PRELIMINARY ENVIRONMENTAL ASSESSMENT REPORT FOR:

PROPOSED IRVINE UNIFIED SCHOOL DISTRICT HIGH SCHOOL #5 – SITE A

prepared for:

IRVINE UNIFIED SCHOOL DISTRICT

Contact:
Dana Grudem.

prepared by:

THE PLANNING CENTER|DC&E

Contact:
Denise Clendening, Ph.D., Associate Principal

JANUARY 2014

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Contact:
Dana Grudem.

100 Nightmist
Irvine, CA 92618
Phone: 949.936.5383

prepared by:

THE PLANNING CENTER|DC&E

Contact:
Denise Clendening, Ph.D., Associate Principal

2850 Inland Empire Boulevard, Suite B
Ontario, CA 91764
Phone: 909.989.4449
Fax: 909.989.4447

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File No. ISD-28.0

Ms. Rana Georges, Project Manager
Department of Toxic Substance Control
School Property Evaluation and Cleanup Division
5796 Corporate Avenue
Cypress, California 90630

Subject: Preliminary Environmental Assessment Report
Proposed High School #5 Site A – Irvine Unified School District

Dear Ms. Georges:

Enclosed please find one hard copy and one CD copy of the Preliminary Environmental Assessment (PEA) Report for Irvine Unified School District's Proposed High School #5 Site A in Orange County, California. The Planning Center|DC&E is submitting the PEA report to the Department of Toxic Substances Control's School Property Evaluation and Cleanup Division for review and approval. If you have any questions, please call Denise Clendening at (909) 989-4449, extension 2202.

Sincerely yours,
THE PLANNING CENTER|DC&E

Denise Clendening

Denise Clendening, Ph.D.
Associate Principal

Michael Watson

Michael Watson, PG 8177
Project Geologist

Enclosures

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Executive Summary

This Preliminary Environmental Assessment (PEA) Report for the proposed High School # 5 Site A (site) located on the former Marine Corps Air Station (MCAS) El Toro in the City of Irvine, was prepared by The Planning Center|DC&E on behalf of Irvine Unified School (District) pursuant to the California Education Code which requires that all new school sites obtain a "No Further Action" (NFA) determination from the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) prior to proceeding with acquisition and/or construction of a school.

The approximately 40.3-acre project site is known as the Proposed High School # 5 Site A located on the eastern side of the base near the intersection of Irvine Boulevard and the former Desert Storm Drive on the former MCAS El Toro, Orange County, California (Figure 1).

The District plans a 2,600-student school for grades 9 through 12 with a full complement of buildings and recreational amenities, including classrooms, administrative building, stadium, pool complex, performing arts center, hard courts, ball fields, etc. The site historically has been leased by the military to farmers for agricultural purposes. Two former fuel pipelines (one was a 12-inch jet fuel pipeline and the second was an 8-inch aviation gas pipeline) traversed the northern portion of the proposed school site that were part of the base fuel distribution system. The pipelines were removed in October 2013. A storm drain culvert runs across the site in a northeast to southwest direction. The site is undeveloped and the nearest structure, a 95 square-foot guard shack, was located off the proposed school site for the eastern base entrance off of Irvine Boulevard. The guard shack was demolished in the summer of 2013 and Desert Storm Drive was removed in October 2013.

The Proposed High School #5 Site A is located within Heritage Fields El Toro District 5. Adjacent land uses included the former airfield operations tower, hangers, and warehouses that were located to the northwest of the site. The original base landfill is located to the north across the former Desert Storm Road. To the west are the former runways and to the south is vacant land. To the north and northeast was military housing located across Irvine Boulevard. Figure 2 shows recent site conditions with an overlay of the proposed high school site boundaries.

A Phase I Environmental Site Assessment (Phase I) was prepared and submitted for the site to the Department of Toxic Substances Control's (DTSC) School Property Evaluation and Cleanup Division in December 2012 (The Planning Center|DCE 2012). In January 2013, the DTSC in an email stated that they concurred with the recommendations and conclusions of the Phase I. A previous draft PEA workplan was completed in September 2012 and revised to include additional background information. A PEA Workplan was submitted to the DTSC in October 2013 following a scoping meeting. DTSC requested additional sampling in a letter dated November 14, 2013. The PEA workplan was revised and resubmitted to the DTSC on November 20, 2013. The DTSC approved the PEA workplan in a letter dated December 4, 2013.

The Phase I identified the agricultural activities as a recognized environmental condition. The site has never been developed and was primarily used for agricultural purposes started on the southern portion of the site during the 1950s and occurred on the northern portion by 1994. Agriculture is currently occurring on the southern portion today. The Phase I identified the following as historical recognized environmental conditions or suspect environmental conditions:

- Stockpiles were seen in aerial photographs located on the northern portion of the site.
- Two fuel pipelines and a valve box were located on the proposed school site. The fuel lines were grouted in place and are currently being removed.
- A groundwater plumes from historic base operations was identified as having been located within approximately a 0.14 mile radius of the proposed school site.

- The original base landfill, IRP 3 southern boundary is located to the north across Desert Storm Drive.

The overall objectives of this PEA are to:

- Evaluate historical information for indication of the past use, storage, disposal, or release of hazardous wastes/substances at the site;

- Establish through a field sampling and analysis program the nature of hazardous wastes/substances that may be present in soil and soil gas at the site, their concentration and general extent; and

- Estimate the potential threat to public health and/or the environment posed by hazardous constituents at the site using a residential land-use scenario.

Based on information developed during the PEA using the DTSC's PEA Guidance Manual (DTSC 1999), the DTSC will then make an informed decision regarding potential risks posed by the site.

The field sampling program and the results are summarized below:

- Soil and soil gas sampling activities were conducted at the site on December 10, 11, 12, and 13 2013. A total of 35 soil gas samples were collected and analyzed for VOCs by 8260B from 16 locations. Forty-five soil gas samples were collected and analyzed for methane by ASTM D1946 and 38 soil gas samples were analyzed for hydrogen sulfide from 16 locations.

- From 51 sampling locations, 104 soil samples plus duplicates were collected. Thirteen composite soil samples plus one discrete soil sample were analyzed for organochlorine pesticides by EPA Method 8081A. Six discrete soil samples were analyzed for CAM 17 Metals by EPA Method 6010B/7471A, 10 discrete soil samples were analyzed for arsenic and lead by EPA Method 6010B, seven soil samples were analyzed for total petroleum hydrocarbons (TPH) by EPA Method 8015B, six soil samples were analyzed for polyaromatic hydrocarbons (PAHs) by EPA Method 8270SIM, four soil samples were analyzed for polychlorinated biphenyls by EPA Method 8082A and four samples were analyzed for dioxins and furans by EPA Method 8290.

- Benzene was detected at one soil gas location at 15 feet bgs with a maximum concentration of 0.70 micrograms per liter (μg/l).

- Bromodichloromethane was detected in 2 soil gas samples collected at 15 feet bgs with a maximum concentration of 0.20 μg/l.

- Chloroform was detected in 4 samples from two locations with a maximum concentration of 0.84 μg/l. Higher concentrations were detected in the deeper samples.

- Ethylbenzene was detected in one sample with a maximum concentration of 0.14 μg/l.

- Toluene was detected in one sample with a maximum concentration of 0.44 μg/l.

- 1,2,4-Trimehtlybenzene and 1,3,5-trimethlybenzene were detected in one soil gas sample with maximum concentration of 0.36 and 0.46 μg/, respectively.

- m-,p-Xylenes were detected in 1 sample with a maximum concentration of 0.74 μg/l.

- o-Xylene was reported in one sample with a maximum reported concentration of 0.18 μg/l.

- Methane and hydrogen sulfide were not detected in any of the soil gas samples.

- Four organochlorine pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and chlordane) were detected at low concentrations above the laboratory detection limits. 4,4'-DDD was reported in two samples with a maximum concentration of 5.1 micrograms per kilogram [μg/kg]. 4,4'-DDE was detected in 10 samples and the concentrations ranged from not detected to 53 μg/kg. 4,4'-DDT was detected in 10 samples and the concentrations ranged from not detected to 46 μg/kg; Chlordane and its isomers were reported in five samples ranging from nondetect to 79 μg/kg. Concentrations were below California Human Health Screening Levels (CHHSLs).

- All metals were detected below their respective CHHSL or DTSC screening level (arsenic);

- Total petroleum hydrocarbons were not detected in the soil samples analyzed;

- Polycyclic aromatic hydrocarbons were not detected in the soil samples analyzed;

- PCBs were not detected in the soil samples analyzed;

- Dioxins were reported in two samples at low concentrations, significantly below the CHHSL for residential land use.

- The human health risk screening indicated that chemical concentrations do not pose a significant risk to human health or the environment under an unrestricted, residential land use scenario. The carcinogenic risk using 95% Upper Confidence Limit concentration was less than 1 excess cancer in 1 million, and the hazard index was less than 1.0;

- Laboratory data obtained were validated to assure that Data Quality Objectives (DQOs) were met and the data were suitable for use in a human health screening evaluation.

The results of the PEA support the following conclusions and recommendations:

Based on the PEA objectives, the environmental quality goals of Irvine Unified School District, and the results of the PEA investigation, The Planning Center|DC&E has determined that no further assessment is needed on the site. Therefore, The Planning Center|DC&E recommends that, per California Education Code Section 17213.1, Section 3, the PEA be approved and that no further assessment be required.

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1. Introduction

This document presents a Preliminary Environmental Assessment (PEA) Report for the for the proposed High School # 5 (site) located on the former Marine Corps Air Station (MCAS) El Toro in the City of Irvine, Orange County, California (Figure 1). The Planning Center|DC&E is submitting this PEA Report to the Department of Toxic Substances Control (DTSC), on behalf of Irvine Unified School District (District) to evaluate the potential presence of hazardous substances at a proposed new school site. The District plans a 2,600-student school for grades 9 through 12 with a full complement of buildings and recreational amenities, including classrooms, administrative building, stadium, pool complex, performing arts center, hard courts, ball fields, etc.

The approximately 40.3-acre proposed school site is located on the eastern side of the base near the intersection of Irvine Boulevard and Desert Storm Drive on the former MCAS El Toro. The proposed school site is located south of Irvine Boulevard, east of Sand Canyon Avenue and Highway 133 and north of Trabuco Road (Figure 1). The site historically has been leased by the military to farmers for agricultural purposes. Two fuel pipelines traversed the northern portion of the proposed school site that was part of the base fuel distribution system. One pipeline was for aviation fuel and the other was for jet fuel. The Norwalk Pipeline was a 29.5 mile fuel pipeline that ran from the Defense Fuel Supply point located in Norwalk California to Tank Farm 555 at former MCAS El Toro. Tank Farm 555 was located to the north of the proposed high school site across Irvine Boulevard. The Norwalk Pipeline was not part of the former MCAS El Toro. The two pipelines ran from Tank Farm 555 across the proposed high school site to aircraft fueling stations located to the west of the proposed high school site. A storm drain culvert runs across the site in a northeast to southwest direction.

The site is undeveloped and the nearest structure located off the proposed school site was a 95 square-foot guard shack for the eastern base entrance off of Irvine Boulevard. The proposed High School Site is within the Heritage Fields El Toro. Adjacent land uses included former airfield operations tower, hangers, and warehouses were located to the northwest of the site. The original base landfill is located to the north across Desert Storm Road. To the west are runways and to the south is vacant land. To the north and northeast was military housing located across Irvine Boulevard. Figure 2 shows the current site conditions with an overlay of the proposed high school site boundaries.

MCAS began operating in 1943 and closed in July 1999 in accordance with the Base Realignment and Closure (BRAC) Act. An Environmental Baseline Survey for MCAS was prepared in support of the base closure in 1995 in compliance with the provisions of the Community Environmental Response Facilitation Act (CEFRA) amends Section 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and was enacted to facilitate the rapid return of uncontaminated properties to local communities during the BRAC process. The proposed high school site is located in Navy Sale Parcel I and was found suitable to transfer as part of the Finding of Suitability to Transfer (FOST) #1 in July 2004. The jet fuel lines were grouted in place as part of decommissioning and was included in the FOST #2 in 2005. In 2008, a 3.9-acre carve-out and a 42.9-acre carve-out were conveyed as FOST #3 and FOST #4, respectively. In 2010, a 119.3-acre carve-out was conveyed as FOST #5. The conveyance of an additional 356.45 acres (FOST #6) was completed in 2011. FOST #7 in 2012 documented the suitability to transfer three carve out areas for approximately 150.821 acres.

Approximately 3,700 acres of MCAS El Toro were auctioned off by the Federal Government in 2005. Heritage Fields El Toro, LLC submitted the successful bid for all four parcels. As part of the purchase of the property, 1,387 acres were transferred to public ownership to create the Orange County Great Park.

The former base is listed on the National Priorities List (NPL). MCAS El Toro was placed on the NPL in 1990 due to volatile organic compound (VOC) groundwater contamination at the Base boundary and in agricultural wells west of the Base. The source of the VOCs in groundwater is located over one mile to the southwest of the proposed high school site. The proposed high school site is upgradient of the

plume. The EPA delisted approximately 1,900 acres of the former Base from the NPL on January 21, 2014. Proposed High School #5 Site A is located within the delisted area.

The PEA was conducted to evaluate the potential presence of residual pesticides in soil from historic agricultural use, petroleum hydrocarbons from the two former fuel pipelines, and if there were any impacts from the adjacent original base landfill and nearby groundwater plume. Soil and soil gas sampling was conducted on the site in general accordance with the guidelines provided by the DTSC in the PEA Guidance Manual (DTSC 1999) and as outlined in the PEA workplan.

1.1 PEA OBJECTIVES

The District has prepared this PEA pursuant to the California Education Code that requires the completion of a Phase I Environmental Site Assessment (Phase I) or PEA, with DTSC oversight, for all new school sites that will receive state funding prior to proceeding with construction of a school.

The overall objectives of this PEA are to:

- Evaluate historical information for indication of the past use, storage, disposal, or release of hazardous waste/substances at the site;
- Establish through a field sampling and analysis program the nature of hazardous wastes/substances that may be present in soil at the site, their concentration and general extent; and
- Estimate the potential threat to public health and/or the environment posed by hazardous constituents, if any, at the site using a residential land-use scenario.

Based on information developed during the PEA and the conservative human and ecological risk evaluation set forth in the DTSC's Preliminary Endangerment Assessment Guidance Manual (DTSC 1999), the DTSC will then make an informed decision regarding potential risks posed by the site.

Possible outcomes of the PEA decision include, but are not limited to, the requirement for further investigation through the Supplemental Site Investigation process if the site is found to be significantly impacted by hazardous substances release(s); the need to perform a Removal Action if localized impacts by hazardous substances release(s) are found; implementation of mitigation actions to address any potential risks; and an issuance of a "No Further Action" (NFA) finding if the site is found not to be significantly impacted and risks to human health and the environment are found to be within acceptable levels based on the conservative screening-level risk assessment.

1.2 SCOPE OF WORK

The scope of work implemented to prepare this PEA included:

- Researching available site background information regarding former and current land use;
- Implementing field and laboratory data collection and evaluation to further assess environmental conditions at the site; and
- Preparing this PEA report.

Several information sources were reviewed as part of the background research for development of this PEA report. These sources were reviewed to develop an understanding of current and past land uses

and practices that may have involved the handling, use, storage, and/or disposal of hazardous substances or wastes. Information was obtained and used to develop a general site history in an attempt to identify potential sources of chemical impact, if any.

The approach utilized to perform the background research is very similar to that used in completing a Phase I under the American Society for Testing and Materials (ASTM) Practice for Environmental Site Assessments (ESAs): Phase I Assessments Process (ASTM Standard E 1527-13). Specific sources of information reviewed and activities performed by The Planning Center|DC&E in conducting the background research included:

- Site inspections and observations of the site and surrounding area within ¼-mile (site photographs are included in Appendix A);
- Review of available aerial photographs (included in Appendix B);
- Review of current U.S. Geological Survey (USGS) 7.5-minute topographic maps;
- Evaluation of environmental database list searches (included in Appendix C);
- Review of agency files at federal, state and local regulatory agencies and offices for the site;
- Review of agency files for listed facilities within ¼-mile of the site that were identified as having a potential to have impacted the site (included in Appendix C);
- Interviews with persons knowledgeable of site history and operations; and
- Collection and review of available applicable information from the District's files.

A sampling and analyses program was conducted to evaluate the potential presence of chemical constituents in soil beneath the site. The sampling program was conducted on December 10th through December 13, 2013. The scope for the field and laboratory investigation is discussed in Section 6.

- A total of 35 soil gas samples were collected and analyzed for VOCs by 8260B from 16 locations. Forty-five soil gas samples were collected and analyzed for methane by ASTM D1946 and 38 soil gas samples were analyzed for hydrogen sulfide from 16 locations.
- From 51 sampling locations, 104 soil samples plus duplicates were collected. Thirteen composite soil samples plus one discrete soil sample were analyzed for organochlorine pesticides by EPA Method 8081A. Six discrete soil samples were analyzed for CAM 17 Metals by EPA Method 6010B/7471A, 10 discrete soil samples were analyzed for arsenic and lead by EPA Method 6010B, seven soil samples were analyzed for total petroleum hydrocarbons (TPH) by EPA Method 8015B, six soil samples were analyzed for polyaromatic hydrocarbons (PAHs) by EPA Method 8270SIM, four soil samples were analyzed for polychlorinated biphenyls by EPA Method 8082A and four samples were analyzed for dioxins and furans by EPA Method 8290.

The analytical results with respect to the project site are as follows:

- Benzene was detected at one soil gas location at 15 feet bgs with a maximum concentration of 0.70 μg/l.

- Bromodichloromethane was detected in 2 soil gas samples collected at 15 feet bgs with a maximum concentration of 0.20 μg/l.

- Chloroform was detected in 4 samples from two locations with a maximum concentration of 0.84 μg/l. Higher concentrations were detected in the deeper samples.

- Ethylbenzene was detected in one sample with a maximum concentration of 0.14 μg/l.

- Toluene was detected in one sample with a maximum concentration of 0.44 μg/l.

- 1,2,4-Trimehtlybenzene and 1,3,5-trimethlybenzene were detected in one soil gas sample with maximum concentration of 0.36 and 0.46 μg/, respectively.

- m-,p-Xylenes were detected in 1 sample with a maximum concentration of 0.74 μg/l.

- o-Xylene was reported in one sample with a maximum reported concentration of 0.18 μg/l.

- Methane and hydrogen sulfide were not detected in any of the soil gas samples.

- Four organochlorine pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and chlordane) were detected at low concentrations above the laboratory detection limits. 4,4'-DDD was reported in two samples with a maximum concentration of 5.1 micrograms per kilogram [μg/kg]. 4,4'-DDE was detected in 10 samples and the concentrations ranged from not detected to 53 μg/kg. 4,4'-DDT was detected in 10 samples and the concentrations ranged from not detected to 46 μg/kg; Chlordane and its isomers were reported in five samples ranging from nondetect to 79 μg/kg. Concentrations were below California Human Health Screening Levels (CHHSLs).

- All metals were detected below their respective CHHSL or DTSC screening level (arsenic);

- Total petroleum hydrocarbons were not detected in the soil samples analyzed;

- Polycyclic aromatic hydrocarbons were not detected in the soil samples analyzed;

- PCBs were not detected in the soil samples analyzed;

- Dioxins were reported in two samples at low concentrations, significantly below the CHHSL for residential land use.

- The human health risk screening indicated that chemical concentrations do not pose a significant risk to human health or the environment under an unrestricted, residential land use scenario;

- Laboratory data obtained were validated to assure that Data Quality Objectives (DQOs) were met and the data were suitable for use in a human health screening evaluation.

1.3 PEA REPORT FORMAT

This PEA Report is organized in general accordance with the format presented in Chapter 3 of the DTSC's PEA Guidance Manual. This PEA Report contains the following sections:

- Section 1 presents an Introduction and Summary of PEA Objectives and PEA Report Format;
- Section 2 presents a Site Description of the proposed school site;
- Section 3 includes Site History and Background Information;
- Section 4 defines the Apparent Problem;
- Section 5 contains a description of the Site Environmental Setting;
- Section 6 presents a discussion of Sampling Activities and Results;
- Section 7 includes the Human Health Screening Evaluation Statement;
- Section 8 presents the Ecological Screening Evaluation Statement;
- Section 9 includes a summary of Quality Assurance Project Plan (QAPP) measures;
- Section 10 describes Health and Safety Plan (HASP) implementation;
- Section 11 summarizes variances from the proposed sampling plan;
- Section 12 presents a discussion of Applicable or Relevant Laws and Regulation Pertaining to School Sites;
- Section 13 presents Conclusions and Recommendations of the PEA; and
- Section 14 lists References cited in the document.

The appendices to this PEA Report include:

Appendix A – Site Photographs;

Appendix B – Research Documentation;

Appendix C – Environmental Database Search Report;

Appendix D – Health and Safety Plan;

Appendix E - Laboratory Reports;

Appendix F – Boring Logs;

Appendix G – Risk Model Results; and

Appendix H – Quality Assurance Project Plan

1.4 PUBLIC PARTICIPATION

Per Assembly Bill (AB) 972, prior to the commencement of the proposed PEA sampling, the public that was within the line of site was notified of the planned investigation activities. The PEA will be made available for public review and comment when the PEA is submitted to the DTSC for review. A public hearing will be conducted for the PEA (Option A under AB 972) that will be advertised in the local newspaper. Upon completion of the 30-day public review and public hearing, a letter will be sent to the DTSC from Irvine Unified School District outlining the public notification process including the date of the public hearing and the dates of the 30-day public review.

2. Site Description

This section describes the location and ownership of the site as well as other pertinent details required by DTSC regarding the specifics of the site description.

2.1 DESCRIPTION AND LOCATION

2.1.1 Site Name

The site has been identified by Irvine Unified School District as the Proposed High School # 5.

2.1.2 Site Address

The site is located on the eastern side of the base near the intersection of Irvine Boulevard and the former Desert Storm Drive on the former Marine Corps Air Station El Toro in the City of Irvine, Orange County, California (Figure 1). There is currently no site address for the proposed school site.

2.1.3 Designated Contact Person

Ms. Dana Grudem, is the contact person designated by the District.

2.1.4 Mailing Address

The mailing address for the project designated by the District is:

Irvine Unified School District
100 Nightmist
Irvine, CA 92618

2.1.5 Telephone Number

The telephone number for Ms. Grudem is (949) 936-5383.

2.1.6 Other Site Names

The site is also known as Proposed High School # 5 Site A. The site has also been called the Great Park High School Site.

2.1.7 U.S. Environmental Protection Agency (USEPA) Identification Number

MCAS El Toro was placed on the National Priorities List (NPL) in 1990 (United States Environmental Protection Agency [U.S. EPA] ID:CA6170023208) due to contaminated groundwater which is not associated with the proposed high school site. Approximately 1,900 acres of the base were delisted from the NPL on January 21, 2014. Proposed High School #5 Site A is located within the delisted area.

2.1.8 EnviroStor Database Number

The DTSC has assigned Envirostor Number 60001784 to the proposed high school site project.

2.1.9 Assessor's Parcel Number(s)

The project site is identified as County of Orange Assessor's Parcel Numbers 591-131-14, 591-131-18 and 591-131-19.

2.1.10 Township, Range, Section and Meridian

Based on the USGS 7½-Minute Topographic Series, Lake Forest, California Quadrangle Map (USGS 2012), the proposed high school site is located in Sections 3, 4, 9 and 10 of Township 6 South, Range 8 West of the San Bernardino Base Line and Meridian.

2.1.11 Site Zoning

The site is zoned as "8.1 Trails and Transit Oriented Development" (TTOD).

2.1.12 Site Maps and Photographs

A vicinity map depicting the site and surrounding area is included as Figures 1 and 2, respectively. Site photographs are included in Appendix A.

3. Site History and Background Information

3.1 CURRENT AND HISTORICAL LAND USES

3.1.1 Facility Ownership/Operators

The site was purchased by Heritage Fields El Toro, LLC in 2005. Construction of a United States Maring Corps (USMC) pilots' fleet operational training facility began in July 1942 on 2,319 acres of land in Orange County, California. The facility was commissioned as MCAS El Toro in March 1943. The Marine Corps acquired the land from James Irvine, a farmer. In 1950, the station was selected for development as a master jet air station and permanent center for Marine aviation on the West Coast to support the operations and combat readiness of Fleet Marine Forces, Pacific. Between 1944 and 1986, additional land was acquired to bring the on-station portion of the installation to 4,710 acres.

MCAS closed in July 1999 in accordance with the Base Realignment and Closure (BRAC) Act. An Environmental Baseline Survey for MCAS was prepared in support of the base closure in 1995 in compliance with the provisions of the Community Environmental Response Facilitation Act (CEFRA) amends Section 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and was enacted to facilitate the rapid return of uncontaminated properties to local communities during the BRAC process. The proposed high school site is located in Navy Sale Parcel I and was found suitable to transfer as part of the Finding of Suitability to Transfer (FOST) #1 in July 2004. The jet fuel lines were grouted in place as part of decommissioning and was included in the FOST #2 in 2005. In 2008, a 3.9-acre carve-out and a 42.9-acre carve-out were conveyed as FOST #3 and FOST #4, respectively. In 2010, a 119.3-acre carve-out was conveyed as FOST #5. The conveyance of an additional 356.45 acres (FOST #6) was completed in 2011. FOST #7 in 2012 documented the suitability to transfer three carve out areas for approximately 150.821 acres.

The proposed high school site was used for agricultural purposes. Buildings were not identified within the proposed high school boundaries.

3.1.2 Business Type

Agricultural activities started on the southern portion of the site during the 1950s. Two former fuel lines ran in an east west direction across the northern portion of the site. The pipelines were removed in October 2013. A drainage channel runs in a northeast to southwest direction across the site. A series of dirt roads run across the site. The site is vacant land with no structures.

3.1.3 Years of Operation

Based on a review of historical aerial photographs and base closure documents, portions of the site historically have been used for agricultural purposes since the 1950s. A drainage area, culvert, traverses the site in a northeast to southwest direction. Various roads, dirt and paved, have been located on the site.

3.1.4 Business/Manufacturing Activities

No manufacturing activities are known to have occurred within the proposed high school boundaries.

3.2 SURROUNDING PROPERTY LAND USES

The surrounding property is part of the decommissioned military base. The buildings that were adjacent to the proposed school site have been demolished. Historically the adjoining land uses are as follows:

North: Military housing was located to the north across Irvine Boulevard. To the northwest across Desert Storm Road, the original base landfill IRP 3 was located.

South: Vacant land was located to the south of the proposed school site.

West: Airfield Operations tower, hangers, warehouse, engine test areas, and training facilities, were located to the north west of the site. Runways were located to the west.

East: Military housing, agricultural and vacant land are located to the east.

Section 17213 of the California Education Code and Section 21151.8 of the California Public Resources Code prohibit construction of a school upon a current or former hazardous waste disposal site or solid waste disposal site. Based on information reviewed for preparation of this PEA report, the Proposed High School #5 Site A project site is not located on a current or former disposal site.

3.3 PAST USAGE OF THE SITE

Past usage of the site was assessed through a review of aerial photographs and base closure documents. Copies of the aerial photographs are included in Appendix B.

Based on the documents reviewed the site appears to have been vacant land in the 1930s prior to acquisition by the military in 1942. Portions of the site have been used for agricultural purposes since the 1950s. Two former fuel lines ran in an east west direction across the proposed school site.

Aerial photographs were obtained from Environmental Data Resources Inc. (EDR) for the years 1938, 1946, 1952, 1968, 1977, 1989, 1994 and 2005 and were reviewed for the subject site.

- 1938 – The site appears to be vacant land with drainage areas running across the site. No structures are apparent on the proposed school site.

- 1946 – A road that runs in northeast to southwest direction then curves to the southeast is now seen. No structures are apparent.

- 1952 – The site appears relatively unchanged in comparison to the 1946 aerial photograph.

- 1968 – The southwestern portion of the site is being used for agricultural purposes. The remaining portions of the site appear relatively unchanged in comparison to the 1952 aerial photograph.

- 1977 – The eastern portion of the site appears to be used for agricultural purposes. Dirt roads are located on the northwestern area of the site.

- 1989 – There appears to be fewer dirt roads. Irvine Boulevard now borders the site to the northeast and the base entrance on Desert Storm Road is now seen. The eastern portion of the site is being used for agricultural purposes.

- 1994 – More of the site is being used for agricultural purposes. The remaining portions of the site appear relatively unchanged in comparison to the 1989 aerial photograph.

- 2005 – The site appears relatively unchanged in comparison to the 1994 aerial photograph. The culvert, drainage area is more channelized and there is a turnout area for the guard station on Desert Storm Road.

3.4 PAST USAGE OF ADJOINING PROPERTIES

Past usage of the adjoining properties was assessed through a review of aerial photographs and historical topographic maps. Based on historical aerial photographs and topographic maps, the adjoining land use was vacant undeveloped until the base was developed in the early 1940s. The adjoining land use on the west side of the proposed school site was used for roadways and a runway. The airport tower and hangers were located to the northwest. The original base landfill IRP 3 was located to the north. To the east across Irvine Boulevard was military housing. Agricultural operations and vacant land were located to the southeast and south.

3.5 HAZARDOUS SUBSTANCE/WASTE MANAGEMENT INFORMATION

3.5.1 Records Review

3.5.2 Agency Files

A letter was sent to the Office of the State Fire Marshal on October 4, 2012 requesting information regarding the locations of high-pressure pipelines located within a 1,500 foot radius of the Site. Based on information received from the Office of the State Fire Marshal, no pipelines jurisdictional to their agency are located in the site vicinity (Appendix B).

The Underground Service Alert (USA) website was accessed on October 4, 2012 to request a list of utility companies in the vicinity of the subject property that may operate transmission lines (USA 2012). USA provided a list of eight companies, including the Southern California Gas Company (SCGC), which provides gas services in the vicinity of the subject property, the Irvine Ranch Water District (IRWD), which provides water to the City of Irvine, and United Paradyne. Southern California Edison provides electricity in the site vicinity. United Paradyne was contacted via mail on October 15, 2012. United Paradyne responded that they do no operate any pipelines within 1,500 feet of the Site. The other companies listed do not operate utilities with the potential to generate hazardous waste on the proposed school site.

A portion of the base fuel pipeline system ran across the proposed high school site (Earth Tech 2003). The two jet fuel pipelines were closed in 2001 with the participation and oversight of the California State Fire Marshal. One pipeline was 12 inches in diameter and the other was 8 inches in diameter. Both pipelines went from Tank Farm 555 located on the northeast side of Irvine Boulevard to Tank Farm 5 located to the west of the proposed school site. Valve box 3, located in the agricultural field within the project boundaries, was associated with the 12-inch pipeline. The fuel lines were grouted in place as part of decommissioning and were included in the Finding of Suitability to Transfer 2 (FOST #2) in 2005. In October 2013 the pipelines were removed.

3.5.3 Oil and Gas Map Review

A review of California Division of Oil, Gas and Geothermal Resources, Wildcat Map Series, Map W1-4, (California Department of Conservation 2010) indicated that there are no active or abandoned oil or gas fields on the subject Site. Division of Oil and Gas and Geothermal Resources (DOGGR) mapped the closest oil well as being located approximately 850 feet to the north northwest of the proposed school site. The well, labeled “Irvine”, was advanced by Calny Oil Co. and is identified as a plugged and abandoned dry hole (Appendix B). At the October 3, 2013 PEA scoping meeting, the DTSC indicated

that the location of former oil well that was identified as Calny Oil Co "Irvine" well was not known. The DTSC raised the concern that the oil well may have been drilled on the school site and when the well was advanced in 1924 to a depth of 4,247 feet below ground some oil and gas were encountered in the subsurface but no oil bearing formations were encountered. A request was made in 1927 to abandon the well by pulling the 10 inch casing and leaving the hole full of heavy mud to the surface. In 2009 the Department of the Navy contacted DOGGR regarding the well. There is no paperwork showing the well was abandoned. DOGGR indicated that even if the well had been abandoned according to 1927 standards, the well could be a danger if someone fell in. DOGGR indicated in 2009 they need to document efforts to locate the well. No other information was posted on the well history. Based on the uncertainty of the location of the former oil well, the PEA included soil gas testing for methane and hydrogen sulfide gas within the school site boundaries.

3.5.4 Site Inspection Results

A site visit to observe site conditions was conducted by Denise Clendening and Mike Watson of The Planning Center|DC&E on November 15, 2012. The Planning Center|DC&E also observed the exterior portions of the property, including the property boundaries. No weather-related conditions or other conditions that would limit our ability to observe the site occurred during our site reconnaissance.

Summarized below are observations relative to specific physical features identified in Section 2.3.2 of the PEA Guidance Manual and site photographs are included as Appendix A.

Physical Feature	*Observations*
Site boundaries:	The project site encompasses the area depicted in Figure 2. Desert Storm which borders the site to the north has been removed since the site visit. Irvine Blvd border the site to the northeast.
Locations and boundaries of all onsite operations (present and past):	Based on interviews and a review of historical aerial photographs, the project site has been used agricultural purposes since the 1950s. Two fuel pipelines had been located on the school site as shown in Figure 3.
Foundations of former structures:	None noted by The Planning Center|DC&E.
Storage tanks and storage areas:	None noted by The Planning Center|DC&E. A valve box for the former fuel pipeline had been located on the site that was removed in October 2013.
Odors:	None noted by The Planning Center|DC&E.
Pools of liquid:	None noted by The Planning Center|DC&E.
Electrical or hydraulic equipment known or likely to contain PCBs:	None noted by The Planning Center|DC&E.
Unidentified substance containers (including empty drum storage):	None noted by The Planning Center|DC&E.
Stained soil and pavement, corrosion, and degradation of floors and walls:	None noted by The Planning Center|DC&E.
Drains and Sumps:	None noted by The Planning Center|DC&E.
Pits, ponds, and lagoons:	A drainage area runs in a northeast to southwest direction across the site.
Surface drainage pathways:	A drainage area runs in a northeast to southwest direction across the site.
Stressed vegetation (from other than insufficient water):	None noted by The Planning Center|DC&E.

Physical Feature	Observations
Solid waste and waste water:	None noted by The Planning Center|DC&E.
Wells (including dry wells, irrigation wells, injection wells):	None noted by The Planning Center|DC&E.
Septic systems:	None noted by The Planning Center|DC&E.
Overhead electrical lines:	None noted by The Planning Center|DC&E.
High-pressure gas or fuel transmission lines:	Two below ground fuel pipelines had traversed the site that were part of the former base fuel system. The pipelines have been removed.
Railroad tracks:	Based on a site reconnaissance no railroads are located within 1,500 feet of the Site.

3.5.5 Interviews

Interviews were conducted with Jim Werkmeister, Director of Land Development for FivePoint Communities. Mr. Werkmeister provided information on prior investigations that had occurred at the base as part of base closure activities. He indicated that the farmers who were recently using the site on the southern portion of the proposed school site were not using any pesticides. Mr. Werkmeister provided us with information regarding the removal of the two fuel pipelines and testing that had occurred by the Navy along the pipelines and valve box.

3.5.6 Prior Assessments/Remediation

Several documents were reviewed in preparation of the PEA. The preparation of the PEA I is based in part upon the following reports:

Earth Tech Inc. September 2003. Final Environmental Baseline Survey, Former Marine Corps Air Station, El Toro, California.

Shaw, 2012. 1st Year Long-Term Monitoring Report August 2010-July 2100 Operation and Maintenance Operable Unit 2C, Installation Program Sites 3 and 5 Former Maine Corps Air Station El Toro California.

U.S. Department of the Navy 2011. Information Package Location of Concern MSC JP5 (JP5 Pipelines) Former Marine Corps Air Station El Toro. 29 April.

_____. 2004. Final Finding of Suitability to Transfer (Parcel IV and Portions of Parcels I, II, and III), Former Marine Corps Air Station, El Toro, California.

_____. 2004. Summary Report. MSC JP5 Valve Box 3 Vicinity Former Marine Corps Air Station, El Toro. 27 December 2004.

_____. 2005. Final Finding of Suitability to Transfer #2 (Portions of Parcels II and III), Former Marine Corps Air Station, El Toro, California.

_____. 2008. Record of Decision, Operable Unit 2C, Installation Restoration Program Landfill Sites 3 and 5. Former Marine Corps Air Station El Toro, California. June.

3.6 REGULATORY STATUS

The Planning Center|DC&E utilized the electronic database service EDR to complete the environmental records review. The database search was used to identify properties that may be listed in the referenced Agency records, located within the American Society for Testing and materials (ASTM)-specified search radii indicated below:

- NPL sites: 1 mile
- CERCLIS sites: 0.5 mile
- CERCLIS NFRAP sites Site and Adjoining
- Federal ERNS: Site only
- RCRA non-CORRACTS TSD facilities: 0.5 mile
- RCRA CORRACTS TSD facilities: 1 mile
- RCRA Generators: Site & Adjoining
- State Hazardous Waste Sites: 1 mile
- Registered Underground Storage Tanks: Site & Adjoining
- State Landfills and Solid Waste Disposal Sites: 0.5 mile
- State Leaking Underground Storage Tanks: 0.5 mile
- CHMIRS: 0.5 mile
- HAZNET: 0.25 mile

A review of selected regulatory agency databases for documented environmental concerns on the site, or in close proximity to the site, was conducted by EDR. A copy of the radius report, dated August 9, 2012 is included in Appendix C. The subject and adjoining properties were identified in the environmental databases searched by EDR. MCAS El Toro is identified as a Department of Defense (DOD) site, DOD sites are federally owned or administered lands that have any area equal to or greater than 640 acres. A summary of significant findings by the database follows below.

3.6.1 NPL Sites

The National Priorities List (NPL) is a list of contaminated sites that are considered the highest priority for clean-up by the USEPA.

MCAS El Toro was placed on the National Priorities List (NPL) in 1990 (United States Environmental Protection Agency [U.S. EPA] ID:CA6170023208) due to volatile organic compound (VOC) groundwater contamination at the Base boundary and in agricultural wells west of the Base. In 2005 and 2006, EPA issued two clarification letters indicating that 1,013 acres of MCAS El Toro had not been impacted by

hazardous waste and were therefore, not part of EPA's initial NPL determination. EPA delisted an additional 1900.4 acres of the former Base from the NPL on January 21, 2014. Proposed High School #5 Site A is located within the delisted area.

Of the approximate 4,700 acres of the base, approximately 1000 acres were or will be transferred to other federal and state agencies. The remaining 3,700 +/- acres (only 410 +/- acres remain to be transferred as of March 2012) are transferring to a private developer for the development of the City of Irvine's "The Great Park" which is a combination of residential, industrial R&D, commercial, educational, and public recreational and open-space uses. The remedies for IRP Site 1 and IRP Site 2 groundwater were selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (Title 42 United States Code [U.S.C] Section [§] 9601, et seq.), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 Code of Federal Regulations [CFR] Part 300). The Navy provides funding for site cleanups at former MCAS El Toro on behalf of the Marine Corps.

The Groundwater Feasibility Study concluded that cleanup is required for perchlorate-impacted groundwater associated with IRP Site 1 and volatile organic compound (VOC)-impacted groundwater associated with IRP Site 2. A total of 25 IRP sites have been investigated at former MCAS El Toro. One site (IRP Site 23) was eliminated as an environmental concern; the remaining 24 sites were grouped into 6 operable units (OUs) including OU-1, OU-2A, OU-2B, OU-2C, OU-3A, and OU-3B. In October 1990, the Marine Corps/DON signed a Federal Facility Agreement (FFA) with the U.S. EPA Region 9, the California Department of Health Services (DHS) (part of which is currently the Department of Toxic Substances Control [DTSC]), and the California Regional Water Quality Control Board, Santa Ana Region (RWQCB) (U.S. EPA, California, DON 1990).

The database search did not identify any additional NPL sites within a one-mile radius of the subject property.

*3.6.2 **CERCLIS Sites***

The Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) list identifies sites which are suspected to have contamination and require additional investigation to assess if they should be considered for inclusion on the NPL.

- MCAS is listed on the CERCLIS List with Site ID 0902770 as a federal facility.
- The database search did not identify any additional CERCLIS sites within a ½-mile radius of the subject property.

*3.6.3 **CERCLIS-NFRAP Sites***

CERCLIS-NFRAP status indicates that a site was once on the CERCLIS List but has No Further Response Actions Planned (NFRAP). Sites on the CERCLIS-NFRAP List were removed from the CERCLIS List in February 1995 because, after an initial investigation was performed, no contamination was found, contamination was removed quickly, or the contamination was not significant enough to warrant NPL status.

- The subject site is not listed on the CERCLIS-NFRAP List.
- The database search did not identify any CERCLIS-NFRAP sites adjacent to the subject property.

3.6.4 Federal ERNS List

The Federal Emergency Response Notification System (ERNS) list tracks information on reported releases of oil and hazardous materials.

- The subject site is not identified on the Federal ERNS list.
- The database search did not identify any Federal ERNS sites adjacent to the subject property.

3.6.5 RCRA CORRACTS Facilities

The Resource and Conservation Recovery Act (RCRA) CORRACTS Facilities list catalogues facilities that treat, store, or dispose of hazardous waste and have been associated with corrective action activity.

- MCAS is listed as a RCRA CORRACTS TSD facility.
- The database search did not identify any additional RCRA CORRACTS TSD facilities within a one-mile radius of the subject property.

RCRA sites were not identified on or adjacent to the proposed school sites. A RCRA Facility Assessment ("RFA") was conducted for the former MCAS El Toro between 1990 and 1993. The purpose of the RFA was to identify Solid Waste Management Units (SWMUs) and Temporary Accumulation Areas (TAAs) where there was an actual, or potential for, release of hazardous waste into the environment, and whether further actions might be required. The RFA was finalized on May 31, 1996. It presents results, recommendations and closure strategies for SWMUs and TAAs. Some of these sites are incorporated in the IRP; others are handled under alternative regulatory procedures. The RCRA sites must meet current environmental compliance requirements. The State of California considers any site from which hazardous constituents may migrate to be a SWMU, but corrective action can be addressed through the Federal Facilities Agreement for the former MCAS El Toro or through responses to petroleum releases with oversight provided by the RWQCB. DTSC has determined that all corrective action obligations required under RCRA for the property subject to FOST #s 1, 2, 3 and 4 (a total of 2854.8 acres) are complete. Final RCRA Corrective Action Complete Determination Packages are documented in FOST #s 1 through 4. Because of continuing groundwater monitoring at FOST #s 5 and 6 sites, RCRA corrective actions have not been determined to be complete for those sites.

3.6.6 RCRA non-CORRACTS TSD Facilities

The RCRA non-CORRACTS TSD Facilities List tracks facilities which treat, store, or dispose of hazardous waste and are not associated with corrective action activity.

- MCAS is listed as a RCRA non-CORRACTS TSD facility.
- The database search did not identify any additional RCRA non-CORRACTS TSD facilities within a ½-mile radius of the subject property.

3.6.7 RCRA Generators

The RCRA Generator list is maintained by the USEPA to track facilities that generate hazardous waste.

- MCAS is listed as a RCRA Hazardous Waste Generator.
- The database search did not identify any RCRA sites near the subject property.

*3.6.8 **Cortese List***

The Cortese List database identifies hazardous waste sites selected for remedial action and underground storage tank (UST) properties having a reportable release and is maintained by the USEPA Office of Emergency Information.

The subject site is not listed on the Cortese List.

- The database search identified one facility on the Historical Cortese List within a ½-mile radius of the subject property.
    - Unocal Service station #4473 was identified in the EDR report as being located approximately 2,550 feet to the west northwest. The site is actually located at 14886 Sand Canyon on the south side of Interstate 5, approximately 1.5 miles from the proposed school site.

*3.6.9 **Registered Underground Storage Tanks (USTs)***

The State Water Resources Control Board's Hazardous Substance Storage Container Database maintains a list of USTs regulated by the RCRA.

- The subject site is not listed on the registered UST list.
- The database search did not identify any registered USTs within a ¼-mile radius of the proposed school site.

*3.6.10 **State Landfills and Solid Waste Disposal Sites***

The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills. The data comes from the Integrated Waste Management Board's Solid Waste Information System database.

- The database search identified two solid waste landfill sites within a half mile of the site.
    - Tierra Verde Industries EcoCentre located at 8065 Marine Way is located approximately 0.3 mile to the northwest of the site. The facility is an active composting facility for green materials. No violations were reported.
    - Composting Plant Irvine located at 7922 Irvine Boulevard is located approximately 0.3 mile to the north northwest of the facility. The facility does not fall into the category of a Class I, II or III facility and composts green waste.

The former base landfill is located approximately 750 feet to the northwest of the proposed school site with a portion of the landfill locate closer to the proposed school site on the north side of Desert Storm Road. IRP Site 3 landfill was active from 1943 until 1955. It was the original former MCAS El Toro landfill, which was operated as a cut-and-fill disposal facility. IRP Site 3 potentially contained a variety of materials disposed at assorted locations within the landfill including metals, incinerator ash, solvents, paint residues, hydraulic fluids, engine coolants, construction debris, oily wastes, municipal solid waste, and various inert solid wastes. The selected remedy for the landfill is documented in the 1st Year Long-Term Monitoring Report July 2012 by Shaw. Portions of the report were included in the Phase I ESA (The Planning Center|DC&E 2012). A single-barrier cap with a flexible membrane liner to prevent contact with landfill materials and reduce the infiltration into landfill contents was installed.

Prior to capping, wastes from IRP Site 3 Unit 4 and Unit 1were consolidated in IRP Site 3, Unit 1 Waste Area A. All waste consolidated were radiologically screened for Radium 226. Land-use restrictions applying to the landfill areas and extending approximately 100 feet off the waste boundaries to protect the landfill covers ensure the containment remedy and contents of the landfill are not disturbed.

Monitoring to detect migration of contaminants from the landfills is being implemented. A landfill gas collection (LFG) and/or venting system to actively collect and vent LFG as necessary and passively vent or monitor gas during inactive periods is installed. Passive gas control gravel trenches within the compliance monitoring zone during remedy implementation were added for an additional measure of safety. A California Integrated Waste Management Board monitoring protocol with compliance LFG monitoring probes within 50 feet of the landfill waste boundary to facilitate perimeter monitoring and assess migration of LFG is being implemented. Remedial construction activities at IRP 3 started in August 2009 and were completed in August 2010.

Four quarters of groundwater monitoring from September 2010 to June 2011 found low concentrations of chloroform and benzene was reported at 1.9 micrograms per liter (µg/l) and at a later monitoring event at 0.76 µg/l in a downgradient well. VOCs were nondetect in the upgradient wells. Groundwater samples were analyzed once for SVOCs, pesticides and PCBs which were all nondetect. Results from the interior LFG extraction wells, perimeter gas probes, and lysimeters over the first year of VOC monitoring were either not reported above the laboratory reporting limits, showed a decreasing trend, or the concentrations had stabilized. It was recommended that laboratory analyses for VOCs be terminated and field instrument monitoring for VOCs be performed for subsequent semiannual monitoring events (Shaw 2012). Methane concentration were not above the laboratory reporting limit in any of the perimeter gas probes, interior extraction wells and lysimeter probes during the four sampling events. The 2012 Shaw report concluded that LFG is not migrating beyond the landfill boundaries.

*3.6.11 **State Leaking Underground Storage Tanks (LUSTs)***

The State Water Resources Control Board's Leaking Underground Storage Tank Information System contains an inventory of LUST Incident Reports.

- The subject site is not listed on the LUST list.
- The database search did not identify any LUST facility within a ½-mile radius of the subject property.

*3.6.12 **Historical Cal-Sites Database***

The Historical Cal-Sites database, maintained by the DTSC, contains both known and potential hazardous substance sites.

- The database search identified El Toro MCAS on the Historical Cal-Sites database.

*3.6.13 **HAZNET***

The California Environmental Protection Agency, Department of Toxic Substances Control maintains a list of facility and manifest data.

- The subject site is listed not the HAZNET list.
- The database search did not identify any properties within ½ -mile of the subject site.

4. Apparent Problem

Based on the results of the site inspection and records review, the following environmental issues required further investigation:

- Two fuel pipelines and a valve box were located on the proposed school site. The fuel lines were grouted in place and were recently removed.
- The original base landfill, IRP 3 southern boundary is located to the north across Desert Storm Drive.
- A groundwater plumes from historic base operations was identified as having been located within approximately a 0.14 mile radius of the proposed school site.
- The original base landfill, IRP 3 southern boundary is located to the north across Desert Storm Drive.
- Historic agricultural use of the site.
- Stockpiles were seen in aerial photographs located on the northern portion of the site.
- Historic oil well in the vicinity of the site

Due to the above-mentioned concerns, a PEA was initiated for the site.

4. Apparent Problem

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5. Environmental Setting

This section describes potential exposure pathways and the site geology and hydrogeology.

1.1 FACTORS RELATED TO SOIL EXPOSURE PATHWAYS

5.1.1 Site Topography

Based on a review of the USGS 7½-Minute Topographic Series, El Toro, California Quadrangle Map (USGS 1997), the surface elevation of the subject property ranges between approximately 410 feet and 400 feet above mean sea level (msl). Based on USGS topographic contours, the subject property and surrounding areas slope gently toward the west southwest.

5.1.2 Site Geology and Soil Types

Former MCAS El Toro is situated on the southeast edge of the Tustin Plain, a gently sloping surface of alluvial fan deposits derived primarily from the Santa Ana Mountains. Bounded to the north and east by the Santa Ana Mountains and to the south by the San Joaquin Hills, the Tustin Plain is at the southeast end of the Los Angeles Basin, a large sedimentary basin in the Peninsular Ranges Geologic Province. The Tustin Plain also lies in the "Central Block" of the Basin, which is bounded on the north by the Whittier Fault Zone and on the south by the Newport-Inglewood Fault Zone.

The Holocene alluvial fan materials are comprised of isolated, coarse-grained stream channel deposits contained within a matrix of fine-grained overbank deposits that range up to a maximum of 300 feet in thickness. The Holocene alluvial materials conformably overlie Pleistocene Age sediments predominantly comprised of interlayered, fine-grained lagoonal and near-shore marine deposits. These materials become increasingly mixed with beach sand, terrace, and stream-channel deposits in the east portion of the Tustin Plain and along the plain margins. The Quaternary deposits form a heterogeneous mixture of silts and clays with interbedded sand and fine-grained gravels that range up to 500 feet in thickness in the west portion of the Tustin Plain. The deeper Quaternary sediments may be equivalent to the lower Pleistocene San Pedro Formation, which is comprised of semi-consolidated silts, clays, and sands with interbedded limestone. These lagoonal and shallow marine deposits are considered to be a major water-bearing unit in the region.

The former MCAS El Toro boundaries extend across the Tustin Plain into the Santa Ana Mountains. The Santa Ana Mountains rise steeply north and east of the station; the highest peak is 6,698 feet, and is approximately 10 miles east of the station. The San Joaquin Hills slope gradually to the south; their highest point is 1,170 feet, and is approximately 10 miles south of the station. The land to the northwest of the station is relatively flat.

According to the United States Department of Agriculture, Soil Conservation Service (USDA 1978) the soils at the proposed school site belong to San Emigdio association. San Emigdio soils are fine sandy loams formed on mixed alluvium. Typically the soils are fine sandy loams to 7 inches, underlain by stratified fine sandy loam, sandy loam, very fine sandy loam, and gravelly loamy coarse sands that extend to a depth of 61 inches or more. San Emigdio soils have moderate infiltration rates that are well drained.

5.1.3 Naturally Occurring Asbestos

Based on a review of *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* (California Department of Conservation, Division of Mines and Geology, 2000) the site is not located within a ten-mile radius or downstream from an area known to contain naturally occurring asbestos (NOA).

5.1.4 Site Accessibility

The site is fenced and is not accessible from Irvine Boulevard, the public street that borders the site to the east. Five Point Community Land Development needs to be contacted for site access.

5.1.5 Proximity to Nearby Receptors

There are no nearby receptors in the vicinity of the site. The base has not been redeveloped and surrounding areas are vacant undeveloped land.

5.2 FACTORS RELATED TO WATER PATHWAYS

The following sections describe factors related to potential water pathways.

5.2.1 Groundwater Pathway

There are no known releases of hazardous substances to the proposed school site, therefore, the potential for releases of hazardous substances from the site to the groundwater is considered negligible.

5.2.1.1 Site Hydrogeologic Setting

Former MCAS El Toro is situated over the Irvine Subbasin in the Main Orange County Groundwater Basin. Although the aquifers beneath the Tustin Plain are in hydraulic contact with the Main Orange County Groundwater Basin, it is difficult to make correlations among specific aquifer zones. In the Irvine area, aquifers are much thinner and separated by thicker sequences of fine-grained materials. Aquifers tend to be comprised of lenticular clayey and silty sands and fine-grained gravels contained within a complex assemblage of sandy clays and sandy silts. Thus, instead of identifiable aquifers that may be correlated from place to place, the groundwater may be considered to flow in a single, large-scale, heterogeneous system.

Several washes originate in the hills to the northeast of former MCAS El Toro and flow through or adjacent to the former base toward the San Diego Creek. Three drainage channels, Borrego Canyon, Agua Chinon and Bee Canyon are contiguous with natural washes that originate in the Santa Ana Mountains.

Investigations by the Orange County Water District (OCWD) northwest of the station have revealed the presence of three distinct hydrochemical layers in groundwater related to depth in the aquifer. The first layer, characteristic of shallow groundwater lying within approximately 200 feet of the ground surface, contains relatively high levels of total dissolved solids (TDS) and nitrate, and is dominated by calcium and sulfate ions. The second layer, characteristic of groundwater lying between approximately 200 and 450 feet bgs, contains lower levels of TDS and nitrate, and is dominated by sodium, calcium, and bicarbonate ions. The third layer lies with the lower hydrogeologic system at depths greater than 450 feet, contains relatively high levels of TDS and relatively low levels of nitrate, and is dominated by sodium and sulfate ions. Shallow groundwater depths ranged from 200 to 220 feet bgs at the original base landfill located approximately 750 feet to the northwest. Groundwater flow is toward the northwest with water-level gradients ranging from 0.0083 to 0.12 (Shaw 2012).

5.2.1.2 Impacted Aquifers from Site Releases

There are no known site releases from the proposed school site.

5.3 FACTORS RELATED TO AIR PATHWAYS

The site vicinity is an area with typical Mediterranean climate, characterized by warm dry summers and mild winters. The Western Regional Climate Center collected climatic data from Tustin Irvine Ranch from 1902 to 2003. The mean temperature in the area ranges from a low of 40.2° Fahrenheit (°F) in the winter to a high of 85.2°F in the summer. The average annual precipitation is 12.86 inches per year.

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6. Sampling Activities and Results

This section describes methods and results of the soil and soil gas sampling activities conducted at the site on December 9, 10, 11, 12 and 13, 2013. Figure 4 shows the sampling locations for the proposed school site and Figure 5 shows the overlay of the school site plan and the sampling locations. Table 1 provides a summary of the sampling and analysis program. The Health and Safety Plan used for the site is included in Appendix D.

- A total of 35 soil gas samples were collected and analyzed for VOCs by 8260B from 16 locations. Forty-five soil gas samples were collected and analyzed for methane by ASTM D1946 and 38 soil gas samples were analyzed for hydrogen sulfide from 16 locations;
- From 51 soil sampling locations, 104 soil samples plus duplicates were collected;
- Thirteen composite soil samples plus one discrete soil sample were analyzed for organochlorine pesticides by EPA Method 8081A;
- Six discrete soil samples (including one duplicate) were analyzed for metals by EPA Method 6010B;
- Ten discrete soil samples were analyzed for arsenic and lead by EPA Method 6010B,
- Seven discrete soil samples (including one duplicate) were analyzed for total petroleum hydrocarbons by EPA Method 8015;
- Six discrete soil samples (including one duplicate) were analyzed for polycyclic aromatic hydrocarbons by EPA Method 8015;
- Four soil samples were analyzed for polychlorinated biphenyls by EPA Method 8082A; and
- Four samples were analyzed for dioxins and furans by EPA Method 8290.

6.1 UTILITY CLEARANCE

Prior to commencement of field activities, USA was notified of our intent to conduct subsurface investigations at least 48 hours prior to initiation of intrusive field tasks. USA contacted all utility owners of record within the site vicinity and notified them of our intention to conduct subsurface investigations in proximity to buried utilities. All utility owners of record, or their designated agents, were expected to clearly mark the position of their utilities on the ground surface throughout the area designated for investigation.

6.2 SAMPLING PROCEDURES

Soil and soil gas samples were collected following protocols described in DTSC's PEA Guidance Manual (DTSC 1999), Advisory Active Soil Gas Investigations (DTSC 2012) and DTSC's Interim Guidance for Sampling Agricultural Properties (Third Revision) (DTSC 2008), The DTSC approved sampling program that was implemented is included in Table 1 (attached), and depicted in Figure 4, Sampling Locations. A Professional Geologist was on-site to direct and observe field activities.

6.2.1 Soil Sampling Methods and Procedures

Soil sampling was conducted using a truck-mounted direct push drill rig (Geoprobe™). The Geoprobe™ rig advanced acetate lined sample core barrels sleeves to desired depths using a hydraulic ram or pneumatic hammer system. The inside diameter of the core barrel was 1.5 to 2.0 inches. The sample barrel was retrieved and the sample interval was observed, logged and preserved. Soil samples were preserved by placing Teflon™ sheeting and polyethylene caps leaving no headspace, and wrapping the samples with Parafilm™ tape or placing them in sealable plastic bags.

Observations pertaining to the soil type were described by a field geologist. Each sample was labeled with the sample number, sample depth, and the date and time sampled. Samples were immediately placed in an ice-filled cooler and listed on a chain-of-custody form. Any observation pertaining to potential soil contamination or soil source was recorded. The chain-of-custody form is included in Appendix E.

6.2.2 Soil Gas Sampling Procedures

Soil gas sampling was preceded by the installation of temporary soil gas probes at 5 feet and 15 feet bgs at all soil gas locations and down to 40' feet bgs at six sampling locations, and after an appropriate equilibration period, the probes were purged then sampled. The soil gas sampling sought to identify VOC contaminants potentially present in the vapor phase through the use of a mobile laboratory operated by American Analytics of Chatsworth, California. The laboratory was equipped with a GC/MS capable of analyzing VOCs via USEPA Method 8260B and for methane by ASTM D1946. Soil gas samples were collected in glass, gas-tight syringes equipped with Teflon® plungers. A sampling rate of approximately 200 mL/min. was maintained and based on the purge test that was performed at the beginning of the field day, a target of three purge volumes was employed. Samples were analyzed within one-half-hour of collection. Sampling for hydrogen sulfide was conducted after the samples for VOCs and methane were collected by attaching the Jerome 631-x analyzer directly to the 3-way valve on the probe.

6.3 QUALITY CONTROL SAMPLING PROCEDURES

Field quality control samples associated with the sampling program included duplicate soil and soil gas samples, equipment blanks and soil matrix spike/matrix spike duplicate (MS/MSD) samples, in accordance with the DTSC PEA Guidance Manual (DTSC 1999). Duplicate soil samples were collected and analyzed. MS/MSD samples were conducted in accordance with the DTSC PEA Guidance Manual to assess the matrix effects of site soils on the recovery of constituents present in the soil (DTSC 1999).

6.4 DECONTAMINATION PROCEDURES

All equipment that came into contact with the soil was decontaminated consistently to assure the quality of samples collected. Decontamination was conducted prior to and after each use of a piece of equipment. All sampling devices used were decontaminated using the following procedures:

- Non-phosphate detergent and distilled water wash, using a brush;
- Initial deionized/distilled water rinse; and
- Final deionized/distilled water rinse.

6.5 INVESTIGATIVE-DERIVED WASTE MANAGEMENT

The borings were backfilled to the surface with bentonite. All investigative-derived waste decontamination water was placed in 5-gallon buckets and transported offsite by the drilling contractor for proper disposal. Used personal protection equipment (PPE) were double bagged and placed in a municipal refuse dumpster.

6.6 ANALYTICAL RESULTS

Laboratory analytical results are summarized in Tables 2 through 10. VOC results for soil gas are summarized on Table 2 and for methane and hydrogen sulfide in soil gas on Table 3. Differential pressure readings for soil gas are summarized on Table 4. Laboratory summary reports for all analytes are included in Appendix E.

6.7 DISCUSSION OF RESULTS

6.7.1 Soil Description

The soils encountered and collected during the investigation consisted of typically consisted of medium dense poorly graded sand with or without gravel, silty sand with or without gravel, clayey sand, silt with or without sand, and clay with or without sand or gravel. No odors or staining were noted by the field geologist and groundwater was not encountered. Fill material was not observed in any of the soil borings. Six soil boring logs along the northwest boundary (closest to the landfill) for SG-1 through SG-5 to 16 feet bgs and a boring log for SG-11 to 41 feet bgs are included in Appendix F.

6.7.2 Soil Gas Results

6.7.2.1 Volatile Organic Compounds

The following maximum concentrations of volatile organic compounds (Table 2) were detected in soil gas:

- Benzene was detected at one soil gas location at 15 feet bgs with a maximum concentration of 0.70 μg/l.
- Bromodichloromethane was detected in 2 soil gas samples collected at 15 feet bgs with a maximum concentration of 0.20 μg/l.
- Chloroform was detected in 4 samples from two locations with a maximum concentration of 0.84 μg/l.
- Ethylbenzene was detected in one sample with a maximum concentration of 0.14 μg/l.
- Toluene was detected in one sample with a maximum concentration of 0.44 μg/l.
- 1,2,4-Trimehtlybenzene and 1,3,5-trimethlybenzene were detected in one soil gas sample with maximum concentration of 0.36 and 0.46 μg/, respectively.
- m-,p-Xylenes were detected in 1 sample with a maximum concentration of 0.74 μg/l.
- o-Xylene was reported in one sample with a maximum reported concentration of 0.18 μg/l.

6.7.2.2 Methane and Hydrogen Sulfide

Methane and hydrogen sulfide were not detected in any of the soil gas samples (Table 3). The soil gas testing did not show any results that indicate the presence of a former oil well located within the proposed school site boundaries.

6.7.3 Soil Results

Analytical laboratory reports and chain-of-custody forms for the soil samples collected and analyzed are included in Appendix E.

6.7.3.1 Organochlorine Pesticides

Four organochlorine pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and chlordane) were detected at low concentrations above the laboratory detection limits (Table 5). 4,4'-DDD was reported in two samples with a maximum concentration of 5.1 micrograms per kilogram [μg/kg]. 4,4'-DDE was detected in 10 samples and the concentrations ranged from not detected to 53 μg/kg. 4,4'-DDT was detected in 10 samples and the concentrations ranged from not detected to 46 μg/kg; Chlordane and its isomers were reported in five samples ranging from nondetect to 79 μg/kg. Concentrations were below California Human Health Screening Levels (CHHSLs).

6.7.3.2 Metals

Table 6 summarizes the results for CAM-17 metals. All metals were detected below their respective CHHSL, or DTSC screening level (arsenic). Arsenic concentrations ranged from 1.2 milligrams per kilogram (mg/kg) to 4.3 mg/kg. The concentrations of arsenic are below the DTSC's risk management level of 12 mg/kg for school sites in California.

6.7.3.3 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons were not detected in any of the soil samples analyzed (Table 7).

6.7.3.4 Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons were not detected in the soil samples analyzed (Table 8).

6.7.3.5 Polychlorinated Biphenyls

Polychlorinated Biphenyls (PCBs) were not detected in the soil samples analyzed (Table 9).

6.7.3.6 Dioxins/Furans

Dioxins were reported in two samples collected from near the surface at low concentrations, significantly below the CHHSL for residential land use. Two dioxins, total HxCDD and OCDD, were reported at low concentrations of 8.1 nanogram per kilogram (ng/kg) and 45 ng/kg, respectively. No furans were reported. Table 10 is a summary of the dioxins/furans reported at the site. Laboratory results are included in Appendix E.

7. Human Health Screening Evaluation

A human health screening assessment was conducted to evaluate the potential threat to human health at the proposed school site. The established PEA screening process was used to determine if there are levels of contamination at the site that may cause a concern about effects on human health. The purpose of the human health risk screening evaluation was to assess whether existing levels of contaminants in soil and soil gas at the site could pose a threat to human health under conservative (health-protective) exposure assumptions. The PEA requires a residential land use scenario regardless of current use and zoning.

7.1 CONCEPTUAL SITE MODEL

The potentially complete soil exposure pathways include soil ingestion, dermal exposure to soil, and inhalation of particulates detected in soil. Inhalation of soil vapor is also a potentially complete pathway. Figure 6 is a conceptual site model of the potential exposure pathways. Potentially exposed populations for the site include on-site school age children and employees based on future land use plans. In order to estimate what the potential exposures may be under current and future land use plans, risk calculations were conducted using the data that were collected for the PEA.

7.2 CHEMICALS OF CONCERN SELECTION

The chemicals of concern (COCs) for the site that were evaluated in the PEA screening risk assessment have been identified based on site history, sampling results and DTSC guidance and protocol. All VOCs detected in soil gas and pesticides that were detected within site boundaries were considered to be a COC. Metals were not included as COCs because all detected concentrations were either below CHHSLs or below DTSC's risk management level for schools. The two dioxins reported were carried forward into a Toxicity Equivalency Factor calculation.

7.3 INDOOR AIR RISK ASSESSMENT

To evaluate potential indoor air inhalation risk from the VOCs reported in soil gas, the DTSC modified screening level Johnson and Ettinger indoor air vapor intrusion model was used to assess potential indoor air concentrations of VOCs and their associated risk. The model version used was EPA Version 2.0 April 2003 and last modified by the DTSC in December 2011 and was obtained from the DTSC's website. The Human and Ecological Risk Division (HERD) of DTSC has taken the model and incorporated human health criteria specific to California, as developed by the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA). The DTSC states in their guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air October 2011 that the intrusion of subsurface vapors into buildings is one of many exposure pathways that must be considered in assessing the risk posed by releases of hazardous chemicals into the environment.

The model was used to estimate potential risk using the VOCs reported in soil gas. Default toxicity values and exposure values from the DTSC modified models were used in the assessment.

7.3.1 Soil Gas Results

The maximum concentrations for the nine VOCs reported in soil gas were used in the J&E Model. Modeling data is provided in Appendix G. California Human Health Screening Levels were not used for the assessment because some of the VOCs detected in soil gas at the site do not have an established CHHSL. The following table summarizes the estimated carcinogenic risk and hazard index for each

chemical of concern reported in soil gas assuming a residential exposure scenario and using the maximum detected concentrations.

Chemical	Frequency of Detection	Sampling Depth feet	Maximum Concentration (µg/l)	Hazard Index	Cancer Risk
Benzene	1/16	15	0.07	0.00086	3.2E-07
Bromodichloromethane	2/16	15	0.20	0.0004	4.4E-07
Chloroform	2/16	15	0.84	0.0012	8.1E-07
Ethylbenzene	1/16	15	0.14	0.000045	4.8E-08
Toluene	1/16	15	0.44	0.00054	NA
1,2,4-Trimethylbenzene	1/16	15	0.36	0.014	NA
1,3,5-Trimethylbenzene	1/16	15	0.46	0.021	NA
Xylenes, m-,p-	2/16	15	0.74	0.0024	NA
Xylenes, o-	1/16	15	0.18	0.00066	NA
Total				**0.041**	**1.62E-06**

The estimated carcinogenic risk for indoor air inhalation slightly exceeds the PEA target cancer risk range of 1E-06 (1 in 1,000,000) using conservative residential exposure factors and maximum detected concentrations. The estimated risk is within the EPAs risk management range of 1E-04 to 1E-06.

The 95% UCL concentrations for soil gas detected at 15 feet bgs were calculated as shown in Table 12. COCs were detected in all cases at 15 feet bgs with the exception of chloroform which was detected in both the 5 foot and 15 foot soil gas samples. The J&E Model was used on both depths and the 15 foot samples resulted in a slightly higher risk so in order to be conservative and protective of human health the sampling depths that had a higher risk were used in the calculations.

Chemical	Frequency of Detection	Sampling Depth feet	95% UCL Concentration (µg/l)	Hazard Index	Cancer Risk
Benzene	1/16	15	0.03	0.00037	1.4E-07
Bromodichloromethane	2/16	15	0.09	0.00018	2.0E-07
Chloroform	2/16	15	0.25	0.00035	2.4E-07
Ethylbenzene	1/16	15	0.07	0.000023	2.4E-08
Toluene	1/16	15	0.13	0.00016	NA
1,2,4-Trimethylbenzene	1/16	15	0.13	0.0042	NA
1,3,5-Trimethylbenzene	1/16	15	0.11	0.0058	NA
Xylenes, m-,p-	2/16	15	0.19	0.00063	NA
Xylenes, o-	1/16	15	0.08	0.00029	NA
Total				**0.012**	**6.0E-07**

The estimated carcinogenic risk using the 95% UCL concentrations for soil gas was 6.0E-07, below the PEA target cancer risk range.

The hazard index (HI) for noncarcinogenic risk for indoor air inhalation was significantly less than 1 using both the maximum concentrations and 95% UCL concentrations. A total HI of 1 or less indicates that there is no cause for concern for adverse noncarcinogenic health effects.

7. Human Health Screening Evaluation

7.4 SOIL RISK ASSESSMENT

A human health screening assessment was conducted to evaluate the potential threat to human health at the proposed high school. California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) has prepared a guidance document titled *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Property, January 2005* (OEHHA 2005). CHHSLs are concentrations of hazardous chemicals in soil that Cal/EPA considers to be below thresholds of concern for risks to human health. The thresholds of concern used to develop CHHSLs are an excess cancer risk of one in a million (1.0E-06) and a hazard quotient of 1.0 for noncancer health effects. Standard exposure assumption and chemical toxicity values published by the USEPA and Cal/EPA were used in developing the CHHSLs.

CHHSLs may be used to screen sites for potential human health concerns. The presence of a chemical in soil at concentrations below the corresponding CHHSL values can be assumed to not pose a significant health risk to people who may live (residential CHHSL) or work (commercial/industrial CHHSL) at the site. CHHSLs have been modeled after USEPA Region IX Preliminary Remediation Goals (PRGs) with the primary difference between CHHSLs and PRGs being the use of Cal/EPA toxicity factors when available.

CHHSL values for soil are based on the assumption that direct exposure to contaminants in soil via incidental soil ingestion, dermal adsorption of chemicals in soil and inhalation of vapors or dust in outdoor air will occur.

The presence of a chemical at concentrations in excess of a CHHSL does not indicate that adverse impacts to human health are occurring or will occur but indicates that further evaluation of potential human health impacts is warranted. CHHSLs can be used in a tiered approach to evaluate if cumulative risk may need to be calculated. If a chemical is present at a concentration below a CHHSL, it can be assumed that the chemical does not pose a significant health risk to people who may live or work at the site. To assess the maximum future beneficial use of a property, data collected should be compared to residential screening levels.

7.4.1 Screening Results for Soil

The concentrations of the four pesticides detected do not exceed the residential land use CHHSL for the potential chemical of concern.

A summary table is provided below showing the highest reported pesticide concentration at the site and the corresponding CHHSL.

Chemical	Maximum Concentration µg/kg	CHHSL µg/kg	Conc./CHHSL
4,4'-DDD	5.1	2300	0.0022
4,4'-DDE	53	1600	0.033
4,4'-DDT	46	1600	0.0288
Chlordane	78	430	0.18
Total Risk			2.4E-07

The estimated cancer risk for the site using the maximum detected concentration assuming a residential land use exposure scenario is 2.4E-07, below the level of concern of one in a million increased cancer risk.

The concentrations of the pesticides at the site do not pose a significant health risk to future users of the site under the most conservative assumptions using a residential land use exposure scenario.

7.4.2 Toxicity Equivalency Factors for Dioxins and Furans

The term "dioxins" is used to refer to a family of complex but related chlorinated compounds with similar chemical structures and biological activity. The polychlorinated dibenzo-p-dioxins (PCDDs) include 75 individual compounds and the polychlorinated dibenzofurans (PCDFs) include 135 individual compounds. These individual compounds are technically referred to as congeners. Based on their ability to bind and evoke a response 7 of the 75 PCDD congeners (i.e., those with chlorine substitutions in the 2,3,7, and 8 positions) and 10 of the 135 PCDF congeners (i.e., those with chlorine substitution in the 2,3,7, and 8 positions) are thought to have significant dioxin-like toxicity. The compounds identified as having significant dioxin-like toxicity concerns were analyzed and are listed in Table 10.

While it is believed that these compounds have a similar mechanism of toxicity not all are equally toxic. The most toxic and best-studied dioxin is 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The remaining compounds have been assigned toxicity values relative to 2,3,7,8-TCDD. These relative toxicity values are called toxicity equivalence factors (TEFs). 2,3,7,8-TCDD is assigned a TEF of 1 and the remaining compounds are typically assigned values less than 1. The DTSC's Human Evaluation Risk Division recommends utilization of the World Health Organization's (WHO) 2005 TEF scheme (TEFWHO05) (Van den Berg, et al., 2005) to weight each compound according to its relative toxicity for cancer risk evaluations (DTSC HERD 2009). Table 11 includes the TEF for each dioxin that was detected at the site.

Because dioxins differ in their toxic potential or potency, the toxicity of each component of the mixture must be accounted for in estimating the overall toxicity of the mixture. The evaluation of environmental dioxin mixtures requires the measured concentration of each compound to be multiplied by its corresponding TEF to produce a TCDD toxicity equivalent (TEQ) concentration. The TEQ concentrations for each compound are added together to determine the total TCDD TEQ concentration in the sample. The total TCDD TEQ concentration represents the amount of 2,3,7,8-TCDD alone, that it would take to equal the combined toxic effect of the mixture.

The table below lists the two dioxins that were reported in the samples. The concentration was multiplied by the reported WHO TEF for the specific compound to yield the TEQ concentration. The TEQ concentration for each compound was summed and compared to the CHHSL for dioxin.

Chemical	*Maximum Concentration ppt*	*WHO 2005 TEF*	*TEQ Concentration ppt*
OCDD	45	0.0003	0.0135
Total HxCDF	8.1	0.1	0.81
Total TEQ			0.8235
CHHSL Residential			50
Conc/CHHSL			0.016
Estimated Risk			**1.6 E-08**

The total TEQ for the two dioxins was 0.8235 parts per trillion (ppt), significantly below the CHHSL of 50 ppt. The estimated carcinogenic risk for the reported concentrations of dioxins at the site is 1.6E-08, below the level of concern of one in a million increased cancer risk.

7.5 UNCERTAINTY ANALYSIS

The data collected are subject to uncertainty associated with sampling and analysis. These data are presented in other parts of the PEA. In the risk analysis it was assumed that samples collected were representative of conditions to which various populations may be exposed. However, the collected samples may not be completely representative due to biases in sampling and to random variability of samples. In general, sampling was biased toward areas of known and suspected elevated chemical concentrations, which will lead to an overestimation of risk when these results are assumed to represent a larger area. The placement of soil borings was in part, purposely biased to detect and characterize potential hot spots of soil based on historical site use. This type of sampling approach is likely to overestimate the chemical concentrations to which a receptor would be exposed and the potential health impact to the receptors evaluated.

Samples were analyzed using California State Certified Laboratory procedures and were subjected to limited review, to obtain data suitable for decision-making. However, it should be understood that sample analysis is subject to uncertainties associated with precision, accuracy and detection of chemicals at low concentrations.

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8.1 SITE CHARACTERIZATION

The project site is proposed for development of a school. Proposed development activities would not maintain any potential wildlife habitat on the Site.

8.2 BIOLOGICAL CHARACTERIZATION

The project site is proposed for development of a school. Proposed development activities would not maintain any potential wildlife habitat on the Site.

8.3 ECOLOGICAL PATHWAY ASSESSMENT

Because the site would not have significant numbers of wildlife based on proposed development activities, no assessment of potential exposure to sensitive ecological receptors is necessary.

8.4 ECOLOGICAL SCREENING EVALUATION SUMMARY

An ecological screening evaluation was not conducted for the site because the site is scheduled to be developed and highly disturbed, and will not support wildlife habitat.

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9. Quality Assurance/ Quality Control (QA/QC) Implementation

The QA/QC Program was implemented in accordance with the DTSC PEA Guidance Manual (DTSC 1999). The primary quality control features of the QA/QC program include the collection and analysis of field quality control samples and the data validation. The Quality Assurance Project Plan is included as Appendix H.

Quality control samples collected in the field included duplicate samples (eight collected and analyzed) and equipment rinseate blanks as described in Section 6. The data for these quality control samples were reviewed as part of the data validation process, along with results from laboratory quality control analyses. Data validation was performed in compliance with DTSC's PEA Guidance Manual, using protocols consistent with the USEPA National Functional Guidelines (DTSC 1999). Each sample was analyzed for the specified suite of analyses presented in Section 6. Data from each of the analyses were evaluated with respect to the quality control criteria listed below. Data for the project as a whole were evaluated in terms of completeness.

- Holding times;
- Field blanks;
- Laboratory method and calibration blanks;
- Initial and continuing calibrations;
- System monitoring compounds (surrogates - organic analyses only);
- Laboratory control samples (LCS) and LCS duplicate samples (LCSD) - as applicable;
- Matrix spikes (MS)/Matrix spike duplicates (MSD);
- Field replicates/confirmatory samples; and
- Compound identification and quantitation.

Data quality for the project is very good, and the data collected are of acceptable quality for use in the screening evaluation. The following issues were identified during the course of the validation review.

Results from the field duplicate samples indicate appropriate sample collection and handling procedures were implemented, and that laboratory analytical precision was also acceptable.

Data validation qualifier flags have been added to those data that did not meet acceptance criteria as defined in School Quality Assurance Project Plans. Results of the validation indicate that all samples collected and analyzed are useful in characterizing the site and assessing the human health and ecological risks for the site. No detectable concentrations were qualified as rejected (R) or were considered to be unusable based on the validation evaluation. Data qualified as estimated (J/UJ) exhibited some bias during analysis and should be considered as an approximate measure of the respective analyte concentration. Qualified data are presented along with the data results in the analytical summary tables provided in this report.

Field activities were observed to be conducted in a manner consistent with the QA/QC procedures presented in the DTSC PEA Guidance Manual (DTSC 1999). No findings were identified that significantly affect the quality of the samples collected or the resulting data evaluation.

9.1 DATA VALIDATION

Data validation was performed for all samples submitted as part of The Planning Center|DC&E's evaluation of soil. Advanced Technology Laboratories, Inc. (ATL) located in Signal Hill, California was the lead laboratory for the project and performed the required analyses for soil. ATL contracted with Pace Analytical Services located in Minneapolis Minnesota for the dioxin/furan analysis. Pace Analytical Minnesota holds DoD certification for Dioxin/Furans & PCBs and is NEFLAC certified, ISO17025 certified in California.

Validation was performed in accordance with the general guidance provided in the USEPA Functional Guidelines for Evaluating Inorganic Analyses (USEPA 1994) and in accordance with the professional judgment of the validation team. Validation was performed to assess analytical performance in terms of the DQOs accuracy, precision, sensitivity, and completeness. Comparability and representativeness DQOs for the samples collected are addressed by the correct implementation of the procedures defined in the sampling and analysis plan.

A summary of the validation program, in terms of the DQOs listed above, is provided in the following sections. Data qualifiers assigned to results, if required, were as follows:

J. Result is estimated due to failure to meet one of the DQO criteria associated with the sample result or associated sample batch. Results reported at concentrations below standard laboratory reporting limits, but above method detection limits, were flagged "J" by the laboratory, or "B" in the case of metals. These data are validated as J/estimated because they are below the reliable quantitation limits determined by the laboratory.

U. Result is qualified as not-detected at the reported value. This qualifier is used when results from blank analyses indicate that detections in associated samples may be biased high due to potential contaminant conditions in the field or laboratory.

UJ. Result is qualified as not-detected at the reported value, and the value is determined to be estimated. This qualifier commonly results when quality control failures are associated with analytes that are not detected, or when detections are qualified "U" due to blank contamination combined with a "J" qualifier resulting from another QC problem.

R. Result is rejected due to severe QC failure, or due to multiple lessor QC problems that are determined to be additive.

9.2 ACCURACY

Accuracy was evaluated by assessing the results of holding times, field and laboratory blanks, initial and continuing calibrations, surrogate spike recoveries (organic analyses), LCS recoveries, MS analyses, and interference check samples (metals by inductively coupled plasma).

Frequency and control criteria for initial and continuing calibration verifications were met. The method blank data showed non-detectable levels for all constituents. MS and MSD were performed at required frequencies. All recoveries were within acceptable limits for MS and MSD, except for endrin in the matrix spike duplicate B3L0329-MSD1. The analytical batch was validated by the laboratory control sample. LCS analyses were performed at required frequencies. All recoveries were within acceptable limits.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 68-94%. All of the labeled standard recoveries obtained for this project were within the 40-135% target range specified in Method 8290. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCDDs and PCDFs at the reporting limits. This indicates that the sample preparation procedures did not significantly impact the results reported for the field samples.

A laboratory spike sample was also prepared with the sample batch using clean sand that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 102-123%, indicating a high degree of accuracy for these determinations. Matrix spikes were prepared with the sample batch using sample material from a separate project; results from these analyses will be provided upon request.

The response obtained for the labeled OCDD congener in calibration standard analysis U140108A_16 was outside the target range. As specified in the method, the average of the daily response factors for this compound was used in the calculations for the samples from this runshift. The affected values were flagged "Y" on the results tables. It should be noted that the accuracy of the native congener determinations was not impacted by this deviation.

9.3 PRECISION

Precision was evaluated by assessing the results between MS and MSD analyses, LCS and LCSD analyses, between field and laboratory duplicate analyses. The precision DQO was generally satisfied for the samples collected during the project. Precision was evaluated as the relative percent difference (RPD) between control or duplicate sample results. RPD criteria reported by the laboratory were used to assess precision. RPDs were within the appropriate control limits and precision is considered acceptable.

9.4 SENSITIVITY

Sensitivity was addressed by ensuring that the reporting limits provided by the laboratories met those as requested in the workplans and task orders provided to the laboratory. Data were qualified in cases where results were reported at concentrations below standard laboratory reporting limits, but above the method detection limits that may have been required to meet the sensitivity requirements for the project. Such results were flagged by the laboratory as either J or B qualified data. These data retain a J/estimated qualifier due to potential decreased reliability at low concentration levels.

9.5 COMPLETENESS

Completeness is an evaluation of the overall sampling program with respect to data generated that is usable versus data that may have been rejected. No data was rejected during the data validation process for this project. The completeness objectives (minimum 90 percent) for this project are therefore considered to be satisfied for all analyses.

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10. HASP Implementation

The Planning Center|DC&E prepared a site-specific HASP pursuant to Health and Safety Code 1910.120. The plan addressed the following:

- Identification and description of potentially hazardous substances that may be encountered during field operations;
- PPE and clothing for site activities; and
- Measures that need to be implemented in the event of an emergency.

The Planning Center|DC&E field personnel reviewed the HASP prior to commencing fieldwork. Prior to initiation of field activities each day, a site safety briefing was conducted to identify potential physical and chemical hazards and measures to be taken in event of an emergency. All on-site personnel were required to sign the site safety briefing form. During field activities, all personnel within the exclusion zone wore appropriate level D PPE.

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11. Field Variances

Soil sampling was conducted on the project area in general accordance with the DTSC approved PEA workplan. No field variances were reported.

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12. Evaluations of Applicable or Relevant Laws and Regulations Pertaining to School Sites

State of California Department of Education Code Section 17213 and Public Resources Code 21151.8 prohibit the approval of a project involving the purchase of a school site or the construction of a new elementary or secondary school by a school district unless the district first determines whether the site is:

a) The site of a current or former hazardous waste disposal site or solid waste disposal site and, if so, whether the wastes have been removed.

b) A hazardous substance release site identified by the State Department of Health Services in a current list adopted pursuant to Section 25356 for removal or remedial action pursuant to Chapter 6.8 (commencing with Section 25300) of Division 20 of the Health and Safety Code.

c) A site which contains one or more pipelines, situated underground or aboveground, which carries hazardous substance, acutely hazardous materials or hazardous wastes, unless the pipeline is a natural gas line which is used only to supply natural gas to that school or neighborhood.

In addition, the school district must contact the local air pollution control district to identify any facilities located within ¼-mile of the proposed school site that might reasonably be anticipated to emit hazardous emissions or handle hazardous materials, substances or waste. If any facilities exist within the ¼-mile the district must be able to make a written finding that:

a) The health risks from the facilities do not and will not constitute an actual or potential endangerment of public health to persons who attend or are employed at the proposed school; or

b) If potential hazards exist and have been identified, corrective measures can be implemented that mitigate air emissions to levels that do not constitute an actual potential endangerment of public health to persons who would attend or be employed at the proposed school.

Hazardous air emissions generated from facilities within a ¼-mile radius are not anticipated to pose an actual or potential endangerment to occupants at the proposed school.

For this proposed school site, a records search of any hazardous waste/substance storage, treatment, or disposal activities at the site and within a ¼-mile of the site was conducted. No evidence of the site being used as a solid waste or hazardous waste disposal site was found. There was no indication that aboveground or underground pipelines are located on the proposed school site. A summary of agencies contacted and records reviewed is provided in Section 3.5.

12. Evaluations of Applicable or Relevant Laws and Regulations Pertaining to School Sites

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13. Conclusions and Recommendations

After reviewing and analyzing the analytical and human health screening evaluation results of this PEA, The Planning Center|DC&E concludes the following with respect to the site:

- Soil and soil gas sampling activities were conducted at the site on December 10, 11, 12, and 13 2013. A total of 35 soil gas samples were collected and analyzed for VOCs by 8260B from 16 locations. Forty-five soil gas samples were collected and analyzed for methane by ASTM D1946 and 38 soil gas samples were analyzed for hydrogen sulfide from 16 locations.

- From 51 sampling locations, 104 soil samples plus duplicates were collected. Thirteen composite soil samples plus one discrete soil sample were analyzed for organochlorine pesticides by EPA Method 8081A. Six discrete soil samples were analyzed for CAM 17 Metals by EPA Method 6010B/7471A, 10 discrete soil samples were analyzed for arsenic and lead by EPA Method 6010B, seven soil samples were analyzed for total petroleum hydrocarbons (TPH) by EPA Method 8015B, six soil samples were analyzed for polyaromatic hydrocarbons (PAHs) by EPA Method 8270SIM, four soil samples were analyzed for polychlorinated biphenyls by EPA Method 8082A and four samples were analyzed for dioxins and furans by EPA Method 8290.

- Benzene was detected at one soil gas location at 15 feet bgs with a maximum concentration of 0.70 μg/l.

- Bromodichloromethane was detected in 2 soil gas samples collected at 15 feet bgs with a maximum concentration of 0.20 μg/l.

- Chloroform was detected in 4 samples from two locations with a maximum concentration of 0.84 μg/l. Higher concentrations were detected in the deeper samples.

- Ethylbenzene was detected in one sample with a maximum concentration of 0.14 μg/l.

- Toluene was detected in one sample with a maximum concentration of 0.44 μg/l.

- 1,2,4-Trimehtlybenzene and 1,3,5-trimethlybenzene were detected in one soil gas sample with maximum concentration of 0.46 and 0.36 μg/, respectively.

- m-,p-Xylenes were detected in 2 samples with a maximum concentration of 0.18 μg/l.

- o-Xylene was reported in one sample with a maximum reported concentration of 0.74 μg/l.

- Methane and hydrogen sulfide were not detected in any of the soil gas samples.

- Four organochlorine pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and chlordane) were detected at low concentrations above the laboratory detection limits. 4,4'-DDD was reported in two samples with a maximum concentration of 5.1 micrograms per kilogram [μg/kg]. 4,4'-DDE was detected in 10 samples and the concentrations ranged from not detected to 53 μg/kg. 4,4'-DDT was detected in 10 samples and the concentrations ranged from not detected to 46 μg/kg; Chlordane and its isomers were reported in five samples ranging from nondetect to 79 μg/kg. Concentrations were below California Human Health Screening Levels (CHHSLs).

- All metals were detected below their respective CHHSL or DTSC screening level (arsenic);

13. Conclusions and Recommendations

- Total petroleum hydrocarbons were not detected in the soil samples analyzed;
- Polycyclic aromatic hydrocarbons were not detected in the soil samples analyzed;
- PCBs were not detected in the soil samples analyzed;
- Dioxins were reported in two samples at low concentrations, significantly below the CHHSL for residential land use.
- The human health risk screening indicated that chemical concentrations do not pose a significant risk to human health or the environment under an unrestricted, residential land use scenario. The carcinogenic risk using 95% Upper Confidence Limit concentration was less than 1 excess cancer in 1 million, and the hazard index was less than 1.0;
- Laboratory data obtained were validated to assure that Data Quality Objectives (DQOs) were met and the data were suitable for use in a human health screening evaluation.

13.1 RECOMMENDATIONS

The results of the PEA support the following conclusions and recommendations:

Based on the PEA objectives, the environmental quality goals of the District, and the results of the PEA investigation, The Planning Center|DC&E has determined that no further assessment is needed on the site. Therefore, The Planning Center|DC&E recommends that, per California Education Code Section 17213.1, Section 3, the PEA be approved and that no further assessment be required.

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