which may eventually include acquisition of up to 11,000 acres of private land from "willing" sellers at a "fair market value." The estimated value of land in the San Diego area is up to \$10,000 per acre. Of particular interest is the acquisition of canyon properties and other open space to provide habitat within an urbanized area. Some lands within the areas of habitat identified in the MSCP will be allowed to be developed as provided in the individual subarea plans. Overall management policies presented in the Elliott Community Plan (see Section 2.1.9.3), including the proposed system of open space, are incorporated by reference in the MSCP Subarea Plan (Ogden Environmental, 1996).

2.1.5.2 Landfill Construction

2.1.5.2.1 The City of San Diego, Refuse Disposal Division is considering the area of East Elliott between Oak and Spring canyons as a site for a new municipal landfill as shown on Figure 2-5 (Greenhalgh, pers. comm., 1997). The City of San Diego regards this area as the single best location for a new landfill and funds have been set aside to acquire private lands for this purpose. The new landfill would eventually occupy approximately 700 acres. However, as required by the MSCP Plan, the development footprint would not exceed 25 percent, or



approximately 175 acres of the total area at any one time. In addition, landfill support facilities could be constructed south of the proposed landfill site (Montgomery Watson, 1995). Design and construction operations are expected to begin between the years 2005 and 2010, with disposal beginning between 2012 and 2015, after the closure of the current city landfill in Miramar. Operations would continue for approximately 120 years (Greenhalgh, pers. comm., 1997).

2.1.5.2.2 Development of the new city and county landfills would likely have a dampening effect on residential development elsewhere in East Elliott. The site would eventually be restored and converted back to open space after landfill activities were complete.

2.1.5.3 Residential Construction

2.1.5.3.1 East Elliott is currently zoned R-1-40, a residential zoning class that permits single-family residential development with minimum lot sizes and improvement height limitations. Since 1984, various property owners (including land development firms such as Brehm Communities) have expressed an interest in developing their properties as a planned residential development (Montgomery Watson, 1995). These property owners have periodically voiced their concerns over potential ordnance contamination in East Elliott and have formally requested that the U.S. government clear ordnance from the area so that their properties would be suitable for development. Because of these concerns, the City of San Diego has been reluctant to issue building permits in the East Elliott area.

2.1.5.3.2 Residential development within East Elliott, if it occurs, would be guided by the Elliott Community Plan (City of San Diego Planning Department, 1971). The Elliott Community Plan, adopted in 1962 and revised in 1971, provides “a basis for application of existing or new controls primarily in the field of zoning and subdivision” and aids in “coordinating private development with the necessary public facilities and services in such a manner as to insure the full realization of desired community growth” (City of San Diego Planning Department, 1971). The major goals of the plan include the following: 1) provide a variety of housing for all income

levels, 2) promote good design and quality in physical improvements, 3) emphasize conservation of the natural environment, and 4) coordinate private and public efforts for development to achieve the greatest benefit to the community.

2.1.5.3.3 According to the Plan, East Elliott is located in “Area J.” The proposal for this area is to have a “very low residential density,” which includes developed areas of 1,380 acres with 2,760 residential units. The estimated population of East Elliott after development is 8,560 (assuming 3.1 occupants per household). The relatively low density proposed for East Elliott is primarily due to the limited access and steep slopes at the site. The Plan states that land with slopes greater than 35 percent should not be developed ([City of San Diego Planning Department, 1971](#)).

2.1.5.3.4 New construction scenarios developed since the Elliott Community Plan will most likely result in a lower residential density than anticipated. In addition, the area available for development is expected to be less than predicted due to the presence of geological hazards such as debris flows, landslides, and expansive soils that significantly impact building plans. Because the landfill in Little Sycamore Canyon will be expanded to maximum capacity (i.e., 500 acres), the area available for residential development within East Elliott will be reduced to 950 acres. The estimated number of residential units would therefore be reduced to 1,865 and the estimated population of East Elliott reduced to 5,790 (using density assumptions provided in the Elliott Community Plan). If the proposed City landfill in the northwest portion of East Elliott is constructed as currently proposed (i.e., 700 acres), the area available for residential development would be reduced to 670 acres. The estimated number of residential units would therefore be reduced to 1,325 with an estimated population of East Elliott of 4,110.

2.1.5.3.5 The Elliott Community Plan also proposes construction of two elementary schools, one high school, two neighborhood parks, major streets (4 to 6 lanes of traffic) at Spring Canyon Road and Mast Boulevard, and a county landfill site (i.e., Sycamore Landfill). No commercial centers are proposed ([City of San Diego Planning Department, 1971](#)). Of these proposed developments, only Mast Boulevard and the West Hills High School in the southeast

corner of East Elliott and Sycamore Landfill have been constructed. The two proposed elementary schools include use of approximately 15 acres of land (10 acres of developed land) with a maximum enrollment of 800 pupils per school. A neighborhood park with at least 5 acres of usable land would be constructed adjacent to each elementary school. No action has been taken to implement these aspects of the Elliott Community Plan.

2.1.5.3.6 Although some lands within East Elliott may be developed under the MSCP Plan ([Ogden Environmental, 1996](#)), it is unlikely that the density of construction will be greater than proposed in the Elliott Community Plan due to the presence of valued biological resources at the site. The Elliott Community Plan includes provisions for an extensive open space system to preserve scenic canyons and to link elements of the community. The open space system will include “green belts” with bike, equestrian, and pedestrian trails in alignment with the objectives of the MSCP Plan. The open space within East Elliott would include approximately 1,820 acres ([City of San Diego Planning Department, 1971](#)).

2.2 PREVIOUS REMOVAL ACTIONS AND REPORTS

2.2.0.0.1 Several ordnance removal activities and reports have been conducted for East Elliott. The following reports were prepared by and for the USACE using available background information regarding ordnance use at East Elliott. These documents, which are included in the information repository for Former Camp Elliott (East Elliott) at the Tierrasanta Branch of the San Diego City Library, are the basis for conducting the field investigation and EE/CA for this site.

2.2.1 1984 Ordnance Site Survey

2.2.1.0.1 The earliest known ordnance action of the East Elliott area was an ordnance site survey in June 1984. This survey was performed in response to legislative and municipal agency inquiries into the potential for OE in the Sycamore Canyon area. The U.S. Army 70th Ordnance Detachment (now known as the 770th EOD Company) was tasked with the removal of OE within a 170-acre area near the southeast corner of East Elliott ([Figure 2-6](#)). The location of this area

appears to have been jointly selected by the San Diego County Sheriff's Department and Office of Disaster Preparedness. In a letter to the U.S. Army 548th Ordnance Detachment in San Francisco dated June 29, 1984, the 70th Ordnance Detachment discussed the following survey findings:

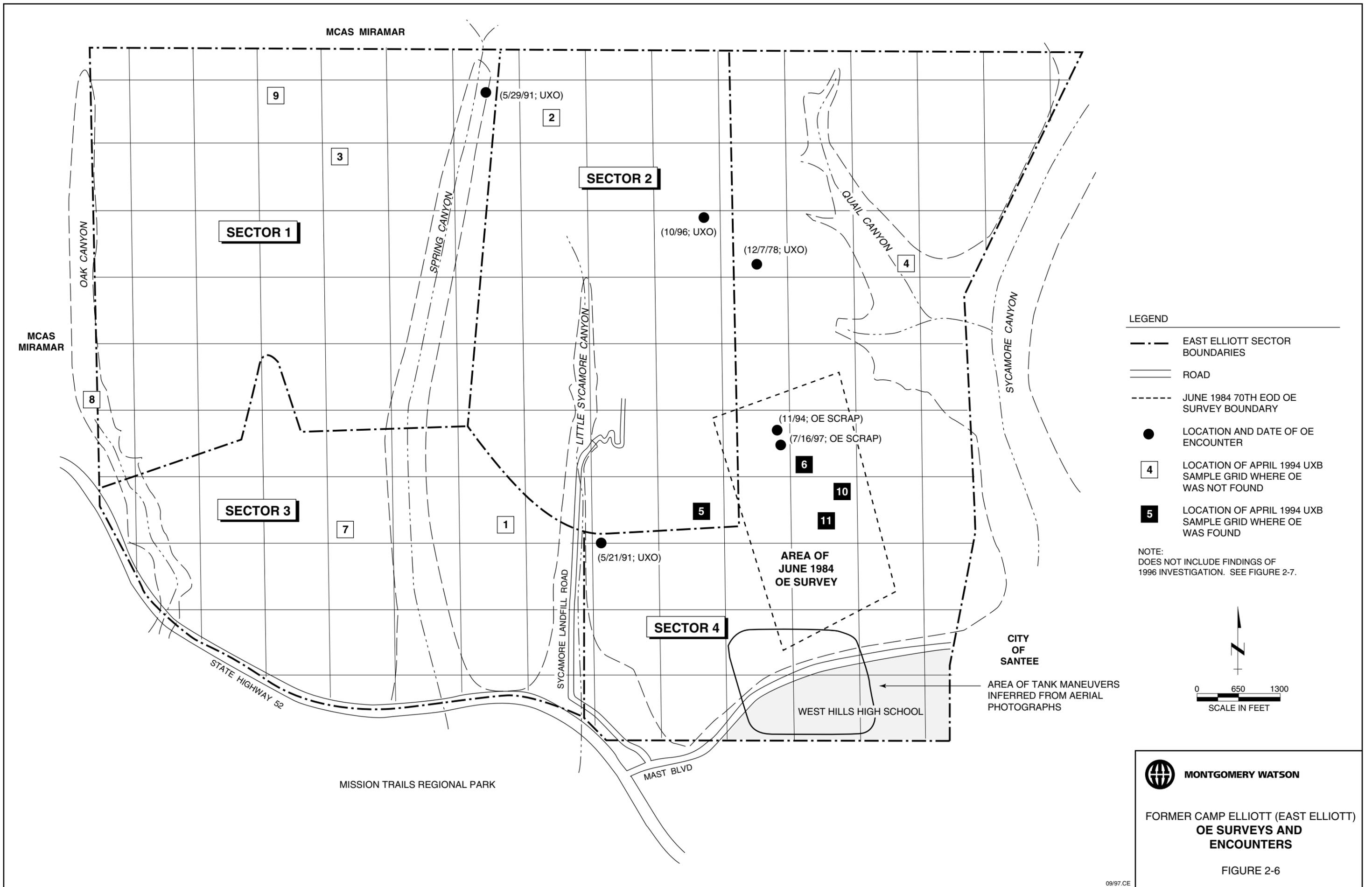
- “moderate to heavy” ordnance contamination was found within the 170-acre survey area; and
- most of the evidence of this ordnance contamination was fragments from HE shells.

2.2.2 1991 Inventory Project Report

2.2.2.0.1 An Inventory Project Report (INPR) for East Elliott was prepared by the USACE in July 1991 (USACE, 1991). A copy of the INPR is included as Appendix D of the Archive Search Report (Montgomery Watson, 1995). Contained within the INPR is a risk assessment for explosive ordnance that evaluates the risks posed by OE at East Elliott on the basis of two factors: hazard severity and hazard probability. Specific factors were assigned a numerical score in an effort to quantify the overall risk at the site. The risk assessment concludes that the East Elliott site warranted a Category II designation (i.e., “Critical”) ranking for hazard severity and a Level A (i.e., “Frequent”) ranking for hazard probability. The resulting Risk Assessment Code (RAC) of 1 suggests a condition of “Imminent Hazard” where “emergency action is required to mitigate the hazard or protect personnel” (USACE, 1991).

2.2.3 1994 OE Sampling Program

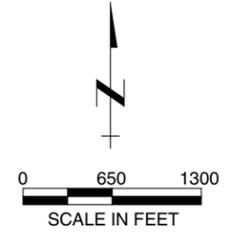
2.2.3.0.1 An OE investigation and removal action was conducted in the East Elliott area by UXB International, Inc. (UXB) for the U.S. Army Corps of Engineers-Huntsville in April 1994 (UXB, 1994). This program involved a detailed visual and geophysical investigation of 11 grids located throughout East Elliott (Figure 2-6). Grids measuring 100 feet by 100 feet (10,000 square feet) were inspected and geophysically swept for OE. Where buried ordnance was



LEGEND

- EAST ELLIOTT SECTOR BOUNDARIES
- ROAD
- - - - JUNE 1984 70TH EOD OE SURVEY BOUNDARY
- LOCATION AND DATE OF OE ENCOUNTER
- 4 LOCATION OF APRIL 1994 UXB SAMPLE GRID WHERE OE WAS NOT FOUND
- 5 LOCATION OF APRIL 1994 UXB SAMPLE GRID WHERE OE WAS FOUND

NOTE:
DOES NOT INCLUDE FINDINGS OF 1996 INVESTIGATION. SEE FIGURE 2-7.



MONTGOMERY WATSON

FORMER CAMP ELLIOTT (EAST ELLIOTT)
OE SURVEYS AND ENCOUNTERS

FIGURE 2-6

suspected, soils were excavated to 3 feet bgs to exhume, identify, and dispose of the OE. The results of this OE sampling program revealed the following:

- no UXO was found in any of the 1994 sample grids, although one fuse component was found;
- 4 of the 11 East Elliott sample grids contained OE;
- OE, where present, primarily consisted of fragments (inert OE); and
- sampling grids in which OE was found were all in the southeast portion of East Elliott (either within or near the June 1984 survey area).

2.2.3.0.2 The June 1994 draft report for this investigation did not address the rationale for sample grid locations. The findings of the June 1984 U.S. Army survey may have influenced the selection of several grid locations (UXB, 1994). The nature of the inert OE was not discussed in this report.

2.2.4 1995 Archive Search Report

2.2.4.0.1 The Final Archives Search Report (Montgomery Watson, 1995), prepared at the request of CEHNC, addressed the past uses of ordnance at various portions of the former Camp Elliott, with special emphasis on East Elliott. The archives search assembled historical records and available field data, assessed potential ordnance presence, and recommended OE follow-up actions. The findings were presented in the context of: 1) areas of probable OE contamination within East Elliott, 2) general risks to the public given current and anticipated land uses, and 3) impacts on proposed OE investigation to complete the East Elliott EE/CA.

2.2.4.0.2 The records search portion of the archive search located and retrieved all identifiable documents and points of contact. The sources of this information included the reference data used in compiling the INPR, existing investigation reports, interviews concerning actual or rumored incidents of OE disposal, interviews concerning past and current uses of the site, military files (including maps and range fans), real estate information, aerial photographs,

and other archive data sources (including sources at a local, regional, and national level). A historical summary of operations and testing at the site was prepared using this information.

2.2.4.0.3 Documents concerning the 1984 Ordnance Site Survey were solicited for additional information on the survey. However, no additional documentation of the 1984 survey was found. Files of the 770th EOD Company offices at Point Loma, San Diego, California; CEHNC; and CESPL were reviewed for the archives search.

2.2.4.0.4 The 1991 INPR was re-evaluated based on the current knowledge of OE at East Elliott and the findings of the Archive Search Report. Montgomery Watson recommended the following refinements or changes based on currently available information:

- Modify the Total Ordnance and Explosive Waste Characterization Value from 14 to 10. While small arms and military flare OE may conceivably be present (included in the original Risk Assessment Code [RAC] assessment), the archive search has not confirmed the presence of this kind of OE in East Elliott. This would have the effect of changing the hazard severity from Critical (Category II) to Marginal (Category I).
- The July 1991 ranking for hazard probability characteristics remains unchanged at 29, and is consistent with the current conditions at East Elliott.

2.2.4.0.5 The modifications above would reduce the original RAC score from 1 to 2, at which “action is required to mitigate hazard or protect personnel” and a “feasibility study is appropriate” ([Montgomery Watson, 1995](#)).

2.2.5 Related Investigations at Camp Elliott

2.2.5.0.1 In recent years (i.e., early 1980s to the present), considerable attention has been focused on OE removal actions within the Tierrasanta and Mission Trail areas of former Camp Elliott located southwest of East Elliott. Together with East Elliott and smaller, ancillary parcels to the north, these areas comprised the surplus land that was sold by the DOD in the 1960s and

early 1970s. Most of the remainder of the former Camp Elliott, north of Tierrasanta, Mission Trails, and East Elliott, lies within MCAS Miramar.

2.2.5.0.2 The pivotal event that drove these investigations and subsequent ordnance cleanups in the Tierrasanta and Mission Trail areas ([Figure 2-3](#)) was the death of two young boys in the Tierrasanta community in December 1983 after finding an unexploded 37-mm HE projectile while playing in the open space adjacent to their homes. Considerable public attention was brought to bear on OE hazards associated with former Camp Elliott following this accident. Two additional ordnance sweeps of the area and a formal public awareness campaign were implemented during 1984 to 1985. These events also provided the impetus for continued evaluation and active remediation of OE hazards in the area since 1984. In general terms, these efforts have focused first on the Tierrasanta study area, followed by the Mission Trails study area immediately to the east of Tierrasanta.

2.2.5.0.3 A comprehensive feasibility study for ordnance remediation in the Tierrasanta area was conducted for CEHNC in 1988 ([DJG, 1988](#)). This study evaluated a 1,897-acre study area within Tierrasanta and sought to determine the magnitude and extent of ordnance contamination there and to evaluate appropriate remedial alternatives in order to remedy the imminent public safety hazards posed by unexploded ordnance. The evaluation of the ordnance contamination in this study concluded the following:

- average density of surface OE contamination ranged from 0.28 to 29.3 items per acre;
- average density of subsurface OE contamination (i.e., ordnance and fragments found beneath the surface) ranged from 3.0 to 90.7 items per acre;
- 87 percent of the OE encountered lay within 6 inches of the ground surface and 94 percent lay within 12 inches;
- approximately 1 percent of the OE contamination posed a potential explosive hazard (i.e., UXO); and
- ordnance was World War II or Korean War vintage and was varied in size and type (small arms munitions to 155-mm howitzer projectiles).

2.2.5.0.4 Several remedial action alternatives for ordnance clearance were considered, including electromagnetic sweeps of former Camp Elliott accompanied by brush removal (through manual cutting or controlled burning) and surface visual sweeps without brush removal. Non-ordnance removal alternatives were also considered including repurchase of former Camp Elliott by the U.S. government, institutional restrictions on land use, and physical restrictions (fencing or signs). Due to the complexities of former Camp Elliott, no single alternative was judged appropriate for all subareas within Tierrasanta. Competing alternatives were evaluated for each of six subareas on the basis of the following criteria: 1) public safety, 2) economic feasibility, 3) technical feasibility, 4) environmental issues, 5) public opinion, and 6) federal, state, and local regulations. The following preferred alternatives were selected:

- reacquisition by the federal government (area adjacent to MCAS Miramar);
- fencing (area along the construction corridor for State Highway 52);
- ordnance clearance via electromagnetic sweeps and manual brush removal (open space areas adjacent to active residential developments or existing residential developments and open space/undeveloped areas where vegetative cover is heavy); and
- ordnance clearance via electromagnetic sweeps without brush removal (for the areas undergoing regrading associated with active residential development or open space/undeveloped areas where vegetative cover is thin).

2.2.5.0.5 Following the preparation of this feasibility study in 1988, extensive ordnance clearance was undertaken within several of the study subareas. As Tierrasanta ordnance clearance progressed, increasing attention was paid to the neighboring undeveloped land that was to become Mission Trails Regional Park. In September 1991, Dames & Moore completed a Final Environmental Assessment for ordnance clearance in the Mission Trails study area for CEHNC (Dames & Moore, 1991). The objective of this study was to evaluate the potential environmental impacts due to proposed ordnance remedial alternatives in this 2,100-acre study area. Five remedial alternatives contemplated for the Mission Trails study area consist of the following:

- electromagnetic sweeps without brush removal;
- electromagnetic sweeps with 35 percent brush removal;
- electromagnetic sweeps with 60-65 percent brush removal;
- electromagnetic sweeps w/ controlled burning; and
- no action.

2.2.5.0.6 Impacts were evaluated as they related to the following issues: 1) biology, 2) cultural features, 3) geology, 4) air quality, 5) land use, 6) visual aesthetics, 7) transportation, 8) noise, 9) agriculture, 10) socioeconomics, and 11) public safety. Mitigation was recommended to lessen the environmental impacts related to each alternative. At Mission Trails, ordnance clearance using magnetometer sweeps and excavation of anomalies was completed in 1996. Within the area adjacent to the southwest corner of East Elliott, no live ordnance (i.e., UXO) was recovered (CMS, 1997).

2.2.6 Recently Encountered OE

2.2.6.0.1 Although documentation on the use of ordnance in East Elliott has not been uncovered, OE has been found at several locations in East Elliott between 1978 and 1999. These encounters are listed in Table 2-3. The majority of this OE appears to lie within the southeast quadrant of East Elliott, on a series of ridges southeast of the Sycamore Landfill, east of Little Sycamore Canyon, and west of Sycamore Canyon (Figure 2-2). During site visits to this area in 1994 and 1995, loose fragments from high explosive projectiles (tentatively identified as fragmentation from 75-mm HE rounds with a lesser amount of 37-mm fragmentation) were found at or near the surface (Walker, pers. comm., 1996). This area was also the site of four 1994 sample grids that contained ordnance contamination, as well as a June 1984 ordnance survey that encountered “moderate to heavy” ordnance contamination from HE shells.

2.2.6.0.2 In late 1996, a 75-mm HE round was found by employees of the Sycamore Landfill during grading operations north of the existing landfill. The round was disposed by personnel from CMS Environmental, Inc., who were at East Elliott during the OE investigation (Walker, pers. comm., 1997b).

TABLE 2-3**SUMMARY OF RECENT OE ENCOUNTERS
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Date	Location	Remarks
December 1978 ^a	East-sloping tributary canyon of Sycamore Canyon; due east of landfill	One “live” 75-mm HE round found by San Diego County surveyor, removed and disposed by Sgt. Conrad Grayson, San Diego County Sheriff’s Department Arson/Explosives Unit.
May 1991 ^a	Tributary gully east of Little Sycamore Canyon, southeast of landfill	During biological/habitat survey of East Elliott area, one 75-mm HE projectile was found and reported by a biologist. The round was inspected and removed by San Diego Fire Department (SDFD) and disposed of by 70th EOD.
May 1991 ^a	North end of Spring Canyon, immediately east of canyon bottom	During biological/habitat survey of East Elliott area, one M67 105-mm high explosive anti-tank (HEAT) projectile and one M62 fuse plug were found and reported by a biologist. The round was inspected and removed by SDFD and disposed of by 70th EOD.
October 1994 ^a	North end of Oak Canyon (likely in MCAS Miramar)	Explosions and detonations were noted by firefighters during recent brushfire. Fire burned 800-900 acres.
November 1994 and October 1995 ^a	Ridges between Little Sycamore and Sycamore canyons	Loose, surface fragments from 37-mm and 75-mm projectiles were found during CEHNC site visit near ridge crest immediately south of sample grid #6.
November 1996 ^b	North of Sycamore Canyon	One 75-mm HE round was found by landfill employees during grading operations and removed/disposed by CMS Environmental, Inc.

Reference:

^a [Montgomery Watson, 1995.](#)^b [Walker, Pers. comm., 1997b.](#)

2.2.6.0.3 Additional indirect evidence of the presence of OE, specifically UXO, in East Elliott consists of anecdotal reports of detonations during brush fires in the area ([Table 2-3](#)). Discussions with fire fighters stationed at nearby MCAS Miramar confirmed that similar detonations have been witnessed in the eastern, undeveloped portions of that installation.

2.2.6.0.4 Photographs of OE found in the vicinity of East Elliott are in [Appendix A-3](#). CESPL ordnance data sheets for OE found in the vicinity of East Elliott are in [Appendix A-4](#). The photographs and data sheets in [Appendices A-3](#) and [A-4](#) are not intended to include all ordnance types either found or potentially present at East Elliott.

2.3 1996 OE SURVEY AND REMOVAL

2.3.0.0.1 Results of an OE survey and removal in the East Elliott area conducted by CMS from September through December 1996 were presented in the *Ordnance and Explosives Sampling Draft Removal Report, Camp Elliott (East Elliott), California* ([CMS, 1997](#)), and are summarized in the following section, along with the associated environmental assessment.

2.3.1 Environmental Assessment

2.3.1.0.1 CESPL conducted an Environmental Assessment of the East Elliott area prior to CMS's investigation in December 1996. The results of this study were presented in a report titled "Final Environmental Assessment, Ordnance and Explosive Waste Sampling from Sampling Grids at Camp Elliott (East Elliott) Formerly Used Defense Sites, San Diego County, California" ([CESPL, 1996](#)). This report included a Finding of No Significant Impact (FONSI) for the project, so preparation of an Environmental Impact Statement (EIS) was not required.

2.3.1.0.2 Five endangered or threatened species inhabit the East Elliott area at least part of the year: the southwestern arroyo toad (*Bufo microscaphus californicus*), least Bell's vireo (*Vireo belli pusillus*), southwestern willow flycatcher (*Empidonax trailli extimus*), slender horned

spineflower (*Dodecahema leptoceras*), and willowy monardella (*Monardella linoides viminea*) (CESPL, 1996). The coastal California gnatcatcher (*Polioptala californica californica*) is a California species of special concern, which is an administrative designation that indicates the species is declining (McGriff, pers. comm., 1997) and has a federal threatened status (50 CFR 17.11). Some of the original sample grids were relocated to avoid impact to significant biological or cultural (archaeological) resources. Sampling was also scheduled between mid-August and December to avoid the foraging and nesting season of the gnatcatcher and other animals.

2.3.1.0.3 According to the Environmental Assessment, upland remnants of the mesa with moderate slopes support a dense chamise chaparral in which the biomass of chamise overwhelms all other species. This ecological prominence is at least partly attributable to the lack of fire in recent decades (CESPL, 1996). Steeper slopes support a less dense and mixed chaparral where multiple species (bunch grass, lilac, sage, manzanita, redberry, scrub oak, etc.) are present in relatively equal numbers. In the eastern and southeastern areas of East Elliott, mixed grasslands locally are most abundant. An oak woodland inhabits the bottom of Oak Canyon, along the western edge of East Elliott, and a riparian community occupies the lower end of Spring Canyon, in the central southern portion of East Elliott. Very dense brush consisting of *ceanothus sp.* (California lilac) is in the southwestern area of East Elliott (Mouer, pers. comm., 1997).

2.3.1.0.4 In the southern third of the project area, coastal sage scrub is present along with mixed chaparral. The Environmental Assessment report suggests that the occurrence of fire in this area has restarted ecological succession and resulted in a more desirable mix of valued habitat (CESPL, 1996). The coastal sage scrub provides habitat for the coastal California gnatcatcher and males of this sensitive species were observed in eight locations within East Elliott on March 21, 1996, by CESPL ecologists.

2.3.1.0.5 Sampling involved the manual removal or pruning of vegetation under the direction of a qualified biologist. In areas of dense vegetation, approximately 30 to 35 percent of the vegetation was removed or pruned. The cutting plan was developed to detail methods and

procedures used to minimize impacts to biological resources. Branches pruned for access were mechanically chipped and strewn back into the chaparral to reduce erosion of the exposed slopes. The Environmental Assessment concluded that by mechanically thinning the vegetation, a habitat may be provided for many birds and annual plants that is similar to, but less extensive than, that caused by natural fire (CESPL, 1996). Regrowth of the vegetation is expected to be completed within two years with no long-term impact to chaparral or coastal sage scrub communities.

2.3.1.0.6 A records and literature search and a field survey for prehistoric sites were conducted for all of former Camp Elliott (including East Elliott) in 1988. One archaeological site, an extensive base camp (Site CA-SDI-10, 054) associated with a larger village site to the south, was identified near the southern boundary of East Elliott, east of Little Sycamore Canyon. According to the Environmental Assessment, the site may be eligible for listing on the National Register of Historic Places.

2.3.2 1996 Site Investigation Approach

2.3.2.0.1 The investigation approach consisted of dividing East Elliott into four sectors (Sectors 1 through 4, [Figure 2-6](#)) for the purposes of evaluating risk and developing recommendations for each sector. The sectors are described as follows:

- **SECTOR 1:** Sector 1 is approximately 750 acres in the northwest quadrant of East Elliott and encompasses the area that would be occupied by the proposed city landfill. The sector is bounded by Oak Canyon to the west and includes Spring Canyon along the eastern perimeter. Topography is typified by canyons and narrow ridges with steep slopes and evidence of landslides. Vegetation is characterized by mixed chaparral and grass, with local expanses of dense brush in the southern and western portions of the sector. Roads are constructed along ridges.
- **SECTOR 2:** Sector 2 is approximately 650 acres in the northern central portion of East Elliott. It encompasses the area that will eventually be occupied by the existing sanitary landfill (currently 170 acres). Little Sycamore Canyon is oriented north-south in the center of the sector. The predominant slope of the terrain is greater than 30 degrees. Vegetation is characterized by grasslands and

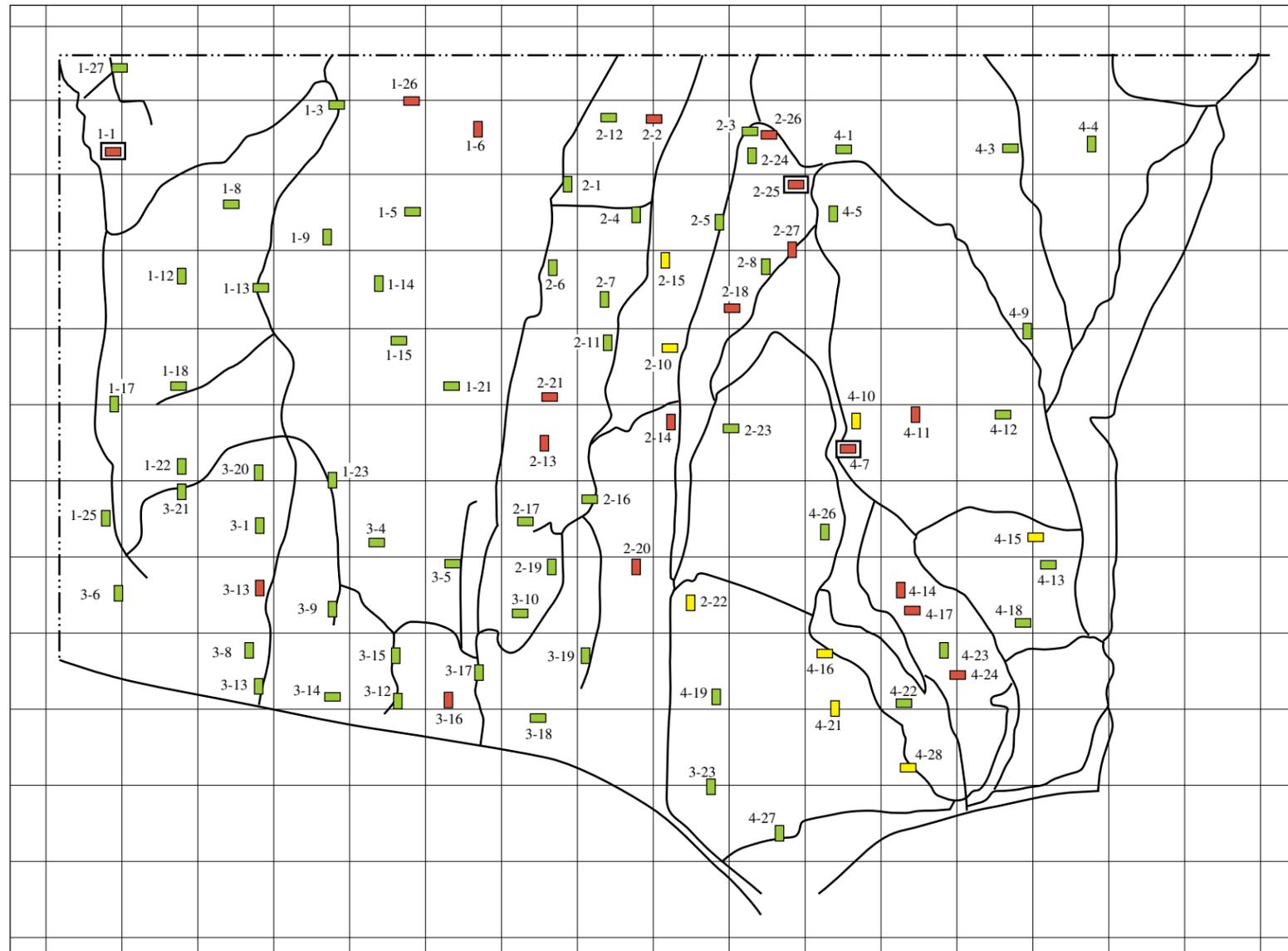
mixed chaparral. Roads are constructed along ridges and within Little Sycamore Canyon.

- **SECTOR 3:** Sector 3 is approximately 750 acres in the southwest quadrant of East Elliott. The sector is bounded by Oak Canyon to the west, Little Sycamore Canyon to the east, and State Highway 52 to the south. Topography is primarily steep-walled canyons and narrow ridges in the northern part of the sector, and less steep slopes in the southern area. Vegetation is characterized by mixed chaparral, dense brush, and poison oak in the north, and by grasslands in the south.
- **SECTOR 4:** Sector 4 is approximately 1,050 acres in the eastern portion of East Elliott. It includes the area that is most frequently used for recreational activities. The sector is bounded by Sycamore Canyon to the east, the county landfill and Little Sycamore Canyon to the west, and the City of Santee to the south. The terrain is defined by three primary ridges with moderate slopes. Mast Boulevard and West Hills High School are in the southeast corner of the sector. Vegetation is primarily grasslands and mixed chaparral.

2.3.2.0.2 Eighty-nine survey grids, each measuring 100 by 200 feet, were established within the four sectors ([Figure 2-7](#)). The grids were further divided into subsections of 25 feet by 25 feet. Brush was thinned and OE was cleared from the surface within the entire area of each survey grid. Each survey grid was then swept using a magnetometer, and all anomalies to a depth of 4 feet bgs were mapped and flagged. All but six survey grids contained anomalies detected by the subsurface sweep. The six grids without anomalies were located in Sector 1 of East Elliott ([CMS, 1997](#)).

2.3.2.0.3 A statistical computer program was used to aid in the characterization of OE in each sector. The program, SiteStats/GridStats (Version 2.0), was developed by CEHNC and QuantiTech, Inc. of Huntsville, Alabama ([QuantiTech, 1995b](#)). This program is based on complex statistical techniques, such as the sequential probability ratio test.

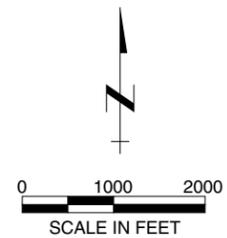
2.3.2.0.4 When all subsurface anomalies were mapped within a survey grid the GridStats module of SiteStats/GridStats was used to randomly select which subsections within the larger survey grids would have subsurface anomalies excavated and identified. As anomalies are excavated, GridStats then statistically determines how many and which anomalies within the grid should be sampled. Anomalies were excavated to a depth of 4 feet bgs. However, no anomalies



LEGEND

- No OE Encountered
- OE Fragments Encountered
- OE Items Encountered (outlined grid symbol indicates that UXO was detected)
- Site Boundary
- Roads and Trails

Reference:
 Modified from "Ordnance & Explosive (OE) Sampling/Draft Removal Report, Camp Elliott (East Elliott) California",
 Prepared by CMS Environmental, Inc., Dated March 7, 1997.



**FORMER CAMP ELLIOTT (CAMP ELLIOTT)
 RESULTS OF 1996 OE INVESTIGATION**

FIGURE 2-7

were detected deeper than 18 inches. If the anomaly was OE scrap, it was removed. UXO was detonated in place. As the anomalies within a particular grid are sampled, the GridStats module predicts the amount of ordnance within that grid. The number of grids sampled for each sector is shown in [Table 2-4](#).

TABLE 2-4
SUMMARY OF 1996 GRIDS SAMPLED
FORMER CAMP ELLIOTT (EAST ELLIOTT)

Sector	No. of Grids Surveyed	No. of Grids Calculated by SiteStats for Sufficient Characterization
Sector 1	17	12
Sector 2	27 ^a	14
Sector 3	20	14
Sector 4	25 ^b	18
Total	89	58

Reference: [CMS, 1997](#)

^a Additional grids were sampled in Sector 2 because abundant OE scrap indicated that UXO should be present but was not found within the first 22 grids.

^b Grid 4-24 was not 100 feet by 200 feet in size. Due to the number of anomalies and restriction of the project schedule, the size of the grid was reduced to 100 feet by 30 feet.

2.3.2.0.5 At East Elliott, grids within each sector were sampled and evaluated using GridStats until SiteStats determined that the entire sector was characterized. The sample data collected for each grid are in [Appendix B](#). The number of grids that SiteStats calculated to complete characterization of each sector at East Elliott is also listed in [Table 2-4](#).

2.3.3 1996 Site Investigation Results

2.3.3.0.1 OE was detected and removed from all four sectors of East Elliott. However, the majority of the survey areas had no OE. In addition, most anomalies detected consisted of “false-positives” or metal debris such as nails and wire. OE from a variety of ordnance was found during the investigation. The majority of identifiable OE was from 37-mm and 75-mm

projectiles ([Appendix B](#)). The maximum depth at which any OE was found at East Elliott was 18 inches, and most OE was found on the surface. UXO was detected in all of the East Elliott sectors except Sector 3. No UXO was found deeper than 8 inches bgs. The UXO consisted of:

- one live 75-mm HE projectile in Sector 1;
- two live 75-mm HE projectiles in Sector 2; and
- one live 75-mm HE projectile in Sector 4.

2.3.3.0.2 The largest concentration of OE was in the southeast quadrant (Sector 4), which is the area of East Elliott that is the closest and most accessible to populated areas and schools. All but one of the 75-mm HE projectiles discovered during the investigation were found pointing westward, indicating that the projectiles were likely fired from points at the southeast corner of East Elliott. In addition, a large number of inert OE fragments and expended fuses were founded in Sector 4. All live UXO and suspect fuses were detonated at the site ([CMS, 1997](#)).

2.3.3.0.3 Twenty-seven identifiable OE items (consisting of both inert OE and UXO) were encountered during sampling at East Elliott. [Table 2-5](#) lists these OE and the grids in which each was located. A more complete listing of the number of anomalies, number of OE found, and number of OE predicted in each grid sampled is in [Appendix B](#).

2.3.3.0.4 Most of the anomalies excavated during the sampling program consisted of scrap, including OE fragments, nails, wire, and miscellaneous metallic debris. A total of 758 pounds of OE and scrap was detected and removed during the investigation and was disposed of at the Sycamore Sanitary Landfill Recycling Center ([CMS, 1997](#)).

2.3.3.0.5 The CMS report recommended the following actions:

- **SECTOR 1:** Conduct additional survey work in the northwest corner of the sector where a UXO item was discovered. This area is a reported ordnance impact area on the MCAS Miramar property.
- **SECTOR 2:** Perform a surface sweep of a 110-acre parcel in the center of East Elliott that is slated for incorporation into the Sycamore Landfill. In addition,

TABLE 2-5

**LISTING OF OE ENCOUNTERED^a
DURING THE 1996 SITE INVESTIGATION
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Sector	Grid	Quantity	Description	Reported Type	Depth (inches bgs)
1	1-1	1	75-mm MK2 High Explosive (HE)^b	UXO	0
	1-1	1	75-mm Armor Piercing Cap (APC) M61	OE Scrap	NA
	1-6	1	75-mm Armor Piercing Tracer (AP-T)	OE Scrap	NA
	1-6	1	75-mm AP-T M74	OE Scrap	10
	1-26	1	37-mm AP-T	OE Scrap	5
TOTAL		5			
2^c	2-2	1	75-mm APC without Fuse	OE Scrap	8
	2-13	1	37-mm AP-T	OE Scrap	0
	2-14	1	75-mm MK 29 AP-T	OE Scrap	0
	2-18	1	37-mm AP-T M80	OE Scrap	NA
	2-18	1	75-mm HE M48 with M51 Fuse	OE Scrap	NA
	2-20	1	37-mm AP-T	OE Scrap	0
	2-21	1	37-mm M74 Armor Piercing (AP)	OE Scrap	0
	2-21	1	75-mm AP-T MK29	OE Scrap	10
	2-25	1	75-mm HE M48^b	UXO	8
	2-26	1	75-mm AP-T MK29	OE Scrap	NA
	2-27	1	37-mm AP-T M74	OE Scrap	NA
TOTAL		10			
3	3-3	1	37-mm AP-T	OE Scrap	NA
	3-16	1	37-mm AP-T	OE Scrap	2
TOTAL		2			
4	4-7	1	37-mm AP-T	OE Scrap	1
	4-7	1	75-mm AP Training	OE Scrap	4
	4-7	1	M48 Fuse	OE Scrap	3
	4-7	1	75-mm HE M48 with M51 Fuse^b	UXO	0
	4-11	1	37-mm AP-T M74	OE Scrap	12
	4-11	1	37-mm AP-T M74	OE Scrap	0
	4-14	1	37-mm AP-T M74	OE Scrap	NA
	4-17	1	37-mm AP-T M74	OE Scrap	2
	4-17	1	37-mm AP-T M74	OE Scrap	NA
	4-24	1	81-mm Mortar M57 White Phosphorous without Fuse	OE Scrap	0
	TOTAL		10		

Reference: [CMS, 1997](#)

^a Includes identifiable OE scrap, but not OE fragments from exploded ordnance.

^b Denotes UXO used to determined OE density (in bold text).

^c List does not include one 75-mm UXO shell found outside the sampling grids by a brush clearance crew.

NA - Not Available; Not listed in Appendix G ([CMS, 1997](#))

bgs - below ground surface

conduct a subsurface sweep of the south- and east-facing slopes of this parcel (a total of 30 acres). The south- and east-facing slopes were judged the most likely areas to have been impacted by ordnance fire, based on a firing location at the southeast corner of the base (see above). One live 75-mm HE round was detected during the 1996 OE survey and removal at this 110-acre parcel. Construction support (surface and subsurface clearance) for a 53-acre landfill expansion was conducted in early 1998 by HFA ([Section 2.4.1](#)).

- **SECTOR 3:** No additional work was recommended for this sector because only AP-T expended rounds were recovered. No UXO was found.
- **SECTOR 4:** Conduct a surface sweep of a 350-acre area southeast of the Sycamore Landfill (in the southeast corner of East Elliott) and a subsurface sweep of the south- and east-facing slopes, if not the entire area. This action was recommended because of the relatively high frequency of detected OE and UXO that is near and is easily accessible to populated areas and schools.

2.4 REMOVAL ACTIONS IN 1998 AND 1999

2.4.0.0.1 Under a contract with CEHNC, removal actions were conducted in Sectors 2 and 4 at East Elliott from 1998 through 1999 by HFA. The results were reported in the *Draft Removal Report, Ordnance and Explosives (OE) Removal Action, East Elliott* ([HFA, 1999](#)). During the removal action, 48 live UXO items and more than 1,300 pounds of OE scrap were removed from East Elliott. UXO items were destroyed on-site. The inert OE resulting from destruction of the UXO and OE scrap were recycled at the Sycamore Landfill Universal Recycling Center within East Elliott. These removal actions are discussed in the following paragraphs.

2.4.1 Construction Support Activities at the Sycamore Landfill

2.4.1.0.1 HFA conducted OE removal operations for construction support during the 1998 expansion of the Sycamore Landfill, which is currently owned and operated by Allied West Industries. Construction support activities included removal of OE encountered on the ground surface and in the subsurface to a depth of 3 feet bgs. Based on the 1996 site investigation ([Section 2.3.3](#)), the maximum depth of OE encountered in the East Elliott area was 18 inches.

2.4.1.0.2 The 1996 OE investigation in Sector 2 identified one UXO (a 75-mm HE round) and several pieces of identifiable OE scrap (Table 2-5). In addition, a 75-mm HE round was discovered by landfill employees north of the landfill in November 1996. The site investigation report (CMS, 1997) recommended additional sweeps for OE in the area of the sector slated for landfill expansion.

2.4.1.0.3 OE removal operations for construction support at the landfill were conducted between February and April 1998, over a 53.3-acre area on the north side of the existing landfill (Figure 2-8). Prior to initiating OE removal operations, the area was surveyed and a grid was laid out to track OE removal and UXO identification. Brush within the area was then thinned or removed to facilitate location and removal of OE. Clearance teams then used Schonstedt magnetometers to detect magnetic anomalies that would indicate the possible presence of OE.

2.4.1.0.4 During these sweeps, 24 UXO items and 64 pounds of OE scrap were discovered. A list of the UXO type and depth at which each item was found is provided in Table 2-6. All UXO identified in the area of landfill expansion were either 37-mm or 75-mm rounds. No UXO was found deeper than 24 inches bgs, and most of these items were found on the ground surface. Locations of the UXO items identified during construction support activities are shown on Figure 2-8. Following identification, these UXO items were destroyed on-site. The resulting inert OE and OE scrap were then recycled at the Universal Recycling Center located at the Sycamore Landfill.

2.4.1.0.5 Some areas of the recent landfill expansion contain California gnatcatcher habitat. As discussed in Section 2.1.3, the California gnatcatcher is on the federal list of threatened species and is a California species of special concern. Varanus Biological Services was contracted by HFA to monitor clearance operations in the area of the gnatcatcher habitat. All clearance operations in the area of the gnatcatcher habitat were concluded prior to the start of the gnatcatcher nesting season, which begins March 15th of each year.

MCAS MIRAMAR

AREA OF SURFACE AND SUBSURFACE
CLEARANCE FOR CONSTRUCTION SUPPORT

SECTOR 1

SPRING CANYON

SECTOR 2

SYCAMORE
LANDFILL

SECTOR 4

SECTOR 3

LITTLE SYCAMORE CANYON

SYCAMORE LANDFILL ROAD

LEGEND

--- EAST ELLIOTT SECTOR BOUNDARIES

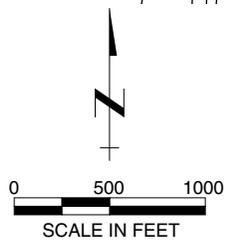
== ROAD

- - - - - INTERMITTENT STREAM

24 ● UXO ITEM (NUMBER CORRESPONDS TO ITEMS LISTED IN TABLE 2-6)

▨ AREA OF SURFACE AND SUBSURFACE REMOVAL IN SECTOR 2

▨ PRESENT EXTENT OF LANDFILL



MONTGOMERY WATSON

FORMER CAMP ELLIOTT (EAST ELLIOTT)
LOCATIONS OF OE ENCOUNTERED
DURING 1998 CONSTRUCTION SUPPORT
AT THE SYCAMORE LANDFILL

FIGURE 2-8

TABLE 2-6

**LISTING OF UXO REMOVED DURING THE 1998 CONSTRUCTION
SUPPORT ACTIVITIES AT THE SYCAMORE LANDFILL
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Item Number	Description	Depth (inches bgs)
1	37-mm	6
2	75-mm HE	0
3	75-mm with booster	0
4	75-mm with M-48 fuse	24
5	75-mm HE	12
6	75-mm HE	0
7	37-mm	0
8	37-mm	12
9	37-mm	6
10	75-mm HE	6
11	75-mm HE	12
12	75-mm HE	12
13	37-mm with M-58 fuse	0
14	75-mm HE	6
15	75-mm with M-48 fuse	0
16	75-mm with M-48 fuse	12
17	75-mm HE (no fuse)	0
18	75-mm with M-48 fuse	12
19	37-mm HE with fuse	0
20	75-mm HE	0
21	75-mm with M-48 fuse	0
22	37-mm with M-58 fuse	6
23	75-mm HE (no fuse)	0
24	75-mm HE	0

Note: Item numbers refer to locations shown on [Figure 2-8](#).

Reference: [HFA, 1999](#)

bgs - below ground surface

HE - high explosive round

mm - millimeter

2.4.1.0.6 Based on the number of UXO items encountered during the 1998 removal action HFA recommended that OE construction support be provided during all expansion activities for the Sycamore Landfill (HFA, 1999).

2.4.2 Time-Critical Removal Action in Sector 4

2.4.2.0.1 Surface clearance was conducted as a Time-Critical Removal Action in Sector 4 in response to the baseline risk assessment results (Appendix C), which were originally presented in the draft version of this EE/CA in January 1998. During the 1996 OE investigation, Sector 4 was found to contain the largest concentration of UXO and OE scrap (CMS, 1997). Based on this concentration of OE, the proximity to local residents, and the large number of recreational users in this area, a Time-Critical Removal Action was deemed necessary due to the immediate threat of public exposure to OE with the risk of serious injury or death.

2.4.2.0.2 The Time-Critical Removal Action was conducted in Sector 4 between July 1998 and February 1999. Surface OE removal operations were conducted over 900 acres of roads, trails, and open space. Surface clearance was not conducted in areas of heavy brush (approximately 150 acres, or 20 percent of Sector 4), as delineated on Figure 2-9.

2.4.2.0.3 Prior to initiating OE removal operations, the boundaries of Sector 4 were surveyed and a grid pattern was laid out to track OE removal and UXO identification. Clearance teams then used Schonstedt magnetometers to detect magnetic anomalies that would indicate the possible presence of OE in areas of heavy grass.

2.4.2.0.4 Twenty-four UXO items and approximately 1,250 pounds of OE scrap were discovered during the Time-Critical Removal Action. The UXO items consisted primarily of 37-mm and 75-mm HE rounds. A list of the UXO items encountered in Sector 4 is in Table 2-7. Locations of the UXO found during the removal action in Sector 4 are shown on Figure 2-9, which indicates the majority of the UXO were discovered in the central portion of Sector 4. Based on information discovered during the archive search (Montgomery Watson, 1995), this

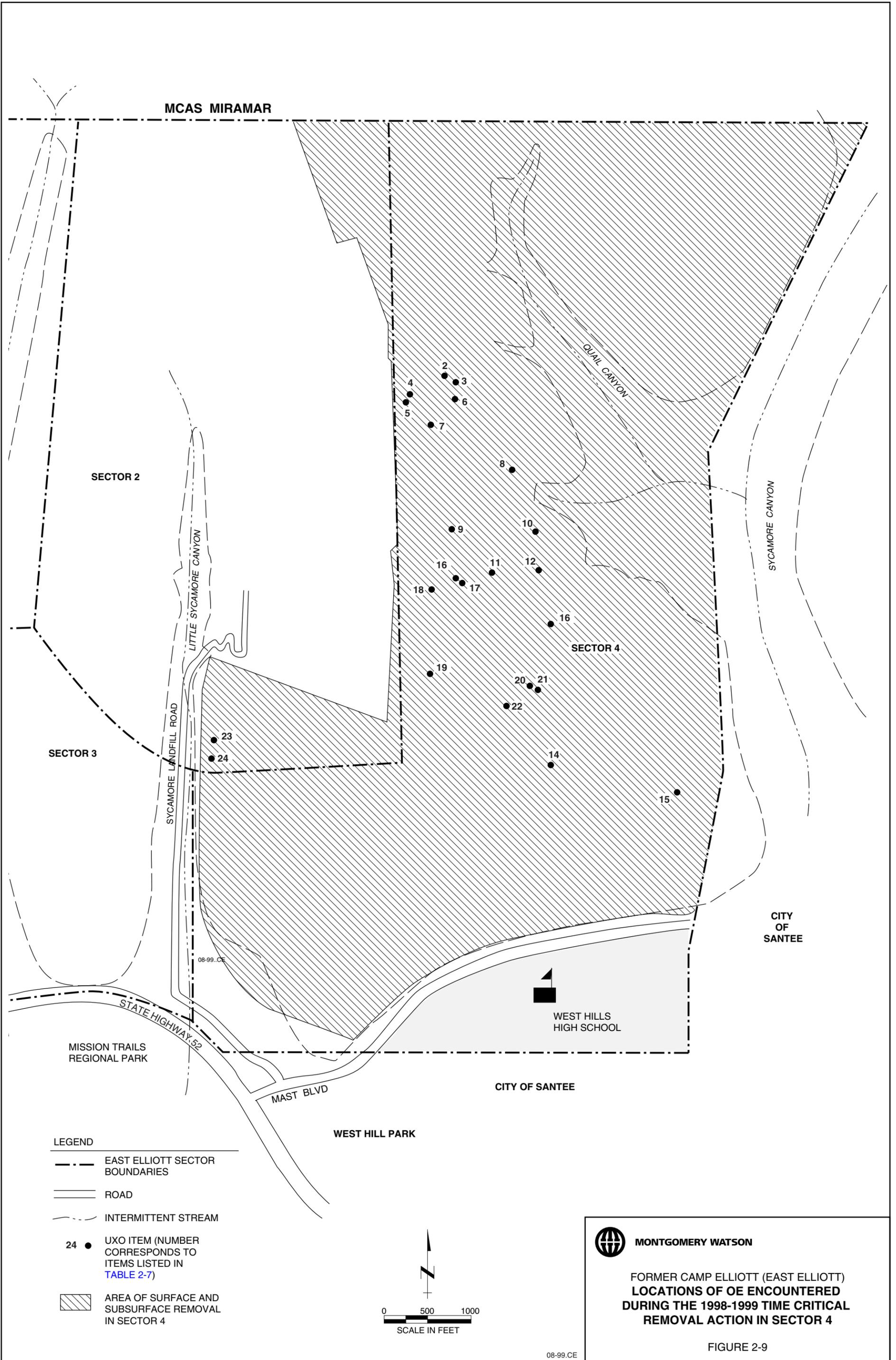


TABLE 2-7

**LISTING OF UXO REMOVED DURING THE
1998-1999 TIME-CRITICAL REMOVAL ACTION IN SECTOR 4
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Item Number	Description
1	75-mm HE (no fuse)
2	75-mm HE (no fuse)
3	75-mm with fuse
4	75-mm HE
5	75-mm HE
6	75-mm HE
7	75-mm HE (no fuse)
8	75-mm HE
9	75-mm HE (no fuse)
10	75-mm HE (no fuse)
11	37-mm HE with M-58 fuse
12	37-mm HE with M-58 fuse
13	37-mm
14	81-mm
15	75-mm HE with M-21 fuse adapter
16	75-mm HE
17	37-mm HE with fuse
18	37-mm HE with fuse
19	37-mm HE with fuse
20	81-mm
21	75-mm HE
22	37-mm HE with fuse
23	37-mm HE with fuse
24	37-mm HE with fuse

Notes: All UXO items were removed from the ground surface.
Item numbers refer to locations shown on [Figure 2-9](#).

Reference: [HFA, 1999](#)

bgs - below ground surface

HE - high explosive round

mm - millimeter

area appears to have been the primary target area for the tank firing area formerly in the southeast corner of East Elliott.

2.4.2.0.5 During the Time-Critical Removal Action, KEA Environmental provided monitoring of the California gnatcatcher habitat during clearance activities. However, because clearance operations were not conducted in heavy brush, potential habitat areas were not disturbed. In addition, clearance operations were not conducted during the nesting season.

2.4.2.0.6 During the Time-Critical Removal Action, numerous subsurface anomalies were identified. However, because the Time-Critical Removal Action was limited to surface OE removal, these anomalies were not excavated. The Draft Removal Report ([HFA, 1999](#)) recommended that subsurface clearance be conducted in the southern area of Sector 4. This recommendation is consistent with recommendations made by CMS after the 1996 site investigation ([CMS, 1997](#)).

2.5 HAZARD EVALUATION AND RISK ASSESSMENT

2.5.0.0.1 The hazard evaluation and risk assessment conducted for East Elliott is summarized in this section. This evaluation considers the risks to the health and welfare of potentially exposed individuals under a variety of land use scenarios. The removal action alternatives considered in this EE/CA range from no action to clearance of ordnance to a depth of 4 feet bgs. The risk assessment for East Elliott provides a basis for justifying various removal actions or risk reduction activities, if warranted. The risk assessment, including an evaluation of the risk reduction associated with each removal action alternative, is in [Appendix C](#). Note that this risk assessment was conducted prior to the Time-Critical Removal Action in Sector 4 ([Section 2.4.2](#)).

2.5.0.0.2 Potential risk associated with OE at East Elliott was evaluated using Ordnance and Explosives Cost-Effectiveness Risk Tool (OECert). OECert provides a means of estimating the number of exposures at a site given different levels of removal action or no action for various

land uses. Land uses evaluated include both current and future recreational uses and future construction activities. These scenarios are evaluated below.

2.5.0.0.3 The basis for using the OECert model to evaluate risk at an ordnance-impacted site is described in OECert, Final Report, Version E ([USAESCH, 1996](#)).

“The risk estimating portion of OECert for dispersed sectors utilizes unexploded ordnance (UXO) density, the proportion of UXO on the surface of the ground, the area traversed by individuals while performing specific activities in the sector, and the number of individuals annually participating in activities to estimate the expected exposures by members of the public to surface UXO. The estimation of expected exposures by members of the public to subsurface UXO is dependent on these same parameters, plus knowledge of the intrusion depth associated with each activity and also the knowledge of the density distribution of subsurface UXO. Sweep efficiency and clearance depth are then considered in measuring the residual risk to the public after remediation.”

2.5.0.0.4 The risk analysis considers exposure to OE, which is defined as “a member of the public being in immediate proximity to OE. The individual does not have to be aware of the presence of an ordnance item for an exposure to occur” ([USAESCH, 1996](#)). The impact of the exposure (i.e., no impact, detonation, bodily harm, death, etc.) is not considered in this analysis.

2.5.1 OE Density

2.5.1.0.1 OE density estimates were calculated and input to OECert based on data collected in September 1996 and summarized in *OE Sampling Draft Report, Camp Elliott (East Elliott), California* ([CMS, 1997](#)) and [Section 2.3](#) of this EE/CA. The OE density estimates are based on an evaluation using SiteStats/GridStats of sampling data obtained during the 1996 site investigation.

2.5.1.0.2 OECert provides vertical ordnance profiles for five soil types: sand, sandy loam, loam, clay, and rock. However, the soil type at East Elliott is loam, with abundant rock fragments that limit the depth of ordnance penetration so the associated ordnance profile predicted by OECert for loam did not agree with the ordnance profile observed during the field

survey. OECert predicted that a greater percentage of items would be found at greater depths. To address this issue, OECert was used to calculate predicted exposures assuming that all of the OE items were on the ground surface. Using the data presented by CMS (1997), the percentage of ordnance items on the ground surface was calculated and compared to the percentage of items found in the subsurface. Items included in this calculation, based on a consensus reached with CEHNC and CESPL during the on-board review meeting (CEHNC, 1997), were UXO, armor-piercing (AP) rounds, and fuses (live and expended). [Table 2-8](#) summarizes the vertical distribution of these items.

TABLE 2-8

**VERTICAL DISTRIBUTION OF OE USED TO ESTIMATE RISK
TO SURFACE AND SUBSURFACE ACTIVITIES AT EAST ELLIOTT¹
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Sector	Percentage of UXO, AP Rounds, and Fuses Found on the Ground Surface	Percentage of UXO, AP Rounds, and Fuses Found Below the Ground Surface
1	40	60
2	67	33
3	50	50
4	72	28

¹ Actual depth data are in [Appendix B \(Table B-2\)](#) of this report.

2.5.1.0.3 [Table 2-9](#) lists the OE density estimates used for each sector. Most of the OE found at East Elliott was on the ground surface or within the shallow subsurface (less than 1 foot bgs). No OE was found deeper than 12 inches bgs ([Appendix B](#)).

TABLE 2-9
ESTIMATED OE DENSITY AT EAST ELLIOTT
FORMER CAMP ELLIOTT (EAST ELLIOTT)

Sector	OE Density ^a (items/ft ²)	OE Density (items/acre)	Percentage of OE which is UXO	Estimated Percentage of OE on the Surface ^b
1	2.8×10^{-6}	0.122	0.44	40
2	2.2×10^{-6}	0.096	0.10	67
3	0	0	0	50
4	2.2×10^{-6}	0.096	0.04	72

^a OE density includes identified identifiable inert OE, UXO, and fuses as described in [Table 2-5](#).

^b The percentage of OE on the ground surface has been calculated to include UXO, AP rounds, and fuses (live and expended).

2.5.1.0.4 OE density on the ground surface has been calculated using data from CMS for each sector ([Appendix B](#)). Items used to calculate the quantity of ordnance on the ground surface included UXO, AP rounds (either AP-T or AP-C), and fuses (either live or expended). All items not found on the ground surface were assumed to have been found within 1 foot bgs. This is consistent with the data from CMS.

2.5.2 Estimated Annual Exposures

2.5.2.0.1 OECert provides a means of determining the estimated number of exposures at a site for various land uses. An OE exposure is defined as coming into contact with or being in destructive range of OE (i.e., UXO). For the purposes of this risk assessment, UXO includes “live,” detonating fuses. If disturbed, either by people, animals, or physical conditions such as fire, UXO items pose the threat of physical trauma, including death. However, each exposure does not necessarily result in injury or death. Many exposures, especially if the UXO is not disturbed, may occur without incident. Inert OE, including OE fragments and expended fuses, also do not pose a risk of detonation.

2.5.2.0.2 The exposures calculated by OECert were weighted according to the percentage of OE items on the ground surface (Tables 2-8 and 2-9). For example, if all ordnance is assumed to be on the ground surface, OECert estimates that there would be 410 exposures for the motor biking scenario in Sector 1. However, only 40 percent of the ordnance items were found on the ground surface in Sector 1. Because motor biking is a surface activity, this translates to 164 exposures (i.e., 40 percent of 410). Using similar methods, all remaining risks for other activities affecting only the ground surface were calculated.

2.5.2.0.3 The only activities which potentially impact ordnance below the ground surface are ORV use and construction. The risks due to ORV use and construction were calculated similarly to the motor biking scenario, but were partitioned into surface and subsurface exposures for purposes of risk reduction calculated for the alternatives considered in this EE/CA.

2.5.2.0.4 An estimate of the expected annual exposures is provided for each of the current and future site activities. The “No Action” evaluation represents the existing state of risk at the site and provides a baseline against which various removal action alternatives can be compared. Site activities evaluated in the risk assessment include both recreational and future development scenarios anticipated for each sector. The future development scenarios include municipal landfill and residential construction in Sectors 1 and 2, and residential construction in Sectors 3 and 4. The evaluation of these land use scenarios is provided below.

2.5.2.1 Recreational Scenarios

2.5.2.1.1 Recreational scenarios comprise the majority of current land uses at East Elliott and were considered for each of the four sectors. Sector 2, while being the site of a 170-acre operating landfill, is also used for recreational purposes. Recreational activities observed in all four sectors (unless otherwise noted) of East Elliott include the following:

- Biking
- Hiking
- Horseback riding (Sectors 1 and 3 only)

- Jogging
- Motor biking
- Off-road vehicle (ORV) use

2.5.2.1.2 A sector-specific estimate of annual usage for each of these activities is in [Appendix C](#). Most of the recreational activities occur in Sector 4, and the least occur in the more remote areas, such as Sector 1. These estimates are based on site visits and interviews with individuals familiar with the site and recreational usage at Mission Trails Regional Park. Mission Trails Regional Park receives approximately 500,000 visitors each year ([Hawsley, pers. comm., 1997](#)) including those who use the golf course, interpretive facilities, and lake (for boating, swimming, etc.), as well as the activities in common with East Elliott. Based on the degree of access to East Elliott from Mission Trails Regional Park and observations by individuals familiar with the site, the total estimated usage at East Elliott is roughly 10 percent of that value ([Walker, pers. comm., 1997a](#); [Hawsley, pers. comm., 1997](#)). Visitors to East Elliott have a risk of exposure to OE on the ground surface. UXO items present in the subsurface present a risk to ORV users, whose activities disturb the subsurface to about 18 inches. [Appendix C](#) provides a list of the remaining assumptions input into OECert to calculate potential recreational exposures to OE.

2.5.2.1.3 The activity-specific baseline risk assessment results for continuing recreational land use are presented in [Table 2-10](#). These risk estimates apply to both current and potential future recreational land uses if no action is taken at East Elliott.

TABLE 2-10

**CURRENT EXPECTED ANNUAL OE EXPOSURES FOR
RECREATIONAL ACTIVITIES
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Activity	Sector 1	Sector 2	Sector 3	Sector 4	All Sectors
Biking	3,278	3,773	0	13,403	20,454
Hiking	2,951	3,396	0	25,657	32,004
Horseback Riding	273	0	0	0	273
Jogging	546	629	0	5,744	6,919
Motor Biking	164	63	0	191	418
ORV Use	1,207	1,591	0	5,185	7,983
Total No. of OE Exposures per Year ^a	8,149	9,452	0	50,180	68,051

^a Assuming No Action is taken at East Elliott

2.5.2.1.4 The results of the analysis indicate that Sector 4 has the highest potential for recreational exposures. This is due primarily to the fact that Sector 4 experiences considerably more usage than Sectors 1 or 2 while having roughly the same OE density. In addition, Sector 4 has nearly twice the percentage of OE on the ground surface of Sector 1. There are no predicted annual exposures for Sector 3 because no UXO or “live” fuses were found during the sampling.

2.5.3 Construction Scenarios

2.5.3.0.1 Construction activities at East Elliott would result in potential risks to workers involved in excavation and other activities that could disturb both surface and subsurface OE. To estimate the number of exposures associated with construction activities at East Elliott, the potential construction scenarios for each sector were identified. These construction scenarios include:

- Residential
- Municipal Landfill (Sectors 1 and 2)

2.5.3.0.2 Currently, the only construction occurring at East Elliott is the expansion of the landfill in Sector 2. Although the Sycamore Landfill is now only 170 acres, development plans include expansion up to approximately 500 acres. In addition, the City of San Diego has proposed constructing a 700-acre landfill in Sector 1.

2.5.3.0.3 It is also possible that residential development will occur in the areas outside of the proposed landfills. For the residential development scenario, the numbers of privately owned parcels and property owners were identified for each sector based on assessor's parcel maps obtained from the County of San Diego and presented in the Archive Search Report ([Montgomery Watson, 1995](#)). East Elliott is currently zoned R-1-40 for single-family residential construction with a minimum lot size of 40,000 square feet (or slightly less than one acre), of which no more than 45 percent would be designated as a building area. However, the presence of geologic hazards such as landslides, debris flows, expansive soils, and steep slopes at East Elliott will probably limit the available building sites. The percentage of potential building area within each sector was therefore estimated based on the Elliott Community Plan open-space system, available topographic maps, and site observations as described in [Appendix C](#).

2.5.3.0.4 After the amount of usable area in each sector was determined, the number of building sites was estimated assuming two residences would be built on each usable acre, as described in the Elliott Community Plan ([City of San Diego Planning Department, 1971](#)), with the minimum lot size maintained by the undeveloped area. It was also assumed that at least one residence would be constructed in each parcel. [Table 2-11](#) lists the estimated number of residential sites for each sector.

TABLE 2-11

**FUTURE RESIDENTIAL CONSTRUCTION ESTIMATES FOR EAST ELLIOTT
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Sector	Estimated Usable Area (Acres)	Estimated No. of Residences	Estimated Population
1	20	40	120
2	75	155	480
3	235	450	1,400
4	340	680	2,110

2.5.3.0.5 For the effective landfill construction area, including the surface and subsurface area affected during construction, it was assumed that the maximum area of each landfill would be excavated such that any subsurface OE item may be disturbed. The effective residential construction area includes an estimate of the surface area needed for the building layout, landscaping, and access roads, and the subsurface area needed to construct a foundation and swimming pool. In addition, the number of construction workers involved in both residential and landfill development was estimated. The assumptions used for estimating the effective construction area, the estimated construction area for each sector, and number of construction workers are in [Appendix C](#).

2.5.3.0.6 Based on these assumptions, risks of exposure for construction workers were calculated using OECert as the total number of exposures predicted during the assumed construction activities. [Table 2-12](#) lists the results of this baseline risk evaluation for construction activities.

TABLE 2-12

**EXPECTED FUTURE EXPOSURES FOR CONSTRUCTION, NO ACTION
FORMER CAMP ELLIOTT (EAST ELLIOTT)**

Sector	Total No. of OE Exposures
1	4,199
2	6,516
3	0
4	3,402
Site Total	14,117

2.5.3.0.7 This analysis indicates that construction workers in Sector 2 have the highest potential for exposure due to the higher percentage of OE consisting of UXO there and the extent to which the area will be disturbed for construction of the landfill. There are no predicted exposures for construction workers in Sector 3 because no UXO was found during the 1996 site investigation (CMS, 1997); however, the residual risk in Sector 3 is not considered to be non-existent. Due to the limitations inherent with OE sampling and the efficiency of the equipment and techniques used to detect OE, a minimal qualitative risk should be assumed for Sector 3.