TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Porter-Cologne Water Quality Control Act (Cont.)				
	LACSD Wastewater Ordinance, April 1, 1972 (as amended November 1, 1989	No person shall discharge to the Los Angeles County Sanitation District (LACSD) facilities wastewater containing constituents in excess of effluent limitations defined by the LACSD in its wastewater ordinances. Total Identifiable Chlorinated Hydrocarbons (TICH) allowed: "Essentially None." Additional criteria include maintaining temperature less than 140˚F; pH between 6.0 and 12.0; a flow of material that will not settle or cause an obstruction; and not discharging materials that cause problems in sewer facilities including ammonia, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), priority pollutants, suspended solids, and phenolic compounds. In addition, LACSD may set case by case effluent limitations on certain constituents, including toxic organics, to protect the public health or the LACSD's sewerage facilities. Discharges to Publicly Owned Treatment Works (POTWs) are considered off-site discharges and must meet both the substantive and procedural requirements for any remedial alternatives that include discharges to LACSD sewer system. Regulations for use of LACSD Sewerage Facilities require detailed plans and operating procedures for pretreatment facilities including accidental discharge procedures are submitted to the CSDOC for review.	No	TBC because remedial alternatives do not include discharges to LACSD sewer systems.
Resolution 68-16	State Water Resources Control Board (SWRCB) Antidegradation Policy	The Antidegradation Policy states in part that: Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it had been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated use of such water and will not result in water quality less than that prescribed in the policies.	Yes	The policy states a goal for the nondegradation of groundwaters of the state and because the soil remediation at the Site may impact the groundwater quality of aquifers underling

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Porter-Cologne Water Quality Control Act (Cont.)				
		Resolution No. 68-16 has not been formally promulgated as a rule or regulation pursuant to the established policy making procedures of the California Water Code § 13147, so the resolution is not fully "applicable" as a rule or regulation. However, the Antidegradation Policy has been adopted by the SWRCB and the LARWQCB as a narrative standard of a water quality objective. The Antidegradation Policy states as a narrative standard the goal that "disposal of wastes into the water of the State shall be so regulated as to achieve the highest water quality consistent with maximum benefit to the people of the State ..." Because the Antidegradation Policy states a goal for the nondegradation of groundwaters of the state, and because the soil remediation at the Site may impact the groundwater quality of aquifers underling the Site the Antidegradation Policy is relevant to the Site remedial activities The Antidegradation Policy is also appropriate for the various remedial alternatives for groundwater since the purpose of the policy is to preserve the quality of groundwater, and since the remedial alternatives for groundwater will have an impact on the groundwater aquifers underlying the Site.		the Site, the Antidegradation Policy is relevant to the Site's remedial activities. Waiver of the Antidegradation Policy at the Site may be appropriate if the attainment is impracticable for several reasons, including the difficulty, excessive time frame and cost for removing of DNAPL.

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Porter-Cologne Water Quality Control Act (Cont.)				
		CERCLA § 121(d) provides that, under certain circumstances, ARARs may be waived. The NCP provides for a waiver of ARARs for remedial actions if achievement of the ARAR is technically impracticable. The waiver can be used if either of two criteria are met: (1) engineering feasibility, in which current engineering methods necessary to construct and maintain an alternative that will meet the ARAR cannot reasonably be implemented; and (2) reliability, in which the potential for the alternative to continue to be protective into the future is low, either because the continued reliability of technical and institutional controls is doubtful, or because of inordinate maintenance costs. A remedial alternative that is feasible might be deemed technically impracticable if it could only be accomplished at inordinate cost. See CERCLA Compliance With Other Laws Manual: Interim Final (Part I), EPA/540/G-89/006 (August 1989), and Overview of ARARs, Focus on ARAR Waivers, EPA Publication 9234.2-03/FS (December 1989).		
California Safe Drinking Water Act (Cal-SDWA)				
State Water Resources Control Board Resolution No. 92-49	Policies and Procedures for "Investigation and Cleanup and Abatement of Discharges" California Water Code Section 13000, 13140, 13240, 13260, 13263, 13267, 13300, 13304, 13307	Provides policy and procedures for cleanup and abatement of a discharge, including determining cleanup values. Cleanup shall be to background water quality, or best water quality that is reasonable if background cannot be attained. Requires the application of Title 23 CCR Section 2550.4 Requirements to Cleanups. Considers technological and economic feasibility in determining applicability of cleanup standards.		

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
California Safe Drinking Water Act (Cal-SDWA)				
22 CCR 64435, 64444.5	Maximum Containment Levels (MCLs)	The Cal-SDWA establishes three criteria for evaluating drinking water quality: drinking water standards (MCLs), advisory drinking water action levels (Als), and advisory applied action levels (AALs). The Cal-SDWA establishes limits for substances that may affect health or aesthetic qualities of water and apply "at the tap." The UBA, Gage, and Lynwood aquifers are not currently drinking water sources, therefore these limits are not applicable since they apply to drinking water and not groundwater itself. MCLs are promulgated to provide safe drinking water. Where the RWQCB has promulgated regulations that classify particular aquifers as potential sources of drinking water, these limits are relevant and appropriate to establish standards for remediation.	Yes	These standards will be ARARs at the Site where they set limits more stringent than federal MCLs for aquifers that are potential sources of drinking water for which risk-based exposure limits are not appropriate.
	Advisory Drinking Water Action Levels (ALs)	ALs are health base concentration limits established by the California Department of Health Services (DHS) to aid in limiting public exposure to substances not yet formally regulated. These standards are non-promulgated advisory standards, and are therefore not ARARs.	No	ALs are TBCs because they are intended to be protective of human health and the environment.
H&SC § 25249.5 under 22 CCR § 12000	Toxic Enforcement Act (Proposition 65)	Proposition 65 regulates discharges and exposures of chemicals known to the State of California to be carcinogenic or reproductive toxins. DTSC has adopted regulations regarding no observable effect levels (NOELs) for reproductive toxins and no significant risk levels (NSRLs) for carcinogens.	Yes	This Act is potentially applicable because chemicals detected in groundwater at the Site are listed in Proposition 65, and because individuals may come into contact with these chemicals listed above.

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
California Safe Drinking Water Act (Cal-SDWA) (Cont.)				
		However, Proposition 65 exempts from its warning requirements: "an exposure for which the person responsible can show that the exposure poses no significant risk assuming lifetime exposure at the level in question for substances known to the state to cause cancer, and that the exposure will have no observable effect assuming the exposure at one thousand (1,000) times the level in question for substances known to the state to cause reproductive toxicity..." H&S Code § 25249.10(c). An analysis would need to be performed to determine whether the risk levels expected to emanate from the groundwater treatment processes would release any of the above listed chemicals in concentration that would trigger Proposition 65, or whether the level of exposure would pose no significant risk for carcinogens or if the exposure is 1,000 times the NOEL for reproductive toxins.		
Mulford-Carrell Air Resources Act				
H&SC §§ 3900-44563 under 17 CCR 70200	Implemented by the local Air Quality Management Districts and overseen by the Air Resources Board	Ambient Air Quality Standards listed under Title 17, Sections 70200/70200.5. Ozone (1-hour) 0.09 ppm CO (8-hour) 9.0 ppm (1-hour) 20 ppm NO_2 (1-hour) 0.25ppm SO_2 (24-hour) 0.04ppm (1-hour) 0.25ppm PM_{10} (particulate matter <10 microns) (24 hour annual mean) 30 µg/m^3 Sulfates (24-hour) 50 µg/m^3 Lead (30-day) 25 µg/m^3 H_2S (1-hour) 1.5 µg/m^3 Vinyl Chloride (24-hour) 0.010 ppm	Yes	Although it sets no standards, this code requirement is applicable because it gives authority to local agencies. These standards had intended to be protective of human health and consist of specific compounds they will be TBCs in the absence of other ARARs.

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Mulford-Carrell Air Resources Act (Cont.)				
		Title 17, Section 93000 also identifies benzene and hexavalent chromium as toxic air contaminants at specific industrial locations not applicable to remedial alternatives considered here.		
	South Coast Air Quality Management District (SCAQMD) Rules and Regulations	*Regulation IV -- Prohibitions.* This Act assigns responsibility for the identification of air pollutants to the CDHS and ARB. The ARB and local air pollution control districts must then develop control measures reducing emissions of the identified pollutants. Rule 401 - Visible Emissions. Limits visible emissions from any point source to Ringelmann No. 1, or 20 percent opacity for 3 minutes in any hour. Rule 402 - Nuisance. Prohibits the discharge of any material (including odorous compounds) that causes injury, or annoyance to the public, property, or businesses or endangers human health, comfort, repose, or safety. Rule 403 - Fugitive Dust. Limits on-site activities so that the concentrations of fugitive dust at the property line shall not be visible at the downwind particulate concentration shall not be more than 100 micrograms per cubic meter, averaged over 5 hours, above the upwind particulate concentration. These requirements do not apply if the wind speed, averaged over 15 minutes, is above 15 miles per hour. The rule also requires every reasonable precaution to minimize fugitive dust and the prevention and cleanup of any material accidentally deposited on paved streets.		Depending on the remedial alternative selected, these rules may be relevant and appropriate. With the exception of Rule 430 which is TBC.

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Mulford-Carrell Air Resources Act (Cont.)				
		Rule 430 - Breakdown Provisions. Rule 430 requires reporting of any breakdown which results in a violation of any rule in Regulations IV or XI within one hour after any such breakdown. The report must identify the time, specific location, equipment involved and the extent known, the cause of the breakdown. The estimated time of repairs must be reported as soon as possible thereafter. Within one week of the breakdown which causes a violation of any rule in Regulations IV or XI has been corrected, the operator shall submit a written report to the SCAQMD Director. Because this is an administrative rule, and because the operation of equipment is expected to be entirely on-site, this rule is a TBC. Rule 431.1, 431.2, 431.3 - Sulfur Content of Combustible Fuels. Establishes allowable sulfur contents for combustion fuels. Rule 473 - Disposal of Solid and Liquid Wastes. Incinerators designed to dispose of combustible refuse at burning rates greater than 50 kilograms per hour shall not release particulate matter in excess of 0.23 grams per cubic meter of gas calculated to 12 percent of carbon dioxide (472(b) and (c)). Rule 474 - Fuel-Burning Equipment Oxides of Nitrogen. Limits the concentration of oxides of nitrogen (as NO_2) to a range of 125 to 300 ppm for gaseous fuels and 225 to 400 ppm for solid and liquid fuels depending on equipment size. Rule 476 - Steam Generating Equipment. Prohibits discharge into the atmosphere of certain combustion contaminants from equipment having a heat input rate of more than 50 million BTU. May be applicable depending upon final size of steam generating equipment used for carbon reactivation.		

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Mulford-Carrell Air Resources Act (Cont.)				
		Regulation X -- National Emission Standards for Hazardous Air Pollutants. Implements the provisions of Part 61, Chapter I, Title 40, of the CFR under the supervision of SCAQMD executive Officer, if contaminants identified at the Site are listed. *Regulation XI -- Source Specific Standards* Rules 1146 and 1146.1 - Emission of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters and Emissions of Oxides of Nitrogen for Small Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters. Prohibits boilers, steam generators, and process heaters rated greater than 5 million BTU/hour (or between 2 million and 5 million for small operators) from discharging in excess of certain limits of nitrogen dioxide (NO_2). Requires emission compliance plan, compliance schedule and compliance determination.		
		Rule 1166 – Volatile Organic Compound Emissions from the Decontamination of Soils This rule sets requirements to control the emission of Volatile Organic Compounds (VOC) from excavating, grading, handling and treating VOC-contaminated soil as a result of leakage from storage or transfer operations, spillage, or other deposition.		
		Rule 1176 - Fugitive Emissions of Volatile Organic Compounds (VOCs). Limits leaks of VOCs from valves, fittings, pumps, compressors and other equipment at refineries, chemical plants and similar processing facilities. While not applicable to the Site, this rule may be relevant and appropriate depending on the remedial alternative selected and the contents of the treatment process pipelines.		

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Mulford-Carrell Air Resources Act (Cont.)				
		Regulation XIII -- New Source Review. This regulation sets forth preconstruction review requirements for new or modified stationary sources, to ensure that the operation of such stationary sources does not interfere with progress in attainment of the national and state ambient air quality standards, without unnecessarily restricting the future economic growth within the district. NAAQS guidelines and emissions limits are on a case-by-case basis. The regulations include requirements for offsets and usage of BACT for certain types of discharges. *Regulation XIV -- Toxics and Other Non-Criteria Pollutants* Rule 1401 - New Source Review of Carcinogenic Air Contaminants. The rule specifies limits for cancer risk and excess cancer cases from new stationary sources and modifications to existing stationary sources that emit carcinogenic air contaminants. The rule establishes allowable emission impacts for all such stationary sources requiring new permits pursuant to SCAQMD Rules 201 or 203. Best Available Control Technology for Toxics (T-BACT) will be required for any system where a lifetime (70 year) maximum individual cancer risk of one is one mission or greater is estimated to occur. Limits are calculated using unit risk factors for specific contaminants. Groundwater contaminants identified at the Site that have identified unit risk factors include BHC, benzene, carbon tetrachloride, chloroform, methylene chloride, trichloroethylene, and 2,4,6-trichlorophenol.		
California Coastal Act of 1976				
14 CCR §§ 13001-13600	Public Resources Code (PRC)	Regulates activities within, or that could discharge to the coastal zone.		TBC since the remedial activities will not take place within the "coastal zone" as defined by PRC § 30103

TABLE 6-2 (cont.)

STATE AND LOCAL ARARs

Citation	Standard or Requirement	Description	Potentially Applicable or Relevant and Appropriate	Comment
Other Applicable Acts				
Labor Code, Sections 6300 et seq.	California Occupational Health and Safety Act	Establishes the requirements for worker safety and responsibility of employers. Cal-OSHA also establishes exposure limits that are more stringent if not equal to OSHA exposure limits.	Yes	Is relevant and appropriate in order to maintain worker safety and health while working on the Site.
16 USC, Section 469; 36 CFR Part 65	National Archaeological and Historical Preservation Act	Alteration of terrain that threatens significant scientific or historical data may require actions to remove or preserve artifacts.		
Endangered Species Act 1973 50 CFR Part 200; 50 CFR Part 402	Endangered Species Act	Requires action to conserve endangered species.		
Native Plant Protection Act	Native Plant Protection Act	Requires consultation with CDFG if species are affected by the project.		

TABLE 6-3
Preliminary Cost Estimate for Alternative 4B

ALTERNATIVE 4B
* Excavate exposed soils and soils under residential hardscape[A] to 3 feet where SSCGs are exceeded.
* No excavation beneath streets.
* Install subslab mitigation at homes where subslab VOC and methane concentrations exceed screening value.
* MNA remedy for GW. Could add limited hot spot remediation to reduce time to achieve cleanup goals.
* Remove LNAPL as feasible.
* SVE/Bioventing

Item	Description	Quantity	Unit	Rate	Amount	Comments
1.0	**Property Purchase Cost (285 properties)**	0	LS	NA	**$ -**	
2.0	**Demolition Costs**				**$ 1,437,282**	Includes 5% handling on outside services
2.1	Asbestos Surveys	0	LS	$ 3,200	$ -	URS Est.
2.2	Asbestos Abatement	0	LS	$ 18,000	$ -	URS Est.
2.3	D & D of Homes	0	LS	$ 35,000	$ -	AIS Est.
2.4	D & D of Hardscape	342,210	SF	$ 4	$ 1,368,840	AIS Est.
3.0	**Excavate, Backfill, & Assoc. Costs**				**$ 33,963,014**	Includes 5% handling on outside services
3.1	Excavate and Load Impacted Soil	67,000	CY	$ 50	$ 3,350,000	183 homes; 1870 sf hardscape, 1430 sf landscape on average, 3' deep
3.2	Remove and Dispose Concrete Bases	0	TONS	$ 80	$ -	AIS Est. (No city sidewalk)
3.3	Shoring (H pile/lagging or sheet pile)	0	SF	$ 40	$ -	
3.4	Vapor Mitigation	183	EA	$ 1,500	$ 274,500	AIS Est.
3.5	T&D Non Haz Soil (Recycle) 100%	113,900	TON	$ 60	$ 6,834,000	Soil Safe, Adelanto AIS Est.
3.6	T&D RCRA Haz Soil (Out of State) 0%	0	TON	$ 215	$ -	Beaty, NV AIS Est.
3.7	Groundwater Remediation	0	LS	$ -	$ -	Assume NMA, no active treatment
3.8	Import Clean Soil	67,000	CY	$ 20	$ 1,340,000	URS Est.
3.9	Backfill and Compact	67,000	CY	$ 9	$ 603,000	AIS Est.
3.10	Fine Grade	13.8	ACRES	$ 30,000	$ 415,289	AIS Est.
3.11	SWPP BMPs	1	LS	$ 150,000	$ 150,000	URS Est.
3.12	Subslab Vapor Mitigation	27	EA	$ 20,000	$ 540,000	URS Est.
3.13	Utilities Restoration	183	EA	$ 1,500	$ 274,500	URS Est.
3.14	Landscape/Hardscape	183	EA	$ 45,000	$ 8,235,000	URS Est. Includes $15K block walls
3.15	SVE/Bioventing	1	LS	$ 10,814,410	$ 10,814,410	URS Est.
3.16	Soil Waste Profiling	1	LS	$ 30,000	$ 30,000	URS Est.
4.0	**Other Direct Costs**				**$ 19,567,105**	Includes 5% handling on outside services
4.1	Contingency for Treatment of Rainwater	1	LS	$ 1,000,000	$ 1,000,000	AIS Est.
4.2	PM, Planning, Permitting, Coordination, Reporting	1	LS	$ 4,460,437	$ 4,460,437	12.6% of Construction $ 24,374 per home
4.3	Field Mgmt, Monitoring, Oversight	1	LS	$ 3,894,033	$ 3,894,033	11% of Construction $ 40,775 per week
4.4	Relocation	183	EA	$ 24,500	$ 4,483,500	Assume $700 per day, 35 days per home
4.5	Security	96	WEEKS	$ 54,400	$ 5,195,200	5 guards - 16 hours per day/24 hours weekend
5.0	**Post Excavation Construction and Long Term O&M**				**$ 24,099,956**	Includes 5% handling on outside services
5.1	Groundwater Monitoring	30	YEAR	$ 80,000	$ 2,400,000	URS Est. Assume semi-annual monitoring plus MNA parameters
5.2	LNAPL Recovery	112	Events	$ 4,571	$ 511,952	URS Est. $4.6K / event: monthly for 4 years, quarterly for next 6 years and semi-annualy for next 20 years
5.3	SVE/Bioventing O&M	30	YEAR	$ 684,942	$ 20,548,254	URS Est.
5.4	Asphalt Capping of Streets (1" grind and overlay)	33,000	SY	$ 15	$ 495,000	URS Est.

Subtotal Estimate Alternative 4B without Contingency		**$ 79,000,000**
Total Estimate Alternative 4B with Contingency Range -20% to +30%	**$ 63,000,000**	**$ 103,000,000**
	Low	**High**

Estimated Duration	96 Weeks	1.9 Years	
Estimated Truck Loads/Day	11 Loads/Day Export	23 Loads/Day Import	
Estimated Total Loads	5,238 Loads Export	4,786 Loads Import	10,024 Total Loads

TABLE 6-4
Preliminary Cost Estimate for Alternative 4C

Geosyntec consultants

ALTERNATIVE 4C
Same as Alt 4B except excavate to 5 feet

Item	Description	Quantity	Unit	Rate	Amount	Comments
1.0	**Property Purchase Cost (285 properties)**	0	LS	NA	**$ -**	
2.0	**Demolition Costs**				**$ 1,437,282**	Includes 5% handling on outside services
2.1	Asbestos Surveys	0	LS	$ 3,200	$ -	URS Est.
2.2	Asbestos Abatement	0	LS	$ 18,000	$ -	URS Est.
2.3	D & D of Homes	0	LS	$ 35,000	$ -	AIS Est.
2.4	D & D of Hardscape	342,210	SF	$ 4	$ 1,368,840	AIS Est.
3.0	**Excavate, Backfill, & Assoc. Costs**				**$ 49,293,840**	Includes 5% handling on outside services
3.1	Excavate and Load Impacted Soil	111,833	CY	$ 60	$ 6,710,000	183 homes; 1870 sf hardscape, 1430 sf landscape on average, 5' deep
3.2	Remove and Dispose Concrete Bases	0	TONS	$ 80	$ -	AIS Est.
3.3	Shoring (H pile/lagging or sheet pile)	173,850	SF	$ 30	$ 5,215,500	AIS Est. around each house
3.4	Vapor Mitigation	183	EA	$ 1,500	$ 274,500	AIS Est.
3.5	T&D Non Haz Soil (Recycle) 100%	190,117	TON	$ 60	$ 11,407,000	Soil Safe, Adelanto AIS Est.
3.6	T&D RCRA Haz Soil (Out of State) 0%	0	TON	$ 215	$ -	Beaty, NV AIS Est.
3.7	Groundwater Remediation	0	LS	$ -	$ -	Assume NMA, no active treatment
3.8	Import Clean Soil	111,833	CY	$ 20	$ 2,236,667	URS Est.
3.9	Backfill and Compact	111,833	CY	$ 9	$ 1,006,500	AIS Est.
3.10	Fine Grade	13.9	ACRES	$ 30,000	$ 415,909	AIS Est.
3.11	SWPP BMPs	1	LS	$ 200,000	$ 200,000	URS Est.
3.12	Subslab Vapor Mitigation	27	EA	$ 20,000	$ 540,000	URS Est.
3.13	Utilities Restoration	183	EA	$ 2,000	$ 366,000	URS Est.
3.14	Landscape/Hardscape	183	EA	$ 45,000	$ 8,235,000	URS Est. Includes $15K block walls
3.15	SVE/Bioventing	1	LS	$ 10,814,410	$ 10,814,410	URS Est.
3.16	Soil Waste Profiling	1	LS	$ 40,000	$ 40,000	URS Est.
4.0	**Other Direct Costs**				**$ 28,825,949**	Includes 5% handling on outside services
4.1	Contingency for Treatment of Rainwater	1	LS	$ 1,000,000	$ 1,000,000	AIS Est.
4.2	PM, Planning, Permitting, Coordination, Reporting	1	LS	$ 6,087,735	$ 6,087,735	12% of Construction $ 33,266 per home
4.3	Field Mgmt, Monitoring, Oversight	1	LS	$ 6,087,735	$ 6,087,735	12% of Construction $ 43,099 per week
4.4	Relocation	183	EA	$ 39,200	$ 7,173,600	Assume $700 per day, 56 days per home
4.5	Security	141	WEEKS	$ 54,400	$ 7,684,000	5 guards - 16 hours per day/24 hours weekend
5.0	**Post Excavation Construction and Long Term O&M**				**$ 24,099,956**	Includes 5% handling on outside services
5.1	Groundwater Monitoring	30	YEAR	$ 80,000	$ 2,400,000	URS Est. Assume semi-annual monitoring plus MNA parameters
5.2	LNAPL Recovery	112	Events	$ 4,571	$ 511,952	URS Est. $4.6K / event: monthly for 4 years, quarterly for next 6 years and semi-annualy for next 20 years
5.3	SVE/Bioventing O&M	30	YEAR	$ 684,942	$ 20,548,254	URS Est.
5.4	Asphalt Capping of Streets (1" grind and overlay)	33,000	SY	$ 15	$ 495,000	URS Est.

Subtotal Estimate Alternative 4C without Contingency		**$ 104,000,000**
Total Estimate Alternative 4C with Contingency Range -20% to +30%	**$ 83,000,000**	**$ 135,000,000**
	Low	**High**

Estimated Duration	141 Weeks	2.8 Years	
Estimated Truck Loads/Day	12 Loads/Day Export	25 Loads/Day Import	
Estimated Total Loads	8,441 Loads Export	7,988 Loads Import	16,429 Total Loads

TABLE 6-5
Preliminary Cost Estimate for Alternative 4D

Geosyntec consultants

ALTERNATIVE 4D
Same as Alt 4B except excavate to 10 feet

Item	Description	Quantity	Unit	Rate	Amount	Comments
1.0	**Property Purchase Cost (285 properties)**	0	LS	NA	**$** -	
2.0	**Demolition Costs**				**$ 1,680,756**	Includes 5% handling on outside services
2.1	Asbestos Surveys	0	LS	$ 3,200	$ -	URS Est.
2.2	Asbestos Abatement	0	LS	$ 18,000	$ -	URS Est.
2.3	D & D of Homes	0	LS	$ 35,000	$ -	AIS Est.
2.4	D & D of Hardscape	400,180	SF	$ 4	$ 1,600,720	AIS Est.
3.0	**Excavate, Backfill, & Assoc. Costs**				**$ 104,534,523**	Includes 5% handling on outside services
3.1	Excavate and Load Impacted Soil	261,556	CY	$ 80	$ 20,924,444	214 homes; 1870 sf hardscape, 1430 sf landscape on average, 10' deep
3.2	Remove and Dispose Concrete Bases	166	TONS	$ 80	$ 13,266	AIS Est.
3.3	Shoring (H pile/lagging or sheet pile)	406,600	SF	$ 50	$ 20,330,000	AIS Est. around each house
3.4	Vapor Mitigation	214	EA	$ 1,500	$ 321,000	AIS Est.
3.5	T&D Non Haz Soil (Recycle) 98%	435,752	TON	$ 60	$ 26,145,093	Soil Safe, Adelanto AIS Est.
3.6	T&D RCRA Haz Soil (Out of State) 2%	8,893	TON	$ 215	$ 1,911,971	Beaty, NV AIS Est.
3.7	Groundwater Remediation	0	LS	$ -	$ -	Assume NMA, no active treatment
3.8	Import Clean Soil	261,556	CY	$ 20	$ 5,231,111	URS Est.
3.9	Backfill and Compact	261,556	CY	$ 9	$ 2,354,000	AIS Est.
3.10	Fine Grade	16.2	ACRES	$ 30,000	$ 486,364	AIS Est.
3.11	SWPP BMPs	1	LS	$ 250,000	$ 250,000	URS Est.
3.12	Subslab Vapor Mitigation	27	EA	$ 20,000	$ 540,000	URS Est.
3.13	Utilities Restoration	214	EA	$ 5,000	$ 1,070,000	URS Est.
3.14	Landscape/Hardscape	214	EA	$ 45,000	$ 9,630,000	URS Est. Includes $15K block walls
3.15	SVE/Bioventing	1	LS	$ 10,814,410	$ 10,814,410	URS Est.
3.16	Soil Waste Profiling	1	LS	$ 50,000	$ 50,000	URS Est.
4.0	**Other Direct Costs**				**$ 56,232,598**	Includes 5% handling on outside services
4.1	Contingency for Treatment of Rainwater	1	LS	$ 1,000,000	$ 1,000,000	AIS Est.
4.2	PM, Planning, Permitting, Coordination, Reporting	1	LS	$ 8,497,222	$ 8,497,222	8% of Construction $ 39,707 per home
4.3	Field Mgmt, Monitoring, Oversight	1	LS	$ 13,807,986	$ 13,807,986	13% of Construction $ 42,486 per week
4.4	Relocation	214	EA	$ 63,700	$ 13,631,800	Assume $700 per day, 91 days per home
4.5	Security	325	WEEKS	$ 54,400	$ 17,680,000	5 guards - 16 hours per day/24 hours weekend
5.0	**Post Excavation Construction and Long Term O&M**				**$ 24,099,956**	Includes 5% handling on outside services
5.1	Groundwater Monitoring	30	YEAR	$ 80,000	$ 2,400,000	URS Est. Assume semi-annual monitoring plus MNA parameter
5.2	LNAPL Recovery	112	Events	$ 4,571	$ 511,952	URS Est. $4.6K / event: monthly for 4 years, quarterly for next 6 years and semi-annualy for next 20 year
5.3	SVE/Bioventing O&M	30	YEAR	$ 684,942	$ 20,548,254	URS Est.
5.4	Asphalt Capping of Streets (1" grind and overlay)	33,000	SY	$ 15	$ 495,000	URS Est.

Subtotal Estimate Alternative 4D without Contingency		**$ 187,000,000**
Total Estimate Alternative 4D with Contingency Range -20% to +30%	**$ 150,000,000**	**$ 243,000,000**
	Low	**High**

Estimated Duration	325 Weeks	6.5 Years		
Estimated Truck Loads/Day	12 Loads/Day Export	24 Loads/Day Import		
Estimated Total Loads	19,212 Loads Export	18,683 Loads Import	37,894	Total Loads

TABLE 6-6
Preliminary Cost Estimate for Alternative 5B

ALTERNATIVE 5B
* Excavate exposed site soils from 0 to 3 feet where SSCGs are exceeded at residential properties.
* No excavation beneath residential hardscape[A], streets and sidewalks.
* Install subslab mitigation at homes where subslab VOC and methane concentrations exceed screening value.
* MNA remedy for GW. Could add limited hot spot remediation to reduce time to achieve cleanup goals.
* Remove LNAPL as feasible.
* SVE/Bioventing

Item	Description	Quantity	Unit	Rate	Amount	Comments
1.0	**Property Purchase Cost (285 properties)**	0	LS	NA	**$ -**	
2.0	**Demolition Costs**				**$ -**	Includes 5% handling on outside services
2.1	Asbestos Surveys	0	LS	$ 3,200	$ -	URS Est.
2.2	Asbestos Abatement	0	LS	$ 18,000	$ -	URS Est.
2.3	D & D of Homes	0	LS	$ 35,000	$ -	AIS Est.
2.4	D & D of Hardscape	0	SF	$ 4	$ -	AIS Est.
3.0	**Excavate, Backfill, & Assoc. Costs**				**$ 22,847,358**	Includes 5% handling on outside services
3.1	Excavate and Load Impacted Soil	30,000	CY	$ 50	$ 1,500,000	183 homes; 1430 sf landscape on average, 3' deep
3.2	Remove and Dispose Concrete Bases	0	TONS	$ 80	$ -	AIS Est.
3.3	Shoring (H pile/lagging or sheet pile)	0	SF	$ 30	$ -	AIS Est. around each house
3.4	Vapor Mitigation	183	EA	$ 1,500	$ 274,500	AIS Est.
3.5	T&D Non Haz Soil (Recycle) 100%	51,000	TON	$ 60	$ 3,060,000	Soil Safe, Adelanto AIS Est.
3.6	T&D RCRA Haz Soil (Out of State) 0%	0	TON	$ 215	$ -	Beaty, NV URS Est.
3.7	Groundwater Remediation	0	LS	$ -	$ -	Assume NMA, no active treatment
3.8	Import Clean Soil	30,000	CY	$ 20	$ 600,000	URS Est.
3.9	Backfill and Compact	30,000	CY	$ 9	$ 270,000	AIS Est.
3.10	Fine Grade	6	ACRES	$ 30,000	$ 185,950	AIS Est.
3.11	SWPP BMPs	1	LS	$ 150,000	$ 150,000	URS Est.
3.12	Subslab Vapor Mitigation	27	EA	$ 20,000	$ 540,000	URS Est.
3.13	Utilities Restoration	183	EA	$ 1,500	$ 274,500	URS Est.
3.14	Landscape	183	EA	$ 25,000	$ 4,575,000	URS Est. Includes $15K block walls
3.15	SVE/Bioventing	1	LS	$ 10,814,410	$ 10,814,410	URS Est.
3.16	Soil Waste Profiling	1	LS	$ 30,000	$ 30,000	URS Est.
4.0	**Other Direct Costs**				**$ 16,781,649**	Includes 5% handling on outside services
4.1	Contingency for Treatment of Rainwater	1	LS	$ 1,000,000	$ 1,000,000	AIS Est.
4.2	PM, Planning, Permitting, Coordination, Reporting	1	LS	$ 3,655,577	$ 3,655,577	16% of Construction $ 19,976 per home
4.3	Field Mgmt, Monitoring, Oversight	1	LS	$ 2,970,157	$ 2,970,157	13% of Construction $ 38,573 per week
4.4	Relocation	183	EA	$ 24,500	$ 4,483,500	Assume $700 per day, 35 days per home
4.5	Security	77	WEEKS	$ 54,400	$ 4,188,800	5 guards - 16 hours per day/24 hours weekend
5.0	**Post Excavation Construction and Long Term O&M**				**$ 24,099,956**	Includes 5% handling on outside services
5.1	Groundwater Monitoring	30	YEAR	$ 80,000	$ 2,400,000	URS Est. Assume semi-annual monitoring plus MNA parameters
5.2	LNAPL Recovery	112	Events	$ 4,571	$ 511,952	URS Est. $4.6K / event: monthly for 4 years, quarterly for next 6 years and semi-annualy for next 20 years
5.3	SVE/Bioventing O&M	30	YEAR	$ 684,942	$ 20,548,254	URS Est.
5.4	Asphalt Capping of Streets (1" grind and overlay)	33,000	SY	$ 15	$ 495,000	URS Est.

Subtotal Estimate Alternative 5B without Contingency		**$ 64,000,000**
Total Estimate Alternative 5B with Contingency Range -20% to +30%	**$ 51,000,000**	**$ 83,000,000**
	Low	**High**

Estimated Duration	77 Weeks	1.5 Years	
Estimated Truck Loads/Day	5 Loads/Day Export	9 Loads/Day Import	
Estimated Total Loads	2,143 Loads Export	2,143 Loads Import	4,286 Total Loads

TABLE 6-7
Preliminary Cost Estimate for Alternative 5C

ALTERNATIVE 5C
Same as Alt 5B except excavate exposed soils to 5 feet.

Item	Description	Quantity	Unit	Rate	Amount	Comments
1.0	**Property Purchase Cost (285 properties)**	0	LS	NA	**$ -**	
2.0	**Demolition Costs**				**$ -**	Includes 5% handling on outside services
2.1	Asbestos Surveys	0	LS	$ 3,200	$ -	URS Est.
2.2	Asbestos Abatement	0	LS	$ 18,000	$ -	URS Est.
2.3	D & D of Homes	0	LS	$ 35,000	$ -	AIS Est.
2.4	D & D of Hardscape	0	SF	$ 4	$ -	AIS Est.
3.0	**Excavate, Backfill, & Assoc. Costs**				**$ 32,488,825**	Includes 5% handling on outside services
3.1	Excavate and Load Impacted Soil	48,461	CY	$ 60	$ 2,907,667	183 homes; 1430 sf landscape on average, 5' deep
3.2	Remove and Dispose Concrete Bases	0	TONS	$ 80	$ -	AIS Est.
3.3	Shoring (H pile/lagging or sheet pile)	173,850	SF	$ 30	$ 5,215,500	AIS Est. around each house
3.4	Vapor Mitigation	183	EA	$ 1,500	$ 274,500	AIS Est.
3.5	T&D Non Haz Soil (Recycle) 100%	82,384	TON	$ 60	$ 4,943,033	Soil Safe, Adelanto AIS Est.
3.6	T&D RCRA Haz Soil (Out of State) 0%	0	TON	$ 215	$ -	Beaty, NV AIS Est.
3.7	Groundwater Remediation	0	LS	$ -	$ -	Assume NMA, no active treatment
3.8	Import Clean Soil	48,461	CY	$ 20	$ 969,222	URS Est.
3.9	Backfill and Compact	48,461	CY	$ 9	$ 436,150	AIS Est.
3.10	Fine Grade	6	ACRES	$ 30,000	$ 180,227	AIS Est.
3.11	SWPP BMPs	1	LS	$ 200,000	$ 200,000	URS Est.
3.12	Subslab Vapor Mitigation	27	EA	$ 20,000	$ 540,000	URS Est.
3.13	Utilities Restoration	183	EA	$ 2,000	$ 366,000	URS Est.
3.14	Landscape	183	EA	$ 25,000	$ 4,575,000	URS Est. Includes $15K block walls
3.15	SVE/Bioventing	1	LS	$ 10,814,410	$ 10,814,410	URS Est.
3.16	Soil Waste Profiling	1	LS	$ 35,000	$ 35,000	URS Est.
4.0	**Other Direct Costs**				**$ 27,080,034**	Includes 5% handling on outside services
4.1	Contingency for Treatment of Rainwater	1	LS	$ 1,000,000	$ 1,000,000	AIS Est.
4.2	PM, Planning, Permitting, Coordination, Reporting	1	LS	$ 5,847,988	$ 5,847,988	18% of Construction $ 31,956 per home
4.3	Field Mgmt, Monitoring, Oversight	1	LS	$ 5,523,100	$ 5,523,100	17% of Construction $ 39,102 per week
4.4	Relocation	183	EA	$ 34,300	$ 6,276,900	Assume $700 per day, 49 days per home
4.5	Security	141	WEEKS	$ 54,400	$ 7,684,000	5 guards - 16 hours per day/24 hours weekend
5.0	**Post Excavation Construction and Long Term O&M**				**$ 24,099,956**	Includes 5% handling on outside services
5.1	Groundwater Monitoring	30	YEAR	$ 80,000	$ 2,400,000	URS Est. Assume semi-annual monitoring plus MNA parameters
5.2	LNAPL Recovery	112	Events	$ 4,571	$ 511,952	URS Est. $4.6K / event: monthly for 4 years, quarterly for next 6 years and semi-annualy for next 20 years
5.3	SVE/Bioventing O&M	30	YEAR	$ 684,942	$ 20,548,254	URS Est.
5.4	Asphalt Capping of Streets (1" grind and overlay)	33,000	SY	$ 15	$ 495,000	URS Est.

Subtotal Estimate Alternative 5C without Contingency		**$ 84,000,000**
Total Estimate Alternative 5C with Contingency Range -20% to +30%	**$ 67,000,000**	**$ 109,000,000**
	Low	**High**

Estimated Duration	141 Weeks	2.8 Years	
Estimated Truck Loads/Day	5 Loads/Day Export	10 Loads/Day Import	
Estimated Total Loads	3,462 Loads Export	3,462 Loads Import	6,923 Total Loads

TABLE 6-8
Preliminary Cost Estimate for Alternative 5D

Geosyntec consultants

ALTERNATIVE 5D
Same as Alt 5B except excavate exposed soils to 10 feet.

Item	Description	Quantity	Unit	Rate	Amount	Comments
1.0	**Property Purchase Cost (285 properties)**	0	LS	NA	**$ -**	
2.0	**Demolition Costs**				**$ -**	Includes 5% handling on outside services
2.1	Asbestos Surveys	0	LS	$ 3,200	$ -	URS Est.
2.2	Asbestos Abatement	0	LS	$ 18,000	$ -	URS Est.
2.3	D & D of Homes	0	LS	$ 35,000	$ -	AIS Est.
2.4	D & D of Hardscape	0	SF	$ 4	$ -	AIS Est.
3.0	**Excavate, Backfill, & Assoc. Costs**				**$ 66,080,854**	Includes 5% handling on outside services
3.1	Excavate and Load Impacted Soil	113,341	CY	$ 80	$ 9,067,259	214 homes; 1550 sf landscape on average, 10' deep
3.2	Remove and Dispose Concrete Bases	72	TONS	$ 80	$ 5,749	AIS Est.
3.3	Shoring (H pile/lagging or sheet pile)	406,600	SF	$ 50	$ 20,330,000	AIS Est. around each house
3.4	Vapor Mitigation	214	EA	$ 1,500	$ 321,000	AIS Est.
3.5	T&D Non Haz Soil (Recycle) 98%	188,826	TON	$ 60	$ 11,329,540	Soil Safe, Adelanto AIS Est.
3.6	T&D RCRA Haz Soil (Out of State) 2%	3,854	TON	$ 215	$ 828,521	Beaty, NV AIS Est.
3.7	Groundwater Remediation	0	LS	$ -	$ -	Assume NMA, no active treatment
3.8	Import Clean Soil	113,341	CY	$ 20	$ 2,266,815	URS Est.
3.9	Backfill and Compact	113,341	CY	$ 9	$ 1,020,067	AIS Est.
3.10	Fine Grade	7	ACRES	$ 30,000	$ 210,758	AIS Est.
3.11	SWPP BMPs	1	LS	$ 250,000	$ 250,000	URS Est.
3.12	Subslab Vapor Mitigation	27	EA	$ 20,000	$ 540,000	URS Est.
3.13	Utilities Restoration	214	EA	$ 5,000	$ 1,070,000	URS Est.
3.14	Landscape	214	EA	$ 25,000	$ 5,350,000	URS Est. Includes $15K block walls
3.15	SVE/Bioventing	1	LS	$ 10,814,410	$ 10,814,410	URS Est.
3.16	Soil Waste Profiling	1	LS	$ 45,000	$ 45,000	URS Est.
4.0	**Other Direct Costs**				**$ 41,693,482**	Includes 5% handling on outside services
4.1	Contingency for Treatment of Rainwater	1	LS	$ 1,000,000	$ 1,000,000	AIS Est.
4.2	PM, Planning, Permitting, Coordination, Reporting	1	LS	$ 8,590,511	$ 8,590,511	13% of Construction $ 40,143 per home
4.3	Field Mgmt, Monitoring, Oversight	1	LS	$ 8,590,511	$ 8,590,511	13% of Construction $ 39,406 per week
4.4	Relocation	214	EA	$ 49,000	$ 10,486,000	Assume $700 per day, 70 days per home
4.5	Security	218	WEEKS	$ 54,400	$ 11,859,200	5 guards - 16 hours per day/24 hours weekend
5.0	**Post Excavation Construction and Long Term O&M**				**$ 24,099,956**	Includes 5% handling on outside services
5.1	Groundwater Monitoring	30	YEAR	$ 80,000	$ 2,400,000	URS Est. Assume semi-annual monitoring plus MNA parameters
5.2	LNAPL Recovery	112	Events	$ 4,571	$ 511,952	URS Est. $4.6K / event: monthly for 4 years, quarterly for next 6 years and semi-annualy for next 20 years
5.3	SVE/Bioventing O&M	30	YEAR	$ 684,942	$ 20,548,254	URS Est.
5.4	Asphalt Capping of Streets (1" grind and overlay)	33,000	SY	$ 15	$ 495,000	URS Est.

Subtotal Estimate Alternative 5D without Contingency		**$ 132,000,000**
Total Estimate Alternative 5D with Contingency Range -20% to +30%	**$ 106,000,000**	**$ 172,000,000**
	Low	**High**

Estimated Duration	218 Weeks	4.4 Years	
Estimated Truck Loads/Day	8 Loads/Day Export	15 Loads/Day Import	
Estimated Total Loads	8,096 Loads Export	8,096 Loads Import	16,192 Total Loads

TABLE 6-9
Preliminary Cost Estimate for Alternative 7

Geosyntec consultants

ALTERNATIVE 7
* Cap all areas of exposed soil at the site.
* Install subslab mitigation at homes where subslab VOC and methane concentrations exceed screening values.
* Remove LNAPL as feasible.
* MNA remedy for GW. Could add limited hot spot remediation to reduce time to achieve cleanup goals.
* SVE/Bioventing

Item	Description	Quantity	Unit	Rate	Amount	Comments
1.0	**Property Purchase Cost (285 properties)**	0	LS	NA	**$ -**	
2.0	**Demolition Costs**				**$ -**	
2.1	Asbestos Surveys	0	LS	$ 3,200	**$** -	Includes 5% handling on outside services
2.2	Asbestos Abatement	0	LS	$ 18,000	$ -	URS Est.
2.3	D & D of Homes	0	LS	$ 35,000	$ -	AIS Est.
2.4	D & D of Hardscape	0	SF	$ 4	$ -	AIS Est.
3.0	**Excavate, Backfill, & Assoc. Costs**				**$ 21,498,960**	Includes 5% handling on outside services
3.1	Excavate and Load Impacted Soil	7,547	CY	$ 20	$ 150,944	Clear and grub surface to 6"
3.2	Remove and Dispose Concrete Bases	0	TONS	$ 80	$ -	AIS Est.
3.3	Shoring (H pile/lagging or sheet pile)	0	SF	$ 30	$ -	AIS Est.
3.4	Vapor Mitigation	0	LS	$ 500,000	$ -	AIS Est.
3.5	T&D Non Haz Soil (Recycle) 100%	12,830	TON	$ 60	$ 769,817	Soil Safe, Adelanto AIS Est.
3.6	T&D RCRA Haz Soil (Out of State) 10%	0	TON	$ 215	$ -	Beaty, NV AIS Est.
3.7	Groundwater Remediation	0	LS	$ -	$ -	Assume NMA, no active treatmen
3.8	Import Clean Soil	0	CY	$ 20	$ -	URS Est.
3.9	Backfill and Compact	0	CY	$ 9	$ -	AIS Est.
3.10	Fine Grade	0	ACRES	$ 30,000	$ -	AIS Est.
3.11	SWPP BMPs	1	LS	$ 150,000	$ 150,000	URS Est.
3.12	Subslab Vapor Mitigation	27	EA	$ 20,000	$ 540,000	URS Est.
3.13	Landscape with Artificial Turf/Pavers etc.	285	EA	$ 30,000	$ 8,550,000	URS Est.
3.15	SVE/Bioventing	1	LS	$ 10,814,410	$ 10,814,410	URS Est.
3.16	Soil Waste Profiling	1	LS	$ 15,000	$ 15,000	URS Est.
4.0	**Other Direct Costs**				**$ 5,899,740**	Includes 5% handling on outside services
4.1	Contingency for Treatment of Rainwater	1	LS	$ 500,000	$ 500,000	AIS Est.
4.2	PM, Planning, Coordination, Reporting	1	LS	$ 3,224,844	$ 3,224,844	15% of Construction $ 11,315 per home
4.3	Field Mgmt, Monitoring, Oversight, Security	1	LS	$ 2,149,896	$ 2,149,896	10% of Construction $ 30,174 per week
5.0	**Post Excavation Construction and Long Term O&M**				**$ 24,099,956**	Includes 5% handling on outside services
5.1	Groundwater Monitoring	30	YEAR	$ 80,000	$ 2,400,000	URS Est. Assume semi-annual monitoring plus MNA parameters
5.2	LNAPL Recovery	112	Events	$ 4,571	$ 511,952	URS Est. $4.6K / event: monthly for 4 years, quarterly for next 6 years and semi-annualy for next 20 years
5.3	SVE/Bioventing O&M	30	YEAR	$ 684,942	$ 20,548,254	URS Est.
5.4	Asphalt Capping of Streets (1" grind and overlay)	33,000	SY	$ 15	$ 495,000	URS Est.

Subtotal Estimate Alternative 7 without Contingency		**$ 51,000,000**
Total Estimate Alternative 7 with Contingency Range -20% to +30%	**$ 41,000,000**	**$ 66,000,000**
	Low	**High**

Estimated Duration	71 Weeks	1.4 Years

Geosyntec consultants

TABLE 6-10
Detailed Evaluation of Remedial Alternatives

Alternative		Detailed Evaluation Criteria[1]									
		Overall Protection of Human Health and the Environment	**Compliance with ARARs**	**Long-term Effectiveness and Permanence**	**Reduction of Toxicity, Mobility, and Volume Through Treatment**	**Short-Term Effectiveness**	**Implementability**	**Cost Estimate**	**Consistency with Resolution 92-49**	**Social Considerations**	**Sustainability**
Alt 1 No Action		No action taken. Not protective.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavate Beneath Residential Landscape and Hardscape; SVE / Bioventing; Sub-slab Mitigation; LNAPL Recovery; Groundwater Monitored Natural Attenuation and Treatment; Existing Institutional Controls.	**Alt 4B Excavate To 3 Feet**	Highly protective. Planned excavation would mitigate incidental contact with impacted soils. SSD would mitigate potential for vapor intrusion. Institutional controls, SVE/bioventing, LNAPL removal, groundwater MNA and supplemental groundwater treatment as needed would be protective.	High degree of compliance. ARARs are met through remedial action.	Highly effective and permanent in the long term.	High degree of reduction of toxicity, mobility and volume through treatment (SVE/ bioventing, LNAPL removal, supplemental groundwater treatment).	Short-term effectiveness is relatively high through careful planning and execution. Potential for community and worker exposure during excavation would be mitigated. SVE/bioventing and SSD would be effective in the short-term.	Implementability is relatively high because utility lines are likely to be below this depth, shoring would not be required, and there would be a relatively small volume of soils. Permission from property owners must be granted to implement remedy.	$63MM to $103 MM	Fully compliant with Resolution 92-49.	Low-to-moderate social impact. Landscape and hardscape would be temporarily removed. Neighborhoods would be impacted by traffic, noise, dust, and odors. 183 properties would be affected by excavation; 214 by SVE/bioventing.	Moderate sustainability. Excavation equipment, truck emissions and greenhouse gas emissions would affect air quality. The disposal of some impacted materials would occupy landfill space, affecting a future resource.
	Alt 4C Excavate To 5 Feet	Highly protective. Planned excavation would mitigate incidental contact with impacted soils. SSD would mitigate potential for vapor intrusion. Institutional controls, SVE/bioventing, LNAPL removal, groundwater MNA and supplemental groundwater treatment as needed would be protective.	High degree of compliance. ARARs are met through remedial action.	Highly effective and permanent in the long term.	High degree of reduction of toxicity, mobility and volume through treatment technologies listed above.	Short-term effectiveness is moderate. While SVE/bioventing and SSD would be as effective as in Alt 4B, there would be more disruption of Site features and community and worker exposure.	Implementability is moderate because shoring or slot trenching would be required where utilities would be encountered during excavation. Utility lines would have to be removed and replaced, or protected and manually excavated around. Permission from property owners must be granted to implement remedy.	$83MM to $135 MM	Not as compliant with Resolution 92-49, because the same level of protectiveness is achieved as Alt 4B, but at higher cost.	Moderate-to-significant social impact due to potential utility disruption, truck traffic, remedy implementation time. Excavation and soil import would take multiple days because of additional soil, shoring, and work with utilities. 183 properties would be affected by excavation; 214 by SVE/bioventing.	Low-to-moderate sustainability. More excavation would increase the impacts listed for Alt 4B.
	Alt 4D Excavate To 10 Feet	Highly protective. Planned excavation would mitigate incidental contact with impacted soils for uses other than extensive construction. SSD would mitigate potential for vapor intrusion. Institutional controls, SVE/bioventing, LNAPL removal, groundwater MNA and supplemental groundwater treatment as needed would be protective.	If it could be implemented it would have a high degree of compliance. ARARs are met through remedial action.	Highly effective and permanent in the long term.	High degree of reduction of toxicity, mobility and volume through treatment technologies listed above.	Short-term effectiveness is very low. While SVE/bioventing and SSD would be as effective as in Alt 4B, there would be extensive disruption of Site features, exposures to community, and higher worker exposures due to longer excavation periods and more properties being affected.	Not implementable. An excavator large enough to reach this depth would not be able to access the backyard via the side yard. Large setbacks would be required, resulting in only being able to excavate 40% of the front yard. Shoring and setbacks required not feasible.	$150 MM to $243 MM	Not as compliant with Resolution 92-49, because the same level of protectiveness is achieved as Alt 4B, but at much higher cost.	Very significant social impact due to utility disruption, truck traffic, long remedy implementation time. Excavation and soil import would take several days because of additional soil, shoring, and utility work. 214 properties would be affected by excavation and by SVE/bioventing.	Low sustainability. More excavation would roughly triple the impacts listed for Alt 4B.

[1] Note: State Acceptance and Community Acceptance will be evaluated after public comment on the FS and RAP.

TABLE 6-10
Detailed Evaluation of Remedial Alternatives

Alternative		Detailed Evaluation Criteria1									
		Overall Protection of Human Health and the Environment	**Compliance with ARARs**	**Long-term Effectiveness and Permanence**	**Reduction of Toxicity, Mobility, and Volume Through Treatment**	**Short-Term Effectiveness**	**Implementability**	**Cost Estimate**	**Consistency with Resolution 92-49**	**Social Considerations**	**Sustainability**
Excavate Beneath Residential Landscape; SVE / Bioventing; Sub-slab Mitigation; LNAPL Recovery; Groundwater Monitored Natural Attenuation and Treatment; Existing Institutional Controls.	**Alt 5B Excavate To 3 Feet**	Moderately protective. It is less than 4B because hardscape could be removed and contact with impacted soils possible. Planned excavation would mitigate incidental contact with impacted soils. SSD would mitigate potential for vapor intrusion. Institutional controls, SVE/bioventing, LNAPL removal, groundwater MNA and supplemental groundwater treatment as needed would be protective.	High degree of compliance. ARARs are met through remedial action.	Moderately effective and permanent in the long term. Hardscape could be removed and contact with impacted soils possible.	High degree of reduction of toxicity, mobility and volume through treatment technologies listed above.	Short-term effectiveness is relatively high through careful planning and execution. Potential for community and worker exposure during excavation would be mitigated. SVE and SSD would be effective in the short-term.	Implementability is relatively high because utility lines are likely to be below this depth, and this alternative relies on existing institutional controls. Permission from property owners must be granted to implement remedy.	$51MM to $83 MM	Not as compliant with Resolution 92-49, because a lesser level of protectiveness is achieved compared with Alt 4B.	Relatively low-to-moderate social impact. Landscape would be temporarily removed. Neighborhoods would be impacted by traffic, noise, dust, and odors. Would likely be able to complete excavation and soil replacement within a day for each property. 183 properties would be affected.	Moderate-to-high sustainability. Excavation equipment and truck emissions would affect air quality. The disposal of contaminated soil would occupy landfill space, and could be a future issue.
	Alt 5C Excavate To 5 Feet	Moderately protective, less than 4C. Planned excavation would prevent most contact with impacted soils. SSD would mitigate potential for vapor intrusion. Institutional controls, SVE/bioventing, LNAPL removal, groundwater MNA and supplemental groundwater treatment as needed would be protective.	High degree of compliance. ARARs are met through remedial action.	Moderately effective and permanent in the long term. Hardscape could be removed and contact with impacted soils possible.	High degree of reduction of toxicity, mobility and volume through treatment technologies listed above.	Short-term effectiveness is moderate. While SVE/bioventing and SSD would be as effective as in Alt 4B, there would be more disruption of site features and community and worker exposure.	Implementability is moderate because utilities would be encountered during excavation. Utility lines would have to be removed and replaced, or manually excavated around. Permission from property owners must be granted to implement remedy.	$67MM to $109 MM	Not as compliant with Resolution 92-49, because a lesser level of protectiveness is achieved compared with Alt 4B.	Moderate-to-significant social impact due to potential utility service disruption, truck traffic, and remedy implementation time. Excavation and soil replacement would take multiple days because of additional soil, shoring, and work with utilities. 183 properties would be affected.	Low-to-moderate sustainability. More excavation would increase the impacts listed for Alt 5B.
	Alt 5D Excavate To 10 Feet	Moderately protective, less than 4D. Planned excavation would prevent contact with impacted soils for uses other than extensive construction. SSD would mitigate potential for vapor intrusion. Institutional controls, SVE/bioventing, LNAPL removal, groundwater MNA and supplemental groundwater treatment as needed would be protective..	If it could be implemented it would have a high degree of compliance. ARARs are met through remedial action.	Moderately effective and permanent in the long term. Hardscape could be removed and contact with impacted soils possible.	High degree of reduction of toxicity, mobility and volume through treatment technologies listed above.	Short-term effectiveness is very low. While SVE/bioventing and SSD would be as effective as in Alt 4B, there would be much more of disruption of site features, exposures to community, and higher worker exposures due to longer excavation periods and more properties being affected.	Not implementable because an excavator large enough to reach this depth would not be able to access the backyard via the side yard. Shoring and setbacks required not feasible.	$106MM to $172 MM	Not as compliant with Resolution 92-49, because a lesser level of protectiveness is achieved compared with Alt 4B.	Very significant level of social impact due to utility service disruption, truck traffic, and long remedy implementation time. Excavation and soil replacement would take several days because of additional soil, shoring, and work with utilities. 219 properties would be affected. .	Low sustainability. More excavation would roughly triple the impacts listed for Alt 5B.

[1] Note: State Acceptance and Community Acceptance will be evaluated after public comment on the FS and RAP.

TABLE 6-10
Detailed Evaluation of Remedial Alternatives

Alternative	Detailed Evaluation Criteria1									
	Overall Protection of Human Health and the Environment	**Compliance with ARARs**	**Long-term Effectiveness and Permanence**	**Reduction of Toxicity, Mobility, and Volume Through Treatment**	**Short-Term Effectiveness**	**Implementability**	**Cost Estimate**	**Consistency with Resolution 92-49**	**Social Considerations**	**Sustainability**
Alt 7 Cap Site	Moderate-to-highly protective. Combination of capping the Site, institutional controls, SVE/bioventing, LNAPL removal, groundwater MNA and supplemental groundwater treatment as needed would be protective.	High degree of compliance. ARARs are met through remedial action.	Highly effective and permanent in the long term.	Moderate-to-high degree of reduction of toxicity, mobility and volume through treatment technologies listed above.	Short-term effectiveness is relatively high, due to only moderate disruption and exposure to community and worker exposure.	Implementability is moderate because excavation is expected to be minimal, so utility lines would not be encountered. Additional permits and institutional controls would be required to prevent residents from contacting impacted soil.	$41 MM to $66 MM	Not as compliant with Resolution 92-49, because of modified land use. Current land use could not accommodate normal residential landscape.	Significant social impact because of the removal and cover of landscape. May affect long-term property values. Would likely be able to complete installation of cap within a day for each property. 183 properties would be affected.	Moderate-to-high sustainability. Relatively little use of trucks, excavators or landfill space. Capping may affect stormwater quality, and groundwater recharge would be reduced.

[1] Note: State Acceptance and Community Acceptance will be evaluated after public comment on the FS and RAP.

TABLE 7-1
Comparative Evaluation of Remedial Alternatives

Alternative		Detailed Evaluation Criteria[1]										
		Overall Protection of Human Health and the Environment	**Compliance with ARARs**	**Long-term Effectiveness and Permanence**	**Reduction of Toxicity, Mobility, and Volume Through Treatment**	**Short-Term Effectiveness**	**Implementability**	**Cost**	**Consistency with Resolution 92-49**	**Social Considerations**	**Sustainability**	**OVERALL SCORE**
Alternative 1 No Action		Does not meet threshold requirement.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Alternative 4: Excavate Beneath Residential Landscape and Hardscape; SVE / Bioventing; Sub-slab Mitigation; LNAPL Recovery; Monitored Natural Attenuation and Groundwater Treatment; Existing Institutional Controls.	**Alt 4B Excavate To 3 Feet**	Meets threshold requirement.	Complies with ARARs.	High: 5	High: 5	High: 5	High: 4	$63 million to $103 million – Moderate-to-High Cost: 2	High: Fully compliant: 5	Low-Moderate Impact: 4	Moderate: 3	**33**
	Alt 4C Excavate To 5 Feet	Meets threshold requirement.	Complies with ARARs.	High: 5	High: 5	Moderate: 3	Moderate: 3	$83 million to $135 million – High Cost: 1	Moderate-to-High: Less compliant: 4	Moderate-Significant Impact: 2	Low-to-Moderate: 2	**25**
	Alt 4D Excavate To 10 Feet	Meets threshold requirement.	Complies with ARARs.	High: 5	High: 5	Very low: 1	Not Implementable: 0	$150 million to $243 million – Very High Cost: 1	Moderate-to-High: Less compliant: 4	Very Significant Impact: 1	Low: 1	**Not Implementable**
Alternative 5: Excavate Beneath Residential Landscape; SVE / Bioventing; Sub-slab Mitigation; LNAPL Recovery; Monitored Natural Attenuation and Groundwater Treatment; Existing Institutional Controls.	**Alt 5B Excavate To 3 Feet**	Meets threshold requirement.	Complies with ARARs.	Moderate: 3	High: 5	High: 5	High: 4	$51 million to $83 million – Moderate Cost: 3	Moderate-to-High: Less compliant: 4	Low-Moderate Impact: 4	Moderate-to-High: 4	**32**
	Alt 5C Excavate To 5 Feet	Meets threshold requirement.	Complies with ARARs.	Moderate: 3	High: 5	Moderate: 3	Moderate: 3	$67 million to $109 million – Moderate Cost: 3	Moderate-to-High: Less compliant: 4	Moderate-Significant Impact: 2	Low-to-Moderate: 2	**25**
	Alt 5D Excavate To 10 Feet	Meets threshold requirement.	Complies with ARARs.	Moderate: 3	High: 5	Very Low: 1	Not Implementable: 0	$106 million to $172 million : High Cost: 1	Moderate-to-High: Less compliant: 4	Very Significant Impact: 1	Low: 1	**Not Implementable**
Alternative 7 Cap Site		Meets threshold requirement.	Complies with ARARs.	High: 5	Moderate-to-High: 4	High: 5	Moderate: 3	$41 million to $66 million – Moderate Cost: 3	Moderate-to-High: Less compliant: 4	Significant Impact: 1	Moderate-High: 4	**29**

[1] Note: State Acceptance and Community Acceptance will be evaluated after public comment on the RAP.

FIGURES

EXPLANATION

APPROXIMATE PROPERTY LINE

Source: URS Corporation

N

0 80 160

SCALE IN FEET

FORMER KAST PROPERTY
Site Location Map

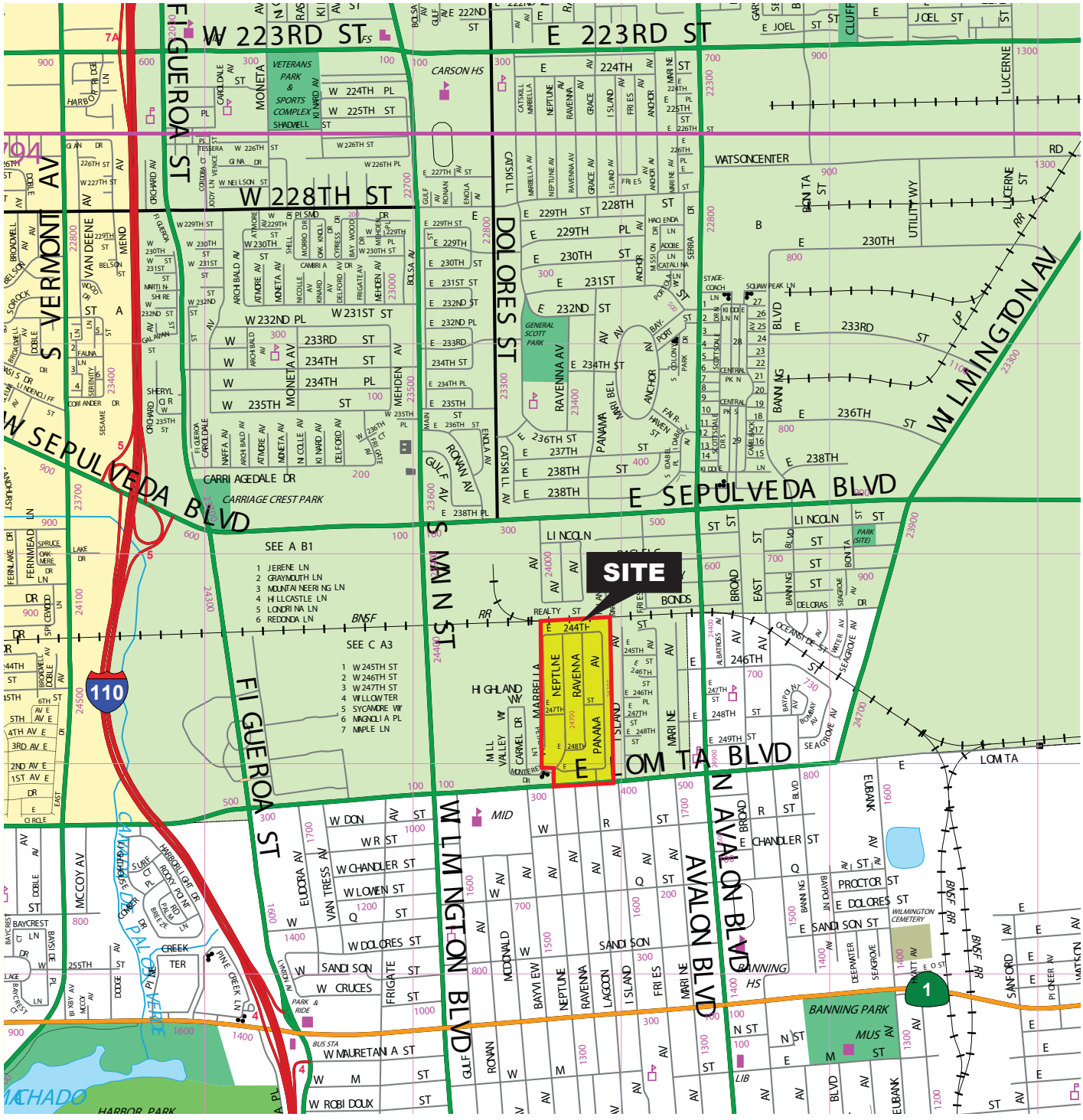
CARSON, CA,

Geosyntec consultants

FIGURE 2-1

PROJECT NO: SB0484 | FEBRUARY 2014

S:\GIS\SB0484\PDF\Figure 2-1_Site Location Map.pdf



FORMER KAST PROPERTY
Site Vicinity Map

CARSON, CA

Geosyntec consultants

FIGURE 2-2

PROJECT NO: SB0484

FEBRUARY 2014

N

E 244TH ST

E 247TH ST

E 247TH ST

E 248TH ST

E 249TH ST

NEPTUNE AVE

RAVENNA AVE

PANAMA AVE

ISLAND AVE

MARBELLA AVE

PETALUMA LN

CARMEL DR

HLAND WAY

MONTEREY DR

NEPTUNE AVE

VE

Legend

- < HHRA or Soil Leaching to GW Criteria
- > Soil Leaching to GW Criteria
- > HHRA Criteria
- > HHRA and Soil Leaching to GW Criteria
- No Data Available
- Antimony, Arsenic, or Thallium > Background

Notes:
ft bgs = feet below ground surface

150 75 0 150 Feet

Properties Exceeding Human Health and/or Leaching to Groundwater Criteria, ≤ 5 Feet Below Ground Surface

Former Kast Property

Geosyntec consultants

Santa Barbara

March 2014

Figure 3-1

P:\GIS\Kast\Projects\2014-03 FS\Fig3-1 Soil_Lte5ft Kast Residential.mxd 20140309

N

E 244TH ST

E 247TH ST

E 247TH ST

E 248TH ST

E 249TH ST

NEPTUNE AVE

RAVENNA AVE

PANAMA AVE

ISLAND AVE

MARBELLA AVE

PETALUMA LN

CARMEL DR

HLAND WAY

MONTEREY DR

NEPTUNE AVE

150 75 0 150 Feet

Legend

- < HHRA or Soil Leaching to GW Criteria
- > Soil Leaching to GW Criteria
- > HHRA Criteria
- > HHRA and Soil Leaching to GW Criteria
- No Data Available
- Antimony, Arsenic, or Thallium > Background

Notes:
ft bgs = feet below ground surface

Properties Exceeding Human Health and/or Leaching to Groundwater Criteria, > 5 Feet and ≤ 10 Feet Below Ground Surface

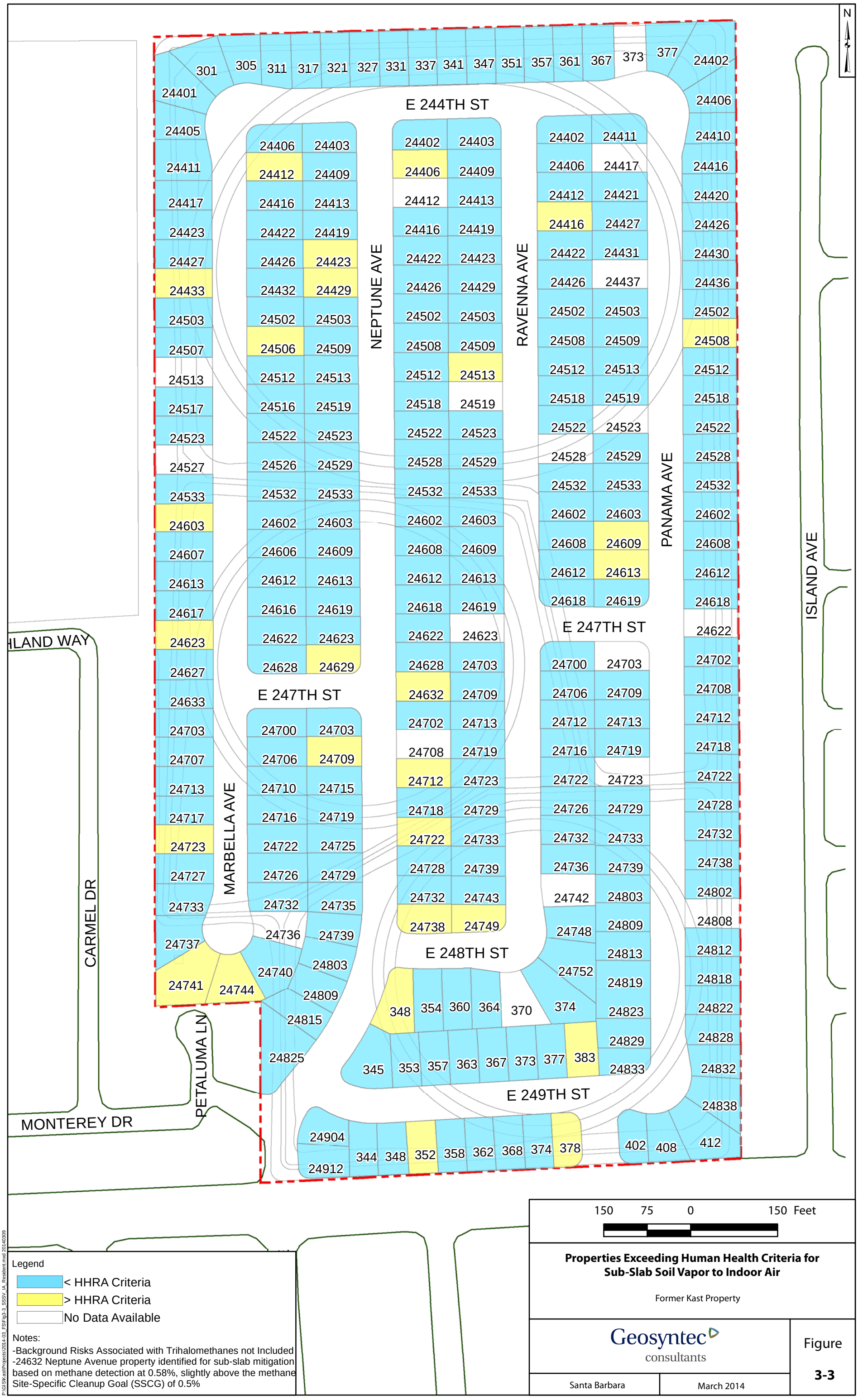
Former Kast Property

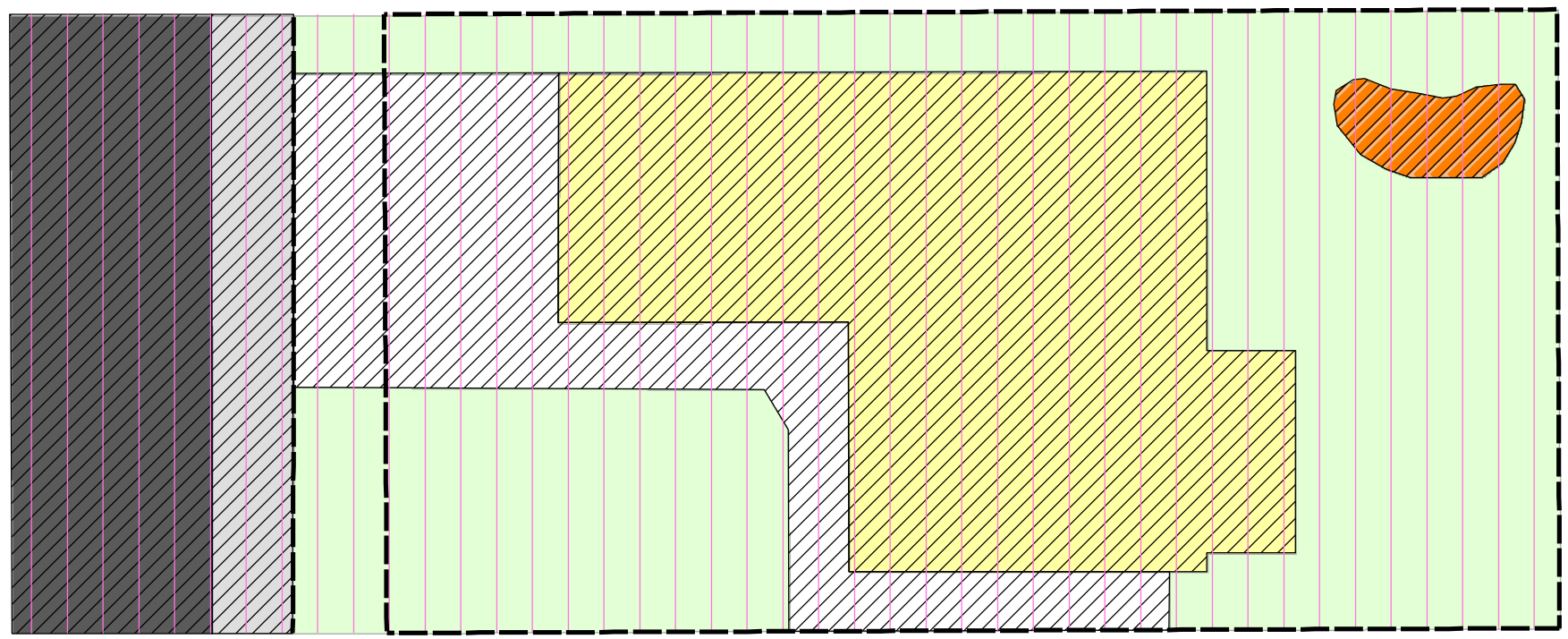
Geosyntec consultants

Santa Barbara | March 2014

Figure 3-2

P:\GIS\Kast\Projects\2014-03 FS\Fig3-2 Soil_5to10ft Kast Residential.mxd 20140309


N
E 244TH ST
NEPTUNE AVE
RAVENNA AVE
PANAMA AVE
ISLAND AVE
E 247TH ST
MARBELLA AVE
E 248TH ST
E 249TH ST
CARMEL DR
PETALUMA LN
MONTEREY DR
HLAND WAY
Legend
< HHRA Criteria
> HHRA Criteria
No Data Available
Notes:
-Background Risks Associated with Trihalomethanes not Included
-24632 Neptune Avenue property identified for sub-slab mitigation based on methane detection at 0.58%, slightly above the methane Site-Specific Cleanup Goal (SSCG) of 0.5%
150 75 0 150 Feet
Properties Exceeding Human Health Criteria for Sub-Slab Soil Vapor to Indoor Air
Former Kast Property
Geosyntec consultants
Santa Barbara
March 2014
Figure
3-3
P:\GIS\Kast\Projects\2014-03_FS\Fig3-3_SSSV_IA_Resident.mxd 20140309



Legend:

- Property Line
- Excavate impacted soils
- Remove all site features
- LNAPL Removal, as feasible
- Road
- Sidewalk
- Driveway/Conc.Walk
- Residence
- Landscaping
- LNAPL

Additional Technologies
1) Existing Institutional Controls
2) Groundwater hot-spot removal and MNA

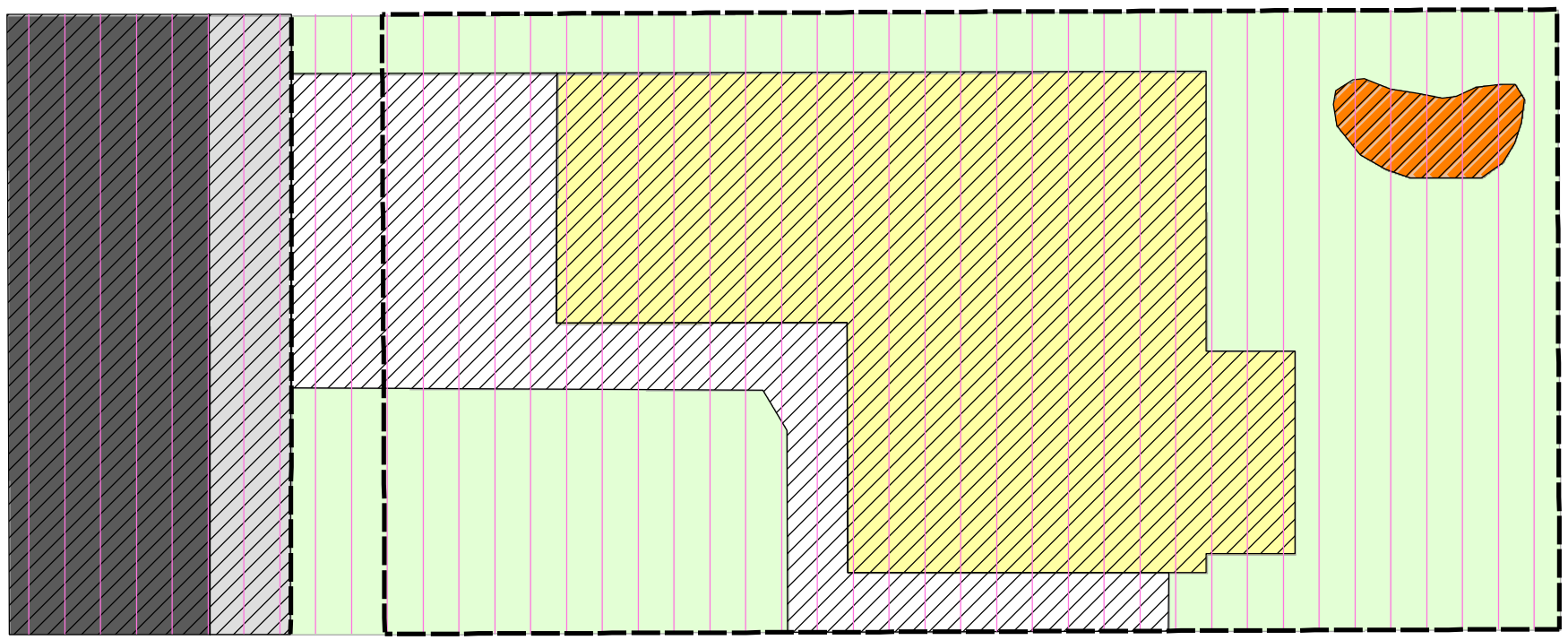
Alternative 2
KAST
Carson, CA

Geosyntec consultants

Project No: SB0484 | February 2014

Figure **5-1**

S:\GIS\SB0484\Projects\20140227\Alternative2.mxd cc 2/27/2014



Legend:

- Property Line
- Excavate to 10 ft.
- Remove all site features
- LNAPL Removal, as feasible
- Road
- Sidewalk
- Driveway/Conc.Walk
- Residence
- Landscaping
- LNAPL

Additional Technologies
1) Existing Institutional Controls
2) Groundwater hot-spot removal and MNA
3) SVE/bioventing

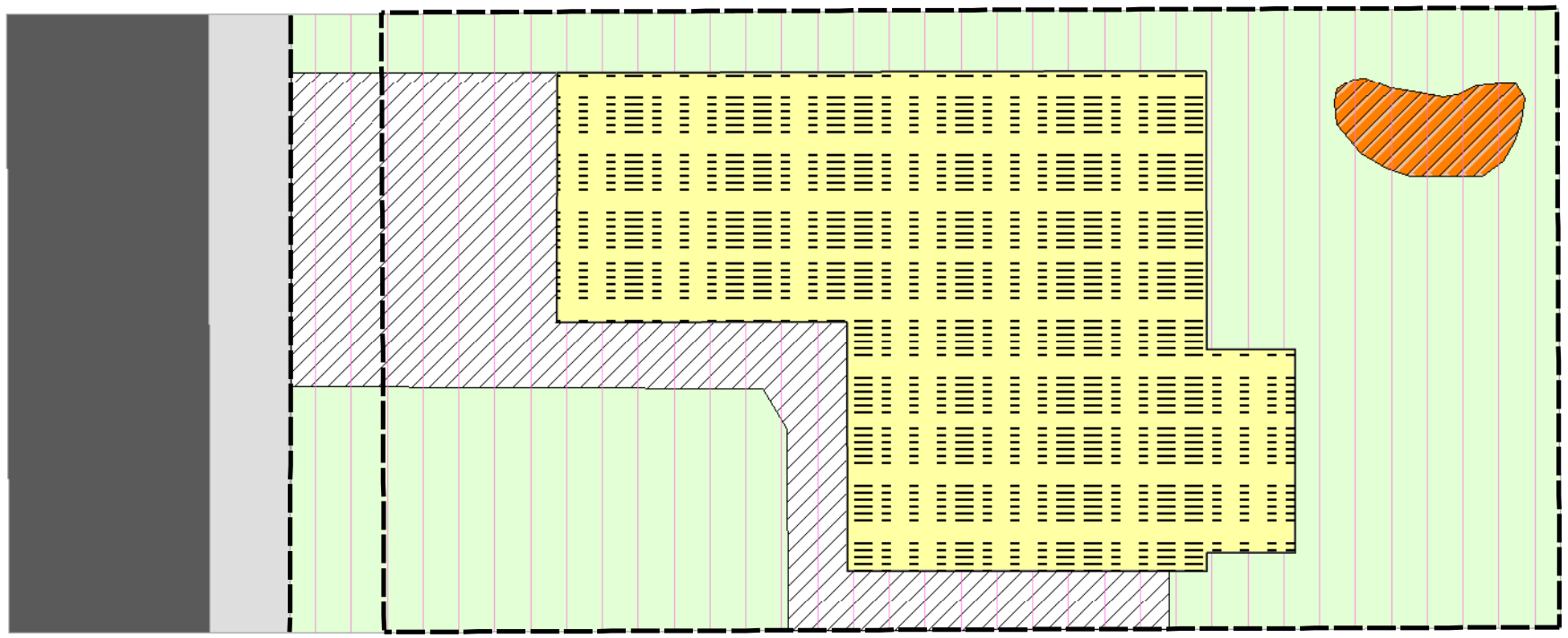
Alternative 3
KAST
Carson, CA

Geosyntec consultants

Project No: SB0484 | February 2014

Figure **5-2**

S:\GIS\SB0484\Projects\20140227\Alternative3.mxd cc 2/27/2014



Legend:

- Property Line
- Sub Slab Mitigation
- Excavate exposed soils to:
  - Alternative 4A = 2 Ft.
  - Alternative 4B = 3 Ft.
  - Alternative 4C = 5 Ft.
  - Alternative 4D = 10 Ft.
- Remove residential hardscape
- LNAPL Removal, as feasible
- Road
- Sidewalk
- Driveway/Conc.Walk
- Residence
- Landscaping
- LNAPL

Additional Technologies
1) Existing Institutional Controls
2) Groundwater hot-spot removal and MNA
3) SVE/bioventing

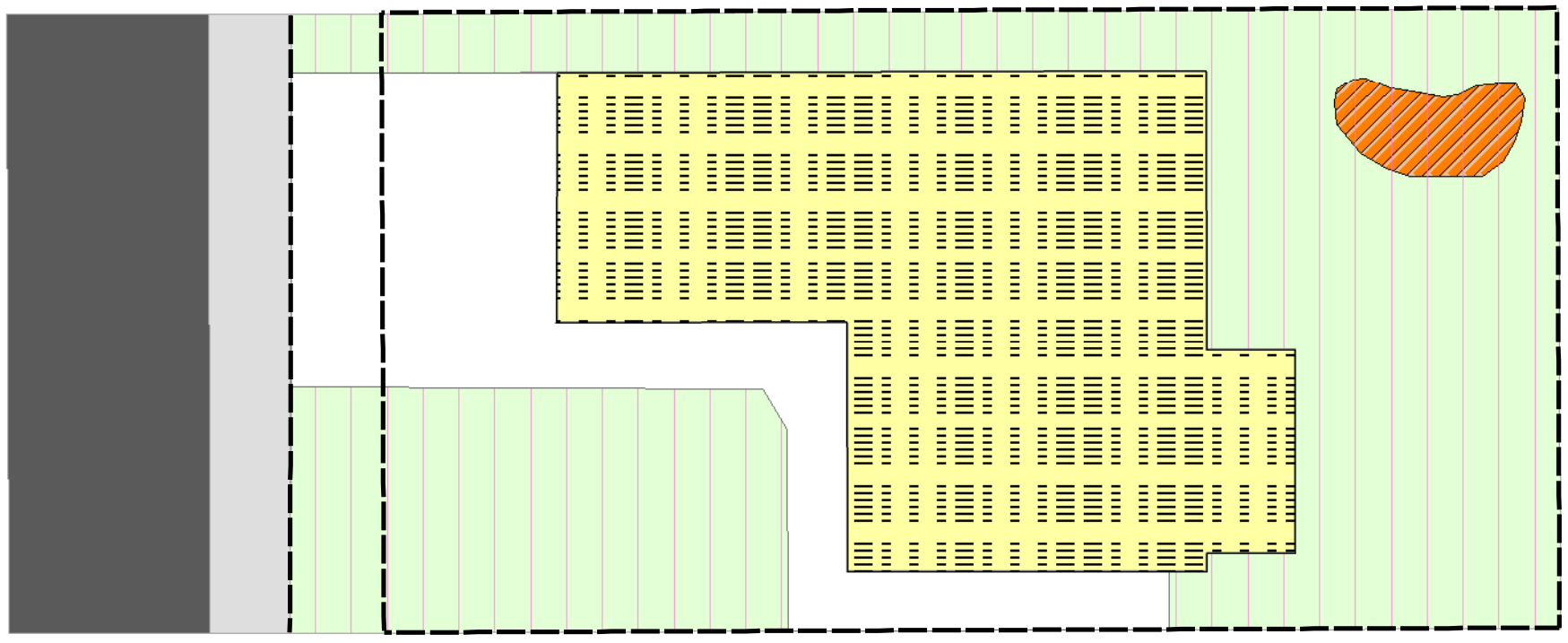
Alternative 4
KAST
Carson, CA

Geosyntec consultants

Project No: SB0484 | February 2014

Figure **5-3**

S:\GIS\SB0484\Projects\20140227\Alternative4.mxd cc 2/27/2014



Legend:

- Property Line
- Sub Slab Mitigation
- Excavate exposed soils to:
  - Alternative 4A = 2 Ft.
  - Alternative 4B = 3 Ft.
  - Alternative 4C = 5 Ft.
  - Alternative 4D = 10 Ft.
- LNAPL Removal, as feasible
- Road
- Sidewalk
- Driveway/Conc.Walk
- Residence
- Landscaping
- LNAPL

Additional Technologies
1) Existing Institutional Controls
2) Groundwater hot-spot removal and MNA
3) SVE/bioventing

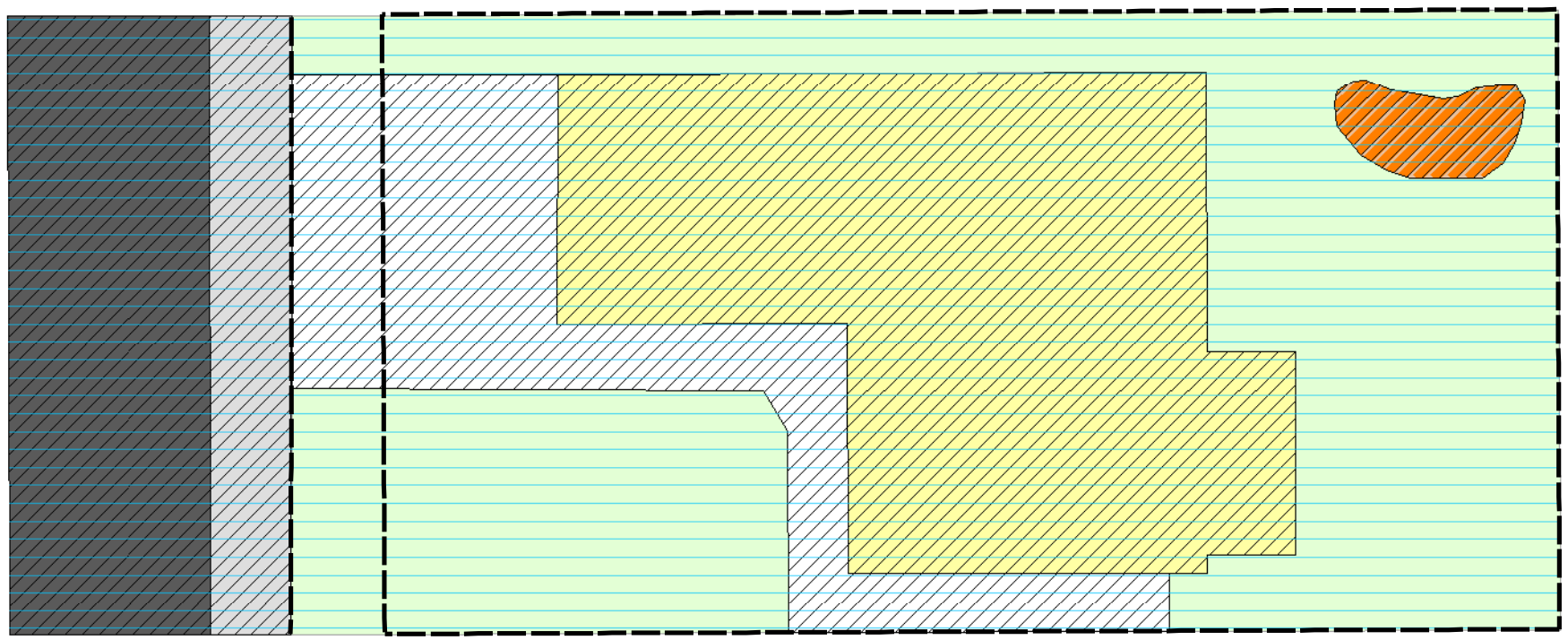
Alternative 5
KAST
Carson, CA

Geosyntec consultants

Project No: SB0484 | February 2014

Figure **5-4**

S:\GIS\SB0484\Projects\20140227\Alternatives5.mxd cc 2/27/2014



Legend:

- Property Line
- Cap whole site
- Remove all site features
- LNAPL Removal, as feasible
- Road
- Sidewalk
- Driveway/Conc.Walk
- Residence
- Landscaping
- LNAPL

Additional Technologies
1) Existing Institutional Controls
2) Groundwater hot-spot removal and MNA
3) SVE/bioventing

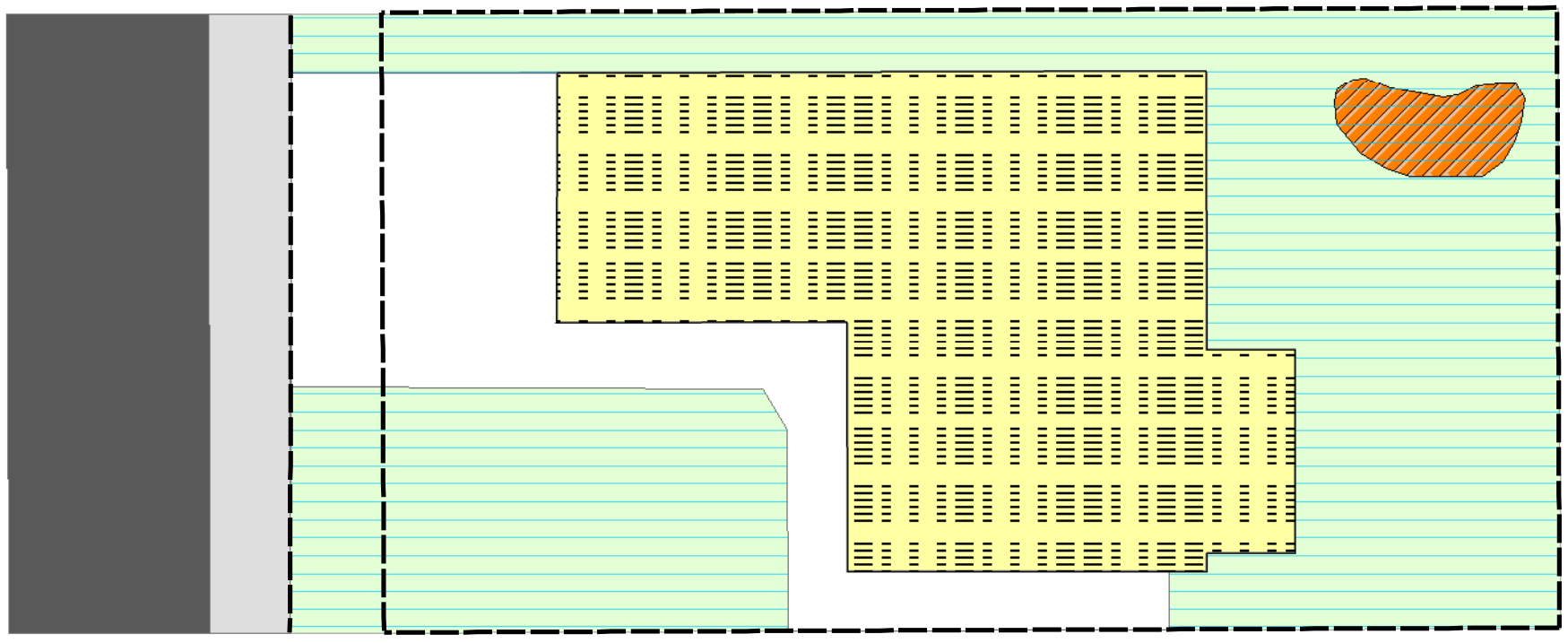
Alternative 6
KAST
Carson, CA

Geosyntec consultants

Project No: SB0484 | February 2014

Figure **5-5**

S:\GIS\SB0484\Projects\20140227\Alternative6.mxd cc 2/27/2014



Legend:

- Property Line
- Sub Slab Mitigation
- Cap exposed soils
- LNAPL Removal, as feasible
- Road
- Sidewalk
- Driveway/Conc.Walk
- Residence
- Landscaping
- LNAPL

Additional Technologies
1) Existing Institutional Controls
2) Groundwater hot-spot removal and MNA
3) SVE/bioventing

Alternative 7

KAST
Carson, CA

Geosyntec consultants

Project No: SB0484 | February 2014

Figure **5-6**

S:\GIS\SB0484\Projects\20140227\Alternative7.mxd cc 2/27/2014

EXHIBIT 10

Prepared for:

Shell Oil Products US
20945 S. Wilmington Avenue
Carson, CA 90810

Human Health Risk Assessment Report

Former Kast Property
Carson, California

Prepared by:

Geosyntec consultants

engineers | scientists | innovators

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Project Number: SB0484-04-03

March 10, 2014

HUMAN HEALTH RISK ASSESSMENT REPORT

Former Kast Property
Carson, California

Prepared for:

Shell Oil Products US

Prepared by:

Geosyntec Consultants, Inc.

Mark Grivetti, P.G., CHG
Principal Hydrogeologist

Ruth Custance
Principal

Robert Ettinger
Principal

Cathy Villaroman
Senior Toxicologist

Geosyntec
consultants

CERTIFICATION

HUMAN HEALTH RISK ASSESSMENT REPORT

FORMER KAST PROPERTY

CARSON, CALIFORNIA

I am the Senior Project Manager for Equilon Enterprises LLC doing business as Shell Oil Products US for this project. I am informed and believe that the matters stated in the Human Health Risk Assessment Report dated March 10, 2014 are true, and on that ground I declare, under penalty of perjury in accordance with Water Code section 13267, that the statements contained therein are true and correct.

_____

Doug Weimer
Senior Principal Program Manager
Shell Oil Products US
March 10, 2014

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LIST OF ACRONYMS

95UCL	95 Percent Upper Confidence Limit of the Average Concentration
AF_{leach}	Soil-Leaching-To-Groundwater Attenuation Factor
BaP-eq	Benzo(a)pyrene Equivalent
BF	Bioattenuation Factor
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BTV	Background Threshold Value
Cal-EPA	California Environmental Protection Agency
CHHSL	California Human Health Screening Level
COC	Constituents of Concern
cPAHs	Carcinogenic PAHs
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DTSC	Department of Toxic Substances Control
EC	Exposure Concentration
EF	Exposure Factor
EPC	Exposure Point Concentration
FS	Feasibility Study
ft bgs	Feet Blew Ground Surface
HHRA	Human Health Risk Assessment
HHSRE	Human Health Screening Risk Evaluation
HI	Hazard Index
IF	Intake Factor
ILCR	Incremental Lifetime Cancer Risk
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk Factor
MCL	Maximum Contaminant Level
NL	Notification Level
OEHHA	Cal-EPA Office of Environmental Health Hazard Assessment
PAH	Polycyclic Aromatic Hydrocarbon
PCE	Tetrachloroethene
PEF	Particulate Emission Factor
PM10	Particulate Matter Less than 10 Micrometers in Diameter
PRG	Preliminary Remedial Goal
RAP	Remedial Action Plan
RBSL	Risk-Based Screening Level

REL	Reference Exposure Level
RfC	Inhalation Reference Concentration
RfD	Reference Doses
RSL	Regional Screening Level
SSCG	Site-Specific Cleanup Goal
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethene
TEF	Toxicity Equivalency Factor
THM	Trihalomethane Compounds
TPH	Total Petroleum Hydrocarbon
TPHd	TPH Diesel Range
TPHg	TPH Gasoline Range
TPHmo	TPH Motor Oil Range
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit
VF	Volatilization Factor
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Geosyntec Consultants, Inc. (Geosyntec) has prepared this human health risk assessment (HHRA) for the Former Kast Property (Site) in Carson, California on behalf of Equilon Enterprises LLC, doing business as Shell Oil Products US (SOPUS), for Shell Oil Company ("Shell"). This HHRA is submitted as directed by the Regional Water Quality Control Board (Regional Board or RWQCB) in their letter dated January 23, 2014. The HHRA is submitted concurrently with, and to provide a basis for, the Feasibility Study (FS) and the Remedial Action Plan (RAP). The FS and RAP are being submitted to the RWQCB under separate cover.

The Regional Board also directed Shell to use RWQCB-revised SSCGs in preparing the RAP and HHRA. The HHRA includes proposed modifications to certain soil SSCGs for potential leaching to groundwater based on the Regional Board's 1996 *Interim Site Assessment & Cleanup* Guidebook [RWQCB, 1996]. The directed and modified SSCGs are presented in this HHRA and support unrestricted residential land use for the Site.

Geosyntec conducted this HHRA to estimate potential human health risks associated with constituents of concern (COCs) detected in soil, sub-slab soil vapor, and soil vapor at the Site. The objective of this HHRA is to evaluate potential human health impacts to onsite residents and onsite construction and utility maintenance workers. In addition, potential leaching of COCs from soil to underlying groundwater is evaluated. The findings of this HHRA are used as a basis for remedy evaluation in the FS, and remedial action planning as presented in the RAP.

A Site location map is provided as **Figure 1**. The Site is a former oil storage facility that was sold by Shell Oil Company to a developer who redeveloped the Site into the Carousel subdivision containing 285 single family houses (**Figure 2**). Based on historical operations, the primary Site COCs are related to crude oil and bunker oil.

1.1 Risk Assessment Approach

The methodology used in this HHRA is consistent with current United States Environmental Protection Agency (USEPA), Los Angeles Regional Water Quality Control Board (RWQCB or Regional Board), and California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) guidance (USEPA, 1989; 1991a; 2002ab; 2009; 2013ab; RWQCB, 1996; Cal-EPA, 2011ab;

2013a) including the withdrawn *Interim Guidance on Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH)* (Cal-EPA, 2009)[1]. The HHRA is a predictive tool used to assess the potential human health risks associated with releases of Site-related chemicals. This information will be used in the remedial decision-making process to determine if further action is warranted.

This HHRA consists of the following major components, which are summarized briefly as follows:

- *Data Evaluation and Selection of COCs*: COCs at the Site (defined as potentially hazardous chemicals associated with the Site that are present at concentrations higher than background levels) were identified by reviewing environmental sampling data collected in soil, sub-slab soil vapor, and soil vapor samples.
- *Identification of Potentially Exposed Populations and Exposure Pathways:* Potentially relevant populations that could be exposed to Site-related COCs based on the current and likely future land use was identified. For each land use scenario, the magnitude, frequency and duration of the exposures, and the pathways by which humans could potentially be exposed to Site-related constituents were evaluated. The exposure scenarios are summarized in the Conceptual Site Model (CSM), which includes the sources, affected media, release mechanisms, and exposure pathways for each identified receptor population.
- *Fate and Transport Modeling:* Current agency-approved fate and transport models were used to estimate the movement of COCs from soil to outdoor air, soil vapor to outdoor air, as well as from sub-slab soil vapor into indoor air. Regulatory guidance such as USEPA's Soil Screening Guidance (USEPA, 2002a) was used to estimate COC migration from soil and soil vapor to outdoor air.
- *Toxicity Assessment:* The relationship between the magnitude of exposure and potential adverse health effects (dose-response assessment) is presented for each COC. Toxicity criteria for each COC were identified and used to estimate the likelihood of adverse effects which potentially could occur at different exposure levels.

[1] Note that the Cal-EPA *Interim Guidance on Evaluating Human Health Risks from Total Petroleum Hydrocarbons (TPH)* is no longer active; however, information provided in this document has now been incorporated into the Preliminary Endangerment Assessment Manual (Cal-EPA, 2013a).

- *Site-Specific Cleanup Goals (SSCGs):* Results of the exposure and toxicity assessments were analyzed and combined to develop risk-based SSCGs for each COC and for each of the exposure scenarios, as well as SSCGs for potential migration to groundwater through leaching. SSCGs based on local and regional background have also been developed for the Site. The SSCGs presented are primarily from the Revised Site-specific Cleanup Level report (Revised SSCG Report) incorporating modifications to address agency comments on the Revised SSCG Report received in January 2014. For SSCGs related to soil leaching to groundwater modifications from the January 23, 2014 letter from the Regional Board on the Revised SSCG Report were made to be consistent with the Regional Board's 1996 Interim Site Assessment & Cleanup Guidebook [RWQCB, 1996].
- *Risk Characterization:* Comparison of the SSCGs to the detected soil, sub-slab soil vapor, and soil vapor concentrations was conducted to estimate the cumulative health risks to defined populations (residents and construction and utility maintenance workers) posed by the presence of multiple COCs. In addition comparison of the soil leaching to groundwater SSCGs to the detected concentrations was conducted.
- *Uncertainty Analysis:* The uncertainties associated with each of the previous steps are discussed to assist decision-makers in evaluating the HHRA results in the context of the assumptions and variability in the data used.

This HHRA addresses potential onsite exposures to current residents and construction and utility maintenance workers. Potential exposures to COCs detected in shallow soils have been evaluated for the direct contact pathways, as well as inhalation of volatile COCs in outdoor air and nonvolatile COCs in fugitive dust. Additionally, the potential for volatile COCs to migrate from the subsurface (using sub-slab soil vapor data) into residential structures present above ground was evaluated for a resident. Potential exposures to COCs in soil vapor were also evaluated for inhalation of vapors in outdoor air. And lastly, potential COCs in soil leaching to groundwater was evaluated.

The following subsections provide a summary of the Site background information and a summary of the risk assessment objectives and approach.

1.2 Site Background Information

The Kast Property is a former petroleum storage facility that was operated by a Shell Oil Company predecessor from the mid-1920s to the mid-1960s. The property was sold to real estate developers who redeveloped it into the Carousel Community residential

housing tract by others in the late 1960s and early 1970's. The Site is located in the City of Carson in the area inclusive of Marbella Avenue on the west and Panama Avenue on the east and E. 244th Street on the north to E. 249th Street to the south (**Figure 1**). The Site is bordered by the Los Angeles County Metropolitan Transportation Authority (MTA) railroad tracks to the north (formerly owned by the BNSF Railway Company), Lomita Boulevard to the south, residential properties of the Monterey Pines Community and industrial property of the former Turco Products Facility to the west, and residential properties to the east (**Figure 2**).

Detailed Site background information, including information on historical Site operations, onsite structures formerly present, Site demolition, and development was provided in the Plume Delineation Report (URS, 2010) and the Site Conceptual Model (SCM, Geosyntec, 2010), included as Appendix A to the Plume Delineation Report. The Site was undeveloped until 1923 when Shell Company of California purchased the 44-acre property from Mary Kast and constructed three oil storage reservoirs on the Site. Two of the reservoirs (the central and southern Reservoirs No. 5 and 6) had capacities of 750,000 barrels each, and the third reservoir (northern Reservoir No. 7) had a capacity of 2 million barrels. The reservoirs were partially in-ground and partially aboveground and with earthen berms constructed using soils excavated from the below-ground portions of the reservoirs. The reservoirs had wire-mesh reinforced concrete-lined floors and side walls, and were covered with wood frame roofs supported by wooden posts on concrete pedestals (URS, 2010). The outer berms were 15 to 20 feet above surrounding grade, and the outer walls of the berms are believed to have been covered with asphalt. The oil storage reservoirs were primarily used to store crude oil. Historical records cited in the Plume Delineation Report (URS, 2010) indicate that bunker oil or heavier intermediate refinery streams may also have been stored in the reservoirs at one time, but the time and quantity of bunker oil storage is unknown. The reservoirs were not used to store refined finished hydrocarbon products.

Site use remained as an active oil storage facility until the 1950s, when the Site was kept on a standby reserve basis. In October of 1965, Shell Oil Company entered into a Purchase Option Agreement to sell the Site, with the oil storage reservoirs intact, to Richard Barclay or his nominee. Richard Barclay was a principal in Barclay Hollander Curci, later renamed Barclay Hollander Corporation (BHC), and Lomita Development Company (Lomita Development). Lomita Development was subsequently merged into BHC. BHC is now a wholly-owned subsidiary of Dole Food Company, Inc. (Dole).

In December 1965, Richard Barclay designated Lomita Development Company as his nominee for purchase of the Site. The property was evaluated for BHC and Lomita Development by Pacific Soils Engineering, which performed soil borings and

developed engineering studies and grading plans for the Site. In 1966, BHC and its contractors conducted these studies, removed the remaining residual oil and water from the reservoirs, demolished the reservoirs and graded the Site. Lomita Development's request to rezone the Site from industrial to residential was approved by Los Angeles County in October 1966, and in the same month, title was transferred to Lomita Development under the Purchase Option Agreement. Construction of homes began in 1967 and was apparently completed by the early 1970s. The Site has remained residential since that time. More detailed information on the Site background is included in Appendix A (Geosyntec, 2010) of the Plume Delineation Report (URS, 2010).

1.3 Environmental Setting, Geology, and Hydrogeology

The Site consists of approximately 44 acres occupied by 285 single-family residential properties and City streets collectively referred to as the Carousel Tract. It is located within the West Coast Basin of the Los Angeles Coastal Plain, approximately 3 miles northwest of Long Beach Harbor. The Site is relatively flat, with a gradual slope to the northwest. The elevation across the Site ranges from approximately 30 to 40 feet above mean sea level (msl). The Site is not located within a 100- or a 500-year Federal Emergency Management Agency (FEMA) designated flood zone (URS, 2008). Historically, the Site area has been an oil production area, and active oil production wells are still present to the west and northwest of the Site. Due to historical oil production, the area directly south of the Site across Lomita Boulevard is designated as within the City of Los Angeles methane mitigation zone.

Geologically, the Basin consists of a very thick sequence of unconsolidated marine and continental sediments overlying consolidated sedimentary rocks that range in age from a few thousand years to tens of million years. Based on Site investigations, the upper 10 feet of soil beneath the Site generally is dominantly fine grained and consists of silt with layers or lenses of silty fine sand. Soils between 10 and 15 feet below ground surface (ft bgs) consist primarily of silt and silty fine sand. From 15 to 85 ft bgs Site soils consist of fine sands to silty fine sand. Soils encountered between 85 and approximately 180 ft bgs consist of silt, silty sand, and fine to medium sand.

Shallowest groundwater encountered beneath the Site occurs within the Bellflower aquitard, an overall fine-grained unit that locally has sandy intervals. First groundwater occurs at a depth of approximately 53 ft beneath the Site, with a groundwater flow direction to the northeast (URS, 2014).

The Gage aquifer occurs beneath the Bellflower aquitard and extends from approximately 90 to 170 ft bgs. Groundwater flow direction in the Gage aquifer is to the east-northeast. The Lynwood aquifer, also known as the "400-foot Gravel," and the deeper Silverado aquifer are located below the Gage aquifer and may be merged in the Site vicinity (CDWR, 1961). The Lynwood aquifer is dominated by coarse sand and gravel in the Site vicinity (Equilon, 2001). These two aquifers extend from approximately 200 ft bgs to at least 550 ft bgs in the Site vicinity. The Lynwood and Silverado aquifers are major sources of groundwater for municipal drinking water wells in the Los Angeles Basin (Equilon, 2001). However, neither the Gage aquifer, nor the shallow Bellflower aquitard (in which the first regional unconfined groundwater was encountered at the Site) is a known source for drinking water in the Site area.

The nearest drinking water well, CWS Well 275, is located 435 ft west of the western Site boundary, upgradient of the Site and downgradient of the Former Fletcher Oil Refinery. CWS Well 275 produces water from the Lynwood and Silverado aquifers which are below 200 ft bgs in this area. Drinking water is supplied to the Carousel neighborhood and surrounding communities by California Water Services Company (Cal-Water), which regularly tests the drinking water to ensure that it meets state and federal drinking water standards.

2.0 DATA EVALUATION AND SELECTION OF CONSTITUENTS OF CONCERN

An initial step in the HHRA process is an evaluation of available data to identify media-specific COCs. A variety of samples have been collected as a part of the Site investigation process. Detected compounds include inorganics, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals. These compounds, if they were detected in at least one sample in a given media (soil or soil vapor), were included in the COC selection process. A toxicity-concentration screen was then used to focus the list of COCs to those chemicals that have the potential to contribute significantly to potential risk at the Site, as discussed in Section 2.2 below. The COCs evaluated in the HHRA are consistent with the COCs presented in the Revised SSCG Report with the addition of toluene and xylenes as requested by the Regional Board in their letter dated January 23, 2014 (RWQCB, 2014).

2.1 Data Evaluation

A variety of samples have been collected in previous Site investigations. Each sample collected may have been analyzed for a number of different chemicals. Data collected through January 2014 have been evaluated to determine which of the chemicals identified are likely to be Site-related and to assess whether the reported concentrations for these chemicals are of acceptable quality for use in this HHRA.

The data evaluation is consistent with guidance provided by USEPA in *Risk Assessment Guidance for Superfund* (1989) and *Guidance for Data Usability in Risk Assessments* (1992). The evaluation included:

- Evaluating the appropriateness of the analytical methods employed during the various site investigations in relation to the types of industrial processes and potential COCs;
- Evaluating the quality of data with respect to sample quantification and detection limits;
- Examining laboratory qualifiers assigned to monitoring data and evaluating potential quality assurance/quality control problems; and
- Evaluating field duplicate samples.

The analytical data were reviewed with respect to any potential qualifiers, but none were found that would impact the HHRA significantly. A few samples that were

rejected due to validation were not included in the risk assessment database. In addition, soil samples that have been removed through excavation were not included.

Field duplicates are collected to evaluate the quality of sample collection as well as sample analysis. Field duplicate samples are usually two samples collected simultaneously from the same sampling location and are used as measures of either the homogeneity of the medium sampled in a particular location or the precision in the sampling and sample handling (in transport and/or in the laboratory).

For cases where a field duplicate sample result is present for the same chemical in a sample, a single representative concentration for the sample was selected as follows:

1) If there had been a detection in both samples the higher concentration was selected;
2) If there had been a detection in one sample but not the other, the detected concentration was selected; and
3) If both samples had been nondetects, the lowest method detection limit was selected and appropriate techniques for handling nondetect data were applied in calculating statistics later in the data evaluation.

2.2 Selection of Constituents of Concern

USEPA risk assessment guidance presents a methodology for identifying which detected chemicals should be included in a quantitative HHRA. These are defined by USEPA (1989) as chemicals potentially related to the site whose data are of sufficient quality for use in a quantitative HHRA. USEPA guidance states that the list of chemicals should include all chemicals that were:

1) Positively detected in at least one sample;
2) Detected above levels of the same chemicals found in associated blank samples;
3) Tentatively identified but may be associated with the Site based on historical information;
4) Transformation products of detected chemicals; and
5) Detected above naturally occurring levels (background).

All data determined to be of sufficient quality were carried forward into the COC selection process described below.

Analytical results for soil samples collected between 0 and 10 ft bgs were used to screen for soil COCs consistent with the depth interval specified in the Cleanup and Abatement Order issued by the Regional Board. This soil interval was evaluated based on the assumption that 10 ft would be the likely maximum depth of disturbance for Site use and maintenance activities, and is therefore the maximum depth of soil to which residents or construction and utility maintenance workers could be directly exposed. Analytical results for sub-slab soil vapor and soil vapor samples collected at the Site were used to screen for soil vapor COCs.

COC screening was conducted using risk-based screening levels (RBSLs) that were calculated assuming potential residential exposures to COCs in soil and soil vapor as part of the human health screening risk evaluation (HHSRE) process (Geosyntec, 2009, 2010a, 2011). The RBSLs represent chemical-specific concentrations in the relevant environmental media that would be consistent with a target risk level for the current land use under conservative (i.e., protective) exposure conditions. For soil vapor, the screening levels were developed to address potential sub-slab soil vapor migration to indoor air. This is the most sensitive land-use and conservative for construction and maintenance worker exposures.

An additional screening criterion for soil was if the chemical was detected in five or less samples collected from across the Site it was excluded from the SSCG derivation. Due to the large number of soil samples collected (over 10,000) this equates to less than or equal to 0.05 percent of soil samples.

In the first step of COC selection, a list of detected chemicals in each media was identified. The prevalence and range of concentrations of all chemicals that were detected at least once in soil, soil vapor, and groundwater across the Site are presented in **Tables 1 through 3**, respectively.

To identify COCs for each media, the maximum concentration for that media was compared to one-tenth of its respective RBSL. One-tenth of the RBSL was used as a conservative approach to screen chemicals for further analysis and to address potential cumulative effects. If the maximum concentration was greater than one-tenth of the RBSL it was selected as a COC for the Site. In addition to the RBSL screen, the COC screening process for metals and carcinogenic PAHs (cPAHs as benzo(a)pyrene equivalents) included a comparison to Site background, with only those compounds exceeding background being selected as COCs (see Section 2.3 below).

COC screening for chemicals detected in soil is presented in **Table 4**, while COC screening for sub-slab soil vapor and soil vapor are presented in **Table 5**. The COCs

that have been identified for soil, sub-slab soil vapor, and soil vapor to be carried forward into the HHRA are summarized in **Table 6**.

For the selection of soil COCs to address the leaching to groundwater pathway, chemicals that were detected in groundwater above their respective maximum contaminant level (MCL) or notification level (NL) were carried forward into the HHRA. Based on the site conceptual model (SCM) presented in Section 2 of the Revised SSCG report (Geosyntec, 2013) and the age of potential petroleum releases at the Site, groundwater impacts from leaching from Site soils are not expected to change appreciably. As a result, the inclusion of chemicals that have been detected above MCLs and NLs is considered appropriate for COC selection. For TPH constituents, no MCL or NL is available but, given their prevalence in Site soils, they were included as COCs in the evaluation of leaching to groundwater. The Site-related and non-Site-related COCs listed below were evaluated in this HHRA for potential leaching to groundwater.

Site-related Soil COCs for Leaching to Groundwater Evaluation:

- Arsenic
- Benzene
- Naphthalene
- TPH as Diesel
- TPH as Gasoline
- TPH as Motor Oil

Non-Site-related Soil COCs for Leaching to Groundwater Evaluation:

- 1,2-Dichloroethane
- cis-1,2-Dichloroethene
- 1,2,3-Trichloropropane
- 1,4-Dichlorobenzene
- Antimony
- Thallium
- Tert-Butyl Alcohol
- Tetrachloroethene
- Trichloroethene
- Vinyl Chloride

2.3 Background Metals and PAH Evaluation

Metals may be associated with petroleum hydrocarbons, but are also naturally occurring in the environment. According to the DTSC (Cal-EPA DTSC 1997, 2009a, 2009c, 2009d, 2011b) for naturally occurring materials such as metals, an evaluation of background concentrations is important to evaluate whether the metals concentrations at the Site are consistent with naturally occurring levels in the area, and whether they should be included in the HHRA. If concentrations of a metal are within background, the metal is not considered a COC and is not evaluated further.

In addition to metals, cPAHs can also be naturally occurring or present at ambient levels not associated with former Site activities. A background dataset and methodology has been developed by DTSC that can be used to evaluate the presence of cPAHs in soil as benzo(a)pyrene equivalents (Cal-EPA DTSC, 2009c). Soil samples collected from the Site were analyzed by USEPA Method 8270 and USEPA Method 8270SIM and include the carcinogenic PAHs (cPAHs) that are commonly considered in the benzo(a)pyrene equivalents calculation as presented in the Cal-EPA DTSC background PAH methodology document (Cal-EPA DTSC, 2009c), as well as other PAHs that are considered carcinogenic (e.g. naphthalene).

Benzo(a)pyrene equivalent (BaP-eq) concentrations were calculated for the Site data using a toxicity equivalency factor (TEF) approach. TEFs are based on shared characteristics that can be used to rank the class of chemicals by carcinogenic potency. The ranking procedure is accomplished by referencing the chemicals to the characteristics and potency of benzo(a)pyrene, which is often used as the reference chemical for expressing the carcinogenic potency of the other cPAHs. Therefore, the cPAHs are indexed to benzo(a)pyrene to generate their TEFs. The TEFs are listed below for the seven cPAHs based on Cal-EPA guidance (Cal-EPA, 2009c):

cPAHs	TEFs
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1.0
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenzo(a,h)anthracene	0.34
Indeno(1,2,3-cd)pyrene	0.1

BaP-eq concentrations were calculated following methods recommended by Cal-EPA (*Use of the Northern and Southern California Polynuclear Aromatic Hydrocarbon (PAH) Studies in the Manufactured Gas Plant Site Cleanup Process.* Cal-EPA DTSC, 2009c). To calculate a BaP-eq concentration for each sample, the TEFs were multiplied by the concentrations of the individual cPAHs and then the seven adjusted concentrations were added together. BaP-eq concentrations were calculated using the detected concentration for the individual cPAHs, or half the detection limit if an individual cPAH was not detected in the sample. These BaP-eq concentrations were used to determine background for the cPAHs detected at the Site and specifically for

each property. Consistent with agency-approved risk assessment practice in California, the DTSC-developed background concentration of 0.9 mg/kg BaP-eq was used to evaluate cPAHs results. Additional details regarding calculation of BaP-eq concentrations are provided in **Appendix A** (Revised Soil Background Evaluation Report).

For each metal, an Upper Tolerance Limit (UTL) has been developed as a Background Threshold Value (BTV) based on local background (**Appendix A**). These values are used with upper-bound Site concentration estimates to determine if a metal is above background and should be considered further. For arsenic, the DTSC background concentration of 12 mg/kg for southern California sites (Cal-EPA DTSC, 2007) and a more detailed statistical evaluation were used for this Site as presented in **Appendix A**.

These BTVs for metals and cPAHs described above were developed for the Site consistent with USEPA and Cal-EPA methodologies using local and regional background datasets. These BTVs are single-point background thresholds that represent an upper limit of the background distributions of individual compounds (USEPA, 2010; Helsel, 2005) and are commonly used to evaluate site data and to determine if site concentrations are above background. The BTVs are presented in **Table 4**. In addition to the BTVs, Site data can be evaluated using guidance from Cal-EPA (Cal-EPA, 1997) to determine if Site concentrations are consistent with background.

Due to the preponderance of Site data (over 10,000 samples and 265 individual study areas), a streamlined approach was developed to evaluate background at the Site. First, as a part of the COC screening process discussed above, Site-wide maximum concentrations were compared to the BTVs to evaluate whether onsite metal or cPAH concentrations are above background concentrations. In addition, concentrations were compared to the conservative risk-based screening levels. Second, for chemicals that are present at concentrations above the BTV or conservative risk-based screening level, a one-sample proportion test was conducted on a property-specific basis to compare the Site data with the BTVs. This is consistent with agency guidance that states that when BTVs and cleanup standards are known, one-sample hypotheses are used to compare site data with the known and pre-established threshold values (USEPA, 2010). Finally a detailed background analysis based on the methodology described in Appendix A was conducted for antimony, arsenic, and thallium on the properties that were assessed to be above background using the BTV comparison test and the one-sample proportion test. These metals were specifically selected for a detailed evaluation due to their presence in the soil depth interval of >5 to $\leq$10 ft bgs, where the potential for leaching to

groundwater is considered. The purpose of the more detailed evaluation was to confirm if these metals are indeed considered above background.

The maximum concentrations detected at the Site for antimony, arsenic, cadmium, cobalt, copper, lead, thallium, vanadium, zinc, and benzo(a)pyrene exceeded one-tenth of their respective RBSL, as well as exceeded their BTV (**Table 4**). Therefore, additional background analysis of the property-specific data for these compounds was conducted using a one-sample proportion test. Further details are presented in **Appendix A**). The results of the one-sample proportion test indicated that cadmium, cobalt, copper, vanadium, and zinc concentrations at the Site are within background. Additional analysis was conducted on property-specific data for antimony, arsenic, and thallium as mentioned above. The results of the property-specific evaluation (detailed in **Appendix A**), indicate that five properties have arsenic concentrations above background, one property for antinomy, four for thallium, and six properties for BaP-eq. Therefore, these compounds were evaluated further in the HHRA.

3.0 EXPOSURE ASSESSMENT

The objectives of an exposure assessment are to identify populations that may potentially be exposed to chemicals in environmental media, the exposure pathways, and the route of potential intake. In addition, for pathways considered complete, the chemical concentrations to which the individuals are potentially exposed (exposure point concentrations, EPCs) and the frequency, magnitude, and duration of these potential exposures (exposure parameters) need to be estimated.

A complete exposure pathway requires a source and mechanism of chemical release, a point of potential human contact within the impacted medium, and an exposure route (e.g., ingestion) at the contact point. These source-pathway-receptor relationships provide the basis for the quantitative exposure assessment. Potentially complete source-pathway-receptor relationships included in this HHRA are depicted in the Conceptual Site Model (CSM) discussed below.

The end product of the exposure assessment is a measure of chemical intake or exposure concentration factor (EC, for inhalation exposures) that integrates the exposure parameters for the receptors of concern (e.g., contact rates, exposure frequency, and duration) with the EPCs for the media of concern.

3.1 Conceptual Site Model

The CSM identifies potential chemical sources, release mechanisms, transport media, routes of chemical migration through the environment, exposure media, and potential exposure populations. The CSM incorporates the current and the anticipated future use of a site; therefore, potential populations that may currently or in the future be exposed to Site-related chemicals are identified in the CSM and evaluated in a HHRA.

A general CSM was constructed for this HHRA based on a review of the available Site information regarding the environmental setting and COC distribution in environmental media. The CSM, presented in **Figure 3**, represents the current understanding of the sources of COCs, the means by which they may be released and transported within and among media, and the exposure pathways and routes by which they may contact human receptors. The major components of the CSM are discussed below.

3.1.1 Chemical Characteristics and Potential Exposure Pathways

Potential exposure to COCs detected in soil, sub-slab soil vapor, and soil vapor at the Site is partly dependent on the type of chemicals that are present and the respective exposure media. For VOCs detected in soil, exposure may occur via direct contact to

soil (dermal contact or incidental ingestion) as well as indirect exposure from vapors migrating from the subsurface into indoor or outdoor air. For non-volatile chemicals such as metals and most SVOCs and PAHs, direct human contact exposures should be considered, as well as inhalation of particulates.

An outdoor air background study was conducted that included upwind, downwind, and onsite sampling during four separate 24-hour events between July 31 and September 17, 2010 (Geosyntec and URS, 2010). The outdoor air samples were collected at four locations west of the Site boundary, four locations east of the Site boundary, and four locations within the interior of the Site for each of the four separate events. The data collected were used to assess whether outdoor air contaminant concentrations within the Site boundary are statistically similar to upwind and downwind locations. Based on the statistical evaluation, all tests show that there is no evidence that the Site or downwind concentrations are different from the upwind concentrations.

While the groundwater beneath the Site is not currently used for drinking water (nor will be in the foreseeable future due to the level of Total Dissolved Solids), COCs in Site soils may migrate to groundwater through leaching and should to be addressed consistent with the Basin Plan, State Board Resolution No. 68-16 (if applicable), and State Board Resolution No. 92-49. Therefore this pathway has been evaluated in the HHRA.

For the COCs related to crude oil, PAHs, and BTEX, results of prior investigations suggests that the soil-root-above ground plant or fruit pathway plays an insignificant role in their uptake. For PAHs, a number of studies suggest that air deposition is the major pathway for plant uptake of PAHs (Edwards, 1983; Nakajima et al., 1995; Kipopoulou et al., 1999; Wilcke, 2000; Li et al., 2010). Li et al. (2010) investigated PAH distribution in water, sediment, soil, and plants, and no correlation was found between PAH concentrations in soils and plants, suggesting that plants accumulate PAHs mainly through air deposition and not through translocation from the soil to the plant. Kaliszova et al. (2010) summarizes that "plant root PAH uptake was observed in some species, but the available data suggest that it does not represent a significant public health risk, even in heavily polluted soils." In addition, green plants may naturally produce benzo(a)pyrene (New Zealand Ministry for the Environment, 2011). For BTEX, either rapid degradation in the root-zone or volatilization to the atmosphere would occur, preventing effective uptake by plant roots. Volatile contaminants have a low potential to accumulate by root uptake because they quickly escape to air (Trapp and Legind, 2011). Consistent with the literature, Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA) does not require evaluation of the soil to root uptake pathway for organic compounds (Cal-EPA OEHHA, 2012). In addition, the

California Human Health Screening Levels (CHHSLs) which are derived by OEHHA based on an unrestricted land use do not include the produce ingestion pathway. Since COC uptake from soil into plants for the primary COCs is considered insignificant, this pathway was not included in this HHRA.

Potential exposure to COCs is also dependent on the locations at which impacts are identified and the likelihood of different populations to contact an impacted media. For example, reasonable maximum exposure assumptions are considered for soils which are readily available for human contact. Conversely, infrequent exposures may be considered for soils where limited contact is expected (e.g., soils covered by impermeable media such as a building foundation, driveway, or hardscape, or soils at greater depths). Consequently, this HHRA evaluates potential exposures to surface soil (≤ 2 ft bgs), shallow surface soil (≤ 5 ft bgs), shallow soil (≤ 10 ft bgs), and subsurface soil (> 5 to ≤ 10 ft bgs) (considering frequent- and infrequent-exposure scenarios), as well as potential leaching to groundwater. Additionally, the residential exposure scenario is assumed to be limited to the residential properties, while construction and utility maintenance worker may be exposed to impacts present on residential properties or within the public rights of way (e.g., utility work within streets).

3.1.2 Identification of Potentially Exposed Populations and Exposure Pathways

Potential exposures to soil may occur via dermal contact, incidental ingestion, and/or outdoor air inhalation of fugitive dust/vapors. Potential exposures to sub-slab soil vapor may occur via indoor air inhalation of vapors migrating from the subsurface into residential structures. Additionally, potential exposures to soil vapor may occur via inhalation of vapors migrating from the subsurface into outdoor air. The receptors and exposure pathways selected for evaluation in this HHRA were based on these considerations and are discussed in detail below.

3.1.2.1 Onsite Resident

An onsite residential scenario was evaluated in this HHRA assuming frequent and infrequent exposure assumptions. Surface soil (≤ 2 ft bgs) and shallow surface soils (≤ 5 ft bgs) are considered for typical residential exposures whereas subsurface soils (> 5 to ≤ 10 ft bgs) are considered for infrequent contact, because the likelihood of a resident contacting soils at deeper depths is extremely low given the developed nature of the Site and typical residential activities where exposure to soil could occur (e.g., recreational activities, lawn care, landscaping). Typical lawn care and gardening would occur in the surface soil horizon (e.g. (≤ 2 ft bgs). USEPA in the Soil Screening Level Guidance (USEPA 2002b) and in the Superfund Lead-Contaminated Residential Site Handbook

(2003) consider the soil horizon of ≤ 2 ft bgs to be the depth interval where direct contact and gardening activates could occur. Therefore, the surface soil (≤ 2 ft bgs) depth interval was evaluated to represent the depth interval a resident could contact on a more frequent basis using the Cal-EPA and USEPA default exposure frequency (EF) of 350 days per year. In addition, to assist in remedial planning shallow surface soils (≤ 5 ft bgs) were evaluated for onsite residents using the same exposure frequency consistent with the Regional Board directive.

The potential does exist for deeper soils to be contacted (e.g., if a sizable tree is planted), but this would not occur on a regular basis for a given property. The unlikely, infrequent exposure to subsurface soils (> 5 to ≤ 10 ft bgs) was evaluated for onsite residents assuming a lower frequency of exposure of 4 days per year. The exposure frequency of 4 days per year is based on $1/10^{th}$ of the USEPA recommended event frequency of 40 events per year for an adult resident gardening outdoors on a more routine basis (USEPA, 1997). Since the value of 40 days per year is based on routine gardening, an adjustment was considered reasonable to account for infrequent contact to with soils > 5 ft bgs to account for instances where a resident may contact deeper soil (e.g., planting a tree as part of gardening). In addition, it is unlikely that residents would contact soils unearthed from a deeper excavation (such as during a major renovation or utility repair work) as these soils could not be placed onsite due to the developed nature of the neighborhood and lack of open area to place the excavated soils. The conceptual model for this assumption includes institutional controls (e.g., a soil management plan including a notification requirement with the existing excavation permitting process) to prevent redistribution of deep soils at the surface.

As discussed in Section 3.1.1, evidence from the literature suggests that for the chemicals related to crude oil, PAHs, and BTEX, which are primary COCs for the Site, uptake from soil into plants and fruit does not play a significant role. Based on this information, this exposure scenario was not considered further in this HHRA. Rather, the pathways that have the most exposure potential, incidental soil ingestion and dermal contact, were evaluated in this HHRA along with particulate and VOC exposure in outdoor air.

Indoor air inhalation of vapors emanating from sub-slab soil vapor was also evaluated for onsite residents as this is the most sensitive pathway for potential residential exposures to soil vapor. Therefore, evaluating the vapor intrusion to indoor air pathway is considered to also be protective of potential outdoor air exposures. As discussed earlier, the community outdoor air sampling program demonstrated air concentrations within the Site boundary are not significantly different from concentrations from areas to the east (generally downwind) and west (generally upwind) of the Site.

Consequently, soil vapor to outdoor air screening levels were not developed for the soil vapor to outdoor air pathway for residential exposures.

It should be noted that the analysis of the vapor intrusion pathway presented in the Revised SSCG report indicated that vapor intrusion is not a significant pathway at this Site and that observed concentrations in indoor air are likely due to background sources. However, as directed by the Regional Board the vapor intrusion pathway has been quantitatively evaluated in the HHRA using the Regional Board recommended vapor intrusion attenuation factor value of 0.002.

3.1.2.2 Construction and Utility Maintenance Worker

Existing utilities that supply the residential properties with water, communications, and natural gas, and sewer lines are present at the Site. Therefore, a construction and utility maintenance worker may contact soils during repair or maintenance of these utilities both on residential properties as well as in the streets. It is assumed that construction and utility workers may be exposed to COCs in the upper 10 ft of soil where utility maintenance work may be more likely to occur within this depth interval. Potential worker exposures evaluated for soils include direct contact to soils (incidental ingestion and dermal contact) and outdoor air inhalation of volatile chemicals and/or fugitive dust generated by wind erosion and by intrusive soil-handling activities. Outdoor air inhalation of volatile COCs emanating from soil vapor was also evaluated for construction and utility maintenance workers. In addition, because utility workers may need to conduct subsurface utility repair or maintenance, the potential exists for worker exposure within a trench and this exposure scenario was also included.

3.1.2.3 Soil Leaching to Groundwater

As discussed in the Revised SSCG Report (Geosyntec, 2013), some COCs may have migrated through the vadose zone to groundwater. However, based on evaluation of groundwater data collected at and adjacent to the Site, the groundwater plume beneath the Site is well defined and is stable/decreasing. Furthermore, COC values in the downgradient wells near the Site boundary are below or very close to the MCLs and NLs. Based on these facts and the age of the releases of COCs in the vadose zone (>~45 years), it is unlikely that significant additional groundwater impacts will result from the remaining shallow soil contamination. COCs currently present in the vadose zone at the Site, which are also present in Site groundwater, may theoretically represent a continuing source of potential groundwater contamination.

In general, infiltration of water in open areas of the Site has the potential to mobilize COCs present in the vadose zone and continue to transport those COCs to groundwater. This transport is expected to occur at a declining rate through time as the compounds degrade in the vadose zone and they are depleted through leaching. Although the extent of the COCs in groundwater related to the Site is stable/ decreasing, the leaching to groundwater pathway was nevertheless evaluated in this HHRA.

As discussed in Section 2.2 above, chemicals that were detected in groundwater above their respective MCL or NL were identified as COCs. These same groundwater COCs were evaluated for the soil leaching to groundwater pathway with the exception of chemicals that were detected in five or less soil samples out of the over 10,000 samples collected for the Site. The chemicals not evaluated are the non-Site-related COCs 1,1-dichloroethane, 1,1-dichloroethene, and trans-1,2-dichloroethene. The list of COCs evaluated for the leaching to groundwater pathway is presented in Section 2.2.

3.1.3 Exposure Assumptions

The exposure parameters used in this HHRA for onsite residents, as well as for construction and utility maintenance workers, are listed in **Table 7**. These parameters are consistent with those recommended by Cal-EPA and USEPA and include separate child and adult exposure parameters that are used in an integrated child/adult exposure scenario consistent with guidance.

3.2 Summary of Selected Exposure Pathways

Given the characteristics of the COCs and the Site conditions, several exposure pathways have been identified as potentially complete. The CSM (**Figure 3**) presents a summary of the exposure pathways evaluated in this HHRA. The following table summarizes the receptor groups, exposure media, and potential exposure pathways that were evaluated quantitatively in this HHRA.

Receptor	Exposure Medium	Potentially Complete Exposure Pathway
Onsite Resident (Child and Adult)	Surface Soil (≤ 2 ft bgs)	• Incidental Ingestion • Dermal Contact • Outdoor Air Inhalation
	Shallow Surface Soil (≤ 5 ft bgs)	• Incidental Ingestion • Dermal Contact • Outdoor Air Inhalation
	Shallow Subsurface Soil (> 5 to ≤ 10 ft bgs)	• Infrequent Incidental Ingestion • Infrequent Dermal Contact • Infrequent Outdoor Air Inhalation
	Sub-Slab Soil Vapor	• Vapor Inhalation in Indoor Air via Vapor Intrusion
Construction and Utility Maintenance Worker	Shallow Soil (≤ 10 ft bgs)	• Incidental Ingestion • Dermal Contact • Outdoor Air Inhalation
	Soil Vapor	• Vapor Inhalation in Outdoor Air
Groundwater	Shallow Soil (≤ 10 ft bgs)	• Leaching to Groundwater

3.3 Exposure Point Concentrations

Exposure point concentrations (EPCs) are the concentrations of chemicals in environmental media to which receptors may be exposed through defined exposure pathways considered complete in the CSM (**Figure 3**). Depending on the nature of the exposure, the number of samples, and chemical distribution, the maximum detected COC concentrations can be used as EPCs. However, long-term exposure to a single sample point is highly remote (i.e., a resident is unlikely to be exposed only to the maximum concentration of chemicals 350 days per year for 30 years). These calculations may overestimate risk because only a portion of the area investigated may be impacted. A more realistic estimate of the EPC can be calculated by using the 95 percent upper confidence limit (95UCL) of the average concentration for each COC if sufficient data are available (Cal-EPA, 2005a; Cal-EPA, 1996; USEPA, 2002a), for each depth interval, and for each property. Use of 95UCL concentrations as EPCs would provide a more reasonable estimate of potential human health risk.

The 95UCL COC concentrations were derived using soil data collected at each property for the different depth intervals and using USEPA ProUCL statistical software (USEPA, 2010). Data collected from the streets were evaluated separately in a similar manner. The data handling steps for deriving 95UCLs are provided below:

1) The data were segregated by depth interval (e.g., $\leq$ 2 ft bgs);
2) Duplicates were processed as described in Section 2.1; and
3) Data sets with less than eight samples or less than five results above analytical detection limits were excluded from the 95UCL calculation (the maximum detected result was used as the EPC for the cases where there were insufficient data to calculate a 95UCL).

The ProUCL output is provided in **Appendix B**.

3.4 Fate and Transport Modeling

Fate and transport modeling was employed to predict the movement of COCs from impacted soil and soil vapor to points of exposure for human populations. Fate and transport modeling was employed to develop transfer factors for the following transport mechanisms:

- Transport of particulate-phase chemicals from soil matrix to outdoor air;
- Transport of vapor-phase chemicals from soil matrix to outdoor air;
- Transport of vapor-phase chemicals from soil vapor to outdoor air; and
- Transport of vapor-phase chemicals from sub-slab soil vapor to indoor air.

Fate and transport modeling for migration from soil to outdoor air was conducted using the models presented in the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (Soil Screening Guidance) (USEPA, 2002b). Standard equations presented in the Soil Screening Guidance were used, incorporating local meteorological conditions for the Los Angeles area, for derivation of COC-specific volatilization factors (VFs) and the particulate emission factor (PEF). The definitions of the transfer factors for each of the transport mechanisms listed above are presented in **Table 8**. Calculations for the VF and PEF are summarized in **Table 9a** for a resident and in **Table 9b** for a construction and utility maintenance worker, and are discussed below. Additional details regarding these transfer factors were discussed in the HHSRE Work Plan (Geosyntec, 2009; 2010a). Fate and transport modeling for leaching to groundwater is discussed in Section 5.2.

The fate and transport modeling that was used to assess the indirect-exposure pathways and the methodology for calculation of TFs are further discussed below.

3.4.1 Fugitive Dust Emissions into Outdoor Air

COCs at the Site may become airborne due to fugitive dust emissions. Compounds (e.g., SVOCs) can adhere to soil particles then become airborne due to wind erosion, which could generate dust containing COCs. Exposure to these chemicals may then occur via inhalation of airborne fugitive dust. Inhalation exposure to non-volatile compounds is typically minor in fugitive dust when compared to direct ingestion exposure (USEPA, 2002b). Nevertheless, a relationship can be estimated between the COC concentration in soil and the corresponding concentration in air (secondary media) attributable to fugitive dust emissions from soil.

Potential exposure to airborne dust is estimated using a PEF that relates the concentration of soil constituents to the concentration of dust particles in air. The PEF represents an annual average emission rate based on wind erosion. The PEF equation described in the Soil Screening Guidance (USEPA, 2002) was used in this evaluation. The emissions part of the PEF equation is based on the "unlimited reservoir" model developed to estimate PM_{10} emissions (particulate matter less than 10 micrometers in diameter [PM_{10}]) due to wind erosion (Cowherd et al., 1985).

3.4.1.1 Onsite Residential Scenario

For onsite residents, the following equation was used to estimate their PEF:

$$PEF = \frac{(Q/C \times CF)}{[0.036 \times (1 - G) \times \left(\frac{U_M}{U_T}\right)^3 \times F_x]}$$

Where:

PEF	=	particulate emission factor as cubic meters per kilogram (m^3/kg)
Q/C	=	inverse of mean concentration at center of source (g/m^2-s per kg/m^3)
CF	=	units conversion factor (3600 s/hr)
0.036	=	respirable fraction (g/m^2-hr)
G	=	fraction of vegetative or other cover (0.5 unitless; USEPA, 2002b)
U_M	=	mean annual wind speed (3.31 m/s, average for Los Angeles; NCDC, 2011)

U_T = equivalent threshold value of wind speed at 7 meters above ground surface (11.32 m/s; USEPA, 2002b)

F_x = function dependent on U_M/U_T (0.00474 unitless; USEPA, 1996)

The dispersion part of the PEF equation includes a dispersion coefficient (Q/C) in units of grams per square meter-second per kilogram per cubic meter (g/m^2-s per kg/m^3). The Q/C term was generated using the Industrial Source Complex model and varies depending on the source area, city, and climatic zone. This term accounts for the dispersion of particulate matter, once emitted and was estimated using the following equation (USEPA, 2002b):

$$(Q/C) = A \times \exp\left[\frac{(\ln A_{SITE} - B)^2}{C}\right]$$

Where:

A_{SITE} = areal extent of soil impact (0.5 acres)

A = constant = 11.911, based on air dispersion modeling (USEPA, 2002)

B = constant = 18.4385 (USEPA, 2002)

C = constant = 209.7845 (USEPA, 2002)

The coefficients A, B, and C for the Los Angeles area are published in the Soil Screening Guidance (USEPA, 2002b). A Q/C value of 68.18 g/m^2-s per kg/m^3 was estimated as the inverse of the mean concentration at the center of a 0.5-acre source. The resulting PEF for onsite residents was estimated at $1.2\times10^{+11}$ m^3/kg (see **Table 9a**).

3.4.1.2 Construction and Utility Maintenance Worker Scenario

Existing utilities that supply the residential properties with water, communications, and natural gas, and sewer lines are present at the Site. Therefore, a construction and utility maintenance worker may contact soils during repair or maintenance of these utilities both on residential properties as well as in the streets. It is assumed that construction and utility workers may be exposed to COCs in the upper 10 ft of soil. Fugitive dust can also be generated during the use of heavy equipment such as backhoes during utility work in trenches. As a conservative exposure assumption, a dust concentration equal to

1 mg/m^3 or 1×10^{-6} kg/m^3 (Cal-EPA, 2011a)[2] was assumed for the construction and utility maintenance worker. The PEF is related to the concentration of particulate matter (dust) in air:

$$PEF = {}^{1}\!/_{CD}$$

Where:

CD = concentration of dust in air, 1×10^{-6} (kg/m^3) (Cal-EPA, 2011a)

The resulting PEF for the construction and utility maintenance worker is $1\times10^{+6}$ m^3/kg (see **Table 9b**).

3.4.2 Vapor Emissions into Outdoor Air

Because VOCs were detected in soil and soil vapor at the Site, individuals could potentially be exposed to vapors migrating through the soil to the surface. Outdoor vapor concentrations are typically negligible considering the significant quantity of ambient air diluting the vapor emissions. Although this pathway is considered potentially insignificant, outdoor air exposures were evaluated for VOCs detected in soil matrix and soil vapor as discussed below.

3.4.2.1 Onsite Residential Scenario

Soil to Outdoor Air

For onsite residents, potential migration of vapors from shallow soil to outdoor air was estimated using the following VF equation, as presented in Section 4.2.3 of the Soil Screening Guidance (USEPA, 2002b; Equation 4-8: *Derivation of the VF*):

$$VF_{soil} = Q/C \times \left(10^{-4}\ \frac{m^2}{cm^2}\right) \times \frac{\left(3.14 \times D_A \times T_{resident}\right)^{1/2}}{2 \times P_b \times D_A}$$

The equation for the COC-specific apparent diffusivity, D_A, is as follows:

[2] The respirable dust concentration of 1 mg/m^3 is based on a maximum concentration of dust in air of 10 mg/m^3 recommended by the American Conference of Governmental Industrial Hygienists (ACGIH 2004, Threshold Limit Values and Biological Exposure Indices), and the assumption that 10 percent of the mass of particles are in the respirable PM_{10} range.

$$D_A = \frac{\left(\theta_a^{3.33} \times D_{air} \times H' + \theta_w^{3.33} \times D_{water}\right) / \theta_T^{2}}{P_b \times K_d + \theta_w + \theta_a \times H'}$$

Where:

D_{air} = COC-specific diffusivity in air (cm^2/s);
D_{water} = COC-specific diffusivity in water (cm^2/s);
θ_a = air-filled porosity (0.28 cm^3-air/cm^3-soil);
θ_w = water-filled porosity (0.15 cm^3-water/cm^3-soil);
θ_T = total soil porosity (0.43 cm^3-air/cm^3-soil);
H' = COC-specific Henry's law coefficient (unitless);
P_b = soil bulk density (1.5 g/cm^3);
K_{oc} = COC-specific soil organic carbon partition coefficient (cm^3/g); and
f_{oc} = fraction organic carbon in soil (0.006 g/g).

To be consistent with the other calculations presented in this report, the equations presented below were used. The equation for the COC-specific effective diffusion coefficients for vadose-zone soils, D_{eff} (ASTM, 2010) is as follows:

$$D_{eff} = \frac{\left[\theta_a^{3.33} \times D_{air} + \frac{\theta_w^{3.33}}{H'} \times D_{water}\right]}{\theta_T^{2}}$$

Where:

D_{air} = COC-specific diffusivity in air (cm^2/s);
D_{water} = COC-specific diffusivity in water (cm^2/s);
θ_a = air-filled porosity (0.28 cm^3-air/cm^3-soil);
θ_w = water-filled porosity (0.15 cm^3-water/cm^3-soil);
θ_T = total soil porosity (0.43 cm^3-air/cm^3-soil); and
H' = COC-specific Henry's law coefficient (unitless).

The equation for the soil to water partition coefficient, K_{sw} (ASTM, 2010) is as follows:

$$K_{sw} = \frac{\theta_a \times H' + \theta_w + Pb \times K_d}{Pb}$$

Where:

θ_a = air-filled porosity (0.28 cm^3-air/cm^3-soil);

H' = COC-specific Henry's law coefficient (unitless);

θ_w = water-filled porosity (0.15 cm^3-water/cm^3-soil);

Pb = soil bulk density (1.5 g/cm^3); and

K_d = soil-organic carbon distribution coefficient (where K_d = fraction organic carbon [f_{oc}] × organic carbon partition coefficient [K_{oc}]) (cm^3/g).

Substituting the equations for D_{eff} and K_{sw} into the apparent diffusivity D_A equation yields the following:

$$D_A = \frac{D_{eff} \times H'}{K_{sw} \times Pb}$$

Substituting this equation for D_A into the VF_{soil} equation presented above yields the following:

$$VF_{soil} = Q/C \times \left(10^{-4} \frac{m^2}{cm^2}\right) \times \frac{\left(3.14 \times \frac{D_{eff} \times H'}{K_{sw} \times Pb} \times T_{resident}\right)^{1/2}}{2 \times P_b \times \frac{D_{eff} \times H'}{K_{sw} \times Pb}}$$

$$VF_{soil} = Q/C \times \left(10^{-4} \frac{m^2}{cm^2}\right) \times \frac{1}{P_b} \left[\frac{3.14 \times \frac{D_{eff} \times H'}{K_{sw} \times Pb} \times T_{resident}}{4 \times \left(\frac{D_{eff} \times H'}{K_{sw} \times Pb}\right)^2}\right]^{1/2}$$

$$VF_{soil} = Q/C \times \left(10^{-4} \frac{m^2}{cm^2}\right) \times \frac{1}{P_b} \left[\frac{3.14 \times T_{resident}}{4 \times \left(\frac{D_{eff} \times H'}{K_{sw} \times Pb}\right)}\right]^{1/2}$$

$$VF_{soil} = Q/C \times \left(10^{-4} \frac{m^2}{cm^2}\right) \times \left(\frac{1}{P_b}\right) \left(\frac{3.14 \times T_{resident} \times K_{sw} \times P_b}{4 \times D_{eff} \times H'}\right)^{1/2}$$

This final equation was used to estimate the COC-specific VF_{soil} for onsite residential exposures, where:

Q/C	=	inverse of mean concentration at center of source (g/m^2-sec per kg/m^3);
$T_{resident}$	=	exposure interval ($9.5\times10^{+8}$ sec = 30 years);
K_{sw}	=	soil to water partition coefficient, defined above (cm^3-water/g-soil);
Pb	=	dry soil bulk density (1.5 g/cm^3);
D_{eff}	=	COC-specific effective diffusion coefficient for vadose-zone soils, defined above (cm^2/sec); and
H'	=	COC-specific Henry's law coefficient (unitless).

A Q/C value of 68.18 g/m^2-s per kg/m^3 was estimated using the equations presented in Section 3.3.1.1 above. The derivation of COC-specific VF_{soil} for onsite residents is presented in **Table 9a**.

3.4.2.2 Construction and Utility Maintenance Worker Scenario

Soil to Outdoor Air

For the construction and utility maintenance worker scenario, VOC emissions into a utility trench and subsequent mixing in air were estimated using the volatilization factor (VF) for transport of COCs from soil to outdoor air from the ASTM *Standard Guide For Risk-Based Corrective Action* (ASTM, 2010). The soil to outdoor air volatilization factor, $VF_{soil\text{-}OA}$, is the ratio of the outdoor air exposure point concentration ($EPC_{soil\text{-}OA}$) to the soil exposure point concentration (EPC_{soil}):

$$VF_{soil\text{-}OA} = \frac{EPC_{soil}}{EPC_{soil\text{-}OA}}$$

The COC-specific $VF_{soil\text{-}OA}$ for construction and utility maintenance worker exposures was derived using the following equation (ASTM, 2004):

$$VF_{soil\text{-}OA} = \frac{DF_{amb}}{Pb} \times \left[\frac{\left(3.14 \times T_{CUW} \times K_{sw} \times Pb\right)}{\left(4 \times D_{eff} \times H'\right)} \right]^{1/2} \times CF_1 \times CF_2$$

Where:

$VF_{soil\text{-}OA}$ = volatilization factor, surficial soils to outdoor (ambient) air (m^3-

air/kg-soil);

DF_{amb} = dispersion factor for outdoor (ambient) air (cm/s);

Pb = dry soil bulk density (1.5 g/cm^3);

T_{CUW} = averaging time for surface emission vapor flux ($7.9\times10^{+8}$ sec);

K_{sw} = soil to water partition coefficient (cm^3-water/g-soil);

D_{eff} = COC-specific effective diffusion coefficient for vadose-zone soils (cm^2/sec);

H' = COC-specific Henry's law coefficient (unitless);

CF_1 = conversion factor ($1\times10^{+3}$ g/kg); and

CF_2 = conversion factor (1×10^{-6} m^3/cm^3).

The following equation was used to estimate the dispersion factor for outdoor air, DF_{amb}, assuming a trench is 91 centimeters (cm) wide by 457 cm long by 183 cm deep. These dimensions are an estimate of what a typical trench size could be:

$$DF_{amb} = \frac{U_{air} \times W \times H}{A}$$

Where:

U_{air} = outdoor air velocity in mixing zone (cm/s);

W = width of source-zone area (457 cm; assume length of trench = 15 ft);

H = mixing zone height (183 cm; assume depth of trench = 6 ft); and

A = source-zone area (assume 4 sidewalls and bottom area of trench = $2.4\times10^{+5}cm^2$).

The outdoor air velocity in the mixing zone, U_{air}, is estimated using the following equation:

$$U_{air} = \frac{ACH \times W_t}{3600}$$

Where:

ACH = air changes per hour (20 hr^{-1});

W_t = length of shortest side of trench (91 cm; assume width of trench = 3 ft); and

3600 = conversion (1 hour = 3600 seconds).

To develop the air exchange rate, a site-specific computational fluid dynamic (CFD) model was constructed to model air flow within the trench as defined above. CFD models have been used to evaluate air dispersion within urban canyon environments and can provide a more refined evaluation of potential air exchange within a trench. Using the CFD model (Ansys, 2011), air flow was calculated using the geometry of the trench and a conservative (i.e. results in higher trench air concentrations) reference velocity of 1.3 m/s which is the lowest monthly average wind speed reported for Long Beach from the last several years (January 2009 to April 2011) (NCDC, 2011) at a height of 10 m. The CFD model was used to monitor the decrease in concentration of a tracer uniformly distributed in the trench. The model assumed an initial concentration of 1 in the trench and zero within the atmosphere. Convection and diffusion of the tracer out of the trench was evaluated, and the reduction in the concentration in the trench over time was calculated.

The ACH was calculated following the calculation methods presented for the air exchange rate from ASTM (2011):

$$ACH = -\frac{[\ln(Ct_2) - \ln(Ct_1)]}{t_2 - t_1}$$

where:

ACH	=	air exchange rate per hour (hr^{-1});
C_{t2}	=	final tracer concentration at time 2;
Ct_1	=	initial tracer concentration at time 1; and
$t_2 - t_1$	=	time interval of simulation (hr).

An ACH of approximately 20 hr^{-1} was calculated for the trench. Derivation of the COC-specific $VF_{soil\text{-}OA}$ for the construction and utility maintenance worker is presented in **Table 9b**.

Soil Vapor to Outdoor Air

The conceptual exposure scenario for the construction and utility maintenance worker is the same as that considered for the soil to outdoor air scenario – exposure during excavation. The volatilization factor for soil vapor to a trench was calculated using the same relationships as those used for soil, except a soil vapor source term was used. This section details the methodology for deriving the volatilization factor for the soil vapor to outdoor air pathway. The soil vapor to outdoor air $VF_{SV\text{-}OA}$ represents the ratio

of the outdoor air exposure point concentration (EPC_{SV-OA}) to the soil vapor exposure point concentration (EPC_{SV}) presented in the equation below:

$$VF_{SV-OA} = \frac{EPC_{SV}}{EPC_{SV-OA}}$$

Where:

VF_{SV-OA} = soil vapor to outdoor air volatilization factor (mg/m^3 soil vapor per mg/m^3outdoor air);

EPC_{SV-OA} = exposure point concentration of COC in outdoor air from soil vapor (mg/m^3); and

EPC_{SV} = exposure point concentration, soil vapor (mg/m^3).

This section presents the approach used to model vapor migration from the subsurface (using soil vapor data) to outdoor air within a utility trench where workers could potentially be exposed via inhalation. The soil vapor exposure point concentration, EPC_{SV}, was calculated from soil exposure point concentration, EPC_{soil}, using the following partitioning relationship proposed by Feenstra et al. (1991):

$$EPC_{SV} = EPC_{soil} \times \frac{H'}{K_{sw}} \times CF_1 \times CF_2$$

Where:

EPC_{SV} = COC concentration in soil vapor (mg/m^3);

EPC_{soil} = COC concentration in soil (mg/kg);

H' = COC-specific Henry's law coefficient (unitless);

K_{sw} = soil to water partition coefficient, defined above (cm^3-water/g-soil);

CF_1 = conversion factor (1×10^{-3} kg/g); and

CF_2 = conversion factor ($1\times10^{+6}$ cm^3/m^3).

The outdoor air concentrations of vapors from soil for a construction and utility maintenance worker can be estimated using the following relationship:

$$EPC_{OA} = \frac{EPC_{soil}}{VF_{soil-OA}}$$

Where:

EPC_{OA} = COC concentration in outdoor air (mg/m^3) (either from soil or from soil vapor);

EPC_{soil} = COC concentration in soil (mg/kg); and

$VF_{soil\text{-}OA}$ = volatilization factor, surficial soils to outdoor (ambient) air (m^3-air/kg-soil).

Rearranging these two equations results in the following:

$$EPC_{OA} = \frac{EPC_{soil}}{VF_{soil\text{-}OA}} = \frac{EPC_{SV}}{VF_{soil\text{-}OA}} \times \frac{K_{sw}}{H'} \times \left(\frac{1}{CF_1 \times CF_2} \right)$$

This equation was then rearranged to calculate the ratio of $EPC_{SV\text{-}OA}$ and EPC_{SV} and provide the equation for the soil vapor to outdoor air volatilization factor, $VF_{SV\text{-}OA}$, for a construction and utility maintenance worker:

$$VF_{SV\text{-}OA} = \frac{EPC_{SV}}{EPC_{SV\text{-}OA}} = VF_{soil\text{-}OA} \times \frac{H'}{K_{sw}} \times (CF_1 \times CF_2)$$

Where:

$VF_{SV\text{-}OA}$ = soil vapor to outdoor air volatilization factor ($\mu g/m^3$ per $\mu g/m^3$);

$EPC_{SV\text{-}OA}$ = exposure point concentration of COC in outdoor air from soil vapor ($\mu g/m^3$); and

EPC_{SV} = exposure point concentration, soil vapor ($\mu g/m^3$).

Derivation of the COC-specific $VF_{SV\text{-}OA}$ for the construction and utility maintenance worker is presented in **Table 9b**.

3.4.3 Vapor Emissions into Indoor Air

Data collected at the Site indicate significant natural attenuation of VOCs in the vadose zone that mitigates the potential migration of vapors detected in soil vapor samples collected at depth to reach the atmosphere. Based on the multiple-lines-of-evidence evaluation, soil vapor samples collected at depth are not considered in the residential receptor analysis. This approach is consistent with Cal-EPA DTSC vapor intrusion guidance (Cal-EPA DTSC, 2011) which states "In general, the closer the sampled medium is to the receptor, the more relevant the data are for estimating exposure and greater its weight of evidence." Therefore, VOCs detected in sub-slab soil vapor at the

Site were evaluated for onsite residents who could potentially be exposed to indoor air vapors migrating from the subsurface.

To investigate the relationship between indoor air and sub-slab soil vapor concentrations, a single regression analysis method was applied to the Site data as described in Appendix B of the Revised SSCG report (Geosyntec, 2013). This analysis evaluated the relationship between indoor air concentrations and sub-slab soil vapor concentrations for a filtered dataset of sub-slab soil vapor data with concentrations ≥100 $\mu g/m^3$. Based on the analysis, an upper-bound vapor intrusion attenuation factor of 0.001 was identified. However, as directed by the RWQCB (RWQCB, 2014), a vapor intrusion attenuation factor of 0.002 was used to derive sub-slab soil vapor SSCGs.

3.5 Estimating COC Intake

The exposure assessment quantifies the magnitude, frequency, and duration of chemical intake (daily intake) by receptor populations using guidelines in the Risk Assessment Guidance for Superfund (USEPA, 1989), Exposure Factors Handbook (USEPA, 1997), Cal-EPA DTSC guidance (2011a), Site-specific information, and professional judgment, as appropriate. Estimates of exposure or chemical intake were calculated based on assumptions regarding exposure pathways and exposure parameters. The COC intake factor (IF) was estimated for the incidental ingestion and dermal contact pathways. For the inhalation pathways, USEPA (2009) recommends that when estimating risk or hazard via inhalation, the concentration of the chemical in air should be used as the exposure metric (e.g., mg/m^3), rather than inhalation intake of a contaminant in air based on inhalation rate and body weight (e.g., mg/kg-day). Therefore, the COC intake factor is replaced with an exposure concentration (EC) factor for the inhalation pathways. The sections below present the equations used to estimate the COC IF and EC. The exposure parameters used in this HHRA are presented in **Table 7**.

3.5.1 Incidental Soil Ingestion

The following equation was used to estimate the intake factor for incidental ingestion of soil (IF_{oral}) based on noncancer effects:

$$IF_{oral} = \frac{IR \times CF \times EF \times ED}{BW \times AT_{NC}}$$

Where:

IR = ingestion rate of soil (mg/day);

EF = exposure frequency (days/yr);
ED = exposure duration (yrs);
CF = conversion factor for soil (10^{-6} kg/mg);
BW = body weight (kg); and
AT_{NC} = averaging time (days) based on noncancer effects: ED x 365 days.

The following equation was used to estimate the IF_{oral} for a construction and utility maintenance worker based on cancer effects:

$$IF_{oral} = \frac{IR \times CF \times EF \times ED}{BW \times AT_C}$$

Where:

AT_C = averaging time (days) based on cancer effects: 70 x 365 days.

The following equation was used to estimate the IF_{oral} for an onsite resident based on cancer effects:

$$IF_{oral} = \left[\frac{IR \times CF \times EF \times ED}{BW \times AT_C}\right]_{CHILD} + \left[\frac{IR \times CF \times EF \times ED}{BW \times AT_C}\right]_{ADULT}$$

The exposure parameters used to estimate IF_{oral} for incidental soil ingestion are presented in **Table 7**.

3.5.2 Dermal Contact with Soil

The following equation was used to estimate the intake factor for dermal contact with soil (IF_{dermal}) based on noncancer effects:

$$IF_{dermal} = \frac{SA \times AF \times ABS \times CF \times EF \times ED}{BW \times AT_{NC}}$$

Where:

SA = surface area of exposed skin soil per day (cm^2/day);
AF = soil-skin adherence factor (mg/cm^2);
ABS = percent dermal absorption (COC-specific; unitless);
CF = conversion factor for soil (10^{-6} kg/mg);

EF = exposure frequency (days/yr);
ED = exposure duration (yrs);
BW = body weight (kg); and
AT_{NC} = averaging time (days) based on noncancer effects: ED x 365 days.

The following equation was used to estimate the IF_{dermal} for a construction and utility maintenance worker based on cancer effects:

$$IF_{dermal} = \frac{SA \times AF \times ABS \times CF \times EF \times ED}{BW \times AT_C}$$

Where:

AT_C = averaging time (days) based on cancer effects: 70 x 365 days.

The following equation was used to estimate the IF_{dermal} for an onsite resident based on cancer effects:

$$IF_{dermal} = \left[\frac{SA \times AF \times ABS \times CF \times EF \times ED}{BW \times AT_C}\right]_{CHILD} + \left[\frac{SA \times AF \times ABS \times CF \times EF \times ED}{BW \times AT_C}\right]_{ADULT}$$

The exposure parameters used to estimate IF_{dermal} for dermal contact with soil are presented in **Table 7**.

3.5.3 Inhalation of Fugitive Dust/Vapors

Inhalation of fugitive dust-containing COCs and volatile COCs in outdoor air is a consideration for soil matrix and soil vapor exposures. Inhalation of indoor air vapors is a consideration for soil vapor exposures. For the inhalation pathways, the IF is replaced with an EC, as discussed in Section 3.4 above. The equations used to estimate the EC are presented below.

3.5.3.1 Outdoor Air Pathway from Soil

The following equation was used to estimate the EC for the inhalation pathways for outdoor air from soil:

$$EC_{inh,soil} = \frac{EF \times ED \times ET}{AT \times (VF_{soil} \text{ or } PEF)}$$

Where:

$EC_{inh,soil}$ = exposure concentration factor of COC in outdoor air from soil (kg/m^3);
EF = exposure frequency (days/yr);
ED = exposure duration (yrs);
ET = exposure time (24 hrs/24 hrs for a resident; 8 hrs/24 hrs for workers);
AT = averaging time (days):
cancer effects: 70 yrs × 365 days;
noncancer effects: ED × 365 days;
PEF = particulate emission factor for soil (m^3/kg);
$PEF_{resident}$ = for a hypothetical future resident (m^3/kg);
PEF_{CUW} = for a construction and utility maintenance worker (m^3/kg);
VF_{soil} = volatilization factor for soil (m^3/kg);
VF_{soil} = for an onsite resident (m^3/kg); and
$VF_{soil-OA}$ = for a construction and utility maintenance worker (m^3/kg).

The exposure parameters used to estimate $EC_{inh,soil}$ for outdoor inhalation of fugitive dust/vapors from soil are presented in **Table 7**.

3.5.3.2 Outdoor Air Pathway from Soil Vapor

The following equation was used to estimate the EC for the inhalation pathway for outdoor air from soil vapor for a construction and utility maintenance worker:

$$EC_{SV\text{-}OA} = \frac{EF \times ED \times ET}{AT \times CF \times VF_{SV\text{-}OA}}$$

Where:

EC_{SV-OA} = exposure concentration factor of COC in outdoor air from soil vapor (unitless);
EF = exposure frequency (days/yr);
ED = exposure duration (yrs);
ET = exposure time (8 hrs/24 hrs for workers);
AT = averaging time (days):
cancer effects: 70 yrs × 365 days;

noncancer effects: ED × 365 days; and

VF_{SV-OA} = volatilization factor for soil vapor (mg/m^3 per mg/m^3).

The exposure parameters used to estimate EC_{SV-OA} for outdoor inhalation of vapors from soil vapor are presented in **Table 7**.

3.5.3.3 Indoor Air Pathway

The following equation was used to estimate the EC for the inhalation pathway for indoor air from sub-slab soil vapor:

$$EC_{SS-SV-IA} = \frac{EF \times ED \times ET \times AF_{SV-IA}}{AT}$$

Where:

$EC_{SS-SV-IA}$ = exposure concentration of COC in indoor air from sub-slab soil vapor (unitless);

EF = exposure frequency (days/yr);

ED = exposure duration (yrs);

ET = exposure time (24 hrs/24 hrs for a resident);

AF_{SV-IA} = 0.002; RWQCB directive (unitless);

AT = averaging time (days):

cancer effects: 70 yrs × 365 days; and

noncancer effects: ED × 365 days.

The exposure parameters used to estimate $EC_{SS-SV-IA}$ for indoor inhalation of vapors from soil vapor are presented in **Table 7**.

4.0 TOXICITY ASSESSMENT

The toxicity assessment characterizes the relationship between the magnitude of exposure to a COC and the nature and magnitude of adverse health effects that may result from such exposure. Consistent with regulatory risk assessment policy, adverse health effects resulting from potential chemical exposures are classified into two broad categories: carcinogens and noncarcinogens. Toxicity criteria are generally developed based on the threshold approach for noncarcinogenic effects and the non-threshold approach for carcinogenic effects.

For carcinogens, it is assumed that there is no level of exposure that does not have a finite possibility of causing cancer (i.e., there is no threshold dose for carcinogenic effects). That is, a single exposure of a carcinogen may, at any level, result in an increased probability of developing cancer. For chemicals exhibiting noncarcinogenic effects, it is believed that organisms have protective mechanisms that must be overcome before the toxic endpoint results (i.e., there is a threshold dose for these effects). For example, if a large number of cells perform the same or similar functions, it would be necessary for significant damage or depletion of these cells to occur before a toxic effect could be seen. As a result, a range of exposures exists from zero to some finite value that can be tolerated by the organism with essentially no chance of expression of adverse effects (USEPA, 1989). Some chemicals may elicit both carcinogenic and noncarcinogenic effects.

The key dose-response criteria are (i) cancer slope factors (CSFs) or inhalation unit risk factors (IURs) for estimating cancer risks from exposure to carcinogens; and (ii) reference doses (RfDs) or inhalation reference concentrations (RfCs) for estimating hazard from exposure to noncarcinogens. In addition, Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA; Cal-EPA 2013b) has developed chronic Reference Exposure Levels (RELs) for noncarcinogenic effects from inhalation exposures. For developing SSCGs, cancer toxicity criteria (except for trichloroethene [TCE] as discussed below) were selected from the following sources, in order of preference:

1) Cal-EPA OEHHA Toxicity Criteria Database, online (Cal-EPA, 2013b);
2) USEPA's (2013a) Integrated Risk Information System (IRIS);
3) USEPA RSLs for Chemical Contaminants at Superfund Sites (USEPA, 2013b);
4) USEPA National Center of Environmental Assessment (as reported in USEPA, 2013b);

5) Agency for Toxic Substances Disease Registry (as reported in USEPA, 2013b); and
6) Health Effects Assessment Summary Tables (as reported in USEPA, 2013b).

The noncancer toxicity criteria were selected from the following sources, in order of preference:

1) USEPA's (2013a) IRIS database; and
2) Cal-EPA OEHHA Toxicity Criteria Database online (Cal-EPA, 2013b).

For TCE, the USEPA inhalation IUR of 4.1×10^{-6} $(\mu g/m^3)^{-1}$ and oral CSF of 4.6×10^{-2} $(mg/kg\text{-}day)^{-1}$ were used for derivation of SSCGs, which are consistent with the most recent USEPA published toxicity values for TCE (USEPA, 2011). Moreover, because TCE is considered carcinogenic by a mutagenic mode of action for kidney effects, separate cancer risk equations are presented for mutagens as outlined in the USEPA RSL User's Guide (USEPA, 2013c). These equations were used for TCE for the residential scenario.

At the present time, Cal-EPA and USEPA have only developed toxicity criteria for the oral and inhalation routes of exposure. As recommended by Cal-EPA and USEPA, in the absence of values specific to the dermal route, the oral toxicity criteria were used to evaluate dermal exposures. In addition, route-to-route extrapolation between ingestion and inhalation routes of exposure was used for those chemicals for which toxicity criteria are extrapolated in the USEPA Region 9 Preliminary Remedial Goal (PRG) table (USEPA, 2004a). This can be considered a conservative approach as current USEPA RSL guidance (USEPA, 2013b) does not include the route-to-route extrapolation. For some of the COCs, neither Cal-EPA nor USEPA have identified a toxicity value. In these cases, a surrogate chemical approach was employed in which the toxicity value developed for a structurally similar compound was assigned to the COC which is lacking the toxicity value (e.g., hexane for heptane).

Toxicity factors for TPH have been suggested by Cal-EPA Department of Toxic Substances Control (Cal-EPA, 2009a, 2013a). Even though these toxicity factors for TPH have not gone through the same level of peer review as the other toxicity factor references used for the other COCs, the toxicity factors presented in Cal-EPA DTSC TPH guidance were used for TPH SSCGs. These values were presented in a letter from Geosyntec dated August 15, 2011 describing the derivation of RBSLs for TPH (TPH RBSL Letter; Geosyntec, 2011), which was approved by the LARWQCB on November 14, 2011.

The traditional RfD approach to the evaluation of chemicals is not applied to lead because most adverse human health effects data associated with exposure to lead have been correlated with concentrations of lead in blood and not with intake of lead by an individual (Cal-EPA, 1996). In the absence of RfDs, Cal-EPA uses a 1 microgram per deciliter (µg/dL) benchmark for source-specific incremental change in blood lead levels for protection of children and fetuses (Cal-EPA, 2007) as the revised health criterion for lead. This benchmark is the estimated incremental increase in a child's blood lead level that would reduce their IQ by up to 1 point. Based on this revised benchmark of 1 µg/dL, Cal-EPA has recommended a revised residential California Human Health Screening Level (CHHSL) of 80 mg/kg.

For the resident potentially exposed to deeper soils for a limited time and the construction and utility maintenance worker, the SSCGs were calculated using the CHHSL methodology for residential and industrial/commercial worker adjusted for exposure frequency and ingestion rate using the Adult Lead Model (ALM) as recommended by Cal-EPA. According to USEPA's 2003 guidance *Assessing Intermittent or Variable Exposures at Lead Sites* and supporting documentation for the ALM, a minimum exposure frequency and exposure duration of 1 day per week for 3 months should be used to account for the model's steady-state assumption. In addition, a central tendency ingestion rate value of 100 mg/day is recommended for construction workers. Therefore, these input parameters were used for shorter term adult lead exposures.

A summary of the cancer and noncancer toxicity criteria for the COCs is presented in **Table 10**.

5.0 SITE-SPECIFIC CLEANUP GOALS

This section presents the methodology that was used in the Revised SSCG Report (Geosyntec, 2013) to derive SSCGs for onsite residents and for construction and utility maintenance workers who may be present at the Site and have the potential to be exposed to residual chemicals present in soil and soil vapor. Additionally, SSCGs for soil leaching to groundwater and odor-based screening levels are presented in this section.

The risk-based SSCGs are calculated following methods presented in the Revised SSCG report (Geosyntec, 2013). The SSCGs for soil leaching to groundwater, odor-based screening levels and groundwater based SSCGs have been updated in response to the January 23, 2014 letter from the Regional Board regarding the Revised SSCG report incorporating modifications in accordance with the Regional Board's 1996 *Interim Site Assessment & Cleanup* Guidebook [RWQCB, 1996]. **Tables 11**, **12** and **13** present the SSCGs for soil, soil vapor and groundwater, respectively.

5.1 Risk-based SSCG Methodology

Deriving risk-based SSCGs for COCs in soil, sub-slab soil vapor, and soil vapor requires information regarding the level of human intake of the COC (exposure assessment), the relationship between intake of the chemical and its toxicity (toxicity assessment), and the acceptable target risk. The sections below present the equations that were used in the development of the SSCGs for soil, sub-slab soil vapor, and soil vapor. The methodology that was used to derive SSCGs is based principally on guidelines provided by the USEPA in *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), Interim Final* (USEPA, 1989) and in the *Soil Screening Guidance* (USEPA, 2002b) and by the DTSC in *Preliminary Endangerment Assessment Guidance Manual* and in *Recommended DTSC Default Exposure Factors For Use In Risk Assessment At California Hazardous Waste Sites and Permitted Facilities* (Cal-EPA, 2011a).

Various demarcations of acceptable risk have been established by regulatory agencies. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR 300) indicates that lifetime incremental cancer risks posed by a site should not exceed a range of one in one million (1×10^{-6}) to one hundred in one million (1×10^{-4}) and noncarcinogenic chemicals should not be present at levels expected to cause adverse health effects (i.e., a Hazard Index [HI] greater than 1). In addition, other relevant guidance (USEPA, 1991b) states that sites posing a cumulative cancer risk of less than 10^{-4} and hazard indices less than unity (1) for noncancer endpoints are generally not

considered to pose a significant risk warranting remediation. The California Hazardous Substances Account Act (HSAA) incorporates the NCP by reference, and thus also incorporates the acceptable risk range set forth in the NCP. The Safe Drinking Water and Toxic Enforcement Act of 1986 (California Proposition 65) regulates chemical exposures to the general population and is based on an acceptable risk level of 1×10^{-5}. The DTSC considers the 1×10^{-6} risk level as the generally accepted point of departure for unrestricted land use.

Under most situations, cancer risks in the range of 1×10^{-6} to 1×10^{-4} may be considered to be acceptable with cancer risks less than 10^{-6} considered insignificant. The risk range between 10^{-6} and 10^{-4} is commonly called the "discretionary risk range." This risk range is in addition to the background risk of Americans in the general population developing cancer from causes unrelated to a Site-specific exposure. The background risk is one chance in three (0.3 or 3×10^{-1}) for an American female, and one chance in two (0.5 or 5×10^{-1}) for an American male of eventually developing cancer (ACS, 2013).

A target cancer risk level of 1×10^{-6} was used to derive SSCGs for onsite residents. For the construction and utility maintenance worker, the SSCGs were derived using a target cancer risk level of 1×10^{-5} (the "mid-point" of the risk management range and commonly used for managing commercial/industrial land uses). A target HI of 1 was used for noncarcinogens for all exposure scenarios. These risk levels are used to provide context to the risk results and to support the following discussion which focuses on those pathways and chemicals that contribute the majority to the risk estimates. It is acknowledged that additional risk management considerations such as technical feasibility, economic, social, political, and legal factors may be part of the final risk management decision. The results of the risk characterization are really the starting point for risk management considerations for a site (USEPA, 1995).

5.1.1 SSCGs Based on Cancer Health Effects

The SSCG equations below describe the established relationship between estimated intake, toxicity, and potential risk for cancer health effects (USEPA, 1989).

For COCs in soil:

$$SSCG_{soil\text{-}c} = \frac{TR}{(CSF_{oral})\times(IF_{oral} + IF_{dermal}) + (IUR\times EC_{inh,soil}\times CF)}$$

For COCs in soil vapor for the construction and utility maintenance worker:

$$SSCG_{sv\text{-}c} = \frac{TR}{(IUR \times EC_{SV\text{-}OA} \times CF)}$$

For COCs in sub-slab soil vapor for the onsite resident:

$$SSCG_{ss\text{-}sv\text{-}c} = \frac{TR}{(IUR \times EC_{SS\text{-}SV\text{-}IA} \times CF)}$$

Where:

$SSCG_{soil\text{-}c}$	=	Site-specific cleanup goal for soil based on cancer effects (mg/kg);
TR	=	target cancer risk level (unitless);
CSF_{oral}	=	cancer slope factor for oral (ingestion and dermal contact) exposures $(mg/kg \cdot d)^{-1}$;
IF_{oral}	=	intake factor for ingestion (kg soil per kg body weight per day);
IF_{dermal}	=	intake factor for dermal contact (kg soil per kg body weight per day);
IUR	=	inhalation unit risk factor $(\mu g/m^3)^{-1}$;
$EC_{inh,soil}$	=	exposure concentration for inhalation of COCs from soil (mg/m^3 per mg/kg);
CF	=	conversion factor (10^3 µg/mg);
$SSCG_{sv\text{-}c}$	=	Site-specific cleanup goal for soil vapor to outdoor air based on cancer effects (mg/m^3);
$EC_{SV\text{-}OA}$	=	exposure concentration for outdoor inhalation (mg/m^3 per mg/m^3);
$SSCG_{ss\text{-}sv\text{-}c}$	=	Site-specific cleanup goal for sub-slab soil vapor to indoor air based on cancer effects (mg/m^3); and
$EC_{SS\text{-}SV\text{-}IA}$	=	exposure concentration for indoor inhalation (mg/m^3 per mg/m^3).

The formulas and exposure parameters for developing the soil IFs for ingestion and dermal contact, as well as for developing the ECs for soil, sub-slab soil vapor, and soil vapor were presented above in Section 3.4. The SSCGs for soil and sub-slab soil vapor are presented in **Tables 11** and **12**, respectively, for the onsite resident. The SSCGs for soil and soil vapor are also presented in **Tables 11** and **12**, respectively, for the construction and utility maintenance worker. SSCG calculations are presented in **Appendix C**.

5.1.2 SSCGs Based on Noncancer Health Effects

The SSCG equations below describe the established relationship between estimated intake, toxicity, and risk for noncancer health effects (USEPA, 1989).

For COCs in soil:

$$SSCG_{soil\text{-}nc} = \frac{THI}{\left(\frac{IF_{oral}}{RfD_{oral}}\right) + \left(\frac{IF_{dermal}}{RfD_{oral}}\right) + \left(\frac{EC_{inh,soil}}{RfC}\right)}$$

For COCs in soil vapor for the construction and utility maintenance worker:

$$SSCG_{sv\text{-}nc} = \frac{THI}{\left(\frac{EC_{SV\text{-}OA}}{RfC}\right)}$$

For COCs in sub-slab soil vapor for the onsite resident:

$$SSCG_{ss\text{-}sv\text{-}nc} = \frac{TR}{\left(\frac{EC_{SS\text{-}SV\text{-}IA}}{RfC}\right)}$$

Where:

$SSCG_{soil\text{-}nc}$ = Site-specific cleanup goal for soil based on noncancer effects (mg/kg);

THI = target noncancer hazard index (unitless);

IF_{oral} = intake factor for ingestion (kg soil per kg body weight per day);

RfD_{oral} = noncancer reference dose for oral (ingestion and direct-contact) exposures (mg/kg·d);

IF_{dermal} = intake factor for dermal contact (kg soil per kg body weight per day);

$EC_{inh,soil}$ = exposure concentration for inhalation of COCs from soil (mg/m^3 per mg/kg from soil);

RfC = noncancer reference concentration for inhalation exposure (mg/m^3);

$SSCG_{sv\text{-}nc}$ = Site-specific cleanup goal for soil vapor to outdoor air based on noncancer effects (mg/m^3);

$EC_{SV\text{-}OA}$ = exposure concentration for outdoor inhalation of COCs (mg/m^3 soil vapor per mg/m^3 outdoor air);

$SSCG_{ss\text{-}sv\text{-}nc}$ = Site-specific cleanup goal for sub-slab soil vapor to indoor air based on noncancer effects (mg/m^3); and

$EC_{SS\text{-}SV\text{-}IA}$ = exposure concentration for indoor inhalation (mg/m^3 per mg/m^3).

The formulas and exposure parameters for developing the soil IFs for ingestion and dermal contact, as well as for developing the ECs for soil, sub-slab soil vapor, and soil vapor were presented above in Section 3.4. The SSCGs for soil and sub-slab soil vapor are presented in **Tables 11** and **12**, respectively, for the onsite resident. The SSCGs for soil and soil vapor are also presented in **Tables 11** and **12**, respectively, for the construction and utility maintenance worker. SSCG calculations are presented in **Appendix C**.

5.1.3 TPH Fraction-Specific SSCGs

TPH compounds include a wide range of chemicals that are found in crude oils, petroleum products, and other petroleum-related materials. Because TPH mixtures can encompass a large range of hydrocarbons, chemical properties and environmental behavior vary widely among the many hundreds of compounds present in these mixtures. Methods to evaluate potential risks associated with TPH analytical results have been published in state and national working group guidance documents including the DTSC (Cal-EPA, 2009a, 2013a), the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG, 1997ab; 1998ab; 1999), and Massachusetts Department of Environmental Protection (MADEP, 2002; 2003). Approaches presented in these documents were used to develop SSCGs for comparison to TPH data collected at the Site.

TPH may refer to a variety of products or wastes, but for the soil samples collected at the Site and analyzed by USEPA Method 8015B (M)[3], analytical results are grouped into three product ranges according to the number of carbon chain atoms:

[3] Results from USEPA Method 8015B (M) are equivalent to USEPA Method 8015C for TPH analysis.

TPH Product Range	Carbon Chain Range
$TPH_{gasoline}$ (TPH_g)	$C_4 - C_{12}$
TPH_{diesel}, (TPH_d)	$C_{10} - C_{22}$
$TPH_{motor\ oil}$ (TPH_{mo})	$C_{17} - C_{44}$

TPH product range concentrations reported (i.e., TPH_g, TPH_d or TPH_{mo}) do not necessarily indicate the presence of gasoline, diesel, or motor oil, only that there are hydrocarbons present that fall in those specific carbon-chain length ranges. In addition, there is some variability in the carbon chain range reported by the analytical laboratories.

For each of the carbon chain ranges, two different types of compounds or fractions may be present: aliphatic or aromatic. Therefore, TPH fractionation analysis was performed on soil and soil vapor samples to refine the TPH characterization. In the TPH fractionation analysis, aliphatic and aromatic fractions are quantified consistent with the Cal-EPA TPH Guidance (Cal-EPA, 2009a, 2013a). These TPH fractions are listed below:

TPH Product Range	Aliphatic Fraction	Aromatic Fraction
Light	$C_5 - C_8$	$C_6 - C_8$
Medium	$C_9 - C_{18}$	$C_9 - C_{16}$
Heavy	$C_{19} - C_{32}$	$C_{17} - C_{32}$

Both types of analyses (i.e., product range analysis and fractionation analysis) have been conducted at the Site, and the TPH fractionation analytical results are used in the derivation of SSCGs for product-range TPH results as described in later sections.

The fraction-specific SSCGs for soil, sub-slab soil vapor, and soil vapor are presented below:

TPH Fractions	Onsite Resident			Construction and Utility Maintenance Worker	
	Soil SSCG (EF350) (mg/kg)	**Soil SSCG (EF4)** (mg/kg)	**Sub-Slab Soil Vapor SSCG** ($\mu g/m^3$)	**Soil SSCG** (mg/kg)	**Soil Vapor SSCG** ($\mu g/m^3$)
Aliphatic: C_5-C_8	7.1E+02	6.2E+04	3.7E+05	8.3E+02	1.2E+09
Aliphatic: C_9-C_{18}	1.4E+03	1.3E+05	1.6E+05	1.6E+03	1.2E+08
Aliphatic: C_{19}-C_{32}	1.1E+05	1.0E+07	--	5.5E+06	--
Aromatic: C_6-C_8	--	--	--	--	--
Aromatic: C_9-C_{16}	6.0E+02	5.3E+04	2.6E+04	7.5E+02	6.7E+06
Aromatic: C_{17}-C_{32}	1.7E+03	1.5E+05	--	8.3E+04	--

Notes:

- EF: exposure frequency; 350 days/year for a typical resident and 4 days/year for a resident who infrequently contacts subsurface soils.
- " – " not calculated
- SSCGs for the C_6-C_8 aromatic fraction are not calculated because individual constituents in this fraction (i.e., benzene, toluene, ethylbenzene) were analyzed.
- Sub-slab soil vapor and soil vapor SSCGs for the C_{19}-C_{32} aliphatic and C_{17}-C_{32} aromatic fractions are not calculated because the volatility of these fractions are low and no RfC is available for these fractions.

5.1.4 SSCGs for TPH Product Ranges

Fraction-specific soil, sub-slab soil vapor, and soil vapor SSCGs for the different TPH fraction ranges presented above are used to derive soil, sub-slab soil vapor, and soil vapor SSCGs for TPH product ranges: TPH_g, TPH_d, and TPH_{mo}. Fractionation results from soil samples collected through February 24, 2011 were used to evaluate the aromatic/aliphatic composition of the different TPH ranges. The analytical results correlation analysis was presented in a letter to the RWQCB dated August 15, 2011 (Geosyntec, 2011). The aromatic/aliphatic ratios for each TPH range are as follows:

- Light Range TPH = 0.03
- Medium Range TPH = 1.3
- Heavy Range TPH = 1.0

The carbon number ranges used in the TPH product range (TPH_g, TPH_d, and TPH_{mo}) analyses are different from those used in the TPH fractionation analyses. As a result, there is overlap in the product range carbon-chain values and what is encompassed by the fraction results. Consequently, the contribution to the TPH product range from the different aliphatic and aromatic fractions was estimated based on a comparison of the carbon ranges encompassed by the different analyses (Geosyntec, 2011). The following contributions were assumed:

- TPH_g: 50% contribution from the light fractions and 50% contribution from the medium fractions;
- TPH_d: 50% contribution from the medium fractions and 50% contribution from the heavy fractions; and
- TPH_{mo}: 100% contribution from the heavy fractions.

The following equation was used to derive the SSCGs for TPH_g, TPH_d, and TPH_{mo}:

$$SSCG\,(TPH_g, TPH_d, TPH_{mo}) = 100\% \times \left[\sum \frac{Fraction\,\%}{Fraction\,SSCG}\right]^{-1}$$

Where:

Fraction % = % contribution of TPH fraction to product range TPH (unitless); and

Fraction SSCG = Site-specific cleanup goal determined above for the different TPH fraction (soil in mg/kg; sub-slab soil vapor and soil vapor in $\mu g/m^3$).

The following table summarizes the SSCG calculations for TPH_g, TPH_d, and TPH_{mo}:

TPH Product Ranges	% Contribution to Product Range TPH	Aromatic/ Aliphatic Ratio	% Contribution of TPH Fraction	Onsite Resident			Construction and Utility Maintenance Worker	
				Soil SSCG (EF350) (mg/kg)	**Soil SSCG (EF4) (mg/kg)**	**Sub-Slab Soil Vapor SSCG ($\mu g/m^3$)**	**Soil SSCG (mg/kg)**	**Soil Vapor SSCG ($\mu g/m^3$)**
TPHg								
Light Fraction	50%	0.03						
Aliphatic: C_5-C_8			49%	7.1E+02	6.2E+04	3.7E+05	8.3E+02	1.2E+09
Aromatic: C_6-C_8			1%	6.0E+02	5.3E+04	2.6E+04	7.5E+02	6.7E+06
Medium Fraction	50%	1.3						
Aliphatic: C_9-C_{18}			22%	1.4E+03	1.3E+05	1.6E+05	1.6E+03	1.2E+08
Aromatic: C_9-C_{16}			28%	6.0E+02	5.3E+04	2.6E+04	7.5E+02	6.7E+06
			TPHg =	**7.6E+02**	**6.6E+04**	**7.2E+04**	**9.0E+02**	**2.2E+07**
TPHd								
Medium Fraction	50%	1.3						
Aliphatic: C_9-C_{18}			22%	1.4E+03	1.3E+05	1.6E+05	1.6E+03	1.2E+08
Aromatic: C_9-C_{16}			28%	6.0E+02	5.3E+04	2.6E+04	7.5E+02	6.7E+06
Heavy Fraction	50%	1.0						
Aliphatic: C_{19}-C_{32}			25%	1.1E+05	1.0E+07	--	5.5E+06	--
Aromatic: C_{17}-C_{32}			25%	1.7E+03	1.5E+05	--	8.3E+04	--
			TPHd =	**1.3E+03**	**1.1E+05**	**8.1E+04**	**1.9E+03**	**2.3E+07**
TPHmo								
Heavy Fraction	100%	1.0						
Aliphatic: C_{19}-C_{32}			49%	1.1E+05	1.0E+07	--	5.5E+06	--
Aromatic: C_{17}-C_{32}			51%	1.7E+03	1.5E+05	--	8.3E+04	--
			TPHmo =	**3.3E+03**	**2.9E+05**	**--**	**1.6E+05**	**--**

Note: Because individual C_6-C_8 aromatic constituents are evaluated separately, SSCG for C_9-C_{16} aromatic fraction used for evaluation

5.2 Soil Leaching to Groundwater Methodology

Site-specific Clean-up levels for potential leaching to groundwater were developed for the COCs identified for this pathway. SSCGs for the leaching to groundwater pathway were included in the January 23, 2014 letter from the Regional Board (RWQCB, 2014). While the values proposed by the Regional Board did consider some site-specific factors, the SSCGs included in the letter were not consistent with Regional

Board guidance (RWQCB, 1996), other guidance documents that were considered in the development of SSCGs as directed in the March 11, 2011 Cleanup and Abatement Order (CAO) for the Site (RWQCB, 2011), or comments on the Revised SSCG report included in the RWQCB letter. To address this discrepancy in recommended approaches to calculate SSCGs for the leaching to groundwater pathway, SSCGS following the methods detailed in the Regional Board's 1996 Interim Site Assessment & Cleanup Guidebook [RWQCB, 1996] were used.

5.2.1 The LARWQCB Values for TPH

For TPH constituents, default values recommended in the Guidebook were used based on the depth to groundwater at the Site. These values for TPH-g, TPH-d and TPH-mo are 500 mg/kg, 1000 mg/kg and 10,000 mg/kg respectively. According to the Guidebook these values are for potential leaching to groundwater as well as are "intended to protect people from exposure when they come in contact with the chemicals through such means as direct contact with the soil, dust particles or gaseous compounds in air" (LARWQCB, 1996). Therefore these values are considered appropriate for the Site where both potential human exposures and potential leaching to groundwater are considered.

5.2.2 The LARWQCB Attenuation Factor Method for VOCs

The Attenuation Factor Method for VOCs, described in the Los Angeles Regional Water Quality Control Board "Interim Site Assessment & Cleanup Guidebook" (the Water Board approach, LARWQCB, 1996), provides an approach to estimate soil cleanup goals for the protection of groundwater quality based on physical properties of a site and chemical properties of the VOCs. A soil-to-soil-leachate attenuation factor is calculated in a three-step process:

1) Estimate a liquid phase contaminant concentration (C_i) that is in equilibrium with the solid phase and the air phase in the vadose zone soil, using the Site-specific soil physical parameters, as well as the partitioning coefficients between the three phases (i.e., soil/water partitioning coefficient, Kd, and the Henry's Law Constant, K_H):

$$C_i = \frac{C_T}{\theta_w + P_b f_{oc} K_{oc} + (n - \theta_w) K_H}$$

where C_T is the total soil concentration, θ_w is the soil water content by volume, n is the soil porosity, P_b is the soil bulk density, f_{oc} is the soil organic content, and

K_{oc} is the organic carbon partition coefficient. Then an AF, the ratio of the liquid phase concentration and the total soil concentration, can be calculated as:

$$AF = 1 + \frac{P_b}{\theta_w} f_{oc} K_{oc} + (n - \theta_w) \frac{K_H}{\theta_w}$$

for COCs where site-specific K_d is available, the $f_{oc}K_{oc}$ term in the above equation can be simply replaced by K_d. The default soil and COC-specific physical property parameters in the LARWQCB guidance (1996) were used to obtain a maximum attenuation factor, AF_{max}. When COC-specific physical property values are not available in the LARWQCB guidance, the USEPA Regional Screening Level tables were consulted for these parameters.

2) Adjust the AF due to distance above groundwater. The hydrogeological information in the Los Angeles area suggests that the soil column can be divided into three zones: (1) a "smear zone", due to groundwater level fluctuation, immediately above groundwater table (0 - 40 ft above water table); (2) a second modification zone between 40 and 150 ft above water table; (3) No-modification zone (distance greater than 150 ft above water table). Based on a VLEACH modeling study, the AF at the top of the smear zone is reduced as one-tenth of the original AF calculated in step one. Subsequently, the AF at each specific depth (AF_D) can be quantified by linear interpolation. The equations used are listed below:

For D>150: $AF_D = AF$

For 40<D≤150: $AF_D = \left(\frac{0.9(D-40)}{110} + 0.1\right) \times AF$

For D≤40: $AF_D = D\left(\frac{0.1AF-1}{40}\right) + 1$

where D is the total depth of the Site soil.

3) Modify AF_D according to site lithology. The steady infiltration rates of different soil types are reported to have a 1:5:10:20 ratio between clay:silt/clay:sand/silt:gravel/sand. Therefore, once the Site lithology is known, the final AF (AF_T) can be obtained by adjusting AF_D based on the following equation:

$$AF_T = \frac{AF_D}{D}\left(\frac{TGR}{20} + \frac{TSA}{10} + \frac{TSI}{5} + \frac{TCL}{1}\right)$$

where D is the total depth of the Site soil, TRG, TSA, TSI, and TCL are the total depths of gravel, sand, silt/clay, and clay, respectively. Based on soil boring logs and soil sample physical property characterization, the soil type onsite is characterized as mainly silty fine sand, sandy silt, and sand. As a conservative measure, the Site soil type was assumed to be uniformly sand.

Finally, the soil SSCG for the protection of groundwater is calculated by:

$$SSCG_{soil\text{-}GW} = C_w \times BF \times AF$$

Where C_w is the groundwater quality criterion and BF is the bioattenuation factor. Following the 1996 LARWQCB guidance, BF is only applied to benzene (a value of 11).

5.2.3 The USEPA RSL Soil Cleanup Goal Method for Metals

Because the LARWQCB approach is only applicable for VOCs, the USEPA Regional Screening Level (RSL) approach (USEPA, 2013c) for the soil-to-groundwater pathway soil screening level was adapted for metals SSCG development. The RSL approach employs a partitioning equation that considers both the contaminant equilibrium between the solid, liquid, and air phase in soil and the dilution of leachate when entering the groundwater. However, based on the Regional Board directive, mixing of leachate with groundwater is not considered. The equation is listed below:

$$SSCG_{soil\text{-}GW} = C_w \times \left[K_d + \frac{\theta_w + \theta_a K_H}{P_b}\right]$$

Where C_w is the groundwater quality criterion, K_d is the soil/water partitioning coefficient, θ_a is water-filled porosity, θ_a is air-filled porosity K_H is Henry's Law Constant, and P_b is the soil bulk density. K_d is calculated by:

$$K_d = K_{oc} \times f_{oc}$$

Parameters used for the LARWQCB and USEPA methods are presented in **Appendix D**. The SSCGs based on soil leaching to groundwater are summarized in **Table 11**, and the detailed calculations are provided in **Appendix D**.

5.3 Background-based SSCG Methodology

Metals and cPAHs may be naturally occurring in the environment or present at ambient levels not associated with former Site activities. Development of the SSCGs, as discussed in previous sections, should also consider background conditions (both natural and non-site-related anthropogenic sources) for metals and cPAHs. The consideration of background concentrations is important in HHRAs and remedial planning as it is infeasible to clean up to lower concentrations than background. BTVs were developed for metals and cPAHs using local and regional background datasets, as discussed in Section 2.3 and in **Appendix A**. After comparison to RBSLs, BTVs, and the additional analysis including one-sample hypothesis testing, antimony, arsenic, lead, thallium, and benzo(a)pyrene were considered to be above background. Therefore, these compounds were evaluated further in this HHRA.

5.4 SSCGs for Methane

The SSCGs for methane are the same as those presented in the Data Evaluation and Decision Matrix previously prepared for the Site. These SSCGs are consistent with Cal-EPA DTSC (DTSC, 2005b) guidance for addressing methane detected at school sites.

Methane Level	Response
>10%LEL (> 5,000 ppmv or 0.5%) Soil vapor pressure > 13.9 in H_2O	Evaluate engineering controls
> 2% - 10%LEL (> 1,000 - 5,000 ppmv or 0.1 to 0.5%) Soil vapor pressure > 2.8 in H_2O	Perform follow-up sampling and evaluate engineering controls

Methane has been detected in sub-surface soil vapor samples, particularly deeper soil vapor samples, collected at the Site. Methane screening conducted in indoor structures at the Site and utility vaults, storm drains, and sewer manholes at and surrounding the Site has not identified methane concentrations in enclosed spaces that indicate a potential safety risk.

Very few instances of methane detection above 1% (i.e., 20% of the LEL) have been found in sub-slab soil vapor, and in all but one location, the results of methane speciation indicate the source was either a natural gas pipeline leak or sewer leak. Methane resulting from

biodegradation of residual petroleum hydrocarbons has been identified in one sub-slab garage probe at one property[1]; Engineering controls have been installed to mitigate potential risks due to methane detected at this location.

Through January 30, 2014, methane concentrations slightly above the interim action levels of 0.1% and 0.5% were detected in one sub-slab probe during one sampling event at five different properties. At four of these properties, methane concentrations were above the lower methane SSCG of 0.1% but were not above the upper methane SSCG of 0.5%. In all four cases, the methane detections were not reproducible in subsequent sampling events. At one location, a methane concentration of 0.58%, slightly above the upper methane SSCG, was detected in a single sampling event. That sub-slab probe has only been sampled once. This location is considered for further evaluation in the RAP.

5.5 Odor-based SSCGs for Soil Vapor

Odor-based screening levels also have been identified for consideration in the preparation of the RAP. The odor-based screening levels for soil vapor published in the SFRWQCB ESL documentation (SFRWQCB, 2013) will be used and are presented on Table 12. Note that the nuisance-based SSCG for TPH in the Regional Board January 23, 2014 letter was not consistent with the SFRWCB ESLs; and the odor-based SSCGs for TPH in Table 12 show the correct ESL values. The risk-based SSCGs are lower than the odor-based screening levels for all COCs. Consequently, corrective action planning to address risk-based SSCGs will also address odor and nuisance concerns.

[1] Sub-slab soil vapor methane concentrations exceeding interim action levels have been identified as a result of leaking natural gas utility lines, which were found at several of the residential properties, and a leaking sewer line at two residential properties.

6.0 RISK CHARACTERIZATION

Risk characterization integrates the results of the toxicity assessment and the exposure assessment to estimate potential incremental lifetime cancer risks and adverse noncancer health effects associated with exposure to chemicals detected at the Site. This integration provides quantitative estimates of cancer risk and noncancer hazard that are then compared to acceptable standards that were discussed in Section 5.

The process of an HHRA is an iterative process where site, receptor, and chemical-specific data are used when available. When specific data are not available, conservative, i.e., health protective, assumptions are utilized (e.g., assuming a resident is in daily contact with exposed soil and ingesting soil at a rate of 100 mg/day). The use of repeated, conservative assumptions can lead to overly conservative estimations of risk or hazard, but which provides an upper-bound estimate of the actual risk or hazard. Thus, for any site, the estimated risk or hazard level reflect an upper-bound estimate of potential risk or hazard. The most probable risk or hazard is likely to be much less, perhaps as low as zero, and probably not measurable in the potentially exposed population.

The methodology for deriving risk-based SSCGs for residential and construction and utility maintenance worker populations and potential exposure routes were presented in the Revised SSCG report (Geosyntec, 2013) and discussed above. This section presents the methodology in which SSCGs were used to estimate chemical-specific and cumulative risk and hazard for the Site. Estimated ILCRs and noncancer HIs are presented and discussed.

This HHRA also includes SSCGs and analysis regarding the presence of COCs in soil at background levels and potential leaching to groundwater. These additional considerations are also included in the risk characterization for the Site and are discussed in this section.

6.1 Human Health Cumulative Risk Methodology

This section presents the approach used in comparing the concentrations of individual COCs in soil, sub-slab soil vapor, and soil vapor to the SSCGs, and in estimating the cumulative ILCR and noncancer hazard associated with exposure to the COCs. As discussed in Section 3.3, soil EPCs for property and street data for each depth interval are based on the 95UCL if sufficient data are available. The maximum concentration for an individual COC is used if sufficient data are not available to calculate a 95UCL. The maximum detected vapor concentrations for each property was used in the analysis

for potential residential exposure to sub-slab soil vapor and for construction and utility maintenance worker exposure to soil vapor. For soil vapor data collected in the streets, the 95UCL was calculated and used in the risk characterization.

The cumulative ILCR and noncancer hazard posed by the presence of COCs detected in soil, sub-slab soil vapor, and soil vapor were estimated in this HHRA using the following equations

Cumulative incremental lifetime cancer risk:

For COCs in soil:

$$ILCR_{tot} = \left[\sum_{i=1}^{n}\left(\frac{EPC_{Soil\,i}}{SSCG_{Soil\text{-}C,i}}\right)\right] \times TR$$

For COCs in soil vapor for the construction and utility maintenance worker:

$$ILCR_{tot} = \left[\sum_{i=1}^{n}\left(\frac{EPC_{SV\,i}}{SSCG_{SV\text{-}C,i}}\right)\right] \times TR$$

For COCs in sub-slab soil vapor for the resident:

$$ILCR_{tot} = \left[\sum_{i=1}^{n}\left(\frac{EPC_{SS\text{-}SV\text{-}C\,i}}{SSCG_{SS\text{-}SV\text{-}C,i}}\right)\right] \times TR$$

Cumulative noncancer hazard index:

For COCs in soil:

$$HI_{tot} = \left[\sum_{i=1}^{n}\left(\frac{EPC_{Soil\,i}}{SSCG_{Soil\text{-}NC,i}}\right)\right] \times THI$$

For COCs in soil vapor for the construction and utility maintenance worker:

$$HI_{tot} = \left[\sum_{i=1}^{n}\left(\frac{EPC_{SV\,i}}{SSCG_{SV\text{-}NC,i}}\right)\right] \times THI$$

For COCs in sub-slab soil vapor for the onsite resident:

$$HI_{tot} = \left[\sum_{i=1}^{n} \left(\frac{EPC_{SS\text{-}SV\,i}}{SSCG_{SS\text{-}SV\text{-}NC,i}} \right) \right] \times THI$$

Where:

$ILCR_{tot}$	=	cumulative incremental lifetime cancer risk from all COCs detected in specific medium (unitless);
EPC_{Soili}	=	exposure point concentration of COC *i* detected in soil (mg/kg);
$SSCG_{Soil\text{-}C}$	=	Site-specific cleanup goal for soil based on cancer effects (mg/kg);
EPC_{SVi}	=	exposure point concentration of COC *i* detected in soil vapor (mg/m^3);
$SSCG_{SV\text{-}C}$	=	Site-specific cleanup goal for soil vapor to outdoor air based on cancer effects (mg/m^3);
$EPC_{SS\text{-}SVi}$	=	exposure point concentration of COC *i* detected in sub-slab soil vapor (mg/m^3);
$SSCG_{SS\text{-}SV\text{-}C}$	=	Site-specific cleanup goal for sub-slab soil vapor to indoor air based on cancer effects (mg/m^3); and
TR	=	target cancer risk (unitless);
HI_{tot}	=	cumulative noncancer hazard index from all COCs detected in the specific medium (unitless);
$SSCG_{Soil\text{-}NC}$	=	Site-specific cleanup goal for soil based on noncancer effects (mg/kg);
$SSCG_{SV\text{-}NC}$	=	Site-specific cleanup goal for soil vapor to outdoor air based on noncancer effects (mg/m^3);
$SSCG_{SS\text{-}SV\text{-}NC}$	=	Site-specific cleanup goal for sub-slab soil vapor to indoor air based on noncancer effects (mg/m^3);
THI	=	target noncancer hazard index (unitless); and
n	=	number of COCs for the medium evaluated (unitless).

The SSCG methodology for estimating cumulative Site cancer risks and noncancer hazards can be applied to each COC detected in soil matrix, sub-slab soil vapor, or soil vapor at the Site. However, it is not always appropriate to include every COC in the cumulative risk and hazard calculations. Background concentrations of COCs should not be considered in the analysis of the cumulative risk and hazard calculations. Background concentrations are those concentrations, either native or anthropogenic,

that are present but not associated with any Site activities. The selection of COCs in an HHRA takes into account background concentrations and only includes those chemicals that have concentrations above their respective background concentration. Because metals and cPAHs are naturally occurring in the environment, background concentrations are generally applied to these constituents detected at a site in the COC selection process. As discussed in Section 2.3, cPAHs and several metals were identified as being above background for select properties within the Kast site. These COCs were included in the risk calculations with the exception of arsenic. Properties where arsenic was determined to be above background have been identified for further consideration in remedial planning.

6.2 Potential Leaching to Groundwater Evaluation

In general, infiltration of water in open areas of the Site has the potential to mobilize COCs present in the vadose zone and continue to transport those COCs to groundwater. This transport is expected to occur at a declining rate through time as the compounds degrade in the vadose zone and they are depleted through leaching. To address this potential migration pathway, cleanup goals for the leaching to groundwater pathway were established for COCs present in both Site soils and groundwater that are protective of groundwater quality, consistent with the Basin Plan and the State's anti-degradation policy.

For groundwater, chemicals present above their respective MCLs or NLs were identified as COCs. These same groundwater COCs were evaluated for the soil leaching to groundwater pathway with the exception of chemicals that were detected in five or less soil samples out of the over 10,000 samples collected for the Site. As discussed in Section 3.1.2.3, the chemicals detected in groundwater, but not evaluated due to very low detection frequencies are the non-Site-related COCs 1,1-dichloroethane, 1,1-dichloroethene, and trans-1,2-dichloroethene.

The SSCG derivation that was presented in the SSCG Report was revised to incorporate the LARWQCB Interim Site Assessment & Cleanup Guidebook (1996) methodology and is presented in **Appendix C**, while the detailed soil data and SSCG comparison spreadsheets are presented in **Appendix E**.

6.3 Risk Characterization Results

As discussed in Section 5.1, various demarcations of acceptable risk have been established by regulatory agencies. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR 300) indicates that lifetime incremental

cancer risks posed by a site should not exceed a range of one in one million (1×10^{-6}) to one hundred in one million (1×10^{-4}) and noncarcinogenic chemicals should not be present at levels that have the potential to cause adverse health effects (i.e., a hazard index greater than 1). If the HI exceeds 1, there may be concern for potential noncarcinogenic health effects. However, an HI above 1 does not indicate an effect will definitely occur due to the margin of safety associated with the exposure assumptions and chemical toxicity criteria used in health risk assessments. Also it should be noted that the scientific methods used in health risk assessment cannot be used to link individual illnesses to chemical exposures, rather health risk assessments are used as a predictive tool to evaluate theoretical risks for remedial decision making.

Incremental Lifetime Cancer Risk (ILCR) estimates were compared to the NCP risk range between 10^{-6} and 10^{-4}. This risk range is in addition to the background risk of Americans in the general population developing cancer from causes unrelated to a Site-specific exposure. The background risk is one chance in three (0.3 or 3×10^{-1}) for an American female, and one chance in two (0.5 or 5×10^{-1}) for an American male of eventually developing cancer (ACS, 2013). For potential residential exposures, results were compared to the lower bound of the risk-range (10^{-6}). For potential worker exposures, results were compared to the mid-point of the risk range (10^{-5}). Noncancer Hazard Indices (HIs) were compared to the threshold value of 1.

Cumulative ILCRs and HIs for the Site are summarized in **Table 14** for potential residential exposure to soil, in **Table 15** for potential construction and utility maintenance worker exposure to soil, **Table 16** for potential residential exposure to soil vapor migrating to indoor air and **Table 17** for potential construction and utility maintenance worker exposure to soil vapor migrating to outdoor air. The detailed cancer risk and noncancer hazard calculation spreadsheets are presented in **Appendix E**. The results for each receptor and exposure pathway scenarios are summarized in the following subsections in relation to the risk ranges mentioned above.

In addition to the evaluation of potential human health risk to COCs in soil, sub-slab soil vapor, and soil vapor, an evaluation of potential COC leaching from soil to groundwater was conducted.

6.3.1 Onsite Resident

6.3.1.1 Soil

Risk characterization results for residents potentially exposed via ingestion, dermal contact and inhalation for the COCs selected for soil are provided in **Table 14** and presented in **Figures 4 through 6** for the different depth intervals evaluated.

For soils ≤2 ft bgs, a total of 86 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or an HI of 1. Seventeen properties had an exceedance of the ILCR of 1×10^{-6}. The ILCR estimates ranged from 2×10^{-6} to 2×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. Two ILCR estimates were at or above a risk level of 1×10^{-5}; the remaining 15 values were at or below 5×10^{-6}. The primary COCs that contributed to the ILCR estimates were benzene, benzo(a)pyrene, ethylbenzene, 1-methylnaphthalene, naphthalene, and PCE (one property). Eighty-six properties were identified as having an exceedance of an HI of 1, ranging from 2 to 10, with two properties having values of 20 and 30. Of these 86 properties, two had HIs of 20 and 30, while 84 properties had HIs ranging from 2 to 10. Thirty-four of those properties have an HI of 2, marginally above the target HI, and with no individual COC-specific HQ above 1. Another 32 properties had HIs ranging from 3 to 5. The primary COCs that contributed to the HI estimates were TPH-d and TPH-mo. One property had a lead hazard quotient of 2, marginally above the HI of 1.

For soils ≤5 ft bgs, 171 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or a hazard index of 1. The ILCR estimates ranged from 2×10^{-6} to 3×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. Two ILCR estimates were at or above a risk level of 1×10^{-5}; the remaining 51 values were at or below 5×10^{-6}. The primary COCs that contributed to the ILCR estimates were benzene, cPAHs, ethylbenzene, 1-methylnaphthalene, naphthalene, PCE (one property) and vinyl chloride (one property). One hundred and seventy (170) properties were identified as having an exceedance of an HI of 1, ranging from 2 to 10, with seven properties having a value of 20 and one property having a value of 40. Thirty-one properties have a value of 2, marginally above the threshold of 1, and 26 properties with no individual COC-specific HQ above 1. Another 104 properties had a value ranging from 3 to 5. The primary COCs that contributed to the HI estimates were TPH-d and TPH-mo, with TPH-d being the primary COC for 55 properties. All lead hazard quotients were below the HI of 1.

For subsurface soils (>5 to ≤10 ft bgs), no properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or an HI of 1 for the

infrequent contact residential exposure scenario. The lead hazard quotient was less than 1.

In addition to the evaluation of incremental cancer risk and noncancer hazard, a property-specific background analysis was conducted for the Site COCs to determine if metals or cPAHs were present in soils above background levels. Metals and cPAHs considered above background were included in the estimates of risk and hazard summarized above with the exception of arsenic. Five properties were identified as being above background for arsenic and should be considered further during remedial planning.

6.3.1.2 Sub-Slab Soil Vapor

Sub-slab soil vapor risk characterization results for residents potentially exposed via indoor air inhalation of COCs are provided in **Table 16** and presented in **Figure 7**.

For sub-slab soil vapor, 49 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or a hazard index of 1. However, the calculated cancer risk was greater than 1×10^{-6} at 23 of these properties due to the presence of trihalomethane compounds (THMs). THMs in soil vapor are a result of off-gassing from municipal water that has been treated with chlorine for disinfection. THMs are not considered Site-COCs, and it is expected that any treatment of THMs would be temporary at best given that residential use of municipal water will continue after remediation. Consequently, risks excluding the contributions of the THMs are also presented in Table 16.

Excluding the THMs, 26 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or a hazard index of 1. The ILCR estimates for 24 properties ranged from 2×10^{-6} to 3×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. Two ILCR estimates were at 1×10^{-4} and 3×10^{-3}, at and above the upper-bound of the risk management range of 1×10^{-4}.

- The property with the highest ILCR estimate is 378 249th Street where elevated benzene concentrations were observed underneath the garage and a sub-slab mitigation system was installed as an interim measure. Two indoor air sampling events have been conducted at this property and the multiple-lines-of-evidence vapor intrusion evaluation indicated that the indoor air concentrations are indistinguishable from background levels.

- The property with the second highest ILCR estimate is 24603 Marbella Avenue where elevated benzene concentrations were observed in one sample in the backyard during the first round of soil vapor sampling for that property. The result was not confirmed in the subsequent two sampling events in which benzene was not detected in any sub-slab soil vapor sample from the property. Additionally, two indoor air sampling events have been conducted at this property and the multiple-lines-of-evidence vapor intrusion evaluation indicated that the indoor air concentrations are indistinguishable from background levels.

The primary COCs that contributed to the ILCR estimates were benzene, carbon tetrachloride, chloroform, ethylbenzene, methylene chloride, naphthalene, PCE, TCE and vinyl chloride (one property). Of the 26 properties that were identified, five properties had no individual ILCR estimate above 1×10^{-6}. Two properties were identified as having an exceedance of a hazard index of 1, with values of 2 and 5. These two properties were also identified as having an ICLR exceedance of greater than 1×10^{-6}.

6.3.2 Construction and Utility Maintenance Worker

6.3.2.1 Soil

Risk characterization results for workers potentially exposed via ingestion, dermal contact and inhalation for COCs selected for soil are provided in **Table 15** and presented in **Figure 6** for $\leq$10 ft bgs. Construction and utility maintenance worker exposures were evaluated for two areas within the Kast Site: (1) within the individual property boundaries and (2) within the Streets.

For property data, 9 properties were identified as having an exceedance of the target risk of 1×10^{-5} or an HI of 1. The ILCR estimates ranged from 2×10^{-5} to 3×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. The primary COC that contributed to the ILCR estimates was benzene. One hundred and thirty eight (138) properties were identified as having an exceedance of an HI of 1, ranging from 2 to 10. Ninety of those properties have a value of 2, marginally above the threshold of 1. The primary COCs that contributed to the HI estimates were TPH-d and TPH-g, with TPH-d the primary contributor at 118 properties. The lead hazard quotients were less than 1.

In addition to the evaluation of incremental cancer risk and noncancer hazard, a property-specific background analysis was conducted for the Site COCs to determine if metals or cPAHs were present in soils above background levels. Metals and cPAHs considered above background were included in the estimates of risk and hazard

summarized above with the exception of arsenic. Six properties were identified as being above background for arsenic and should be considered further during remedial planning.

For data collected in the Streets the ILCR was 2×10^{-5} with no individual COC having a risk greater than 1×10^{-5}. The noncancer HI estimate was 6 with TPH-d and TPH-g as the primary contributors to the HI estimate. The lead hazard quotient was less than 1.

6.3.2.2 Soil Vapor

Soil vapor risk characterization results for construction and utility maintenance workers potentially exposed via outdoor air inhalation of COCs are provided in **Table 17**.

No property had an ILCR greater than 1×10^{-5} or a noncancer HI greater than 1. For data collected in the streets the ILCR was 2×10^{-5} and the noncancer HI estimate was 0.04.

6.3.3 Potential Soil Leaching to Groundwater

An evaluation was conducted for the potential for COCs to migrate from the soil to underlying groundwater at the Site. For soil $\leq$5 ft bgs within the properties, one hundred and seventy-nine (179) properties exceed the soil-leaching-to-groundwater SSCGs. TPHd, naphthalene, and benzene are the compounds with the most frequent exceedance in this depth interval. For soil >5 to $\leq$10 ft bgs, one hundred and seventy-two (172) properties exceed the soil-leaching-to-groundwater SSCGs. TPHd, naphthalene, benzene, TPHg, and TPHmo are the chemicals with the most frequent exceedance in this depth interval. The property-specific results are presented in **Table 14** and are presented in **Figures 4 and 5** for the different depth intervals evaluated.

A total of ten properties were identified as having metals present above background due to the presence of arsenic, antimony, or thallium. A review of the data with respect to depth interval was conducted to evaluate whether the presence of these metals concentrations above background would be addressed through shallow excavation or remain at depths from > 5 to 10 feet bgs and pose a potential for leaching to groundwater.

Antimony was present above background levels at one property, but detections above background concentrations are present in surface shallow soil and can be addressed by excavation.

Arsenic was present above background levels at five properties and thallium was present above background levels at four properties. The detections of arsenic and

thalium above background are localized and do not represent a significant mass for leaching to groundwater. Leaching of arsenic and thallium to groundwater is not expected to be above what would occur for background soils. However, groundwater will be monitored to assess whether an increase in arsenic or thallium concentrations due to the leaching pathway is occurring.

For soil data collected in the streets from ≤10 ft bgs, the maximum and 95UCL EPCs were compared to the soil-leaching-to-groundwater SSCGs (**Table 18**). The maximum EPC was also used because of the large area over which the street data was averaged using the 95UCL approach. Using the 95UCL EPCs, five COC concentrations exceeded the SSCGs for leaching to groundwater (benzene, naphthalene, TPH-g, TPG-d and TPH-mo). Using the maximum detected EPC, nine COC concentrations exceeded their respective soil leaching to groundwater SSCGs (1,2,3-trichloropropane, antimony, arsenic, benzene, naphthalene, thallium, TPHg, TPGd and TPHmo).

6.3.4 Potential Human Health Exposures and Soil Leaching to Groundwater

The results of the HHRA are presented graphically on Figures 4, 5, 6 and 7. Property addresses that exceeded the lower bound of the risk management range for ILCR and a noncancer hazard index of 1 for soil and sub-slab soil vapor, respectively are identified. In addition, soil leaching to groundwater and metals present above background are considered. For sub-slab soil vapor, concentrations of methane were also considered. These properties along with impacts in the Streets are identified as not meeting the RAOs established for the Site and are considered further in the RAP.

The number of properties that have been identified for consideration in the FS and RAP are summarized in the table below:

Media	Depth	Number of Properties for Consideration
Soil	≤5 ft bgs	183
Soil	>5 to ≤10 ft bgs	173
Soil	≤5 ft bgs and >5 to ≤10 ft bgs combined	214
Soil Vapor	Sub-Slab	27

7.0 UNCERTAINTIES

The results of a risk assessment are estimates only and include some uncertainty. Where possible, conservative (health-protective) assumptions were used as inputs into the HHRA, which is consistent with agency guidance. Key uncertainties associated with this HHRA include:

- To identify COCs for each media, the maximum concentration for that media was compared to one-tenth of its respective RBSL. One-tenth of the RBSL was used as a conservative approach to screen chemicals for further analysis and to address potential cumulative health effects. If the maximum concentration was greater than one-tenth of the RBSL, the chemical was selected as a COC for the Site. An additional screening criterion for soil was if the chemical was detected in five or less samples it was excluded from the SSCG derivation. Due to the large number of soil samples collected (over 10,000), this equates to less than or equal to 0.05 percent of soil samples. This screening step does not significantly affect the results of the cumulative risk calculations due to the conservative nature of the COC screen (only screening out chemicals that contribute insignificantly to risk) and the limited number of COCs identified for the Site that contribute the majority to the ILCR and noncancer HI estimates.
- The potential for concentrations to attenuate over time was not considered in this HHRA. For example, the model upon which volatilization is estimated assumes that the source of COCs is infinite (i.e., not depleting) and fixed in place (i.e., steady-state conditions are present) even though the concentrations would likely deplete over time. This depletion would be accelerated by biodegradation or other processes, which were not considered in this HHRA. Therefore, the risks and hazards estimated in this HHRA are likely to be lower than predicted, especially because biodegradation or other natural attenuation processes are occurring.
- There are uncertainties associated with the soil physical parameters (e.g., porosity and moisture content) that were used in the fate and transport models. The soil lithology can vary across the area of evaluation both vertically and horizontally. This may lead to variation in flux from different areas, which results in uncertainty in the estimation of potential risks and hazards. However, there have been numerous soil borings installed at the Site adequately characterizing the general lithology and reducing the uncertainty in the soil type selected for the fate and transport modeling.

- Soil vapor was used to evaluate the vapor intrusion pathway. The vapor intrusion evaluation presented in the SSCG report indicated that concentrations observed in indoor air are not attributable to sub-slab vapor concentrations. In response to RWQCB comments on the SSCG Report (Geosyntec, 2013) , additional analysis was conducted to investigate the relationship between indoor air and sub-slab soil vapor concentrations. Based on the analysis, an upper-bound vapor intrusion attenuation factor of 0.001 was identified in the Revised SSCG Report. However, as directed by the RWQCB (RWQCB, 2014), a vapor intrusion attenuation factor of 0.002 was used to derive sub-slab soil vapor SSCGs. The use of an attenuation factor of 0.002, rather than the upper-bound value of 0.001 derived using Site data, will result in an even more conservative, over-estimation of indoor air concentrations as compared to the upper-bound Site-specific value.
- Uncertainty in the toxicity assessment arises for those chemicals which rely on animal studies as the basis for determining the appropriate toxicity value for effects on humans. Toxicity values typically assume that adverse effects observed in animal toxicity experiments would also be observed in humans. In addition, a margin of safety is added in the derivation of toxicity values used in health risk assessments which results in a conservative and likely over-estimation of potential health risks. Likewise, the use of route-to-route extrapolation for those COCs for which inhalation toxicity criteria (RfCs or RELs) are not available could be considered a conservative approach and thus result in an over-estimation of potential health risk or hazard for that compound. The use of surrogate chemicals to represent the COCs that appear to be structurally similar could result in an over- or under-estimation of potential health risk or hazard for that compound. For this Site, there were only a few COCs in which surrogate information was used – and these COCs did not contribute significantly to the risk or hazard estimates. Therefore, this uncertainty is thought to have a small effect on the HHRA results.
- Assumed exposure durations used in this HHRA represent upper-bound estimates of the total amount of time that an individual may be either indoors or outdoors for the full duration of the exposure period. In other words, the HHRA assumptions entail the receptor staying outdoor or indoors the entire duration of the exposure period. As a result, the estimated incremental cancer risks and noncancer hazards are over-estimated.
- The PEF used for a construction worker is based on $1/10^{th}$ of the Permissible Exposure Limit of 10 mg/m^3, which is considered a conservative estimate of dust that may be generated. It is anticipated that engineering controls will be in

place, such as the use of water to suppress dust, which will limit this type of exposure.

- The HHRA assumed that the soil is exposed to the surface. The majority of the Site is currently covered by landscaping and hardscape, thus limiting direct contact and fugitive dust exposures. As a result, risk and hazard estimates presented in this HHRA are likely higher than if actual Site characteristics are considered, such as hardscape that would limit exposure.

In summary, because a HHRA contains multiple sources of uncertainty, simplifying assumptions are often made so that potential health risks and hazards can be estimated quantitatively. Since the exact amount of uncertainty cannot be quantified, the HHRA is intended to over-estimate rather than under-estimate probable cancer risk or noncancer hazard. Results of this HHRA, therefore, are likely to be protective of health despite the inherent uncertainties in the process.

8.0 SUMMARY

Geosyntec conducted this HHRA to estimate potential human health risks associated with COCs detected in soil, sub-slab soil vapor, and soil vapor at the Site. In addition, the potential for COCs in soil to migrate to groundwater was evaluated. The findings of this HHRA are used as a basis for remedy evaluation in the FS, and remedial action planning as presented in the RAP.

The methodology used in this HHRA is consistent with current USEPA, Regional Board, and Cal-EPA DTSC guidance (USEPA, 1989; 1991a; 2002ab; 2009; 2013ab; RWQCB, 1996; Cal-EPA, 2011ab; 2013a) and incorporates the methodology presented in the Revised SSCG Report (Geosyntec, 2013) with modifications based on comments received from the Regional Board in January 2014.

This HHRA addresses potential onsite exposures to current residents and construction and utility maintenance workers. Potential exposures to COCs detected in surface and shallow soils have been evaluated for the direct contact pathways, as well as inhalation of volatile COCs in outdoor air and nonvolatile COCs in fugitive dust. Additionally, the potential for volatile COCs to migrate from the subsurface (using sub-slab soil vapor data) into residential structures present above ground was evaluated. This is a conservative approach given that the analysis of the vapor intrusion pathway presented in the Revised SSCG report indicated that vapor intrusion is not a significant pathway at this Site and that observed concentrations in indoor air are likely due to background sources. However, as directed by the Regional Board the vapor intrusion pathway was quantitatively evaluated in the HHRA Potential exposures to COCs in soil vapor were also evaluated for inhalation of vapors in outdoor air.

Incremental Lifetime Cancer Risk (ILCR) estimates were compared to the risk range between 10^{-6} and 10^{-4} commonly called the "discretionary risk range." This risk range is in addition to the background risk of Americans in the general population developing cancer from causes unrelated to a Site-specific exposure. The background risk is one chance in three (0.3 or 3×10^{-1}) for an American female, and one chance in two (0.5 or 5×10^{-1}) for an American male of eventually developing cancer (ACS, 2013). For potential residential exposures, results were compared to the lower bound of the risk-range (10^{-6}). For potential worker exposures, results were compared to the mid-point of the risk range (10^{-5}). Noncancer Hazard Indices (HIs) were compared to the threshold value of 1.

Soil

For soils ≤2 ft bgs, a total of 86 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or an HI of 1 assuming potential residential exposure. Seventeen properties had an exceedance of the ILCR of 1×10^{-6}. The ILCR estimates ranged from 2×10^{-6} to 2×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. The primary COCs that contributed to the ILCR estimates were benzene, benzo(a)pyrene, ethylbenzene, 1-methylnaphthalene, naphthalene, and PCE (one property). Eighty-six properties were identified as having an exceedance of an HI of 1, ranging from 2 to 10, with two properties having values of 20 and 30. The primary COCs that contributed to the HI estimates were TPH-d and TPH-mo.

For soils ≤5 ft bgs, 171 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or a hazard index of 1. The ILCR estimates ranged from 2×10^{-6} to 3×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. The primary COCs that contributed to the ILCR estimates were benzene, cPAHs, ethylbenzene, 1-methylnaphthalene, naphthalene, PCE (one property) and vinyl chloride (one property). One hundred and seventy (170) properties were identified as having an exceedance of an HI of 1, ranging from 2 to 10, with seven properties having a value of 20 and one property having a value of 40. The primary COCs that contributed to the HI estimates were TPH-d and TPH-mo, with TPH-d being the primary COC for 55 properties.

For subsurface soils (>5 to ≤10 ft bgs), no properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or an HI of 1 for the infrequent contact residential exposure scenario.

In addition to the evaluation of incremental cancer risk and noncancer hazard, a property-specific background analysis was conducted for the Site COCs to determine if metals or cPAHs were present in soils above background levels. Metals and cPAHs considered above background were included in the estimates of risk and hazard summarized above with the exception of arsenic. Six properties were identified as being above background for arsenic and should be considered further during remedial planning.

Nine properties were identified as having an exceedance of the target risk of 1×10^{-5} or an HI of 1 for potential construction and utility maintenance worker exposures. The ILCR estimates ranged from 2×10^{-5} to 3×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. The primary COC that contributed to the ILCR estimates was benzene. One hundred and thirty eight (138) properties were identified as having an exceedance

of an HI of 1, ranging from 2 to 10. Ninety of those properties have a value of 2, marginally above the threshold of 1. The primary COCs that contributed to the HI estimates were TPHd and TPHg, with TPHd the primary contributor at 118 properties.

For data collected in the Streets the ILCR was 2×10^{-5} with no individual COC having a risk greater than 1×10^{-5}. The noncancer HI estimate was 6 with TPH-d and TPH-g as the primary contributors to the HI estimate.

Soil Vapor

For sub-slab soil vapor, 49 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or a hazard index of 1. However, the calculated cancer risk was greater than 1×10^{-6} at 23 of these properties due to the presence of trihalomethane compounds (THMs). THMs in soil vapor are a result of off-gassing from municipal water that has been treated with chlorine for disinfection.

Excluding the THMs, 26 properties were identified as having an exceedance of the lower bound of the risk range of 1×10^{-6} or a hazard index of 1. The ILCR estimates for 24 properties ranged from 2×10^{-6} to 3×10^{-5}, well within the risk management range of 10^{-6} to 10^{-4}. Two ILCR estimates were at 1×10^{-4} and 3×10^{-3}, at and above the upper-bound of the risk management range of 1×10^{-4}; the highest ILCR was observed where sub-slab mitigation is in place beneath the garage. The second highest value was from a single detection of benzene in an early round of sampling; all subsequent rounds of sampling were nondetect.

No property had an ILCR greater than 1×10^{-5} or a noncancer HI greater than 1 for potential construction and utility maintenance worker exposures. For data collected in the streets the ILCR was 2×10^{-5} and the noncancer HI estimate was 0.04.

Potential Soil Leaching to Groundwater

For soil $\leq$5 ft bgs within the properties, one hundred and seventy-nine (179) properties exceed the soil-leaching-to-groundwater SSCGs. TPHd, naphthalene, and benzene are the compounds with the most frequent exceedance in this depth interval. For soil >5 to $\leq$10 ft bgs, one hundred and seventy-two (172) properties exceed the soil-leaching-to-groundwater SSCGs. TPHd, naphthalene, benzene, TPHg, and TPHmo are the chemicals with the most frequent exceedance in this depth interval. For soil data collected in the streets from $\leq$10 ft bgs, nine COC concentrations exceeded their respective soil leaching to groundwater SSCGs (1,2,3-trichloropropane, antimony, arsenic, benzene, naphthalene, thallium, TPHg, TPGd and TPHmo).

Potential Human Health Exposures and Soil Leaching to Groundwater

The results of the HHRA are presented graphically on Figures 4, 5, 6 and 7. Property addresses that exceeded the lower bound of the risk management range for ILCR and a noncancer hazard index of 1 for soil and sub-slab soil vapor, respectively are identified. In addition, soil leaching to groundwater and metals present above background are considered. For sub-slab soil vapor, concentrations of methane were also considered. These properties along with impacts in the Streets are identified as not meeting the RAOs established for the Site and are considered further in the RAP.

The number of properties that have been identified for consideration in the FS and RAP are summarized in the table below:

Media	Depth	Number of Properties for Consideration
Soil	≤5 ft bgs	183
Soil	>5 to ≤10 ft bgs	173
Soil	≤5 ft bgs and >5 to ≤10 ft bgs combined	214
Soil Vapor	Sub-slab	27

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TABLES

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 2 ft bgs							≤ 5 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
630-20-6	1,1,1,2-Tetrachloroethane	ug/kg	4759	0	0	0.17	290	--	--	7729	0	0	0.17	1500	--	--
71-55-6	1,1,1-Trichloroethane	ug/kg	4759	0	0	0.17	220	--	--	7729	1	0.01	0.16	1100	0.86	0.86
79-34-5	1,1,2,2-Tetrachloroethane	ug/kg	4759	8	0.17	0.08	200	0.1	0.48	7729	26	0.34	0.08	1000	0.1	420
79-00-5	1,1,2-Trichloroethane	ug/kg	4759	0	0	0.16	210	--	--	7729	4	0.05	0.16	1100	0.23	14
75-34-3	1,1-Dichloroethane	ug/kg	4759	1	0.02	0.1	140	0.26	0.26	7729	1	0.01	0.1	700	0.26	0.26
75-35-4	1,1-Dichloroethene	ug/kg	4759	1	0.02	0.091	120	0.18	0.18	7729	1	0.01	0.091	620	0.18	0.18
563-58-6	1,1-Dichloropropene	ug/kg	4759	0	0	0.14	190	--	--	7729	0	0	0.14	980	--	--
87-61-6	1,2,3-Trichlorobenzene	ug/kg	4759	7	0.15	0.13	180	0.18	53	7729	17	0.22	0.13	900	0.18	69
96-18-4	1,2,3-Trichloropropane	ug/kg	4759	8	0.17	0.2	570	0.55	1.3	7729	13	0.17	0.2	2900	0.48	130
120-82-1	1,2,4-Trichlorobenzene	ug/kg	4759	3	0.06	0.12	160	0.17	17	7732	7	0.09	0.12	81000	0.17	33
95-63-6	1,2,4-Trimethylbenzene	ug/kg	4759	1063	22	0.077	64	0.089	48000	7729	2212	29	0.077	99	0.089	60000
96-12-8	1,2-Dibromo-3-Chloropropane	ug/kg	4759	0	0	0.5	3200	--	--	7729	1	0.01	0.5	16000	9.6	9.6
106-93-4	1,2-Dibromoethane (EDB)	ug/kg	4759	2	0.04	0.19	180	0.51	950	7729	2	0.03	0.19	2000	0.51	950
95-50-1	1,2-Dichlorobenzene	ug/kg	4759	8	0.17	0.084	110	0.11	1.9	7732	15	0.19	0.084	41000	0.11	330
107-06-2	1,2-Dichloroethane	ug/kg	4759	5	0.11	0.11	150	0.2	3.7	7729	5	0.06	0.11	750	0.2	3.7
78-87-5	1,2-Dichloropropane	ug/kg	4759	2	0.04	0.17	230	0.31	0.65	7729	4	0.05	0.17	1200	0.31	100
108-67-8	1,3,5-Trimethylbenzene	ug/kg	4759	146	3.1	0.065	60	0.083	12000	7729	804	10	0.065	440	0.079	25000
541-73-1	1,3-Dichlorobenzene	ug/kg	4759	1	0.02	0.11	140	0.21	0.21	7732	4	0.05	0.11	41000	0.21	30
142-28-9	1,3-Dichloropropane	ug/kg	4759	0	0	0.12	150	--	--	7729	1	0.01	0.12	780	0.19	0.19
106-46-7	1,4-Dichlorobenzene	ug/kg	4759	65	1.4	0.1	130	0.14	200	7732	76	0.98	0.1	61000	0.13	200
90-12-0	1-Methylnaphthalene	mg/kg	4755	1383	29	0.001	48	0.001	45	7727	2972	38	0.001	48	0.001	160
594-20-7	2,2-Dichloropropane	ug/kg	4759	0	0	0.24	400	--	--	7729	0	0	0.24	2000	--	--
95-95-4	2,4,5-Trichlorophenol	mg/kg	4755	0	0	0.013	76	--	--	7727	0	0	0.0121	150	--	--
88-06-2	2,4,6-Trichlorophenol	mg/kg	4755	0	0	0.013	79	--	--	7727	1	0.01	0.0121	160	0.14	0.14
120-83-2	2,4-Dichlorophenol	mg/kg	4755	1	0.02	0.013	69	0.43	0.43	7727	1	0.01	0.0121	140	0.43	0.43
105-67-9	2,4-Dimethylphenol	mg/kg	4755	0	0	0.013	60	--	--	7727	0	0	0.0121	120	--	--
51-28-5	2,4-Dinitrophenol	mg/kg	4755	0	0	0.045	360	--	--	7727	0	0	0.045	720	--	--
121-14-2	2,4-Dinitrotoluene	mg/kg	4755	5	0.11	0.013	76	0.061	1.6	7727	7	0.09	0.0121	150	0.061	1.6
606-20-2	2,6-Dinitrotoluene	mg/kg	4755	0	0	0.008	83	--	--	7727	2	0.03	0.008	170	0.058	0.18
78-93-3	2-Butanone (Methyl Ethyl Ketone)	ug/kg	4759	540	11	1.5	8300	2.7	2700	7729	736	9.5	1.5	42000	2.5	2700

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 2 ft bgs							≤ 5 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
91-58-7	2-Chloronaphthalene	mg/kg	4755	2	0.04	0.0083	49	0.16	0.56	7727	2	0.03	0.0083	97	0.16	0.56
95-57-8	2-Chlorophenol	mg/kg	4755	0	0	0.013	68	--	--	7727	0	0	0.0121	140	--	--
95-49-8	2-Chlorotoluene	ug/kg	4759	4	0.08	0.076	48	0.15	180	7729	5	0.06	0.076	520	0.15	180
591-78-6	2-Hexanone	ug/kg	4759	8	0.17	0.8	4900	2.3	31	7729	9	0.12	0.8	25000	2.3	31
91-57-6	2-Methylnaphthalene	mg/kg	4755	3543	75	0.0006	47	0.0006	72	7727	5688	74	0.0006	47	0.0006	260
95-48-7	2-Methylphenol	mg/kg	4755	0	0	0.013	70	--	--	7727	0	0	0.0121	140	--	--
88-74-4	2-Nitroaniline	mg/kg	4755	0	0	0.046	82	--	--	7727	0	0	0.046	160	--	--
88-75-5	2-Nitrophenol	mg/kg	4755	0	0	0.013	64	--	--	7727	0	0	0.0121	130	--	--
91-94-1	3,3'-Dichlorobenzidine	mg/kg	4755	0	0	0.0093	540	--	--	7727	0	0	0.0093	1100	--	--
106-44-5	3/4-Methylphenol	mg/kg	4755	1	0.02	0.0547	68	0.073	0.073	7727	1	0.01	0.0121	140	0.073	0.073
99-09-2	3-Nitroaniline	mg/kg	4755	0	0	0.01	79	--	--	7727	0	0	0.01	160	--	--
534-52-1	4,6-Dinitro-2-Methylphenol	mg/kg	4755	0	0	0.05	790	--	--	7727	0	0	0.0483	1600	--	--
101-55-3	4-Bromophenyl-Phenyl Ether	mg/kg	4755	0	0	0.0067	50	--	--	7727	0	0	0.0067	100	--	--
59-50-7	4-Chloro-3-Methylphenol	mg/kg	4755	0	0	0.013	76	--	--	7727	0	0	0.0121	150	--	--
106-47-8	4-Chloroaniline	mg/kg	4755	0	0	0.013	62	--	--	7727	0	0	0.0121	120	--	--
7005-72-3	4-Chlorophenyl-Phenyl Ether	mg/kg	4755	0	0	0.0057	52	--	--	7727	0	0	0.0057	100	--	--
106-43-4	4-Chlorotoluene	ug/kg	4759	0	0	0.068	91	--	--	7729	0	0	0.068	460	--	--
108-10-1	4-Methyl-2-Pentanone	ug/kg	4759	21	0.44	0.8	1800	1.8	15	7729	23	0.30	0.8	9000	1.4	15
MEPH4	4-Methylphenol (p-Cresol)	mg/kg	315	5	1.6	0.079	24	0.14	0.22	489	7	1.4	0.079	47	0.14	0.22
100-01-6	4-Nitroaniline	mg/kg	4755	0	0	0.05	70	--	--	7727	0	0	0.0483	140	--	--
100-02-7	4-Nitrophenol	mg/kg	4755	0	0	0.0067	79	--	--	7727	0	0	0.0067	160	--	--
83-32-9	Acenaphthene	mg/kg	4755	531	11	0.0009	49	0.00099	7.1	7727	1980	26	0.0009	49	0.00099	17
208-96-8	Acenaphthylene	mg/kg	4755	1022	21	0.0006	64	0.0006	1	7727	1502	19	0.0006	64	0.0006	4.5
67-64-1	Acetone	ug/kg	4759	4442	93	4.7	5600	5	860	7729	6514	84	4.6	28000	5	1400
C19C32ALIPH	Aliphatics (C19 - C32)	mg/kg	917	808	88	5	10	5	7200	1483	1246	84	5	10	5	32000
C5C8ALIPH	Aliphatics (C5 - C8)	mg/kg	917	373	41	0.0091	0.5	0.0091	1100	1482	748	50	0.0091	0.5	0.0091	5800
C9C18ALIPH	Aliphatics (C9 - C18)	mg/kg	917	356	39	5	10	5	3000	1482	652	44	5	10	5	6300
62-53-3	Aniline	mg/kg	4755	2	0.04	0.056	56	0.97	1.6	7727	4	0.05	0.056	110	0.088	2.6
120-12-7	Anthracene	mg/kg	4755	1636	34	0.0004	57	0.00054	26	7727	2964	38	0.0004	57	0.00054	26
7440-36-0	Antimony	mg/kg	4724	920	19	0.149	0.306	0.151	4.92	7676	1454	19	0.149	0.306	0.151	6.45

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 2 ft bgs							≤ 5 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
12674-11-2	AROCLOR 1016	ug/kg	13	0	0	10	10	--	--	29	0	0	10	14	--	--
11104-28-2	AROCLOR 1221	ug/kg	13	0	0	10	10	--	--	29	0	0	10	13	--	--
11141-16-5	AROCLOR 1232	ug/kg	13	0	0	10	10	--	--	29	0	0	10	11	--	--
53469-21-9	AROCLOR 1242	ug/kg	13	0	0	10	10	--	--	29	0	0	10	12	--	--
12672-29-6	AROCLOR 1248	ug/kg	13	0	0	10	10	--	--	29	0	0	10	14	--	--
11097-69-1	AROCLOR 1254	ug/kg	13	0	0	10	10	--	--	29	0	0	10	12	--	--
11096-82-5	AROCLOR 1260	ug/kg	13	0	0	11	11	--	--	29	0	0	11	11	--	--
37324-23-5	AROCLOR 1262	ug/kg	13	0	0	10	10	--	--	29	0	0	10	12	--	--
C17C32AROM	Aromatics (C17 - C32)	mg/kg	917	765	83	5	10	5	6000	1483	1174	79	5	10	5	36000
C6C8AROM	Aromatics (C6 - C8)	mg/kg	917	70	7.6	0.0002	0.02	0.0002	60	1483	267	18	0.0002	0.02	0.0002	310
C9C16AROM	Aromatics (C9 - C16)	mg/kg	917	400	44	5	10	5	6800	1483	724	49	5	10	5	41000
7440-38-2	Arsenic	mg/kg	4724	4705	100	0.259	0.398	0.398	20	7676	7646	100	0.259	0.398	0.398	50.9
103-33-3	Azobenzene	mg/kg	4755	0	0	0.1	54	--	--	7727	0	0	0.1	110	--	--
7440-39-3	Barium	mg/kg	4724	4724	100			10.9	457	7676	7676	100	--	--	10.9	1020
71-43-2	Benzene	ug/kg	4759	2761	58	0.095	55	0.1	13000	7729	4118	53	0.095	600	0.1	24000
92-87-5	Benzidine	mg/kg	4755	0	0	0.071	460	--	--	7727	0	0	0.071	930	--	--
56-55-3	Benzo (a) Anthracene	mg/kg	4755	3936	83	0.00065	95	0.0007	19	7727	5998	78	0.00065	95	0.0007	47
50-32-8	Benzo (a) Pyrene	mg/kg	4755	3947	83	0.00049	43	0.0005	9	7727	5889	76	0.00049	43	0.0005	22
205-99-2	Benzo (b) Fluoranthene	mg/kg	4755	3421	72	0.00035	42	0.0005	5.2	7727	4975	64	0.00035	42	0.0005	16
191-24-2	Benzo (g,h,i) Perylene	mg/kg	4755	3977	84	0.00047	45	0.00057	5.7	7727	5691	74	0.00047	45	0.00052	13
207-08-9	Benzo (k) Fluoranthene	mg/kg	4755	1381	29	0.0007	55	0.00073	2.3	7727	1919	25	0.0007	55	0.00073	4.6
65-85-0	Benzoic Acid	mg/kg	4755	6	0.13	0.064	390	0.29	1.5	7727	7	0.09	0.064	780	0.12	1.5
100-51-6	Benzyl Alcohol	mg/kg	4755	1	0.02	0.054	77	1.8	1.8	7727	1	0.01	0.054	150	1.8	1.8
7440-41-7	Beryllium	mg/kg	4724	4717	100	0.0894	0.0894	0.102	1.17	7676	7667	100	0.0894	0.137	0.0906	1.19
111-91-1	Bis(2-Chloroethoxy) Methane	mg/kg	4755	0	0	0.012	62	--	--	7727	0	0	0.012	120	--	--
111-44-4	Bis(2-Chloroethyl) Ether	mg/kg	4755	0	0	0.013	57	--	--	7727	0	0	0.0121	110	--	--
108-60-1	Bis(2-Chloroisopropyl) Ether	mg/kg	4755	0	0	0.013	60	--	--	7727	0	0	0.0121	120	--	--
117-81-7	Bis(2-Ethylhexyl) Phthalate	mg/kg	4755	239	5.0	0.039	48	0.11	6.9	7727	290	3.8	0.039	96	0.083	22
108-86-1	Bromobenzene	ug/kg	4759	1	0.02	0.14	180	0.41	0.41	7729	2	0.03	0.14	930	0.41	0.42
74-97-5	Bromochloromethane	ug/kg	4759	0	0	0.51	1200	--	--	7729	0	0	0.5	6100	--	--

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 2 ft bgs							≤ 5 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
75-27-4	Bromodichloromethane	ug/kg	4759	24	0.50	0.08	60	0.12	660	7729	25	0.32	0.08	650	0.12	660
75-25-2	Bromoform	ug/kg	4759	6	0.13	0.3	580	0.65	2.9	7729	7	0.09	0.3	2900	0.65	140
74-83-9	Bromomethane	ug/kg	4759	119	2.5	0.5	1600	0.71	850	7729	202	2.6	0.5	8200	0.69	900
85-68-7	Butyl Benzyl Phthalate	mg/kg	4755	72	1.5	0.013	50	0.12	1	7727	90	1.2	0.0121	100	0.023	1
7440-43-9	Cadmium	mg/kg	4724	1662	35	0.0064	0.135	0.0072	9.02	7676	2274	30	0.0064	0.135	0.007	9.02
75-15-0	Carbon Disulfide	ug/kg	4759	2673	56	0.13	150	0.13	52	7729	4320	56	0.13	780	0.13	110
56-23-5	Carbon Tetrachloride	ug/kg	4759	1	0.02	0.21	280	0.3	0.3	7729	1	0.01	0.21	1400	0.3	0.3
108-90-7	Chlorobenzene	ug/kg	4759	90	1.9	0.098	62	0.12	150	7729	121	1.6	0.098	660	0.12	150
75-00-3	Chloroethane	ug/kg	4759	7	0.15	0.27	360	0.39	1.8	7729	10	0.13	0.27	1800	0.39	1.8
67-66-3	Chloroform	ug/kg	4759	493	10	0.11	150	0.14	110	7729	666	8.6	0.11	760	0.14	110
74-87-3	Chloromethane	ug/kg	4759	37	0.78	0.23	2500	0.27	520	7729	52	0.67	0.22	13000	0.25	520
7440-47-3	Chromium	mg/kg	4724	4724	100	--	--	2.64	74.2	7676	7676	100	--	--	2.64	74.2
18540-29-9	Chromium, Hexavalent	mg/kg	4635	428	9.2	0.0025	0.43	0.048	1.5	7473	812	11	0.0025	0.43	0.039	1.5
218-01-9	Chrysene	mg/kg	4755	4209	89	0.00058	2.2	0.00062	72	7727	6462	84	0.00058	2.2	0.00062	130
156-59-2	cis-1,2-Dichloroethene	ug/kg	4759	2	0.04	0.19	250	0.33	0.56	7729	8	0.10	0.19	1300	0.31	49
10061-01-5	cis-1,3-Dichloropropene	ug/kg	4759	0	0	0.12	160	--	--	7729	0	0	0.12	810	--	--
7440-48-4	Cobalt	mg/kg	4724	4724	100	--	--	1.19	24.1	7676	7676	100	--	--	1.19	26
7440-50-8	Copper	mg/kg	4724	4724	100	--	--	1.01	1190	7676	7676	100	--	--	1.01	1190
98-82-8	Cumene (Isopropylbenzene)	ug/kg	4759	282	5.9	0.078	67	0.098	5900	7729	1375	18	0.078	220	0.092	11000
53-70-3	Dibenz (a,h) Anthracene	mg/kg	4755	1629	34	0.00052	45	0.00064	1.6	7727	2262	29	0.00052	45	0.00053	3.4
132-64-9	Dibenzofuran	mg/kg	4755	2	0.04	0.0073	58	0.15	0.23	7727	5	0.06	0.0073	120	0.13	0.42
124-48-1	Dibromochloromethane	ug/kg	4759	17	0.36	0.08	170	0.1	6.8	7729	21	0.27	0.08	880	0.1	6.8
74-95-3	Dibromomethane	ug/kg	4759	0	0	0.2	610	--	--	7729	2	0.03	0.2	3100	0.41	0.63
84-66-2	Diethyl Phthalate	mg/kg	4755	239	5.0	0.0063	79	0.061	0.75	7727	369	4.8	0.0063	160	0.06	3.1
108-20-3	Diisopropyl Ether (DIPE)	ug/kg	4759	4	0.08	0.16	220	0.21	0.3	7729	10	0.13	0.16	1100	0.2	0.97
131-11-3	Dimethyl Phthalate	mg/kg	4755	372	7.8	0.008	90	0.052	2.7	7727	574	7.4	0.008	180	0.052	2.7
84-74-2	Di-n-Butyl Phthalate	mg/kg	4755	8	0.17	0.033	48	0.13	0.33	7727	8	0.10	0.033	96	0.13	0.33
117-84-0	Di-n-Octyl Phthalate	mg/kg	4755	2	0.04	0.0083	42	0.47	0.57	7727	3	0.04	0.0083	120	0.27	0.57
64-17-5	Ethanol	ug/kg	4759	639	13	37	87000	50	100000	7729	875	11	37	240000	45	100000
100-41-4	Ethylbenzene	ug/kg	4759	408	8.6	0.1	19	0.12	15000	7729	1485	19	0.1	25	0.12	29000

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Former Kast Property

CAS Number	Analyte	Units	≤ 2 ft bgs							≤ 5 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
637-92-3	Ethyl-t-Butyl Ether (ETBE)	ug/kg	4759	0	0	0.14	190	--	--	7729	0	0	0.14	950	--	--
206-44-0	Fluoranthene	mg/kg	4755	3784	80	0.00049	54	0.0005	11	7727	5922	77	0.00049	54	0.0005	29
86-73-7	Fluorene	mg/kg	4755	968	20	0.00073	53	0.00078	23	7727	2547	33	0.00073	53	0.00078	23
75-69-4	Freon 11	ug/kg	4759	3	0.06	0.1	140	0.17	0.47	7729	3	0.04	0.1	690	0.17	0.47
76-13-1	Freon 113	ug/kg	4759	0	0	0.26	410	--	--	7729	0	0	0.26	2100	--	--
75-71-8	Freon 12	ug/kg	4759	13	0.27	0.13	170	0.16	0.68	7729	21	0.27	0.13	860	0.16	17
87-68-3	Hexachloro-1,3-Butadiene	ug/kg	4755	0	0	0.5	50000	--	--	7727	0	0	0.5	100000	--	--
118-74-1	Hexachlorobenzene	mg/kg	4755	0	0	0.006	52	--	--	7727	0	0	0.006	100	--	--
77-47-4	Hexachlorocyclopentadiene	mg/kg	4755	0	0	0.013	350	--	--	7727	0	0	0.0121	700	--	--
67-72-1	Hexachloroethane	mg/kg	4755	0	0	0.0067	54	--	--	7727	0	0	0.0067	110	--	--
193-39-5	Indeno (1,2,3-c,d) Pyrene	mg/kg	4755	2437	51	0.00053	49	0.00064	2	7727	3332	43	0.00053	49	0.00056	3.2
78-59-1	Isophorone	mg/kg	4755	1	0.02	0.0083	59	0.41	0.41	7727	1	0.01	0.0083	120	0.41	0.41
7439-92-1	Lead	mg/kg	4724	4722	100	0.181	0.181	0.514	390	7676	7672	100	0.181	0.181	0.48	390
7439-97-6	Mercury	mg/kg	4724	4570	97	0.0013	0.00588	0.004	1.33	7676	7358	96	0.0013	0.00588	0.0039	1.33
67-56-1	Methanol (MeOH)	mg/kg	1	0	0	0.064	0.064	--	--	1	0	--	0.064	0.064	--	--
1319-77-3	Methyl Phenol	mg/kg	210	0	0	0.013	3.2	--	--	338	0	0	0.013	3.2	--	--
75-09-2	Methylene Chloride	ug/kg	4759	18	0.38	0.99	4500	2.8	2100	7729	35	0.45	0.98	23000	1.4	2100
1634-04-4	Methyl-tert-Butyl Ether	ug/kg	4759	24	0.50	0.087	120	0.11	1.9	7729	55	0.71	0.087	590	0.11	140
7439-98-7	Molybdenum	mg/kg	4724	2871	61	0.0206	0.132	0.0456	24.1	7676	4270	56	0.0206	0.132	0.0266	24.1
91-20-3	Naphthalene	ug/kg	4759	2552	54	0.23	110	0.26	26000	7732	4539	59	0.23	740	0.25	68000
104-51-8	n-Butylbenzene	ug/kg	4759	115	2.4	0.11	27	0.13	6200	7729	1132	15	0.11	36	0.12	11000
7440-02-0	Nickel	mg/kg	4724	4724	100	--	--	1.57	33.8	7676	7676	100	--	--	1.57	43.1
98-95-3	Nitrobenzene	mg/kg	4755	0	0	0.013	380	--	--	7727	0	0	0.0121	760	--	--
62-75-9	N-Nitrosodimethylamine	mg/kg	4755	0	0	0.091	58	--	--	7727	0	0	0.091	120	--	--
621-64-7	N-Nitroso-di-n-propylamine	mg/kg	4755	0	0	0.0067	58	--	--	7727	0	0	0.0067	120	--	--
86-30-6	N-Nitrosodiphenylamine	mg/kg	4755	2	0.04	0.0073	59	0.24	0.32	7727	3	0.04	0.0073	120	0.24	0.61
95-47-6	o-Xylene	ug/kg	600	5	0.83	0.088	61	0.57	270	944	54	5.7	0.088	170	0.12	15000
1330-20-7-1	p/m-Xylene	ug/kg	600	10	1.7	0.15	29	0.28	10000	944	63	6.7	0.15	290	0.22	34000
87-86-5	Pentachlorophenol	mg/kg	4755	0	0	0.05	640	--	--	7727	0	0	0.0483	1300	--	--
85-01-8	Phenanthrene	mg/kg	4755	4121	87	0.00051	58	0.00082	100	7727	6430	83	0.00051	58	0.00051	100

Table 1a
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Former Kast Property

CAS Number	Analyte	Units	≤ 2 ft bgs							≤ 5 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
108-95-2	Phenol	mg/kg	4755	2	0.04	0.0053	71	0.97	1.8	7727	2	0.03	0.0053	140	0.97	1.8
99-87-6	p-Isopropyltoluene	ug/kg	4759	806	17	0.076	77	0.089	6100	7729	1877	24	0.076	98	0.088	7000
103-65-1	Propylbenzene	ug/kg	4759	68	1.4	0.14	340	0.56	8600	7729	807	10	0.14	880	0.18	15000
129-00-0	Pyrene	mg/kg	4755	4385	92	0.00049	2.1	0.0007	140	7727	6852	89	0.00049	2.1	0.0005	180
110-86-1	Pyridine	mg/kg	4755	0	0	0.082	170	--	--	7727	0	0	0.082	330	--	--
135-98-8	sec-Butylbenzene	ug/kg	4759	167	3.5	0.068	71	0.083	4000	7729	1413	18	0.068	300	0.083	8000
7782-49-2	Selenium	mg/kg	4724	294	6.2	0.175	0.351	0.198	8.16	7676	444	5.8	0.175	0.351	0.198	8.99
7440-22-4	Silver	mg/kg	4724	65	1.4	0.017	0.117	0.0362	3.82	7676	79	1.0	0.017	0.117	0.0362	3.82
100-42-5	Styrene	ug/kg	4759	4	0.08	0.14	180	0.21	3.9	7729	8	0.10	0.14	910	0.21	78
994-05-8	tert-Amyl-Methyl Ether (TAME)	ug/kg	4759	0	0	0.086	110	--	--	7729	0	0	0.086	580	--	--
75-65-0	tert-Butyl Alcohol (TBA)	ug/kg	4759	28	0.59	3.8	13000	4.1	430	7729	63	0.82	3.8	68000	4.1	430
98-06-6	tert-Butylbenzene	ug/kg	4759	56	1.2	0.081	110	0.11	230	7729	706	9.1	0.081	550	0.096	350
127-18-4	Tetrachloroethene	ug/kg	4759	74	1.6	0.11	150	0.15	19000	7729	129	1.7	0.11	750	0.14	19000
7440-28-0	Thallium	mg/kg	4724	175	3.7	0.0987	0.232	0.163	3.38	7676	276	3.6	0.0987	0.232	0.163	3.47
108-88-3	Toluene	ug/kg	4759	2417	51	0.098	130	0.11	4900	7729	3322	43	0.098	660	0.11	57000
TPHC6C44	Total Petroleum Hydrocarbons (C6-C44)	mg/kg	4	4	100	--	--	350	11000	7	7	100	--	--	350	11000
68334-30-5	TPH as Diesel	mg/kg	4755	3959	83	4.8	4.8	4.9	96000	7727	6044	78	4.8	4.8	4.9	140000
PHCG	TPH as Gasoline	mg/kg	4759	1596	34	0.0001	0.42	0.043	3700	7729	3248	42	0.0001	12	0.043	7000
TPHMOIL	TPH as Motor Oil	mg/kg	4755	4080	86	7	7	7	180000	7727	6222	81	7	7	7	320000
156-60-5	trans-1,2-Dichloroethene	ug/kg	4759	0	0	0.17	220	--	--	7729	0	0	0.17	1100	--	--
10061-02-6	trans-1,3-Dichloropropene	ug/kg	4759	0	0	0.16	1700	--	--	7729	0	0	0.16	8400	--	--
79-01-6	Trichloroethene	ug/kg	4759	29	0.61	0.12	160	0.15	140	7729	43	0.56	0.12	800	0.15	300
7440-62-2	Vanadium	mg/kg	4724	4724	100	--	--	4.16	78.4	7676	7676	100	--	--	4.16	82.2
108-05-4	Vinyl Acetate	ug/kg	4759	0	0	3.5	6500	--	--	7729	0	0	3.5	33000	--	--
75-01-4	Vinyl Chloride	ug/kg	4759	8	0.17	0.14	190	0.19	0.49	7729	12	0.16	0.14	950	0.19	49
1330-20-7	Xylenes, Total	ug/kg	4745	847	18	0.13	83	0.16	52000	7705	1876	24	0.13	170	0.15	140000
7440-66-6	Zinc	mg/kg	4724	4724	100	--	--	6.51	5770	7676	7676	100	--	--	6.51	5770

Notes:

-- not applicable; DL = detection limit

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 10 ft bgs							> 5 to ≤ 10 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
630-20-6	1,1,1,2-Tetrachloroethane	ug/kg	10374	0	0	0.11	1500	--	--	2645	0	0	0.11	610	--	--
71-55-6	1,1,1-Trichloroethane	ug/kg	10374	1	0.01	0.11	1100	0.86	0.86	2645	0	0	0.11	460	--	--
79-34-5	1,1,2,2-Tetrachloroethane	ug/kg	10374	31	0.30	0.08	1000	0.1	420	2645	5	0.19	0.09	420	0.1	1.6
79-00-5	1,1,2-Trichloroethane	ug/kg	10374	10	0.10	0.16	1100	0.23	59	2645	6	0.23	0.17	440	0.49	59
75-34-3	1,1-Dichloroethane	ug/kg	10374	1	0.01	0.1	700	0.26	0.26	2645	0	0	0.11	420	--	--
75-35-4	1,1-Dichloroethene	ug/kg	10374	1	0.01	0.091	620	0.18	0.18	2645	0	0	0.1	320	--	--
563-58-6	1,1-Dichloropropene	ug/kg	10374	0	0	0.14	980	--	--	2645	0	0	0.16	400	--	--
87-61-6	1,2,3-Trichlorobenzene	ug/kg	10374	27	0.26	0.13	900	0.17	340	2645	10	0.38	0.15	840	0.17	340
96-18-4	1,2,3-Trichloropropane	ug/kg	10374	24	0.23	0.2	2900	0.48	180	2645	11	0.42	0.2	1200	0.6	180
120-82-1	1,2,4-Trichlorobenzene	ug/kg	10381	12	0.12	0.12	81000	0.17	320	2649	5	0.19	0.13	1000	0.24	320
95-63-6	1,2,4-Trimethylbenzene	ug/kg	10374	3583	35	0.077	99	0.089	84000	2645	1371	52	0.084	62	0.09	84000
96-12-8	1,2-Dibromo-3-Chloropropane	ug/kg	10374	1	0.01	0.5	16000	9.6	9.6	2645	0	0	0.5	6700	--	--
106-93-4	1,2-Dibromoethane (EDB)	ug/kg	10374	2	0.02	0.12	2000	0.51	950	2645	0	0	0.12	820	--	--
95-50-1	1,2-Dichlorobenzene	ug/kg	10381	16	0.15	0.084	41000	0.11	330	2649	1	0.04	0.091	520	0.55	0.55
107-06-2	1,2-Dichloroethane	ug/kg	10374	7	0.07	0.11	750	0.2	7.3	2645	2	0.08	0.12	310	0.21	7.3
78-87-5	1,2-Dichloropropane	ug/kg	10374	6	0.06	0.17	1200	0.31	100	2645	2	0.08	0.19	490	0.45	90
108-67-8	1,3,5-Trimethylbenzene	ug/kg	10374	1704	16	0.065	510	0.078	31000	2645	900	34	0.072	510	0.078	31000
541-73-1	1,3-Dichlorobenzene	ug/kg	10381	4	0.04	0.084	41000	0.21	30	2649	0	0	0.084	510	--	--
142-28-9	1,3-Dichloropropane	ug/kg	10374	1	0.01	0.12	780	0.19	0.19	2645	0	0	0.12	320	--	--
106-46-7	1,4-Dichlorobenzene	ug/kg	10381	78	0.75	0.1	61000	0.13	440	2649	2	0.08	0.11	770	0.29	440
90-12-0	1-Methylnaphthalene	mg/kg	10374	4542	44	0.001	48	0.001	160	2647	1570	59	0.001	4.3	0.001	140
594-20-7	2,2-Dichloropropane	ug/kg	10374	0	0	0.16	2000	--	--	2645	0	0	0.16	840	--	--
95-95-4	2,4,5-Trichlorophenol	mg/kg	10375	1	0.01	0.0116	150	0.075	0.075	2648	1	0.04	0.0116	30	0.075	0.075
88-06-2	2,4,6-Trichlorophenol	mg/kg	10375	1	0.01	0.0116	160	0.14	0.14	2648	0	0	0.0116	32	--	--
120-83-2	2,4-Dichlorophenol	mg/kg	10375	2	0.02	0.0116	140	0.078	0.43	2648	1	0.04	0.0116	28	0.078	0.078
105-67-9	2,4-Dimethylphenol	mg/kg	10375	0	0	0.0116	120	--	--	2648	0	0	0.0116	24	--	--
51-28-5	2,4-Dinitrophenol	mg/kg	10375	0	0	0.045	720	--	--	2648	0	0	0.045	190	--	--
121-14-2	2,4-Dinitrotoluene	mg/kg	10375	15	0.14	0.0116	150	0.061	3.1	2648	8	0.30	0.0116	30	0.066	3.1
606-20-2	2,6-Dinitrotoluene	mg/kg	10375	2	0.02	0.008	170	0.058	0.18	2648	0	0	0.008	33	--	--
78-93-3	2-Butanone (Methyl Ethyl Ketone)	ug/kg	10372	878	8.5	1.5	42000	2.1	2700	2643	142	5.4	1.6	17000	2.1	32

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 10 ft bgs							> 5 to ≤ 10 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
91-58-7	2-Chloronaphthalene	mg/kg	10375	3	0.03	0.0083	97	0.16	2.8	2648	1	0.04	0.0083	20	2.8	2.8
95-57-8	2-Chlorophenol	mg/kg	10375	0	0	0.0116	140	--	--	2648	0	0	0.0116	27	--	--
95-49-8	2-Chlorotoluene	ug/kg	10374	6	0.06	0.076	520	0.15	180	2645	1	0.04	0.083	210	3.6	3.6
591-78-6	2-Hexanone	ug/kg	10372	9	0.09	0.8	25000	2.3	31	2643	0	0	0.8	10000	--	--
91-57-6	2-Methylnaphthalene	mg/kg	10375	7609	73	0.0006	47	0.0006	280	2648	1921	73	0.0006	2.4	0.0006	280
95-48-7	2-Methylphenol	mg/kg	10375	0	0	0.0116	140	--	--	2648	0	0	0.0116	28	--	--
88-74-4	2-Nitroaniline	mg/kg	10375	1	0.01	0.046	160	0.18	0.18	2648	1	0.04	0.046	33	0.18	0.18
88-75-5	2-Nitrophenol	mg/kg	10375	0	0	0.0116	130	--	--	2648	0	0	0.0116	26	--	--
91-94-1	3,3'-Dichlorobenzidine	mg/kg	10375	0	0	0.0093	1100	--	--	2648	0	0	0.0093	220	--	--
106-44-5	3/4-Methylphenol	mg/kg	10374	1	0.01	0.0116	140	0.073	0.073	2647	0	0	0.0116	27	--	--
99-09-2	3-Nitroaniline	mg/kg	10375	0	0	0.01	160	--	--	2648	0	0	0.01	32	--	--
534-52-1	4,6-Dinitro-2-Methylphenol	mg/kg	10375	0	0	0.0463	1600	--	--	2648	0	0	0.0463	320	--	--
101-55-3	4-Bromophenyl-Phenyl Ether	mg/kg	10375	0	0	0.0067	100	--	--	2648	0	0	0.0067	20	--	--
59-50-7	4-Chloro-3-Methylphenol	mg/kg	10375	1	0.01	0.0116	150	0.087	0.087	2648	1	0.04	0.0116	30	0.087	0.087
106-47-8	4-Chloroaniline	mg/kg	10375	0	0	0.0116	120	--	--	2648	0	0	0.0116	25	--	--
7005-72-3	4-Chlorophenyl-Phenyl Ether	mg/kg	10375	0	0	0.0057	100	--	--	2648	0	0	0.0057	21	--	--
106-43-4	4-Chlorotoluene	ug/kg	10374	1	0.01	0.068	460	0.27	0.27	2645	1	0.04	0.075	200	0.27	0.27
108-10-1	4-Methyl-2-Pentanone	ug/kg	10372	27	0.26	0.8	9000	1.4	15	2643	4	0.15	0.8	4000	1.7	7
MEPH4	4-Methylphenol (p-Cresol)	mg/kg	652	8	1.2	0.079	47	0.14	0.22	163	1	0.61	0.079	24	0.14	0.14
100-01-6	4-Nitroaniline	mg/kg	10375	0	0	0.0463	140	--	--	2648	0	0	0.0463	28	--	--
100-02-7	4-Nitrophenol	mg/kg	10375	1	0.01	0.0067	160	0.1	0.1	2648	1	0.04	0.0067	32	0.1	0.1
83-32-9	Acenaphthene	mg/kg	10375	3375	33	0.0009	49	0.0009	17	2648	1395	53	0.0009	13	0.0009	11
208-96-8	Acenaphthylene	mg/kg	10375	1943	19	0.0006	64	0.0006	4.5	2648	441	17	0.0006	6	0.0006	3
67-64-1	Acetone	ug/kg	10372	8015	77	4.6	28000	4.8	1800	2643	1501	57	4.6	12000	4.8	1800
C19C32ALIPH	Aliphatics (C19 - C32)	mg/kg	2020	1635	81	5	10	5	32000	537	389	72	5	10	5.1	16000
C5C8ALIPH	Aliphatics (C5 - C8)	mg/kg	2019	1107	55	0.0091	0.5	0.0091	7000	537	359	67	0.0091	0.5	0.0092	7000
C9C18ALIPH	Aliphatics (C9 - C18)	mg/kg	2019	916	45	5	10	5	6300	537	264	49	5	10	5.3	5900
62-53-3	Aniline	mg/kg	10374	6	0.06	0.056	110	0.088	4	2647	2	0.08	0.056	23	1.9	4
120-12-7	Anthracene	mg/kg	10375	4047	39	0.0004	57	0.00054	26	2648	1083	41	0.0004	15	0.0006	6.7
7440-36-0	Antimony	mg/kg	10300	1899	18	0.149	0.306	0.151	6.45	2624	445	17	0.149	0.306	0.191	4.87

Table 1a
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12674-11-2	AROCLOR 1016	ug/kg	47	0	0	10	14	--	--	18	0	0	10	14	--	--
11104-28-2	AROCLOR 1221	ug/kg	47	0	0	10	13	--	--	18	0	0	10	13	--	--
11141-16-5	AROCLOR 1232	ug/kg	47	0	0	10	11	--	--	18	0	0	10	11	--	--
53469-21-9	AROCLOR 1242	ug/kg	47	0	0	10	12	--	--	18	0	0	10	12	--	--
12672-29-6	AROCLOR 1248	ug/kg	47	0	0	10	14	--	--	18	0	0	10	14	--	--
11097-69-1	AROCLOR 1254	ug/kg	47	0	0	10	12	--	--	18	0	0	10	12	--	--
11096-82-5	AROCLOR 1260	ug/kg	47	0	0	11	11	--	--	18	0	0	11	11	--	--
37324-23-5	AROCLOR 1262	ug/kg	47	0	0	10	12	--	--	18	0	0	10	12	--	--
C17C32AROM	Aromatics (C17 - C32)	mg/kg	2020	1525	75	5	10	5	36000	537	351	65	5	10	5	18000
C6C8AROM	Aromatics (C6 - C8)	mg/kg	2020	497	25	0.0002	0.02	0.0002	310	537	230	43	0.0002	0.02	0.0002	180
C9C16AROM	Aromatics (C9 - C16)	mg/kg	2020	1007	50	5	10	5	41000	537	283	53	5	10	5	6400
7440-38-2	Arsenic	mg/kg	10300	10264	100	0.259	0.398	0.398	62.9	2624	2618	100	0.398	0.398	0.44	62.9
103-33-3	Azobenzene	mg/kg	10374	1	0.01	0.1	110	0.24	0.24	2647	1	0.04	0.1	21	0.24	0.24
7440-39-3	Barium	mg/kg	10300	10300	100	--	--	10.9	1020	2624	2624	100	--	--	14.8	460
71-43-2	Benzene	ug/kg	10374	5466	53	0.095	600	0.1	33000	2645	1348	51	0.096	240	0.1	33000
92-87-5	Benzidine	mg/kg	10375	0	0	0.071	930	--	--	2648	0	0	0.071	240	--	--
56-55-3	Benzo (a) Anthracene	mg/kg	10375	7640	74	0.00065	95	0.0007	47	2648	1642	62	0.00065	3.1	0.0007	35
50-32-8	Benzo (a) Pyrene	mg/kg	10375	7359	71	0.00049	43	0.0005	22	2648	1470	56	0.00049	2.3	0.0005	15
205-99-2	Benzo (b) Fluoranthene	mg/kg	10375	6132	59	0.00035	42	0.0005	16	2648	1157	44	0.00035	2.2	0.0005	8
191-24-2	Benzo (g,h,i) Perylene	mg/kg	10375	6848	66	0.00047	45	0.00052	13	2648	1157	44	0.00047	8.2	0.00061	8.3
207-08-9	Benzo (k) Fluoranthene	mg/kg	10375	2293	22	0.0007	55	0.00073	4.6	2648	374	14	0.0007	11	0.00074	2.2
65-85-0	Benzoic Acid	mg/kg	10375	8	0.08	0.064	780	0.12	1.5	2648	1	0.04	0.064	160	1.2	1.2
100-51-6	Benzyl Alcohol	mg/kg	10375	1	0.01	0.054	150	1.8	1.8	2648	0	0	0.054	31	--	--
7440-41-7	Beryllium	mg/kg	10300	10272	100	0.0037	0.137	0.0813	1.21	2624	2605	99	0.0037	0.137	0.0813	1.21
111-91-1	Bis(2-Chloroethoxy) Methane	mg/kg	10375	0	0	0.0116	120	--	--	2648	0	0	0.0116	25	--	--
111-44-4	Bis(2-Chloroethyl) Ether	mg/kg	10375	0	0	0.0116	110	--	--	2648	0	0	0.0116	23	--	--
108-60-1	Bis(2-Chloroisopropyl) Ether	mg/kg	10375	0	0	0.0116	120	--	--	2648	0	0	0.0116	24	--	--
117-81-7	Bis(2-Ethylhexyl) Phthalate	mg/kg	10375	324	3.1	0.039	96	0.083	22	2648	34	1.3	0.039	33	0.098	1.4
108-86-1	Bromobenzene	ug/kg	10374	3	0.03	0.1	930	0.41	1.6	2645	1	0.04	0.1	380	1.6	1.6
74-97-5	Bromochloromethane	ug/kg	10372	0	0	0.33	6100	--	--	2643	0	0	0.33	2500	--	--

Table 1a
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			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
75-27-4	Bromodichloromethane	ug/kg	10374	31	0.30	0.08	650	0.12	1300	2645	6	0.23	0.09	270	0.14	1300
75-25-2	Bromoform	ug/kg	10374	9	0.09	0.3	2900	0.65	140	2645	2	0.08	0.3	1200	0.78	2.3
74-83-9	Bromomethane	ug/kg	10374	281	2.7	0.5	8700	0.69	1300	2645	79	3.0	0.6	8700	0.73	1300
85-68-7	Butyl Benzyl Phthalate	mg/kg	10375	116	1.1	0.0116	100	0.023	3.1	2648	26	0.98	0.0116	24	0.024	3.1
7440-43-9	Cadmium	mg/kg	10300	2741	27	0.0064	0.135	0.007	9.02	2624	467	18	0.0064	0.135	0.011	2.89
75-15-0	Carbon Disulfide	ug/kg	10372	5570	54	0.13	780	0.13	120	2643	1250	47	0.13	320	0.13	120
56-23-5	Carbon Tetrachloride	ug/kg	10374	1	0.01	0.13	1400	0.3	0.3	2645	0	0	0.13	580	--	--
108-90-7	Chlorobenzene	ug/kg	10374	141	1.4	0.098	660	0.12	150	2645	20	0.76	0.11	270	0.12	29
75-00-3	Chloroethane	ug/kg	10374	13	0.13	0.27	1800	0.32	1.8	2645	3	0.11	0.3	1400	0.32	0.89
67-66-3	Chloroform	ug/kg	10374	787	7.6	0.11	760	0.13	110	2645	121	4.6	0.11	320	0.13	60
74-87-3	Chloromethane	ug/kg	10374	78	0.75	0.22	13000	0.25	520	2645	26	0.98	0.23	5300	0.28	310
7440-47-3	Chromium	mg/kg	10300	10300	100	--	--	2.11	74.2	2624	2624	100	--	--	2.11	38.2
18540-29-9	Chromium, Hexavalent	mg/kg	10012	1130	11	0.0025	0.43	0.039	4.8	2539	318	13	0.038	0.43	0.04	4.8
218-01-9	Chrysene	mg/kg	10375	8299	80	0.00058	2.2	0.00062	130	2648	1837	69	0.00058	2.2	0.00062	88
156-59-2	cis-1,2-Dichloroethene	ug/kg	10374	15	0.14	0.13	1300	0.23	440	2645	7	0.26	0.13	520	0.23	440
10061-01-5	cis-1,3-Dichloropropene	ug/kg	10374	0	0	0.12	810	--	--	2645	0	0	0.12	330	--	--
7440-48-4	Cobalt	mg/kg	10300	10300	100	--	--	1.19	31.3	2624	2624	100	--	--	1.2	31.3
7440-50-8	Copper	mg/kg	10300	10300	100	--	--	0.512	1190	2624	2624	100	--	--	0.512	91.4
98-82-8	Cumene (Isopropylbenzene)	ug/kg	10374	2661	26	0.078	500	0.092	16000	2645	1286	49	0.086	500	0.096	16000
53-70-3	Dibenz (a,h) Anthracene	mg/kg	10375	2663	26	0.00052	45	0.00053	3.4	2648	401	15	0.00052	6.7	0.0007	0.92
132-64-9	Dibenzofuran	mg/kg	10375	7	0.07	0.0073	120	0.13	1.2	2648	2	0.08	0.0073	23	0.48	1.2
124-48-1	Dibromochloromethane	ug/kg	10374	26	0.25	0.08	880	0.1	6.8	2645	5	0.19	0.09	530	0.1	6.2
74-95-3	Dibromomethane	ug/kg	10374	3	0.03	0.2	3100	0.41	50	2645	1	0.04	0.2	1300	50	50
84-66-2	Diethyl Phthalate	mg/kg	10375	494	4.8	0.0063	160	0.06	3.1	2648	125	4.7	0.0063	31	0.06	0.65
108-20-3	Diisopropyl Ether (DIPE)	ug/kg	10374	14	0.13	0.16	1100	0.2	1.4	2645	4	0.15	0.18	450	0.23	1.4
131-11-3	Dimethyl Phthalate	mg/kg	10375	741	7.1	0.008	180	0.052	2.7	2648	167	6.3	0.008	36	0.054	0.6
84-74-2	Di-n-Butyl Phthalate	mg/kg	10375	8	0.08	0.033	96	0.13	0.33	2648	0	0	0.033	25	--	--
117-84-0	Di-n-Octyl Phthalate	mg/kg	10375	5	0.05	0.0083	120	0.12	0.57	2648	2	0.08	0.0083	48	0.12	0.32
64-17-5	Ethanol	ug/kg	10372	1042	10	37	240000	45	100000	2643	167	6.3	40	180000	47	21000
100-41-4	Ethylbenzene	ug/kg	10374	2839	27	0.1	48	0.12	42000	2645	1354	51	0.11	48	0.12	42000

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 10 ft bgs							> 5 to ≤ 10 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
637-92-3	Ethyl-t-Butyl Ether (ETBE)	ug/kg	10374	0	0	0.14	950	--	--	2645	0	0	0.15	470	--	--
206-44-0	Fluoranthene	mg/kg	10375	7651	74	0.00049	54	0.0005	29	2648	1729	65	0.00049	2.2	0.0005	12
86-73-7	Fluorene	mg/kg	10375	4145	40	0.00073	53	0.00076	23	2648	1598	60	0.00073	3.1	0.00076	20
75-69-4	Freon 11	ug/kg	10374	3	0.03	0.1	690	0.17	0.47	2645	0	0	0.11	350	--	--
76-13-1	Freon 113	ug/kg	10372	0	0	0.17	2100	--	--	2643	0	0	0.17	860	--	--
75-71-8	Freon 12	ug/kg	10374	27	0.26	0.13	860	0.16	17	2645	6	0.23	0.14	410	0.16	17
87-68-3	Hexachloro-1,3-Butadiene	ug/kg	10376	0	0	0.5	100000	--	--	2649	0	0	0.6	20000	--	--
118-74-1	Hexachlorobenzene	mg/kg	10375	0	0	0.006	100	--	--	2648	0	0	0.006	28	--	--
77-47-4	Hexachlorocyclopentadiene	mg/kg	10375	0	0	0.0116	700	--	--	2648	0	0	0.0116	170	--	--
67-72-1	Hexachloroethane	mg/kg	10375	1	0.01	0.0067	110	6.6	6.6	2648	1	0.04	0.0067	22	6.6	6.6
193-39-5	Indeno (1,2,3-c,d) Pyrene	mg/kg	10375	3907	38	0.00053	49	0.00055	3.2	2648	575	22	0.00053	8.7	0.00055	1.9
78-59-1	Isophorone	mg/kg	10375	1	0.01	0.0083	120	0.41	0.41	2648	0	0	0.0083	24	--	--
7439-92-1	Lead	mg/kg	10300	10275	100	0.0527	0.181	0.231	1330	2624	2603	99	0.0527	0.181	0.231	1330
7439-97-6	Mercury	mg/kg	10300	9891	96	0.0013	0.00588	0.0039	1.33	2624	2533	97	0.0013	0.00588	0.0041	0.279
67-56-1	Methanol (MeOH)	mg/kg	1	0	--	0.064	0.064	--	--	--	--	--	--	--	--	--
1319-77-3	Methyl Phenol	mg/kg	433	0	0	0.013	3.2	--	--	95	0	0	0.013	1.6	--	--
75-09-2	Methylene Chloride	ug/kg	10374	47	0.45	0.64	23000	1.4	2100	2645	12	0.45	0.64	9500	2.2	23
1634-04-4	Methyl-tert-Butyl Ether	ug/kg	10374	73	0.70	0.087	590	0.11	140	2645	18	0.68	0.095	270	0.16	1.9
7439-98-7	Molybdenum	mg/kg	10300	5712	55	0.0206	0.132	0.0266	24.1	2624	1442	55	0.0206	0.132	0.0315	6.97
91-20-3	Naphthalene	ug/kg	10381	6463	62	0.23	740	0.25	92000	2649	1924	73	0.24	360	0.26	92000
104-51-8	n-Butylbenzene	ug/kg	10374	2375	23	0.11	36	0.12	13000	2645	1243	47	0.12	19	0.15	13000
7440-02-0	Nickel	mg/kg	10300	10300	100	--	--	1.57	43.1	2624	2624	100	--	--	1.81	40.7
98-95-3	Nitrobenzene	mg/kg	10375	0	0	0.0116	760	--	--	2648	0	0	0.0116	150	--	--
62-75-9	N-Nitrosodimethylamine	mg/kg	10374	0	0	0.091	120	--	--	2647	0	0	0.091	23	--	--
621-64-7	N-Nitroso-di-n-propylamine	mg/kg	10375	1	0.01	0.0067	120	0.14	0.14	2648	1	0.04	0.0067	23	0.14	0.14
86-30-6	N-Nitrosodiphenylamine	mg/kg	10375	4	0.04	0.0073	120	0.24	5.5	2648	1	0.04	0.0073	24	5.5	5.5
95-47-6	o-Xylene	ug/kg	1246	105	8.4	0.088	410	0.12	15000	302	51	17	0.092	410	0.67	11000
1330-20-7-1	p/m-Xylene	ug/kg	1246	133	11	0.15	290	0.22	34000	302	70	23	0.16	260	0.28	27000
87-86-5	Pentachlorophenol	mg/kg	10375	0	0	0.0463	1300	--	--	2648	0	0	0.0463	260	--	--
85-01-8	Phenanthrene	mg/kg	10375	8398	81	0.00051	58	0.00051	100	2648	1968	74	0.00051	2	0.00059	95

Table 1a
Statistical Summary of Soil Matrix Data - Residential Properties
Former Kast Property

CAS Number	Analyte	Units	≤ 10 ft bgs							> 5 to ≤ 10 ft bgs						
			Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value	Number of Samples	Number of Detects	Percent Detected	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
108-95-2	Phenol	mg/kg	10375	2	0.02	0.0053	140	0.97	1.8	2648	0	0	0.0053	28	--	--
99-87-6	p-Isopropyltoluene	ug/kg	10374	3147	30	0.076	580	0.088	12000	2645	1270	48	0.084	580	0.092	12000
103-65-1	Propylbenzene	ug/kg	10374	1857	18	0.14	880	0.18	24000	2645	1050	40	0.17	410	0.3	24000
129-00-0	Pyrene	mg/kg	10375	8966	86	0.00049	2.1	0.0005	240	2648	2114	80	0.00049	2.1	0.00058	240
110-86-1	Pyridine	mg/kg	10374	0	0	0.082	330	--	--	2647	0	0	0.082	67	--	--
135-98-8	sec-Butylbenzene	ug/kg	10374	2752	27	0.068	530	0.079	9800	2645	1339	51	0.075	530	0.079	9800
7782-49-2	Selenium	mg/kg	10300	589	5.7	0.175	0.43	0.198	8.99	2624	145	5.5	0.175	0.43	0.291	4.14
7440-22-4	Silver	mg/kg	10300	123	1.2	0.017	0.117	0.0362	3.82	2624	44	1.7	0.017	0.117	0.129	2.03
100-42-5	Styrene	ug/kg	10374	17	0.16	0.14	910	0.21	78	2645	9	0.34	0.15	560	0.25	36
994-05-8	tert-Amyl-Methyl Ether (TAME)	ug/kg	10374	0	0	0.086	580	--	--	2645	0	0	0.093	320	--	--
75-65-0	tert-Butyl Alcohol (TBA)	ug/kg	10374	125	1.2	2.5	68000	4.1	430	2645	62	2.3	2.5	28000	4.2	120
98-06-6	tert-Butylbenzene	ug/kg	10374	1470	14	0.072	550	0.096	420	2645	764	29	0.072	230	0.097	420
127-18-4	Tetrachloroethene	ug/kg	10374	165	1.6	0.1	750	0.14	19000	2645	36	1.4	0.1	310	0.14	29
7440-28-0	Thallium	mg/kg	10300	420	4.1	0.0987	0.232	0.163	3.47	2624	144	5.5	0.0987	0.232	0.195	3.47
108-88-3	Toluene	ug/kg	10374	4330	42	0.098	660	0.11	57000	2645	1008	38	0.11	470	0.11	50000
TPHC6C44	Total Petroleum Hydrocarbons (C6-C44)	mg/kg	12	9	75	4.8	4.8	350	22000	5	2	40	4.8	4.8	4900	22000
68334-30-5	TPH as Diesel	mg/kg	10375	7710	74	4.8	4.8	4.9	140000	2648	1666	63	4.8	4.8	4.9	54000
PHCG	TPH as Gasoline	mg/kg	10375	4824	46	0.0001	12	0.043	9800	2646	1576	60	0.039	0.42	0.046	9800
TPHMOIL	TPH as Motor Oil	mg/kg	10375	7958	77	7	7	7	320000	2648	1736	66	7	7	7	78000
156-60-5	trans-1,2-Dichloroethene	ug/kg	10374	4	0.04	0.17	1100	0.53	1500	2645	4	0.15	0.18	470	0.53	1500
10061-02-6	trans-1,3-Dichloropropene	ug/kg	10372	0	0	0.16	8400	--	--	2643	0	0	0.2	3500	--	--
79-01-6	Trichloroethene	ug/kg	10374	51	0.49	0.12	800	0.15	720	2645	8	0.30	0.13	330	0.17	720
7440-62-2	Vanadium	mg/kg	10300	10300	100	--	--	4.16	86	2624	2624	100	--	--	4.74	86
108-05-4	Vinyl Acetate	ug/kg	10372	1	0.01	2.3	33000	9200	9200	2643	1	0.04	2.3	14000	9200	9200
75-01-4	Vinyl Chloride	ug/kg	10374	15	0.14	0.14	950	0.18	49	2645	3	0.11	0.15	460	0.18	0.34
1330-20-7	Xylenes, Total	ug/kg	10341	3105	30	0.13	200	0.15	140000	2636	1229	47	0.15	200	0.16	140000
7440-66-6	Zinc	mg/kg	10300	10300	100	--	--	5.57	5770	2624	2624	100	--	--	5.57	673

Notes:

-- not applicable; DL = detection limit

Table 1b

Statistical Summary of Soil Matrix Data - Streets

Former Kast Property

Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
EPH	C19C32ALIPH	Aliphatics (C19 - C32)	2	2	100	mg/kg	--	--	56	990
EPH	C5C8ALIPH	Aliphatics (C5 - C8)	2	2	100	mg/kg	--	--	3.6	520
EPH	C9C18ALIPH	Aliphatics (C9 - C18)	2	2	100	mg/kg	--	--	53	1200
EPH	C17C32AROM	Aromatics (C17 - C32)	2	2	100	mg/kg	--	--	49	760
EPH	C6C8AROM	Aromatics (C6 - C8)	2	2	100	mg/kg	--	--	0.00026	0.06
EPH	C9C16AROM	Aromatics (C9 - C16)	2	2	100	mg/kg	--	--	40	670
METALS	7440-36-0	Antimony	212	26	12	mg/kg	0.149	0.306	0.224	4.87
METALS	7440-38-2	Arsenic	212	211	100	mg/kg	0.398	0.398	1.32	28.2
METALS	7440-39-3	Barium	212	212	100	mg/kg	--	--	23	410
METALS	7440-41-7	Beryllium	212	209	99	mg/kg	0.0037	0.0037	0.129	1.17
METALS	7440-43-9	Cadmium	212	44	21	mg/kg	0.0099	0.135	0.103	1.28
METALS	7440-47-3	Chromium	212	212	100	mg/kg	--	--	4.37	35.1
METALS	18540-29-9	Chromium, Hexavalent	15	0	0	mg/kg	0.22	0.22	--	--
METALS	7440-48-4	Cobalt	212	212	100	mg/kg	--	--	1.86	27.1
METALS	7440-50-8	Copper	212	212	100	mg/kg	--	--	1.83	46.6
METALS	7439-92-1	Lead	212	211	100	mg/kg	0.0527	0.0527	1.07	200
METALS	7439-97-6	Mercury	212	117	55	mg/kg	0.0013	0.00588	0.0041	0.228
METALS	7439-98-7	Molybdenum	212	51	24	mg/kg	0.0206	0.132	0.0779	24.1
METALS	7440-02-0	Nickel	212	212	100	mg/kg	--	--	3.4	30.8
METALS	7782-49-2	Selenium	212	38	18	mg/kg	0.175	0.351	0.301	1.64
METALS	7440-22-4	Silver	212	2	0.94	mg/kg	0.0209	0.117	0.243	1.03
METALS	7440-28-0	Thallium	212	11	5.2	mg/kg	0.0987	0.232	0.163	2.87
METALS	7440-62-2	Vanadium	212	212	100	mg/kg	--	--	6.21	78.4
METALS	7440-66-6	Zinc	212	212	100	mg/kg	--	--	6.55	430
Method-dependent	87-61-6	1,2,3-Trichlorobenzene	247	0	0	ug/kg	0.15	900	--	--
Method-dependent	120-82-1	1,2,4-Trichlorobenzene	247	0	0	ug/kg	0.13	810	--	--
Method-dependent	95-50-1	1,2-Dichlorobenzene	247	0	0	ug/kg	0.092	520	--	--
Method-dependent	541-73-1	1,3-Dichlorobenzene	247	0	0	ug/kg	0.12	510	--	--
Method-dependent	106-46-7	1,4-Dichlorobenzene	247	0	0	ug/kg	0.11	680	--	--
Method-dependent	91-20-3	Naphthalene	247	152	62	ug/kg	0.23	110	0.34	47000

Table 1b
Statistical Summary of Soil Matrix Data - Streets
Former Kast Property

Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
Method-dependent	98-95-3	Nitrobenzene	245	0	0	mg/kg	0.1	380	--	--
ORGANIC	106-44-5	3/4-Methylphenol	245	0	0	mg/kg	0.058	68	--	--
ORGANIC	12674-11-2	AROCLOR 1016	40	0	0	ug/kg	10	10	--	--
ORGANIC	11104-28-2	AROCLOR 1221	40	0	0	ug/kg	10	10	--	--
ORGANIC	11141-16-5	AROCLOR 1232	40	0	0	ug/kg	10	10	--	--
ORGANIC	53469-21-9	AROCLOR 1242	40	0	0	ug/kg	10	10	--	--
ORGANIC	12672-29-6	AROCLOR 1248	40	0	0	ug/kg	10	10	--	--
ORGANIC	11097-69-1	AROCLOR 1254	40	0	0	ug/kg	10	10	--	--
ORGANIC	11096-82-5	AROCLOR 1260	40	0	0	ug/kg	11	11	--	--
ORGANIC	37324-23-5	AROCLOR 1262	40	0	0	ug/kg	10	10	--	--
ORGANIC	85-68-7	Butyl Benzyl Phthalate	245	1	0.41	mg/kg	0.1	50	0.32	0.32
ORGANIC	64-17-5	Ethanol	247	3	1.2	ug/kg	40	240000	9000	10000
ORGANIC	76-13-1	Freon 113	247	0	0	ug/kg	0.26	2100	--	--
ORGANIC	TPHC6C44	Total Petroleum Hydrocarbons (C6-C44)	11	8	73	mg/kg	4.8	4.8	410	22000
ORGANIC	68334-30-5	TPH as Diesel	245	209	85	mg/kg	4.8	4.8	5.7	82000
ORGANIC	PHCG	TPH as Gasoline	247	200	81	mg/kg	0.04	12	0.048	9800
ORGANIC	TPHMOIL	TPH as Motor Oil	245	212	87	mg/kg	7	7	7.7	120000
SVOC	90-12-0	1-Methylnaphthalene	245	120	49	mg/kg	0.001	48	0.0016	49
SVOC	95-95-4	2,4,5-Trichlorophenol	245	0	0	mg/kg	0.067	76	--	--
SVOC	88-06-2	2,4,6-Trichlorophenol	245	0	0	mg/kg	0.062	79	--	--
SVOC	120-83-2	2,4-Dichlorophenol	245	0	0	mg/kg	0.065	69	--	--
SVOC	105-67-9	2,4-Dimethylphenol	245	0	0	mg/kg	0.085	60	--	--
SVOC	51-28-5	2,4-Dinitrophenol	245	0	0	mg/kg	0.72	360	--	--
SVOC	121-14-2	2,4-Dinitrotoluene	245	0	0	mg/kg	0.056	76	--	--
SVOC	606-20-2	2,6-Dinitrotoluene	245	0	0	mg/kg	0.053	83	--	--
SVOC	91-58-7	2-Chloronaphthalene	245	0	0	mg/kg	0.097	49	--	--
SVOC	95-57-8	2-Chlorophenol	245	0	0	mg/kg	0.1	68	--	--
SVOC	91-57-6	2-Methylnaphthalene	245	134	55	mg/kg	0.0006	47	0.0007	85
SVOC	95-48-7	2-Methylphenol	245	0	0	mg/kg	0.068	70	--	--
SVOC	88-74-4	2-Nitroaniline	245	0	0	mg/kg	0.047	82	--	--

Table 1b
Statistical Summary of Soil Matrix Data - Streets
Former Kast Property

Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
SVOC	88-75-5	2-Nitrophenol	245	0	0	mg/kg	0.063	64	--	--
SVOC	91-94-1	3,3'-Dichlorobenzidine	245	0	0	mg/kg	1.1	540	--	--
SVOC	99-09-2	3-Nitroaniline	245	0	0	mg/kg	0.054	79	--	--
SVOC	534-52-1	4,6-Dinitro-2-Methylphenol	245	0	0	mg/kg	0.99	790	--	--
SVOC	101-55-3	4-Bromophenyl-Phenyl Ether	245	0	0	mg/kg	0.094	50	--	--
SVOC	59-50-7	4-Chloro-3-Methylphenol	245	0	0	mg/kg	0.059	76	--	--
SVOC	106-47-8	4-Chloroaniline	245	0	0	mg/kg	0.061	62	--	--
SVOC	7005-72-3	4-Chlorophenyl-Phenyl Ether	245	0	0	mg/kg	0.1	52	--	--
SVOC	100-01-6	4-Nitroaniline	245	0	0	mg/kg	0.051	70	--	--
SVOC	100-02-7	4-Nitrophenol	245	0	0	mg/kg	0.051	79	--	--
SVOC	83-32-9	Acenaphthene	245	81	33	mg/kg	0.0009	49	0.0015	3.5
SVOC	208-96-8	Acenaphthylene	245	10	4.1	mg/kg	0.0006	64	0.0009	0.56
SVOC	62-53-3	Aniline	245	0	0	mg/kg	0.056	56	--	--
SVOC	120-12-7	Anthracene	245	63	26	mg/kg	0.0004	57	0.00056	3.1
SVOC	103-33-3	Azobenzene	245	0	0	mg/kg	0.1	54	--	--
SVOC	92-87-5	Benzidine	245	0	0	mg/kg	0.93	460	--	--
SVOC	56-55-3	Benzo (a) Anthracene	245	88	36	mg/kg	0.00065	95	0.0007	9.7
SVOC	50-32-8	Benzo (a) Pyrene	245	71	29	mg/kg	0.0005	43	0.0009	6.2
SVOC	205-99-2	Benzo (b) Fluoranthene	245	63	26	mg/kg	0.00035	42	0.00076	3.2
SVOC	191-24-2	Benzo (g,h,i) Perylene	245	65	27	mg/kg	0.0008	45	0.0014	3.3
SVOC	207-08-9	Benzo (k) Fluoranthene	245	10	4.1	mg/kg	0.0007	55	0.00076	0.27
SVOC	65-85-0	Benzoic Acid	245	0	0	mg/kg	0.56	390	--	--
SVOC	100-51-6	Benzyl Alcohol	245	0	0	mg/kg	0.054	77	--	--
SVOC	111-91-1	Bis(2-Chloroethoxy) Methane	245	0	0	mg/kg	0.082	62	--	--
SVOC	111-44-4	Bis(2-Chloroethyl) Ether	245	0	0	mg/kg	0.1	57	--	--
SVOC	108-60-1	Bis(2-Chloroisopropyl) Ether	245	0	0	mg/kg	0.092	60	--	--
SVOC	117-81-7	Bis(2-Ethylhexyl) Phthalate	245	0	0	mg/kg	0.096	48	--	--
SVOC	218-01-9	Chrysene	245	108	44	mg/kg	0.0012	2.2	0.0016	72
SVOC	53-70-3	Dibenz (a,h) Anthracene	245	13	5.3	mg/kg	0.00052	45	0.00082	0.11
SVOC	132-64-9	Dibenzofuran	245	0	0	mg/kg	0.097	58	--	--

Table 1b
Statistical Summary of Soil Matrix Data - Streets
Former Kast Property

Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
SVOC	84-66-2	Diethyl Phthalate	245	1	0.41	mg/kg	0.06	79	0.12	0.12
SVOC	131-11-3	Dimethyl Phthalate	245	11	4.5	mg/kg	0.051	90	0.1	2.7
SVOC	84-74-2	Di-n-Butyl Phthalate	245	0	0	mg/kg	0.096	48	--	--
SVOC	117-84-0	Di-n-Octyl Phthalate	245	0	0	mg/kg	0.083	42	--	--
SVOC	206-44-0	Fluoranthene	245	84	34	mg/kg	0.00049	54	0.0005	6.5
SVOC	86-73-7	Fluorene	245	87	36	mg/kg	0.00073	53	0.0014	5.5
SVOC	87-68-3	Hexachloro-1,3-Butadiene	245	0	0	ug/kg	88	50000	--	--
SVOC	118-74-1	Hexachlorobenzene	245	0	0	mg/kg	0.1	52	--	--
SVOC	77-47-4	Hexachlorocyclopentadiene	245	0	0	mg/kg	0.7	350	--	--
SVOC	67-72-1	Hexachloroethane	245	0	0	mg/kg	0.096	54	--	--
SVOC	193-39-5	Indeno (1,2,3-c,d) Pyrene	245	30	12	mg/kg	0.00053	49	0.0011	1.8
SVOC	78-59-1	Isophorone	245	0	0	mg/kg	0.053	59	--	--
SVOC	62-75-9	N-Nitrosodimethylamine	245	0	0	mg/kg	0.091	58	--	--
SVOC	621-64-7	N-Nitroso-di-n-propylamine	245	0	0	mg/kg	0.082	58	--	--
SVOC	86-30-6	N-Nitrosodiphenylamine	245	0	0	mg/kg	0.074	59	--	--
SVOC	87-86-5	Pentachlorophenol	245	0	0	mg/kg	0.88	640	--	--
SVOC	85-01-8	Phenanthrene	245	127	52	mg/kg	0.00095	58	0.001	71
SVOC	108-95-2	Phenol	245	0	0	mg/kg	0.079	71	--	--
SVOC	129-00-0	Pyrene	245	120	49	mg/kg	0.0008	2.1	0.0011	120
SVOC	110-86-1	Pyridine	245	0	0	mg/kg	0.082	170	--	--
VOC	630-20-6	1,1,1,2-Tetrachloroethane	247	0	0	ug/kg	0.18	1500	--	--
VOC	71-55-6	1,1,1-Trichloroethane	247	0	0	ug/kg	0.16	1100	--	--
VOC	79-34-5	1,1,2,2-Tetrachloroethane	247	0	0	ug/kg	0.17	1000	--	--
VOC	79-00-5	1,1,2-Trichloroethane	247	0	0	ug/kg	0.17	1100	--	--
VOC	75-34-3	1,1-Dichloroethane	247	0	0	ug/kg	0.11	700	--	--
VOC	75-35-4	1,1-Dichloroethene	247	0	0	ug/kg	0.1	620	--	--
VOC	563-58-6	1,1-Dichloropropene	247	0	0	ug/kg	0.16	980	--	--
VOC	96-18-4	1,2,3-Trichloropropane	247	1	0.40	ug/kg	0.47	2900	130	130
VOC	95-63-6	1,2,4-Trimethylbenzene	247	127	51	ug/kg	0.084	99	0.13	84000
VOC	96-12-8	1,2-Dibromo-3-Chloropropane	247	0	0	ug/kg	1.3	16000	--	--

Table 1b
Statistical Summary of Soil Matrix Data - Streets
Former Kast Property

Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
VOC	106-93-4	1,2-Dibromoethane (EDB)	247	1	0.40	ug/kg	0.19	2000	950	950
VOC	107-06-2	1,2-Dichloroethane	247	0	0	ug/kg	0.12	750	--	--
VOC	78-87-5	1,2-Dichloropropane	247	0	0	ug/kg	0.19	1200	--	--
VOC	108-67-8	1,3,5-Trimethylbenzene	247	84	34	ug/kg	0.071	440	0.089	31000
VOC	142-28-9	1,3-Dichloropropane	247	0	0	ug/kg	0.13	780	--	--
VOC	594-20-7	2,2-Dichloropropane	247	0	0	ug/kg	0.24	2000	--	--
VOC	78-93-3	2-Butanone (Methyl Ethyl Ketone)	247	19	7.7	ug/kg	2.8	42000	3	44
VOC	95-49-8	2-Chlorotoluene	247	1	0.40	ug/kg	0.084	520	180	180
VOC	591-78-6	2-Hexanone	247	0	0	ug/kg	1.3	25000	--	--
VOC	106-43-4	4-Chlorotoluene	247	0	0	ug/kg	0.075	460	--	--
VOC	108-10-1	4-Methyl-2-Pentanone	247	0	0	ug/kg	1.5	9000	--	--
VOC	67-64-1	Acetone	247	92	37	ug/kg	4.6	28000	5.3	670
VOC	71-43-2	Benzene	247	143	58	ug/kg	0.095	600	0.11	33000
VOC	108-86-1	Bromobenzene	247	0	0	ug/kg	0.15	930	--	--
VOC	74-97-5	Bromochloromethane	247	0	0	ug/kg	0.5	6100	--	--
VOC	75-27-4	Bromodichloromethane	247	2	0.81	ug/kg	0.11	650	660	1300
VOC	75-25-2	Bromoform	247	0	0	ug/kg	0.48	2900	--	--
VOC	74-83-9	Bromomethane	247	5	2.0	ug/kg	1.3	8200	230	490
VOC	75-15-0	Carbon Disulfide	247	64	26	ug/kg	0.13	780	0.15	42
VOC	56-23-5	Carbon Tetrachloride	247	0	0	ug/kg	0.21	1400	--	--
VOC	108-90-7	Chlorobenzene	247	2	0.81	ug/kg	0.11	660	81	150
VOC	75-00-3	Chloroethane	247	0	0	ug/kg	0.3	1800	--	--
VOC	67-66-3	Chloroform	247	1	0.40	ug/kg	0.12	760	0.15	0.15
VOC	74-87-3	Chloromethane	247	3	1.2	ug/kg	0.22	13000	0.3	30
VOC	156-59-2	cis-1,2-Dichloroethene	247	2	0.81	ug/kg	0.2	1300	0.56	1
VOC	10061-01-5	cis-1,3-Dichloropropene	247	0	0	ug/kg	0.13	810	--	--
VOC	98-82-8	Cumene (Isopropylbenzene)	247	129	52	ug/kg	0.086	100	0.11	16000
VOC	124-48-1	Dibromochloromethane	247	0	0	ug/kg	0.14	880	--	--
VOC	74-95-3	Dibromomethane	247	0	0	ug/kg	0.51	3100	--	--
VOC	108-20-3	Diisopropyl Ether (DIPE)	247	0	0	ug/kg	0.18	1100	--	--

Table 1b
Statistical Summary of Soil Matrix Data - Streets
Former Kast Property

Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
VOC	100-41-4	Ethylbenzene	247	148	60	ug/kg	0.11	48	0.14	42000
VOC	637-92-3	Ethyl-t-Butyl Ether (ETBE)	247	0	0	ug/kg	0.16	950	--	--
VOC	75-69-4	Freon 11	247	0	0	ug/kg	0.11	690	--	--
VOC	75-71-8	Freon 12	247	0	0	ug/kg	0.14	860	--	--
VOC	75-09-2	Methylene Chloride	247	2	0.81	ug/kg	0.98	23000	2.8	230
VOC	1634-04-4	Methyl-tert-Butyl Ether	247	7	2.8	ug/kg	0.096	590	0.12	2.6
VOC	104-51-8	n-Butylbenzene	247	140	57	ug/kg	0.11	36	0.13	13000
VOC	99-87-6	p-Isopropyltoluene	247	115	47	ug/kg	0.083	98	0.11	12000
VOC	103-65-1	Propylbenzene	247	110	45	ug/kg	0.37	880	0.76	24000
VOC	135-98-8	sec-Butylbenzene	247	137	55	ug/kg	0.078	88	0.14	9800
VOC	100-42-5	Styrene	247	3	1.2	ug/kg	0.15	910	0.27	78
VOC	994-05-8	tert-Amyl-Methyl Ether (TAME)	247	0	0	ug/kg	0.094	580	--	--
VOC	75-65-0	tert-Butyl Alcohol (TBA)	247	9	3.6	ug/kg	3.8	68000	6.5	200
VOC	98-06-6	tert-Butylbenzene	247	57	23	ug/kg	0.089	550	0.11	350
VOC	127-18-4	Tetrachloroethene	247	2	0.81	ug/kg	0.12	750	16	29
VOC	108-88-3	Toluene	247	51	21	ug/kg	0.11	660	0.14	12000
VOC	156-60-5	trans-1,2-Dichloroethene	247	0	0	ug/kg	0.18	1100	--	--
VOC	10061-02-6	trans-1,3-Dichloropropene	247	0	0	ug/kg	0.44	8400	--	--
VOC	79-01-6	Trichloroethene	247	0	0	ug/kg	0.13	800	--	--
VOC	108-05-4	Vinyl Acetate	247	1	0.40	ug/kg	3.5	33000	9200	9200
VOC	75-01-4	Vinyl Chloride	247	0	0	ug/kg	0.16	950	--	--
VOC	1330-20-7	Xylenes, Total	247	121	49	ug/kg	0.15	170	0.17	140000

Notes:
-- not applicable; DL = detection limit

Table 2a

Statistical Summary of Soil Vapor Data - Residential Properties

Former Kast Property

Matrix	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
Soil Vapor, Sub-Slab	71-55-6	1,1,1-Trichloroethane	2316	40	1.7	µg/m^3	0.21	260	1.8	100
Soil Vapor, Sub-Slab	79-34-5	1,1,2,2-Tetrachloroethane	2316	0	0	µg/m^3	0.12	210	--	--
Soil Vapor, Sub-Slab	79-00-5	1,1,2-Trichloroethane	2316	0	0	µg/m^3	0.23	460	--	--
Soil Vapor, Sub-Slab	75-34-3	1,1-Dichloroethane	2316	0	0	µg/m^3	0.23	230	--	--
Soil Vapor, Sub-Slab	75-35-4	1,1-Dichloroethene	2316	1	0.04	µg/m^3	0.37	370	18	18
Soil Vapor, Sub-Slab	120-82-1	1,2,4-Trichlorobenzene	2316	1	0.04	µg/m^3	0.59	1100	1300	1300
Soil Vapor, Sub-Slab	95-63-6	1,2,4-Trimethylbenzene	2316	65	2.8	µg/m^3	0.12	280	2.7	2200
Soil Vapor, Sub-Slab	106-93-4	1,2-Dibromoethane (EDB)	2316	0	0	µg/m^3	0.19	500	--	--
Soil Vapor, Sub-Slab	95-50-1	1,2-Dichlorobenzene	2316	8	0.35	µg/m^3	0.17	460	5.4	780
Soil Vapor, Sub-Slab	107-06-2	1,2-Dichloroethane	2316	4	0.17	µg/m^3	0.22	210	4.5	47
Soil Vapor, Sub-Slab	78-87-5	1,2-Dichloropropane	2316	5	0.22	µg/m^3	0.38	260	5.2	22
Soil Vapor, Sub-Slab	108-67-8	1,3,5-Trimethylbenzene	2316	21	0.91	µg/m^3	0.14	550	5.3	1000
Soil Vapor, Sub-Slab	106-99-0	1,3-Butadiene	2316	1	0.04	µg/m^3	0.15	360	2.2	2.2
Soil Vapor, Sub-Slab	541-73-1	1,3-Dichlorobenzene	2316	1	0.04	µg/m^3	0.085	300	36	36
Soil Vapor, Sub-Slab	106-46-7	1,4-Dichlorobenzene	2316	8	0.35	µg/m^3	0.18	150	2	110
Soil Vapor, Sub-Slab	123-91-1	1,4-Dioxane	2316	31	1.3	µg/m^3	0.25	2400	1.6	200
Soil Vapor, Sub-Slab	540-84-1	2,2,4-Trimethylpentane	2316	40	1.7	µg/m^3	0.19	87	2	140000
Soil Vapor, Sub-Slab	78-93-3	2-Butanone (Methyl Ethyl Ketone)	2316	441	19	µg/m^3	0.5	790	2.7	210
Soil Vapor, Sub-Slab	591-78-6	2-Hexanone	2316	22	0.95	µg/m^3	0.37	680	0.68	360
Soil Vapor, Sub-Slab	107-05-1	3-Chloropropene	2316	0	0	µg/m^3	0.32	990	--	--
Soil Vapor, Sub-Slab	622-96-8	4-Ethyltoluene	2316	40	1.7	µg/m^3	0.14	370	5.4	1300
Soil Vapor, Sub-Slab	108-10-1	4-Methyl-2-Pentanone	2316	4	0.17	µg/m^3	0.09	270	3.8	14
Soil Vapor, Sub-Slab	67-64-1	Acetone	2316	1292	56	µg/m^3	1	410	8.2	1300
Soil Vapor, Sub-Slab	BZLCL	alpha-Chlorotoluene	2316	0	0	µg/m^3	0.14	360	--	--
Soil Vapor, Sub-Slab	71-43-2	Benzene	2316	192	8.3	µg/m^3	0.2	51	0.53	62000
Soil Vapor, Sub-Slab	75-27-4	Bromodichloromethane	2316	32	1.4	µg/m^3	0.2	470	0.92	370
Soil Vapor, Sub-Slab	75-25-2	Bromoform	2316	2	0.09	µg/m^3	0.11	950	2.2	3.1
Soil Vapor, Sub-Slab	74-83-9	Bromomethane	2273	33	1.5	µg/m^3	0.28	860	4.5	95
Soil Vapor, Sub-Slab	C10C12ALIPH	C10-C12 Aliphatics	2311	50	2.2	µg/m^3	94	48000	110	59000
Soil Vapor, Sub-Slab	C10C12AROM	C10-C12 Aromatics	2311	16	0.69	µg/m^3	74	38000	140	3400

Table 2a

Statistical Summary of Soil Vapor Data - Residential Properties

Former Kast Property

Matrix	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
Soil Vapor, Sub-Slab	C5C6ALIPH	C5-C6 Aliphatics	2311	44	1.9	µg/m^3	44	1400	58	380000
Soil Vapor, Sub-Slab	C6C8ALIPH	C6-C8 Aliphatics	2311	62	2.7	µg/m^3	55	1800	100	1600000
Soil Vapor, Sub-Slab	C8C10ALIPH	C8-C10 Aliphatics	2311	58	2.5	µg/m^3	78	2600	120	210000
Soil Vapor, Sub-Slab	C8C10AROM	C8-C10 Aromatics	2311	23	1.0	µg/m^3	66	34000	120	19000
Soil Vapor, Sub-Slab	75-15-0	Carbon Disulfide	2316	122	5.3	µg/m^3	0.22	600	0.69	230
Soil Vapor, Sub-Slab	56-23-5	Carbon Tetrachloride	2316	7	0.30	µg/m^3	0.39	610	2.2	99
Soil Vapor, Sub-Slab	108-90-7	Chlorobenzene	2316	2	0.09	µg/m^3	0.18	280	2.4	48
Soil Vapor, Sub-Slab	75-00-3	Chloroethane	2316	3	0.13	µg/m^3	0.29	680	3.8	66
Soil Vapor, Sub-Slab	67-66-3	Chloroform	2316	363	16	µg/m^3	0.27	880	1.5	8400
Soil Vapor, Sub-Slab	74-87-3	Chloromethane	2316	16	0.69	µg/m^3	0.29	1300	9.7	200
Soil Vapor, Sub-Slab	156-59-2	cis-1,2-Dichloroethene	2316	9	0.39	µg/m^3	0.28	600	4.2	130
Soil Vapor, Sub-Slab	10061-01-5	cis-1,3-Dichloropropene	2316	0	0	µg/m^3	0.29	320	--	--
Soil Vapor, Sub-Slab	98-82-8	Cumene (Isopropylbenzene)	2316	47	2.0	µg/m^3	0.3	240	0.75	100
Soil Vapor, Sub-Slab	110-82-7	Cyclohexane	2316	45	1.9	µg/m^3	0.24	18	2.5	14000
Soil Vapor, Sub-Slab	124-48-1	Dibromochloromethane	2316	8	0.35	µg/m^3	0.15	580	0.75	110
Soil Vapor, Sub-Slab	64-17-5	Ethanol	2316	480	21	µg/m^3	0.26	800	3	1600
Soil Vapor, Sub-Slab	100-41-4	Ethylbenzene	2316	48	2.1	µg/m^3	0.21	120	4.2	5300
Soil Vapor, Sub-Slab	75-69-4	Freon 11	2316	43	1.9	µg/m^3	0.16	300	1.1	72
Soil Vapor, Sub-Slab	76-13-1	Freon 113	2316	28	1.2	µg/m^3	0.3	530	1.7	150
Soil Vapor, Sub-Slab	76-14-2	Freon 114	2316	1	0.04	µg/m^3	0.29	290	27	27
Soil Vapor, Sub-Slab	75-71-8	Freon 12	2316	184	7.9	µg/m^3	0.14	240	1.8	120
Soil Vapor, Sub-Slab	142-82-5	Heptane	2316	68	2.9	µg/m^3	0.35	64	2.3	3500
Soil Vapor, Sub-Slab	87-68-3	Hexachloro-1,3-Butadiene	2316	0	0	µg/m^3	0.46	1300	--	--
Soil Vapor, Sub-Slab	110-54-3	Hexane	2316	95	4.1	µg/m^3	0.22	100	1.7	7500
Soil Vapor, Sub-Slab	67-63-0	Isopropanol	2316	141	6.1	µg/m^3	0.51	740	0.95	17000
Soil Vapor, Sub-Slab	74-82-8	Methane	2313	159	6.9	MOL %	0.00001	0.15	0.00016	23
Soil Vapor, Sub-Slab	75-09-2	Methylene Chloride	2316	39	1.7	µg/m^3	0.27	190	1.8	28000
Soil Vapor, Sub-Slab	1634-04-4	Methyl-tert-Butyl Ether	2316	6	0.26	µg/m^3	0.17	200	10	440
Soil Vapor, Sub-Slab	91-20-3	Naphthalene	2316	1283	55	µg/m^3	0.27	620	0.3	260
Soil Vapor, Sub-Slab	95-47-6	o-Xylene	2316	36	1.6	µg/m^3	0.11	340	4.6	190

Table 2a

Statistical Summary of Soil Vapor Data - Residential Properties

Former Kast Property

Matrix	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
Soil Vapor, Sub-Slab	1330-20-7-1	p/m-Xylene	2316	78	3.4	µg/m^3	0.22	110	3.7	5200
Soil Vapor, Sub-Slab	103-65-1	Propylbenzene	2316	16	0.69	µg/m^3	0.13	230	4.5	280
Soil Vapor, Sub-Slab	100-42-5	Styrene	2316	2	0.09	µg/m^3	0.15	220	5.8	20
Soil Vapor, Sub-Slab	127-18-4	Tetrachloroethene	2316	206	8.9	µg/m^3	0.33	300	1.8	950
Soil Vapor, Sub-Slab	109-99-9	Tetrahydrofuran	2316	35	1.5	µg/m^3	0.22	240	2.2	77
Soil Vapor, Sub-Slab	108-88-3	Toluene	2316	207	8.9	µg/m^3	0.17	67	1.6	1800
Soil Vapor, Sub-Slab	156-60-5	trans-1,2-Dichloroethene	2316	2	0.09	µg/m^3	0.32	520	6.2	12
Soil Vapor, Sub-Slab	10061-02-6	trans-1,3-Dichloropropene	2316	2	0.09	µg/m^3	0.13	170	7.4	8.4
Soil Vapor, Sub-Slab	79-01-6	Trichloroethene	2316	30	1.3	µg/m^3	0.26	430	2.1	720
Soil Vapor, Sub-Slab	75-01-4	Vinyl Chloride	2316	1	0.04	µg/m^3	0.17	380	27	27
Soil Vapor, Non-Sub-Slab	71-55-6	1,1,1-Trichloroethane	180	1	0.56	µg/m^3	0.3	9800	6.2	6.2
Soil Vapor, Non-Sub-Slab	79-34-5	1,1,2,2-Tetrachloroethane	180	1	0.56	µg/m^3	0.64	13000	9000	9000
Soil Vapor, Non-Sub-Slab	79-00-5	1,1,2-Trichloroethane	180	1	0.56	µg/m^3	0.38	12000	7.1	7.1
Soil Vapor, Non-Sub-Slab	75-34-3	1,1-Dichloroethane	180	1	0.56	µg/m^3	0.26	7500	200	200
Soil Vapor, Non-Sub-Slab	75-35-4	1,1-Dichloroethene	180	1	0.56	µg/m^3	0.57	7900	1.8	1.8
Soil Vapor, Non-Sub-Slab	75-37-6	1,1-Difluoroethane	74	2	2.7	µg/m^3	2.3	27000	13	15
Soil Vapor, Non-Sub-Slab	120-82-1	1,2,4-Trichlorobenzene	180	0	0	µg/m^3	1.7	97000	--	--
Soil Vapor, Non-Sub-Slab	95-63-6	1,2,4-Trimethylbenzene	180	92	51	µg/m^3	0.46	6800	3.2	990000
Soil Vapor, Non-Sub-Slab	106-93-4	1,2-Dibromoethane (EDB)	180	0	0	µg/m^3	0.6	15000	--	--
Soil Vapor, Non-Sub-Slab	95-50-1	1,2-Dichlorobenzene	180	0	0	µg/m^3	0.55	12000	--	--
Soil Vapor, Non-Sub-Slab	107-06-2	1,2-Dichloroethane	180	6	3.3	µg/m^3	0.39	6900	1.7	1700
Soil Vapor, Non-Sub-Slab	78-87-5	1,2-Dichloropropane	180	0	0	µg/m^3	0.44	9500	--	--
Soil Vapor, Non-Sub-Slab	108-67-8	1,3,5-Trimethylbenzene	180	58	32	µg/m^3	0.44	3500	3.7	450000
Soil Vapor, Non-Sub-Slab	106-99-0	1,3-Butadiene	107	0	0	µg/m^3	0.26	1000	--	--
Soil Vapor, Non-Sub-Slab	541-73-1	1,3-Dichlorobenzene	180	0	0	µg/m^3	0.52	14000	--	--
Soil Vapor, Non-Sub-Slab	106-46-7	1,4-Dichlorobenzene	180	1	0.56	µg/m^3	0.48	15000	170	170
Soil Vapor, Non-Sub-Slab	123-91-1	1,4-Dioxane	107	0	0	µg/m^3	0.87	1500	--	--
Soil Vapor, Non-Sub-Slab	540-84-1	2,2,4-Trimethylpentane	107	3	2.8	µg/m^3	0.28	560	8	14
Soil Vapor, Non-Sub-Slab	78-93-3	2-Butanone (Methyl Ethyl Ketone)	180	77	43	µg/m^3	0.6	1600	3.2	160000
Soil Vapor, Non-Sub-Slab	591-78-6	2-Hexanone	180	10	5.6	µg/m^3	0.55	38000	3.6	16000

Table 2a

Statistical Summary of Soil Vapor Data - Residential Properties

Former Kast Property

Matrix	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
Soil Vapor, Non-Sub-Slab	107-05-1	3-Chloropropene	107	0	0	µg/m^3	0.58	3200	--	--
Soil Vapor, Non-Sub-Slab	622-96-8	4-Ethyltoluene	180	79	44	µg/m^3	0.4	3800	1.9	440000
Soil Vapor, Non-Sub-Slab	108-10-1	4-Methyl-2-Pentanone	180	9	5.0	µg/m^3	0.095	11000	3.6	16
Soil Vapor, Non-Sub-Slab	67-64-1	Acetone	180	80	44	µg/m^3	0.9	3000	18	240000
Soil Vapor, Non-Sub-Slab	BZLCL	alpha-Chlorotoluene	180	0	0	µg/m^3	0.24	37000	--	--
Soil Vapor, Non-Sub-Slab	71-43-2	Benzene	180	145	81	µg/m^3	0.29	72	3.4	3800000
Soil Vapor, Non-Sub-Slab	75-27-4	Bromodichloromethane	180	4	2.2	µg/m^3	0.46	12000	2.3	12000
Soil Vapor, Non-Sub-Slab	75-25-2	Bromoform	180	0	0	µg/m^3	0.73	29000	--	--
Soil Vapor, Non-Sub-Slab	74-83-9	Bromomethane	180	1	0.56	µg/m^3	0.6	6500	1.4	1.4
Soil Vapor, Non-Sub-Slab	C10C12ALIPH	C10-C12 Aliphatics	7	1	14	µg/m^3	160	210	360000	360000
Soil Vapor, Non-Sub-Slab	C10C12AROM	C10-C12 Aromatics	7	0	0	µg/m^3	120	8600	--	--
Soil Vapor, Non-Sub-Slab	C5C6ALIPH	C5-C6 Aliphatics	7	2	29	µg/m^3	75	78	110	550000
Soil Vapor, Non-Sub-Slab	C6C8ALIPH	C6-C8 Aliphatics	7	2	29	µg/m^3	95	99	1000	3500000
Soil Vapor, Non-Sub-Slab	C8C10ALIPH	C8-C10 Aliphatics	7	2	29	µg/m^3	130	140	400	2200000
Soil Vapor, Non-Sub-Slab	C8C10AROM	C8-C10 Aromatics	7	1	14	µg/m^3	110	150	88000	88000
Soil Vapor, Non-Sub-Slab	75-15-0	Carbon Disulfide	180	89	49	µg/m^3	0.5	1200	1.4	170000
Soil Vapor, Non-Sub-Slab	56-23-5	Carbon Tetrachloride	180	0	0	µg/m^3	0.46	11000	--	--
Soil Vapor, Non-Sub-Slab	108-90-7	Chlorobenzene	180	1	0.56	µg/m^3	0.18	9000	5.9	5.9
Soil Vapor, Non-Sub-Slab	75-00-3	Chloroethane	180	1	0.56	µg/m^3	0.6	7400	6.7	6.7
Soil Vapor, Non-Sub-Slab	67-66-3	Chloroform	180	12	6.7	µg/m^3	0.39	8000	3.6	370
Soil Vapor, Non-Sub-Slab	74-87-3	Chloromethane	180	12	6.7	µg/m^3	0.3	3700	1	98
Soil Vapor, Non-Sub-Slab	156-59-2	cis-1,2-Dichloroethene	180	6	3.3	µg/m^3	0.52	9500	2.7	690
Soil Vapor, Non-Sub-Slab	10061-01-5	cis-1,3-Dichloropropene	180	0	0	µg/m^3	0.51	11000	--	--
Soil Vapor, Non-Sub-Slab	98-82-8	Cumene (Isopropylbenzene)	107	65	61	µg/m^3	0.35	200	6.2	31000
Soil Vapor, Non-Sub-Slab	110-82-7	Cyclohexane	107	60	56	µg/m^3	0.3	220	3.9	2700000
Soil Vapor, Non-Sub-Slab	124-48-1	Dibromochloromethane	180	0	0	µg/m^3	0.63	17000	--	--
Soil Vapor, Non-Sub-Slab	108-20-3	Diisopropyl Ether (DIPE)	73	0	0	µg/m^3	0.9	10000	--	--
Soil Vapor, Non-Sub-Slab	64-17-5	Ethanol	180	53	29	µg/m^3	0.44	2500	1.4	54000
Soil Vapor, Non-Sub-Slab	100-41-4	Ethylbenzene	180	143	79	µg/m^3	0.48	160	3.2	1800000
Soil Vapor, Non-Sub-Slab	637-92-3	Ethyl-t-Butyl Ether (ETBE)	73	0	0	µg/m^3	2.1	25000	--	--

Table 2a

Statistical Summary of Soil Vapor Data - Residential Properties

Former Kast Property

Matrix	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
Soil Vapor, Non-Sub-Slab	75-69-4	Freon 11	180	3	1.7	µg/m^3	0.26	7900	2.5	19
Soil Vapor, Non-Sub-Slab	76-13-1	Freon 113	180	2	1.1	µg/m^3	0.67	14000	54	200
Soil Vapor, Non-Sub-Slab	76-14-2	Freon 114	180	0	0	µg/m^3	0.89	14000	--	--
Soil Vapor, Non-Sub-Slab	75-71-8	Freon 12	180	9	5.0	µg/m^3	0.23	13000	2.3	210
Soil Vapor, Non-Sub-Slab	142-82-5	Heptane	107	26	24	µg/m^3	0.35	1300	16	1000000
Soil Vapor, Non-Sub-Slab	87-68-3	Hexachloro-1,3-Butadiene	180	3	1.7	µg/m^3	2.2	35000	730	2000
Soil Vapor, Non-Sub-Slab	110-54-3	Hexane	107	34	32	µg/m^3	0.28	850	3.1	1900000
Soil Vapor, Non-Sub-Slab	67-63-0	Isopropanol	180	49	27	µg/m^3	0.83	960	9.8	450000
Soil Vapor, Non-Sub-Slab	74-82-8	Methane	105	79	75	MOL %	0.00001	0.000055	0.0011	74
Soil Vapor, Non-Sub-Slab	75-09-2	Methylene Chloride	180	31	17	µg/m^3	0.28	12000	2.3	7300
Soil Vapor, Non-Sub-Slab	1634-04-4	Methyl-tert-Butyl Ether	180	17	9.4	µg/m^3	0.23	7800	1.2	2800
Soil Vapor, Non-Sub-Slab	91-20-3	Naphthalene	179	77	43	µg/m^3	0.34	200000	0.5	5200
Soil Vapor, Non-Sub-Slab	95-47-6	o-Xylene	107	16	15	µg/m^3	0.19	1300	5	21000
Soil Vapor, Non-Sub-Slab	1330-20-7-1	p/m-Xylene	107	40	37	µg/m^3	0.38	820	4.4	170000
Soil Vapor, Non-Sub-Slab	103-65-1	Propylbenzene	107	62	58	µg/m^3	0.3	180	9.5	37000
Soil Vapor, Non-Sub-Slab	100-42-5	Styrene	180	24	13	µg/m^3	0.35	14000	2.1	5900
Soil Vapor, Non-Sub-Slab	994-05-8	tert-Amyl-Methyl Ether (TAME)	73	0	0	µg/m^3	1.2	14000	--	--
Soil Vapor, Non-Sub-Slab	75-65-0	tert-Butyl Alcohol (TBA)	73	6	8.2	µg/m^3	1.2	14000	5.4	140
Soil Vapor, Non-Sub-Slab	127-18-4	Tetrachloroethene	180	32	18	µg/m^3	0.42	14000	3.7	5300
Soil Vapor, Non-Sub-Slab	109-99-9	Tetrahydrofuran	107	6	5.6	µg/m^3	0.43	780	3.5	12
Soil Vapor, Non-Sub-Slab	108-88-3	Toluene	180	98	54	µg/m^3	0.25	710	4.8	3700000
Soil Vapor, Non-Sub-Slab	156-60-5	trans-1,2-Dichloroethene	180	5	2.8	µg/m^3	0.55	13000	4.6	5600
Soil Vapor, Non-Sub-Slab	10061-02-6	trans-1,3-Dichloropropene	180	1	0.56	µg/m^3	0.42	8400	6.5	6.5
Soil Vapor, Non-Sub-Slab	79-01-6	Trichloroethene	180	7	3.9	µg/m^3	0.5	10000	2	6600
Soil Vapor, Non-Sub-Slab	108-05-4	Vinyl Acetate	73	3	4.1	µg/m^3	2.5	29000	2.6	5.1
Soil Vapor, Non-Sub-Slab	75-01-4	Vinyl Chloride	180	1	0.56	µg/m^3	0.33	4700	4.6	4.6

Notes:

-- not applicable; DL = detection limit

Table 2b
Statistical Summary of Soil Vapor Data - Streets
Former Kast Property

CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
71-55-6	1,1,1-Trichloroethane	168	1	0.60	µg/m^3	0.3	9800	6.2	6.2
79-34-5	1,1,2,2-Tetrachloroethane	168	1	0.60	µg/m^3	0.64	13000	9000	9000
79-00-5	1,1,2-Trichloroethane	168	1	0.60	µg/m^3	0.51	12000	7.1	7.1
75-34-3	1,1-Dichloroethane	168	1	0.60	µg/m^3	0.34	7500	200	200
75-35-4	1,1-Dichloroethene	168	1	0.60	µg/m^3	0.65	7900	1.8	1.8
120-82-1	1,2,4-Trichlorobenzene	168	0	0	µg/m^3	1.9	97000	--	--
95-63-6	1,2,4-Trimethylbenzene	168	91	54	µg/m^3	0.52	6800	3.2	990000
106-93-4	1,2-Dibromoethane (EDB)	168	0	0	µg/m^3	0.6	15000	--	--
95-50-1	1,2-Dichlorobenzene	168	0	0	µg/m^3	0.65	12000	--	--
107-06-2	1,2-Dichloroethane	168	6	3.6	µg/m^3	0.39	6900	1.7	1700
78-87-5	1,2-Dichloropropane	168	0	0	µg/m^3	0.54	9500	--	--
108-67-8	1,3,5-Trimethylbenzene	168	58	35	µg/m^3	0.44	3500	3.7	450000
106-99-0	1,3-Butadiene	95	0	0	µg/m^3	0.36	1000	--	--
541-73-1	1,3-Dichlorobenzene	168	0	0	µg/m^3	0.52	14000	--	--
106-46-7	1,4-Dichlorobenzene	168	1	0.60	µg/m^3	0.48	15000	170	170
123-91-1	1,4-Dioxane	95	0	0	µg/m^3	1.3	1500	--	--
540-84-1	2,2,4-Trimethylpentane	95	2	2.1	µg/m^3	0.32	560	11	14
78-93-3	2-Butanone (Methyl Ethyl Ketone)	168	68	40	µg/m^3	0.6	1600	4.7	160000
591-78-6	2-Hexanone	168	10	6.0	µg/m^3	0.69	38000	3.6	16000
107-05-1	3-Chloropropene	95	0	0	µg/m^3	2.7	3200	--	--
622-96-8	4-Ethyltoluene	168	79	47	µg/m^3	0.4	3800	1.9	440000
108-10-1	4-Methyl-2-Pentanone	168	9	5.4	µg/m^3	0.095	11000	3.6	16
67-64-1	Acetone	168	70	42	µg/m^3	0.9	3000	18	240000
BZLCL	alpha-Chlorotoluene	168	0	0	µg/m^3	0.5	37000	--	--
71-43-2	Benzene	168	139	83	µg/m^3	0.36	72	3.4	3800000
75-27-4	Bromodichloromethane	168	4	2.4	µg/m^3	0.54	12000	2.3	12000
75-25-2	Bromoform	168	0	0	µg/m^3	0.73	29000	--	--
74-83-9	Bromomethane	168	1	0.60	µg/m^3	0.6	6500	1.4	1.4
75-15-0	Carbon Disulfide	168	79	47	µg/m^3	0.5	1200	1.4	170000
56-23-5	Carbon Tetrachloride	168	0	0	µg/m^3	0.51	11000	--	--
108-90-7	Chlorobenzene	168	1	0.60	µg/m^3	0.36	9000	5.9	5.9
75-00-3	Chloroethane	168	1	0.60	µg/m^3	0.6	7400	6.7	6.7
67-66-3	Chloroform	168	11	6.5	µg/m^3	0.56	8000	3.6	370
74-87-3	Chloromethane	168	12	7.1	µg/m^3	0.3	3700	1	98
156-59-2	cis-1,2-Dichloroethene	168	5	3.0	µg/m^3	0.72	9500	2.7	690
10061-01-5	cis-1,3-Dichloropropene	168	0	0	µg/m^3	0.51	11000	--	--
98-82-8	Cumene (Isopropylbenzene)	95	63	66	µg/m^3	0.42	200	6.5	31000
110-82-7	Cyclohexane	95	59	62	µg/m^3	0.61	220	3.9	2700000
124-48-1	Dibromochloromethane	168	0	0	µg/m^3	0.63	17000	--	--
108-20-3	Diisopropyl Ether (DIPE)	73	0	0	µg/m^3	0.9	10000	--	--
64-17-5	Ethanol	168	48	29	µg/m^3	1.2	2500	1.4	54000

Table 2b
Statistical Summary of Soil Vapor Data - Streets
Former Kast Property

CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
100-41-4	Ethylbenzene	168	141	84	µg/m^3	0.48	160	3.2	1800000
637-92-3	Ethyl-t-Butyl Ether (ETBE)	73	0	0	µg/m^3	2.1	25000	--	--
75-69-4	Freon 11	168	3	1.8	µg/m^3	0.56	7900	2.5	19
76-13-1	Freon 113	168	2	1.2	µg/m^3	0.67	14000	54	200
76-14-2	Freon 114	168	0	0	µg/m^3	0.9	14000	--	--
75-71-8	Freon 12	168	9	5.4	µg/m^3	0.54	13000	2.3	210
7440-59-7	Helium	95	6	6.3	MOL %	0.0025	0.03	0.16	0.87
142-82-5	Heptane	95	26	27	µg/m^3	0.38	1300	16	1000000
87-68-3	Hexachloro-1,3-Butadiene	168	3	1.8	µg/m^3	3	35000	730	2000
110-54-3	Hexane	95	33	35	µg/m^3	0.31	850	3.1	1900000
67-63-0	Isopropanol	168	47	28	µg/m^3	0.83	960	13	450000
74-82-8	Methane	93	79	85	MOL %	0.00001	0.000055	0.0011	74
75-09-2	Methylene Chloride	168	29	17	µg/m^3	0.28	12000	2.3	7300
1634-04-4	Methyl-tert-Butyl Ether	168	17	10	µg/m^3	0.29	7800	1.2	2800
91-20-3	Naphthalene	167	72	43	µg/m^3	0.37	200000	0.59	5200
95-47-6	o-Xylene	95	14	15	µg/m^3	0.34	1300	6.7	21000
1330-20-7-1	p/m-Xylene	95	36	38	µg/m^3	0.4	820	19	170000
103-65-1	Propylbenzene	95	62	65	µg/m^3	0.3	180	9.5	37000
100-42-5	Styrene	168	23	14	µg/m^3	0.35	14000	2.1	5900
994-05-8	tert-Amyl-Methyl Ether (TAME)	73	0	0	µg/m^3	1.2	14000	--	--
75-65-0	tert-Butyl Alcohol (TBA)	73	6	8.2	µg/m^3	1.2	14000	5.4	140
127-18-4	Tetrachloroethene	168	28	17	µg/m^3	0.72	14000	3.7	5300
109-99-9	Tetrahydrofuran	95	1	1.1	µg/m^3	0.46	780	8.5	8.5
108-88-3	Toluene	168	93	55	µg/m^3	0.32	710	4.8	3700000
156-60-5	trans-1,2-Dichloroethene	168	5	3.0	µg/m^3	0.74	13000	4.6	5600
10061-02-6	trans-1,3-Dichloropropene	168	1	0.60	µg/m^3	0.44	8400	6.5	6.5
79-01-6	Trichloroethene	168	7	4.2	µg/m^3	0.72	10000	2	6600
108-05-4	Vinyl Acetate	73	3	4.1	µg/m^3	2.5	29000	2.6	5.1
75-01-4	Vinyl Chloride	168	1	0.60	µg/m^3	0.33	4700	4.6	4.6
C10C12ALIPH	C10-C12 Aliphatics	2	1	50	µg/m^3	210	210	360000	360000
C10C12AROM	C10-C12 Aromatics	2	0	0	µg/m^3	160	8600	--	--
C5C6ALIPH	C5-C6 Aliphatics	2	2	100	µg/m^3	--	--	110	550000
C6C8ALIPH	C6-C8 Aliphatics	2	2	100	µg/m^3	--	--	1000	3500000
C8C10ALIPH	C8-C10 Aliphatics	2	2	100	µg/m^3	--	--	400	2200000
C8C10AROM	C8-C10 Aromatics	2	1	50	µg/m^3	150	150	88000	88000

Notes:

-- not applicable; DL = detection limit

Table 3
Statistical Summary of Groundwater Data
Former Kast Property

Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
Water Table										
	15584-04-0	Arsenate	11	11	100	µg/L	--	--	0.16	16.9
	15502-74-6	Arsenite	11	11	100	µg/L	--	--	0.097	264
	TPHC11C12	Carbon Chain C11-C12	151	80	53	µg/L	14	50	0.52	620
	TPHC13C14	Carbon Chain C13-C14	150	67	45	µg/L	16	50	1.4	600
	TPHC15C16	Carbon Chain C15-C16	150	69	46	µg/L	17	50	6.5	520
	TPHC17C18	Carbon Chain C17-C18	151	85	56	µg/L	17	50	0.94	420
	TPHC19C20	Carbon Chain C19-C20	151	82	54	µg/L	18	50	0.32	300
	TPHC21C22	Carbon Chain C21-C22	151	86	57	µg/L	18	50	4.4	230
	TPHC23C24	Carbon Chain C23-C24	151	93	62	µg/L	18	50	13	140
	TPHC25C28	Carbon Chain C25-C28	151	98	65	µg/L	16	50	5.6	140
	TPHC29C32	Carbon Chain C29-C32	151	96	64	µg/L	8.5	50	3.5	130
	TPHC33C36	Carbon Chain C33-C36	151	58	38	µg/L	7.9	50	0.019	86
	TPHC37C40	Carbon Chain C37-C40	147	50	34	µg/L	6.8	50	0.28	55
	TPHC41C44	Carbon Chain C41-C44	146	15	10	µg/L	6.6	50	6.7	22
	TPHC6	Carbon Chain C6	146	77	53	µg/L	1.4	50	1.6	300
	TPHC7	Carbon Chain C7	147	84	57	µg/L	6.1	50	4.8	100
	TPHC8	Carbon Chain C8	147	88	60	µg/L	9.9	50	5.5	390
	TPHC9C10	Carbon Chain C9-C10	149	85	57	µg/L	13	50	0.9	620
	DOC	Dissolved Organic Carbon	11	11	100	mg/L	--	--	3.4	170
	ALKH	Hydroxide Alkalinity as CACO3	19	0	0	mg/L	0.85	0.85	--	--
	NH3N	Nitrogen, Ammonia (as N)	11	9	82	mg/L	0.094	0.094	0.11	0.78
	7440-09-7	Potassium	30	30	100	mg/L	--	--	4.69	12.7
	7440-23-5	Sodium	30	30	100	mg/L	--	--	68.1	502
	PO4TOT	Total Phosphate (as PO4)	11	8	73	mg/L	0.067	0.067	0.085	0.83
GENERAL	ALK	Alkalinity, Total (as CaCO3)	30	30	100	mg/L	--	--	122	1080
GENERAL	16887-00-6	Chloride	30	30	100	mg/L	--	--	57	1400
GENERAL	HARD	Hardness (AS CaCO3)	19	19	100	mg/L	--	--	300	1800
GENERAL	MBAS	MBAS	19	3	16	mg/L	0.089	0.089	0.1	0.29
GENERAL	14797-55-8	Nitrate (as N)	30	8	27	mg/L	0.017	0.037	0.098	14
GENERAL	14797-65-0	Nitrite (as N)	19	1	5.3	mg/L	0.013	0.016	0.097	0.097
GENERAL	TDS	Solids, Total Dissolved	30	30	100	mg/L	--	--	613	3320
GENERAL	14808-79-8	Sulfate	30	29	97	mg/L	0.19	0.19	0.41	260

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Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
GENERAL	S	Sulfide	11	3	27	mg/L	0.03	0.03	0.05	0.3
INORGANIC	ALKB	Bicarbonate Alkalinity as CACO3	30	30	100	mg/L	--	--	122	1080
INORGANIC	CO3	Carbonate (AS CO3)	30	0	0	mg/L	0.85	0.85	--	--
METALS	7429-90-5	Aluminum	11	11	100	mg/L	--	--	0.00825	6.42
METALS	7440-36-0	Antimony	30	4	13	mg/L	0.0021	0.00787	0.0095	0.0193
METALS	7440-38-2	Arsenic	41	31	76	mg/L	0.0031	0.0061	0.00039	0.9
METALS	7440-39-3	Barium	30	30	100	mg/L	--	--	0.048	0.839
METALS	7440-41-7	Beryllium	30	0	0	mg/L	0.0002	0.0044	--	--
METALS	7440-43-9	Cadmium	30	0	0	mg/L	0.0004	0.00454	--	--
METALS	7440-70-2	Calcium	30	30	100	mg/L	--	--	82.1	482
METALS	7440-47-3	Chromium	41	6	15	mg/L	0.0004	0.0044	0.00057	0.0126
METALS	7440-48-4	Cobalt	30	0	0	mg/L	0.0007	0.00441	--	--
METALS	7440-50-8	Copper	47	14	30	mg/L	0.0013	0.00392	0.00153	0.0181
METALS	7439-89-6	Iron	30	30	100	mg/L	--	--	0.0643	67
METALS	7439-92-1	Lead	30	2	6.7	mg/L	0.0024	0.00693	0.00473	0.0105
METALS	7439-95-4	Magnesium	30	30	100	mg/L	--	--	22.7	139
METALS	7439-96-5	Manganese	30	29	97	mg/L	0.0045	0.0045	0.00248	2.55
METALS	7439-97-6	Mercury	30	3	10	mg/L	0.00003	0.0001	0.00004	0.0001
METALS	7439-98-7	Molybdenum	30	10	33	mg/L	0.0008	0.0043	0.00379	0.0293
METALS	7440-02-0	Nickel	30	1	3.3	mg/L	0.0014	0.00433	0.00396	0.00396
METALS	7782-49-2	Selenium	30	5	17	mg/L	0.003	0.0107	0.00823	0.0242
METALS	7440-22-4	Silver	30	2	6.7	mg/L	0.0004	0.00211	0.00144	0.00228
METALS	7440-28-0	Thallium	30	3	10	mg/L	0.0023	0.0054	0.00376	0.00424
METALS	7440-62-2	Vanadium	30	0	0	mg/L	0.0003	0.0045	--	--
METALS	7440-66-6	Zinc	36	11	31	mg/L	0.0008	0.0067	0.00576	0.123
Method-dependent	87-61-6	1,2,3-Trichlorobenzene	156	0	0	µg/L	0.31	2.5	--	--
Method-dependent	120-82-1	1,2,4-Trichlorobenzene	156	0	0	µg/L	0.49	2.5	--	--
Method-dependent	95-50-1	1,2-Dichlorobenzene	156	4	2.6	µg/L	0.27	2.3	2	4.6
Method-dependent	541-73-1	1,3-Dichlorobenzene	156	0	0	µg/L	0.28	2	--	--
Method-dependent	106-46-7	1,4-Dichlorobenzene	156	4	2.6	µg/L	0.21	2.2	4.7	11
Method-dependent	91-20-3	Naphthalene	156	40	26	µg/L	0.037	5.1	0.041	82
Method-dependent	98-95-3	Nitrobenzene	18	0	0	µg/L	1.3	1.3	--	--
ORGANIC	106-44-5	3/4-Methylphenol	18	0	0	µg/L	1	1	--	--

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ORGANIC	12674-11-2	AROCLOR 1016	5	0	0	µg/L	0.15	0.15	--	--
ORGANIC	11104-28-2	AROCLOR 1221	5	0	0	µg/L	0.1	0.1	--	--
ORGANIC	11141-16-5	AROCLOR 1232	5	0	0	µg/L	0.1	0.1	--	--
ORGANIC	53469-21-9	AROCLOR 1242	5	0	0	µg/L	0.1	0.1	--	--
ORGANIC	12672-29-6	AROCLOR 1248	5	0	0	µg/L	0.1	0.1	--	--
ORGANIC	11097-69-1	AROCLOR 1254	5	0	0	µg/L	0.1	0.1	--	--
ORGANIC	11096-82-5	AROCLOR 1260	5	0	0	µg/L	0.25	0.25	--	--
ORGANIC	37324-23-5	AROCLOR 1262	5	0	0	µg/L	0.1	0.1	--	--
ORGANIC	85-68-7	Butyl Benzyl Phthalate	18	0	0	µg/L	1	1	--	--
ORGANIC	64-17-5	Ethanol	156	0	0	µg/L	43	250	--	--
ORGANIC	16984-48-8	Fluoride	30	28	93	mg/L	0.033	0.033	0.08	0.97
ORGANIC	76-13-1	Freon 113	156	3	1.9	µg/L	0.64	3.9	0.84	1.2
ORGANIC	TPHC6C44	Total Petroleum Hydrocarbons (C6-C44)	151	128	85	µg/L	47	47	48	4000
ORGANIC	68334-30-5	TPH as Diesel	156	153	98	µg/L	33	33	33	3200
ORGANIC	PHCG	TPH as Gasoline	156	119	76	µg/L	48	48	52	3000
ORGANIC	TPHMOIL	TPH as Motor Oil	156	66	42	µg/L	210	210	210	1700
SVOC	90-12-0	1-Methylnaphthalene	18	7	39	µg/L	0.036	1.4	0.071	1.4
SVOC	95-95-4	2,4,5-Trichlorophenol	18	0	0	µg/L	0.97	0.97	--	--
SVOC	88-06-2	2,4,6-Trichlorophenol	18	0	0	µg/L	1.2	1.2	--	--
SVOC	120-83-2	2,4-Dichlorophenol	18	0	0	µg/L	1.1	1.1	--	--
SVOC	105-67-9	2,4-Dimethylphenol	18	2	11	µg/L	1.2	1.2	7.2	11
SVOC	51-28-5	2,4-Dinitrophenol	18	0	0	µg/L	2.6	2.6	--	--
SVOC	121-14-2	2,4-Dinitrotoluene	18	0	0	µg/L	1	1	--	--
SVOC	606-20-2	2,6-Dinitrotoluene	18	0	0	µg/L	1.1	1.1	--	--
SVOC	91-58-7	2-Chloronaphthalene	18	0	0	µg/L	1.3	1.3	--	--
SVOC	95-57-8	2-Chlorophenol	18	0	0	µg/L	1	1	--	--
SVOC	91-57-6	2-Methylnaphthalene	18	7	39	µg/L	0.035	1.2	0.078	0.48
SVOC	95-48-7	2-Methylphenol	18	0	0	µg/L	1.1	1.1	--	--
SVOC	88-74-4	2-Nitroaniline	18	0	0	µg/L	1	1	--	--
SVOC	88-75-5	2-Nitrophenol	18	0	0	µg/L	1.2	1.2	--	--
SVOC	91-94-1	3,3'-Dichlorobenzidine	18	0	0	µg/L	1.3	1.3	--	--
SVOC	99-09-2	3-Nitroaniline	18	0	0	µg/L	1.2	1.2	--	--
SVOC	534-52-1	4,6-Dinitro-2-Methylphenol	18	0	0	µg/L	3.4	3.4	--	--

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SVOC	101-55-3	4-Bromophenyl-Phenyl Ether	18	0	0	µg/L	1.2	1.2	--	--
SVOC	59-50-7	4-Chloro-3-Methylphenol	18	0	0	µg/L	1.2	1.2	--	--
SVOC	106-47-8	4-Chloroaniline	18	0	0	µg/L	1.3	1.3	--	--
SVOC	7005-72-3	4-Chlorophenyl-Phenyl Ether	18	0	0	µg/L	1.2	1.2	--	--
SVOC	100-01-6	4-Nitroaniline	18	0	0	µg/L	2.4	2.4	--	--
SVOC	100-02-7	4-Nitrophenol	18	0	0	µg/L	0.86	0.86	--	--
SVOC	83-32-9	Acenaphthene	18	1	5.6	µg/L	0.037	1.4	0.14	0.14
SVOC	208-96-8	Acenaphthylene	18	2	11	µg/L	0.033	1.4	0.063	0.085
SVOC	62-53-3	Aniline	18	0	0	µg/L	1.2	1.2	--	--
SVOC	120-12-7	Anthracene	18	0	0	µg/L	0.036	1.5	--	--
SVOC	103-33-3	Azobenzene	18	0	0	µg/L	1.7	1.7	--	--
SVOC	92-87-5	Benzidine	18	0	0	µg/L	0.62	0.62	--	--
SVOC	56-55-3	Benzo (a) Anthracene	18	0	0	µg/L	0.043	1.1	--	--
SVOC	50-32-8	Benzo (a) Pyrene	18	0	0	µg/L	0.035	0.88	--	--
SVOC	205-99-2	Benzo (b) Fluoranthene	18	0	0	µg/L	0.036	1.2	--	--
SVOC	191-24-2	Benzo (g,h,i) Perylene	18	0	0	µg/L	0.037	0.71	--	--
SVOC	207-08-9	Benzo (k) Fluoranthene	18	0	0	µg/L	0.05	1.7	--	--
SVOC	65-85-0	Benzoic Acid	18	0	0	µg/L	0.43	0.43	--	--
SVOC	100-51-6	Benzyl Alcohol	18	0	0	µg/L	1	1	--	--
SVOC	111-91-1	Bis(2-Chloroethoxy) Methane	18	0	0	µg/L	1.2	1.2	--	--
SVOC	111-44-4	Bis(2-Chloroethyl) Ether	18	0	0	µg/L	1	1	--	--
SVOC	108-60-1	Bis(2-Chloroisopropyl) Ether	18	0	0	µg/L	1.5	1.5	--	--
SVOC	117-81-7	Bis(2-Ethylhexyl) Phthalate	18	0	0	µg/L	1	1	--	--
SVOC	218-01-9	Chrysene	18	0	0	µg/L	0.041	1.3	--	--
SVOC	53-70-3	Dibenz (a,h) Anthracene	18	0	0	µg/L	0.039	0.82	--	--
SVOC	132-64-9	Dibenzofuran	18	0	0	µg/L	1.4	1.4	--	--
SVOC	84-66-2	Diethyl Phthalate	18	0	0	µg/L	1.4	1.4	--	--
SVOC	131-11-3	Dimethyl Phthalate	18	0	0	µg/L	1.3	1.3	--	--
SVOC	84-74-2	Di-n-Butyl Phthalate	18	0	0	µg/L	1.5	1.5	--	--
SVOC	117-84-0	Di-n-Octyl Phthalate	18	0	0	µg/L	1	1	--	--
SVOC	206-44-0	Fluoranthene	18	0	0	µg/L	0.038	1.5	--	--
SVOC	86-73-7	Fluorene	18	1	5.6	µg/L	0.035	1.4	0.18	0.18
SVOC	87-68-3	Hexachloro-1,3-Butadiene	18	0	0	µg/L	1.2	1.2	--	--

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SVOC	118-74-1	Hexachlorobenzene	18	0	0	µg/L	1.2	1.2	--	--
SVOC	77-47-4	Hexachlorocyclopentadiene	18	0	0	µg/L	0.44	0.44	--	--
SVOC	67-72-1	Hexachloroethane	18	0	0	µg/L	0.98	0.98	--	--
SVOC	193-39-5	Indeno (1,2,3-c,d) Pyrene	18	0	0	µg/L	0.036	0.83	--	--
SVOC	78-59-1	Isophorone	18	0	0	µg/L	1.2	1.2	--	--
SVOC	62-75-9	N-Nitrosodimethylamine	18	0	0	µg/L	1.1	1.1	--	--
SVOC	621-64-7	N-Nitroso-di-n-propylamine	18	0	0	µg/L	1.3	1.3	--	--
SVOC	86-30-6	N-Nitrosodiphenylamine	18	0	0	µg/L	1.4	1.4	--	--
SVOC	87-86-5	Pentachlorophenol	18	0	0	µg/L	0.75	0.75	--	--
SVOC	85-01-8	Phenanthrene	18	0	0	µg/L	0.038	1.5	--	--
SVOC	108-95-2	Phenol	18	3	17	µg/L	1.2	1.2	1.8	13
SVOC	129-00-0	Pyrene	18	0	0	µg/L	0.05	1.4	--	--
SVOC	110-86-1	Pyridine	18	0	0	µg/L	1.4	1.4	--	--
VOC	630-20-6	1,1,1,2-Tetrachloroethane	156	1	0.64	µg/L	0.35	2	4	4
VOC	71-55-6	1,1,1-Trichloroethane	156	4	2.6	µg/L	0.3	1.5	0.44	0.52
VOC	79-34-5	1,1,2,2-Tetrachloroethane	156	0	0	µg/L	0.41	2	--	--
VOC	79-00-5	1,1,2-Trichloroethane	156	8	5.1	µg/L	0.38	1.9	0.39	1.5
VOC	75-34-3	1,1-Dichloroethane	156	77	49	µg/L	0.28	1.4	0.34	22
VOC	75-35-4	1,1-Dichloroethene	156	93	60	µg/L	0.4	2.2	0.46	33
VOC	563-58-6	1,1-Dichloropropene	156	0	0	µg/L	0.26	2.3	--	--
VOC	96-18-4	1,2,3-Trichloropropane	156	17	11	µg/L	0.64	3.2	3.6	27
VOC	95-63-6	1,2,4-Trimethylbenzene	156	48	31	µg/L	0.24	1.8	0.24	97
VOC	96-12-8	1,2-Dibromo-3-Chloropropane	156	0	0	µg/L	1.2	6.2	--	--
VOC	106-93-4	1,2-Dibromoethane (EDB)	156	0	0	µg/L	0.36	1.8	--	--
VOC	107-06-2	1,2-Dichloroethane	156	15	10	µg/L	0.24	1.2	0.38	6.1
VOC	78-87-5	1,2-Dichloropropane	156	0	0	µg/L	0.38	2.1	--	--
VOC	108-67-8	1,3,5-Trimethylbenzene	156	32	21	µg/L	0.23	1.4	0.32	25
VOC	142-28-9	1,3-Dichloropropane	156	0	0	µg/L	0.3	1.5	--	--
VOC	594-20-7	2,2-Dichloropropane	156	0	0	µg/L	0.36	1.8	--	--
VOC	78-93-3	2-Butanone (Methyl Ethyl Ketone)	156	2	1.3	µg/L	2.2	14	2.9	8.4
VOC	95-49-8	2-Chlorotoluene	156	0	0	µg/L	0.24	1.2	--	--
VOC	591-78-6	2-Hexanone	156	0	0	µg/L	2.1	14	--	--
VOC	106-43-4	4-Chlorotoluene	156	1	0.64	µg/L	0.13	0.66	0.27	0.27

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VOC	108-10-1	4-Methyl-2-Pentanone	156	0	0	µg/L	4.4	22	--	--
VOC	67-64-1	Acetone	156	6	3.8	µg/L	6	50	12	120
VOC	71-43-2	Benzene	156	136	87	µg/L	0.14	0.57	0.14	680
VOC	108-86-1	Bromobenzene	156	0	0	µg/L	0.3	1.5	--	--
VOC	74-97-5	Bromochloromethane	156	0	0	µg/L	0.48	2.4	--	--
VOC	75-27-4	Bromodichloromethane	156	0	0	µg/L	0.21	1	--	--
VOC	75-25-2	Bromoform	156	0	0	µg/L	0.5	2.5	--	--
VOC	74-83-9	Bromomethane	156	0	0	µg/L	3.9	19	--	--
VOC	75-15-0	Carbon Disulfide	156	1	0.64	µg/L	0.41	3.8	0.84	0.84
VOC	56-23-5	Carbon Tetrachloride	156	0	0	µg/L	0.23	1.1	--	--
VOC	108-90-7	Chlorobenzene	156	0	0	µg/L	0.17	0.86	--	--
VOC	75-00-3	Chloroethane	156	0	0	µg/L	1.3	11	--	--
VOC	67-66-3	Chloroform	156	17	11	µg/L	0.33	2.3	2.2	7
VOC	74-87-3	Chloromethane	156	1	0.64	µg/L	0.49	8.8	0.6	0.6
VOC	156-59-2	cis-1,2-Dichloroethene	156	120	77	µg/L	0.48	2.4	0.5	510
VOC	10061-01-5	cis-1,3-Dichloropropene	156	0	0	µg/L	0.25	1.2	--	--
VOC	98-82-8	Cumene (Isopropylbenzene)	156	57	37	µg/L	0.23	1.2	0.38	25
VOC	124-48-1	Dibromochloromethane	156	0	0	µg/L	0.25	1.2	--	--
VOC	74-95-3	Dibromomethane	156	0	0	µg/L	0.46	2.3	--	--
VOC	108-20-3	Diisopropyl Ether (DIPE)	156	0	0	µg/L	0.31	1.7	--	--
VOC	100-41-4	Ethylbenzene	156	82	53	µg/L	0.14	0.44	0.16	150
VOC	637-92-3	Ethyl-t-Butyl Ether (ETBE)	156	0	0	µg/L	0.27	2.2	--	--
VOC	75-69-4	Freon 11	156	0	0	µg/L	0.31	8.3	--	--
VOC	75-71-8	Freon 12	156	0	0	µg/L	0.46	2.3	--	--
VOC	75-09-2	Methylene Chloride	156	1	0.64	µg/L	0.64	5.2	0.84	0.84
VOC	1634-04-4	Methyl-tert-Butyl Ether	156	12	7.7	µg/L	0.3	1.5	0.64	2.5
VOC	104-51-8	n-Butylbenzene	156	34	22	µg/L	0.23	1.1	0.28	3.4
VOC	95-47-6	o-Xylene	11	2	18	µg/L	0.23	0.46	1.4	2.1
VOC	1330-20-7-1	p/m-Xylene	11	4	36	µg/L	0.24	0.49	0.27	68
VOC	99-87-6	p-Isopropyltoluene	156	38	24	µg/L	0.16	0.79	0.17	4.4
VOC	103-65-1	Propylbenzene	156	56	36	µg/L	0.17	1.6	0.18	25
VOC	135-98-8	sec-Butylbenzene	156	67	43	µg/L	0.2	0.49	0.21	3.4

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VOC	100-42-5	Styrene	156	1	0.64	µg/L	0.17	0.86	0.2	0.2
VOC	994-05-8	tert-Amyl-Methyl Ether (TAME)	156	0	0	µg/L	0.22	1.1	--	--
VOC	75-65-0	tert-Butyl Alcohol (TBA)	156	76	49	µg/L	3.5	23	4.2	62
VOC	98-06-6	tert-Butylbenzene	156	3	1.9	µg/L	0.28	1.4	0.28	0.37
VOC	127-18-4	Tetrachloroethene	156	21	13	µg/L	0.39	1.9	0.88	260
VOC	108-88-3	Toluene	156	17	11	µg/L	0.24	1.2	0.25	12
VOC	156-60-5	trans-1,2-Dichloroethene	156	80	51	µg/L	0.37	1.8	0.37	120
VOC	10061-02-6	trans-1,3-Dichloropropene	156	0	0	µg/L	0.25	1.3	--	--
VOC	79-01-6	Trichloroethene	156	77	49	µg/L	0.3	1.8	0.39	400
VOC	108-05-4	Vinyl Acetate	156	0	0	µg/L	2.8	14	--	--
VOC	75-01-4	Vinyl Chloride	156	11	7.1	µg/L	0.3	1.5	0.33	0.71
VOC	1330-20-7	Xylenes, Total	156	61	39	µg/L	0.23	0.91	0.27	280
Lower Gage										
	15584-04-0	Arsenate	4	4	100	µg/L	--	--	0.27	0.84
	15502-74-6	Arsenite	4	4	100	µg/L	--	--	4.84	7.97
	TPHC11C12	Carbon Chain C11-C12	36	1	2.8	µg/L	14	14	18	18
	TPHC13C14	Carbon Chain C13-C14	36	1	2.8	µg/L	16	16	16	16
	TPHC15C16	Carbon Chain C15-C16	36	4	11	µg/L	17	17	17	33
	TPHC17C18	Carbon Chain C17-C18	36	1	2.8	µg/L	17	17	37	37
	TPHC19C20	Carbon Chain C19-C20	36	1	2.8	µg/L	18	18	24	24
	TPHC21C22	Carbon Chain C21-C22	36	4	11	µg/L	18	18	19	34
	TPHC23C24	Carbon Chain C23-C24	36	4	11	µg/L	18	18	20	63
	TPHC25C28	Carbon Chain C25-C28	36	11	31	µg/L	16	16	17	79
	TPHC29C32	Carbon Chain C29-C32	36	8	22	µg/L	8.5	8.5	9	46
	TPHC33C36	Carbon Chain C33-C36	36	5	14	µg/L	7.9	7.9	8.1	32
	TPHC37C40	Carbon Chain C37-C40	36	4	11	µg/L	6.8	6.8	9.2	10
	TPHC41C44	Carbon Chain C41-C44	36	0	0	µg/L	6.6	6.6	--	--
	TPHC6	Carbon Chain C6	36	9	25	µg/L	1.4	1.4	1.5	4.8
	TPHC7	Carbon Chain C7	36	0	0	µg/L	6.1	6.1	--	--
	TPHC8	Carbon Chain C8	36	0	0	µg/L	9.9	9.9	--	--
	TPHC9C10	Carbon Chain C9-C10	36	7	19	µg/L	13	13	14	33
	DOC	Dissolved Organic Carbon	4	4	100	mg/L	--	--	7.3	29

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Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
	ALKH	Hydroxide Alkalinity as CACO3	4	0	0	mg/L	0.85	0.85	--	--
	NH3N	Nitrogen, Ammonia (as N)	4	4	100	mg/L	--	--	0.28	0.73
	7440-09-7	Potassium	8	8	100	mg/L	--	--	7.65	11.4
	7440-23-5	Sodium	8	8	100	mg/L	--	--	110	304
	PO4TOT	Total Phosphate (as PO4)	4	4	100	mg/L	--	--	0.17	2
GENERAL	ALK	Alkalinity, Total (as CaCO3)	8	8	100	mg/L	--	--	142	330
GENERAL	16887-00-6	Chloride	8	8	100	mg/L	--	--	210	370
GENERAL	HARD	Hardness (AS CaCO3)	4	4	100	mg/L	--	--	130	270
GENERAL	MBAS	MBAS	4	1	25	mg/L	0.089	0.089	0.12	0.12
GENERAL	14797-55-8	Nitrate (as N)	8	0	0	mg/L	0.025	0.037	--	--
GENERAL	14797-65-0	Nitrite (as N)	4	0	0	mg/L	0.016	0.016	--	--
GENERAL	TDS	Solids, Total Dissolved	8	8	100	mg/L	--	--	615	1000
GENERAL	14808-79-8	Sulfate	8	8	100	mg/L	--	--	0.49	110
GENERAL	S	Sulfide	4	2	50	mg/L	0.03	0.03	0.2	0.2
INORGANIC	ALKB	Bicarbonate Alkalinity as CACO3	8	8	100	mg/L	--	--	120	276
INORGANIC	CO3	Carbonate (AS CO3)	8	2	25	mg/L	0.85	0.85	22	138
METALS	7429-90-5	Aluminum	4	4	100	mg/L	--	--	0.0144	0.0456
METALS	7440-36-0	Antimony	8	1	13	mg/L	0.00744	0.00787	0.00968	0.00968
METALS	7440-38-2	Arsenic	12	10	83	mg/L	0.00611	0.00611	0.00532	0.026
METALS	7440-39-3	Barium	8	7	88	mg/L	0.00296	0.00296	0.0138	0.0796
METALS	7440-41-7	Beryllium	8	0	0	mg/L	0.00056	0.00439	--	--
METALS	7440-43-9	Cadmium	8	0	0	mg/L	0.00269	0.00454	--	--
METALS	7440-70-2	Calcium	8	8	100	mg/L	--	--	8.54	106
METALS	7440-47-3	Chromium	12	0	0	mg/L	0.0004	0.00436	--	--
METALS	7440-48-4	Cobalt	8	0	0	mg/L	0.00295	0.00441	--	--
METALS	7440-50-8	Copper	12	9	75	mg/L	0.00392	0.00392	0.00051	0.0175
METALS	7439-89-6	Iron	8	8	100	mg/L	--	--	0.0339	6
METALS	7439-92-1	Lead	8	0	0	mg/L	0.00406	0.00693	--	--
METALS	7439-95-4	Magnesium	8	8	100	mg/L	--	--	5.26	30.1
METALS	7439-96-5	Manganese	8	8	100	mg/L	--	--	0.0061	0.177
METALS	7439-97-6	Mercury	8	2	25	mg/L	0.00003	0.00004	0.00004	0.00005
METALS	7439-98-7	Molybdenum	8	4	50	mg/L	0.00278	0.00278	0.00824	0.0227

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METALS	7440-02-0	Nickel	8	0	0	mg/L	0.00298	0.00433	--	--
METALS	7782-49-2	Selenium	8	0	0	mg/L	0.00699	0.0107	--	--
METALS	7440-22-4	Silver	8	0	0	mg/L	0.00139	0.00211	--	--
METALS	7440-28-0	Thallium	8	1	13	mg/L	0.00291	0.0054	0.00311	0.00311
METALS	7440-62-2	Vanadium	8	2	25	mg/L	0.00244	0.00449	0.00354	0.0273
METALS	7440-66-6	Zinc	8	5	63	mg/L	0.00352	0.00666	0.00618	0.465
Method-dependent	87-61-6	1,2,3-Trichlorobenzene	36	0	0	µg/L	0.51	0.51	--	--
Method-dependent	120-82-1	1,2,4-Trichlorobenzene	36	0	0	µg/L	0.5	0.5	--	--
Method-dependent	95-50-1	1,2-Dichlorobenzene	36	0	0	µg/L	0.46	0.46	--	--
Method-dependent	541-73-1	1,3-Dichlorobenzene	36	0	0	µg/L	0.4	0.4	--	--
Method-dependent	106-46-7	1,4-Dichlorobenzene	36	0	0	µg/L	0.43	0.43	--	--
Method-dependent	91-20-3	Naphthalene	36	3	8.3	µg/L	0.037	2.5	0.047	0.07
Method-dependent	98-95-3	Nitrobenzene	4	0	0	µg/L	1.3	1.3	--	--
ORGANIC	106-44-5	3/4-Methylphenol	4	1	25	µg/L	1	1	1.7	1.7
ORGANIC	85-68-7	Butyl Benzyl Phthalate	4	0	0	µg/L	1	1	--	--
ORGANIC	64-17-5	Ethanol	36	0	0	µg/L	50	50	--	--
ORGANIC	16984-48-8	Fluoride	8	8	100	mg/L	--	--	0.22	0.74
ORGANIC	76-13-1	Freon 113	36	0	0	µg/L	0.78	0.78	--	--
ORGANIC	TPHC6C44	Total Petroleum Hydrocarbons (C6-C44)	36	8	22	µg/L	47	47	53	350
ORGANIC	68334-30-5	TPH as Diesel	36	29	81	µg/L	33	33	34	330
ORGANIC	PHCG	TPH as Gasoline	36	0	0	µg/L	48	48	--	--
ORGANIC	TPHMOIL	TPH as Motor Oil	36	1	2.8	µg/L	210	210	330	330
SVOC	90-12-0	1-Methylnaphthalene	4	0	0	µg/L	0.036	0.036	--	--
SVOC	95-95-4	2,4,5-Trichlorophenol	4	0	0	µg/L	0.97	0.97	--	--
SVOC	88-06-2	2,4,6-Trichlorophenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	120-83-2	2,4-Dichlorophenol	4	0	0	µg/L	1.1	1.1	--	--
SVOC	105-67-9	2,4-Dimethylphenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	51-28-5	2,4-Dinitrophenol	4	0	0	µg/L	2.6	2.6	--	--
SVOC	121-14-2	2,4-Dinitrotoluene	4	0	0	µg/L	1	1	--	--
SVOC	606-20-2	2,6-Dinitrotoluene	4	0	0	µg/L	1.1	1.1	--	--
SVOC	91-58-7	2-Chloronaphthalene	4	0	0	µg/L	1.3	1.3	--	--
SVOC	95-57-8	2-Chlorophenol	4	0	0	µg/L	1	1	--	--

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Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
SVOC	91-57-6	2-Methylnaphthalene	4	1	25	µg/L	0.035	0.035	0.037	0.037
SVOC	95-48-7	2-Methylphenol	4	0	0	µg/L	1.1	1.1	--	--
SVOC	88-74-4	2-Nitroaniline	4	0	0	µg/L	1	1	--	--
SVOC	88-75-5	2-Nitrophenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	91-94-1	3,3'-Dichlorobenzidine	4	0	0	µg/L	1.3	1.3	--	--
SVOC	99-09-2	3-Nitroaniline	4	0	0	µg/L	1.2	1.2	--	--
SVOC	534-52-1	4,6-Dinitro-2-Methylphenol	4	0	0	µg/L	3.4	3.4	--	--
SVOC	101-55-3	4-Bromophenyl-Phenyl Ether	4	0	0	µg/L	1.2	1.2	--	--
SVOC	59-50-7	4-Chloro-3-Methylphenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	106-47-8	4-Chloroaniline	4	0	0	µg/L	1.3	1.3	--	--
SVOC	7005-72-3	4-Chlorophenyl-Phenyl Ether	4	0	0	µg/L	1.2	1.2	--	--
SVOC	100-01-6	4-Nitroaniline	4	0	0	µg/L	2.4	2.4	--	--
SVOC	100-02-7	4-Nitrophenol	4	0	0	µg/L	0.86	0.86	--	--
SVOC	83-32-9	Acenaphthene	4	0	0	µg/L	0.037	0.037	--	--
SVOC	208-96-8	Acenaphthylene	4	0	0	µg/L	0.033	0.033	--	--
SVOC	62-53-3	Aniline	4	0	0	µg/L	1.2	1.2	--	--
SVOC	120-12-7	Anthracene	4	0	0	µg/L	0.036	0.036	--	--
SVOC	103-33-3	Azobenzene	4	0	0	µg/L	1.7	1.7	--	--
SVOC	92-87-5	Benzidine	4	0	0	µg/L	0.62	0.62	--	--
SVOC	56-55-3	Benzo (a) Anthracene	4	0	0	µg/L	0.043	0.043	--	--
SVOC	50-32-8	Benzo (a) Pyrene	4	0	0	µg/L	0.035	0.035	--	--
SVOC	205-99-2	Benzo (b) Fluoranthene	4	0	0	µg/L	0.036	0.036	--	--
SVOC	191-24-2	Benzo (g,h,i) Perylene	4	0	0	µg/L	0.037	0.037	--	--
SVOC	207-08-9	Benzo (k) Fluoranthene	4	0	0	µg/L	0.05	0.05	--	--
SVOC	65-85-0	Benzoic Acid	4	1	25	µg/L	0.43	0.43	2.6	2.6
SVOC	100-51-6	Benzyl Alcohol	4	0	0	µg/L	1	1	--	--
SVOC	111-91-1	Bis(2-Chloroethoxy) Methane	4	0	0	µg/L	1.2	1.2	--	--
SVOC	111-44-4	Bis(2-Chloroethyl) Ether	4	0	0	µg/L	1	1	--	--
SVOC	108-60-1	Bis(2-Chloroisopropyl) Ether	4	0	0	µg/L	1.5	1.5	--	--
SVOC	117-81-7	Bis(2-Ethylhexyl) Phthalate	4	0	0	µg/L	1	1	--	--
SVOC	218-01-9	Chrysene	4	0	0	µg/L	0.041	0.041	--	--
SVOC	53-70-3	Dibenz (a,h) Anthracene	4	0	0	µg/L	0.039	0.039	--	--

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SVOC	132-64-9	Dibenzofuran	4	0	0	µg/L	1.4	1.4	--	--
SVOC	84-66-2	Diethyl Phthalate	4	0	0	µg/L	1.4	1.4	--	--
SVOC	131-11-3	Dimethyl Phthalate	4	0	0	µg/L	1.3	1.3	--	--
SVOC	84-74-2	Di-n-Butyl Phthalate	4	0	0	µg/L	1.5	1.5	--	--
SVOC	117-84-0	Di-n-Octyl Phthalate	4	0	0	µg/L	1	1	--	--
SVOC	206-44-0	Fluoranthene	4	0	0	µg/L	0.038	0.038	--	--
SVOC	86-73-7	Fluorene	4	0	0	µg/L	0.035	0.035	--	--
SVOC	87-68-3	Hexachloro-1,3-Butadiene	4	0	0	µg/L	1.2	1.2	--	--
SVOC	118-74-1	Hexachlorobenzene	4	0	0	µg/L	1.2	1.2	--	--
SVOC	77-47-4	Hexachlorocyclopentadiene	4	0	0	µg/L	0.44	0.44	--	--
SVOC	67-72-1	Hexachloroethane	4	0	0	µg/L	0.98	0.98	--	--
SVOC	193-39-5	Indeno (1,2,3-c,d) Pyrene	4	0	0	µg/L	0.036	0.036	--	--
SVOC	78-59-1	Isophorone	4	0	0	µg/L	1.2	1.2	--	--
SVOC	62-75-9	N-Nitrosodimethylamine	4	0	0	µg/L	1.1	1.1	--	--
SVOC	621-64-7	N-Nitroso-di-n-propylamine	4	0	0	µg/L	1.3	1.3	--	--
SVOC	86-30-6	N-Nitrosodiphenylamine	4	0	0	µg/L	1.4	1.4	--	--
SVOC	87-86-5	Pentachlorophenol	4	0	0	µg/L	0.75	0.75	--	--
SVOC	85-01-8	Phenanthrene	4	0	0	µg/L	0.038	0.038	--	--
SVOC	108-95-2	Phenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	129-00-0	Pyrene	4	0	0	µg/L	0.05	0.05	--	--
SVOC	110-86-1	Pyridine	4	0	0	µg/L	1.4	1.4	--	--
VOC	630-20-6	1,1,1,2-Tetrachloroethane	36	0	0	µg/L	0.4	0.4	--	--
VOC	71-55-6	1,1,1-Trichloroethane	36	0	0	µg/L	0.3	0.3	--	--
VOC	79-34-5	1,1,2,2-Tetrachloroethane	36	0	0	µg/L	0.41	0.41	--	--
VOC	79-00-5	1,1,2-Trichloroethane	36	0	0	µg/L	0.38	0.38	--	--
VOC	75-34-3	1,1-Dichloroethane	36	0	0	µg/L	0.28	0.28	--	--
VOC	75-35-4	1,1-Dichloroethene	36	0	0	µg/L	0.43	0.43	--	--
VOC	563-58-6	1,1-Dichloropropene	36	0	0	µg/L	0.46	0.46	--	--
VOC	96-18-4	1,2,3-Trichloropropane	36	0	0	µg/L	0.64	0.64	--	--
VOC	95-63-6	1,2,4-Trimethylbenzene	36	0	0	µg/L	0.36	0.36	--	--
VOC	96-12-8	1,2-Dibromo-3-Chloropropane	36	0	0	µg/L	1.2	1.2	--	--
VOC	106-93-4	1,2-Dibromoethane (EDB)	36	0	0	µg/L	0.36	0.36	--	--

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VOC	107-06-2	1,2-Dichloroethane	36	1	2.8	µg/L	0.24	0.24	0.31	0.31
VOC	78-87-5	1,2-Dichloropropane	36	0	0	µg/L	0.42	0.42	--	--
VOC	108-67-8	1,3,5-Trimethylbenzene	36	0	0	µg/L	0.28	0.28	--	--
VOC	142-28-9	1,3-Dichloropropane	36	0	0	µg/L	0.3	0.3	--	--
VOC	594-20-7	2,2-Dichloropropane	36	0	0	µg/L	0.36	0.36	--	--
VOC	78-93-3	2-Butanone (Methyl Ethyl Ketone)	36	0	0	µg/L	2.2	2.2	--	--
VOC	95-49-8	2-Chlorotoluene	36	0	0	µg/L	0.24	0.24	--	--
VOC	591-78-6	2-Hexanone	36	0	0	µg/L	2.1	2.1	--	--
VOC	106-43-4	4-Chlorotoluene	36	0	0	µg/L	0.13	0.13	--	--
VOC	108-10-1	4-Methyl-2-Pentanone	36	0	0	µg/L	4.4	4.4	--	--
VOC	67-64-1	Acetone	36	2	5.6	µg/L	6	10	6.7	8.3
VOC	71-43-2	Benzene	36	6	17	µg/L	0.14	0.14	0.15	0.89
VOC	108-86-1	Bromobenzene	36	0	0	µg/L	0.3	0.3	--	--
VOC	74-97-5	Bromochloromethane	36	2	5.6	µg/L	0.48	0.48	0.79	1.5
VOC	75-27-4	Bromodichloromethane	36	0	0	µg/L	0.21	0.21	--	--
VOC	75-25-2	Bromoform	36	0	0	µg/L	0.5	0.5	--	--
VOC	74-83-9	Bromomethane	36	0	0	µg/L	3.9	3.9	--	--
VOC	75-15-0	Carbon Disulfide	36	15	42	µg/L	0.41	0.41	0.45	9.3
VOC	56-23-5	Carbon Tetrachloride	36	0	0	µg/L	0.23	0.23	--	--
VOC	108-90-7	Chlorobenzene	36	0	0	µg/L	0.17	0.17	--	--
VOC	75-00-3	Chloroethane	36	0	0	µg/L	2.3	2.3	--	--
VOC	67-66-3	Chloroform	36	2	5.6	µg/L	0.46	0.46	0.5	0.67
VOC	74-87-3	Chloromethane	36	0	0	µg/L	1.8	1.8	--	--
VOC	156-59-2	cis-1,2-Dichloroethene	36	7	19	µg/L	0.48	0.48	0.93	11
VOC	10061-01-5	cis-1,3-Dichloropropene	36	0	0	µg/L	0.25	0.25	--	--
VOC	98-82-8	Cumene (Isopropylbenzene)	36	0	0	µg/L	0.58	0.58	--	--
VOC	124-48-1	Dibromochloromethane	36	0	0	µg/L	0.25	0.25	--	--
VOC	74-95-3	Dibromomethane	36	3	8.3	µg/L	0.46	0.46	0.71	2.1
VOC	108-20-3	Diisopropyl Ether (DIPE)	36	0	0	µg/L	0.33	0.33	--	--
VOC	100-41-4	Ethylbenzene	36	0	0	µg/L	0.14	0.14	--	--
VOC	637-92-3	Ethyl-t-Butyl Ether (ETBE)	36	0	0	µg/L	0.44	0.44	--	--
VOC	75-69-4	Freon 11	36	0	0	µg/L	1.7	1.7	--	--

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VOC	75-71-8	Freon 12	36	0	0	µg/L	0.46	0.46	--	--
VOC	75-09-2	Methylene Chloride	36	0	0	µg/L	0.64	0.64	--	--
VOC	1634-04-4	Methyl-tert-Butyl Ether	36	0	0	µg/L	0.31	0.31	--	--
VOC	104-51-8	n-Butylbenzene	36	0	0	µg/L	0.23	0.23	--	--
VOC	95-47-6	o-Xylene	4	0	0	µg/L	0.23	0.23	--	--
VOC	1330-20-7-1	p/m-Xylene	4	0	0	µg/L	0.24	0.24	--	--
VOC	99-87-6	p-Isopropyltoluene	36	0	0	µg/L	0.16	0.16	--	--
VOC	103-65-1	Propylbenzene	36	0	0	µg/L	0.17	0.17	--	--
VOC	135-98-8	sec-Butylbenzene	36	0	0	µg/L	0.25	0.25	--	--
VOC	100-42-5	Styrene	36	0	0	µg/L	0.17	0.17	--	--
VOC	994-05-8	tert-Amyl-Methyl Ether (TAME)	36	0	0	µg/L	0.22	0.22	--	--
VOC	75-65-0	tert-Butyl Alcohol (TBA)	36	2	5.6	µg/L	4.6	4.6	6.6	8.5
VOC	98-06-6	tert-Butylbenzene	36	0	0	µg/L	0.28	0.28	--	--
VOC	127-18-4	Tetrachloroethene	36	0	0	µg/L	0.39	0.39	--	--
VOC	108-88-3	Toluene	36	0	0	µg/L	0.24	0.24	--	--
VOC	156-60-5	trans-1,2-Dichloroethene	36	0	0	µg/L	0.37	0.37	--	--
VOC	10061-02-6	trans-1,3-Dichloropropene	36	0	0	µg/L	0.25	0.25	--	--
VOC	79-01-6	Trichloroethene	36	0	0	µg/L	0.37	0.37	--	--
VOC	108-05-4	Vinyl Acetate	36	0	0	µg/L	2.8	2.8	--	--
VOC	75-01-4	Vinyl Chloride	36	0	0	µg/L	0.3	0.3	--	--
VOC	1330-20-7	Xylenes, Total	36	0	0	µg/L	0.23	0.24	--	--
Upper Gage										
	15584-04-0	Arsenate	4	4	100	µg/L	--	--	0.3	6.61
	15502-74-6	Arsenite	4	4	100	µg/L	--	--	0.097	16.4
	TPHC11C12	Carbon Chain C11-C12	36	8	22	µg/L	14	14	15	49
	TPHC13C14	Carbon Chain C13-C14	36	6	17	µg/L	16	16	16	34
	TPHC15C16	Carbon Chain C15-C16	36	4	11	µg/L	17	17	21	24
	TPHC17C18	Carbon Chain C17-C18	36	0	0	µg/L	17	17	--	--
	TPHC19C20	Carbon Chain C19-C20	36	0	0	µg/L	18	18	--	--
	TPHC21C22	Carbon Chain C21-C22	36	0	0	µg/L	18	18	--	--
	TPHC23C24	Carbon Chain C23-C24	36	3	8.3	µg/L	18	18	20	28
	TPHC25C28	Carbon Chain C25-C28	36	10	28	µg/L	16	16	18	52

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Category	CAS Number	Analyte	Number of Samples	Number of Detects	Percent Detected	Units	Minimum DL	Maximum DL	Minimum Detected Value	Maximum Detected Value
	TPHC29C32	Carbon Chain C29-C32	36	6	17	µg/L	8.5	8.5	8.9	32
	TPHC33C36	Carbon Chain C33-C36	36	3	8.3	µg/L	7.9	7.9	9.4	33
	TPHC37C40	Carbon Chain C37-C40	36	6	17	µg/L	6.8	6.8	7.4	12
	TPHC41C44	Carbon Chain C41-C44	36	2	5.6	µg/L	6.6	6.6	7.8	8
	TPHC6	Carbon Chain C6	36	16	44	µg/L	1.4	1.4	1.5	160
	TPHC7	Carbon Chain C7	36	12	33	µg/L	6.1	6.1	6.9	38
	TPHC8	Carbon Chain C8	36	13	36	µg/L	9.9	9.9	10	87
	TPHC9C10	Carbon Chain C9-C10	36	14	39	µg/L	13	13	13	120
	DOC	Dissolved Organic Carbon	4	4	100	mg/L	--	--	6.8	30
	ALKH	Hydroxide Alkalinity as CACO3	4	0	0	mg/L	0.85	0.85	--	--
	NH3N	Nitrogen, Ammonia (as N)	4	3	75	mg/L	0.094	0.094	0.5	0.62
	7440-09-7	Potassium	8	8	100	mg/L	--	--	7.69	19.4
	7440-23-5	Sodium	8	8	100	mg/L	--	--	131	338
	PO4TOT	Total Phosphate (as PO4)	4	4	100	mg/L	--	--	0.52	1.5
GENERAL	ALK	Alkalinity, Total (as CaCO3)	8	8	100	mg/L	--	--	108	357
GENERAL	16887-00-6	Chloride	8	8	100	mg/L	--	--	130	490
GENERAL	HARD	Hardness (AS CaCO3)	4	4	100	mg/L	--	--	170	270
GENERAL	MBAS	MBAS	4	1	25	mg/L	0.089	0.089	0.12	0.12
GENERAL	14797-55-8	Nitrate (as N)	8	1	13	mg/L	0.025	0.037	0.1	0.1
GENERAL	14797-65-0	Nitrite (as N)	4	0	0	mg/L	0.016	0.016	--	--
GENERAL	TDS	Solids, Total Dissolved	8	8	100	mg/L	--	--	600	1220
GENERAL	14808-79-8	Sulfate	8	8	100	mg/L	--	--	2.6	350
GENERAL	S	Sulfide	4	1	25	mg/L	0.03	0.03	0.2	0.2
INORGANIC	ALKB	Bicarbonate Alkalinity as CACO3	8	8	100	mg/L	--	--	108	357
INORGANIC	CO3	Carbonate (AS CO3)	8	1	13	mg/L	0.85	0.85	20	20
METALS	7429-90-5	Aluminum	4	4	100	mg/L	--	--	0.00702	0.106
METALS	7440-36-0	Antimony	8	1	13	mg/L	0.00744	0.00787	0.0101	0.0101
METALS	7440-38-2	Arsenic	12	10	83	mg/L	0.00438	0.00438	0.00416	0.0267
METALS	7440-39-3	Barium	8	8	100	mg/L	--	--	0.0142	0.134
METALS	7440-41-7	Beryllium	8	0	0	mg/L	0.00056	0.00439	--	--
METALS	7440-43-9	Cadmium	8	0	0	mg/L	0.00269	0.00454	--	--
METALS	7440-70-2	Calcium	8	8	100	mg/L	--	--	35.8	142

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METALS	7440-47-3	Chromium	12	1	8.3	mg/L	0.0004	0.00436	0.00055	0.00055
METALS	7440-48-4	Cobalt	8	0	0	mg/L	0.00295	0.00441	--	--
METALS	7440-50-8	Copper	12	6	50	mg/L	0.00267	0.00392	0.00076	0.00612
METALS	7439-89-6	Iron	8	8	100	mg/L	--	--	0.0592	0.287
METALS	7439-92-1	Lead	8	1	13	mg/L	0.00406	0.00693	0.00748	0.00748
METALS	7439-95-4	Magnesium	8	8	100	mg/L	--	--	13.2	38.3
METALS	7439-96-5	Manganese	8	8	100	mg/L	--	--	0.00933	0.232
METALS	7439-97-6	Mercury	8	1	13	mg/L	0.00003	0.00004	0.00004	0.00004
METALS	7439-98-7	Molybdenum	8	4	50	mg/L	0.00278	0.00278	0.00748	0.0167
METALS	7440-02-0	Nickel	8	0	0	mg/L	0.00298	0.00433	--	--
METALS	7782-49-2	Selenium	8	0	0	mg/L	0.00699	0.0107	--	--
METALS	7440-22-4	Silver	8	0	0	mg/L	0.00139	0.00211	--	--
METALS	7440-28-0	Thallium	8	2	25	mg/L	0.00291	0.0054	0.00292	0.00313
METALS	7440-62-2	Vanadium	8	2	25	mg/L	0.00244	0.00449	0.00708	0.0112
METALS	7440-66-6	Zinc	8	5	63	mg/L	0.00352	0.00352	0.00716	0.0461
Method-dependent	87-61-6	1,2,3-Trichlorobenzene	36	0	0	µg/L	0.51	0.51	--	--
Method-dependent	120-82-1	1,2,4-Trichlorobenzene	36	0	0	µg/L	0.5	0.5	--	--
Method-dependent	95-50-1	1,2-Dichlorobenzene	36	0	0	µg/L	0.46	0.46	--	--
Method-dependent	541-73-1	1,3-Dichlorobenzene	36	0	0	µg/L	0.4	0.4	--	--
Method-dependent	106-46-7	1,4-Dichlorobenzene	36	0	0	µg/L	0.43	0.43	--	--
Method-dependent	91-20-3	Naphthalene	36	4	11	µg/L	2.5	2.5	0.047	0.4
Method-dependent	98-95-3	Nitrobenzene	4	0	0	µg/L	1.3	1.3	--	--
ORGANIC	106-44-5	3/4-Methylphenol	4	0	0	µg/L	1	1	--	--
ORGANIC	85-68-7	Butyl Benzyl Phthalate	4	0	0	µg/L	1	1	--	--
ORGANIC	64-17-5	Ethanol	36	0	0	µg/L	50	50	--	--
ORGANIC	16984-48-8	Fluoride	8	8	100	mg/L	--	--	0.13	0.64
ORGANIC	76-13-1	Freon 113	36	0	0	µg/L	0.78	0.78	--	--
ORGANIC	TPHC6C44	Total Petroleum Hydrocarbons (C6-C44)	36	16	44	µg/L	47	47	52	580
ORGANIC	68334-30-5	TPH as Diesel	36	29	81	µg/L	33	33	34	200
ORGANIC	PHCG	TPH as Gasoline	36	16	44	µg/L	48	48	49	710
ORGANIC	TPHMOIL	TPH as Motor Oil	36	0	0	µg/L	210	210	--	--
SVOC	90-12-0	1-Methylnaphthalene	4	0	0	µg/L	0.036	0.036	--	--

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SVOC	95-95-4	2,4,5-Trichlorophenol	4	0	0	µg/L	0.97	0.97	--	--
SVOC	88-06-2	2,4,6-Trichlorophenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	120-83-2	2,4-Dichlorophenol	4	0	0	µg/L	1.1	1.1	--	--
SVOC	105-67-9	2,4-Dimethylphenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	51-28-5	2,4-Dinitrophenol	4	0	0	µg/L	2.6	2.6	--	--
SVOC	121-14-2	2,4-Dinitrotoluene	4	0	0	µg/L	1	1	--	--
SVOC	606-20-2	2,6-Dinitrotoluene	4	0	0	µg/L	1.1	1.1	--	--
SVOC	91-58-7	2-Chloronaphthalene	4	0	0	µg/L	1.3	1.3	--	--
SVOC	95-57-8	2-Chlorophenol	4	0	0	µg/L	1	1	--	--
SVOC	91-57-6	2-Methylnaphthalene	4	0	0	µg/L	0.035	0.035	--	--
SVOC	95-48-7	2-Methylphenol	4	0	0	µg/L	1.1	1.1	--	--
SVOC	88-74-4	2-Nitroaniline	4	0	0	µg/L	1	1	--	--
SVOC	88-75-5	2-Nitrophenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	91-94-1	3,3'-Dichlorobenzidine	4	0	0	µg/L	1.3	1.3	--	--
SVOC	99-09-2	3-Nitroaniline	4	0	0	µg/L	1.2	1.2	--	--
SVOC	534-52-1	4,6-Dinitro-2-Methylphenol	4	0	0	µg/L	3.4	3.4	--	--
SVOC	101-55-3	4-Bromophenyl-Phenyl Ether	4	0	0	µg/L	1.2	1.2	--	--
SVOC	59-50-7	4-Chloro-3-Methylphenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	106-47-8	4-Chloroaniline	4	0	0	µg/L	1.3	1.3	--	--
SVOC	7005-72-3	4-Chlorophenyl-Phenyl Ether	4	0	0	µg/L	1.2	1.2	--	--
SVOC	100-01-6	4-Nitroaniline	4	0	0	µg/L	2.4	2.4	--	--
SVOC	100-02-7	4-Nitrophenol	4	0	0	µg/L	0.86	0.86	--	--
SVOC	83-32-9	Acenaphthene	4	0	0	µg/L	0.037	0.037	--	--
SVOC	208-96-8	Acenaphthylene	4	0	0	µg/L	0.033	0.033	--	--
SVOC	62-53-3	Aniline	4	0	0	µg/L	1.2	1.2	--	--
SVOC	120-12-7	Anthracene	4	0	0	µg/L	0.036	0.036	--	--
SVOC	103-33-3	Azobenzene	4	0	0	µg/L	1.7	1.7	--	--
SVOC	92-87-5	Benzidine	4	0	0	µg/L	0.62	0.62	--	--
SVOC	56-55-3	Benzo (a) Anthracene	4	0	0	µg/L	0.043	0.043	--	--
SVOC	50-32-8	Benzo (a) Pyrene	4	0	0	µg/L	0.035	0.035	--	--
SVOC	205-99-2	Benzo (b) Fluoranthene	4	0	0	µg/L	0.036	0.036	--	--
SVOC	191-24-2	Benzo (g,h,i) Perylene	4	0	0	µg/L	0.037	0.037	--	--

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SVOC	207-08-9	Benzo (k) Fluoranthene	4	0	0	µg/L	0.05	0.05	--	--
SVOC	65-85-0	Benzoic Acid	4	0	0	µg/L	0.43	0.43	--	--
SVOC	100-51-6	Benzyl Alcohol	4	0	0	µg/L	1	1	--	--
SVOC	111-91-1	Bis(2-Chloroethoxy) Methane	4	0	0	µg/L	1.2	1.2	--	--
SVOC	111-44-4	Bis(2-Chloroethyl) Ether	4	0	0	µg/L	1	1	--	--
SVOC	108-60-1	Bis(2-Chloroisopropyl) Ether	4	0	0	µg/L	1.5	1.5	--	--
SVOC	117-81-7	Bis(2-Ethylhexyl) Phthalate	4	0	0	µg/L	1	1	--	--
SVOC	218-01-9	Chrysene	4	0	0	µg/L	0.041	0.041	--	--
SVOC	53-70-3	Dibenz (a,h) Anthracene	4	0	0	µg/L	0.039	0.039	--	--
SVOC	132-64-9	Dibenzofuran	4	0	0	µg/L	1.4	1.4	--	--
SVOC	84-66-2	Diethyl Phthalate	4	0	0	µg/L	1.4	1.4	--	--
SVOC	131-11-3	Dimethyl Phthalate	4	0	0	µg/L	1.3	1.3	--	--
SVOC	84-74-2	Di-n-Butyl Phthalate	4	0	0	µg/L	1.5	1.5	--	--
SVOC	117-84-0	Di-n-Octyl Phthalate	4	0	0	µg/L	1	1	--	--
SVOC	206-44-0	Fluoranthene	4	0	0	µg/L	0.038	0.038	--	--
SVOC	86-73-7	Fluorene	4	0	0	µg/L	0.035	0.035	--	--
SVOC	87-68-3	Hexachloro-1,3-Butadiene	4	0	0	µg/L	1.2	1.2	--	--
SVOC	118-74-1	Hexachlorobenzene	4	0	0	µg/L	1.2	1.2	--	--
SVOC	77-47-4	Hexachlorocyclopentadiene	4	0	0	µg/L	0.44	0.44	--	--
SVOC	67-72-1	Hexachloroethane	4	0	0	µg/L	0.98	0.98	--	--
SVOC	193-39-5	Indeno (1,2,3-c,d) Pyrene	4	0	0	µg/L	0.036	0.036	--	--
SVOC	78-59-1	Isophorone	4	0	0	µg/L	1.2	1.2	--	--
SVOC	62-75-9	N-Nitrosodimethylamine	4	0	0	µg/L	1.1	1.1	--	--
SVOC	621-64-7	N-Nitroso-di-n-propylamine	4	0	0	µg/L	1.3	1.3	--	--
SVOC	86-30-6	N-Nitrosodiphenylamine	4	0	0	µg/L	1.4	1.4	--	--
SVOC	87-86-5	Pentachlorophenol	4	0	0	µg/L	0.75	0.75	--	--
SVOC	85-01-8	Phenanthrene	4	0	0	µg/L	0.038	0.038	--	--
SVOC	108-95-2	Phenol	4	0	0	µg/L	1.2	1.2	--	--
SVOC	129-00-0	Pyrene	4	0	0	µg/L	0.05	0.05	--	--
SVOC	110-86-1	Pyridine	4	0	0	µg/L	1.4	1.4	--	--
VOC	630-20-6	1,1,1,2-Tetrachloroethane	36	0	0	µg/L	0.4	0.4	--	--
VOC	71-55-6	1,1,1-Trichloroethane	36	0	0	µg/L	0.3	0.3	--	--

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VOC	79-34-5	1,1,2,2-Tetrachloroethane	36	0	0	µg/L	0.41	0.41	--	--
VOC	79-00-5	1,1,2-Trichloroethane	36	0	0	µg/L	0.38	0.38	--	--
VOC	75-34-3	1,1-Dichloroethane	36	0	0	µg/L	0.28	0.28	--	--
VOC	75-35-4	1,1-Dichloroethene	36	2	5.6	µg/L	0.43	0.43	0.48	0.57
VOC	563-58-6	1,1-Dichloropropene	36	0	0	µg/L	0.46	0.46	--	--
VOC	96-18-4	1,2,3-Trichloropropane	36	3	8.3	µg/L	0.64	0.64	1.1	3.4
VOC	95-63-6	1,2,4-Trimethylbenzene	36	9	25	µg/L	0.36	0.36	0.36	1.6
VOC	96-12-8	1,2-Dibromo-3-Chloropropane	36	0	0	µg/L	1.2	1.2	--	--
VOC	106-93-4	1,2-Dibromoethane (EDB)	36	0	0	µg/L	0.36	0.36	--	--
VOC	107-06-2	1,2-Dichloroethane	36	22	61	µg/L	0.24	0.24	0.42	3.6
VOC	78-87-5	1,2-Dichloropropane	36	0	0	µg/L	0.42	0.42	--	--
VOC	108-67-8	1,3,5-Trimethylbenzene	36	1	2.8	µg/L	0.28	0.28	0.59	0.59
VOC	142-28-9	1,3-Dichloropropane	36	0	0	µg/L	0.3	0.3	--	--
VOC	594-20-7	2,2-Dichloropropane	36	0	0	µg/L	0.36	0.36	--	--
VOC	78-93-3	2-Butanone (Methyl Ethyl Ketone)	36	0	0	µg/L	2.2	2.2	--	--
VOC	95-49-8	2-Chlorotoluene	36	0	0	µg/L	0.24	0.24	--	--
VOC	591-78-6	2-Hexanone	36	0	0	µg/L	2.1	2.1	--	--
VOC	106-43-4	4-Chlorotoluene	36	0	0	µg/L	0.13	0.13	--	--
VOC	108-10-1	4-Methyl-2-Pentanone	36	0	0	µg/L	4.4	4.4	--	--
VOC	67-64-1	Acetone	36	1	2.8	µg/L	6	10	7	7
VOC	71-43-2	Benzene	36	26	72	µg/L	0.14	0.14	0.15	370
VOC	108-86-1	Bromobenzene	36	0	0	µg/L	0.3	0.3	--	--
VOC	74-97-5	Bromochloromethane	36	0	0	µg/L	0.48	0.48	--	--
VOC	75-27-4	Bromodichloromethane	36	0	0	µg/L	0.21	0.21	--	--
VOC	75-25-2	Bromoform	36	0	0	µg/L	0.5	0.5	--	--
VOC	74-83-9	Bromomethane	36	0	0	µg/L	3.9	3.9	--	--
VOC	75-15-0	Carbon Disulfide	36	10	28	µg/L	0.41	0.41	0.45	4.8
VOC	56-23-5	Carbon Tetrachloride	36	0	0	µg/L	0.23	0.23	--	--
VOC	108-90-7	Chlorobenzene	36	0	0	µg/L	0.17	0.17	--	--
VOC	75-00-3	Chloroethane	36	0	0	µg/L	2.3	2.3	--	--
VOC	67-66-3	Chloroform	36	3	8.3	µg/L	0.46	0.46	0.5	0.59
VOC	74-87-3	Chloromethane	36	0	0	µg/L	1.8	1.8	--	--

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VOC	156-59-2	cis-1,2-Dichloroethene	36	22	61	µg/L	0.48	0.48	0.55	71
VOC	10061-01-5	cis-1,3-Dichloropropene	36	0	0	µg/L	0.25	0.25	--	--
VOC	98-82-8	Cumene (Isopropylbenzene)	36	2	5.6	µg/L	0.58	0.58	0.9	0.96
VOC	124-48-1	Dibromochloromethane	36	0	0	µg/L	0.25	0.25	--	--
VOC	74-95-3	Dibromomethane	36	0	0	µg/L	0.46	0.46	--	--
VOC	108-20-3	Diisopropyl Ether (DIPE)	36	15	42	µg/L	0.33	0.33	0.36	1.7
VOC	100-41-4	Ethylbenzene	36	14	39	µg/L	0.14	0.14	0.16	14
VOC	637-92-3	Ethyl-t-Butyl Ether (ETBE)	36	0	0	µg/L	0.44	0.44	--	--
VOC	75-69-4	Freon 11	36	0	0	µg/L	1.7	1.7	--	--
VOC	75-71-8	Freon 12	36	0	0	µg/L	0.46	0.46	--	--
VOC	75-09-2	Methylene Chloride	36	0	0	µg/L	0.64	0.64	--	--
VOC	1634-04-4	Methyl-tert-Butyl Ether	36	0	0	µg/L	0.31	0.31	--	--
VOC	104-51-8	n-Butylbenzene	36	0	0	µg/L	0.23	0.23	--	--
VOC	95-47-6	o-Xylene	4	0	0	µg/L	0.23	0.23	--	--
VOC	1330-20-7-1	p/m-Xylene	4	1	25	µg/L	0.24	0.24	0.7	0.7
VOC	99-87-6	p-Isopropyltoluene	36	0	0	µg/L	0.16	0.16	--	--
VOC	103-65-1	Propylbenzene	36	4	11	µg/L	0.17	0.17	0.2	0.52
VOC	135-98-8	sec-Butylbenzene	36	0	0	µg/L	0.25	0.25	--	--
VOC	100-42-5	Styrene	36	0	0	µg/L	0.17	0.17	--	--
VOC	994-05-8	tert-Amyl-Methyl Ether (TAME)	36	0	0	µg/L	0.22	0.22	--	--
VOC	75-65-0	tert-Butyl Alcohol (TBA)	36	21	58	µg/L	4.6	4.6	5.9	250
VOC	98-06-6	tert-Butylbenzene	36	0	0	µg/L	0.28	0.28	--	--
VOC	127-18-4	Tetrachloroethene	36	0	0	µg/L	0.39	0.39	--	--
VOC	108-88-3	Toluene	36	9	25	µg/L	0.24	0.24	0.94	3.6
VOC	156-60-5	trans-1,2-Dichloroethene	36	9	25	µg/L	0.37	0.37	0.81	2.6
VOC	10061-02-6	trans-1,3-Dichloropropene	36	0	0	µg/L	0.25	0.25	--	--
VOC	79-01-6	Trichloroethene	36	8	22	µg/L	0.37	0.37	0.42	2.2
VOC	108-05-4	Vinyl Acetate	36	0	0	µg/L	2.8	2.8	--	--
VOC	75-01-4	Vinyl Chloride	36	0	0	µg/L	0.3	0.3	--	--
VOC	1330-20-7	Xylenes, Total	36	10	28	µg/L	0.23	0.24	0.27	8.8

Notes:
-- not applicable; DL = detection limit

Table 4
Soil Matrix Constituent of Concern Screening
Former Kast Property

CAS Number	Chemical[1]	Maximum Detected Concentration	Units	Potential Leaching to GW[2]?	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	BTV	COC Selection Rationale[3]	COC?	Site-Related COC[4]
Metals												
7440-36-0	Antimony	6.5E+00	mg/kg	Yes	--	3.1E+01	--	3.1E+00	7.4E-01	RBSLnc, background, leach-GW	Yes	No
7440-38-2	Arsenic	6.3E+01	mg/kg	Yes	3.9E-01	2.2E+01	3.9E-02	2.2E+00	1.2E+01	RBSLc, RBSLnc, background, leach-GW	Yes	Yes
7440-39-3	Barium	1.0E+03	mg/kg	No	--	1.6E+04	--	1.6E+03	2.0E+02	--	No	No
7440-41-7	Beryllium	1.2E+00	mg/kg	No	1.2E+05	1.6E+02	1.2E+04	1.6E+01	5.6E-01	--	No	No
7440-43-9	Cadmium	9.0E+00	mg/kg	No	6.7E+04	7.0E+01	6.7E+03	7.0E+00	3.8E+00	--	No[5]	No
7440-47-3	Chromium	7.4E+01	mg/kg	No	--	1.2E+05	--	1.2E+04	3.3E+01	--	No	No
18540-29-9	Chromium, Hexavalent	4.8E+00	mg/kg	No	1.9E+03	2.3E+02	1.9E+02	2.3E+01	--	--	Yes[6]	No
7440-48-4	Cobalt	3.1E+01	mg/kg	No	3.1E+04	2.3E+01	3.1E+03	2.3E+00	1.1E+01	--	No[5]	No
7440-50-8	Copper	1.2E+03	mg/kg	No	--	3.1E+03	--	3.1E+02	5.9E+01	--	No[5]	No
7439-92-1	Lead	1.3E+03	mg/kg	No	--	8.0E+01	--	8.0E+00	6.2E+01	RBSLnc, background	Yes	Yes
7439-97-6	Mercury	1.3E+00	mg/kg	No	--	2.3E+01	--	2.3E+00	1.3E-01	--	No	No
7439-98-7	Molybdenum	2.4E+01	mg/kg	No	--	3.9E+02	--	3.9E+01	4.1E-01	--	No	No
7440-02-0	Nickel	4.3E+01	mg/kg	No	1.1E+06	1.6E+03	1.1E+05	1.6E+02	2.0E+01	--	No	No
7782-49-2	Selenium	9.0E+00	mg/kg	No	--	3.9E+02	--	3.9E+01	7.8E-01	--	No	No
7440-22-4	Silver	3.8E+00	mg/kg	No	--	3.9E+02	--	3.9E+01	1.3E+00	--	No	No
7440-28-0	Thallium	3.5E+00	mg/kg	Yes	--	7.8E-01	--	7.8E-02	2.3E-01	RBSLnc, background, leach-GW	Yes	No
7440-62-2	Vanadium	8.6E+01	mg/kg	No	--	5.5E+02	--	5.5E+01	4.6E+01	--	No[5]	No
7440-66-6	Zinc	5.8E+03	mg/kg	No	--	2.3E+04	--	2.3E+03	2.9E+02	--	No[5]	No
PAHs												
83-32-9	Acenaphthene	1.7E+01	mg/kg	No	--	3.2E+03	--	3.2E+02	--	--	No	No
208-96-8	Acenaphthylene	4.5E+00	mg/kg	No	--	1.7E+04	--	1.7E+03	--	--	No	No
120-12-7	Anthracene	2.6E+01	mg/kg	No	--	1.7E+04	--	1.7E+03	--	--	No	No
56-55-3	Benzo (a) Anthracene	4.7E+01	mg/kg	No	1.6E+00	--	1.6E-01	--	--	RBSLc	Yes	Yes
50-32-8	Benzo (a) Pyrene	2.2E+01	mg/kg	No	1.6E-01	--	1.6E-02	--	9.0E-01	RBSLc, background	Yes	Yes
205-99-2	Benzo (b) Fluoranthene	1.6E+01	mg/kg	No	1.6E+00	--	1.6E-01	--	--	RBSLc	Yes	Yes
191-24-2	Benzo (g,h,i) Perylene	1.3E+01	mg/kg	No	--	1.7E+03	--	1.7E+02	--	--	No	No
207-08-9	Benzo (k) Fluoranthene	4.6E+00	mg/kg	No	1.6E+00	--	1.6E-01	--	--	RBSLc	Yes	Yes
218-01-9	Chrysene	1.3E+02	mg/kg	No	1.6E+01	--	1.6E+00	--	--	RBSLc	Yes	Yes
53-70-3	Dibenz (a,h) Anthracene	3.4E+00	mg/kg	No	1.1E-01	--	1.1E-02	--	--	RBSLc	Yes	Yes

Table 4
Soil Matrix Constituent of Concern Screening
Former Kast Property

CAS Number	Chemical[1]	Maximum Detected Concentration	Units	Potential Leaching to GW[2]?	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	BTV	COC Selection Rationale[3]	COC?	Site-Related COC[4]
206-44-0	Fluoranthene	2.9E+01	mg/kg	No	--	2.3E+03	--	2.3E+02	--	--	No	No
86-73-7	Fluorene	2.3E+01	mg/kg	No	--	2.2E+03	--	2.2E+02	--	--	No	No
193-39-5	Indeno (1,2,3-c,d) Pyrene	3.2E+00	mg/kg	No	1.6E+00	--	1.6E-01	--	--	RBSLc	Yes	Yes
90-12-0	1-Methylnaphthalene	1.6E+02	mg/kg	No	2.2E+01	5.5E+03	2.2E+00	5.5E+02	--	RBSLc	Yes	Yes
91-57-6	2-Methylnaphthalene	2.8E+02	mg/kg	No	--	3.1E+02	--	3.1E+01	--	RBSLnc	Yes	Yes
91-20-3	Naphthalene	9.2E+04	µg/kg	Yes	4.1E+03	3.7E+05	4.1E+02	3.7E+04	--	RBSLc, RBSLnc, leach-GW	Yes	Yes
85-01-8	Phenanthrene	1.0E+02	mg/kg	No	--	1.7E+03	--	1.7E+02	--	--	No	No
129-00-0	Pyrene	2.4E+02	mg/kg	No	--	1.7E+03	--	1.7E+02	--	RBSLnc	Yes	Yes
SVOCs												
121-14-2	2,4-Dinitrotoluene	3.1E+00	mg/kg	No	1.6E+00	1.2E+02	1.6E-01	1.2E+01	--	RBSLc	Yes	No
MEPH4	4-Methylphenol (p-Cresol)	2.2E-01	mg/kg	No	--	6.1E+03	--	6.1E+02	--	--	No	No
62-53-3	Aniline	4.0E+00	mg/kg	No	8.5E+01	4.3E+02	8.5E+00	4.3E+01	--	--	No	No
65-85-0	Benzoic Acid	1.5E+00	mg/kg	No	--	2.4E+05	--	2.4E+04	--	--	No	No
117-81-7	Bis(2-Ethylhexyl) Phthalate	2.2E+01	mg/kg	No	3.5E+01	1.2E+03	3.5E+00	1.2E+02	--	RBSLc	Yes	No
85-68-7	Butyl Benzyl Phthalate	3.1E+00	mg/kg	No	2.6E+02	1.2E+04	2.6E+01	1.2E+03	--	--	No	No
132-64-9	Dibenzofuran	1.2E+00	mg/kg	No	--	1.5E+02	--	1.5E+01	--	--	No	No
84-66-2	Diethyl Phthalate	3.1E+00	mg/kg	No	--	4.9E+04	--	4.9E+03	--	--	No	No
131-11-3	Dimethyl Phthalate	2.7E+00	mg/kg	No	--	6.1E+05	--	6.1E+04	--	--	No	No
84-74-2	Di-n-Butyl Phthalate	3.3E-01	mg/kg	No	--	6.1E+03	--	6.1E+02	--	--	No	No
TPH												
68334-30-5	TPH as Diesel	1.4E+05	mg/kg	Yes	--	1.3E+03	--	1.3E+02	--	RBSLnc, leach-GW	Yes	Yes
PHCG	TPH as Gasoline	9.8E+03	mg/kg	Yes	--	7.6E+02	--	7.6E+01	--	RBSLnc, leach-GW	Yes	Yes
TPHMOIL	TPH as Motor Oil	3.2E+05	mg/kg	Yes	--	3.3E+03	--	3.3E+02	--	RBSLnc, leach-GW	Yes	Yes
VOCs												
79-34-5	1,1,2,2-Tetrachloroethane	4.2E+02	µg/kg	No	4.8E+02	1.3E+05	4.8E+01	1.3E+04	--	RBSLc	Yes	No
79-00-5	1,1,2-Trichloroethane	5.9E+01	µg/kg	No	8.9E+02	7.4E+04	8.9E+01	7.4E+03	--	--	No	No
87-61-6	1,2,3-Trichlorobenzene	3.4E+02	µg/kg	No	--	6.3E+04	--	6.3E+03	--	--	No	No
96-18-4	1,2,3-Trichloropropane	1.8E+02	µg/kg	Yes	2.1E+01	2.5E+03	2.1E+00	2.5E+02	--	RBSLc, leach-GW	Yes	No
120-82-1	1,2,4-Trichlorobenzene	3.2E+02	µg/kg	No	1.8E+05	1.5E+05	1.8E+04	1.5E+04	--	--	No	No
95-63-6	1,2,4-Trimethylbenzene	8.4E+04	µg/kg	No	--	1.4E+05	--	1.4E+04	--	RBSLnc	Yes	Yes

Table 4
Soil Matrix Constituent of Concern Screening
Former Kast Property

CAS Number	Chemical[1]	Maximum Detected Concentration	Units	Potential Leaching to GW[2]?	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	BTV	COC Selection Rationale[3]	COC?	Site-Related COC[4]
95-50-1	1,2-Dichlorobenzene	3.3E+02	µg/kg	No	--	2.1E+06	--	2.1E+05	--	--	No	No
107-06-2	1,2-Dichloroethane	7.3E+00	µg/kg	Yes	4.4E+02	8.0E+05	4.4E+01	8.0E+04	--	leach-GW	Yes	No
78-87-5	1,2-Dichloropropane	1.0E+02	µg/kg	No	8.0E+02	1.5E+04	8.0E+01	1.5E+03	--	RBSLc	Yes	No
108-67-8	1,3,5-Trimethylbenzene	3.1E+04	µg/kg	No	--	4.9E+04	--	4.9E+03	--	RBSLnc	Yes	Yes
106-46-7	1,4-Dichlorobenzene	4.4E+02	µg/kg	Yes	2.8E+03	3.6E+06	2.8E+02	3.6E+05	--	RBSLc, leach-GW	Yes	No
78-93-3	2-Butanone (Methyl Ethyl Ketone)	2.7E+03	µg/kg	No	--	2.8E+07	--	2.8E+06	--	--	No	No
95-49-8	2-Chlorotoluene	1.8E+02	µg/kg	No	--	6.1E+05	--	6.1E+04	--	--	No	No
591-78-6	2-Hexanone	3.1E+01	µg/kg	No	--	2.0E+05	--	2.0E+04	--	--	No	No
108-10-1	4-Methyl-2-Pentanone	1.5E+01	µg/kg	No	--	5.3E+06	--	5.3E+05	--	--	No	No
67-64-1	Acetone	1.8E+03	µg/kg	No	--	6.0E+07	--	6.0E+06	--	--	No	No
71-43-2	Benzene	3.3E+04	µg/kg	Yes	2.2E+02	1.1E+05	2.2E+01	1.1E+04	--	RBSLc, RBSLnc, leach-GW	Yes	Yes
75-27-4	Bromodichloromethane	1.3E+03	µg/kg	No	5.0E+02	4.4E+05	5.0E+01	4.4E+04	--	RBSLc	Yes	No
75-25-2	Bromoform	1.4E+02	µg/kg	No	2.4E+04	7.1E+05	2.4E+03	7.1E+04	--	--	No	No
74-83-9	Bromomethane	1.3E+03	µg/kg	No	--	8.9E+03	--	8.9E+02	--	RBSLnc	Yes	No
75-15-0	Carbon Disulfide	1.2E+02	µg/kg	No	--	8.9E+05	--	8.9E+04	--	--	No	No
108-90-7	Chlorobenzene	1.5E+02	µg/kg	No	--	1.3E+06	--	1.3E+05	--	--	No	No
75-00-3	Chloroethane	1.8E+00	µg/kg	No	--	1.4E+07	--	1.4E+06	--	--	No	No
67-66-3	Chloroform	1.1E+02	µg/kg	No	1.1E+03	4.1E+05	1.1E+02	4.1E+04	--	--	No	No
74-87-3	Chloromethane	5.2E+02	µg/kg	No	--	9.8E+04	--	9.8E+03	--	--	No	No
124-48-1	Dibromochloromethane	6.8E+00	µg/kg	No	1.1E+03	5.9E+05	1.1E+02	5.9E+04	--	--	No	No
156-59-2	Dichloroethene, cis-1,2-	4.4E+02	µg/kg	Yes	--	9.3E+04	--	9.3E+03	--	leach-GW	Yes	No
108-20-3	Diisopropyl Ether (DIPE)	1.4E+00	µg/kg	No	--	1.2E+06	--	1.2E+05	--	--	No	No
64-17-5	Ethanol	1.0E+05	µg/kg	No	--	2.5E+07	--	2.5E+06	--	--	No	No
100-41-4	Ethylbenzene	4.2E+04	µg/kg	No	4.9E+03	4.6E+06	4.9E+02	4.6E+05	--	RBSLc	Yes	Yes
75-71-8	Freon 12	1.7E+01	µg/kg	No	--	2.7E+05	--	2.7E+04	--	--	No	No
98-82-8	Isopropylbenzene (cumene)	1.6E+04	µg/kg	No	--	4.3E+05	--	4.3E+04	--	--	No	No
75-09-2	Methylene Chloride	2.1E+03	µg/kg	No	5.4E+03	8.6E+05	5.4E+02	8.6E+04	--	RBSLc	Yes	No
1634-04-4	Methyl-tert-Butyl Ether	1.4E+02	µg/kg	No	3.5E+04	2.9E+07	3.5E+03	2.9E+06	--	--	No	No
104-51-8	n-Butylbenzene	1.3E+04	µg/kg	No	--	8.8E+05	--	8.8E+04	--	--	No	No
99-87-6	p-Isopropyltoluene	1.2E+04	µg/kg	No	--	3.8E+06	--	3.8E+05	--	--	No	No

Table 4
Soil Matrix Constituent of Concern Screening
Former Kast Property

CAS Number	Chemical[1]	Maximum Detected Concentration	Units	Potential Leaching to GW[2]?	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	BTV	COC Selection Rationale[3]	COC?	Site-Related COC[4]
103-65-1	Propylbenzene	2.4E+04	µg/kg	No	--	7.3E+05	--	7.3E+04	--	--	No	No
135-98-8	sec-Butylbenzene	9.8E+03	µg/kg	No	--	9.9E+05	--	9.9E+04	--	--	No	No
100-42-5	Styrene	7.8E+01	µg/kg	No	--	7.1E+06	--	7.1E+05	--	--	No	No
75-65-0	tert-Butyl Alcohol (TBA)	4.3E+02	µg/kg	Yes	--	8.4E+06	--	8.4E+05	--	leach-GW	No	No
98-06-6	tert-Butylbenzene	4.2E+02	µg/kg	No	--	7.9E+05	--	7.9E+04	--	--	No	No
127-18-4	Tetrachloroethene	1.9E+04	µg/kg	Yes	5.6E+02	8.4E+04	5.6E+01	8.4E+03	--	RBSLc, RBSLnc, leach-GW	Yes	No
108-88-3	Toluene	5.7E+04	µg/kg	No	--	1.1E+06	--	1.1E+05	--	--	Yes[5]	Yes
79-01-6	Trichloroethene	7.2E+02	µg/kg	Yes	3.9E+03	2.3E+04	3.9E+02	2.3E+03	--	RBSLc, leach-GW	Yes	No
75-01-4	Vinyl Chloride	4.9E+01	µg/kg	Yes	3.2E+01	7.4E+04	3.2E+00	7.4E+03	--	RBSLc, leach-GW	Yes	No
95-47-6	o-Xylene	1.5E+04	µg/kg	No	--	4.5E+06	--	4.5E+05	--	--	Yes[5]	Yes
1330-20-7-1	p/m-Xylene	3.4E+04	µg/kg	No	--	4.0E+06	--	4.0E+05	--	--	Yes[5]	Yes
1330-20-7	Xylenes, Total	1.4E+05	µg/kg	No	--	3.4E+06	--	3.4E+05	--	--	Yes[5]	Yes

Notes:

-- not available or not applicable

mg/kg: milligram per kilogram

µg/kg: microgram per kilogram

GW = groundwater; COC: Constituent of Concern

RBSLs = risk-based screening levels assuming potential residential exposures calculated as part of the human health screening risk evaluation (HHSRE) process (Geosyntec, 2009, 2010, 2011).

RBSLc = based on cancer effects; RBSLnc = based on noncancer effects

BTV = Background threshold values developed for the Site consistent with USEPA and Cal-EPA methodologies using local and regional background datasets (presented in Appendix A).

[1] Chemicals included if greater than 5 detects in soil from 0-10 feet below ground surface.

[2] Chemicals that were detected in groundwater above their respective maximum contaminant level (MCL) or notification level (NL) were carried forward into the HHRA.

[3] COC when maximum Site-wide concentration exceeded 0.1 × Residential RBSL or background. Selection criterion or criteria are listed in this column. For metals and PAHs, a compound is selected as a COC only when the maximum concentration exceeds both the RBSL and the background concentration (when data available).

[4] Site-Related COCs may be related to site activities associated with crude oil storage prior to redevelopment.

[5] Although maximum detected concentration exceed the BTV, additional background analysis (one-sample proportion test) indicated this metal to be within background for all properties.

[6] Due to change in oral cancer assessment not reflected in RBSLs from HHSRE Work Plan, hexavalent chromium included as a COC.

Table 5
Soil Vapor Constituent of Concern Screening
Former Kast Property

Matrix	CAS Number	Chemical	Units	Maximum Detected Concentration	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	COC Selection Rationale[1]	COC?	Site-Related COC[2]
Soil Vapor, Sub-Slab	71-55-6	1,1,1-Trichloroethane	µg/m^3	1.0E+02	--	1.0E+05	--	1.0E+04	--	No	No
Soil Vapor, Sub-Slab	75-35-4	1,1-Dichloroethene	µg/m^3	1.8E+01	--	7.3E+03	--	7.3E+02	--	No	No
Soil Vapor, Sub-Slab	120-82-1	1,2,4-Trichlorobenzene	µg/m^3	1.3E+03	--	4.2E+02	--	4.2E+01	RBSLnc	Yes	No
Soil Vapor, Sub-Slab	95-63-6	1,2,4-Trimethylbenzene	µg/m^3	2.2E+03	--	7.3E+02	--	7.3E+01	RBSLnc	Yes	Yes
Soil Vapor, Sub-Slab	95-50-1	1,2-Dichlorobenzene	µg/m^3	7.8E+02	--	2.1E+04	--	2.1E+03	--	No	No
Soil Vapor, Sub-Slab	107-06-2	1,2-Dichloroethane	µg/m^3	4.7E+01	1.2E+01	4.2E+04	1.2E+00	4.2E+03	RBSLc	Yes	No
Soil Vapor, Sub-Slab	78-87-5	1,2-Dichloropropane	µg/m^3	2.2E+01	2.4E+01	4.2E+02	2.4E+00	4.2E+01	RBSLc	Yes	No
Soil Vapor, Sub-Slab	108-67-8	1,3,5-Trimethylbenzene	µg/m^3	1.0E+03	--	6.3E+02	--	6.3E+01	RBSLnc	Yes	Yes
Soil Vapor, Sub-Slab	106-99-0	1,3-Butadiene	µg/m^3	2.2E+00	1.4E+00	2.1E+03	1.4E-01	2.1E+02	RBSLc	Yes	No
Soil Vapor, Sub-Slab	541-73-1	1,3-Dichlorobenzene	µg/m^3	3.6E+01	--	1.1E+04	--	1.1E+03	--	No	No
Soil Vapor, Sub-Slab	106-46-7	1,4-Dichlorobenzene	µg/m^3	1.1E+02	2.2E+01	8.3E+04	2.2E+00	8.3E+03	RBSLc	Yes	No
Soil Vapor, Sub-Slab	123-91-1	1,4-Dioxane	µg/m^3	2.0E+02	3.2E+01	3.1E+05	3.2E+00	3.1E+04	RBSLc	Yes	No
Soil Vapor, Sub-Slab	540-84-1	2,2,4-Trimethylpentane	µg/m^3	1.4E+05	--	1.1E+05	--	1.1E+04	RBSLnc	Yes	No
Soil Vapor, Sub-Slab	78-93-3	2-Butanone (Methyl Ethyl Ketone)	µg/m^3	2.1E+02	--	5.2E+05	--	5.2E+04	--	No	No
Soil Vapor, Sub-Slab	591-78-6	2-Hexanone	µg/m^3	3.6E+02	--	3.1E+03	--	3.1E+02	RBSLnc	Yes	No
Soil Vapor, Sub-Slab	622-96-8	4-Ethyltoluene	µg/m^3	1.3E+03	--	7.3E+04	--	7.3E+03	--	No	Yes
Soil Vapor, Sub-Slab	108-10-1	4-Methyl-2-Pentanone	µg/m^3	1.4E+01	--	3.1E+05	--	3.1E+04	--	No	No
Soil Vapor, Sub-Slab	67-64-1	Acetone	µg/m^3	1.3E+03	--	3.2E+06	--	3.2E+05	--	No	No
Soil Vapor, Sub-Slab	71-43-2	Benzene	µg/m^3	6.2E+04	8.4E+00	6.3E+03	8.4E-01	6.3E+02	RBSLc, RBSLnc	Yes	Yes
Soil Vapor, Sub-Slab	75-27-4	Bromodichloromethane	µg/m^3	3.7E+02	6.6E+00	7.3E+03	6.6E-01	7.3E+02	RBSLc	Yes	No
Soil Vapor, Sub-Slab	75-25-2	Bromoform	µg/m^3	3.1E+00	2.2E+02	7.3E+03	2.2E+01	7.3E+02	--	No	No
Soil Vapor, Sub-Slab	74-83-9	Bromomethane	µg/m^3	9.5E+01	--	5.2E+02	--	5.2E+01	RBSLnc	Yes	No
Soil Vapor, Sub-Slab	75-15-0	Carbon Disulfide	µg/m^3	2.3E+02	--	8.3E+04	--	8.3E+03	--	No	No
Soil Vapor, Sub-Slab	56-23-5	Carbon Tetrachloride	µg/m^3	9.9E+01	5.8E+00	4.2E+03	5.8E-01	4.2E+02	RBSLc	Yes	No
Soil Vapor, Sub-Slab	108-90-7	Chlorobenzene	µg/m^3	4.8E+01	--	1.0E+05	--	1.0E+04	--	No	No
Soil Vapor, Sub-Slab	75-00-3	Chloroethane	µg/m^3	6.6E+01	--	3.1E+06	--	3.1E+05	--	No	No
Soil Vapor, Sub-Slab	67-66-3	Chloroform	µg/m^3	8.4E+03	4.6E+01	3.1E+04	4.6E+00	3.1E+03	RBSLc, RBSLnc	Yes	No
Soil Vapor, Sub-Slab	74-87-3	Chloromethane	µg/m^3	2.0E+02	--	9.4E+03	--	9.4E+02	--	No	No
Soil Vapor, Sub-Slab	110-82-7	Cyclohexane	µg/m^3	1.4E+04	--	6.3E+05	--	6.3E+04	--	No	Yes

Table 5
Soil Vapor Constituent of Concern Screening
Former Kast Property

Matrix	CAS Number	Chemical	Units	Maximum Detected Concentration	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	COC Selection Rationale[1]	COC?	Site-Related COC[2]
Soil Vapor, Sub-Slab	124-48-1	Dibromochloromethane	µg/m^3	1.1E+02	9.0E+00	7.3E+03	9.0E-01	7.3E+02	RBSLc	Yes	No
Soil Vapor, Sub-Slab	156-59-2	Dichloroethene, cis-1,2-	µg/m^3	1.3E+02	--	3.7E+03	--	3.7E+02	--	No	No
Soil Vapor, Sub-Slab	156-60-5	Dichloroethene, trans-1,2-	µg/m^3	1.2E+01	--	6.3E+03	--	6.3E+02	--	No	No
Soil Vapor, Sub-Slab	10061-02-6	Dichloropropene, trans-1,3-	µg/m^3	8.4E+00	1.5E+01	2.1E+03	1.5E+00	2.1E+02	RBSLc	Yes	No
Soil Vapor, Sub-Slab	64-17-5	Ethanol	µg/m^3	1.6E+03	--	4.2E+05	--	4.2E+04	--	No	No
Soil Vapor, Sub-Slab	100-41-4	Ethylbenzene	µg/m^3	5.3E+03	9.7E+01	2.1E+05	9.7E+00	2.1E+04	RBSLc	Yes	Yes
Soil Vapor, Sub-Slab	75-69-4	Freon 11	µg/m^3	7.2E+01	--	7.3E+04	--	7.3E+03	--	No	No
Soil Vapor, Sub-Slab	76-13-1	Freon 113	µg/m^3	1.5E+02	--	3.1E+06	--	3.1E+05	--	No	No
Soil Vapor, Sub-Slab	76-14-2	Freon 114	µg/m^3	2.7E+01	--	3.1E+06	--	3.1E+05	--	No	No
Soil Vapor, Sub-Slab	75-71-8	Freon 12	µg/m^3	1.2E+02	--	2.1E+04	--	2.1E+03	--	No	No
Soil Vapor, Sub-Slab	142-82-5	Heptane	µg/m^3	3.5E+03	--	7.3E+05	--	7.3E+04	--	No	Yes
Soil Vapor, Sub-Slab	110-54-3	Hexane	µg/m^3	7.5E+03	--	7.3E+05	--	7.3E+04	--	No	Yes
Soil Vapor, Sub-Slab	67-63-0	Isopropanol	µg/m^3	1.7E+04	--	7.3E+05	--	7.3E+04	--	No	No
Soil Vapor, Sub-Slab	98-82-8	Isopropylbenzene (cumene)	µg/m^3	1.0E+02	--	4.2E+04	--	4.2E+03	--	No	Yes
Soil Vapor, Sub-Slab	75-09-2	Methylene Chloride	µg/m^3	2.8E+04	2.4E+02	4.2E+04	2.4E+01	4.2E+03	RBSLc, RBSLnc	Yes	No
Soil Vapor, Sub-Slab	1634-04-4	Methyl-tert-Butyl Ether	µg/m^3	4.4E+02	9.4E+02	8.3E+05	9.4E+01	8.3E+04	RBSLc	Yes	No
Soil Vapor, Sub-Slab	91-20-3	Naphthalene	µg/m^3	2.6E+02	7.2E+00	9.4E+02	7.2E-01	9.4E+01	RBSLc, RBSLnc	Yes	Yes
Soil Vapor, Sub-Slab	103-65-1	Propylbenzene	µg/m^3	2.8E+02	--	1.5E+04	--	1.5E+03	--	No	Yes
Soil Vapor, Sub-Slab	100-42-5	Styrene	µg/m^3	2.0E+01	--	9.4E+04	--	9.4E+03	--	No	No
Soil Vapor, Sub-Slab	127-18-4	Tetrachloroethene	µg/m^3	9.5E+02	4.1E+01	3.7E+03	4.1E+00	3.7E+02	RBSLc, RBSLnc	Yes	No
Soil Vapor, Sub-Slab	109-99-9	Tetrahydrofuran	µg/m^3	7.7E+01	1.3E+02	3.1E+04	1.3E+01	3.1E+03	RBSLc	Yes	No
Soil Vapor, Sub-Slab	108-88-3	Toluene	µg/m^3	1.8E+03	--	3.1E+04	--	3.1E+03	--	No	Yes
Soil Vapor, Sub-Slab	79-01-6	Trichloroethene	µg/m^3	7.2E+02	1.2E+02	6.3E+04	1.2E+01	6.3E+03	RBSLc	Yes	No
Soil Vapor, Sub-Slab	75-01-4	Vinyl Chloride	µg/m^3	2.7E+01	3.1E+00	1.0E+04	3.1E-01	1.0E+03	RBSLc	Yes	No
Soil Vapor, Sub-Slab	95-47-6	o-Xylene	µg/m^3	1.9E+02	--	7.3E+04	--	7.3E+03	--	No	Yes
Soil Vapor, Sub-Slab	1330-20-7-1	p/m-Xylene	µg/m^3	5.2E+03	--	7.3E+04	--	7.3E+03	--	No	Yes
Soil Vapor, Non-Sub-Slab	71-55-6	1,1,1-Trichloroethane	µg/m^3	6.2E+00	--	1.0E+05	--	1.0E+04	--	No	No
Soil Vapor, Non-Sub-Slab	79-34-5	1,1,2,2-Tetrachloroethane	µg/m^3	9.0E+03	4.2E+00	1.5E+03	4.2E-01	1.5E+02	RBSLc, RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	79-00-5	1,1,2-Trichloroethane	µg/m^3	7.1E+00	1.5E+01	1.5E+03	1.5E+00	1.5E+02	RBSLc	Yes	No

Table 5
Soil Vapor Constituent of Concern Screening
Former Kast Property

Matrix	CAS Number	Chemical	Units	Maximum Detected Concentration	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	COC Selection Rationale[1]	COC?	Site-Related COC[2]
Soil Vapor, Non-Sub-Slab	75-34-3	1,1-Dichloroethane	µg/m^3	2.0E+02	1.5E+02	7.3E+04	1.5E+01	7.3E+03	RBSLc	Yes	No
Soil Vapor, Non-Sub-Slab	75-35-4	1,1-Dichloroethene	µg/m^3	1.8E+00	--	7.3E+03	--	7.3E+02	--	No	No
Soil Vapor, Non-Sub-Slab	75-37-6	1,1-Difluoroethane	µg/m^3	1.5E+01	--	--	--	--	--	No	No
Soil Vapor, Non-Sub-Slab	95-63-6	1,2,4-Trimethylbenzene	µg/m^3	9.9E+05	--	7.3E+02	--	7.3E+01	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	107-06-2	1,2-Dichloroethane	µg/m^3	1.7E+03	1.2E+01	4.2E+04	1.2E+00	4.2E+03	RBSLc	Yes	No
Soil Vapor, Non-Sub-Slab	108-67-8	1,3,5-Trimethylbenzene	µg/m^3	4.5E+05	--	6.3E+02	--	6.3E+01	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	106-46-7	1,4-Dichlorobenzene	µg/m^3	1.7E+02	2.2E+01	8.3E+04	2.2E+00	8.3E+03	RBSLc	Yes	No
Soil Vapor, Non-Sub-Slab	540-84-1	2,2,4-Trimethylpentane	µg/m^3	1.4E+01	--	1.1E+05	--	1.1E+04	--	No	No
Soil Vapor, Non-Sub-Slab	78-93-3	2-Butanone (Methyl Ethyl Ketone)	µg/m^3	1.6E+05	--	5.2E+05	--	5.2E+04	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	591-78-6	2-Hexanone	µg/m^3	1.6E+04	--	3.1E+03	--	3.1E+02	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	622-96-8	4-Ethyltoluene	µg/m^3	4.4E+05	--	7.3E+04	--	7.3E+03	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	108-10-1	4-Methyl-2-Pentanone	µg/m^3	1.6E+01	--	3.1E+05	--	3.1E+04	--	No	No
Soil Vapor, Non-Sub-Slab	67-64-1	Acetone	µg/m^3	2.4E+05	--	3.2E+06	--	3.2E+05	--	No	No
Soil Vapor, Non-Sub-Slab	71-43-2	Benzene	µg/m^3	3.8E+06	8.4E+00	6.3E+03	8.4E-01	6.3E+02	RBSLc, RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	75-27-4	Bromodichloromethane	µg/m^3	1.2E+04	6.6E+00	7.3E+03	6.6E-01	7.3E+02	RBSLc, RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	74-83-9	Bromomethane	µg/m^3	1.4E+00	--	5.2E+02	--	5.2E+01	--	No	No
Soil Vapor, Non-Sub-Slab	75-15-0	Carbon Disulfide	µg/m^3	1.7E+05	--	8.3E+04	--	8.3E+03	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	108-90-7	Chlorobenzene	µg/m^3	5.9E+00	--	1.0E+05	--	1.0E+04	--	No	No
Soil Vapor, Non-Sub-Slab	75-00-3	Chloroethane	µg/m^3	6.7E+00	--	3.1E+06	--	3.1E+05	--	No	No
Soil Vapor, Non-Sub-Slab	67-66-3	Chloroform	µg/m^3	3.7E+02	4.6E+01	3.1E+04	4.6E+00	3.1E+03	RBSLc	Yes	No
Soil Vapor, Non-Sub-Slab	74-87-3	Chloromethane	µg/m^3	9.8E+01	--	9.4E+03	--	9.4E+02	--	No	No
Soil Vapor, Non-Sub-Slab	110-82-7	Cyclohexane	µg/m^3	2.7E+06	--	6.3E+05	--	6.3E+04	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	156-59-2	Dichloroethene, cis-1,2-	µg/m^3	6.9E+02	--	3.7E+03	--	3.7E+02	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	156-60-5	Dichloroethene, trans-1,2-	µg/m^3	5.6E+03	--	6.3E+03	--	6.3E+02	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	10061-02-6	Dichloropropene, trans-1,3-	µg/m^3	6.5E+00	1.5E+01	2.1E+03	1.5E+00	2.1E+02	RBSLc	Yes	No
Soil Vapor, Non-Sub-Slab	64-17-5	Ethanol	µg/m^3	5.4E+04	--	4.2E+05	--	4.2E+04	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	100-41-4	Ethylbenzene	µg/m^3	1.8E+06	9.7E+01	2.1E+05	9.7E+00	2.1E+04	RBSLc, RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	75-69-4	Freon 11	µg/m^3	1.9E+01	--	7.3E+04	--	7.3E+03	--	No	No
Soil Vapor, Non-Sub-Slab	76-13-1	Freon 113	µg/m^3	2.0E+02	--	3.1E+06	--	3.1E+05	--	No	No

Table 5
Soil Vapor Constituent of Concern Screening
Former Kast Property

Matrix	CAS Number	Chemical	Units	Maximum Detected Concentration	RBSLc	RBSLnc	RBSLc × 0.1	RBSLnc × 0.1	COC Selection Rationale[1]	COC?	Site-Related COC[2]
Soil Vapor, Non-Sub-Slab	75-71-8	Freon 12	µg/m^3	2.1E+02	--	2.1E+04	--	2.1E+03	--	No	No
Soil Vapor, Non-Sub-Slab	142-82-5	Heptane	µg/m^3	1.0E+06	--	7.3E+05	--	7.3E+04	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	87-68-3	Hexachloro-1,3-Butadiene	µg/m^3	2.0E+03	1.1E+01	3.7E+02	1.1E+00	3.7E+01	RBSLc, RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	110-54-3	Hexane	µg/m^3	1.9E+06	--	7.3E+05	--	7.3E+04	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	67-63-0	Isopropanol	µg/m^3	4.5E+05	--	7.3E+05	--	7.3E+04	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	98-82-8	Isopropylbenzene (cumene)	µg/m^3	3.1E+04	--	4.2E+04	--	4.2E+03	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	75-09-2	Methylene Chloride	µg/m^3	7.3E+03	2.4E+02	4.2E+04	2.4E+01	4.2E+03	RBSLc, RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	1634-04-4	Methyl-tert-Butyl Ether	µg/m^3	2.8E+03	9.4E+02	8.3E+05	9.4E+01	8.3E+04	RBSLc	Yes	No
Soil Vapor, Non-Sub-Slab	91-20-3	Naphthalene	µg/m^3	5.2E+03	7.2E+00	9.4E+02	7.2E-01	9.4E+01	RBSLc, RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	103-65-1	Propylbenzene	µg/m^3	3.7E+04	--	1.5E+04	--	1.5E+03	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	100-42-5	Styrene	µg/m^3	5.9E+03	--	9.4E+04	--	9.4E+03	--	No	No
Soil Vapor, Non-Sub-Slab	75-65-0	tert-Butyl Alcohol (TBA)	µg/m^3	1.4E+02	--	1.1E+03	--	1.1E+02	RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	127-18-4	Tetrachloroethene	µg/m^3	5.3E+03	4.1E+01	3.7E+03	4.1E+00	3.7E+02	RBSLc, RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	109-99-9	Tetrahydrofuran	µg/m^3	1.2E+01	1.3E+02	3.1E+04	1.3E+01	3.1E+03	--	No	No
Soil Vapor, Non-Sub-Slab	108-88-3	Toluene	µg/m^3	3.7E+06	--	3.1E+04	--	3.1E+03	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	79-01-6	Trichloroethene	µg/m^3	6.6E+03	1.2E+02	6.3E+04	1.2E+01	6.3E+03	RBSLc, RBSLnc	Yes	No
Soil Vapor, Non-Sub-Slab	108-05-4	Vinyl Acetate	µg/m^3	5.1E+00	--	2.1E+04	--	2.1E+03	--	No	No
Soil Vapor, Non-Sub-Slab	75-01-4	Vinyl Chloride	µg/m^3	4.6E+00	3.1E+00	1.0E+04	3.1E-01	1.0E+03	RBSLc	Yes	No
Soil Vapor, Non-Sub-Slab	95-47-6	o-Xylene	µg/m^3	2.1E+04	--	7.3E+04	--	7.3E+03	RBSLnc	Yes	Yes
Soil Vapor, Non-Sub-Slab	1330-20-7-1	p/m-Xylene	µg/m^3	1.7E+05	--	7.3E+04	--	7.3E+03	RBSLnc	Yes	Yes

Notes:

-- not available or not applicable

µg/m^3: microgram per cubic meter

COC: Constituent of Concern

RBSLc = Risk-based Screening Level for carcinogenic effects

RBSLnc = Risk-based Screening Level for noncarcinogenic effects

[1] COC when maximum Site-wide concentration exceeded 0.1 × Residential RBSL. Selection criterion or criteria are listed in this column.

[2] Site-Related COCs may be related to site activities associated with crude oil storage prior to redevelopment.

Table 6
Summary of Constituents of Concern
Former Kast Property

CAS Number	Chemical[1]	Soil		Soil Vapor, Sub-Slab		Soil Vapor, Non-Sub-Slab	
		COC	Site-Related COC[1]	COC	Site-Related COC[1]	COC	Site-Related COC[1]
Metals							
7440-36-0	Antimony	Yes	No	--	--	--	--
7440-38-2	Arsenic	Yes	Yes	--	--	--	--
7440-43-9	Cadmium	No[2]	No	--	--	--	--
18540-29-9	Chromium, Hexavalent	Yes[3]	No	--	--	--	--
7440-48-4	Cobalt	No[2]	No	--	--	--	--
7440-50-8	Copper	No[2]	No	--	--	--	--
7439-92-1	Lead	Yes	Yes	--	--	--	--
7440-28-0	Thallium	Yes	No	--	--	--	--
7440-62-2	Vanadium	No[2]	No	--	--	--	--
7440-66-6	Zinc	No[2]	No	--	--	--	--
PAHs							
56-55-3	Benzo (a) Anthracene	Yes	Yes	--	--	--	--
50-32-8	Benzo (a) Pyrene	Yes	Yes	--	--	--	--
205-99-2	Benzo (b) Fluoranthene	Yes	Yes	--	--	--	--
207-08-9	Benzo (k) Fluoranthene	Yes	Yes	--	--	--	--
218-01-9	Chrysene	Yes	Yes	--	--	--	--
53-70-3	Dibenz (a,h) Anthracene	Yes	Yes	--	--	--	--
193-39-5	Indeno (1,2,3-c,d) Pyrene	Yes	Yes	--	--	--	--
90-12-0	1-Methylnaphthalene	Yes	Yes	--	--	--	--
91-57-6	2-Methylnaphthalene	Yes	Yes	--	--	--	--
129-00-0	Pyrene	Yes	Yes	--	--	--	--
SVOCs							
121-14-2	2,4-Dinitrotoluene	Yes	No	--	--	--	--
117-81-7	Bis(2-Ethylhexyl) Phthalate	Yes	No	--	--	--	--
TPH							
68334-30-5	TPH as Diesel	Yes	Yes	--	--	--	--
PHCG	TPH as Gasoline	Yes	Yes	--	--	--	--
TPHMOIL	TPH as Motor Oil	Yes	Yes	--	--	--	--
VOCs							
79-34-5	1,1,2,2-Tetrachloroethane	Yes	No	--	--	Yes	No
79-00-5	1,1,2-Trichloroethane	No	No	--	--	Yes	No
75-34-3	1,1-Dichloroethane	--	--	--	--	Yes	No
96-18-4	1,2,3-Trichloropropane	Yes	No	--	--	--	--
120-82-1	1,2,4-Trichlorobenzene	No	No	Yes	No	--	--
95-63-6	1,2,4-Trimethylbenzene	Yes	Yes	Yes	Yes	Yes	Yes
107-06-2	1,2-Dichloroethane	Yes	No	Yes	No	Yes	No
78-87-5	1,2-Dichloropropane	Yes	No	Yes	No	--	--
108-67-8	1,3,5-Trimethylbenzene	Yes	Yes	Yes	Yes	Yes	Yes
106-99-0	1,3-Butadiene	--	--	Yes	No	--	--
106-46-7	1,4-Dichlorobenzene	Yes	No	Yes	No	Yes	No
123-91-1	1,4-Dioxane	--	--	Yes	No	--	--

Table 6
Summary of Constituents of Concern
Former Kast Property

CAS Number	Chemical[1]	Soil		Soil Vapor, Sub-Slab		Soil Vapor, Non-Sub-Slab	
		COC	Site-Related COC[1]	COC	Site-Related COC[1]	COC	Site-Related COC[1]
540-84-1	2,2,4-Trimethylpentane	--	--	Yes	No	No	No
78-93-3	2-Butanone (Methyl Ethyl Ketone)	No	No	No	No	Yes	No
591-78-6	2-Hexanone	No	No	Yes	No	Yes	No
622-96-8	4-Ethyltoluene	--	--	No	Yes	Yes	Yes
71-43-2	Benzene	Yes	Yes	Yes	Yes	Yes	Yes
75-27-4	Bromodichloromethane	Yes	No	Yes	No	Yes	No
74-83-9	Bromomethane	Yes	No	Yes	No	No	No
75-15-0	Carbon Disulfide	No	No	No	No	Yes	No
56-23-5	Carbon Tetrachloride	--	--	Yes	No	--	--
67-66-3	Chloroform	No	No	Yes	No	Yes	No
110-82-7	Cyclohexane	--	--	No	Yes	Yes	Yes
124-48-1	Dibromochloromethane	No	No	Yes	No	--	--
156-59-2	Dichloroethene, cis-1,2-	Yes	No	No	No	Yes	No
156-60-5	Dichloroethene, trans-1,2-	--	--	No	No	Yes	No
10061-02-6	Dichloropropene, trans-1,3-	--	--	Yes	No	Yes	No
64-17-5	Ethanol	No	No	No	No	Yes	No
100-41-4	Ethylbenzene	Yes	Yes	Yes	Yes	Yes	Yes
142-82-5	Heptane	--	--	No	Yes	Yes	Yes
87-68-3	Hexachloro-1,3-Butadiene	--	--	--	--	Yes	No
110-54-3	Hexane	--	--	No	Yes	Yes	Yes
67-63-0	Isopropanol	--	--	No	No	Yes	No
98-82-8	Isopropylbenzene (cumene)	No	No	No	Yes	Yes	Yes
75-09-2	Methylene Chloride	Yes	No	Yes	No	Yes	No
1634-04-4	Methyl-tert-Butyl Ether	No	No	Yes	No	Yes	No
91-20-3	Naphthalene	Yes	Yes	Yes	Yes	Yes	Yes
103-65-1	Propylbenzene	No	No	No	Yes	Yes	Yes
75-65-0	tert-Butyl Alcohol (TBA)	Yes	No	--	--	Yes	No
127-18-4	Tetrachloroethene	Yes	No	Yes	No	Yes	No
109-99-9	Tetrahydrofuran	--	--	Yes	No	No	No
108-88-3	Toluene	Yes[4]	Yes	Yes[4]	Yes	Yes[4]	Yes
79-01-6	Trichloroethene	Yes	No	Yes	No	Yes	No
75-01-4	Vinyl Chloride	Yes	No	Yes	No	Yes	No
95-47-6	o-Xylene	Yes[4]	Yes	Yes[4]	Yes	Yes[4]	Yes
1330-20-7-1	p/m-Xylene	Yes[4]	Yes	Yes[4]	Yes	Yes[4]	Yes
1330-20-7	Xylenes, Total	Yes[4]	Yes	Yes[4]	Yes	Yes[4]	Yes

Notes:

-- not available or not applicable

COC: Constituent of Concern

[1] Site-Related COCs may be related to Site activities associated with crude oil storage prior to redevelopment.

[2] Additional background analysis (one-sample proportion test) indicated this metal to be within background for all properties.

[3] Due to change in oral cancer assessment not reflected in RBSLs from HHSRE Work Plan, hexavalent chromium included as a COC.

[4] Although not selected as COCs through the screening process, the RWQCB has requested these VOCs to be evaluated as COCs.

Table 7
Exposure Parameters
Former Kast Property

Parameter		Units	Onsite Resident		Source	Onsite Construction and Utility Maintenance Worker	Source
			Adult	Child			
IR	Soil ingestion rate	mg/d	100	200	(1,2)	330	(1)
SA	Skin surface area	cm^2	5,700	2,800	(1,3)	5,700	(1)
AF	Soil-to-skin adherence factor	–	0.07	0.2	(1,3)	0.8	(1)
EF	Exposure frequency	d/yr	350	350	(1,2)	10	PJ
	Infrequent exposure to subsurface soils	d/yr	4	4	PJ	--	
ED	Exposure duration	yr	24	6	(1,2)	25	(2)
ET	Exposure time	hours	24	24	(2)	20 m^3/day for the 8 hour workday	(1)
BW	Body weight	kg	70	15	(1,2)	70	(1,2)
AT_C	Averaging time for carcinogenic effects	d	25,550	25,550	(1,2)	25,550	(1,2)
AT_{NC}	Averaging time for noncarcinogenic effects	d	8,760	2,190	(1,2)	9,125	(1,2)

Note:

"--" not applicable; " PJ " Professional Judgement

Source:

(1) Cal-EPA 2011a. Human Health Risk Assessment (HHRA) Note. Office of Human and Ecological Risk (HERO) HHRA Note Number 1. Recommended DTSC Default Exposure Factors For Use In Risk Assessment At California Hazardous Waste Sites and Permitted Facilities. Issued: May 20, 2011.

(2) USEPA 1991c. RAGS. Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

(3) USEPA 2004b. RAGS. Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Interim Guidance. EPA/540/R-99/005

Table 8
Definition of Transfer Factors
Former Kast Property

Exposure Route	Transfer Factor	Definition
Inhalation of particulates in outdoor air	Particulate emission factor (PEF) (kg/m^3)	Ratio of chemical concentration in outdoor air (mg/m^3) to chemical concentration in soil (mg/kg)
Inhalation of vapors in outdoor air	Soil-to-outdoor air volatilization factor ($VF_{soil-OA}$ or VF_{soil}) (kg/m^3)	Ratio of chemical concentration in outdoor air (mg/m^3) to chemical concentration in soil (mg/kg)
	Soil vapor-to-outdoor air volatilization factor (VF_{SV-OA}) ($\mu g/m^3$ per $\mu g/m^3$)	Ratio of chemical concentration in outdoor air ($\mu g/m^3$) to chemical concentration in soil vapor ($\mu g/m^3$)

Table 9a

Derivation of Particulate Emission and Volatilization Factors, Onsite Resident

Former Kast Property

Parameter	Value	Units	Reference
Water-filled soil porosity (θw)	1.50E-01	(Lwater-Lsoil)	USEPA 2012 RSL default
Total soil porosity (θ_T)	4.30E-01	(Lpore-Lsoil)	USEPA 2012 RSL default
Air-filled soil porosity (θa)	2.80E-01	(Lair-Lsoil)	USEPA 2012 RSL default
Soil bulk density (Pb)	1.5	g/cm^3	USEPA 2012 RSL default
Fraction organic carbon in soil (foc)	0.006	unitless	USEPA 2012 RSL default
Exposure interval ($T_{resident}$)	9.46E+08	sec	30 year exposure duration
Inverse of mean conc, $Q/C_{resident}$	68.18	(g/m^2-s per kg/m^3)	Calculated for a 0.5-acre site in Los Angeles (USEPA 2002)
Fraction of vegetative cover, $G_{resident}$	0.5	unitless	Default (USEPA 2002)
Mean annual windspeed (Um)	3.31	m/s	Average for Los Angeles, 7.4 mph (NCDC 2011)
Equivalent threshold value of windspeed at 7m (Ut)	11.32	m/s	Default (USEPA 2002)
Function dependent on Um/Ut (Fx)	4.74E-03	unitless	Los Angeles-Specific (Appendix D, Table 2 in USEPA 1996)
Particulate Emission Factor, $PEF_{resident}$	1.2E+11	(m^3/kg)	Calculated for a 0.5-acre site in Los Angeles (USEPA 2002)

Particulate Emission Factor; $PEF_{resident}$ (USEPA 2002): $PEF = [(Q/C_{resident} * 3600) / (0.036 * (1-G_{resident}) * (Um/Ut)^3 * Fx)]$

CAS Number	Chemical of Concern	Diffusivity in Air (D_{air}) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_{water}) (cm^2/s)	Organic Carbon Partition Coefficient (K_{oc}) (cm^3/g)	Soil-Water Partition Coefficient (Kd) (cm^3/g)	Apparent Diffusivity (D_A) (cm^2/s)	Effective Diffusion Coefficient (D_{eff}) (cm^2/s)	Soil-water partition coefficient (K_{sw}) (cm^3/g)	Onsite Resident VF_{soil} (m^3/kg)
79-34-5	1,1,2,2-Tetrachloroethane	7.1E-02	1.4E-02	7.9E-06	9.3E+01	5.6E-01	7.8E-05	5.5E-03	6.6E-01	1.4E+04
96-18-4	1,2,3-Trichloropropane	7.1E-02	1.7E-02	7.9E-06	2.2E+01	1.3E-01	2.6E-04	5.5E-03	2.4E-01	7.6E+03
95-63-6	1,2,4-Trimethylbenzene	6.1E-02	2.5E-01	7.9E-06	1.4E+03	8.1E+00	9.6E-05	4.7E-03	8.3E+00	1.3E+04
78-87-5	1,2-Dichloropropane	7.8E-02	1.1E-01	8.7E-06	4.4E+01	2.6E-01	1.2E-03	6.1E-03	3.8E-01	3.6E+03
108-67-8	1,3,5-Trimethylbenzene	6.0E-02	2.4E-01	8.7E-06	1.4E+03	8.1E+00	9.1E-05	4.7E-03	8.3E+00	1.3E+04
106-46-7	1,4-Dichlorobenzene	6.9E-02	9.8E-02	7.9E-06	6.2E+02	3.7E+00	9.2E-05	5.4E-03	3.8E+00	1.3E+04
71-43-2	Benzene	8.8E-02	2.3E-01	9.8E-06	5.9E+01	3.5E-01	2.1E-03	6.9E-03	5.0E-01	2.7E+03
75-27-4	Bromodichloromethane	3.0E-02	6.5E-02	1.1E-05	5.5E+01	3.3E-01	2.3E-04	2.3E-03	4.4E-01	8.2E+03

Table 9a

Derivation of Particulate Emission and Volatilization Factors, Onsite Resident

Former Kast Property

CAS Number	Chemical of Concern	Diffusivity in Air (D_{air}) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_{water}) (cm^2/s)	Organic Carbon Partition Coefficient (K_{oc}) (cm^3/g)	Soil-Water Partition Coefficient (Kd) (cm^3/g)	Apparent Diffusivity (D_A) (cm^2/s)	Effective Diffusion Coefficient (D_{eff}) (cm^2/s)	Soil-water partition coefficient (K_{sw}) (cm^3/g)	Onsite Resident VF_{soil} (m^3/kg)
74-83-9	Bromomethane	7.3E-02	2.6E-01	1.2E-05	1.1E+01	6.3E-02	4.6E-03	5.7E-03	2.1E-01	1.8E+03
100-41-4	Ethylbenzene	7.5E-02	3.2E-01	7.8E-06	3.6E+02	2.2E+00	5.3E-04	5.9E-03	2.3E+00	5.4E+03
75-09-2	Methylene chloride	1.0E-01	9.0E-02	1.2E-05	1.2E+01	7.0E-02	2.5E-03	7.9E-03	1.9E-01	2.5E+03
127-18-4	Tetrachloroethene	7.2E-02	7.5E-01	8.2E-06	1.6E+02	9.3E-01	2.4E-03	5.6E-03	1.2E+00	2.5E+03
108-88-3	Toluene	8.7E-02	2.7E-01	8.6E-06	1.8E+02	1.1E+00	9.8E-04	6.8E-03	1.2E+00	3.9E+03
79-01-6	Trichloroethene	7.9E-02	4.2E-01	9.1E-06	1.7E+02	1.0E+00	1.5E-03	6.2E-03	1.2E+00	3.2E+03
75-01-4	Vinyl chloride	1.1E-01	1.1E+00	1.2E-05	1.9E+01	1.1E-01	1.5E-02	8.3E-03	4.2E-01	1.0E+03
1330-20-7	Xylenes, total	7.7E-02	3.1E-01	8.4E-06	3.9E+02	2.3E+00	5.0E-04	6.0E-03	2.5E+00	5.5E+03
90-12-0	Methylnaphthalene, 1-	5.3E-02	2.1E-02	7.9E-06	3.0E+03	1.8E+01	3.1E-06	4.1E-03	1.8E+01	7.0E+04
91-57-6	Methylnaphthalene, 2-	5.2E-02	2.1E-02	7.8E-06	2.8E+03	1.7E+01	3.4E-06	4.1E-03	1.7E+01	6.7E+04
91-20-3	Naphthalene	5.9E-02	2.0E-02	7.5E-06	2.0E+03	1.2E+01	5.0E-06	4.6E-03	1.2E+01	5.5E+04
129-00-0	Pyrene	2.7E-02	4.5E-04	7.2E-06	1.1E+05	6.3E+02	1.1E-09	2.3E-03	6.3E+02	3.8E+06

Volatilization Factor; VF_{soil}:

$$VF_{soil} = Q/C \times \left(10^{-4}\ \frac{m^2}{cm^2}\right) \times \left(\frac{1}{P_b}\right) \left(\frac{3.14 \times T_{resident} \times K_{sw} \times P_b}{4 \times D_{eff} \times H'}\right)^{1/2}$$

Table 9b

Derivation of Particulate Emission and Volatilization Factors, Onsite Construction and Utility Maintenance Worker

Former Kast Property

Parameter	Value	Units	Reference
Water-filled soil porosity (θw)	1.5E-01	(Lwater-Lsoil)	USEPA 2012 RSL default
Total soil porosity (θ_T)	4.3E-01	(Lpore-Lsoil)	USEPA 2012 RSL default
Air-filled soil porosity (θa)	2.8E-01	(Lair-Lsoil)	USEPA 2012 RSL default
Soil bulk density (Pb)	1.5	g/cm^3	USEPA 2012 RSL default
Fraction organic carbon in soil (foc)	0.006	unitless	USEPA 2012 RSL default
Exposure interval (T_{CUW})	7.9E+08	sec	25 year exposure duration for the construction/utility maintenance worker
Ambient air velocity in mixing zone (U_{air})	5.1E-01	cm/s	Based on an air exchange rate of 20 hr^{-1}, wind direction parallel to the short side of the trench (3 ft or 91 cm), professional judgment
Width of source-zone area (W)	457	cm	Assume length of trench = 4.57 meters
Mixing zone height (H)	183	cm	Assume depth of trench = 1.83 meters
Width of trench (W_t)	91	cm	Assume width of trench = 0.91 meters
Source-zone area (A)	2.4E+05	cm^2	4 sidewalls and bottom area of trench
Dispersion factor for ambient air (DF_{amb})	1.7E-01	cm/s	Calculated (ASTM 2004)
Particulate Emission Factor, PEF_{CUW}	1.0E+06	(m^3/kg)	DTSC HERO HHRA Note Number 1 (Cal-EPA, 2011)

CAS Number	Chemical of Concern	Diffusivity in Air (D_{air}) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_{water}) (cm^2/s)	Organic Carbon Partition Coefficient (K_{oc}) (cm^3/g)	Soil-Water Partition Coefficient (Kd) (cm^3/g)	Apparent Diffusivity (D_A) (cm^2/s)	Effective Diffusion Coefficient (D_{eff}) (cm^2/s)	Soil-water partition coefficient (K_{sw}) (cm^3/g)	Construction and Utility Maintenance Worker $VF_{soil-OA}$ (m^3/kg)	Construction and Utility Maintenance Worker VF_{SV-OA} (µg/m^3 per µg/m^3)
79-34-5	1,1,2,2-Tetrachloroethane	7.1E-02	1.4E-02	7.9E-06	9.3E+01	5.6E-01	7.8E-05	5.5E-03	6.6E-01	3.3E+02	7.0E+03
79-00-5	1,1,2-Trichloroethane	7.8E-02	3.7E-02	8.8E-06	5.0E+01	3.0E-01	3.7E-04	6.1E-03	4.1E-01	--	1.4E+04
75-34-3	1,1-Dichloroethane	7.4E-02	2.3E-01	1.1E-05	3.2E+01	1.9E-01	2.7E-03	5.8E-03	3.3E-01	--	3.9E+04
96-18-4	1,2,3-Trichloropropane	7.1E-02	1.7E-02	7.9E-06	2.2E+01	1.3E-01	2.6E-04	5.5E-03	2.4E-01	1.8E+02	--
120-82-1	1,2,4-Trichlorobenzene	3.0E-02	5.8E-02	8.2E-06	1.8E+03	1.1E+01	8.4E-06	2.3E-03	1.1E+01	--	5.4E+03
95-63-6	1,2,4-Trimethylbenzene	6.1E-02	2.5E-01	7.9E-06	1.4E+03	8.1E+00	9.6E-05	4.7E-03	8.3E+00	3.0E+02	9.0E+03
107-06-2	1,2-Dichloroethane	1.0E-01	4.0E-02	9.9E-06	1.7E+01	1.0E-01	1.0E-03	8.1E-03	2.1E-01	--	1.7E+04
78-87-5	1,2-Dichloropropane	7.8E-02	1.1E-01	8.7E-06	4.4E+01	2.6E-01	1.2E-03	6.1E-03	3.8E-01	8.3E+01	2.5E+04
108-67-8	1,3,5-Trimethylbenzene	6.0E-02	2.4E-01	8.7E-06	1.4E+03	8.1E+00	9.1E-05	4.7E-03	8.3E+00	3.0E+02	8.8E+03

Table 9b

Derivation of Particulate Emission and Volatilization Factors, Onsite Construction and Utility Maintenance Worker

Former Kast Property

CAS Number	Chemical of Concern	Diffusivity in Air (D_{air}) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_{water}) (cm^2/s)	Organic Carbon Partition Coefficient (K_{oc}) (cm^3/g)	Soil-Water Partition Coefficient (Kd) (cm^3/g)	Apparent Diffusivity (D_A) (cm^2/s)	Effective Diffusion Coefficient (D_{eff}) (cm^2/s)	Soil-water partition coefficient (K_{sw}) (cm^3/g)	Construction and Utility Maintenance Worker $VF_{soil-OA}$ (m^3/kg)	Construction and Utility Maintenance Worker VF_{SV-OA} ($\mu g/m^3$ per $\mu g/m^3$)
106-99-0	1,3-Butadiene	2.5E-01	3.0E+00	1.1E-05	1.9E+01	1.1E-01	5.0E-02	1.9E-02	7.8E-01	--	5.0E+04
106-46-7	1,4-Dichlorobenzene	6.9E-02	9.8E-02	7.9E-06	6.2E+02	3.7E+00	9.2E-05	5.4E-03	3.8E+00	3.0E+02	7.8E+03
123-91-1	1,4-Dioxane	2.3E-01	2.3E-04	1.0E-05	1.0E+00	6.0E-03	2.6E-05	1.8E-02	1.1E-01	--	1.2E+03
540-84-1	2,2,4-Trimethylpentane	1.0E-01	1.8E+02	1.0E-05	1.5E+05	9.0E+02	1.0E-03	7.8E-03	9.3E+02	--	1.8E+04
591-78-6	2-Hexanone	7.5E-02	3.8E-03	8.4E-06	9.4E+00	5.7E-02	9.4E-05	5.8E-03	1.6E-01	--	7.2E+03
622-96-8	4-Ethyltoluene	6.8E-02	2.1E-01	7.3E-06	1.8E+03	1.1E+01	6.7E-05	5.3E-03	1.1E+01	--	6.7E+03
71-43-2	Benzene	8.8E-02	2.3E-01	9.8E-06	5.9E+01	3.5E-01	2.1E-03	6.9E-03	5.0E-01	6.3E+01	2.9E+04
75-27-4	Bromodichloromethane	3.0E-02	6.5E-02	1.1E-05	5.5E+01	3.3E-01	2.3E-04	2.3E-03	4.4E-01	1.9E+02	2.8E+04
74-83-9	Bromomethane	7.3E-02	2.6E-01	1.2E-05	1.1E+01	6.3E-02	4.6E-03	5.7E-03	2.1E-01	4.3E+01	5.2E+04
75-15-0	Carbon disulfide	1.0E-01	1.2E+00	1.0E-05	4.6E+01	2.7E-01	1.1E-02	8.1E-03	6.1E-01	--	5.6E+04
56-23-5	Carbon tetrachloride	7.8E-02	1.2E+00	8.8E-06	1.7E+02	1.0E+00	3.6E-03	6.1E-03	1.4E+00	--	4.3E+04
67-66-3	Chloroform	1.0E-01	1.5E-01	1.0E-05	4.0E+01	2.4E-01	2.2E-03	8.1E-03	3.7E-01	--	2.5E+04
110-82-7	Cyclohexane	7.4E-02	7.9E+00	8.5E-06	1.7E+02	9.9E-01	1.2E-02	5.7E-03	2.6E+00	--	8.2E+04
124-48-1	Dibromochloromethane	2.0E-02	3.2E-02	1.1E-05	6.3E+01	3.8E-01	6.7E-05	1.5E-03	4.8E-01	--	2.3E+04
156-59-2	Dichloroethene, cis-1,2-	7.4E-02	1.7E-01	1.1E-05	3.6E+01	2.1E-01	1.8E-03	5.7E-03	3.4E-01	--	3.3E+04
156-60-5	Dichloroethene, trans-1,2-	7.1E-02	3.8E-01	1.2E-05	5.3E+01	3.2E-01	2.9E-03	5.5E-03	4.9E-01	--	4.2E+04
10061-02-6	Dichloropropene, trans-1,3-	6.3E-02	7.2E-01	1.0E-05	4.6E+01	2.7E-01	4.6E-03	4.9E-03	5.1E-01	--	6.1E+04
64-17-5	Ethanol	1.5E-01	1.9E-04	1.6E-05	1.0E+00	6.0E-03	1.5E-05	1.3E-02	1.1E-01	--	1.3E+03
100-41-4	Ethylbenzene	7.5E-02	3.2E-01	7.8E-06	3.6E+02	2.2E+00	5.4E-04	5.9E-03	2.3E+00	1.2E+02	1.7E+04
142-82-5	Heptane	9.3E-02	8.2E+01	7.6E-06	2.7E+02	1.6E+00	2.3E-02	7.2E-03	1.7E+01	--	9.2E+04
87-68-3	Hexachloro-1,3-butadiene	5.6E-02	3.3E-01	6.2E-06	5.4E+04	3.2E+02	3.0E-06	4.4E-03	3.2E+02	--	1.7E+03
110-54-3	Hexane	2.0E-01	6.8E+01	7.8E-06	4.3E+01	2.6E-01	5.4E-02	1.6E-02	1.3E+01	--	6.5E+04
67-63-0	Isopropanol	8.0E-02	3.6E-04	9.3E-06	6.9E+00	4.2E-02	1.1E-05	6.5E-03	1.4E-01	--	2.2E+03
98-82-8	Isopropylbenzene (cumene)	6.5E-02	4.7E+01	7.1E-06	4.9E+02	2.9E+00	1.3E-02	5.1E-03	1.2E+01	--	1.0E+05

Table 9b

Derivation of Particulate Emission and Volatilization Factors, Onsite Construction and Utility Maintenance Worker

Former Kast Property

CAS Number	Chemical of Concern	Diffusivity in Air (D_{air}) (cm^2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (D_{water}) (cm^2/s)	Organic Carbon Partition Coefficient (K_{oc}) (cm^3/g)	Soil-Water Partition Coefficient (Kd) (cm^3/g)	Apparent Diffusivity (D_A) (cm^2/s)	Effective Diffusion Coefficient (D_{eff}) (cm^2/s)	Soil-water partition coefficient (K_{sw}) (cm^3/g)	Construction and Utility Maintenance Worker $VF_{soil-OA}$ (m^3/kg)	Construction and Utility Maintenance Worker VF_{SV-OA} ($\mu g/m^3$ per $\mu g/m^3$)
78-93-3	Methyl ethyl ketone (2-butanone)	8.1E-02	2.3E-03	9.8E-06	2.3E+00	1.4E-02	8.4E-05	6.3E-03	1.1E-01	--	6.3E+03
75-09-2	Methylene chloride	1.0E-01	9.0E-02	1.2E-05	1.2E+01	7.0E-02	2.5E-03	7.9E-03	1.9E-01	5.8E+01	2.8E+04
1634-04-4	Methyl-tert-butyl ether	1.0E-01	2.6E-02	1.1E-05	7.3E+00	4.4E-02	9.1E-04	8.0E-03	1.5E-01	--	1.6E+04
103-65-1	Propylbenzene	6.0E-02	4.4E-01	7.8E-06	5.6E+02	3.4E+00	3.8E-04	4.7E-03	3.6E+00	--	1.8E+04
75-65-0	tert-Butyl Alcohol (TBA)	8.5E-02	3.0E-03	9.1E-06	4.2E+00	2.5E-02	1.1E-04	6.7E-03	1.3E-01	--	6.7E+03
127-18-4	Tetrachloroethene	7.2E-02	7.5E-01	8.2E-06	1.6E+02	9.3E-01	2.4E-03	5.6E-03	1.2E+00	5.9E+01	3.8E+04
109-99-9	Tetrahydrofuran	9.8E-02	2.9E-03	1.1E-05	9.5E-01	5.7E-03	1.4E-04	7.7E-03	1.1E-01	--	6.7E+03
108-88-3	Toluene	8.7E-02	2.7E-01	8.6E-06	1.8E+02	1.1E+00	9.8E-04	6.8E-03	1.2E+00	9.2E+01	2.0E+04
79-01-6	Trichloroethene	7.9E-02	4.2E-01	9.1E-06	1.7E+02	1.0E+00	1.5E-03	6.2E-03	1.2E+00	7.5E+01	2.7E+04
75-01-4	Vinyl chloride	1.1E-01	1.1E+00	1.2E-05	1.9E+01	1.1E-01	1.5E-02	8.3E-03	4.2E-01	2.4E+01	6.3E+04
1330-20-7	Xylenes, total	7.7E-02	3.1E-01	8.4E-06	3.9E+02	2.3E+00	5.0E-04	6.0E-03	2.5E+00	1.3E+02	1.4E+04
90-12-0	Methylnaphthalene, 1-	5.3E-02	2.1E-02	7.9E-06	3.0E+03	1.8E+01	3.1E-06	4.1E-03	1.8E+01	1.6E+03	--
91-57-6	Methylnaphthalene, 2-	5.2E-02	2.1E-02	7.8E-06	2.8E+03	1.7E+01	3.4E-06	4.1E-03	1.7E+01	1.6E+03	--
91-20-3	Naphthalene	5.9E-02	2.0E-02	7.5E-06	2.0E+03	1.2E+01	5.0E-06	4.6E-03	1.2E+01	--	2.1E+03
129-00-0	Pyrene	2.7E-02	4.5E-04	7.2E-06	1.1E+05	6.3E+02	1.1E-09	2.3E-03	6.3E+02	8.8E+04	--

Note:

--: Not selected as COC for this medium.

Volatilization Factor:

$$VF_{soil-OA} = \frac{DF_{amb}}{Pb} \times \left[\frac{(3.14 \times T_{CUW} \times K_{sw} \times Pb)}{(4 \times D_{eff} \times H')} \right]^{1/2} \times CF_1 \times CF_2 \quad \text{and} \quad VF_{SV-OA} = VF_{soil-OA} \times \frac{H'}{K_{sw}} \times (CF_1 \times CF_2)$$

Table 10
Toxicity Criteria
Former Kast Property

CAS Number	Chemical of Concern	Dermal ABS^	GI ABS^	Cancer Toxicity Criteria					Noncancer Toxicity Criteria				
				Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Source	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Source	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Source	Inhalation RfC or REL (mg/m^3)	Source
	Inorganics												
7440-36-0	Antimony	NA	0.15	NC		NC	NC		4.0E-04	6.0E-05	I	NA	
7440-38-2	Arsenic	0.03	1	9.5E+00	C	9.5E+00	3.3E-03	C	3.0E-04	3.0E-04	I	1.5E-05	C
7440-43-9	Cadmium	0.001	0.025	NC		NC	4.2E-03	C	1.0E-03	2.5E-05	I	2.0E-05	C
18540-29-9	Chromium, hexavalent	NA	0.025	5.0E-01	J	NC	1.5E-01	C	3.0E-03	7.5E-05	I	1.0E-04	I
7440-48-4	Cobalt	NA	1	NC		NC	9.0E-03	P	3.0E-04	3.0E-04	P	6.0E-06	P
7440-50-8	Copper	NA	1	NC		NC	NC		4.0E-02	4.0E-02	H	NA	
7439-92-1	Lead	NA	1	NC		NC	NC		NA	NA		NA	
7440-28-0	Thallium	NA	1	NC		NC	NC		1.0E-05	1.0E-05	X	NA	
7440-62-2	Vanadium	NA	1	NC		NC	NC		5.0E-03	5.0E-03	S	1.0E-04	A
7440-66-6	Zinc	NA	1	NC		NC	NC		3.0E-01	3.0E-01	I	NA	
	PAHs												
56-55-3	Benzo (a) anthracene	0.13	1	2.9E-01	C*	2.9E-01	1.1E-04	C	NA	NA		NA	
50-32-8	Benzo (a) pyrene	0.13	1	2.9E+00	C*	2.9E+00	1.1E-03	C	NA	NA		NA	
205-99-2	Benzo (b) fluoranthene	0.13	1	2.9E-01	C*	2.9E-01	1.1E-04	C	NA	NA		NA	
207-08-9	Benzo (k) fluoranthene	0.13	1	2.9E-01	C*	2.9E-01	1.1E-04	C	NA	NA		NA	
218-01-9	Chrysene	0.13	1	2.9E-02	C*	2.9E-02	1.1E-05	C	NA	NA		NA	
53-70-3	Dibenz (a,h) anthracene	0.13	1	4.1E+00	C	4.1E+00	1.2E-03	C	NA	NA		NA	
193-39-5	Indeno (1,2,3-cd) pyrene	0.13	1	2.9E-01	C*	2.9E-01	1.1E-04	C	NA	NA		NA	
90-12-0	Methylnaphthalene, 1-	0.13	1	2.9E-02	P	2.9E-02	NC		7.0E-02	7.0E-02	A	NA	
91-57-6	Methylnaphthalene, 2-	0.13	1	NC		NC	NC		4.0E-03	4.0E-03	I	NA	
91-20-3	Naphthalene	0.13	1	NC		NC	3.4E-05	C	2.0E-02	2.0E-02	I	3.0E-03	I
129-00-0	Pyrene	0.13	1	NC		NC	NC		3.0E-02	3.0E-02	I	1.1E-01	R

Table 10
Toxicity Criteria
Former Kast Property

CAS Number	Chemical of Concern	Dermal ABS^	GI ABS^	Cancer Toxicity Criteria					Noncancer Toxicity Criteria				
				Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Source	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Source	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Source	Inhalation RfC or REL (mg/m^3)	Source
	TPH												
	TPH Aliphatic: C5-C8	0.13	1	NC		NC	NC		4.0E-02	4.0E-02	B	7.0E-01	B
	TPH Aliphatic: C9-C18	0.13	1	NC		NC	NC		1.0E-01	1.0E-01	B	3.0E-01	B
	TPH Aliphatic: C19-C32	0.13	1	NC		NC	NC		2.0E+00	2.0E+00	B	--	B
	TPH Aromatic: C6-C8	0.13	1	NC		NC	NC		--	--	B	--	B
	TPH Aromatic: C9-C16	0.13	1	NC		NC	NC		3.0E-02	3.0E-02	B	5.0E-02	B
	TPH Aromatic: C17-C32	0.13	1	NC		NC	NC		3.0E-02	3.0E-02	B	--	B
	SVOCs												
121-14-2	2,4-Dinitrotoluene	0.102	1	3.1E-01	C	3.1E-01	8.9E-05	C	2.0E-03	2.0E-03	I	7.0E-03	R
117-81-7	Bis(2-Ethylhexyl) Phthalate	0.1	1	1.4E-02	I	1.4E-02	2.4E-06	C	2.0E-02	2.0E-02	I	7.0E-02	R
	VOCs												
79-34-5	1,1,2,2-Tetrachloroethane	NA	1	2.7E-01	C	2.7E-01	5.8E-05	C	2.0E-02	2.0E-02	I	7.0E-02	R
79-00-5	1,1,2-Trichloroethane	NA	1	7.2E-02	C	7.2E-02	1.6E-05	C	4.0E-03	4.0E-03	I	2.0E-04	X
75-34-3	1,1-Dichloroethane	NA	1	5.7E-03	C	5.7E-03	1.6E-06	C	2.0E-01	2.0E-01	P	7.0E-01	R
96-18-4	1,2,3-Trichloropropane	NA	1	3.0E+01	I	3.0E+01	NC		4.0E-03	4.0E-03	I	3.0E-04	I
120-82-1	1,2,4-Trichlorobenzene	NA	1	3.6E-03	C	3.6E-03	NC		1.0E-02	1.0E-02	I	2.0E-03	P
95-63-6	1,2,4-Trimethylbenzene	NA	1	NC		NC	NC		1.0E-02	1.0E-02	X	7.0E-03	P
107-06-2	1,2-Dichloroethane	NA	1	4.7E-02	C	4.7E-02	2.1E-05	C	6.0E-03	6.0E-03	X	7.0E-03	P
78-87-5	1,2-Dichloropropane	NA	1	3.6E-02	C	3.6E-02	1.0E-05	C	9.0E-02	9.0E-02	A	4.0E-03	I
108-67-8	1,3,5-Trimethylbenzene	NA	1	NC		NC	NC		1.0E-02	1.0E-02	X	7.0E-03	P
106-99-0	1,3-Butadiene	NA	1	3.4E+00	C	3.4E+00	1.7E-04	C	5.7E-04	5.7E-04	R	2.0E-03	I
106-46-7	1,4-Dichlorobenzene	NA	1	5.4E-03	C	5.4E-03	1.1E-05	C	7.0E-02	7.0E-02	A	8.0E-01	C
123-91-1	1,4-Dioxane	0.1	1	2.7E-02	C	2.7E-02	7.7E-06	C	3.0E-02	3.0E-02	I	3.0E+00	C
540-84-1	2,2,4-Trimethylpentane	NA	1	NC		NC	NC		NA	NA		1.0E+00	D

Table 10
Toxicity Criteria
Former Kast Property

CAS Number	Chemical of Concern	Dermal ABS^	GI ABS^	Cancer Toxicity Criteria					Noncancer Toxicity Criteria				
				Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Source	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Source	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Source	Inhalation RfC or REL (mg/m^3)	Source
591-78-6	2-Hexanone	NA	1	NC		NC	NC		5.0E-03	5.0E-03	I	3.0E-02	I
622-96-8	4-Ethyltoluene*	NA	1	NC		NC	NC		2.0E-01	2.0E-01	S	1.0E-01	S
71-43-2	Benzene	NA	1	1.0E-01	C	1.0E-01	2.9E-05	C	4.0E-03	4.0E-03	I	3.0E-02	I
75-27-4	Bromodichloromethane	NA	1	1.3E-01	C	1.3E-01	3.7E-05	C	2.0E-02	2.0E-02	I	7.0E-02	R
74-83-9	Bromomethane	NA	1	NC		NC	NC		1.4E-03	1.4E-03	I	5.0E-03	C
75-15-0	Carbon disulfide	NA	1	NC		NC	NC		1.0E-01	1.0E-01	I	7.0E-01	I
56-23-5	Carbon tetrachloride	NA	1	1.5E-01	C	1.5E-01	4.2E-05	C	4.0E-03	4.0E-03	I	1.0E-01	I
67-66-3	Chloroform	NA	1	3.1E-02	C	3.1E-02	5.3E-06	C	1.0E-02	1.0E-02	I	9.8E-02	A
110-82-7	Cyclohexane	NA	1	NC		NC	NC		1.7E+00	1.7E+00	R	6.0E+00	I
124-48-1	Dibromochloromethane	0.1	1	9.4E-02	C	9.4E-02	2.7E-05	C	2.0E-02	2.0E-02	I	7.0E-02	R
156-59-2	Dichloroethene, cis-1,2-	NA	1	NC		NC	NC		2.0E-03	2.0E-03	I	7.0E-03	R
156-60-5	Dichloroethene, trans-1,2-	NA	1	NC		NC	NC		2.0E-02	2.0E-02	I	6.0E-02	P
10061-02-6	Dichloropropene, trans-1,3-*	NA	1	9.1E-02	C	9.1E-02	1.6E-05	C	3.0E-02	3.0E-02	I	2.0E-02	I
64-17-5	Ethanol*	NA	1	NC		NC	NC		5.0E-01	5.0E-01	I	4.0E+00	C
100-41-4	Ethylbenzene	NA	1	1.1E-02	C	1.1E-02	2.5E-06	C	1.0E-01	1.0E-01	I	1.0E+00	I
142-82-5	Heptane*	NA	1	NC		NC	NC		6.0E-02	6.0E-02	H	7.0E-01	I
87-68-3	Hexachloro-1,3-butadiene	0.1	1	7.8E-02	I	7.8E-02	2.2E-05	I	1.0E-03	1.0E-03	P	3.5E-03	R
110-54-3	Hexane	NA	1	NC		NC	NC		6.0E-02	6.0E-02	H	7.0E-01	I
67-63-0	Isopropanol	0.1	1	NC		NC	NC		NA	NA		7.0E+00	C
98-82-8	Isopropylbenzene (cumene)	NA	1	NC		NC	NC		1.0E-01	1.0E-01	I	4.0E-01	I
78-93-3	Methyl ethyl ketone (2-butanone)	NA	1	NC		NC	NC		6.0E-01	6.0E-01	I	5.0E+00	I
75-09-2	Methylene chloride	NA	1	1.4E-02	C	1.4E-02	1.0E-06	C	6.0E-03	6.0E-03	I	6.0E-01	I
1634-04-4	Methyl-tert-butyl ether	NA	1	1.8E-03	C	1.8E-03	2.6E-07	C	8.6E-01	8.6E-01	R	3.0E+00	I
103-65-1	Propylbenzene	0.1	1	NC		NC	NC		1.0E-01	1.0E-01	X	1.0E+00	X
75-65-0	tert-Butyl Alcohol (TBA)*	0.1	1	NC		NC	NC		3.0E-01	3.0E-01	I	1.1E+00	R

Table 10
Toxicity Criteria
Former Kast Property

CAS Number	Chemical of Concern	Dermal ABS^	GI ABS^	Cancer Toxicity Criteria					Noncancer Toxicity Criteria				
				Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Source	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Source	Oral RfD (mg/kg-day)	Dermal RfD (mg/kg-day)	Source	Inhalation RfC or REL (mg/m^3)	Source
127-18-4	Tetrachloroethene	NA	1	5.4E-01	C	5.4E-01	5.9E-06	C	6.0E-03	6.0E-03	I	4.0E-02	I
109-99-9	Tetrahydrofuran	0.1	1	NC		NC	NC		9.0E-01	9.0E-01	I	2.0E+00	I
108-88-3	Toluene	NA	1	NC		NC	NC		8.0E-02	8.0E-02	I	5.0E+00	I
79-01-6	Trichloroethene	NA	1	4.6E-02	I	4.6E-02	4.1E-06	I	5.0E-04	5.0E-04	I	2.0E-03	I
75-01-4	Vinyl chloride	NA	1	2.7E-01	C	2.7E-01	7.8E-05	C	3.0E-03	3.0E-03	I	1.0E-01	I
1330-20-7	Xylene, total	NA	1	NC		NC	NC		2.0E-01	2.0E-01	S	1.0E-01	S

Notes:

" NA " not available; " -- " not applicable; " NC " not considered a carcinogen; " ABS " absorption; " GI " gastrointestinal; " PAH " Polycyclic Aromatic Hydrocarbons; " RfD " reference dose; " RfC " reference concentration; " REL " reference exposure level

Surrogates: * p-Xylene for 4-Ethyltoluene; Hexane for Heptane; Isobutyl alcohol for tert-Butyl Alcohol; 1,3-Dichloropropene for trans-1,3-Dichloropropene; Methanol for Ethanol

^ Source of Dermal ABS and GI ABS: USEPA 2013b. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November. http://www.epa.gov/region9/superfund//prg/index.html

Key:

C* = Cal-EPA 2010

C = Cal-EPA 2013

A = Agency For Toxic Substances And Disease Registry (ATSDR) as reported in USEPA 2013b

B = Cal-EPA 2009. Interim Guidance: Evaluating Human Health Risks from Total Petroleum Hydrocarbons.

D = TPHCWG, 1997. Develoment of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for TPH

H = Health Effects Assessment Summary Tables (HEAST). July. EPA 540/R-97-036-PB97-921199 as reported in USEPA 2013b

I = Integrated Risk Information System Database, IRIS in USEPA 2013a

J = New Jersey; reported in USEPA 2013b

P = Provisional Peer Reviewed Toxicity Value (PPRTV) as reported in USEPA 2013b

R = route-to-route extrapolation

S = reported in USEPA 2013b

X = PPRTV Appendix; reported in USEPA 2013b

Table 11
Site-Specific Cleanup Goals for Soil
Former Kast Property

CAS Number	Constituents of Concern[2]	$SSCG_{soil-GW}$[3] (mg/kg)	(BTV)[4] (mg/kg)	Soil Site-Specific Cleanup Goals[1] (mg/kg)					
				Onsite Resident				Construction and Utility Maintenance Worker	
				EF = 350 d/y		EF = 4 d/y			
				SSCGnc	SSCGc	SSCGnc	SSCGc	SSCGnc	SSCGc
	Inorganics								
7440-36-0	Antimony	2.7E-01	7.4E-01	3.1E+01	--	2.7E+03	--	3.1E+03	--
7440-38-2	Arsenic	2.9E-01	1.2E+01	2.2E+01	6.1E-02	1.9E+03	5.4E+00	4.1E+02	1.5E+01
7440-43-9	Cadmium	--	3.8E+00	7.0E+01	6.7E+04	6.2E+03	5.8E+06	6.4E+02	2.4E+02
18540-29-9	Chromium VI	--	--	2.3E+02	1.3E+00	2.1E+04	1.1E+02	3.2E+03	6.7E+00
7440-48-4	Cobalt	--	1.1E+01	2.3E+01	3.1E+04	2.1E+03	2.7E+06	2.0E+02	1.1E+02
7440-50-8	Copper	--	5.9E+01	3.1E+03	--	2.7E+05	--	3.1E+05	--
7439-92-1	Lead	--	6.1E+01	8.0E+01[5]	--	8.2E+02[6]	--	8.2E+02[7]	--
7440-28-0	Thallium	1.4E-01	2.3E-01	7.8E-01	--	6.8E+01	--	7.7E+01	--
7440-62-2	Vanadium	--	4.6E+01	3.9E+02	--	3.4E+04	--	3.3E+03	--
7440-66-6	Zinc	--	2.9E+02	2.3E+04	--	2.1E+06	--	2.3E+06	--
	PAHs								
56-55-3	Benz[a]anthracene	--	--	--	1.6E+00	--	1.4E+02	--	2.6E+02
50-32-8	Benzo[a]pyrene	--	9.0E-01	--	1.6E-01	--	1.4E+01	--	2.6E+01
205-99-2	Benzo[b]fluoranthene	--	--	--	1.6E+00	--	1.4E+02	--	2.6E+02
207-08-9	Benzo[k]fluoranthene	--	--	--	1.6E+00	--	1.4E+02	--	2.6E+02
218-01-9	Chrysene	--	--	--	1.6E+01	--	1.4E+03	--	2.6E+03
53-70-3	Dibenz[a,h]anthracene	--	--	--	1.1E-01	--	9.7E+00	--	1.9E+01
193-39-5	Indeno[1,2,3-cd]pyrene	--	--	--	1.6E+00	--	1.4E+02	--	2.6E+02
90-12-0	Methylnaphthalene, 1-	--	--	4.0E+03	1.6E+01	3.5E+05	1.4E+03	1.9E+05	2.7E+03
91-57-6	Methylnaphthalene, 2-	--	--	2.3E+02	--	2.0E+04	--	1.1E+04	--
91-20-3	Naphthalene	5.2E-01	--	1.5E+02	4.0E+00	1.3E+04	3.5E+02	1.4E+02	3.9E+01
129-00-0	Pyrene	--	--	1.7E+03	--	1.5E+05	--	6.7E+04	--
	TPH[8]								
	TPHg	5.0E+02	--	7.6E+02	--	6.6E+04	--	8.6E+02	--
	TPHd	1.0E+03	--	1.3E+03	--	1.1E+05	--	1.9E+03	--
	TPHmo	1.0E+04	--	3.3E+03	--	2.9E+05	--	1.6E+05	--
	SVOCs								
121-14-2	2,4-Dinitrotoluene	--	--	1.2E+02	1.6E+00	1.1E+04	1.4E+02	6.3E+03	2.8E+02
117-81-7	Bis(2-Ethylhexyl) Phthalate	--	--	1.2E+03	3.5E+01	1.1E+05	3.0E+03	6.3E+04	6.4E+03
	VOCs								
79-34-5	1,1,2,2-Tetrachloroethane	--	--	6.2E+02	4.7E-01	5.4E+04	4.1E+01	8.3E+02	5.7E+00
96-18-4	1,2,3-Trichloropropane	1.2E-05	--	2.4E+00	2.1E-02	2.1E+02	1.9E+00	2.0E+00	7.2E+00
95-63-6	1,2,4-Trimethylbenzene	--	--	8.3E+01	--	7.2E+03	--	7.5E+01	--
107-06-2	1,2-Dichloroethane	5.0E-04	--	--	--	--	--	--	--
156-59-2	cis-1,2-Dichloroethene	7.3E-03	--	--	--	--	--	--	--
78-87-5	1,2-Dichloropropane	--	--	1.5E+01	8.3E-01	1.3E+03	7.2E+01	1.2E+01	8.5E+00
108-67-8	1,3,5-Trimethylbenzene	--	--	8.5E+01	--	7.4E+03	--	7.7E+01	--
106-46-7	1,4-Dichlorobenzene	3.8E-02	--	3.6E+03	2.8E+00	3.2E+05	2.4E+02	8.7E+03	2.8E+01
71-43-2	Benzene	1.5E-02	--	6.7E+01	2.2E-01	5.8E+03	1.9E+01	6.9E+01	2.2E+00

Table 11
Site-Specific Cleanup Goals for Soil
Former Kast Property

CAS Number	Constituents of Concern[2]	$SSCG_{soil-GW}$[3] (mg/kg)	(BTV)[4] (mg/kg)	Soil Site-Specific Cleanup Goals[1] (mg/kg)					
				Onsite Resident				Construction and Utility Maintenance Worker	
				EF = 350 d/y		EF = 4 d/y			
				SSCGnc	SSCGc	SSCGnc	SSCGc	SSCGnc	SSCGc
75-27-4	Bromodichloromethane	--	--	4.3E+02	4.9E-01	3.8E+04	4.2E+01	4.9E+02	5.3E+00
74-83-9	Bromomethane	--	--	8.8E+00	--	7.7E+02	--	7.8E+00	--
100-41-4	Ethylbenzene	--	--	3.3E+03	4.8E+00	2.9E+05	4.2E+02	4.5E+03	5.1E+01
75-09-2	Methylene chloride	--	--	3.6E+02	5.3E+00	3.2E+04	4.7E+02	1.2E+03	5.9E+01
75-65-0	tert-Butyl Alcohol	1.2E-02	--	--	--	--	--	--	--
127-18-4	Tetrachloroethene	6.6E-02	--	8.6E+01	5.5E-01	7.5E+03	4.9E+01	8.6E+01	1.0E+01
108-88-3	Toluene	--	--	4.8E+03	--	4.2E+05	--	1.6E+04	--
79-01-6	Trichloroethene	1.3E-02	--	5.8E+00	1.2E+00	5.0E+02	1.0E+02	5.5E+00	1.9E+01
75-01-4	Vinyl chloride	1.5E-03	--	7.4E+01	3.2E-02	6.4E+03	2.8E+00	8.7E+01	3.1E-01
1330-20-7	Xylene, total			5.6E+02	--	4.9E+04	--	4.7E+02	--

Notes:

" -- " not applicable

EF = exposure frequency; d/y = days per year

TPHg = Total Petroleum Hydrocarbons- gasoline range

TPHd = Total Petroleum Hydrocarbons- diesel range

TPHmo = Total Petroleum Hydrocarbons- motor oil range

[1] See Section 5 for derivation of these Site-specific cleanup goals (SSCGs).

$SSCG_{soil-GW}$ = based on soil leaching to groundwater; SSCGnc = based on noncancer effects; SSCGc = based on cancer effects

[2] See Section 2 for discussion of Constituents of Concern.

[3] A $SSCG_{soil-GW}$ value was only listed for those COCs identified for potential soil leaching to groundwater. These $SSCG_{soil-GW}$ were modified from the January 23, 2014 letter from the Regional Board on the Revised SSCG Report to be consistent with the Regional Board's 1996 Interim Site Assessment & Cleanup Guidebook (RWQCB, 1996).

[4] To evaluate potential human health exposures, the higher value between the health-based SSCG and Background Threshold Value (BTV) will be selected as the cleanup goal.
To evaluate potential leaching to groundwater, the higher between $SSCG_{soil-GW}$ and BTV will be will be selected as the cleanup goal.

[5] Cal-EPA 2009b. Revised California Human Health Screening Levels for Lead. September 2009.

[6] Based on USEPA adult lead model, similar parameters used for the residential CHHSL, and a lower exposure frequency.

[7] Based on USEPA adult lead model, similar parameters used for the industrial worker CHHSL, and a lower exposure frequency.

[8] The $SSCG_{soil-GW}$ for TPH is based on Regional Board's 1996 Interim Site Assessment & Cleanup Guidebook (RWQCB, 1996).

Table 12

Site-Specific Cleanup Goals for Soil Vapor

Former Kast Property

CAS Number	Constituents of Concern[1]	Odor-Based SSCG[2] (µg/m³)	Sub-Slab Soil Vapor[3]		Soil Vapor	
			Onsite Resident		Construction and Utility Maintenance Worker	
			SSCGnc (µg/m^3)	SSCGc (µg/m^3)	SSCGnc (µg/m^3)	SSCGc (µg/m^3)
79-34-5	1,1,2,2-Tetrachloroethane	5.2E+06	3.7E+04	2.1E+01	1.8E+07	1.2E+05
79-00-5	1,1,2-Trichloroethane	--	1.0E+02	7.5E+01	1.0E+05	8.6E+05
75-34-3	1,1-Dichloroethane	6.3E+07	3.7E+05	7.6E+02	9.9E+08	2.5E+07
120-82-1	1,2,4-Trichlorobenzene	1.1E+07	1.0E+03	--	3.9E+05	--
95-63-6	1,2,4-Trimethylbenzene	--	3.7E+03	--	2.3E+06	--
107-06-2	1,2-Dichloroethane	1.2E+06	3.7E+03	5.9E+01	4.4E+06	8.5E+05
78-87-5	1,2-Dichloropropane	6.0E+05	2.1E+03	1.2E+02	3.6E+06	2.5E+06
108-67-8	1,3,5-Trimethylbenzene	--	3.7E+03	--	2.3E+06	--
106-99-0	1,3-Butadiene	--	1.0E+03	7.2E+00	3.7E+06	3.0E+05
106-46-7	1,4-Dichlorobenzene	5.5E+05	4.2E+05	1.1E+02	2.3E+08	7.2E+05
123-91-1	1,4-Dioxane	3.1E+08	1.6E+06	1.6E+02	1.3E+08	1.6E+05
540-84-1	2,2,4-Trimethylpentane	--	5.2E+05	--	6.5E+08	--
591-78-6	2-Hexanone	--	1.6E+04	--	7.9E+06	--
622-96-8	4-Ethyltoluene	--	5.2E+04	--	2.5E+07	--
71-43-2	Benzene	2.4E+06	1.6E+04	4.2E+01	3.2E+07	1.0E+06
75-27-4	Bromodichloromethane	5.5E+09	3.7E+04	3.3E+01	7.2E+07	7.8E+05
74-83-9	Bromomethane	4.0E+07	2.6E+03	--	9.5E+06	--
75-15-0	Carbon disulfide	--	3.7E+05	--	1.4E+09	--
56-23-5	Carbon tetrachloride	3.2E+07	5.2E+04	2.9E+01	1.6E+08	1.1E+06
67-66-3	Chloroform	2.1E+08	5.1E+04	2.3E+02	9.0E+07	4.9E+06
110-82-7	Cyclohexane	--	3.1E+06	--	1.8E+10	--
124-48-1	Dibromochloromethane	--	3.7E+04	4.5E+01	6.0E+07	8.8E+05
156-59-2	Dichloroethene, cis-1,2-	3.4E+07	3.7E+03	--	8.3E+06	--
156-60-5	Dichloroethene, trans-1,2-	3.4E+07	3.1E+04	--	9.3E+07	--
10061-02-6	Dichloropropene, trans-1,3-	2.1E+06	1.0E+04	7.6E+01	4.4E+07	3.9E+06
64-17-5	Ethanol	--	2.1E+06	--	1.9E+08	--
100-41-4	Ethylbenzene	1.0E+06	5.2E+05	4.9E+02	6.3E+08	7.0E+06
142-82-5	Heptane	--	3.7E+05	--	2.3E+09	--
87-68-3	Hexachloro-1,3-butadiene	6.0E+06	1.8E+03	5.5E+01	2.2E+05	8.0E+04
110-54-3	Hexane	--	3.7E+05	--	1.7E+09	--
67-63-0	Isopropanol	--	3.7E+06	--	5.7E+08	--
98-82-8	Isopropylbenzene (cumene)	--	2.1E+05	--	1.5E+09	--
78-93-3	Methyl ethyl ketone (2-butanone)	1.6E+07	2.6E+06	--	1.1E+09	--
75-09-2	Methylene chloride	2.8E+08	3.1E+05	1.2E+03	6.1E+08	2.8E+07
1634-04-4	Methyl-tert-butyl ether	2.7E+05	1.6E+06	4.7E+03	1.8E+09	6.5E+07
91-20-3	Naphthalene	2.2E+05	1.6E+03	3.6E+01	2.3E+05	6.3E+04
103-65-1	Propylbenzene	--	5.2E+05	--	6.6E+08	--
75-65-0	tert-Butyl Alcohol (TBA)	--	5.5E+05	--	2.6E+08	--
127-18-4	Tetrachloroethene	1.6E+07	2.1E+04	2.1E+02	5.5E+07	6.6E+06

Table 12

Site-Specific Cleanup Goals for Soil Vapor

Former Kast Property

CAS Number	Constituents of Concern[1]	Odor-Based SSCG[2] (µg/m³)	Sub-Slab Soil Vapor[3]		Soil Vapor	
			Onsite Resident		Construction and Utility Maintenance Worker	
			SSCGnc (µg/m^3)	SSCGc (µg/m^3)	SSCGnc (µg/m^3)	SSCGc (µg/m^3)
109-99-9	Tetrahydrofuran	--	1.0E+06	--	4.9E+08	--
108-88-3	Toluene	1.5E+07	2.6E+06	--	3.7E+09	--
79-01-6	Trichloroethene	6.8E+08	1.0E+03	2.2E+02	2.0E+06	6.7E+06
75-01-4	Vinyl chloride	3.9E+08	5.2E+04	1.6E+01	2.3E+08	8.3E+05
1330-20-7	Xylene, total	2.2E+05	5.2E+04	--	5.9E+07	--
	TPH					
	Aliphatic: C5-C8	--	3.7E+05	--	1.2E+09	--
	Aliphatic: C9-C18	--	1.6E+05	--	1.2E+08	--
	Aliphatic: C19-C32	--	--	--	--	--
	Aromatic: C6-C8	--	--	--	--	--
	Aromatic: C9-C16	--	2.6E+04	--	6.7E+06	--
	Aromatic: C17-C32	--	--	--	--	--
	TPHg	5.0E+04	7.2E+04	--	2.2E+07	--
	TPHd	5.0E+05	8.1E+04	--	2.3E+07	--
	TPHmo	--	--	--	--	--

Notes:

" -- " not applicable or not available

[1] See Section 2 for discussion of Constituents of Concern.

[2] Odor-based SSCGs for soil vapor based on SFRWCQB 2013 ESL as directed by RWQCB (RWQCB, 2014)

[3] As directed by the RWQCB (RWQCB, 2014), a vapor intrusion attenuation factor of 0.002 was used to derive sub-slab soil vapor SSCGs.

Table 13
Site-Specific Cleanup Goals for Groundwater
Former Kast Property

CAS Number	Constituents of Concern	Primary MCL (µg/L)	Secondary MCL, NL or ESL (µg/L)	Selected Groundwater $SSCG_{GW}$
	Inorganics			
7440-36-0	Antimony	6.0E+00	--	Bkgd
7440-38-2	Arsenic	1.0E+01	--	Bkgd
7440-28-0	Thallium	2.0E+00	--	Bkgd
	PAHs			
91-20-3	Naphthalene	--	1.7E+01	1.7E+01
	TPH[1]			
	TPHg	--	4.1E+02	1.0E+02*
	TPHd	--	2.0E+02	1.0E+02*
	TPHmo	--	6.2E+03	1.0E+02*
	VOCs			
75-34-3	1,1-Dichloroethane	5.0E+00	--	5.0E+00
75-35-4	1,1-Dichloroethene	6.0E+00	--	6.0E+00
96-18-4	1,2,3-Trichloropropane	--	5.0E-03	5.0E-03
107-06-2	1,2-Dichloroethane	5.0E-01	--	5.0E-01
156-59-2	cis-1,2-Dichloroethene	6.0E+00	--	6.0E+00
71-43-2	Benzene	1.0E+00	--	1.0E+00
75-65-0	tert-Butyl Alcohol (TBA)	--	1.2E+01	1.2E+01
127-18-4	Tetrachloroethene	5.0E+00	--	5.0E+00
156-60-5	trans-1,2-Dichloroethene	1.0E+01	--	1.0E+01
79-01-6	Trichloroethene	5.0E+00	--	5.0E+00
75-01-4	Vinyl Chloride	5.0E-01	--	5.0E-01
106-46-7	1,4-Dichlorobenzene	5.0E+00	--	5.0E+00

Notes:

" -- " not available

µg/L: micrograms per liter

Bkgd = background

MCL = State of Maximum Contaminant Level for drinking water

NL = Notification Level

ESL = Environmental Screening Levels, San Francisco RWQCB, Region 2

GW = groundwater; SSCG = Site-Specific Cleanup Goal

* Secondary taste and odor threshold for TPH (A Compilation of Water Quality Goals, 16th Edition, April 2011)

Table 14

Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident

Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24401 MARBELLA AVE	40	5E-01	7E-01	5E-08		No
24402 NEPTUNE AVE	11	1E-01	1E+00	3E-07		No
24402 PANAMA AVE	15	2E-01	1E+00	5E-07		No
24402 RAVENNA AVE	21	3E-01	**5E+00**	**3E-06**	TPHd, Benzene	Yes
24403 NEPTUNE AVE	16	2E-01	**4E+00**	6E-07	TPHd	Yes
24403 RAVENNA AVE	16	2E-01	8E-01	3E-07		No
24405 MARBELLA AVE	13	2E-01	1E+00	1E-08		No
24406 MARBELLA AVE	14	2E-01	**4E+00**	3E-08	TPHd	Yes
24406 NEPTUNE AVE	29	4E-01	8E-01	1E-07		No
24406 PANAMA AVE	34	4E-01	**2E+00**	2E-07	no COC-specific HQ >1	Yes
24406 RAVENNA AVE	14	2E-01	1E+00	5E-07		No
24409 NEPTUNE AVE	28	3E-01	1E+00	2E-08		No
24409 RAVENNA AVE	74	9E-01	9E-01	5E-08		No
24410 PANAMA AVE	19	2E-01	1E+00	3E-07		No
24411 MARBELLA AVE	25	3E-01	**1E+01**	**3E-06**	TPHd, TPHmo, 1-MN	Yes
24411 PANAMA AVE	48	6E-01	1E+00	5E-08	Arsenic > bkgd	Yes
24412 MARBELLA AVE	56	7E-01	**2E+00**	3E-07	no COC-specific HQ >1	Yes
24412 RAVENNA AVE	12	2E-01	**3E+00**	6E-07	TPHd	Yes
24413 NEPTUNE AVE	26	3E-01	4E-01	7E-08		No
24413 RAVENNA AVE	42	5E-01	7E-01	5E-07		No
24416 MARBELLA AVE	15	2E-01	9E-01	6E-09		No
24416 NEPTUNE AVE	10	1E-01	6E-01	9E-09		No
24416 PANAMA AVE	19	2E-01	**2E+00**	1E-08	no COC-specific HQ >1	Yes
24416 RAVENNA AVE	24	3E-01	**1E+01**	**3E-06**	TPHd, TPHmo	Yes
24417 MARBELLA AVE	22	3E-01	7E-01	3E-07		No
24417 PANAMA AVE	16	2E-01	1E+00	4E-07		No
24419 NEPTUNE AVE	28	4E-01	8E-01	3E-08		No
24419 RAVENNA AVE	16	2E-01	2E-01	1E-07		No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24420 PANAMA AVE	34	4E-01	**4E+00**	2E-07	TPHd, TPHmo	Yes
24421 PANAMA AVE	17	2E-01	1E+00	2E-08		No
24422 MARBELLA AVE	13	2E-01	1E+00	2E-07		No
24422 NEPTUNE AVE	14	2E-01	5E-01	2E-07		No
24422 RAVENNA AVE	13	2E-01	**1E+01**	**4E-06**	TPHd, TPHmo, Naphthalene	Yes
24423 MARBELLA AVE	64	8E-01	7E-01	1E-08		No
24423 NEPTUNE AVE	8.7	1E-01	2E-01	5E-07		No
24423 RAVENNA AVE	8.5	1E-01	8E-01	3E-07		No
24426 MARBELLA AVE	31	4E-01	1E+00	3E-07		No
24426 NEPTUNE AVE	14	2E-01	6E-01	3E-07		No
24426 PANAMA AVE	15	2E-01	**3E+00**	6E-09	no COC-specific HQ >1	Yes
24426 RAVENNA AVE	18	2E-01	1E+00	3E-07		No
24427 MARBELLA AVE	12	2E-01	8E-01	2E-08		No
24427 PANAMA AVE	14	2E-01	8E-01	5E-07		No
24429 NEPTUNE AVE	12	1E-01	5E-01	2E-07		No
24429 RAVENNA AVE	13	2E-01	1E+00	1E-08		No
24430 PANAMA AVE	31	4E-01	1E-01	4E-07		No
24431 PANAMA AVE	19	2E-01	**2E+00**	5E-07	no COC-specific HQ >1	Yes
24432 MARBELLA AVE	15	2E-01	1E+00	6E-08		No
24433 MARBELLA AVE	132	**2E+00**	**1E+01**	**2E-05**	TPHd, TPHmo, PCE	Yes
24436 PANAMA AVE	8.8	1E-01	7E-02	4E-07		No
24502 MARBELLA AVE	9.5	1E-01	1E+00	7E-08		No
24502 NEPTUNE AVE	8.5	1E-01	5E-01	4E-07		No
24502 PANAMA AVE	7.4	9E-02	4E-02	2E-07		No
24502 RAVENNA AVE	15	2E-01	7E-01	5E-07		No
24503 MARBELLA AVE	10	1E-01	8E-01	8E-09		No
24503 NEPTUNE AVE	12	1E-01	4E-01	2E-07		No
24503 PANAMA AVE	9.0	1E-01	**2E+00**	1E-08	no COC-specific HQ >1	Yes

Table 14

Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident

Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24503 RAVENNA AVE	9.4	1E-01	3E-01	2E-08		No
24506 MARBELLA AVE	26	3E-01	1E+00	6E-09		No
24507 MARBELLA AVE	12	1E-01	1E+00	2E-07		No
24508 NEPTUNE AVE	14	2E-01	**2E+00**	9E-08	no COC-specific HQ >1	Yes
24508 PANAMA AVE	8.7	1E-01	2E-01	3E-07		No
24508 RAVENNA AVE	8.1	1E-01	1E+00	6E-09		No
24509 NEPTUNE AVE	14	2E-01	1E+00	3E-07		No
24509 PANAMA AVE	23	3E-01	**3E+00**	5E-07	TPHd	Yes
24509 RAVENNA AVE	34	4E-01	5E-01	3E-07		No
24512 MARBELLA AVE	13	2E-01	**2E+00**	3E-08	no COC-specific HQ >1	Yes
24512 NEPTUNE AVE	10	1E-01	7E-01	4E-09		No
24512 PANAMA AVE	10	1E-01	8E-02	3E-09		No
24512 RAVENNA AVE	8.4	1E-01	2E-01	3E-07		No
24513 NEPTUNE AVE	10	1E-01	4E-01	2E-07		No
24513 PANAMA AVE	11	1E-01	6E-01	3E-07		No
24513 RAVENNA AVE	16	2E-01	3E-01	2E-08		No
24516 MARBELLA AVE	12	2E-01	1E+00	9E-08		No
24517 MARBELLA AVE	20	2E-01	**2E+00**	3E-07	no COC-specific HQ >1	Yes
24518 NEPTUNE AVE	25	3E-01	1E+00	5E-09		No
24518 PANAMA AVE	32	4E-01	1E-01	5E-07		No
24518 RAVENNA AVE	12	2E-01	2E-01	2E-07		No
24519 NEPTUNE AVE	12	1E-01	4E-01	4E-07		No
24519 PANAMA AVE	15	2E-01	1E-01	3E-07		No
24522 MARBELLA AVE	10	1E-01	**5E+00**	7E-08	TPHd	Yes
24522 NEPTUNE AVE	8.9	1E-01	6E-01	5E-09		No
24522 PANAMA AVE	13	2E-01	2E-01	3E-07		No
24522 RAVENNA AVE	10	1E-01	2E-01	3E-07		No
24523 MARBELLA AVE	48	6E-01	6E-01	3E-08		No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24523 NEPTUNE AVE	14	2E-01	1E+00	2E-08		No
24523 RAVENNA AVE	20	2E-01	7E-01	1E-07		No
24526 MARBELLA AVE	8.3	1E-01	**4E+00**	6E-07	TPHd	Yes
24528 NEPTUNE AVE	8.3	1E-01	5E-01	2E-07		No
24528 PANAMA AVE	7.4	9E-02	2E-01	1E-08		No
24529 NEPTUNE AVE	13	2E-01	4E-01	3E-07		No
24529 PANAMA AVE	8.2	1E-01	1E-01	5E-07		No
24529 RAVENNA AVE	23	3E-01	8E-01	3E-07		No
24532 MARBELLA AVE	12	1E-01	1E+00	2E-07		No
24532 NEPTUNE AVE	27	3E-01	4E-02	2E-08		No
24532 PANAMA AVE	11	1E-01	2E-01	3E-07		No
24532 RAVENNA AVE	6.9	9E-02	1E-01	3E-07		No
24533 MARBELLA AVE	16	2E-01	7E-01	2E-08		No
24533 PANAMA AVE	6.3	8E-02	2E-01	3E-07		No
24533 RAVENNA AVE	11	1E-01	4E-02	3E-07		No
24602 MARBELLA AVE	15	2E-01	8E-01	6E-07		No
24602 NEPTUNE AVE	10	1E-01	2E-01	2E-07		No
24602 PANAMA AVE	16	2E-01	1E+00	3E-07		No
24602 RAVENNA AVE	20	3E-01	3E-01	3E-07		No
24603 MARBELLA AVE	19	2E-01	7E-01	3E-07		No
24603 NEPTUNE AVE	8.6	1E-01	**3E+00**	**4E-06**	TPHd, Benzene	Yes
24603 PANAMA AVE	11	1E-01	3E-01	4E-07		No
24603 RAVENNA AVE	31	4E-01	**7E+00**	8E-07	TPHd, TPHmo, Thallium > bkgd	Yes
24606 MARBELLA AVE	10	1E-01	9E-01	6E-07		No
24607 MARBELLA AVE	17	2E-01	8E-01	3E-08		No
24608 NEPTUNE AVE	39	5E-01	**6E+00**	1E-06	TPHd, TPHmo	Yes
24608 PANAMA AVE	8.8	1E-01	**3E+00**	1E-06	Thallium > bkgd	Yes
24608 RAVENNA AVE	18	2E-01	**2E+00**	2E-08	no COC-specific HQ >1	Yes

Table 14

Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident

Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24609 NEPTUNE AVE	10	1E-01	**4E+00**	**3E-06**	TPHd; Benzene	Yes
24609 PANAMA AVE	8.0	1E-01	7E-01	3E-07		No
24609 RAVENNA AVE	7.1	9E-02	1E+00	7E-09		No
24612 MARBELLA AVE	36	5E-01	**2E+00**	3E-07	no COC-specific HQ >1	Yes
24612 NEPTUNE AVE	6.6	8E-02	2E-01	2E-07		No
24612 PANAMA AVE	10	1E-01	2E-01	3E-08		No
24612 RAVENNA AVE	27	3E-01	5E-01	5E-09		No
24613 MARBELLA AVE	10	1E-01	7E-01	3E-07	Arsenic > bkgd	Yes
24613 NEPTUNE AVE	11	1E-01	**7E+00**	1E-06	TPHd, TPHmo	Yes
24613 PANAMA AVE	10	1E-01	6E-01	3E-07		No
24613 RAVENNA AVE	8.3	1E-01	8E-01	2E-07		No
24616 MARBELLA AVE	11	1E-01	**3E+00**	1E-06	no COC-specific HQ >1	Yes
24617 MARBELLA AVE	11	1E-01	**2E+00**	2E-07	no COC-specific HQ >1, Thallium > bkgd	Yes
24618 NEPTUNE AVE	14	2E-01	4E-01	2E-08		No
24618 PANAMA AVE	21	3E-01	**4E+00**	7E-08	TPHd, TPHmo	Yes
24618 RAVENNA AVE	4.4	6E-02	1E-01	3E-07		No
24619 NEPTUNE AVE	8.9	1E-01	8E-01	7E-07		No
24619 PANAMA AVE	11	1E-01	6E-01	4E-08		No
24619 RAVENNA AVE	7.2	9E-02	1E-01	2E-07		No
24622 MARBELLA AVE	15	2E-01	9E-01	3E-07	Arsenic > bkgd	Yes
24622 NEPTUNE AVE	10	1E-01	9E-01	2E-07		No
24623 MARBELLA AVE	13	2E-01	7E-01	2E-07		No
24623 NEPTUNE AVE	18	2E-01	**2E+00**	8E-07	no COC-specific HQ >1	Yes
24627 MARBELLA AVE	14	2E-01	1E+00	3E-07		No
24628 MARBELLA AVE	23	3E-01	**2E+00**	**2E-06**	no COC-specific HQ >1 or risk >1E-06	Yes
24628 NEPTUNE AVE	7.9	1E-01	3E-01	8E-09		No
24629 NEPTUNE AVE	14	2E-01	7E-01	2E-07		No
24632 NEPTUNE AVE	20	2E-01	3E-01	9E-08		No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24633 MARBELLA AVE	116	1E+00	**7E+00**	1E-07	TPHd, TPHmo	Yes
24700 MARBELLA AVE	22	3E-01	**5E+00**	1E-06	TPHd	Yes
24700 RAVENNA AVE	27	3E-01	**2E+00**	3E-07	no COC-specific HQ >1	Yes
24702 NEPTUNE AVE	11	1E-01	4E-01	9E-09		No
24702 PANAMA AVE	41	5E-01	1E+00	3E-07		No
24703 MARBELLA AVE	28	3E-01	**2E+00**	2E-07	no COC-specific HQ >1	Yes
24703 NEPTUNE AVE	15	2E-01	**7E+00**	5E-07	TPHd, TPHmo	Yes
24703 RAVENNA AVE	8.5	1E-01	**2E+00**	2E-07	TPHd	Yes
24706 MARBELLA AVE	11	1E-01	8E-01	3E-08		No
24706 RAVENNA AVE	38	5E-01	**2E+00**	2E-09	no COC-specific HQ >1	Yes
24707 MARBELLA AVE	19	2E-01	9E-01	3E-07		No
24708 PANAMA AVE	20	2E-01	**2E+00**	9E-07	no COC-specific HQ >1	Yes
24709 NEPTUNE AVE	16	2E-01	1E+00	1E-08		No
24709 PANAMA AVE	13	2E-01	4E-01	2E-07		No
24709 RAVENNA AVE	11	1E-01	4E-01	9E-09		No
24710 MARBELLA AVE	43	5E-01	1E+00	4E-08		No
24712 NEPTUNE AVE	19	2E-01	3E-01	3E-08		No
24712 PANAMA AVE	14	2E-01	1E+00	8E-07		No
24712 RAVENNA AVE	17	2E-01	7E-01	3E-07		No
24713 MARBELLA AVE	8.2	1E-01	1E+00	2E-07		No
24713 PANAMA AVE	15	2E-01	6E-01	3E-08		No
24713 RAVENNA AVE	11	1E-01	**4E+00**	**2E-06**	TPHd	Yes
24715 NEPTUNE AVE	16	2E-01	**4E+00**	**2E-06**	TPHd	Yes
24716 MARBELLA AVE	15	2E-01	**2E+00**	2E-07	no COC-specific HQ >1	Yes
24716 RAVENNA AVE	21	3E-01	1E+00	1E-08		No
24717 MARBELLA AVE	8.2	1E-01	**3E+00**	5E-07	TPHd	Yes
24718 NEPTUNE AVE	6.6	8E-02	**2E+00**	1E-08	no COC-specific HQ >1, Antimony > bkgd	Yes
24718 PANAMA AVE	22	3E-01	7E-01	6E-07		No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24719 NEPTUNE AVE	34	4E-01	1E+00	9E-08		No
24719 PANAMA AVE	12	2E-01	2E-01	3E-07		No
24719 RAVENNA AVE	29	4E-01	**7E+00**	**4E-06**	TPHd, TPHmo	Yes
24722 MARBELLA AVE	11	1E-01	**2E+00**	6E-07	no COC-specific HQ >1	Yes
24722 NEPTUNE AVE	9.4	1E-01	6E-02	3E-07		No
24722 PANAMA AVE	18	2E-01	7E-01	4E-08		No
24722 RAVENNA AVE	31	4E-01	**3E+00**	6E-07	TPHmo	Yes
24723 MARBELLA AVE	12	1E-01	**4E+00**	4E-08	TPHd, TPHmo	Yes
24723 RAVENNA AVE	17	2E-01	4E-01	3E-07		No
24725 NEPTUNE AVE	44	5E-01	4E-01	3E-07		No
24726 MARBELLA AVE	11	1E-01	1E+00	4E-08		No
24726 RAVENNA AVE	7.6	1E-01	7E-01	3E-07		No
24727 MARBELLA AVE	13	2E-01	**2E+00**	3E-07	no COC-specific HQ >1	Yes
24728 NEPTUNE AVE	13	2E-01	**2E+00**	**2E-06**	no COC-specific HQ >1 or risk >1E-06	Yes
24728 PANAMA AVE	48	6E-01	1E+00	7E-07		No
24729 NEPTUNE AVE	37	5E-01	**2E+00**	6E-07	no COC-specific HQ >1	Yes
24729 PANAMA AVE	10	1E-01	6E-01	1E-08		No
24729 RAVENNA AVE	21	3E-01	2E-01	1E-08		No
24732 MARBELLA AVE	11	1E-01	4E-01	3E-07		No
24732 NEPTUNE AVE	12	2E-01	9E-01	6E-09		No
24732 PANAMA AVE	19	2E-01	8E-01	4E-07		No
24732 RAVENNA AVE	8.4	1E-01	1E+00	2E-07		No
24733 MARBELLA AVE	12	2E-01	**3E+00**	**2E-06**	Naphthalene	Yes
24733 PANAMA AVE	19	2E-01	1E+00	5E-07		No
24733 RAVENNA AVE	11	1E-01	**2E+00**	1E-07	no COC-specific HQ >1, Thallium > bkgd	Yes
24735 NEPTUNE AVE	13	2E-01	**5E+00**	8E-09	TPHd, TPHmo	Yes
24736 MARBELLA AVE	16	2E-01	1E+00	2E-07		No
24736 RAVENNA AVE	7.1	9E-02	**5E+00**	8E-07	TPHd, TPHmo	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24737 MARBELLA AVE	23	3E-01	**8E+00**	**3E-06**	TPHd, TPHmo, 1-MN	Yes
24738 NEPTUNE AVE	36	4E-01	1E+00	3E-07		No
24738 PANAMA AVE	22	3E-01	1E+00	2E-07		No
24739 NEPTUNE AVE	19	2E-01	**4E+00**	2E-07	TPHd, TPHmo	Yes
24739 PANAMA AVE	16	2E-01	**8E+00**	**5E-06**	TPHd, TPHmo, Ethylbenzene, Naphthalene	Yes
24739 RAVENNA AVE	12	1E-01	**9E+00**	**3E-06**	TPHd, TPHmo	Yes
24740 MARBELLA AVE	16	2E-01	1E+00	2E-07		No
24741 MARBELLA AVE	21	3E-01	5E-01	3E-09		No
24743 RAVENNA AVE	11	1E-01	**4E+00**	9E-07	TPHd, TPHmo	Yes
24744 MARBELLA AVE	14	2E-01	**1E+01**	2E-07	TPHd, TPHmo	Yes
24748 RAVENNA AVE	10	1E-01	**2E+00**	3E-07	TPHd	Yes
24749 RAVENNA AVE	16	2E-01	**4E+00**	9E-07	TPHd	Yes
24752 RAVENNA AVE	14	2E-01	1E+00	5E-09		No
24802 PANAMA AVE	15	2E-01	**2E+00**	2E-07	no COC-specific HQ >1	Yes
24803 NEPTUNE AVE	16	2E-01	**3E+00**	9E-09	TPHd, TPHmo	Yes
24803 PANAMA AVE	6.0	8E-02	**3E+00**	1E-06	TPHd	Yes
24809 NEPTUNE AVE	21	3E-01	**2E+00**	7E-08	no COC-specific HQ >1	Yes
24809 PANAMA AVE	10	1E-01	**2E+00**	3E-07	no COC-specific HQ >1	Yes
24812 PANAMA AVE	15	2E-01	**2E+00**	2E-07	no COC-specific HQ >1	Yes
24813 PANAMA AVE	35	4E-01	**2E+00**	2E-08	no COC-specific HQ >1	Yes
24815 NEPTUNE AVE	29	4E-01	5E-01	3E-07		No
24818 PANAMA AVE	31	4E-01	**9E+00**	4E-07	TPHd, TPHmo	Yes
24819 PANAMA AVE	102	1E+00	7E-01	1E-07		No
24822 PANAMA AVE	33	4E-01	**2E+00**	3E-07	no COC-specific HQ >1	Yes
24823 PANAMA AVE	10	1E-01	**2E+00**	4E-07	no COC-specific HQ >1	Yes
24825 NEPTUNE AVE	19	2E-01	4E-01	2E-07		No
24828 PANAMA AVE	66	8E-01	**7E+00**	1E-08	TPHd, TPHmo	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
24829 PANAMA AVE	10	1E-01	1E+00	1E-07		No
24832 PANAMA AVE	15	2E-01	6E-01	2E-08		No
24833 PANAMA AVE	19	2E-01	9E-01	2E-07		No
24838 PANAMA AVE	46	6E-01	**1E+01**	3E-07	TPHd, TPHmo	Yes
24904 NEPTUNE AVE	15	2E-01	6E-01	2E-07		No
24912 NEPTUNE AVE	22	3E-01	1E-01	3E-07		No
301 244TH ST	16	2E-01	1E+00	2E-08		No
305 244TH ST	26	3E-01	**1E+01**	8E-07	TPHd, TPHmo	Yes
311 244TH ST	71	9E-01	**2E+01**	**1E-05**	TPHd, TPHmo, BaP	Yes
317 244TH ST	66	8E-01	**3E+01**	3E-07	TPHd, TPHmo	Yes
321 244TH ST	17	2E-01	8E-01	2E-07	Arsenic > bkgd	Yes
327 244TH ST	13	2E-01	9E-01	3E-07		No
331 244TH ST	10	1E-01	7E-01	2E-08	Arsenic > bkgd	Yes
337 244TH ST	10	1E-01	**2E+00**	2E-07	no COC-specific HQ >1	Yes
341 244TH ST	13	2E-01	6E-01	2E-07		No
344 249TH ST	36	5E-01	6E-01	7E-09		No
345 249TH ST	20	2E-01	1E+00	3E-07		No
347 244TH ST	21	3E-01	8E-01	4E-07		No
348 248TH ST	14	2E-01	1E+00	2E-07		No
348 249TH ST	43	5E-01	4E-01	2E-07		No
351 244TH ST	13	2E-01	9E-01	3E-07		No
352 249TH ST	27	3E-01	7E-01	2E-07		No
353 249TH ST	12	2E-01	6E-01	2E-07		No
354 248TH ST	20	2E-01	**4E+00**	8E-07	TPHd	Yes
357 244TH ST	11	1E-01	6E-01	3E-07		No
357 249TH ST	11	1E-01	7E-01	2E-08		No
358 249TH ST	15	2E-01	1E+00	3E-09		No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)					
	≤2 ft bgs					
	HHRA					Exceeds HHRA?
	Lead		Other COCs			
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	
360 248TH ST	7.7	1E-01	5E-01	7E-09		No
361 244TH ST	13	2E-01	9E-01	6E-07		No
362 249TH ST	20	2E-01	1E+00	4E-08		No
363 249TH ST	35	4E-01	6E-01	3E-08		No
364 248TH ST	17	2E-01	**3E+00**	2E-07	TPHd	Yes
367 244TH ST	24	3E-01	**3E+00**	7E-10	TPHd, TPHmo	Yes
367 249TH ST	31	4E-01	7E-01	2E-07		No
368 249TH ST	13	2E-01	9E-01	3E-07		No
373 249TH ST	21	3E-01	5E-01	1E-08		No
374 248TH ST	19	2E-01	1E+00	2E-07		No
374 249TH ST	20	2E-01	8E-01	8E-09		No
377 244TH ST	15	2E-01	1E+00	3E-07		No
377 249TH ST	11	1E-01	**4E+00**	8E-07	TPHd	Yes
378 249TH ST	20	2E-01	3E-01	2E-07		No
383 249TH ST	15	2E-01	9E-01	4E-08		No
402 249TH ST	14	2E-01	7E-01	1E-08		No
408 249TH ST	42	5E-01	1E-01	3E-07		No
412 249TH ST	66	8E-01	1E+00	5E-07		No

Notes:

HHRA = human health risk assessment; HQ = noncancer hazard quotient

EF = exposure frequency; COC = constituent of concern

ft bgs = feet below ground surface; bkgd = background

TPHd = Total Petroleum Hydrocarbons- diesel range; TPHg = gasoline range;
TPHmo = motor oil range; BaP = benzo(a)pyrene; PCE = tetrachloroethene

Lead Hazard = 95UCL of Lead ÷ SSCG of 80 mg/kg for an onsite resident

Bold + Shaded if cumulative noncancer hazard >1 or cumulative cancer risk >1E-06

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24401 MARBELLA AVE	29	4E-01	8E-01	4E-07			No
24402 NEPTUNE AVE	10	1E-01	1E+00	3E-07			No
24402 PANAMA AVE	11	1E-01	1E+00	2E-07			No
24402 RAVENNA AVE	17	2E-01	**6E+00**	**3E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24403 NEPTUNE AVE	12	2E-01	**9E+00**	**1E-05**	TPHd, TPHmo, Benzene	Benzene, Naphthalene, TPHd	Yes
24403 RAVENNA AVE	14	2E-01	8E-01	2E-07			No
24405 MARBELLA AVE	12	1E-01	9E-01	5E-07			No
24406 MARBELLA AVE	14	2E-01	**6E+00**	**9E-06**	TPHd, Benzene, Ethylbenzene	Benzene, Naphthalene, TPHd, TPHg	Yes
24406 NEPTUNE AVE	21	3E-01	8E-01	1E-07			No
24406 PANAMA AVE	32	4E-01	**5E+00**	2E-07	TPHd, TPHmo	TPHd	Yes
24406 RAVENNA AVE	12	1E-01	7E-01	5E-07		1,2-DCA	Yes
24409 NEPTUNE AVE	37	5E-01	**3E+00**	5E-08	TPHd	TBA, TPHd	Yes
24409 RAVENNA AVE	51	6E-01	1E+00	1E-08			No
24410 PANAMA AVE	20	2E-01	1E+00	3E-07			No
24411 MARBELLA AVE	18	2E-01	**8E+00**	4E-07	TPHd, TPHmo	Naphthalene, TPHd	Yes
24411 PANAMA AVE	35	4E-01	**6E+00**	**7E-06**	TPHd, Benzene, Arsenic > bkgd	Benzene; Naphthalene; TBA; TPHd; TPHg; Arsenic > bkgd	Yes
24412 MARBELLA AVE	40	5E-01	**1E+01**	**4E-06**	TPHd, TPHmo, Naphthalene	Benzene, Naphthalene, TPHd, TPHg	Yes
24412 RAVENNA AVE	10	1E-01	**3E+00**	1E-06	TPHd	Benzene, Naphthalene, TPHd	Yes
24413 NEPTUNE AVE	27	3E-01	**3E+00**	1E-06	TPHd	1,4-DCB, Naphthalene, TPHd	Yes
24413 RAVENNA AVE	34	4E-01	9E-01	5E-07			No
24416 MARBELLA AVE	23	3E-01	**7E+00**	**8E-06**	TPHd, TPHmo, Benzene	Benzene, Naphthalene, TPHd, TPHg	Yes
24416 NEPTUNE AVE	36	5E-01	**2E+01**	8E-08	TPHd, TPHmo	TPHd, TPHmo	Yes
24416 PANAMA AVE	19	2E-01	9E-01	1E-08			No
24416 RAVENNA AVE	12	2E-01	**7E+00**	1E-06	TPHd, TPHmo	Naphthalene, TPHd	Yes
24417 MARBELLA AVE	22	3E-01	7E-01	3E-07			No
24417 PANAMA AVE	15	2E-01	1E+00	4E-07			No
24419 NEPTUNE AVE	20	3E-01	**2E+00**	4E-07	no COC-specific HQ >1	TPHd	Yes
24419 RAVENNA AVE	15	2E-01	4E-01	1E-07			No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24420 PANAMA AVE	27	3E-01	**3E+00**	2E-07	TPHd, TPHmo	TPHd	Yes
24421 PANAMA AVE	14	2E-01	**5E+00**	**2E-06**	TPHd	Naphthalene, TPHd	Yes
24422 MARBELLA AVE	9.3	1E-01	**2E+00**	5E-07	TPHd	Naphthalene, TPHd	Yes
24422 NEPTUNE AVE	20	3E-01	7E-01	3E-07			No
24422 RAVENNA AVE	11	1E-01	**8E+00**	**2E-06**	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
24423 MARBELLA AVE	38	5E-01	6E-01	1E-08			No
24423 NEPTUNE AVE	7.6	1E-01	**5E+00**	**2E-06**	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
24423 RAVENNA AVE	7.6	1E-01	**3E+00**	**5E-06**	Benzene	Benzene, Naphthalene, TPHd	Yes
24426 MARBELLA AVE	18	2E-01	**8E+00**	5E-07	TPHd, TPHmo	TPHd, TPHmo, TCE	Yes
24426 NEPTUNE AVE	10	1E-01	1E+00	2E-07			No
24426 PANAMA AVE	13	2E-01	**2E+00**	2E-07	no COC-specific HQ >1	TPHd	Yes
24426 RAVENNA AVE	14	2E-01	**5E+00**	**3E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24427 MARBELLA AVE	11	1E-01	8E-01	2E-08			No
24427 PANAMA AVE	12	1E-01	1E+00	5E-07			No
24429 NEPTUNE AVE	12	1E-01	**3E+00**	4E-07	TPHd	TPHd	Yes
24429 RAVENNA AVE	11	1E-01	1E+00	3E-07			No
24430 PANAMA AVE	24	3E-01	7E-02	3E-07			No
24431 PANAMA AVE	14	2E-01	**2E+00**	5E-07	no COC-specific HQ >1		Yes
24432 MARBELLA AVE	12	2E-01	1E+00	1E-07		TPHd	Yes
24433 MARBELLA AVE	88	1E+00	**7E+00**	**1E-05**	TPHd, TPHmo, PCE	PCE, TPHd, TPHmo, TCE	Yes
24436 PANAMA AVE	7.8	1E-01	5E-02	3E-07		1,2,3-TCP	Yes
24502 MARBELLA AVE	9.0	1E-01	**2E+00**	6E-08	no COC-specific HQ >1	TPHd	Yes
24502 NEPTUNE AVE	6.9	9E-02	6E-01	4E-07			No
24502 PANAMA AVE	6.9	9E-02	4E-02	2E-07			No
24502 RAVENNA AVE	11	1E-01	**6E+00**	**3E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24503 MARBELLA AVE	9.4	1E-01	7E-01	1E-08			No
24503 NEPTUNE AVE	11	1E-01	**2E+00**	3E-07	TPHd	TPHd	Yes
24503 PANAMA AVE	10	1E-01	**5E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24503 RAVENNA AVE	8.5	1E-01	3E-01	3E-07			No
24506 MARBELLA AVE	16	2E-01	**8E+00**	**5E-06**	TPHd, TPHmo, Benzene	Benzene, Naphthalene, TPHd, TPHmo	Yes
24507 MARBELLA AVE	10	1E-01	9E-01	2E-07			No
24508 NEPTUNE AVE	11	1E-01	**2E+00**	4E-07	no COC-specific HQ >1	1,4-DCB, TPHd	Yes
24508 PANAMA AVE	7.7	1E-01	2E-01	3E-07			No
24508 RAVENNA AVE	7.7	1E-01	**3E+00**	4E-07	TPHd	Naphthalene, TPHd	Yes
24509 NEPTUNE AVE	13	2E-01	**3E+00**	3E-07	TPHd	TPHd	Yes
24509 PANAMA AVE	14	2E-01	**3E+00**	7E-07	TPHd	Naphthalene, TPHd	Yes
24509 RAVENNA AVE	29	4E-01	**4E+00**	3E-07	TPHd, TPHmo	TPHd	Yes
24512 MARBELLA AVE	10	1E-01	**7E+00**	**2E-06**	TPHd, TPHmo	Benzene, Naphthalene, TBA, TPHd	Yes
24512 NEPTUNE AVE	8.4	1E-01	**3E+00**	8E-07	TPHd	Benzene, Naphthalene, TPHd	Yes
24512 PANAMA AVE	8.8	1E-01	8E-02	3E-07			No
24512 RAVENNA AVE	8.3	1E-01	**5E+00**	**5E-06**	TPHd, Benzene	Benzene, Naphthalene, TPHd, TPHg	Yes
24513 NEPTUNE AVE	9.3	1E-01	4E-01	2E-07			No
24513 PANAMA AVE	8.7	1E-01	**6E+00**	**3E-06**	TPHd, TPHmo, Benzene	Benzene, Naphthalene, TPHd	Yes
24513 RAVENNA AVE	13	2E-01	3E-01	1E-08			No
24516 MARBELLA AVE	11	1E-01	**3E+00**	1E-06	TPHd	Benzene, Naphthalene, TPHd	Yes
24517 MARBELLA AVE	12	2E-01	**2E+00**	3E-07	no COC-specific HQ >1		Yes
24518 NEPTUNE AVE	18	2E-01	**3E+00**	9E-07	TPHd	Benzene, Naphthalene, TPHd	Yes
24518 PANAMA AVE	22	3E-01	1E-01	3E-07			No
24518 RAVENNA AVE	10	1E-01	**6E+00**	**2E-06**	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
24519 NEPTUNE AVE	10	1E-01	**3E+00**	8E-07	TPHd	Naphthalene, TPHd	Yes
24519 PANAMA AVE	18	2E-01	**4E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24522 MARBELLA AVE	8.4	1E-01	**1E+01**	**8E-06**	TPHd, TPHmo, Benzene, Ethylbenzene	Benzene, Naphthalene, TPHd, TPHmo	Yes
24522 NEPTUNE AVE	9.3	1E-01	**3E+00**	4E-07	no COC-specific HQ >1	Naphthalene, TPHd	Yes
24522 PANAMA AVE	10	1E-01	2E-01	3E-07			No
24522 RAVENNA AVE	8.3	1E-01	**3E+00**	**3E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24523 MARBELLA AVE	38	5E-01	1E+00	2E-07			No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24523 NEPTUNE AVE	11	1E-01	**1E+01**	**1E-05**	TPHd, TPHmo, Benzene	Benzene, Naphthalene, TPHd, TPHg	Yes
24523 RAVENNA AVE	16	2E-01	**2E+00**	8E-07	TPHd	Naphthalene, TPHd	Yes
24526 MARBELLA AVE	7.6	9E-02	**1E+01**	**3E-05**	TPHd, TPHmo, TPHg, Benzene, Naphthalene	Benzene, Naphthalene, TBA, TPHd, TPHg	Yes
24528 NEPTUNE AVE	7.7	1E-01	1E+00	7E-07		Naphthalene	Yes
24528 PANAMA AVE	12	2E-01	6E-01	1E-08			No
24529 NEPTUNE AVE	10	1E-01	**7E+00**	**1E-05**	TPHd, TPHmo, Benzene	Benzene, Naphthalene, TBA, TPHd	Yes
24529 PANAMA AVE	7.2	9E-02	9E-02	4E-07			No
24529 RAVENNA AVE	15	2E-01	**2E+00**	5E-07	no COC-specific HQ >1	Naphthalene, TPHd	Yes
24532 MARBELLA AVE	9.2	1E-01	**1E+01**	**9E-06**	TPHd, TPHmo, Benzene, Naphthalene	Benzene, Naphthalene, TPHd	Yes
24532 NEPTUNE AVE	25	3E-01	4E-02	5E-07			No
24532 PANAMA AVE	9.2	1E-01	1E+00	3E-07			No
24532 RAVENNA AVE	6.3	8E-02	1E-01	3E-07			No
24533 MARBELLA AVE	20	2E-01	7E-01	2E-08			No
24533 PANAMA AVE	8.4	1E-01	1E+00	2E-07			No
24533 RAVENNA AVE	7.5	9E-02	2E-02	2E-07			No
24602 MARBELLA AVE	13	2E-01	8E-01	7E-07			No
24602 NEPTUNE AVE	8.3	1E-01	2E-01	2E-07			No
24602 PANAMA AVE	20	2E-01	8E-01	3E-07			No
24602 RAVENNA AVE	15	2E-01	2E-01	3E-07			No
24603 MARBELLA AVE	16	2E-01	**5E+00**	7E-07	TPHd, TPHmo	Naphthalene, TPHd	Yes
24603 NEPTUNE AVE	7.9	1E-01	**2E+00**	**5E-06**	Benzene, Ethylbenzene	Benzene, Naphthalene, TPHd	Yes
24603 PANAMA AVE	13	2E-01	1E+00	3E-07		TPHd	Yes
24603 RAVENNA AVE	22	3E-01	**6E+00**	3E-07	Thallium > bkgd	TPHd; Thallium > bkgd	Yes
24606 MARBELLA AVE	8.1	1E-01	**8E+00**	**7E-06**	TPHd, TPHmo, Benzene, Naphthalene	Benzene, Naphthalene, TPHd	Yes
24607 MARBELLA AVE	14	2E-01	7E-01	2E-07			No
24608 NEPTUNE AVE	30	4E-01	**5E+00**	**2E-06**	TPHd	Naphthalene, TPHd	Yes
24608 PANAMA AVE	116	1E+00	**2E+01**	1E-06	TPHd, TPHmo, Thallium > bkgd	TPHd; TPHmo; Thallium > bkgd	Yes
24608 RAVENNA AVE	18	2E-01	**4E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24609 NEPTUNE AVE	8.5	1E-01	**1E+01**	**8E-06**	TPHd, TPHmo, Benzene, Naphthalene	Benzene, Naphthalene, TPHd, TPHg	Yes
24609 PANAMA AVE	19	2E-01	**3E+00**	3E-07	TPHd	TPHd	Yes
24609 RAVENNA AVE	6.6	8E-02	1E+00	2E-07			No
24612 MARBELLA AVE	26	3E-01	**9E+00**	**6E-06**	TPHd, TPHmo, Benzene	1,2,3-TCP, Benzene, Naphthalene, TPHd	Yes
24612 NEPTUNE AVE	8.3	1E-01	**7E+00**	**5E-06**	TPHd, TPHmo, Benzene, Naphthalene	Benzene, Naphthalene, TPHd	Yes
24612 PANAMA AVE	12	1E-01	1E+00	8E-07		Naphthalene, TPHd	Yes
24612 RAVENNA AVE	35	4E-01	**5E+00**	1E-07	TPHd, TPHmo	TPHd	Yes
24613 MARBELLA AVE	10	1E-01	7E-01	3E-07	Arsenic > bkgd	Arsenic > bkgd	Yes
24613 NEPTUNE AVE	9.2	1E-01	**6E+00**	**3E-06**	TPHd, TPHmo	Benzene, Naphthalene, TBA, TPHd	Yes
24613 PANAMA AVE	51	6E-01	**1E+01**	5E-07	TPHd, TPHmo	TPHd, TPHmo	Yes
24613 RAVENNA AVE	7.2	9E-02	**2E+00**	**2E-06**	no COC-specific HQ >1 or risk >1E-06	Naphthalene, TPHd	Yes
24616 MARBELLA AVE	9.4	1E-01	**1E+01**	**1E-05**	TPHd, TPHmo, BaP, 1-MN, Benzene, Naphthalene, VC	Benzene, cis-1,2-DCE, Naphthalene, TPHd, TPHmo, TCE, VC	Yes
24617 MARBELLA AVE	11	1E-01	**2E+00**	2E-07	no COC-specific HQ >1, Thallium > bkgd	Thallium > bkgd	Yes
24618 NEPTUNE AVE	12	1E-01	**4E+00**	1E-06	TPHd	Naphthalene, TPHd	Yes
24618 PANAMA AVE	15	2E-01	**3E+00**	2E-07	TPHd	Naphthalene, TPHd	Yes
24618 RAVENNA AVE	4.6	6E-02	1E+00	6E-07			No
24619 NEPTUNE AVE	11	1E-01	**5E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24619 PANAMA AVE	19	2E-01	**3E+00**	1E-06	TPHd	Benzene, Naphthalene, TPHd	Yes
24619 RAVENNA AVE	7.0	9E-02	2E-01	3E-07			No
24622 MARBELLA AVE	12	1E-01	**1E+01**	**1E-05**	TPHd, TPHmo, BaP, Naphthalene, Arsenic > bkgd	Benzene; Naphthalene; TPHd; Arsenic > bkgd	Yes
24622 NEPTUNE AVE	17	2E-01	**4E+00**	1E-06	TPHd	Naphthalene, TPHd	Yes
24623 MARBELLA AVE	11	1E-01	**8E+00**	**2E-06**	TPHd, TPHg	Benzene, Naphthalene, TPHd, TPHg	Yes
24623 NEPTUNE AVE	16	2E-01	**4E+00**	**2E-06**	TPHd	Naphthalene, TPHd, TCE	Yes
24627 MARBELLA AVE	11	1E-01	**7E+00**	**3E-06**	TPHd, Naphthalene	1,2-DCA, Naphthalene, TPHd, TCE	Yes
24628 MARBELLA AVE	18	2E-01	**7E+00**	**6E-06**	TPHd, TPHmo, Benzene, Ethylbenzene	Benzene, Naphthalene, TPHd	Yes
24628 NEPTUNE AVE	12	2E-01	3E-01	2E-08			No
24629 NEPTUNE AVE	10	1E-01	**6E+00**	**2E-06**	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
24632 NEPTUNE AVE	18	2E-01	**3E+00**	5E-07	TPHd	Naphthalene, TPHd	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24633 MARBELLA AVE	80	1E+00	**5E+00**	7E-08	TPHd, TPHmo	TPHd	Yes
24700 MARBELLA AVE	17	2E-01	**6E+00**	1E-06	TPHd, TPHmo	Naphthalene, TPHd	Yes
24700 RAVENNA AVE	19	2E-01	1E+00	3E-07			No
24702 NEPTUNE AVE	12	2E-01	**4E+00**	6E-07	TPHd, TPHmo	Naphthalene, TPHd	Yes
24702 PANAMA AVE	35	4E-01	**3E+00**	**5E-06**	TPHd, Benzene	Benzene, Naphthalene, TPHd, TPHg	Yes
24703 MARBELLA AVE	17	2E-01	**2E+00**	2E-07	no COC-specific HQ >1	TPHd	Yes
24703 NEPTUNE AVE	11	1E-01	**5E+00**	9E-07	TPHd, TPHmo	Naphthalene, TPHd	Yes
24703 RAVENNA AVE	9.2	1E-01	**3E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24706 MARBELLA AVE	10	1E-01	**5E+00**	**2E-06**	TPHd	Naphthalene, TPHd	Yes
24706 RAVENNA AVE	32	4E-01	**2E+00**	3E-09	no COC-specific HQ >1	TPHd	Yes
24707 MARBELLA AVE	14	2E-01	7E-01	2E-07			No
24708 PANAMA AVE	16	2E-01	**2E+00**	4E-07	no COC-specific HQ >1	TPHd	Yes
24709 NEPTUNE AVE	13	2E-01	**3E+00**	8E-07	TPHd	Benzene, Naphthalene, TPHd	Yes
24709 PANAMA AVE	12	2E-01	**2E+00**	1E-06	no COC-specific HQ >1	Benzene, Naphthalene, TPHd	Yes
24709 RAVENNA AVE	9.3	1E-01	**3E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
24710 MARBELLA AVE	28	4E-01	**8E+00**	**4E-06**	TPHd, TPHmo, Benzene	1,4-DCB, Benzene, Naphthalene, TBA, TPHd	Yes
24712 NEPTUNE AVE	13	2E-01	**2E+00**	4E-07	TPHd	Naphthalene, TPHd	Yes
24712 PANAMA AVE	67	8E-01	**7E+00**	7E-07	TPHd, TPHmo	Naphthalene, TPHd	Yes
24712 RAVENNA AVE	35	4E-01	**2E+00**	7E-07	no COC-specific HQ >1	Naphthalene, TPHd	Yes
24713 MARBELLA AVE	6.9	9E-02	7E-01	2E-07		Naphthalene	Yes
24713 PANAMA AVE	17	2E-01	**3E+00**	2E-07	TPHd	TPHd	Yes
24713 RAVENNA AVE	6.7	8E-02	**3E+00**	1E-06	TPHd	Naphthalene, TPHd	Yes
24715 NEPTUNE AVE	12	2E-01	**6E+00**	**5E-06**	TPHd, TPHmo, BaP	Naphthalene, TPHd	Yes
24716 MARBELLA AVE	15	2E-01	**6E+00**	**4E-06**	TPHd, Ethylbenzene	Benzene, Naphthalene, TPHd	Yes
24716 RAVENNA AVE	13	2E-01	**3E+00**	5E-08	TPHd	TPHd	Yes
24717 MARBELLA AVE	7.2	9E-02	**3E+00**	1E-06	TPHd	Naphthalene, TPHd	Yes
24718 NEPTUNE AVE	5.8	7E-02	**7E+00**	**3E-06**	TPHd; TPHmo; Antimony > bkgd; no COC-specific risk >1E-06	Benzene; Naphthalene; TPHd; TPHg; Antimony > bkgd	Yes
24718 PANAMA AVE	23	3E-01	**3E+00**	5E-07	TPHd	1,2,3-TCP, Naphthalene, TPHd	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24719 NEPTUNE AVE	32	4E-01	**4E+00**	**2E-06**	TPHd	1,4-DCB, Naphthalene, TPHd	Yes
24719 PANAMA AVE	17	2E-01	**3E+00**	3E-07	TPHd	TPHd	Yes
24719 RAVENNA AVE	19	2E-01	**5E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd, TPHg	Yes
24722 MARBELLA AVE	10	1E-01	**2E+00**	6E-07	no COC-specific HQ >1	TPHd	Yes
24722 NEPTUNE AVE	7.7	1E-01	4E-02	2E-07			No
24722 PANAMA AVE	13	2E-01	**2E+00**	6E-08	no COC-specific HQ >1	TPHd	Yes
24722 RAVENNA AVE	36	5E-01	**4E+00**	6E-07	TPHd, TPHmo	Naphthalene, TPHd	Yes
24723 MARBELLA AVE	10	1E-01	**3E+00**	2E-07	no COC-specific HQ >1	TPHd	Yes
24723 RAVENNA AVE	17	2E-01	1E+00	4E-07		1,4-DCB, TPHd	Yes
24725 NEPTUNE AVE	30	4E-01	4E-01	2E-07			No
24726 MARBELLA AVE	9.5	1E-01	1E+00	3E-07			No
24726 RAVENNA AVE	6.6	8E-02	1E+00	3E-07			No
24727 MARBELLA AVE	20	2E-01	**6E+00**	1E-06	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
24728 NEPTUNE AVE	7.5	9E-02	**3E+00**	**6E-06**	Benzene	Benzene, Naphthalene, TPHd	Yes
24728 PANAMA AVE	80	1E+00	**2E+01**	7E-07	TPHd, TPHmo	TPHd, TPHmo	Yes
24729 NEPTUNE AVE	42	5E-01	1E+00	3E-07			No
24729 PANAMA AVE	17	2E-01	6E-01	3E-07			No
24729 RAVENNA AVE	19	2E-01	2E-01	3E-07			No
24732 MARBELLA AVE	8.6	1E-01	**3E+00**	1E-06	TPHd	TPHd	Yes
24732 NEPTUNE AVE	10	1E-01	**8E+00**	**2E-05**	TPHd, TPHmo, Benzene, Naphthalene	Benzene, Naphthalene, TPHd, TPHg, TCE	Yes
24732 PANAMA AVE	14	2E-01	7E-01	3E-07			No
24732 RAVENNA AVE	8.1	1E-01	**2E+00**	3E-07	no COC-specific HQ >1	TPHd	Yes
24733 MARBELLA AVE	10	1E-01	**2E+00**	8E-07	no COC-specific HQ >1	Naphthalene	Yes
24733 PANAMA AVE	32	4E-01	1E+00	5E-07			No
24733 RAVENNA AVE	9.4	1E-01	1E+00	4E-07	Thallium > bkgd	1,2,3-TCP; Thallium > bkgd	Yes
24735 NEPTUNE AVE	13	2E-01	**3E+00**	3E-07	TPHd	TPHd	Yes
24736 MARBELLA AVE	13	2E-01	7E-01	2E-07			No
24736 RAVENNA AVE	6.5	8E-02	**5E+00**	**2E-06**	TPHd, TPHmo	Benzene, Naphthalene, TBA, TPHd	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24737 MARBELLA AVE	18	2E-01	**6E+00**	1E-06	TPHd, TPHmo	Naphthalene, TPHd	Yes
24738 NEPTUNE AVE	24	3E-01	**1E+01**	**2E-05**	TPHd, TPHmo, TPHg, Benzene, Naphthalene	Benzene, Naphthalene, TPHd, TPHg	Yes
24738 PANAMA AVE	39	5E-01	**3E+00**	3E-07	TPHd	TPHd	Yes
24739 NEPTUNE AVE	15	2E-01	**3E+00**	4E-07	no COC-specific HQ >1	TPHd	Yes
24739 PANAMA AVE	12	2E-01	**9E+00**	**3E-06**	TPHd, TPHmo, Naphthalene	Benzene, Naphthalene, TBA, TPHd, TPHg, TPHmo	Yes
24739 RAVENNA AVE	12	2E-01	**2E+01**	**2E-05**	TPHd, TPHmo, TPHg, Benzene, Naphthalene	Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24740 MARBELLA AVE	15	2E-01	**2E+00**	3E-07	no COC-specific HQ >1	TPHd	Yes
24741 MARBELLA AVE	14	2E-01	1E+00	4E-07			No
24743 RAVENNA AVE	10	1E-01	**1E+01**	**4E-06**	TPHd, TPHmo	Benzene, Naphthalene, TPHd, TPHmo	Yes
24744 MARBELLA AVE	12	1E-01	**7E+00**	4E-07	TPHd, TPHmo	TPHd	Yes
24748 RAVENNA AVE	8.6	1E-01	**6E+00**	**3E-06**	TPHd, TPHmo	Benzene, Naphthalene, TBA, TPHd	Yes
24749 RAVENNA AVE	24	3E-01	**6E+00**	8E-07	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
24752 RAVENNA AVE	48	6E-01	**6E+00**	**2E-06**	TPHd, TPHmo, Naphthalene	Naphthalene, TBA, TPHd	Yes
24802 PANAMA AVE	15	2E-01	**2E+00**	2E-07	no COC-specific HQ >1	TPHd	Yes
24803 NEPTUNE AVE	14	2E-01	**2E+00**	3E-07	no COC-specific HQ >1	TPHd	Yes
24803 PANAMA AVE	5.2	7E-02	**4E+00**	**6E-06**	TPHd, Benzene, Naphthalene	Benzene, Naphthalene, TPHd	Yes
24809 NEPTUNE AVE	17	2E-01	**2E+00**	4E-07	no COC-specific HQ >1	TPHd	Yes
24809 PANAMA AVE	8.7	1E-01	**6E+00**	**3E-06**	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
24812 PANAMA AVE	14	2E-01	8E-01	2E-07			No
24813 PANAMA AVE	19	2E-01	**6E+00**	**4E-06**	TPHd, TPHmo, Naphthalene	Benzene, Naphthalene, TPHd	Yes
24815 NEPTUNE AVE	23	3E-01	**3E+00**	4E-07	TPHd	TPHd	Yes
24818 PANAMA AVE	29	4E-01	**1E+01**	**2E-06**	TPHd, TPHmo	Naphthalene, TPHd, TPHmo	Yes
24819 PANAMA AVE	61	8E-01	**5E+00**	**4E-06**	TPHd, Benzene	1,2,3-TCP, Benzene, Naphthalene, TPHd	Yes
24822 PANAMA AVE	25	3E-01	**1E+01**	8E-07	TPHd, TPHmo	1,2,3-TCP, Naphthalene, TBA, TPHd, TPHmo	Yes
24823 PANAMA AVE	8.0	1E-01	**3E+00**	3E-07	TPHd	TPHd	Yes
24825 NEPTUNE AVE	15	2E-01	3E-01	2E-07			No
24828 PANAMA AVE	49	6E-01	**2E+01**	8E-09	TPHd, TPHmo	TPHd, TPHmo	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24829 PANAMA AVE	9.3	1E-01	1E+00	7E-07			No
24832 PANAMA AVE	12	1E-01	1E+00	2E-08			No
24833 PANAMA AVE	12	1E-01	1E+00	3E-07			No
24838 PANAMA AVE	21	3E-01	**7E+00**	4E-07	TPHd, TPHmo	TPHd, TPHmo	Yes
24904 NEPTUNE AVE	12	2E-01	9E-01	3E-07			No
24912 NEPTUNE AVE	21	3E-01	1E-01	2E-07			No
301 244TH ST	13	2E-01	8E-01	3E-07			No
305 244TH ST	37	5E-01	**2E+01**	5E-07	TPHd, TPHmo	1,2,3-TCP, TPHd, TPHmo	Yes
311 244TH ST	78	1E+00	**4E+01**	**3E-05**	TPHd, TPHmo, BaP, BaA, BbF	Benzene, Naphthalene, TPHd, TPHmo	Yes
317 244TH ST	51	6E-01	**2E+01**	2E-07	TPHd, TPHmo	TPHd, TPHmo	Yes
321 244TH ST	15	2E-01	8E-01	2E-07	Arsenic > bkgd	Arsenic > bkgd	Yes
327 244TH ST	10	1E-01	7E-01	6E-07			No
331 244TH ST	9.2	1E-01	7E-01	5E-07	Arsenic > bkgd	Arsenic > bkgd	Yes
337 244TH ST	9.0	1E-01	1E+00	2E-07			No
341 244TH ST	11	1E-01	6E-01	5E-07			No
344 249TH ST	18	2E-01	**2E+00**	8E-09	no COC-specific HQ >1		Yes
345 249TH ST	28	3E-01	1E+00	3E-07			No
347 244TH ST	14	2E-01	7E-01	4E-07			No
348 248TH ST	12	2E-01	**8E+00**	**4E-06**	TPHd, TPHmo, Naphthalene	Benzene, Naphthalene, TPHd	Yes
348 249TH ST	36	4E-01	1E+00	6E-07			No
351 244TH ST	39	5E-01	**3E+00**	6E-07	no COC-specific HQ >1	Naphthalene, TPHd	Yes
352 249TH ST	20	2E-01	8E-01	2E-07			No
353 249TH ST	10	1E-01	**3E+00**	**4E-06**	TPHd, Benzene	Benzene, Naphthalene, TPHd	Yes
354 248TH ST	14	2E-01	**4E+00**	**2E-06**	TPHd, Naphthalene	Naphthalene, TPHd	Yes
357 244TH ST	10	1E-01	6E-01	3E-07			No
357 249TH ST	10	1E-01	6E-01	3E-08			No
358 249TH ST	10	1E-01	**3E+00**	9E-07	TPHd	Naphthalene, TPHd	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 350 d/y)						
	≤5 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
360 248TH ST	8.0	1E-01	**2E+00**	3E-07	no COC-specific HQ >1	Naphthalene, TPHd	Yes
361 244TH ST	11	1E-01	6E-01	6E-07			No
362 249TH ST	19	2E-01	1E+00	4E-08			No
363 249TH ST	33	4E-01	8E-01	3E-08			No
364 248TH ST	11	1E-01	**4E+00**	1E-06	TPHd	Benzene, Naphthalene, TPHd	Yes
367 244TH ST	88	1E+00	**8E+00**	7E-10	TPHd, TPHmo	TPHd, TPHmo	Yes
367 249TH ST	16	2E-01	1E+00	2E-07			No
368 249TH ST	28	4E-01	**6E+00**	**2E-06**	TPHd, TPHmo	Benzene, Naphthalene, TPHd	Yes
373 249TH ST	19	2E-01	1E+00	2E-07		Naphthalene, TPHd	Yes
374 248TH ST	18	2E-01	**5E+00**	5E-07	TPHd, TPHmo	Naphthalene, TBA, TPHd	Yes
374 249TH ST	21	3E-01	**4E+00**	**2E-06**	TPHd	Benzene, Naphthalene, TPHd	Yes
377 244TH ST	13	2E-01	8E-01	3E-07			No
377 249TH ST	8.0	1E-01	**4E+00**	8E-07	TPHd	Naphthalene, TPHd	Yes
378 249TH ST	14	2E-01	**3E+00**	6E-07	TPHd	Naphthalene, TPHd	Yes
383 249TH ST	13	2E-01	**2E+00**	7E-08	no COC-specific HQ >1	TPHd	Yes
402 249TH ST	11	1E-01	**3E+00**	6E-07	TPHd	Naphthalene, TPHd	Yes
408 249TH ST	46	6E-01	2E-01	3E-07			No
412 249TH ST	49	6E-01	**2E+00**	3E-07	no COC-specific HQ >1	TPHd	Yes

Notes:

HHRA = human health risk assessment; HQ = noncancer hazard quotient; GW = groundwater

EF = exposure frequency; COC = constituent of concern; 95UCL = 95% upper confidence limit

ft bgs = feet below ground surface; SSCG = Site-specific cleanup goal; bkgd = background

TPHd = Total Petroleum Hydrocarbons- diesel range; TPHg = gasoline range; TPHmo = motor oil range

BaP = benzo(a)pyrene; BaA = Benzo(a)Anthracene; BbF = Benzo(b)Fluoranthene; MN = Methylnaphthalene; DCA = Dichloroethane; DCE = Dichloroethene; DCB = Dichlorobenzene; TBA = tert-Butyl Alcohol; PCE = tetrachloroethene; TCE = trichloroethene; TCP = Trichloropropane; VC = vinyl chloride

Lead Hazard = 95UCL of Lead ÷ SSCG of 80 mg/kg for an onsite resident

Bold + Shaded if cumulative noncancer hazard >1 or cumulative cancer risk >1E-06

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24401 MARBELLA AVE	10	1E-02	9E-03	8E-11			No
24402 NEPTUNE AVE	7.9	1E-02	1E-01	1E-08		Naphthalene, TPHd	Yes
24402 PANAMA AVE	7.2	9E-03	8E-03	5E-10			No
24402 RAVENNA AVE	7.1	9E-03	3E-01	8E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24403 NEPTUNE AVE	9.4	1E-02	2E-01	3E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24403 RAVENNA AVE	12	1E-02	7E-02	1E-08		Benzene, Naphthalene, TPHd	Yes
24405 MARBELLA AVE	15	2E-02	8E-03	2E-11			No
24406 MARBELLA AVE	4.9	6E-03	2E-01	7E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24406 NEPTUNE AVE	40	5E-02	3E-01	2E-08		Benzene, Naphthalene, TPHd, TPHmo	Yes
24406 PANAMA AVE	5.6	7E-03	4E-03	6E-10			No
24406 RAVENNA AVE	17	2E-02	5E-02	5E-09		Naphthalene, TPHd	Yes
24409 NEPTUNE AVE	10	1E-02	2E-01	4E-08		Benzene, Naphthalene, TPHd, TPHmo	Yes
24409 RAVENNA AVE	7.1	9E-03	8E-02	1E-08		Naphthalene, TPHd	Yes
24410 PANAMA AVE	6.2	8E-03	5E-03	7E-11			No
24411 MARBELLA AVE	5.4	7E-03	6E-03	4E-10			No
24411 PANAMA AVE	9.3	1E-02	2E-01	4E-07	Arsenic > bkgd	Benzene; Naphthalene; TPHd; TPHg; TPHmo; Arsenic > bkgd	Yes
24412 MARBELLA AVE	20	2E-02	3E-01	4E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24412 RAVENNA AVE	8.0	1E-02	1E-01	6E-09		Naphthalene, TPHd	Yes
24413 NEPTUNE AVE	7.7	9E-03	2E-01	8E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24413 RAVENNA AVE	13	2E-02	1E-01	3E-09		TPHd	Yes
24416 MARBELLA AVE	4.9	6E-03	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24416 NEPTUNE AVE	10	1E-02	4E-03	6E-10			No
24416 PANAMA AVE	4.4	5E-03	4E-03	3E-11			No
24416 RAVENNA AVE	11	1E-02	5E-02	5E-09		TPHd	Yes
24417 MARBELLA AVE	8.4	1E-02	6E-03	1E-11			No
24417 PANAMA AVE	12	2E-02	2E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24419 NEPTUNE AVE	12	2E-02	1E-01	6E-08		Benzene, Naphthalene, TPHd	Yes
24419 RAVENNA AVE	7.4	9E-03	1E-02	6E-09		Benzene, Naphthalene	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24420 PANAMA AVE	5.9	7E-03	5E-03	2E-10			No
24421 PANAMA AVE	8.5	1E-02	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24422 MARBELLA AVE	8.9	1E-02	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24422 NEPTUNE AVE	8.1	1E-02	2E-02	2E-09		TBA, TPHd	Yes
24422 RAVENNA AVE	11	1E-02	4E-02	3E-09		TPHd	Yes
24423 MARBELLA AVE	6.1	7E-03	6E-03	4E-12			No
24423 NEPTUNE AVE	7.3	9E-03	2E-01	8E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24423 RAVENNA AVE	6.6	8E-03	6E-02	2E-08		Benzene, Naphthalene, TPHd	Yes
24426 MARBELLA AVE	13	2E-02	2E-01	5E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24426 NEPTUNE AVE	10	1E-02	4E-02	2E-09		TPHd	Yes
24426 PANAMA AVE	4.9	6E-03	5E-03	2E-10			No
24426 RAVENNA AVE	7.6	9E-03	1E-02	8E-09		Benzene, Naphthalene	Yes
24427 MARBELLA AVE	9.5	1E-02	8E-03	1E-11			No
24427 PANAMA AVE	43	5E-02	6E-02	2E-08		Benzene, Naphthalene, TPHd	Yes
24429 NEPTUNE AVE	21	3E-02	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24429 RAVENNA AVE	5.9	7E-03	9E-03	6E-09		Naphthalene	Yes
24430 PANAMA AVE	5.3	7E-03	3E-05	4E-09			No
24431 PANAMA AVE	5.7	7E-03	4E-02	3E-09		Naphthalene, TPHd	Yes
24432 MARBELLA AVE	10	1E-02	1E-01	3E-08		Benzene, cis-1,2-DCE, Naphthalene, TPHd, TPHg, TCE	Yes
24433 MARBELLA AVE	23	3E-02	1E-02	1E-09			No
24436 PANAMA AVE	2.2	3E-03	7E-05	2E-09			No
24502 MARBELLA AVE	655	8E-01	8E-02	2E-08		Naphthalene, TPHd, TPHg	Yes
24502 NEPTUNE AVE	8.8	1E-02	9E-02	4E-09		TPHd	Yes
24502 PANAMA AVE	1.9	2E-03	9E-06	1E-09			No
24502 RAVENNA AVE	13	2E-02	2E-02	7E-09		Benzene, TBA	Yes
24503 MARBELLA AVE	12	1E-02	1E-02	2E-10			No
24503 NEPTUNE AVE	10	1E-02	1E-01	2E-08		Benzene, Naphthalene, TBA, TPHd, TPHg	Yes
24503 PANAMA AVE	8.0	1E-02	4E-02	3E-09		Naphthalene, TPHd	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24503 RAVENNA AVE	7.7	9E-03	3E-02	1E-08		Naphthalene, TPHd, TPHg	Yes
24506 MARBELLA AVE	14	2E-02	2E-01	3E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24507 MARBELLA AVE	10	1E-02	9E-03	5E-11			No
24508 NEPTUNE AVE	6.6	8E-03	1E-01	9E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24508 PANAMA AVE	3.2	4E-03	4E-06	6E-10			No
24508 RAVENNA AVE	29	4E-02	2E-01	4E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24509 NEPTUNE AVE	14	2E-02	4E-02	5E-09		Naphthalene, TPHd	Yes
24509 PANAMA AVE	7.5	9E-03	1E-01	8E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24509 RAVENNA AVE	8.1	1E-02	2E-01	4E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24512 MARBELLA AVE	7.7	9E-03	2E-01	9E-08		Benzene, Naphthalene, TBA, TPHd, TPHg, TPHmo	Yes
24512 NEPTUNE AVE	6.1	7E-03	9E-02	6E-08		Benzene, Naphthalene, TPHd	Yes
24512 PANAMA AVE	5.0	6E-03	1E-06	3E-10			No
24512 RAVENNA AVE	27	3E-02	6E-02	6E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24513 NEPTUNE AVE	6.6	8E-03	9E-02	8E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24513 PANAMA AVE	5.5	7E-03	1E-01	1E-07		1,4-DCB, Benzene, Naphthalene, TPHd, TPHg	Yes
24513 RAVENNA AVE	5.7	7E-03	2E-01	5E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24516 MARBELLA AVE	9.1	1E-02	4E-01	9E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24517 MARBELLA AVE	19	2E-02	1E-02	3E-09			No
24518 NEPTUNE AVE	6.2	8E-03	2E-01	5E-08		Benzene, Naphthalene, TBA, TPHd, TPHg, TPHmo	Yes
24518 PANAMA AVE	3.0	4E-03	2E-04	3E-09			No
24518 RAVENNA AVE	6.6	8E-03	1E-01	7E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24519 NEPTUNE AVE	8.6	1E-02	6E-02	2E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24519 PANAMA AVE	6.0	7E-03	2E-01	6E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24522 MARBELLA AVE	6.2	8E-03	3E-01	9E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24522 NEPTUNE AVE	11	1E-02	6E-02	3E-08		Benzene, Naphthalene, TPHd	Yes
24522 PANAMA AVE	2.0	2E-03	1E-04	3E-09			No
24522 RAVENNA AVE	4.2	5E-03	9E-02	3E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24523 MARBELLA AVE	8.3	1E-02	6E-03	5E-09			No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24523 NEPTUNE AVE	7.5	9E-03	2E-01	3E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24523 RAVENNA AVE	6.2	8E-03	1E-01	4E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24526 MARBELLA AVE	5.3	6E-03	2E-01	6E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24528 NEPTUNE AVE	4.8	6E-03	4E-02	2E-08		Naphthalene, TPHd, TCE	Yes
24528 PANAMA AVE	2.7	3E-03	3E-04	1E-10			No
24529 NEPTUNE AVE	14	2E-02	2E-01	6E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24529 PANAMA AVE	3.3	4E-03	3E-05	6E-09			No
24529 RAVENNA AVE	2.3	3E-03	2E-01	8E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24532 MARBELLA AVE	8.5	1E-02	5E-01	3E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24532 NEPTUNE AVE	3.2	4E-03					No
24532 PANAMA AVE	68	8E-02	7E-02	1E-07		1,2,3-TCP, TPHd	Yes
24532 RAVENNA AVE	2.9	4E-03	5E-05	4E-09			No
24533 MARBELLA AVE	7.8	1E-02	8E-03	3E-10			No
24533 PANAMA AVE	4.3	5E-03	1E-03	4E-09			No
24533 RAVENNA AVE	4.0	5E-03	2E-04	4E-09			No
24602 MARBELLA AVE	8.6	1E-02	1E-01	1E-07		Naphthalene, TPHd	Yes
24602 NEPTUNE AVE	3.4	4E-03	1E-04	3E-09			No
24602 PANAMA AVE	46	6E-02	4E-02	3E-09		TPHd	Yes
24602 RAVENNA AVE	13	2E-02	2E-05	2E-09			No
24603 MARBELLA AVE	9.6	1E-02	9E-03	3E-09			No
24603 NEPTUNE AVE	4.1	5E-03	1E-02	9E-09		Benzene	Yes
24603 PANAMA AVE	7.9	1E-02	9E-04	4E-09			No
24603 RAVENNA AVE	2.9	4E-03	3E-02	6E-10	Thallium > bkgd	Thallium > bkgd	Yes
24606 MARBELLA AVE	4.8	6E-03	1E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24607 MARBELLA AVE	9.1	1E-02	8E-03	4E-11		1,2-DCA	Yes
24608 NEPTUNE AVE	4.1	5E-03	2E-01	1E-07		Naphthalene, TPHd, TPHg	Yes
24608 PANAMA AVE	9.9	1E-02	5E-02	7E-09	Thallium > bkgd	Naphthalene; Thallium > bkgd	Yes
24608 RAVENNA AVE	33	4E-02	2E-01	6E-09		Naphthalene, TPHd, TPHmo	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24609 NEPTUNE AVE	8.8	1E-02	4E-01	3E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24609 PANAMA AVE	8.5	1E-02	6E-02	5E-08		Benzene, Naphthalene, TPHd	Yes
24609 RAVENNA AVE	4.6	6E-03	1E-05	2E-09			No
24612 MARBELLA AVE	5.6	7E-03	2E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24612 NEPTUNE AVE	5.5	7E-03	1E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24612 PANAMA AVE	36	4E-02	4E-02	4E-09		Naphthalene, TPHd	Yes
24612 RAVENNA AVE	5.3	6E-03	8E-03	3E-09			No
24613 MARBELLA AVE	7.7	9E-03	6E-03	3E-09	Arsenic > bkgd	Arsenic > bkgd	Yes
24613 NEPTUNE AVE	5.2	6E-03	3E-01	4E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24613 PANAMA AVE	39	5E-02	5E-02	3E-08		1,2,3-TCP, Benzene, Naphthalene, TPHd	Yes
24613 RAVENNA AVE	4.7	6E-03	5E-03	9E-09		Benzene, Naphthalene	Yes
24616 MARBELLA AVE	5.7	7E-03	4E-01	8E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24617 MARBELLA AVE	6.1	7E-03	2E-02	2E-11	Thallium > bkgd	Thallium > bkgd	Yes
24618 NEPTUNE AVE	5.3	6E-03	2E-01	2E-07		Benzene, Naphthalene, TBA, TPHd, TPHmo	Yes
24618 PANAMA AVE	37	4E-02	7E-02	2E-08		Naphthalene, TPHd	Yes
24618 RAVENNA AVE	3.2	4E-03	8E-05	2E-09			No
24619 NEPTUNE AVE	7.2	9E-03	3E-01	3E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24619 PANAMA AVE	26	3E-02	1E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24619 RAVENNA AVE	5.2	6E-03	1E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
24622 MARBELLA AVE	5.6	7E-03	2E-01	2E-07	Arsenic > bkgd	Benzene; Naphthalene; TPHd; TPHg; TPHmo; Arsenic > bkgd	Yes
24622 NEPTUNE AVE	4.9	6E-03	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo, TCE	Yes
24623 MARBELLA AVE	7.2	9E-03	1E-01	4E-08		Naphthalene, TPHd, TPHg	Yes
24623 NEPTUNE AVE	7.5	9E-03	2E-01	4E-07		Benzene, Naphthalene, TBA, TPHd, TPHg, TPHmo	Yes
24627 MARBELLA AVE	7.3	9E-03	4E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24628 MARBELLA AVE	6.1	7E-03	3E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24628 NEPTUNE AVE	6.2	8E-03	2E-01	6E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24629 NEPTUNE AVE	10	1E-02	2E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24632 NEPTUNE AVE	8.0	1E-02	2E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24633 MARBELLA AVE	8.7	1E-02	6E-03	6E-11			No
24700 MARBELLA AVE	9.8	1E-02	3E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24700 RAVENNA AVE	4.7	6E-03	1E-03	3E-09			No
24702 NEPTUNE AVE	6.2	8E-03	2E-01	7E-08		Benzene, Naphthalene, TBA, TPHd, TPHg, TPHmo	Yes
24702 PANAMA AVE	156	2E-01	3E-01	6E-08		Benzene, Naphthalene, TPHd, TPHmo	Yes
24703 MARBELLA AVE	6.2	8E-03	5E-03	7E-11			No
24703 NEPTUNE AVE	8.2	1E-02	1E-01	3E-08		1,2,3-TCP, Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24703 RAVENNA AVE	5.9	7E-03	2E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24706 MARBELLA AVE	7.3	9E-03	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24706 RAVENNA AVE	5.6	7E-03	2E-03	2E-10			No
24707 MARBELLA AVE	4.5	5E-03	4E-03	4E-09			No
24708 PANAMA AVE	72	9E-02	7E-02	8E-09		TPHd	Yes
24709 NEPTUNE AVE	9.1	1E-02	2E-01	5E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24709 PANAMA AVE	39	5E-02	3E-01	3E-08		Benzene, Naphthalene, TPHd, TPHmo	Yes
24709 RAVENNA AVE	5.0	6E-03	2E-01	8E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24710 MARBELLA AVE	5.4	7E-03	2E-01	1E-06		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24712 NEPTUNE AVE	4.6	6E-03	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24712 PANAMA AVE	65	8E-02	4E-02	4E-09		TPHd	Yes
24712 RAVENNA AVE	7.0	9E-03	3E-03	1E-09			No
24713 MARBELLA AVE	3.5	4E-03	3E-03	2E-09		Naphthalene	Yes
24713 PANAMA AVE	209	3E-01	2E-01	1E-08		Benzene, TPHd, TPHmo	Yes
24713 RAVENNA AVE	4.1	5E-03	1E-01	6E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24715 NEPTUNE AVE	6.0	7E-03	2E-01	3E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24716 MARBELLA AVE	5.2	6E-03	3E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24716 RAVENNA AVE	3.2	4E-03	3E-04	2E-09			No
24717 MARBELLA AVE	3.6	4E-03	8E-03	2E-09			No
24718 NEPTUNE AVE	4.3	5E-03	1E-01	6E-08	Antimony > bkgd	Benzene; cis-1,2-DCE; Naphthalene; TPHd; TPHg; Antimony > bkgd	Yes
24718 PANAMA AVE	8.9	1E-02	4E-03	4E-09		1,2,3-TCP	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24719 NEPTUNE AVE	7.5	9E-03	4E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24719 PANAMA AVE	82	1E-01	2E-01	5E-09		TPHd, TPHmo	Yes
24719 RAVENNA AVE	4.7	6E-03	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24722 MARBELLA AVE	5.4	7E-03	5E-03	2E-10			No
24722 NEPTUNE AVE	4.5	6E-03	4E-04	3E-09			No
24722 PANAMA AVE	5.6	7E-03	7E-03	3E-09			No
24722 RAVENNA AVE	6.9	8E-03	5E-03	3E-09			No
24723 MARBELLA AVE	2.8	3E-03	4E-03	4E-10			No
24723 RAVENNA AVE	5.9	7E-03	7E-02	2E-08		Naphthalene, TPHd, TPHg	Yes
24725 NEPTUNE AVE	4.6	6E-03	5E-04	4E-09			No
24726 MARBELLA AVE	4.8	6E-03	4E-03	3E-09			No
24726 RAVENNA AVE	3.9	5E-03	6E-04	3E-09			No
24727 MARBELLA AVE	3.2	4E-03	5E-04	3E-09			No
24728 NEPTUNE AVE	4.4	5E-03	2E-02	3E-08		Benzene, Naphthalene, TPHg	Yes
24728 PANAMA AVE	10	1E-02	2E-02	2E-09		TPHd	Yes
24729 NEPTUNE AVE	5.0	6E-03	1E-03	4E-09			No
24729 PANAMA AVE	7.7	9E-03	6E-04	3E-09			No
24729 RAVENNA AVE	5.5	7E-03	1E-05	5E-10			No
24732 MARBELLA AVE	15	2E-02	2E-05	3E-09			No
24732 NEPTUNE AVE	2.8	3E-03	5E-01	9E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24732 PANAMA AVE	5.3	6E-03	2E-04	3E-09			No
24732 RAVENNA AVE	5.5	7E-03	5E-03	4E-11			No
24733 MARBELLA AVE	3.2	4E-03	2E-03	3E-09			No
24733 PANAMA AVE	12	1E-02	1E-03	3E-09			No
24733 RAVENNA AVE	7.0	9E-03	7E-03	3E-09	Thallium > bkgd	1,2,3-TCP; Thallium > bkgd	Yes
24735 NEPTUNE AVE	5.3	6E-03	2E-04	2E-11			No
24736 MARBELLA AVE	4.7	6E-03	3E-03	3E-09			No
24736 RAVENNA AVE	6.1	7E-03	1E-01	6E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24737 MARBELLA AVE	4.5	5E-03	2E-01	6E-09		TPHd, TPHmo	Yes
24738 NEPTUNE AVE	7.0	8E-03	2E-01	5E-07		Benzene, Naphthalene, TBA, TPHd, TPHg, TPHmo	Yes
24738 PANAMA AVE	5.5	7E-03	2E-03	3E-09			No
24739 NEPTUNE AVE	6.7	8E-03	2E-04	4E-09			No
24739 PANAMA AVE	5.3	6E-03	2E-01	7E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24739 RAVENNA AVE	6.1	7E-03	2E-01	4E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
24740 MARBELLA AVE	4.3	5E-03	1E-02	4E-09			No
24741 MARBELLA AVE	5.3	6E-03	1E-05	2E-09			No
24743 RAVENNA AVE	12	2E-02	2E-01	2E-07		Benzene, Naphthalene, TBA, TPHd, TPHg, TPHmo	Yes
24744 MARBELLA AVE	7.7	9E-03	1E-03	3E-09			No
24748 RAVENNA AVE	5.9	7E-03	6E-02	1E-08		Benzene, Naphthalene, TBA, TPHd	Yes
24749 RAVENNA AVE	8.6	1E-02	2E-01	7E-08		Benzene, Naphthalene, TPHd, TPHmo	Yes
24752 RAVENNA AVE	9.0	1E-02	6E-02	2E-08		Benzene, Naphthalene, TBA, TPHd, TPHg	Yes
24802 PANAMA AVE	5.5	7E-03	2E-03	2E-09			No
24803 NEPTUNE AVE	6.0	7E-03	8E-04	2E-09			No
24803 PANAMA AVE	5.5	7E-03	6E-02	7E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24809 NEPTUNE AVE	8.2	1E-02	9E-02	5E-09		TPHd	Yes
24809 PANAMA AVE	8.1	1E-02	9E-02	2E-07		Benzene, Naphthalene, TBA, TPHd, TPHg	Yes
24812 PANAMA AVE	5.5	7E-03	4E-04	2E-09			No
24813 PANAMA AVE	6.9	8E-03	2E-01	9E-08		Benzene, Naphthalene, TPHd, TPHmo	Yes
24815 NEPTUNE AVE	7.5	9E-03	9E-03	7E-10			No
24818 PANAMA AVE	5.7	7E-03	5E-04	4E-09			No
24819 PANAMA AVE	57	7E-02	5E-02	3E-08		Benzene, Naphthalene, TBA, TPHd	Yes
24822 PANAMA AVE	5.3	6E-03	7E-04	4E-09		1,2,3-TCP	Yes
24823 PANAMA AVE	8.9	1E-02	2E-01	5E-08		Benzene, Naphthalene, TBA, TPHd, TPHmo	Yes
24825 NEPTUNE AVE	4.7	6E-03	3E-04	3E-09			No
24828 PANAMA AVE	5.5	7E-03	3E-04	2E-11		TBA	Yes

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
24829 PANAMA AVE	7.2	9E-03	4E-02	6E-08		Benzene, Naphthalene, TBA, TPHd	Yes
24832 PANAMA AVE	6.9	8E-03	2E-03	3E-09			No
24833 PANAMA AVE	8.9	1E-02	8E-02	5E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
24838 PANAMA AVE	8.6	1E-02	3E-03	3E-09			No
24904 NEPTUNE AVE	24	3E-02	3E-02	5E-09		TPHd	Yes
24912 NEPTUNE AVE	11	1E-02	1E-02	4E-09		1,2,3-TCP	Yes
301 244TH ST	7.9	1E-02	9E-03	6E-09			No
305 244TH ST	8.6	1E-02	6E-03	3E-09		1,2,3-TCP	Yes
311 244TH ST	7.7	9E-03	6E-02	5E-08		Naphthalene, TPHd	Yes
317 244TH ST	8.3	1E-02	9E-03	5E-11			No
321 244TH ST	9.0	1E-02	7E-03	3E-11	Arsenic > bkgd	Arsenic > bkgd	Yes
327 244TH ST	8.8	1E-02	8E-03	3E-11			No
331 244TH ST	9.4	1E-02	8E-03	3E-09	Arsenic > bkgd	Arsenic > bkgd	Yes
337 244TH ST	6.5	8E-03	5E-03	2E-10			No
341 244TH ST	5.6	7E-03	5E-03	3E-11			No
344 249TH ST	11	1E-02	7E-03	9E-11			No
345 249TH ST	43	5E-02	9E-02	1E-08		Benzene, Naphthalene, TPHd	Yes
347 244TH ST	5.3	6E-03	5E-03	3E-09			No
348 248TH ST	5.2	6E-03	2E-01	2E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
348 249TH ST	14	2E-02	3E-02	6E-09		TPHd	Yes
351 244TH ST	5.7	7E-03	5E-03	3E-09			No
352 249TH ST	25	3E-02	5E-02	3E-09		TPHd	Yes
353 249TH ST	5.4	7E-03	4E-02	9E-08		Benzene, Naphthalene, TPHd, TPHg	Yes
354 248TH ST	23	3E-02	2E-01	8E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
357 244TH ST	5.6	7E-03	5E-03	3E-09			No
357 249TH ST	6.1	7E-03	2E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
358 249TH ST	8.9	1E-02	1E-03	3E-09			No

Table 14
Cumulative Risk and Hazard Results for Soil and Potential Leaching to Groundwater, Onsite Resident
Former Kast Property

Location	Resident (EF = 4 d/y)						
	>5 ft bgs to ≤10 ft bgs						
	HHRA					Soil Leaching to GW	Exceeds HHRA or Soil Leach to GW?
	Lead		Other COCs		Risk and/or Hazard Drivers	Compounds Exceeding SSCG Based on UCL	
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk			
360 248TH ST	6.6	8E-03	8E-02	3E-08		Benzene, Naphthalene, TPHd	Yes
361 244TH ST	7.6	9E-03	6E-03	2E-09			No
362 249TH ST	6.9	8E-03	1E-04	4E-09			No
363 249TH ST	82	1E-01	4E-01	8E-08		Benzene, Naphthalene, TPHd, TPHg, TPHmo	Yes
364 248TH ST	52	6E-02	5E-02	1E-08		Benzene, Naphthalene, TPHd	Yes
367 244TH ST	5.7	7E-03	1E-03				No
367 249TH ST	22	3E-02	4E-02	1E-08		1,2,3-TCP, Naphthalene, TPHd	Yes
368 249TH ST	6.2	8E-03	3E-02	2E-08		Benzene, Naphthalene, TPHd	Yes
373 249TH ST	18	2E-02	6E-02	2E-08		1,2,3-TCP, Benzene, Naphthalene, TPHd	Yes
374 248TH ST	67	8E-02	2E-01	3E-08		Benzene, Naphthalene, TBA, TPHd, TPHmo	Yes
374 249TH ST	6.8	8E-03	1E-01	1E-07		Benzene, Naphthalene, TPHd, TPHg	Yes
377 244TH ST	7.3	9E-03	6E-03	2E-11			No
377 249TH ST	15	2E-02	1E-01	3E-08		Benzene, Naphthalene, TPHd	Yes
378 249TH ST	7.8	9E-03	7E-02	3E-08		Benzene, Naphthalene, TPHd	Yes
383 249TH ST	8.9	1E-02	6E-02	2E-08		Benzene, Naphthalene, TPHd	Yes
402 249TH ST	4.9	6E-03	3E-04	4E-11			No
408 249TH ST	6.0	7E-03	3E-03	7E-11			No
412 249TH ST	37	5E-02	2E-01	3E-09		TPHd, TPHmo	Yes

Notes:

HHRA = human health risk assessment; GW = groundwater; 95UCL = 95% upper confidence limit

EF = exposure frequency; COC = constituent of concern

ft bgs = feet below ground surface; SSCG = Site-specific cleanup goal; bkgd = background

TPHd = Total Petroleum Hydrocarbons- diesel range; TPHg = gasoline range; TPHmo = motor oil range

BaP = benzo(a)pyrene; BaA = Benzo(a)Anthracene; BbF = Benzo(b)Fluoranthene; DCB = Dichlorobenzene; DCE = Dichloroethene; TBA = tert-Butyl Alcohol; PCE = tetrachloroethene; TCE = trichloroethene; TCP = Trichloropropane; VC = vinyl chloride

Lead Hazard = 95UCL of Lead ÷ SSCG of 820 mg/kg for an infrequent contact onsite resident

Bold + Shaded if cumulative noncancer hazard >1 or cumulative cancer risk >1E-06

Table 15
Cumulative Risk and Hazard Results for Soil,
Construction and Utility Maintenance Worker
Former Kast Property

Location	Construction and Utility Maintenance Worker				
	Soil ≤10 ft bgs				
	Lead		Other COCs		Risk and/or Hazard Drivers
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	
24401 MARBELLA AVE	25	3E-02	1E-01	2E-06	
24402 NEPTUNE AVE	9.1	1E-02	1E+00	2E-06	
24402 PANAMA AVE	10	1E-02	3E-01	1E-06	
24402 RAVENNA AVE	12	1E-02	**6E+00**	1E-05	TPHd
24403 NEPTUNE AVE	11	1E-02	**6E+00**	1E-05	TPHd
24403 RAVENNA AVE	13	2E-02	1E+00	2E-06	
24405 MARBELLA AVE	12	1E-02	2E-01	2E-06	
24406 MARBELLA AVE	12	1E-02	**3E+00**	1E-05	TPHd
24406 NEPTUNE AVE	22	3E-02	**4E+00**	1E-06	TPHd
24406 PANAMA AVE	23	3E-02	1E+00	1E-06	
24406 RAVENNA AVE	12	1E-02	5E-01	1E-06	
24409 NEPTUNE AVE	32	4E-02	**2E+00**	7E-07	TPHd
24409 RAVENNA AVE	37	5E-02	1E+00	1E-06	
24410 PANAMA AVE	13	2E-02	2E-01	1E-06	
24411 MARBELLA AVE	15	2E-02	**2E+00**	1E-06	TPHd
24411 PANAMA AVE	30	4E-02	**5E+00**	1E-05	TPHd, Arsenic > bkgd
24412 MARBELLA AVE	34	4E-02	**5E+00**	8E-06	TPHd
24412 RAVENNA AVE	10	1E-02	**2E+00**	2E-06	no COC-specific HQ >1
24413 NEPTUNE AVE	22	3E-02	**3E+00**	2E-06	TPHd
24413 RAVENNA AVE	28	3E-02	1E+00	1E-06	
24416 MARBELLA AVE	18	2E-02	**5E+00**	7E-06	TPHd
24416 NEPTUNE AVE	32	4E-02	**7E+00**	5E-08	TPHd
24416 PANAMA AVE	13	2E-02	2E-01	8E-07	
24416 RAVENNA AVE	11	1E-02	**3E+00**	9E-07	TPHd
24417 MARBELLA AVE	14	2E-02	1E-01	2E-06	
24417 PANAMA AVE	13	2E-02	**3E+00**	8E-06	TPHd
24419 NEPTUNE AVE	18	2E-02	**2E+00**	2E-06	TPHd
24419 RAVENNA AVE	10	1E-02	3E-01	3E-07	
24420 PANAMA AVE	23	3E-02	8E-01	3E-07	
24421 PANAMA AVE	12	1E-02	**4E+00**	3E-06	TPHd
24422 MARBELLA AVE	8.3	1E-02	**2E+00**	3E-06	TPHd
24422 NEPTUNE AVE	13	2E-02	5E-01	3E-07	
24422 RAVENNA AVE	11	1E-02	**3E+00**	1E-06	TPHd
24423 MARBELLA AVE	31	4E-02	1E-01	1E-06	
24423 NEPTUNE AVE	7.1	9E-03	**3E+00**	3E-06	TPHd
24423 RAVENNA AVE	7.2	9E-03	**2E+00**	5E-06	no COC-specific HQ >1
24426 MARBELLA AVE	16	2E-02	**5E+00**	1E-06	TPHd
24426 NEPTUNE AVE	10	1E-02	5E-01	1E-06	
24426 PANAMA AVE	11	1E-02	6E-01	1E-06	
24426 RAVENNA AVE	13	2E-02	**2E+00**	3E-06	TPHd

Table 15
Cumulative Risk and Hazard Results for Soil,
Construction and Utility Maintenance Worker
Former Kast Property

Location	Construction and Utility Maintenance Worker				
	Soil ≤10 ft bgs				
	Lead		Other COCs		Risk and/or Hazard Drivers
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	
24427 MARBELLA AVE	10	1E-02	1E-01	1E-06	
24427 PANAMA AVE	21	3E-02	1E+00	2E-06	
24429 NEPTUNE AVE	11	1E-02	**5E+00**	3E-06	TPHd
24429 RAVENNA AVE	10	1E-02	6E-01	7E-07	
24430 PANAMA AVE	13	2E-02	2E-02	5E-07	
24431 PANAMA AVE	14	2E-02	7E-01	2E-06	
24432 MARBELLA AVE	12	1E-02	**2E+00**	6E-07	TPHd
24433 MARBELLA AVE	68	8E-02	**2E+00**	5E-06	TPHd
24436 PANAMA AVE	8.2	1E-02	1E-02	5E-07	
24502 MARBELLA AVE	148	2E-01	1E+00	1E-06	
24502 NEPTUNE AVE	7.1	9E-03	1E+00	6E-07	
24502 PANAMA AVE	5.7	7E-03	2E-02	3E-07	
24502 RAVENNA AVE	11	1E-02	**2E+00**	2E-06	TPHd
24503 MARBELLA AVE	9.5	1E-02	1E-01	1E-06	
24503 NEPTUNE AVE	10	1E-02	**5E+00**	8E-07	TPHd
24503 PANAMA AVE	9.3	1E-02	**2E+00**	7E-07	TPHd
24503 RAVENNA AVE	7.9	1E-02	9E-01	8E-07	
24506 MARBELLA AVE	15	2E-02	**4E+00**	7E-06	TPHd
24507 MARBELLA AVE	10	1E-02	1E-01	2E-06	
24508 NEPTUNE AVE	10	1E-02	**2E+00**	4E-06	TPHd
24508 PANAMA AVE	8.2	1E-02	5E-02	5E-07	
24508 RAVENNA AVE	14	2E-02	**5E+00**	**2E-05**	TPHd, Benzene
24509 NEPTUNE AVE	12	2E-02	1E+00	6E-07	
24509 PANAMA AVE	11	1E-02	**3E+00**	4E-06	TPHd
24509 RAVENNA AVE	22	3E-02	**4E+00**	1E-05	TPHd
24512 MARBELLA AVE	9.3	1E-02	**6E+00**	4E-06	TPHd
24512 NEPTUNE AVE	7.4	9E-03	**2E+00**	2E-06	TPHd
24512 PANAMA AVE	7.6	9E-03	3E-02	5E-07	
24512 RAVENNA AVE	10	1E-02	**3E+00**	4E-06	TPHd
24513 NEPTUNE AVE	8.2	1E-02	**2E+00**	2E-06	TPHd
24513 PANAMA AVE	7.5	9E-03	**4E+00**	5E-06	TPHd
24513 RAVENNA AVE	12	1E-02	**4E+00**	1E-06	TPHd
24516 MARBELLA AVE	10	1E-02	**5E+00**	1E-05	TPHd
24517 MARBELLA AVE	13	2E-02	3E-01	2E-06	
24518 NEPTUNE AVE	16	2E-02	**3E+00**	2E-06	TPHd
24518 PANAMA AVE	17	2E-02	2E-02	5E-07	
24518 RAVENNA AVE	9.0	1E-02	**3E+00**	2E-06	TPHd
24519 NEPTUNE AVE	9.4	1E-02	1E+00	1E-06	
24519 PANAMA AVE	15	2E-02	**2E+00**	2E-06	TPHd
24522 MARBELLA AVE	7.3	9E-03	**8E+00**	6E-06	TPHd

Table 15
Cumulative Risk and Hazard Results for Soil,
Construction and Utility Maintenance Worker
Former Kast Property

Location	Construction and Utility Maintenance Worker				
	Soil ≤10 ft bgs				
	Lead		Other COCs		Risk and/or Hazard Drivers
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	
24522 NEPTUNE AVE	8.9	1E-02	1E+00	2E-06	
24522 PANAMA AVE	8.6	1E-02	9E-02	5E-07	
24522 RAVENNA AVE	7.2	9E-03	**2E+00**	2E-06	TPHd
24523 MARBELLA AVE	30	4E-02	2E-01	2E-06	
24523 NEPTUNE AVE	10	1E-02	**5E+00**	**2E-05**	TPHd; no COC-specific risk >1E-05
24523 RAVENNA AVE	14	2E-02	**3E+00**	1E-06	TPHd
24526 MARBELLA AVE	6.9	8E-03	**7E+00**	**3E-05**	TPHd, TPHg, Benzene
24528 NEPTUNE AVE	7.0	8E-03	7E-01	1E-06	
24528 PANAMA AVE	7.8	1E-02	1E-01	7E-09	
24529 NEPTUNE AVE	9.3	1E-02	**4E+00**	**2E-05**	TPHd; no COC-specific risk >1E-05
24529 PANAMA AVE	6.2	8E-03	4E-02	7E-07	
24529 RAVENNA AVE	14	2E-02	**3E+00**	2E-06	TPHd
24532 MARBELLA AVE	8.1	1E-02	**8E+00**	1E-05	TPHd
24532 NEPTUNE AVE	22	3E-02	9E-03	5E-07	
24532 PANAMA AVE	22	3E-02	9E-01	7E-07	
24532 RAVENNA AVE	6.6	8E-03	3E-02	5E-07	
24533 MARBELLA AVE	17	2E-02	1E-01	1E-06	
24533 PANAMA AVE	9.2	1E-02	3E-01	4E-07	
24533 RAVENNA AVE	6.8	8E-03	6E-03	4E-07	
24602 MARBELLA AVE	12	1E-02	**2E+00**	4E-06	TPHd
24602 NEPTUNE AVE	7.0	9E-03	2E-02	4E-07	
24602 PANAMA AVE	24	3E-02	1E+00	4E-07	
24602 RAVENNA AVE	13	2E-02	5E-02	6E-07	
24603 MARBELLA AVE	14	2E-02	**2E+00**	2E-06	no COC-specific HQ >1
24603 NEPTUNE AVE	7.0	8E-03	1E+00	3E-06	
24603 PANAMA AVE	12	1E-02	5E-01	5E-07	
24603 RAVENNA AVE	17	2E-02	6E-01	4E-07	Thallium > bkgd
24606 MARBELLA AVE	7.2	9E-03	**4E+00**	8E-06	TPHd
24607 MARBELLA AVE	13	2E-02	1E-01	1E-06	
24608 NEPTUNE AVE	25	3E-02	**3E+00**	3E-06	TPHd
24608 PANAMA AVE	91	1E-01	**5E+00**	8E-07	TPHd, Thallium > bkgd
24608 RAVENNA AVE	13	2E-02	**2E+00**	1E-06	TPHd
24609 NEPTUNE AVE	7.8	9E-03	**8E+00**	9E-06	TPHd
24609 PANAMA AVE	16	2E-02	1E+00	1E-06	
24609 RAVENNA AVE	6.0	7E-03	4E-01	4E-07	
24612 MARBELLA AVE	21	3E-02	**5E+00**	8E-06	TPHd
24612 NEPTUNE AVE	6.5	8E-03	**6E+00**	5E-06	TPHd
24612 PANAMA AVE	20	2E-02	8E-01	4E-07	
24612 RAVENNA AVE	28	3E-02	1E+00	5E-07	
24613 MARBELLA AVE	9.2	1E-02	9E-02	2E-06	Arsenic > bkgd

Table 15
Cumulative Risk and Hazard Results for Soil,
Construction and Utility Maintenance Worker
Former Kast Property

Location	Construction and Utility Maintenance Worker				
	Soil ≤10 ft bgs				
	Lead		Other COCs		Risk and/or Hazard Drivers
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	
24613 NEPTUNE AVE	8.5	1E-02	**5E+00**	1E-05	TPHd
24613 PANAMA AVE	41	5E-02	**3E+00**	1E-06	TPHd
24613 RAVENNA AVE	6.6	8E-03	**2E+00**	1E-06	no COC-specific HQ >1
24616 MARBELLA AVE	8.5	1E-02	**1E+01**	**2E-05**	TPHd; no COC-specific risk >1E-05
24617 MARBELLA AVE	10	1E-02	9E-02	2E-06	Thallium > bkgd
24618 NEPTUNE AVE	11	1E-02	**3E+00**	3E-06	TPHd
24618 PANAMA AVE	19	2E-02	**2E+00**	9E-07	TPHd
24618 RAVENNA AVE	4.3	5E-03	4E-01	7E-07	
24619 NEPTUNE AVE	10	1E-02	**6E+00**	7E-06	TPHd
24619 PANAMA AVE	18	2E-02	**2E+00**	3E-06	TPHd
24619 RAVENNA AVE	6.3	8E-03	**2E+00**	3E-06	TPHd
24622 MARBELLA AVE	10	1E-02	**5E+00**	7E-06	TPHd, Arsenic > bkgd
24622 NEPTUNE AVE	13	2E-02	**4E+00**	4E-06	TPHd
24623 MARBELLA AVE	10	1E-02	**5E+00**	4E-06	TPHd, TPHg
24623 NEPTUNE AVE	14	2E-02	**4E+00**	5E-06	TPHd
24627 MARBELLA AVE	10	1E-02	**4E+00**	5E-06	TPHd
24628 MARBELLA AVE	16	2E-02	**5E+00**	7E-06	TPHd
24628 NEPTUNE AVE	10	1E-02	**4E+00**	2E-06	TPHd
24629 NEPTUNE AVE	10	1E-02	**4E+00**	5E-06	TPHd
24632 NEPTUNE AVE	16	2E-02	**3E+00**	3E-06	TPHd
24633 MARBELLA AVE	62	8E-02	1E+00	1E-06	
24700 MARBELLA AVE	15	2E-02	**4E+00**	3E-06	TPHd
24700 RAVENNA AVE	16	2E-02	3E-01	4E-07	
24702 NEPTUNE AVE	11	1E-02	**4E+00**	2E-06	TPHd
24702 PANAMA AVE	50	6E-02	**4E+00**	4E-06	TPHd
24703 MARBELLA AVE	13	2E-02	5E-01	1E-06	
24703 NEPTUNE AVE	10	1E-02	**3E+00**	1E-06	TPHd
24703 RAVENNA AVE	8.5	1E-02	**4E+00**	6E-06	TPHd
24706 MARBELLA AVE	9.1	1E-02	**5E+00**	4E-06	TPHd
24706 RAVENNA AVE	26	3E-02	7E-01	3E-09	
24707 MARBELLA AVE	12	1E-02	1E-01	1E-06	
24708 PANAMA AVE	31	4E-02	1E+00	7E-07	
24709 NEPTUNE AVE	11	1E-02	**4E+00**	1E-06	TPHd
24709 PANAMA AVE	26	3E-02	**4E+00**	1E-06	TPHd
24709 RAVENNA AVE	8.2	1E-02	**4E+00**	4E-06	TPHd
24710 MARBELLA AVE	24	3E-02	**5E+00**	**2E-05**	TPHd; no COC-specific risk >1E-05
24712 NEPTUNE AVE	8.2	1E-02	**3E+00**	2E-06	TPHd
24712 PANAMA AVE	56	7E-02	**2E+00**	9E-07	TPHd
24712 RAVENNA AVE	28	3E-02	1E+00	4E-07	
24713 MARBELLA AVE	5.9	7E-03	1E-01	1E-06	

Table 15
Cumulative Risk and Hazard Results for Soil,
Construction and Utility Maintenance Worker
Former Kast Property

Location	Construction and Utility Maintenance Worker				
	Soil ≤10 ft bgs				
	Lead		Other COCs		Risk and/or Hazard Drivers
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	
24713 PANAMA AVE	48	6E-02	**2E+00**	1E-06	TPHd
24713 RAVENNA AVE	5.8	7E-03	**3E+00**	1E-06	TPHd
24715 NEPTUNE AVE	10	1E-02	**6E+00**	8E-06	TPHd
24716 MARBELLA AVE	13	2E-02	**3E+00**	3E-06	TPHd
24716 RAVENNA AVE	11	1E-02	1E+00	4E-07	
24717 MARBELLA AVE	6.4	8E-03	**2E+00**	2E-06	TPHd
24718 NEPTUNE AVE	5.4	7E-03	**4E+00**	3E-06	TPHd, Antimony > bkgd
24718 PANAMA AVE	20	2E-02	9E-01	5E-07	
24719 NEPTUNE AVE	27	3E-02	**4E+00**	3E-06	TPHd
24719 PANAMA AVE	41	5E-02	**2E+00**	5E-07	TPHd
24719 RAVENNA AVE	16	2E-02	**4E+00**	4E-06	TPHd
24722 MARBELLA AVE	8.5	1E-02	5E-01	1E-06	
24722 NEPTUNE AVE	8.3	1E-02	1E-02	4E-07	
24722 PANAMA AVE	12	1E-02	6E-01	5E-07	
24722 RAVENNA AVE	30	4E-02	1E+00	7E-07	
24723 MARBELLA AVE	8.3	1E-02	8E-01	1E-06	
24723 RAVENNA AVE	14	2E-02	8E-01	9E-07	
24725 NEPTUNE AVE	23	3E-02	1E-01	3E-07	
24726 MARBELLA AVE	10	1E-02	2E-01	1E-06	
24726 RAVENNA AVE	7.4	9E-03	3E-01	5E-07	
24727 MARBELLA AVE	10	1E-02	**2E+00**	9E-07	no COC-specific HQ >1
24728 NEPTUNE AVE	6.5	8E-03	1E+00	5E-06	
24728 PANAMA AVE	67	8E-02	**8E+00**	7E-07	TPHd
24729 NEPTUNE AVE	33	4E-02	3E-01	5E-07	
24729 PANAMA AVE	11	1E-02	2E-01	4E-07	
24729 RAVENNA AVE	15	2E-02	5E-02	5E-07	
24732 MARBELLA AVE	8.3	1E-02	1E+00	6E-07	
24732 NEPTUNE AVE	10	1E-02	**4E+00**	**2E-05**	TPHd, Benzene
24732 PANAMA AVE	16	2E-02	2E-01	4E-07	
24732 RAVENNA AVE	7.4	9E-03	6E-01	5E-07	
24733 MARBELLA AVE	8.5	1E-02	5E-01	1E-06	
24733 PANAMA AVE	27	3E-02	4E-01	5E-07	
24733 RAVENNA AVE	8.7	1E-02	3E-01	6E-07	Thallium > bkgd
24735 NEPTUNE AVE	11	1E-02	9E-01	6E-07	
24736 MARBELLA AVE	11	1E-02	1E-01	1E-06	
24736 RAVENNA AVE	6.2	8E-03	**3E+00**	2E-06	TPHd
24737 MARBELLA AVE	15	2E-02	**3E+00**	1E-06	TPHd
24738 NEPTUNE AVE	20	2E-02	**7E+00**	**2E-05**	TPHd, TPHg, Benzene
24738 PANAMA AVE	37	4E-02	1E+00	4E-07	

Table 15
Cumulative Risk and Hazard Results for Soil,
Construction and Utility Maintenance Worker
Former Kast Property

Location	Construction and Utility Maintenance Worker				
	Soil ≤10 ft bgs				
	Lead		Other COCs		Risk and/or Hazard Drivers
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	
24739 NEPTUNE AVE	13	2E-02	8E-01	4E-07	
24739 PANAMA AVE	11	1E-02	**4E+00**	3E-06	TPHd
24739 RAVENNA AVE	8.9	1E-02	**9E+00**	**2E-05**	TPHd, TPHg, Benzene
24740 MARBELLA AVE	13	2E-02	9E-01	5E-07	
24741 MARBELLA AVE	13	2E-02	2E-01	5E-07	
24743 RAVENNA AVE	10	1E-02	**5E+00**	6E-06	TPHd
24744 MARBELLA AVE	10	1E-02	**2E+00**	5E-07	TPHd
24748 RAVENNA AVE	8.0	1E-02	**3E+00**	3E-06	TPHd
24749 RAVENNA AVE	32	4E-02	**4E+00**	2E-06	TPHd
24752 RAVENNA AVE	39	5E-02	**3E+00**	2E-06	TPHd
24802 PANAMA AVE	13	2E-02	6E-01	4E-07	
24803 NEPTUNE AVE	14	2E-02	7E-01	4E-07	
24803 PANAMA AVE	5.2	6E-03	**2E+00**	5E-06	no COC-specific HQ >1
24809 NEPTUNE AVE	14	2E-02	1E+00	6E-07	
24809 PANAMA AVE	8.2	1E-02	**3E+00**	5E-06	TPHd
24812 PANAMA AVE	11	1E-02	3E-01	4E-07	
24813 PANAMA AVE	23	3E-02	**3E+00**	5E-06	TPHd
24815 NEPTUNE AVE	19	2E-02	9E-01	5E-07	
24818 PANAMA AVE	24	3E-02	**4E+00**	2E-06	TPHd
24819 PANAMA AVE	52	6E-02	**2E+00**	3E-06	TPHd
24822 PANAMA AVE	20	2E-02	**4E+00**	7E-07	TPHd
24823 PANAMA AVE	8.0	1E-02	**3E+00**	1E-06	TPHd
24825 NEPTUNE AVE	12	1E-02	5E-02	3E-07	
24828 PANAMA AVE	39	5E-02	**8E+00**	4E-09	TPHd
24829 PANAMA AVE	8.7	1E-02	7E-01	8E-06	
24832 PANAMA AVE	13	2E-02	4E-01	4E-07	
24833 PANAMA AVE	10	1E-02	1E+00	1E-06	
24838 PANAMA AVE	26	3E-02	**2E+00**	5E-07	TPHd
24904 NEPTUNE AVE	17	2E-02	6E-01	6E-07	
24912 NEPTUNE AVE	18	2E-02	2E-01	4E-07	
301 244TH ST	13	2E-02	1E-01	2E-06	
305 244TH ST	31	4E-02	**7E+00**	1E-06	TPHd
311 244TH ST	67	8E-02	**1E+01**	4E-06	TPHd
317 244TH ST	42	5E-02	**7E+00**	1E-06	TPHd
321 244TH ST	13	2E-02	1E-01	1E-06	Arsenic > bkgd
327 244TH ST	9.4	1E-02	1E-01	2E-06	
331 244TH ST	8.8	1E-02	1E-01	2E-06	Arsenic > bkgd
337 244TH ST	8.3	1E-02	3E-01	1E-06	
341 244TH ST	10	1E-02	8E-02	2E-06	

Table 15
Cumulative Risk and Hazard Results for Soil,
Construction and Utility Maintenance Worker
Former Kast Property

Location	Construction and Utility Maintenance Worker				
	Soil ≤10 ft bgs				
	Lead		Other COCs		Risk and/or Hazard Drivers
	95UCL (mg/kg)	Lead Hazard	Noncancer Hazard	Cancer Risk	
344 249TH ST	21	3E-02	4E-01	6E-09	
345 249TH ST	19	2E-02	**2E+00**	5E-07	TPHd
347 244TH ST	15	2E-02	9E-02	2E-06	
348 248TH ST	11	1E-02	**5E+00**	6E-06	TPHd
348 249TH ST	29	3E-02	5E-01	7E-07	
351 244TH ST	30	4E-02	7E-01	1E-06	
352 249TH ST	17	2E-02	6E-01	3E-07	
353 249TH ST	8.5	1E-02	1E+00	3E-06	
354 248TH ST	17	2E-02	**5E+00**	4E-06	TPHd
357 244TH ST	8.6	1E-02	7E-02	2E-06	
357 249TH ST	8.7	1E-02	**2E+00**	2E-06	TPHd
358 249TH ST	9.3	1E-02	1E+00	9E-07	
360 248TH ST	7.5	9E-03	**2E+00**	8E-07	no COC-specific HQ >1
361 244TH ST	9.2	1E-02	8E-02	2E-06	
362 249TH ST	16	2E-02	3E-01	7E-07	
363 249TH ST	35	4E-02	**4E+00**	2E-06	TPHd
364 248TH ST	25	3E-02	**2E+00**	9E-07	TPHd
367 244TH ST	70	9E-02	**2E+00**	7E-10	TPHd
367 249TH ST	20	2E-02	1E+00	5E-07	
368 249TH ST	24	3E-02	**2E+00**	2E-06	TPHd
373 249TH ST	17	2E-02	1E+00	4E-07	
374 248TH ST	27	3E-02	**3E+00**	6E-07	TPHd
374 249TH ST	17	2E-02	**3E+00**	5E-06	TPHd
377 244TH ST	11	1E-02	1E-01	2E-06	
377 249TH ST	8.0	1E-02	**3E+00**	9E-07	TPHd
378 249TH ST	10	1E-02	**2E+00**	9E-07	no COC-specific HQ >1
383 249TH ST	11	1E-02	1E+00	3E-07	
402 249TH ST	9.0	1E-02	1E+00	3E-07	
408 249TH ST	36	4E-02	5E-02	6E-07	
412 249TH ST	40	5E-02	**2E+00**	4E-07	TPHd
Streets	40	5E-02	**6E+00**	**2E-05**	TPHd; no COC-specific risk >1E-05

Notes:

ft bgs = feet below ground surface; COC = constituent of concern

95UCL = 95% upper confidence limit; HQ = noncancer hazard quotient; bkgd = background

TPHd = Total Petroleum Hydrocarbons- diesel range; TPHg = gasoline range

Lead Hazard = 95UCL of Lead ÷ SSCG of 820 mg/kg for a construction and utility maintenance worker

Bold + Shaded if cumulative noncancer hazard >1 or cumulative cancer risk >1E-05

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24401 MARBELLA AVE	1E-02	1E-06		1E-02	1E-06	
24402 NEPTUNE AVE	1E-02	2E-07		1E-02	2E-07	
24402 PANAMA AVE	7E-03	3E-07		7E-03	3E-07	
24402 RAVENNA AVE	6E-03	1E-06		1E-03	3E-08	
24403 NEPTUNE AVE	3E-03	1E-07		3E-03	1E-07	
24403 RAVENNA AVE	4E-03	3E-07		4E-03	3E-07	
24405 MARBELLA AVE	1E-02	9E-07		1E-02	9E-07	
24406 MARBELLA AVE	2E-03	3E-07		2E-03	3E-07	
24406 NEPTUNE AVE	6E-02	**6E-06**	Carbon Tetrachloride, Naphthalene	6E-02	**5E-06**	Carbon Tetrachloride, Naphthalene
24406 PANAMA AVE	7E-02	5E-07		7E-02	5E-07	
24406 RAVENNA AVE	8E-04	3E-08		8E-04	3E-08	
24409 NEPTUNE AVE	3E-03	1E-07		3E-03	1E-07	
24409 RAVENNA AVE	1E-03	3E-07		1E-03	3E-07	
24410 PANAMA AVE	3E-03	6E-08		3E-03	4E-08	
24411 MARBELLA AVE	6E-02	1E-06		6E-02	1E-06	
24411 PANAMA AVE	3E-02	1E-06		3E-02	1E-06	
24412 MARBELLA AVE	7E-01	**4E-06**	TCE	7E-01	**4E-06**	TCE
24412 RAVENNA AVE	6E-04	2E-07		6E-04	2E-07	
24413 NEPTUNE AVE	5E-03	3E-07		5E-03	3E-07	
24413 RAVENNA AVE	5E-03	3E-07		5E-03	3E-07	
24416 MARBELLA AVE	1E-03	1E-07		1E-03	4E-08	
24416 NEPTUNE AVE	2E-03	1E-07		1E-03	6E-08	
24416 PANAMA AVE	1E-02	9E-07		1E-02	9E-07	
24416 RAVENNA AVE	2E-02	**5E-06**	Benzene	2E-02	**5E-06**	Benzene
24417 MARBELLA AVE	3E-03	2E-07		3E-03	2E-07	
24417 PANAMA AVE	--[a]	--[a]		--[a]	--[a]	
24419 NEPTUNE AVE	3E-02	**6E-06**	Chloroform	6E-04	2E-07	
24419 RAVENNA AVE	2E-03	2E-07		1E-03	1E-07	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24420 PANAMA AVE	2E-03	7E-08		2E-03	7E-08	
24421 PANAMA AVE	4E-03	8E-08		4E-03	8E-08	
24422 MARBELLA AVE	3E-03	3E-07		3E-03	1E-07	
24422 NEPTUNE AVE	2E-02	5E-07		2E-02	3E-07	
24422 RAVENNA AVE	1E-03	6E-08		1E-03	6E-08	
24423 MARBELLA AVE	1E-02	1E-06		1E-02	1E-06	
24423 NEPTUNE AVE	5E-02	**7E-06**	Chloroform, VC	3E-02	**3E-06**	VC
24423 RAVENNA AVE	6E-03	7E-07		4E-03	3E-07	
24426 MARBELLA AVE	1E-02	5E-07		1E-02	5E-07	
24426 NEPTUNE AVE	6E-03	7E-07		6E-03	7E-07	
24426 PANAMA AVE	1E-03	6E-08		1E-03	6E-08	
24426 RAVENNA AVE	3E-02	7E-07		3E-02	7E-07	
24427 MARBELLA AVE	2E-03	1E-07		2E-03	1E-07	
24427 PANAMA AVE	2E-03	3E-07		9E-04	2E-07	
24429 NEPTUNE AVE	3E-02	**2E-06**	PCE	3E-02	**2E-06**	PCE
24429 RAVENNA AVE	1E-03	1E-07		1E-03	5E-08	
24430 PANAMA AVE	9E-03	6E-07		9E-03	6E-07	
24431 PANAMA AVE	5E-03	1E-07		5E-03	1E-07	
24432 MARBELLA AVE	5E-03	4E-07		5E-03	4E-07	
24433 MARBELLA AVE	1E-01	**2E-06**	no COC-specific risk >1E-06	1E-01	**2E-06**	no COC-specific risk >1E-06
24436 PANAMA AVE	3E-03	4E-07		3E-03	3E-07	
24502 MARBELLA AVE	7E-03	9E-07		5E-03	1E-07	
24502 NEPTUNE AVE	2E-02	**4E-06**	Chloroform	9E-03	3E-07	
24502 PANAMA AVE	1E-02	5E-07		1E-02	5E-07	
24502 RAVENNA AVE	4E-03	4E-07		4E-03	4E-07	
24503 MARBELLA AVE	2E-02	1E-06		2E-02	1E-06	
24503 NEPTUNE AVE	2E-02	**5E-06**	Chloroform	3E-03	2E-07	
24503 PANAMA AVE	6E-03	6E-07		5E-03	5E-07	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24503 RAVENNA AVE	2E-03	2E-07		1E-03	1E-07	
24506 MARBELLA AVE	6E-02	**3E-06**	Benzene	6E-02	**3E-06**	Benzene
24507 MARBELLA AVE	2E-03	1E-07		2E-03	1E-07	
24508 NEPTUNE AVE	8E-03	1E-07		8E-03	1E-07	
24508 PANAMA AVE	**2E+00**	**5E-06**	Naphthalene	**2E+00**	**5E-06**	Naphthalene
24508 RAVENNA AVE	1E-03	7E-08		1E-03	6E-08	
24509 NEPTUNE AVE	2E-03	2E-07		2E-03	2E-07	
24509 PANAMA AVE	2E-03	1E-07		2E-03	1E-07	
24509 RAVENNA AVE	4E-03	3E-07		4E-03	2E-07	
24512 MARBELLA AVE	3E-03	1E-07		3E-03	1E-07	
24512 NEPTUNE AVE	3E-03	1E-07		3E-03	1E-07	
24512 PANAMA AVE	3E-03	2E-07		2E-03	8E-08	
24512 RAVENNA AVE	2E-03	8E-08		2E-03	8E-08	
24513 NEPTUNE AVE	6E-03	3E-07		6E-03	3E-07	
24513 PANAMA AVE	8E-03	2E-07		8E-03	2E-07	
24513 RAVENNA AVE	1E-02	**2E-06**	no COC-specific risk >1E-06	1E-02	**2E-06**	no COC-specific risk >1E-06
24516 MARBELLA AVE	1E-02	6E-07		1E-02	6E-07	
24517 MARBELLA AVE	1E-02	6E-07		1E-02	6E-07	
24518 NEPTUNE AVE	2E-02	**5E-06**	Chloroform	4E-03	6E-07	
24518 PANAMA AVE	5E-03	1E-07		5E-03	1E-07	
24518 RAVENNA AVE	7E-03	4E-07		7E-03	4E-07	
24519 NEPTUNE AVE	3E-05	4E-09		3E-05	4E-09	
24519 PANAMA AVE	3E-03	2E-07		3E-03	1E-07	
24522 MARBELLA AVE	7E-03	7E-07		7E-03	7E-07	
24522 NEPTUNE AVE	5E-03	6E-08		5E-03	6E-08	
24522 PANAMA AVE	2E-03	2E-07		1E-03	5E-08	
24522 RAVENNA AVE	2E-03	1E-06		9E-04	4E-08	
24523 MARBELLA AVE	1E-02	1E-06		1E-02	1E-06	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24523 NEPTUNE AVE	3E-03	1E-07		3E-03	1E-07	
24523 RAVENNA AVE	5E-02	**4E-06**	Chloroform	3E-02	1E-06	
24526 MARBELLA AVE	2E-03	2E-07		2E-03	2E-07	
24528 NEPTUNE AVE	7E-03	4E-07		7E-03	3E-07	
24528 PANAMA AVE	3E-03	1E-07		3E-03	1E-07	
24529 NEPTUNE AVE	1E-02	1E-06		1E-02	8E-07	
24529 PANAMA AVE	1E-03	5E-08		1E-03	5E-08	
24529 RAVENNA AVE	4E-03	2E-07		3E-03	2E-07	
24532 MARBELLA AVE	2E-03	4E-07		2E-03	3E-07	
24532 NEPTUNE AVE	1E-02	8E-07		1E-02	8E-07	
24532 PANAMA AVE	5E-03	4E-07		4E-03	2E-07	
24532 RAVENNA AVE	2E-03	2E-07		2E-03	2E-07	
24533 MARBELLA AVE	2E-03	1E-07		2E-03	1E-07	
24533 NEPTUNE AVE	3E-03	4E-07		9E-04	4E-08	
24533 PANAMA AVE	2E-03	8E-08		2E-03	8E-08	
24533 RAVENNA AVE	5E-03	2E-07		5E-03	2E-07	
24602 MARBELLA AVE	1E-03	2E-07		1E-03	1E-07	
24602 NEPTUNE AVE	2E-03	1E-06		2E-03	1E-06	
24602 PANAMA AVE	4E-03	2E-07		4E-03	2E-07	
24602 RAVENNA AVE	4E-03	2E-07		4E-03	2E-07	
24603 MARBELLA AVE	1E+00	**1E-04**	Benzene, Ethylbenzene	1E+00	**1E-04**	Benzene, Ethylbenzene
24603 NEPTUNE AVE	1E-03	6E-08		1E-03	6E-08	
24603 PANAMA AVE	3E-03	2E-07		3E-03	1E-07	
24603 RAVENNA AVE	6E-03	1E-07		6E-03	1E-07	
24606 MARBELLA AVE	5E-03	2E-07		5E-03	2E-07	
24607 MARBELLA AVE	2E-03	5E-07		2E-03	4E-07	
24608 NEPTUNE AVE	7E-03	**2E-06**	no COC-specific risk >1E-06	6E-03	1E-06	
24608 PANAMA AVE	4E-02	**6E-06**	Chloroform	2E-02	1E-06	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24608 RAVENNA AVE	4E-03	7E-07		4E-03	7E-07	
24609 NEPTUNE AVE	2E-03	9E-07		2E-03	9E-07	
24609 PANAMA AVE	3E-02	**5E-06**	Carbon Tetrachloride	3E-02	**5E-06**	Carbon Tetrachloride
24609 RAVENNA AVE	2E-03	6E-08		2E-03	6E-08	
24612 MARBELLA AVE	1E-03	6E-07		2E-05	--	
24612 NEPTUNE AVE	1E-03	9E-08		1E-03	6E-08	
24612 PANAMA AVE	2E-03	1E-07		1E-03	6E-08	
24612 RAVENNA AVE	4E-03	2E-07		4E-03	2E-07	
24613 MARBELLA AVE	1E-02	7E-07		1E-02	7E-07	
24613 NEPTUNE AVE	2E-03	7E-07		2E-03	7E-07	
24613 PANAMA AVE	2E-02	**2E-06**	no COC-specific risk >1E-06	2E-02	**2E-06**	no COC-specific risk >1E-06
24613 RAVENNA AVE	1E-02	4E-07		1E-02	4E-07	
24616 MARBELLA AVE	9E-02	**2E-05**	BDCM, DBCM	7E-02	8E-07	
24617 MARBELLA AVE	5E-03	3E-07		5E-03	3E-07	
24618 NEPTUNE AVE	3E-03	3E-07		2E-03	2E-07	
24618 PANAMA AVE	2E-03	3E-07		1E-03	6E-08	
24618 RAVENNA AVE	7E-03	1E-06		4E-03	2E-07	
24619 NEPTUNE AVE	5E-04	2E-08		5E-04	2E-08	
24619 PANAMA AVE	1E-02	6E-07		1E-02	6E-07	
24619 RAVENNA AVE	3E-03	2E-07		3E-03	2E-07	
24622 MARBELLA AVE	4E-04	7E-08		2E-04	2E-08	
24622 NEPTUNE AVE	7E-03	6E-07		6E-03	5E-07	
24623 MARBELLA AVE	9E-03	**3E-06**	Benzene	9E-03	**3E-06**	Benzene
24623 NEPTUNE AVE	4E-03	2E-07		4E-03	2E-07	
24627 MARBELLA AVE	5E-03	2E-07		5E-03	2E-07	
24628 MARBELLA AVE	1E-03	5E-08		1E-03	5E-08	
24628 NEPTUNE AVE	3E-02	**7E-06**	BDCM, Chloroform	6E-03	9E-08	
24629 NEPTUNE AVE	2E-02	**6E-06**	Benzene	2E-02	**6E-06**	Benzene

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24632 NEPTUNE AVE	1E-02	8E-07		1E-02	6E-07	
24633 MARBELLA AVE	5E-03	2E-07		5E-03	2E-07	
24700 MARBELLA AVE	1E-02	9E-07		1E-02	8E-07	
24700 RAVENNA AVE	3E-03	5E-07		2E-03	1E-07	
24702 NEPTUNE AVE	2E-05	--		2E-05	--	
24702 PANAMA AVE	9E-04	1E-07		9E-04	1E-07	
24703 MARBELLA AVE	4E-03	7E-07		4E-03	7E-07	
24703 NEPTUNE AVE	4E-02	5E-07		4E-02	5E-07	
24703 RAVENNA AVE	3E-03	2E-07		3E-03	2E-07	
24706 MARBELLA AVE	4E-02	1E-06		3E-02	5E-07	
24706 RAVENNA AVE	7E-03	1E-06		5E-03	6E-07	
24707 MARBELLA AVE	5E-03	4E-07		5E-03	4E-07	
24708 PANAMA AVE	3E-03	1E-06		3E-03	1E-06	
24709 NEPTUNE AVE	1E-01	**5E-06**	Naphthalene	1E-01	**5E-06**	Naphthalene
24709 PANAMA AVE	2E-02	9E-07		2E-02	7E-07	
24709 RAVENNA AVE	3E-02	7E-07		3E-02	7E-07	
24710 MARBELLA AVE	4E-02	5E-07		4E-02	3E-07	
24712 NEPTUNE AVE	9E-02	**6E-06**	Chloroform, Naphthalene	8E-02	**2E-06**	Naphthalene
24712 PANAMA AVE	6E-04	2E-08		6E-04	2E-08	
24712 RAVENNA AVE	4E-03	2E-07		4E-03	2E-07	
24713 MARBELLA AVE	1E-03	6E-08		1E-03	6E-08	
24713 PANAMA AVE	2E-02	**3E-06**	no COC-specific risk >1E-06	2E-02	1E-06	
24713 RAVENNA AVE	9E-03	**2E-06**	Chloroform	8E-04	4E-08	
24715 NEPTUNE AVE	6E-03	2E-07		6E-03	2E-07	
24716 MARBELLA AVE	4E-02	**4E-06**	Chloroform	3E-02	5E-07	
24716 RAVENNA AVE	2E-03	3E-07		1E-03	4E-08	
24717 MARBELLA AVE	5E-03	5E-07		4E-03	4E-07	
24718 NEPTUNE AVE	5E-03	4E-07		5E-03	4E-07	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24718 PANAMA AVE	3E-02	**3E-06**	no COC-specific risk >1E-06	3E-02	1E-06	
24719 NEPTUNE AVE	2E-02	**5E-06**	Chloroform	5E-03	1E-06	
24719 PANAMA AVE	3E-03	2E-07		2E-03	9E-08	
24719 RAVENNA AVE	3E-03	1E-07		3E-03	1E-07	
24722 MARBELLA AVE	2E-03	3E-07		2E-03	3E-07	
24722 NEPTUNE AVE	2E-02	**6E-06**	Benzene	2E-02	**6E-06**	Benzene
24722 PANAMA AVE	2E-02	**3E-06**	no COC-specific risk >1E-06	1E-02	7E-07	
24722 RAVENNA AVE	2E-03	9E-08		2E-03	6E-08	
24723 MARBELLA AVE	2E-02	**3E-06**	PCE	2E-02	**3E-06**	PCE
24723 RAVENNA AVE	3E-03	1E-06		7E-04	3E-08	
24725 NEPTUNE AVE	9E-03	8E-07		7E-03	3E-07	
24726 MARBELLA AVE	4E-03	6E-07		3E-03	3E-07	
24726 RAVENNA AVE	2E-03	1E-07		1E-03	6E-08	
24727 MARBELLA AVE	5E-04	2E-07		5E-04	2E-07	
24728 NEPTUNE AVE	2E-02	1E-06		2E-02	1E-06	
24728 PANAMA AVE	7E-03	1E-07		7E-03	1E-07	
24729 NEPTUNE AVE	8E-03	**2E-06**	no COC-specific risk >1E-06	6E-03	4E-07	
24729 PANAMA AVE	7E-04	3E-08		7E-04	3E-08	
24729 RAVENNA AVE	1E-03	2E-07		1E-03	2E-07	
24732 MARBELLA AVE	3E-03	1E-07		2E-03	1E-07	
24732 NEPTUNE AVE	3E-03	2E-07		2E-03	1E-07	
24732 PANAMA AVE	2E-02	8E-07		2E-02	8E-07	
24732 RAVENNA AVE	3E-02	1E-06		2E-02	2E-07	
24733 MARBELLA AVE	6E-03	6E-07		6E-03	6E-07	
24733 PANAMA AVE	2E-02	**2E-06**	no COC-specific risk >1E-06	1E-02	9E-07	
24733 RAVENNA AVE	2E-03	2E-07		2E-03	1E-07	
24735 NEPTUNE AVE	2E-03	1E-07		1E-03	5E-08	
24736 RAVENNA AVE	7E-02	1E-06		6E-02	2E-07	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24737 MARBELLA AVE	9E-03	6E-07		9E-03	6E-07	
24738 NEPTUNE AVE	5E-02	**2E-06**	no COC-specific risk >1E-06	5E-02	**2E-06**	no COC-specific risk >1E-06
24738 PANAMA AVE	1E-02	1E-06		1E-02	1E-06	
24739 NEPTUNE AVE	1E-02	3E-07		1E-02	2E-07	
24739 PANAMA AVE	3E-03	5E-08		3E-03	5E-08	
24739 RAVENNA AVE	2E-02	2E-07		2E-02	2E-07	
24740 MARBELLA AVE	3E-03	5E-07		3E-03	5E-07	
24741 MARBELLA AVE	2E-01	**6E-06**	PCE	2E-01	**6E-06**	PCE
24743 RAVENNA AVE	4E-03	2E-07		3E-03	1E-07	
24744 MARBELLA AVE	7E-02	**2E-06**	no COC-specific risk >1E-06	7E-02	**2E-06**	no COC-specific risk >1E-06
24748 RAVENNA AVE	8E-03	**2E-06**	no COC-specific risk >1E-06	4E-03	6E-07	
24749 RAVENNA AVE	2E-01	**3E-05**	Benzene	1E-01	**3E-05**	Benzene
24752 RAVENNA AVE	2E-04	3E-08		2E-05	--	
24802 PANAMA AVE	3E-03	5E-07		3E-03	5E-07	
24803 NEPTUNE AVE	3E-03	1E-07		3E-03	1E-07	
24803 PANAMA AVE	4E-03	9E-07		4E-03	8E-07	
24809 NEPTUNE AVE	4E-02	2E-07		4E-02	2E-07	
24809 PANAMA AVE	4E-03	6E-07		3E-03	5E-07	
24812 PANAMA AVE	1E-03	9E-08		1E-03	5E-08	
24813 PANAMA AVE	3E-02	**7E-06**	BDCM, Chloroform	4E-03	4E-07	
24815 NEPTUNE AVE	4E-03	3E-07		4E-03	3E-07	
24818 PANAMA AVE	3E-03	2E-07		3E-03	1E-07	
24819 PANAMA AVE	1E-02	5E-07		1E-02	5E-07	
24822 PANAMA AVE	3E-03	1E-07		3E-03	1E-07	
24823 PANAMA AVE	5E-04	2E-07		5E-04	2E-07	
24825 NEPTUNE AVE	2E-02	**2E-06**	no COC-specific risk >1E-06	1E-02	5E-07	
24828 PANAMA AVE	4E-03	2E-07		4E-03	2E-07	
24829 PANAMA AVE	2E-02	**2E-06**	no COC-specific risk >1E-06	1E-02	1E-06	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
24832 PANAMA AVE	2E-03	8E-08		2E-03	8E-08	
24833 PANAMA AVE	6E-02	1E-06		6E-02	1E-06	
24838 PANAMA AVE	1E-02	**2E-06**	no COC-specific risk >1E-06	1E-02	9E-07	
24904 NEPTUNE AVE	4E-03	4E-07		4E-03	4E-07	
24912 NEPTUNE AVE	6E-02	1E-06		6E-02	1E-06	
301 244TH ST	9E-03	1E-06		9E-03	1E-06	
305 244TH ST	4E-03	3E-07		4E-03	3E-07	
311 244TH ST	2E-03	2E-07		2E-03	9E-08	
317 244TH ST	2E-01	**4E-05**	BDCM, Chloroform	2E-03	4E-07	
321 244TH ST	5E-03	2E-07		5E-03	2E-07	
327 244TH ST	1E-03	1E-07		7E-04	3E-08	
331 244TH ST	4E-03	6E-07		4E-03	6E-07	
337 244TH ST	4E-04	4E-08		2E-04	1E-08	
341 244TH ST	4E-03	2E-07		4E-03	2E-07	
344 249TH ST	8E-03	1E-06		1E-03	7E-08	
345 249TH ST	1E-02	4E-07		1E-02	4E-07	
347 244TH ST	2E-03	1E-07		1E-03	6E-08	
348 248TH ST	7E-03	**3E-06**	Carbon Tetrachloride	6E-03	**3E-06**	Carbon Tetrachloride
348 249TH ST	4E-03	5E-07		4E-03	3E-07	
351 244TH ST	8E-03	1E-06		8E-03	1E-06	
352 249TH ST	5E-02	**5E-06**	PCE	5E-02	**5E-06**	PCE
353 249TH ST	1E-03	1E-07		1E-03	1E-07	
354 248TH ST	4E-03	3E-07		3E-03	3E-07	
357 244TH ST	4E-03	3E-07		4E-03	3E-07	
357 249TH ST	3E-03	1E-06		3E-03	1E-06	
358 249TH ST	3E-03	1E-07		3E-03	1E-07	
360 248TH ST	4E-03	9E-07		4E-03	9E-07	
361 244TH ST	2E-02	6E-08		2E-02	6E-08	

Table 16
Cumulative Risk and Hazard Results, Sub-Slab Soil Vapor
Onsite Resident - Indoor Air Inhalation
Former Kast Property

Location	Resident (EF = 350 d/y)					
	With THMs			Without THMs		
	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers	Noncancer Hazard	Cancer Risk	Risk and/or Hazard Drivers
362 249TH ST	2E-02	9E-07		2E-02	9E-07	
363 249TH ST	4E-03	4E-07		3E-03	1E-07	
364 248TH ST	4E-03	9E-07		4E-03	9E-07	
367 244TH ST	1E-03	5E-07		1E-03	5E-07	
367 249TH ST	1E-02	5E-07		1E-02	3E-07	
368 249TH ST	5E-03	4E-07		5E-03	3E-07	
373 249TH ST	1E-03	5E-08		1E-03	5E-08	
374 248TH ST	2E-02	7E-07		2E-02	5E-07	
374 249TH ST	6E-03	1E-06		1E-03	5E-08	
377 244TH ST	7E-04	2E-07		7E-04	2E-07	
377 249TH ST	1E-02	1E-06		1E-02	3E-07	
378 249TH ST	**5E+00**	**2E-03**	Benzene, Ethylbenzene, Methylene Chloride, Naphthalene	**5E+00**	**2E-03**	Benzene, Ethylbenzene, Methylene Chloride, Naphthalene
383 249TH ST	3E-01	**3E-06**	Naphthalene	3E-01	**3E-06**	Naphthalene
402 249TH ST	4E-03	4E-07		2E-03	9E-08	
408 249TH ST	3E-05	2E-07		3E-05	2E-07	
412 249TH ST	7E-03	4E-07		7E-03	4E-07	

Notes:

[a] Sub-slab soil vapor sampling was not conducted due to a lack of access to the property.

EF = exposure frequency; THM = trihalomethanes; COC = constituent of concern

BDCM = bromodichloromethane; DBCM = dibromochloromethane; PCE = tetrachloroethene; TCE = trichloroethene; VC = vinyl chloride

Bold + Shaded if cumulative noncancer hazard >1 or cumulative cancer risk >1E-06

Table 17
Cumulative Risk and Hazard Results, Soil Vapor
Construction and Utility Maintenance Worker - Outdoor Air Inhalation
Former Kast Property

Location	Construction and Utility Maintenance Worker			
	With THMs		Without THMs	
	Noncancer Hazard	Cancer Risk	Noncancer Hazard	Cancer Risk
24401 MARBELLA AVE	1E-05	6E-10	1E-05	6E-10
24402 NEPTUNE AVE	2E-05	5E-10	2E-05	5E-10
24402 PANAMA AVE	5E-05	2E-09	5E-05	2E-09
24402 RAVENNA AVE	1E-05	8E-10	7E-06	2E-10
24403 NEPTUNE AVE	2E-05	6E-10	2E-05	6E-10
24403 RAVENNA AVE	3E-05	1E-09	3E-05	1E-09
24405 MARBELLA AVE	3E-05	3E-09	3E-05	3E-09
24406 MARBELLA AVE	9E-06	4E-10	8E-06	4E-10
24406 NEPTUNE AVE	4E-04	1E-08	4E-04	1E-08
24406 PANAMA AVE	6E-05	1E-09	6E-05	1E-09
24406 RAVENNA AVE	5E-06	2E-10	5E-06	2E-10
24409 NEPTUNE AVE	2E-05	7E-10	2E-05	7E-10
24409 RAVENNA AVE	7E-06	2E-09	7E-06	2E-09
24410 PANAMA AVE	8E-06	2E-10	8E-06	2E-10
24411 MARBELLA AVE	1E-04	4E-09	1E-04	4E-09
24411 PANAMA AVE	4E-05	1E-09	4E-05	1E-09
24412 MARBELLA AVE	4E-04	2E-09	4E-04	2E-09
24412 RAVENNA AVE	4E-07	9E-11	4E-07	9E-11
24413 NEPTUNE AVE	3E-05	1E-09	3E-05	1E-09
24413 RAVENNA AVE	4E-05	1E-09	4E-05	1E-09
24416 MARBELLA AVE	7E-06	3E-10	7E-06	2E-10
24416 NEPTUNE AVE	9E-06	4E-10	9E-06	3E-10
24416 PANAMA AVE	4E-05	1E-09	4E-05	1E-09
24416 RAVENNA AVE	5E-05	4E-09	5E-05	4E-09
24417 MARBELLA AVE	1E-05	5E-10	1E-05	5E-10
24417 PANAMA AVE	--[a]	--[a]	--[a]	--[a]
24419 NEPTUNE AVE	2E-05	3E-09	8E-07	9E-11
24419 RAVENNA AVE	7E-06	3E-10	7E-06	3E-10
24420 PANAMA AVE	1E-05	4E-10	1E-05	4E-10
24421 PANAMA AVE	1E-05	3E-10	1E-05	3E-10
24422 MARBELLA AVE	2E-05	8E-10	2E-05	7E-10
24422 NEPTUNE AVE	3E-05	2E-09	3E-05	1E-09
24422 RAVENNA AVE	1E-05	4E-10	1E-05	4E-10
24423 MARBELLA AVE	1E-05	6E-10	1E-05	6E-10
24423 NEPTUNE AVE	6E-05	3E-09	5E-05	1E-09
24423 RAVENNA AVE	3E-05	1E-09	3E-05	9E-10
24426 MARBELLA AVE	6E-05	2E-09	6E-05	2E-09
24426 NEPTUNE AVE	2E-05	2E-09	2E-05	2E-09
24426 PANAMA AVE	9E-06	3E-10	9E-06	3E-10
24426 RAVENNA AVE	1E-04	4E-09	1E-04	4E-09

Table 17
Cumulative Risk and Hazard Results, Soil Vapor
Construction and Utility Maintenance Worker - Outdoor Air Inhalation
Former Kast Property

Location	Construction and Utility Maintenance Worker			
	With THMs		Without THMs	
	Noncancer Hazard	Cancer Risk	Noncancer Hazard	Cancer Risk
24427 MARBELLA AVE	1E-05	5E-10	1E-05	5E-10
24427 PANAMA AVE	4E-06	3E-10	3E-06	2E-10
24429 NEPTUNE AVE	2E-05	8E-10	2E-05	8E-10
24429 RAVENNA AVE	7E-06	3E-10	7E-06	3E-10
24430 PANAMA AVE	5E-05	2E-09	5E-05	2E-09
24431 PANAMA AVE	2E-05	7E-10	2E-05	7E-10
24432 MARBELLA AVE	3E-05	1E-09	3E-05	1E-09
24433 MARBELLA AVE	3E-04	5E-09	3E-04	5E-09
24436 PANAMA AVE	2E-05	6E-10	2E-05	6E-10
24502 MARBELLA AVE	2E-05	9E-10	2E-05	5E-10
24502 NEPTUNE AVE	5E-05	3E-09	4E-05	1E-09
24502 PANAMA AVE	6E-05	2E-09	6E-05	2E-09
24502 RAVENNA AVE	2E-05	7E-10	2E-05	7E-10
24503 MARBELLA AVE	2E-05	9E-10	2E-05	9E-10
24503 NEPTUNE AVE	3E-05	3E-09	1E-05	5E-10
24503 PANAMA AVE	2E-05	9E-10	2E-05	9E-10
24503 RAVENNA AVE	3E-06	2E-10	3E-06	1E-10
24506 MARBELLA AVE	9E-05	2E-09	9E-05	2E-09
24507 MARBELLA AVE	6E-06	2E-10	6E-06	2E-10
24508 NEPTUNE AVE	1E-05	4E-10	1E-05	4E-10
24508 PANAMA AVE	5E-03	3E-08	5E-03	3E-08
24508 RAVENNA AVE	9E-06	3E-10	9E-06	3E-10
24509 NEPTUNE AVE	1E-05	5E-10	1E-05	5E-10
24509 PANAMA AVE	2E-05	6E-10	2E-05	6E-10
24509 RAVENNA AVE	2E-05	9E-10	2E-05	8E-10
24512 MARBELLA AVE	2E-05	7E-10	2E-05	7E-10
24512 NEPTUNE AVE	2E-05	7E-10	2E-05	7E-10
24512 PANAMA AVE	1E-05	5E-10	1E-05	5E-10
24512 RAVENNA AVE	1E-05	4E-10	1E-05	4E-10
24513 NEPTUNE AVE	4E-05	2E-09	4E-05	2E-09
24513 PANAMA AVE	4E-05	1E-09	4E-05	1E-09
24513 RAVENNA AVE	2E-05	1E-09	2E-05	1E-09
24516 MARBELLA AVE	6E-05	2E-09	6E-05	2E-09
24517 MARBELLA AVE	3E-05	9E-10	3E-05	9E-10
24518 NEPTUNE AVE	3E-05	3E-09	2E-05	8E-10
24518 PANAMA AVE	2E-05	7E-10	2E-05	7E-10
24518 RAVENNA AVE	3E-05	1E-09	3E-05	1E-09
24519 NEPTUNE AVE	8E-08	2E-12	8E-08	2E-12
24519 PANAMA AVE	2E-05	8E-10	2E-05	8E-10
24522 MARBELLA AVE	3E-05	3E-09	3E-05	3E-09

Table 17
Cumulative Risk and Hazard Results, Soil Vapor
Construction and Utility Maintenance Worker - Outdoor Air Inhalation
Former Kast Property

Location	Construction and Utility Maintenance Worker			
	With THMs		Without THMs	
	Noncancer Hazard	Cancer Risk	Noncancer Hazard	Cancer Risk
24522 NEPTUNE AVE	1E-05	4E-10	1E-05	4E-10
24522 PANAMA AVE	8E-06	3E-10	7E-06	3E-10
24522 RAVENNA AVE	6E-06	6E-10	6E-06	2E-10
24523 MARBELLA AVE	4E-05	2E-09	4E-05	2E-09
24523 NEPTUNE AVE	2E-05	6E-10	2E-05	6E-10
24523 RAVENNA AVE	6E-05	3E-09	5E-05	2E-09
24526 MARBELLA AVE	1E-05	5E-10	1E-05	5E-10
24528 NEPTUNE AVE	4E-05	2E-09	4E-05	2E-09
24528 PANAMA AVE	2E-05	6E-10	2E-05	6E-10
24529 NEPTUNE AVE	4E-05	3E-09	4E-05	3E-09
24529 PANAMA AVE	7E-06	4E-10	7E-06	4E-10
24529 RAVENNA AVE	2E-05	7E-10	2E-05	7E-10
24532 MARBELLA AVE	6E-06	3E-10	6E-06	3E-10
24532 NEPTUNE AVE	3E-05	1E-09	3E-05	1E-09
24532 PANAMA AVE	3E-05	1E-09	3E-05	9E-10
24532 RAVENNA AVE	1E-05	6E-10	1E-05	6E-10
24533 MARBELLA AVE	5E-06	2E-10	5E-06	2E-10
24533 NEPTUNE AVE	7E-06	4E-10	6E-06	2E-10
24533 PANAMA AVE	1E-05	5E-10	1E-05	5E-10
24533 RAVENNA AVE	4E-05	1E-09	4E-05	1E-09
24602 MARBELLA AVE	7E-06	3E-10	7E-06	3E-10
24602 NEPTUNE AVE	8E-06	8E-09	8E-06	8E-09
24602 PANAMA AVE	2E-05	9E-10	2E-05	9E-10
24602 RAVENNA AVE	2E-05	8E-10	2E-05	8E-10
24603 MARBELLA AVE	2E-03	5E-08	2E-03	5E-08
24603 NEPTUNE AVE	1E-05	4E-10	1E-05	4E-10
24603 PANAMA AVE	2E-05	6E-10	2E-05	6E-10
24603 RAVENNA AVE	3E-05	8E-10	3E-05	8E-10
24606 MARBELLA AVE	2E-05	8E-10	2E-05	8E-10
24607 MARBELLA AVE	1E-05	4E-09	1E-05	4E-09
24608 NEPTUNE AVE	2E-05	1E-09	2E-05	1E-09
24608 PANAMA AVE	9E-05	5E-09	7E-05	3E-09
24608 RAVENNA AVE	1E-05	6E-10	1E-05	6E-10
24609 NEPTUNE AVE	1E-05	6E-10	1E-05	6E-10
24609 PANAMA AVE	1E-04	6E-09	1E-04	6E-09
24609 RAVENNA AVE	1E-05	4E-10	1E-05	4E-10
24612 MARBELLA AVE	7E-07	3E-10	1E-07	0E+00
24612 NEPTUNE AVE	9E-06	3E-10	9E-06	3E-10
24612 PANAMA AVE	9E-06	3E-10	9E-06	3E-10
24612 RAVENNA AVE	2E-05	9E-10	2E-05	9E-10

Table 17
Cumulative Risk and Hazard Results, Soil Vapor
Construction and Utility Maintenance Worker - Outdoor Air Inhalation
Former Kast Property

Location	Construction and Utility Maintenance Worker			
	With THMs		Without THMs	
	Noncancer Hazard	Cancer Risk	Noncancer Hazard	Cancer Risk
24613 MARBELLA AVE	1E-04	4E-09	1E-04	4E-09
24613 NEPTUNE AVE	9E-06	5E-09	9E-06	5E-09
24613 PANAMA AVE	3E-05	4E-09	3E-05	4E-09
24613 RAVENNA AVE	2E-05	6E-10	2E-05	6E-10
24616 MARBELLA AVE	9E-05	8E-09	8E-05	2E-09
24617 MARBELLA AVE	2E-05	8E-10	2E-05	8E-10
24618 NEPTUNE AVE	1E-05	5E-10	1E-05	4E-10
24618 PANAMA AVE	9E-06	4E-10	9E-06	3E-10
24618 RAVENNA AVE	3E-05	1E-09	3E-05	9E-10
24619 NEPTUNE AVE	4E-06	1E-10	4E-06	1E-10
24619 PANAMA AVE	3E-05	1E-09	3E-05	1E-09
24619 RAVENNA AVE	1E-05	6E-10	1E-05	6E-10
24622 MARBELLA AVE	2E-07	3E-11	9E-08	6E-12
24622 NEPTUNE AVE	3E-05	3E-09	3E-05	3E-09
24623 MARBELLA AVE	9E-06	1E-09	9E-06	1E-09
24623 NEPTUNE AVE	2E-05	9E-10	2E-05	9E-10
24627 MARBELLA AVE	3E-05	1E-09	3E-05	1E-09
24628 MARBELLA AVE	7E-06	3E-10	7E-06	3E-10
24628 NEPTUNE AVE	3E-05	4E-09	2E-05	5E-10
24629 NEPTUNE AVE	2E-05	3E-09	2E-05	3E-09
24632 NEPTUNE AVE	5E-05	2E-09	5E-05	2E-09
24633 MARBELLA AVE	3E-05	1E-09	3E-05	1E-09
24700 MARBELLA AVE	3E-05	1E-09	3E-05	1E-09
24700 RAVENNA AVE	9E-06	2E-10	9E-06	4E-11
24702 NEPTUNE AVE	2E-07	--	2E-07	0E+00
24702 PANAMA AVE	4E-06	1E-10	4E-06	1E-10
24703 MARBELLA AVE	2E-05	2E-09	2E-05	2E-09
24703 NEPTUNE AVE	9E-05	2E-09	9E-05	2E-09
24703 RAVENNA AVE	2E-05	9E-10	2E-05	9E-10
24706 MARBELLA AVE	3E-05	9E-10	3E-05	6E-10
24706 RAVENNA AVE	2E-05	9E-10	2E-05	7E-10
24707 MARBELLA AVE	3E-05	2E-09	3E-05	2E-09
24708 PANAMA AVE	2E-05	1E-08	2E-05	1E-08
24709 NEPTUNE AVE	7E-04	3E-08	7E-04	3E-08
24709 PANAMA AVE	8E-05	3E-09	8E-05	3E-09
24709 RAVENNA AVE	1E-04	3E-09	1E-04	3E-09
24710 MARBELLA AVE	6E-05	2E-09	6E-05	2E-09
24712 NEPTUNE AVE	3E-04	1E-08	3E-04	1E-08
24712 PANAMA AVE	3E-06	1E-10	3E-06	1E-10
24712 RAVENNA AVE	2E-05	8E-10	2E-05	8E-10

Table 17
Cumulative Risk and Hazard Results, Soil Vapor
Construction and Utility Maintenance Worker - Outdoor Air Inhalation
Former Kast Property

Location	Construction and Utility Maintenance Worker			
	With THMs		Without THMs	
	Noncancer Hazard	Cancer Risk	Noncancer Hazard	Cancer Risk
24713 MARBELLA AVE	9E-06	3E-10	9E-06	3E-10
24713 PANAMA AVE	3E-05	2E-09	3E-05	1E-09
24713 RAVENNA AVE	1E-05	1E-09	6E-06	2E-10
24715 NEPTUNE AVE	1E-05	4E-10	1E-05	4E-10
24716 MARBELLA AVE	4E-05	3E-09	3E-05	9E-10
24716 RAVENNA AVE	7E-06	3E-10	7E-06	2E-10
24717 MARBELLA AVE	2E-05	9E-10	2E-05	8E-10
24718 NEPTUNE AVE	2E-05	7E-10	2E-05	7E-10
24718 PANAMA AVE	2E-05	1E-09	2E-05	5E-10
24719 NEPTUNE AVE	3E-05	3E-09	2E-05	1E-09
24719 PANAMA AVE	1E-05	5E-10	1E-05	5E-10
24719 RAVENNA AVE	2E-05	7E-10	2E-05	7E-10
24722 MARBELLA AVE	1E-05	3E-09	1E-05	3E-09
24722 NEPTUNE AVE	2E-05	3E-09	2E-05	3E-09
24722 PANAMA AVE	7E-05	3E-09	7E-05	2E-09
24722 RAVENNA AVE	1E-05	4E-10	1E-05	4E-10
24723 MARBELLA AVE	3E-05	5E-09	3E-05	5E-09
24723 RAVENNA AVE	6E-06	7E-10	5E-06	2E-10
24725 NEPTUNE AVE	3E-05	1E-09	3E-05	1E-09
24726 MARBELLA AVE	1E-05	7E-10	1E-05	5E-10
24726 RAVENNA AVE	1E-05	4E-10	1E-05	4E-10
24727 MARBELLA AVE	3E-06	1E-09	3E-06	1E-09
24728 NEPTUNE AVE	3E-05	9E-10	3E-05	9E-10
24728 PANAMA AVE	2E-05	5E-10	2E-05	5E-10
24729 NEPTUNE AVE	4E-05	2E-09	4E-05	1E-09
24729 PANAMA AVE	5E-06	2E-10	5E-06	2E-10
24729 RAVENNA AVE	6E-06	3E-10	6E-06	3E-10
24732 MARBELLA AVE	2E-05	6E-10	2E-05	6E-10
24732 NEPTUNE AVE	2E-05	6E-10	2E-05	5E-10
24732 PANAMA AVE	9E-05	3E-09	9E-05	3E-09
24732 RAVENNA AVE	2E-05	6E-10	2E-05	3E-10
24733 MARBELLA AVE	6E-06	4E-10	6E-06	4E-10
24733 PANAMA AVE	7E-05	3E-09	7E-05	3E-09
24733 RAVENNA AVE	5E-06	2E-10	5E-06	2E-10
24735 NEPTUNE AVE	9E-06	3E-10	9E-06	3E-10
24736 RAVENNA AVE	1E-04	1E-09	1E-04	7E-10
24737 MARBELLA AVE	2E-05	6E-10	2E-05	6E-10
24738 NEPTUNE AVE	1E-04	5E-09	1E-04	5E-09
24738 PANAMA AVE	6E-05	3E-09	6E-05	3E-09
24739 NEPTUNE AVE	3E-05	8E-10	3E-05	8E-10

Table 17
Cumulative Risk and Hazard Results, Soil Vapor
Construction and Utility Maintenance Worker - Outdoor Air Inhalation
Former Kast Property

Location	Construction and Utility Maintenance Worker			
	With THMs		Without THMs	
	Noncancer Hazard	Cancer Risk	Noncancer Hazard	Cancer Risk
24739 PANAMA AVE	5E-06	2E-10	5E-06	2E-10
24739 RAVENNA AVE	4E-05	8E-10	4E-05	8E-10
24740 MARBELLA AVE	7E-06	4E-10	7E-06	4E-10
24741 MARBELLA AVE	1E-04	2E-09	1E-04	2E-09
24743 RAVENNA AVE	2E-05	8E-10	2E-05	8E-10
24744 MARBELLA AVE	2E-04	7E-09	2E-04	7E-09
24748 RAVENNA AVE	2E-05	2E-09	2E-05	8E-10
24749 RAVENNA AVE	1E-04	1E-08	1E-04	1E-08
24752 RAVENNA AVE	2E-07	2E-11	1E-07	0E+00
24802 PANAMA AVE	1E-05	6E-10	1E-05	6E-10
24803 NEPTUNE AVE	2E-05	6E-10	2E-05	6E-10
24803 PANAMA AVE	1E-05	8E-10	1E-05	8E-10
24809 NEPTUNE AVE	2E-05	6E-11	2E-05	6E-11
24809 PANAMA AVE	1E-05	7E-10	1E-05	6E-10
24812 PANAMA AVE	8E-06	3E-10	8E-06	3E-10
24813 PANAMA AVE	3E-05	5E-09	2E-05	2E-09
24815 NEPTUNE AVE	2E-05	9E-10	2E-05	9E-10
24818 PANAMA AVE	2E-05	7E-10	2E-05	7E-10
24819 PANAMA AVE	6E-05	2E-09	6E-05	2E-09
24822 PANAMA AVE	2E-05	6E-10	2E-05	6E-10
24823 PANAMA AVE	3E-07	6E-11	3E-07	6E-11
24825 NEPTUNE AVE	8E-05	4E-09	8E-05	3E-09
24828 PANAMA AVE	2E-05	8E-10	2E-05	8E-10
24829 PANAMA AVE	5E-05	2E-09	5E-05	2E-09
24832 PANAMA AVE	1E-05	4E-10	1E-05	4E-10
24833 PANAMA AVE	2E-04	5E-09	2E-04	5E-09
24838 PANAMA AVE	5E-05	2E-09	5E-05	2E-09
24904 NEPTUNE AVE	2E-05	8E-10	2E-05	8E-10
24912 NEPTUNE AVE	1E-04	2E-09	1E-04	2E-09
301 244TH ST	1E-05	4E-09	1E-05	4E-09
305 244TH ST	2E-05	9E-10	2E-05	9E-10
311 244TH ST	1E-05	5E-10	1E-05	5E-10
317 244TH ST	1E-04	2E-08	7E-06	3E-09
321 244TH ST	3E-05	1E-09	3E-05	1E-09
327 244TH ST	5E-06	2E-10	5E-06	2E-10
331 244TH ST	2E-05	2E-09	2E-05	2E-09
337 244TH ST	2E-06	7E-11	2E-06	6E-11
341 244TH ST	2E-05	8E-10	2E-05	8E-10
344 249TH ST	1E-05	1E-09	9E-06	3E-10
345 249TH ST	7E-05	2E-09	7E-05	2E-09

Table 17
Cumulative Risk and Hazard Results, Soil Vapor
Construction and Utility Maintenance Worker - Outdoor Air Inhalation
Former Kast Property

Location	Construction and Utility Maintenance Worker			
	With THMs		Without THMs	
	Noncancer Hazard	Cancer Risk	Noncancer Hazard	Cancer Risk
347 244TH ST	9E-06	4E-10	9E-06	3E-10
348 248TH ST	1E-05	1E-09	1E-05	1E-09
348 249TH ST	2E-05	9E-10	2E-05	9E-10
351 244TH ST	4E-05	2E-09	4E-05	2E-09
352 249TH ST	4E-05	7E-09	4E-05	7E-09
353 249TH ST	6E-06	2E-10	6E-06	2E-10
354 248TH ST	2E-05	8E-10	2E-05	8E-10
357 244TH ST	2E-05	9E-10	2E-05	9E-10
357 249TH ST	2E-06	2E-09	2E-06	2E-09
358 249TH ST	2E-05	9E-10	2E-05	9E-10
360 248TH ST	1E-05	6E-10	1E-05	5E-10
361 244TH ST	3E-05	8E-10	3E-05	8E-10
362 249TH ST	2E-05	6E-10	2E-05	6E-10
363 249TH ST	2E-05	7E-10	2E-05	6E-10
364 248TH ST	2E-05	9E-10	2E-05	9E-10
367 244TH ST	8E-07	2E-10	8E-07	2E-10
367 249TH ST	3E-05	1E-09	3E-05	1E-09
368 249TH ST	2E-05	7E-10	2E-05	7E-10
373 249TH ST	7E-06	3E-10	7E-06	3E-10
374 248TH ST	7E-05	2E-09	7E-05	2E-09
374 249TH ST	1E-05	9E-10	8E-06	3E-10
377 244TH ST	4E-07	1E-10	4E-07	1E-10
377 249TH ST	6E-05	2E-09	6E-05	2E-09
378 249TH ST	3E-03	7E-07	3E-03	7E-07
383 249TH ST	7E-04	1E-08	7E-04	1E-08
402 249TH ST	2E-05	8E-10	2E-05	7E-10
408 249TH ST	5E-06	2E-09	5E-06	2E-09
412 249TH ST	4E-05	2E-09	4E-05	2E-09
Streets	4E-02	3E-06	4E-02	3E-06

Notes:

[a] Soil vapor sampling was not conducted due to a lack of access to the property.

THM = trihalomethanes

No property had a cumulative noncancer hazard >1 nor a cumulative cancer risk >1E-05