

# 5 | HAZARDOUS MATERIALS

## 5.1 | OVERVIEW

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**General characteristics** The term “hazardous materials” covers a large number of gaseous, liquid and solid substances that are toxic, flammable, corrosive, reactive, infectious or explosive. Due to those properties, hazardous materials have the potential to harm human health or environmental resources, especially if managed improperly. Hazardous materials can lead to numerous negative impacts to human health such as kidney and liver toxicity, diseases of the lung, various types of cancer, harm to the central nervous system, deleterious effects on human reproduction and impairment of the blood function. Growing community awareness of the threat posed by hazardous materials has resulted in a complex framework of federal, state, regional and local laws and regulations, and has made hazardous-materials management an increasingly important consideration in land-use planning. The various regulations and programs have detailed planning and management requirements to ensure that hazardous materials and wastes are used, handled, stored, transported and disposed of properly in order to reduce or eliminate harm to public health and environmental resources.



**Sources** Hazardous materials are generated by a broad range of industrial, commercial, transportation-related and other activities essential to the functioning of a technologically complex society; they are even generated by many everyday household activities. Common hazardous materials and sources include solvents, paint, acids, plating solutions and other substances produced by heavy- and light-industrial businesses; waste oil, exhaust emissions and other gases and liquids associated with transportation-related facilities (including airports, seaports, corporation yards and, more indirectly, parking lots, streets and freeways); motor oil and other motor-vehicle fluids used or released by gasoline stations and auto repair and service centers; herbicides, pesticides and other lawn-care chemicals used on golf courses and other landscaped areas; and perchloroethylene, used by numerous dry-cleaning establishments. Finally, common hazardous materials routinely used by individuals and households, in Oakland and elsewhere, include motor oil and other vehicle fluids, paints, thinners and solvents, batteries, and chemical cleaning and lawn-care products. Of special concern are substances classified by federal law as “extremely hazardous materials” and by state law as “acutely hazardous materials” (AHMs). The most common AHMs are ammonia, chlorine gas and sulfuric acid.

**Methods of exposure** When disposed of or released into the environment—whether properly or improperly—hazardous materials become hazardous waste. Disposal or release of, and exposure to, hazardous materials and waste can occur in a number of ways: illegal dumping into the sewer or storm-drain system, into creeks or along roadways; industrial accidents or spills on freeways or railroads; a ruptured gas or petroleum pipeline; leaking underground storage tanks; illegal disposal in household garbage cans for disposal at conventional landfills; demolition or remodeling of older buildings containing asbestos, lead-based paint or other hazardous building materials; contaminated groundwater plumes; application of pesticides or herbicides; and urban storm-water runoff carrying grease, oil and other pollutants. It should be mentioned that hazardous waste from households and small businesses—while much less than that generated by commercial and industrial enterprises—is of particular concern since it is more likely to be disposed of illegally.

**Toxic air contaminants (TACs)** A subset of hazardous materials, TACs are gaseous, or air-borne, toxins, typically occurring at low concentrations and having carcinogenic, mutagenic and other significant adverse impacts on human health. The largest source of TACs is motor-vehicle exhaust from cars, trucks and buses (known as “mobile sources”). Stationary sources of TACs include industrial processes such as

petroleum refining, incineration and plating operations; commercial establishments such as gasoline stations and dry cleaners; and residential fireplaces. Government agencies in charge of controlling air pollution have traditionally focused their efforts on the more common “criteria” air pollutants, which are governed by federal clean-air standards: carbon monoxide, nitrogen dioxide, sulfur dioxide, ozone and particulate matter. However, it is becoming increasingly obvious that TACs—for which nosafe exposure levels have been established—represent the greater respiratory health threat. Regulation of TACs is achieved through permit controls on individual stationary sources and, indirectly, through vehicle-emission standards and fuel specifications.

**Hazardous-waste management hierarchy** The accepted process for managing hazardous wastes is a hierarchy in which the most desirable option is to reduce or eliminate the generation of hazardous waste in the first place by reducing the use of hazardous materials; this process is known as “source reduction” or “pollution prevention.” This option is followed by, in order of decreasing preferability, recycling of the remaining waste for reuse; treatment of the remaining waste by methods other than incineration; treatment by incineration; and, finally, proper and secure disposal of treated residuals in approved repositories. Each step in the hierarchy has significant advantages over steps below it: reduced risks of human exposure, environmental release and liability; reduced costs associated with handling, transportation, treatment and disposal; and a reduced need to expand treatment and disposal facilities. Barriers to source reduction include institutional inertia, and lack of information on the part of businesses and the public on alternatives to hazardous products and on proper disposal methods.

**Contaminated sites** The use of hazardous materials before the adoption of current environmental regulations caused long-term contamination of soil and groundwater and has left a legacy of contaminated sites, especially in older cities such as Oakland. For this reason, many of the regulations and programs related to hazardous materials and wastes are designed not only to prevent future pollution but also to clean up pollution generated in the past. Sites associated with hazardous waste contamination include landfills, rail yards, certain manufacturing operations, and, most commonly, sites with leaking underground storage tanks (LUSTs). Sites with LUSTs include gasoline stations, corporation yards and other places associated with the use, storage or maintenance of fuels and motor vehicles. The risk of hazardous materials releases from contaminated sites is serious but typically not immediately life threatening, and depends on the quantity and toxicity of contaminants, and the available exposure pathways for contaminants to affect human health.



**Brownfields** The term “brownfields” describes vacant, abandoned or underutilized industrial properties with known or suspected contamination on which redevelopment is inhibited by the uncertainties associated with clean-up costs, long-term liability from health and safety risks, and onerous or unclear regulatory requirements. Generally, before a site can be returned to productive use, contamination must be shown not to pose a risk to human health or environmental resources, or it must be cleaned up in order to permanently reduce such risk. Clean-up, also known as “remediation,” is usually a very costly, complicated and time-consuming process, involving many agencies at different levels of government. The level of remediation required at a given site depends on the type and extent of contamination and the type of land use that is planned. It is worth mentioning that any landowner of a contaminated site, whether responsible for the contamination or not, is liable for the cost of clean-up .

**Local risks** Oakland is home to a large number of businesses and facilities that generate, use, store or dispose of hazardous materials. These operations include high-tech manufacturers and biotech firms; businesses serving individual consumers, such as drycleaners and automotive body shops; metal casters and finishers, plastics extruders and fabricators and other light-industrial concerns; hospitals, laboratories and medical offices; and corporation yards and other government facilities. These sites are found throughout the city—as could be expected from such a wide range of land uses—though they are primarily concentrated in the industrial areas of West and East Oakland. Safety requirements notwithstanding, the presence of large quantities of hazardous materials, especially close to populated areas, represents a constant risk. As a relatively dense city with a large industrial presence and extensive freeway and rail networks, Oakland faces daily the risks of a transportation-related or other hazardous-materials incident such as a fire, explosion, spill or accidental gas release. While hazardous-materials incidents can happen anywhere, certain areas of the city are particularly vulnerable to these hazards, namely residences near industrial zones and along interstate highways.

**Relationship to other hazards** The Loma Prieta and Northridge earthquakes are good demonstrations of the relationship that exists between natural hazards and the risks posed by hazardous materials. Both seismic events resulted in dozens of reported hazardous-materials releases, many of which, in turn, triggered fires from leaked natural gas, spilled crude oil and various chemical reactions. Fortunately, extensive damage was averted through a combination of good fortune and effective disaster response. It can

be expected that future strong earthquakes will result in similar accidental releases of hazardous materials, and that the potential for serious harm to human health and property from these releases will continue to be present. Generally, the hazardous materials that would pose the greatest hazard during a disaster are gaseous ones, because they could affect large numbers of people by spreading quickly and easily.

**Related topics in other elements** Several topics related to hazardous materials and waste are covered in the open space, conservation and recreation (OSCAR) element and the land use and transportation element of the Oakland general plan. Chapter 3 of the OSCAR element (“Conservation”) has sections on earth resources, which discusses soils contamination from the storage and disposal of toxic substances and from mining sites; on water resources, which addresses such issues as groundwater pollution, urban runoff, and sewage collection and treatment; and on air resources, which examines the impacts of criteria air pollutants—though not of TACs—on air quality. The land use and transportation element includes as one of its policy goals to improve air quality (by integrating land use and transportation planning and by promoting alternative transportation options).

## 5.2 | INSTITUTIONAL FRAMEWORK

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**U.S. Environmental Protection Agency (EPA)** The EPA is the main regulatory agency of the federal government on water and air quality, hazardous materials, environmental justice and other important environmental issues. The major federal laws that form the legal basis for the EPA’s programs on hazardous materials are:

- Resource Conservation and Recovery Act (RCRA): regulates hazardous waste from its generation to its ultimate disposal, including transportation, treatment and storage; amendments to the law created a comprehensive framework for the management of underground storage tanks (USTs).
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), better known as “Superfund:” regulates the clean-up of closed or abandoned sites that are contaminated with hazardous waste; important subsequent changes and additions to the Superfund program were made by the Superfund Amendments and Reauthorization Act (SARA).





- Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of SARA: this disclosure law requires facilities to report on toxic chemicals and releases in order to help increase the public’s knowledge and access to information, and help communities improve safety procedures.
- Toxic Substances Control Act (TSCA): enables the tracking of approximately 75,000 industrial chemicals produced or imported into the U.S., and allows the EPA to ban the manufacture and import of those chemicals that pose unreasonable risks.
- Clean Air Act (CAA): established a permit program for large stationary sources of air pollution, created a comprehensive approach to reducing pollution from motor vehicles, requires industrial plants to develop plans to prevent accidental releases of HAPs, and established the Chemical Safety Board to investigate such accidents; amendments to the act passed in 1997 expanded the EPA’s authority to regulate HAPs from stationary sources.

**California Environmental Protection Agency (Cal/EPA)** Cal/EPA is an “umbrella” agency made up of the following six boards, departments office charged with protecting human health and the environment in California:

- Air Resources Board (ARB): sets air-quality standards and emission standards for fuels and motor vehicles; establishes control measures for TACs; and assists local air quality districts with the regulation of stationary air-pollution sources.
- Department of Pesticide Regulation (DPR): regulates the registration, sale and use of pesticides.
- Department of Toxic Substances Control (DTSC): regulates hazardous waste, including the clean-up of contaminated sites.
- California Integrated Waste Management Board (IWMB): manages the state’s solid-waste stream, regulates landfills and other waste-management facilities, and cleans up illegal dumps.
- Office of Environmental Health Hazard Assessment (OEHHA): evaluates risks posed by hazardous substances, and develops and disseminates toxicological and medical information relevant to decisions concerning public health.
- State Water Resources Control Board (SWRCB): in coordination with nine regional water quality control boards (RWQCBs), develops and enforces water-quality objectives and implementation plans to protect the beneficial uses of the state’s waters; the City of Oakland falls within the jurisdiction of the San Francisco Bay RWQCB.

**California regulations** California has often taken the lead among states in regulating the management of hazardous materials. Many significant regulations were enacted in the 1980s, when awareness of the threat posed by hazardous substances became a mainstream concern. Most regulations dealing with hazardous materials and waste can be found under the California Health and Safety Code (HSC). In addition to the HSC chapters mentioned in the next section (“Unified program”), important chapters and sections under the HSC include:

- Division 11 (“Explosives”).
- Division 20: Safe Drinking Water and Toxic Enforcement Act of 1986, better known as Proposition 65 (chapter 6.6); chapter 6.65 (“Unified agency review of hazardous materials release sites”); Underground Storage Tank Cleanup Trust Fund Act (chapter 6.75); Hazardous Substance Account Act (California’s equivalent of the federal Superfund program; chapter 6.8); and chapter 6.95 (“Hazardous materials release response plans and inventory”).
- Division 26: §39650 et seq. (“Toxic air contaminants”); and Air Toxics “Hot Spots” Information and Assessment Act (§44300 et seq.).
- Division 104: California Hazardous Substances Act (§108100 et seq.); California Safe Drinking Water Act (§116270 et seq.); Medical Waste Management Act (§117600 et seq.); and California Indoor Clean Air Act (§118875 et seq.).

**Unified program** In an effort to streamline the management of hazardous materials, the state established the unified hazardous waste and materials management program (“unified program”) to coordinate and make consistent the administration, permitting, inspection and enforcement for six environmental regulatory programs. The unified program is implemented at the local-government level by certified unified program agencies (CUPAs), usually the local fire or environmental-health department. The six regulatory programs brought under the unified program are:

- Hazardous-materials release response plans and inventories (better known as “business plans” for hazardous materials).
- California accidental release prevention (CalARP).
- Installation, operation and maintenance oversight of underground storage tanks (USTs).
- Spill-prevention, control and countermeasure (SPCC) plans for above-ground petroleum storage tanks.
- Tiered permitting of hazardous-waste generation and onsite treatment.
- California Uniform Fire Code requirements concerning hazardous-material management plans and inventories.

Regulations establishing the unified program are found under chapter 6.11 of the California Health and Safety Code (HSC). Regulations concerning the six component programs are found under HSC division 20, chapter 6.5 (hazardous waste permitting); chapter 6.67 (above-ground storage tanks); chapter 6.7 (underground storage tanks); and chapter 6.95 (hazardous-materials business plans, and CalARP); and section 80.103 of the Uniform Fire Code (fire-code requirements).



**California Environmental Quality Act (CEQA)** The state’s CEQA guidelines propose a wide range of environmental impacts that public agencies should consider in their evaluation of development proposals. Considerations related to hazardous materials include the potential for a project to:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- be located on a site which is included on a list of hazardous materials sites and, as a result, create a significant hazard to the public or the environment;
- conflict with or obstruct implementation of the applicable air quality plan;
- violate any air quality standard or contribute substantially to an existing or projected air quality violation; and
- expose sensitive receptors to substantial pollutant concentrations.

**Bay Area Air Quality Management District (BAAQMD)** The BAAQMD is the regional agency that controls air pollution in most of the nine-county San Francisco Bay Area. Its regulatory air-toxics program integrates federal and state mandates to reduce ambient concentrations of TACs and the public’s exposure to them. The BAAQMD regulates TACs from stationary sources through its permit process; mobile sources are regulated indirectly through vehicle-emissions standards and fuel specifications. The main components of the BAAQMD’s air-toxics program are:

- Pre-construction review of new and modified stationary sources for potential health impacts, and requirements for the use of the “best available control technology.”
- Identification of industrial and commercial facilities that could cause TAC “hot spots” (locally elevated ambient concentrations), evaluation of health risks from these facilities, specific public-notification requirements for different risk levels, and requirements for the reduction of risks to below-significant levels.
- Control measures to reduce emissions from various categories of TAC sources.
- Annual inventories of TAC emissions from permitted stationary sources.
- Monitoring of ambient concentrations of TACs through a regional network of monitoring stations.

**Alameda County Hazardous Waste Management Plan** Pursuant to state law, each county is required to prepare a plan for the management of hazardous wastes produced within the county. Alameda County’s plan is prepared by the Alameda County Waste Management Authority, an agency that also provides technical assistance to its member agencies in the implementation of the plan. (The Authority operates under a joint exercise-of-powers agreement among the county, each of the 14 cities in the county—including Oakland—and two sanitary districts; also, it operates collectively as one agency with the Alameda County Source Reduction and Recycling Board.) The primary focus of the plan is the maximum feasible reduction of hazardous waste generated in the county in order to minimize the number of hazardous-waste management facilities needed to manage that waste. The plan sets out goals and policies; provides a comprehensive overview of current conditions; projects future conditions based on current and expected trends; and lays out an implementation program for achieving hazardous-waste minimization. The city’s land use and transportation element was amended on July 21, 1998 to incorporate by reference the goals, policies, facility-siting criteria and other provisions of the plan.

**OFD Office of Emergency Services (OES)** Pursuant to approval received from Cal/EPA and to an agreement with the County of Alameda, the City of Oakland has assumed CUPA responsibilities (see above). OES is the designated city office responsible for local administration and enforcement of the unified program. In its role, OES issues permits for, and inspects, facilities that handle hazardous materials or waste; oversees the reporting of disclosure forms, risk-management plans, hazardous-materials assessment reports and remediation plans, and closure plans by such facilities; and provides information to the public and other city agencies.

**Other local regulations** In addition to the ordinances mentioned above, the city has enacted a number of regulations dealing with issues related to hazardous materials, including the use of fireworks, disposal of hazardous materials, property blight, transport of explosives and radioactive materials, designated truck routes, notification of spills into surface waters, and electroplating activities. In addition, there are local amendments to the California Building Code addressing the storage of hazardous materials and fire-sprinkler standards when code limits on the quantity of hazardous materials used or stored are exceeded.

**Oakland’s hazardous materials area plan** State law requires cities that serve as their own lead enforcement agency for the regulation of hazardous materials to prepare

Regulations concerning the city’s assumption of responsibility for implementation of the unified program and other programs related to the management of hazardous materials are found in chapter 8.42 of the Oakland Municipal Code.

Regulations pertaining to explosives and fireworks are found in chapter 8.06 of the Oakland Municipal Code; the disposal of hazardous materials, in section 8.28.130; property blight, in chapter 8.24; transport of radioactive materials, in section 8.38.200; designated truck routes, in chapter 10.52; notification of spills, in section 13.16.220; and electroplating activities, in section 17.102.340. Local amendments to the California Building Code addressing the storage of hazardous materials are found in section 15.04.745; and fire-sprinkler standards, in sections 15.04.750 and 15.04.755.

an emergency preparedness and response plan in the event of a disaster related to the use, storage or transport of hazardous materials. Oakland’s plan, prepared by the city’s OES, addresses specific emergency-response responsibilities, protocols and procedures; pre-emergency planning; coordination of response activities with state, federal and other local agencies; training of response personnel; public-safety and information guidelines; emergency-response supplies, equipment and resources; and incident critique and follow-up. Also included in the plan are maps showing the location of facilities with significant concentrations of hazardous materials, evacuation routes from these facilities, and the location of “sensitive receptors” such as schools, hospitals and nursing homes.

**Oakland’s household hazardous-waste element** As required by state law, the City of Oakland has prepared a household hazardous waste (HHW) element, which seeks to ensure that HHW is not mixed with ordinary, non-hazardous solid waste at disposal. (While called an “element,” this document is not part of the Oakland general plan.) This element has among its goals to eliminate HHW disposal to landfills, reduce the generation of HHW, provide adequate opportunities for collection of HHW, ensure that the management of HHW follows the hazardous-waste hierarchy (see previous section), and ensure public health and safety and protection of the environment in managing HHW.

**Urban Land Redevelopment (ULR) Program** In Oakland, many of the large remaining developable sites were in former industrial use and are likely to require some level of hazardous-materials remediation. The ULR program is a collaborative effort by the City of Oakland and the principal agencies charged with enforcing environmental regulations in Oakland—DTSC, SFRWQCB and Alameda County Environmental Health—to facilitate the cleanup and redevelopment of contaminated properties in the city. The program clarifies environmental investigation requirements, standardizes the regulatory process and establishes Oakland-specific criteria that, when met, adequately address the risk posed by contamination to human health. The ULR program assists developers of brownfields to obtain faster regulatory-agency approval of corrective actions, reduce the cost of implementing corrective actions, provide potential lenders with greater certainty regarding environmental costs and facilitate communication with persons who live and work in the vicinity of development sites.

**Other agencies** Numerous federal, state, regional and local agencies besides those mentioned above have responsibility over various aspects of hazardous-materials management affecting the City of Oakland. The U.S. Coast Guard is the first responder

to spills of oil and other hazardous substances in San Francisco Bay. California OES tracks accidental releases and dispatches other agencies to respond to emergencies as needed. The Office of the State Fire Marshal (OSFM) regulates the safety of intrastate pipelines transporting hazardous liquids. The California Public Utilities Commission (CPUC) has safety oversight of heavy-freight railroads and of certain natural-gas and propane facilities in the state. Caltrans, the California Department of Transportation, regulates the transport of hazardous materials and waste by highway. The Association of Bay Area Governments (ABAG) has conducted an inter-jurisdictional process for the allocation of new hazardous-waste management facilities among the nine Bay Area counties, based on a “fair share” method. The District Attorney’s Office of Alameda County handles enforcement actions related to unlawful discharges of hazardous materials occurring in Oakland.

### 5.3 | ANALYSIS

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**Business plan program** This is a disclosure, or “community right to know,” program designed to make available to the public and regulatory agencies information on businesses’ hazmat inventories. It requires businesses that handle above a certain amount of hazardous materials to prepare a “hazardous materials management plan” (HMMP). Required elements of an HMMP include an inventory of the type, quantity and storage location of hazardous materials on site; a detailed site and facility map; and a site-specific emergency-response plan; employee training in safety procedures; and designation of emergency contact personnel. HMMP’s are collected by OES, which uses the information to prioritize inspection of facilities according to hazmat risk. Inspections occur triennially, and are conducted by OES’s hazmat specialists. There are approximately 1,200 local businesses that have businesses plans on file at OES. It can be expected that this number—as well as the total amount of hazardous materials handled in the city—will grow as industrial activity increases in Oakland, especially in the high-tech sector. Continued monitoring and enforcement of existing regulations will be required to reduce the risks posed by industrial growth.

**CalARP program** The purpose of this program is to decrease the risk of an accidental off-site release of a hazardous substance. It requires operators that handle

above a threshold quantity of certain regulated hazardous materials to implement an accidental-release prevention program. Facilities are classified according to three levels—P1, P2 and P3, from most to least risk-prone—depending on the type and quantity of hazardous materials present at a site, a facility’s accident history and other factors reflecting the potential impact of an accidental hazmat release; OFD uses these program levels to prioritize facility inspections. Of the approximately 1,400 facilities on OES’s master database of hazmat facilities, 111 have been assigned a P1 ranking (see Figure 5.1). The majority of these facilities are in West Oakland, in the strip between I-880 and the estuary, and in the San Leandro Street corridor; the zip codes with the greatest number of P1-level facilities are 94601 (19 facilities), 94607 (17) and 94621 (15). In some cases, high-risk facilities are required to prepare and submit risk management plans (RMPs), which must include a description of current and past practices and releases, a detailed engineering analysis of the potential accident factors present at a business, and mitigation measures that can be implemented to reduce this accident potential; and which must incorporate into their analysis external events such as seismic activity, and consider the facility’s proximity to sensitive receptors. Of the city’s P1-level facilities, nine have RMPs on file (see also Figure 5.1).

**UST program** Because of the fire hazard they pose, flammable liquids have historically been stored in USTs. The majority of USTs contain petroleum products (such as gasoline, diesel, heating oil, kerosene and jet fuel) and are primarily associated with service stations (although they are also found in connection with hospitals and other facilities with back-up power supplies). The UST program seeks to prevent contamination of soil and groundwater from the underground storage of hazardous materials. Through this program, OES grants permits for new USTs (provided they are designed to prevent or contain leaks for the lifetime of the tank), inspects existing UST for leak-monitoring and containment measures, and conducts site investigation and clean-up, and enforcement actions. There are 164 facilities in Oakland with at least one UST, of which 33 have at least four tanks and seven have at least five tanks (see Figure 5.1). The zip codes with the greatest number of facilities with USTs are 94607 (27 facilities), 94621 (20) and 94601 (16).

**Aboveground storage tank program** This program requires operators of large aboveground petroleum storage tanks to disclose information about their storage facilities and to implement a “spill prevention control and countermeasure” (SPCC) plan. Program inspections are conducted by the SFRWQCB or by OES. There are 225 facilities in Oakland with at least one aboveground storage tank, of which 39 have at



least five (see Figure 5-1) and nine have at least ten (see also Figure 5-1). The zip codes with the greatest number of facilities with aboveground storage tanks are 94601 (39 facilities), 94607 (34), and 94621 (31).

**Hazardous-waste tiered permitting program** The management of hazardous waste requires detailed, extensive and costly record-keeping. All businesses and other non-household entities that generate, store, transport or dispose of hazardous waste must obtain a U.S. EPA identification number, used to track the waste from its point of origin to its final disposal (“cradle to grave”). There are approximately 980 facilities on OES’s master database that generate hazardous wastes. Tiered permitting is a five-level authorization program for the treatment, storage and disposal of hazardous waste. The first three tiers— presently administered by OES—are for the regulation of on-site treatment of small amounts of hazardous waste. The fourth tier, or “standardized permit,” is for off-site treatment or storage of wastes not requiring a federal permit while the fifth tier is for full treatment, storage or disposal, requiring a federal permit. Hazwaste generators must, in general, contract with a licensed hazardous-waste hauler to collect, transport, treat, store and dispose of their waste. Small businesses may dispose of their waste through the conditionally exempt small-quantity generator program. Since there are no Class I (hazardous waste) repositories in Alameda County, wastes generated in Oakland must be transported outside the county for disposal.

**Household hazardous-waste management** In 2000, the Alameda County Waste Management Authority and Source Reduction and Recycling Board (ACWMA) conducted a solid-waste characterization study to determine the composition of solid waste generated by Alameda County, including by each of the county’s 14 incorporated municipalities. The study estimated that Oakland residents and businesses caused 2,184 tons of HHW to be landfilled in the year 2000 (representing 0.6%, by weight, of the city’s waste stream). This was a marked increase from 1,453 tons (and 0.3% of the waste stream) in 1995, estimated by a previous ACWMA study. Based on surveys conducted at HHW collection events, the Oakland HHW element assumes that one ton of HHW is dumped illegally into the sewer and storm-drain systems and into the ground for every 4.5 tons disposed of in the garbage, as part of the waste stream. Based on this assumption, Oaklanders dumped 485 tons of HHW illegally into sewers, storm drains and the soil in the year 2000.

The proper method for the disposal of household hazardous waste in Oakland is less than convenient, as residents must generally deliver the material themselves to a

hazardous-waste management facility. Pursuant to its hazardous-waste management plan (see previous section), Alameda County has developed three permanent facilities for the collection and recycling of household hazardous-waste, including one in Oakland, at 2100 East Seventh Street. (The other facilities are located in Hayward and Livermore.) These facilities collect, identify, sort, store, pack and recycle or dispose of the most common types of hazardous wastes used by Alameda County residents and “small-quantity generators.” In addition, there are several private facilities in the county and around the Bay Area that recycle many types of household hazardous waste, including household and motor-vehicle batteries, motor oil, oil filters, paint and solvents. Also, the City of Oakland provides residential curbside collection of used motor oil. The lack of convenient, low-cost disposal options, combined with ignorance about the consequences, is the main reason for the illegal disposal of household hazardous waste.



**Toxic air contaminants** The BAAQMD works to control both ambient background concentrations of TACs and locally elevated concentrations (or “hot spots”). Unlike for criteria air pollutants, no ambient air-quality standards have been established for TACs. Nevertheless, the BAAQMD and ARB operate a network of 20 TAC monitoring stations in the Bay Area, primarily as a way to measure the effectiveness over time of TAC control strategies and to enable population-risk assessments. Two of the stations are located in Oakland, at 198 Oak Rd. (Davie Stadium) and at 2419 Filbert St. The BAAQMD has found that ambient background concentrations of TACs are low throughout the Bay Area. In 2000, the Oakland station recorded a higher “mean concentration” (or arithmetic average) than the average across all Bay Area sites for only one of 12 TACs monitored (carbon tetrachloride), and then, only slightly higher (an average of 11 parts per billion, or ppb, at the Oakland site compared to an average of 10 ppb across all sites).

The BAAQMD’s air toxics “hot spots” program involves the evaluation of health risks due to routine and predictable TAC emissions from industrial and commercial facilities, and requires notification to the public of significant health risks. The number of facilities in the Bay Area posing health risks that required public notification has decreased steadily since the inception of the program, from 30 in 1991 to nine in 1993, two in 1995, and zero currently. (It should be noted that facilities evaluated do not include dry cleaners and gasoline stations, which are being considered on an industry-wide basis statewide.)

Additionally, the BAAQMD maintains an annual inventory of TAC emissions from stationary sources in the Bay Area with emissions above certain thresholds established for some 113 different TACs. The inventory includes routine releases, and is not intended to describe the potential for acute hazards from accidental releases. BAAQMD's year 2001 inventory lists 53 facilities in Oakland with above-threshold emissions (see figure 5-1). The zip codes with the most facilities are 94601 and 94610 (seven facilities each) and 94605, 94611 and 94621 (five each). Of the 53 facilities, almost two thirds (35) are dry cleaners exceeding threshold emission levels only of perchloroethylene (or "perc"). Notable emitters of particular TACs in Oakland in 2001 included:

- American Brass & Iron Foundry, which was the largest emitter of beryllium and of chlorinated dioxins and furans in the Bay Area, the second-largest emitter of arsenic, and the fourth-largest emitter of cadmium and manganese.
- Dollar Cleaners the fourth-largest emitter of perc (out of 882 reported emitters).
- EBMUD, the largest emitter of acrolein, second-largest of chloroform and dichlorobenzene, and eighth-largest of ammonia and benzene.
- Integrated Environmental Systems, the second-largest emitter of hydrogen chloride. (This firm has since its closed its facility in Oakland.)
- Mountain View Cemetery Association, the fourth-largest emitter of chlorinated dioxins and furans.
- Owens-Brockway Glass Container, the largest emitter of lead and selenium, and second-largest of cadmium.
- Rolls-Royce Engine Services, the third-largest emitter of trichloroethylene.
- Lesaffre Yeast and Fleischmann's Yeast, respectively the largest and second-largest emitters of acetaldehyde. (These firms have since closed their plants in Oakland.)

Public perceptions to the contrary, the majority of TACs in the Bay Area are generated not by stationary sources but by mobile sources: automobiles and light trucks, for example, emit over a third of TACs while refineries, in contrast, generate only two percent. (Also, growing evidence indicates that exposure to diesel emissions from vehicles in the form of particulate matter result in cancer risks that dwarf measured risks from all other TACs combined.) Indirectly, the largest generators of TACs are major traffic thoroughfares; in Oakland, these are interstate highways 80, 580, 880 and 980, and state routes 13 and 24. Oakland's role as the Bay Area's transportation hub and its location at the intersection of several interstate highways, makes the city especially vulnerable to TAC exposure from mobile sources. The biggest obstacle to local



improvements in air quality will be regional increases in traffic—much of which will be funneled through the city—from new land-use developments. While the city’s environmental review process and the BAAQMD’s permitting requirements ensure that the air-quality impacts from stationary sources are kept at acceptable levels, reducing the impacts from mobile sources will require fundamental changes in travel behavior. Local governments have a role in reducing public exposure to TACs by encouraging such changes. The air-resources section of the city’s OSCAR element contains several policies to improve air quality by encouraging transportation alternatives and land use patterns that reduce automobile dependence (see Appendix A). *Emission Oakland*, the city’s land use and transportation element, includes among its policy goals to integrate land use and transportation planning, to promote alternative transportation options, and to improve air quality. (Policies related to these goals are too numerous to have been listed in Appendix B, which lists only those policy statements from the land use and transportation element that are most directly related to issues in the safety element.)

**Contaminated sites and brownfields** Through its Superfund program, the U.S. EPA maintains the “Comprehensive Environmental Response, Compensation, and Liability Information System” (CERCLIS), a nationwide database of approximately 11,200 hazardous-waste sites, potential hazardous-waste sites, and sites on which there are ongoing remedial activities. There are 23 CERCLIS sites in Oakland (see Figure 5.1), six each in the 94621 and 94607 zip codes, four in 94603, two in 94619 and one each in 94608, 94609, 94613, 94625 and 94626. In addition, and as part of the CERCLIS database, the EPA maintains the “National Priority List” (NPL), an inventory of the most seriously contaminated sites throughout the country. The NPL currently includes approximately 1,200 sites, of which one is located in Oakland: AMCO chemical, at 1414 Third Street (see Figure 5.1).

In addition, the California DTSC maintains a “Site Mitigation and Brownfields Reuse Program” database which lists sites where hazardous substances have been released or where the potential for a release exists. The database inventories sites under six categories:

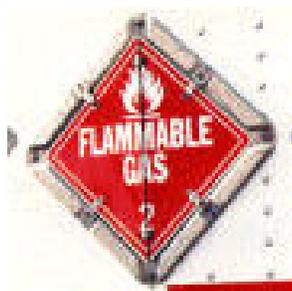
- CalSites properties, or state Superfund sites: properties where hazardous-substance releases have been confirmed and are, therefore, considered to pose the greatest threat to the public or the environment. The CalSites database currently lists 28 such properties in Oakland (see Figure 5.1), of which eleven are in the 94607 zip code, four in 94601, three in 94603, two each in 94604, 94608 and 94609, and one each in 94605, 94606, 94621 and 94625.

- School-property evaluation program: proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination; there are 14 such properties in Oakland.
- Voluntary cleanup program: low-threat-level properties for which project proponents have requested that DTSC oversee investigation or cleanup and have agreed to cover DTSC's costs; the database includes 45 such properties in Oakland.
- Referred to another local or state agency: properties with unconfirmed contamination and, because they were determined not to require DTSC action or oversight, have been referred to another state or local regulatory agency; there are 28 such properties in Oakland.
- Needing further evaluation: properties suspected, but not yet confirmed, of being contaminated; the database lists 10 such properties in Oakland.
- No further action determination: properties that do not pose a problem to the environment or to public health; of such properties, 15 are in Oakland.

Finally, the SWRCB maintains an online database, called GeoTracker, that provides regulatory data about leaking underground fuel tanks (LUFTs, the majority of which are located at operating or former gas stations), fuel pipelines and public drinking-water supplies. GeoTracker reports 770 facilities in Oakland with LUFTs, of which 312 have an “open” status (meaning that there is an ongoing investigation or remediation of a fuel release to the underlying soil or groundwater) and 458 have a “closed” status (meaning that they have been investigated and met regulatory cleanup requirements.) While active (or “open”) LUFTs are scattered throughout the city, the most significant concentrations are in West Oakland, downtown, along San Pablo Avenue, Highway 24, Broadway and MacArthur Boulevard, and in the area between International Boulevard and the estuary (especially along International, San Leandro Street and Hegenberger Road).

In addition to the above-mentioned known hazardous-waste sites, contamination could exist on other formerly industrial sites. Records of previous activities usually do not document use of hazardous materials; however, activities such as rail transportation, paint products manufacturing, metal plating and transformer work could well have resulted in site contamination. In addition, Oakland has many older buildings with asbestos, lead paint, PCBs and other materials that are potentially hazardous if disturbed. Special demolition and disposal requirements could be necessary to reduce the risk of airborne contaminants if such buildings are renovated or if the sites on which they sit are redeveloped.

**Transportation** The transportation of hazardous materials through populated areas constitutes a potential significant public-safety hazard. A hazardous-materials spill, release or other transport-related accident can endanger life and property, and contaminate surface water and groundwater. Oakland’s role as the Bay Area’s transportation hub makes it particularly vulnerable to truck and rail accidents involving hazardous materials. Oakland is traversed by four interstate highways (I-80, I-580, I-880 and I-980) and three transcontinental railroad lines; also, the city is home to the Port of Oakland, one of the world’s largest gateways for ocean-borne cargo and the Bay Area’s top destination for truck and rail traffic, and for hazardous materials in general (see Figure 5.1). The transport of hazardous materials is closely regulated by the federal and state governments to minimize the potential for releases of hazardous materials; due to the interstate-nature of commercial and industrial transportation, the City of Oakland is able to regulate transport on city streets only. Generators of hazardous waste, in particular, are required to track the transport of their wastes to the ultimate disposal location through the use of “manifests,” forms which indicate the types and amounts of hazardous wastes being transported.



Highway transportation of hazardous materials represents a much greater threat than railroad transportation, because of the higher volume of truck traffic than of railroad traffic and because trucks, unlike trains, do not travel on segregated rights of way. The main route for hazardous-materials transport through Oakland is I-880, both because it provides a direct connection to the Port of Oakland and because it runs through most of the heavy-industrial areas of southeastern Alameda County. Secondary to I-880 as hazardous-materials routes through Oakland are I-80 and I-980. (I-580 presents little threat, as trucks are prohibited on this highway through Oakland and San Leandro.) The proximity of downtown Oakland and other densely populated neighborhoods of the city to these routes suggests the potential for a disastrous transportation-related accident involving hazardous-materials. (To minimize the number of people exposed to safety risks, areas along designated truck routes should ideally be low-occupancy land uses; in practice, this is very difficult as truck routes are generally major arterials that also offer ease of access for commercial and residential uses.) The risk of transportation-related accidents is mitigated by the many federal and state safety precautions, and by the fact that accidents on freeways are likely to be detected and reported quickly. In the event of a spill or other accidental release, OFD would be the first responder, while Caltrans would assume responsibility for the subsequent clean-up.

**Pipelines** The proximity to populated areas of pipelines carrying hazardous liquids is a potential safety threat. Intense earthquake-induced ground-shaking, for example, could damage pipelines, creating the potential for fires, explosions and the contamination of groundwater. Pipelines for the transportation of liquefied natural gas (LNG), crude oil and refined-petroleum products traverse Oakland, including residential and commercial areas of the city. (Due to safety concerns, the state’s Office of the State Fire Marshal, which regulates intrastate pipelines carrying hazardous liquids, no longer disseminates pipeline-mapping data for public use.) Pipelines which present a particular hazard are those that cross active and potentially active fault lines, unstable slopes and areas underlain by soft mud. The public-safety threat presented by a pipeline rupture or spill would depend on the proximity of the incident to populated areas and on the liquid being transported. (Petroleum products are generally believed to be more hazardous than LNG because they are transported at higher pressures and, when released, flow along the ground, rather than rise and dissipate, as LNG would do; also, petroleum fires are more likely to spread to nearby properties than natural-gas fires, which burn vertically.) Under state and federal laws, local pipeline operators must provide local fire departments with a contingency plan for pipeline emergencies; file leak-mitigation and emergency-response plans with the state; and report pipeline accidents to fire departments and the California OES, which, in turn, notifies the State Fire Marshal for immediate dispatching of employees with technical expertise. In recognition of the hazards posed by pipelines, federal and state laws require that pipelines undergo periodic pressure testing and incorporate means of leak detection, corrosion prevention, valve protection and internal inspection.



**Emergency response** Emergency incidents involving hazardous materials can threaten human life, damage property, contaminate the environment, require the evacuation of nearby populations and block off major transportation routes. Potential hazards include accidental releases of toxic substances, industrial fires and explosion of petroleum products and other chemicals. In Oakland, OFD is responsible for on-scene management of hazardous-materials incidents (though public-works staff respond to small-scale spills and complaints about illegal dumping.) Responding fire engines are assisted by OFD’s hazardous materials response team, which is dispatched to the scene with a van from fire station #3 equipped with specialized apparatuses and personal-protection equipment. The hazmat team includes specialists from the city’s OES, and is able to provide technical expertise in the areas of isolation, identification of chemicals, hazard assessment, containment, mitigation, decontamination and disposal.

The high toxicity of many hazardous materials and the specialized nature of hazmat incidents require adequate response protocols. Oakland’s hazardous materials area plan for emergency response (see previous section) outlines specific procedures for an organized response to hazmat emergencies. The document contains guidelines and instructions on plan activation; fire and police dispatch; immediate response; situation assessment; evacuation, crowd and traffic control, and sheltering; notification to the public, regional, state and federal agencies, and medical facilities; internal and mutual-aid coordination and communication; training, drills and exercises; maintenance of supplies and equipment; and incident critique and follow-up. The plan also lists the specific responsibilities of city departments and county, state, federal and non-governmental agencies that could be expected to play a role in the event of a hazmat incident. The Oakland neighborhoods most vulnerable to a hazmat-related emergency are West Oakland, downtown, and areas alongside I-880. Sites with noteworthy concentrations of hazardous materials include the airport, the seaport, and EBMUD’s wastewater treatment plant (at 2020 Wake Avenue, in West Oakland). A specific concern involves an accident at the wastewater treatment plant resulting in the release of chlorine gas, which is classified as an acutely hazardous materials. It should be mentioned that the parties responsible for hazmat releases are liable for the cost of response.

The zoning ordinance is found under Title 17 (“Planning”) of the Oakland municipal code. Regulations governing the M-30 and M-40 zones are found under chapters 17.70 and 17.72 of the code, respectively; activity types, including general and heavy manufacturing, are defined under chapter 17.10.

**Zoning** One of the biggest challenges related to hazardous materials in Oakland is the incompatible mixture of heavy-industrial and residential land uses. Since land-use zoning is a local-government responsibility, cities can play a key role in reducing public exposure to hazardous materials by separating residential populations from areas of hazardous-materials uses. Under the city’s zoning ordinance, which regulates densities, intensities and specific land uses, the zones most closely associated with the use of hazardous materials are M-30 (“general industrial”) and, especially, M-40 (“heavy industrial”). As shown on Figure 5.1, most M-30 and M-40 zones are found in the areas of the airport and seaport, along I-880 and San Leandro Street, and in West Oakland. Additionally, the city’s S-16 zoning designation (“industrial-residential transition;” see also Figure 5.1) is an overlay that provides transition areas between incompatible uses, mostly in West Oakland, by limiting the impacts of new industrial development on adjacent residential zones; it prohibits such activities as automotive repair, certain transport and warehousing operations, general manufacturing, and industrial hazardous-waste transfer and storage.

In areas of incompatible land uses between residential and business users, residents suffer from noise, emissions, toxins, odor, glare and other industrial impacts while

industry suffers from complaints and restrictions over their operations. The land use and transportation element (LUTE) sets out a number of “good neighbor” criteria to address land-use conflicts. These include the development and enforcement of codes and guidelines, targeted relocation of facilities, a gradual transition to low-impact businesses and mediation of disputes. The LUTE singles out three areas as having incompatible and conflicting land uses: the West Clawson neighborhood in West Oakland; Lower Fruitvale; and San Leandro Street between High Street and the city of San Leandro, particularly along Railroad Avenue near Pearmain Street.

In certain areas of the city, residential and industrial uses developed gradually around each other over decades. Meanwhile, as the city’s supply of developable land shrinks, there is the potential for residential uses to encroach into areas dominated by industrial activities. Over the long term, appropriate zoning is a much more effective strategy in reducing conflicts than requiring hazmat facilities to incorporate mitigation measures, most of which are expensive and of limited benefit. Future zoning decisions must be sensitive to the potential conflicts of siting industrial operations near residential areas and other “sensitive receptors,” such as schools, hospitals, and nursing homes, or of developing land within industrial areas with sensitive uses. (Sensitive receptors are facilities that house children, the elderly, the acutely or chronically ill and others who are especially susceptible to the effects of pollution; residential areas are considered sensitive because people are often at home for extended periods.)

The city is also considering a revision of its zoning ordinance to add a “health and safety protection” overlay zone, the purpose of which would be to ensure that activities which use or store hazardous materials on a regular basis are located in appropriate locations and do not endanger public health or the environment. The overlay zone would apply to all areas within “housing and business mix” districts (as designated on the general plan land use map) and to some light-industrial and general-industrial zones and “industrial-residential transition” zones that are within 300 feet of a residential, institutional or open-space zones. Businesses in the overlay zone planning to store and use hazardous materials would be required to obtain a clearance from OFD prior to obtaining a zoning clearance or commencing operation or any alteration of activity. In addition, the overlay zone would prohibit outright electroplating businesses and business that manufacture, store or use explosives or that store hazardous materials or chemicals as a primary activity.

## 5.4 | POLICY STATEMENTS

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**POLICY HM-1** Minimize the potential risks to human and environmental health and safety associated with the past and present use, handling, storage and disposal of hazardous materials.

- ACTION HM-1.1: Continue to exercise unified-program responsibilities, including the issuance of permits for and inspection of certain industrial facilities, monitoring the filing of disclosure forms and risk-management plans, hazardous-materials assessment reports and remediation plans, and closure plans by such facilities.

▶ OFD OFFICE OF EMERGENCY SERVICES

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- ACTION HM-1.2: Continue to enforce provisions under the zoning ordinance regulating the location of facilities which use or store hazardous materials.

▶ CEDA PLANNING AND ZONING DIVISION

▶ OFD OFFICE OF EMERGENCY SERVICES

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- ACTION HM-1.3: Consider adopting a health and safety protection overlay zone or set of procedures to ensure that new activities which use or store hazardous materials on a regular basis near residential zones do not endanger public health or the environment.

▶ CEDA PLANNING AND ZONING DIVISION

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- ACTION HM-1.4: Continue to participate in the Alameda County Waste Management Authority and, as a participant, continue to implement policies under the county’s hazardous-waste management plan to minimize the generation of hazardous wastes.

▶ PWA ENVIRONMENTAL SERVICES DIVISION

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- ACTION HM-1.5: Continue to implement the city’s household hazardous-waste element (including educating residents about waste-disposal options and the consequences of illegal disposal) in order to reduce the generation of household hazardous waste and the amount of such waste that is disposed inappropriately.

▶ PWA ENVIRONMENTAL SERVICES DIVISION

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- ACTION HM-1.6: Through the Urban Land Redevelopment program, and along with other participating agencies, continue to assist developers in the environmental clean-up of contaminated properties.

► **PWA ENVIRONMENTAL SERVICES DIVISION**

- ACTION HM-1.7: Create and maintain a database with detailed site information on all brownfields and contaminated sites in the city.

► **PWA ENVIRONMENTAL SERVICES DIVISION**

**POLICY HM-2** Reduce the public's exposure to toxic air contaminants through appropriate land use and transportation strategies.

- ACTION HM-2.1: Continue to enforce performance standards controlling the emission of air contaminants, particulate matter, smoke and unpleasant odors.

► **CEDA BUILDING SERVICES DIVISION**

- ACTION HM-2.2: Continue to discourage the development of sensitive receptors adjacent to significant sources of air contaminants and encourage industry to adopt best-available control technologies to reduce air contaminants.

► **CEDA PLANNING AND ZONING DIVISION**

- ACTION HM-2.3: Continue to support the efforts of the Bay Area Air Quality Management District's air-toxics program, including the review and permitting of stationary sources, identification of emitting facilities, promulgation of categorical control measures, and monitoring and inventory of emissions.

► **PWA ENVIRONMENTAL SERVICES DIVISION**

- ACTION HM-2.4: Ensure implementation of policies and actions in the land use and transportation element designed to integrate land use and transportation planning and to promote alternative transportation options (see Appendix B); and policies in the open space, conservation and recreation element designed to encourage transportation alternatives and land use patterns that reduce automobile dependence (see Appendix A).

► **CEDA PLANNING AND ZONING DIVISION**

- ACTION HM-2.5: Review and comment on regional and state air-quality plans and also on environmental impact reports for development projects in neighboring jurisdictions; and for the latter, request mitigation measures for any significant negative impacts on the city's air quality.

**POLICY HM-3** Seek to prevent industrial and transportation accidents involving hazardous materials, and enhance the city’s capacity to respond to such incidents.

- ACTION HM-3.1: Continue to enforce regulations limiting truck travel through certain areas of the city to designated routes, and consider establishing time-based restrictions on truck travel on certain routes to reduce the risk and potential impact of accidents during peak traffic hours.

► PWA TRANSPORTATION SERVICES DIVISION

- ACTION HM-3.2: Continue to support the prohibition of trucks on I-580 through Oakland.

► PWA TRANSPORTATION SERVICES DIVISION

- ACTION HM-3.3: Support state and federal legislative efforts that seek to increase the safety of transporting hazardous materials.

► OFD OFFICE OF EMERGENCY SERVICES

- ACTION HM-3.4: Continue to rely on, and update, the city’s hazardous materials area plan to respond to emergencies related to hazardous materials.

► OFD OFFICE OF EMERGENCY SERVICES

- ACTION HM-3.5: Continue to offer basic emergency-response education and training to local businesses.

► OFD OFFICE OF EMERGENCY SERVICES

## 5.5 | RESOURCES

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### Agencies consulted

- U.S. Environmental Protection Agency ([www.epa.gov](http://www.epa.gov))
- California Environmental Protection Agency ([www.calepa.ca.gov](http://www.calepa.ca.gov))

- California Air Resources Board ([www.arb.ca.gov](http://www.arb.ca.gov))
- California Department of Pesticide Regulation ([www.cdpr.ca.gov](http://www.cdpr.ca.gov))
- California Department of Toxic Substances Control ([www.dtsc.ca.gov](http://www.dtsc.ca.gov))
- California Integrated Waste Management Board ([www.ciwmb.ca.gov](http://www.ciwmb.ca.gov))
- California Office of Environmental Health Hazard Assessment ([www.oehha.ca.gov](http://www.oehha.ca.gov))
- California State Water Resources Control Board ([www.swrcb.ca.gov](http://www.swrcb.ca.gov))
- S.F. Bay Regional Water Quality Control Board ([www.swrcb.ca.gov/rwqcb2](http://www.swrcb.ca.gov/rwqcb2))
- Bay Area Air Quality Management District ([www.baaqmd.gov](http://www.baaqmd.gov))
- Alameda County Waste Management Authority ([www.stopwaste.org](http://www.stopwaste.org))
- Oakland Office of Emergency Services
- Oakland Community and Economic Development Agency  
([www.oaklandnet.com/government/ceda/revised/ceda.html](http://www.oaklandnet.com/government/ceda/revised/ceda.html))

#### **Documents consulted**

- “Toxic Air Contaminant Control Program Annual Report 2000;” Bay Area Air Quality Management District, December 2001.
- “2000 Solid Waste Characterization Study;” Alameda County Waste Management Authority, December 2001.
- “Hazardous Materials Area Plan for Emergency Response;” Oakland Fire Services Agency, April 1997.
- “Alameda County Hazardous Waste Management Plan;” Alameda County Waste Management Authority, November 1995.
- “Household Hazardous Waste Element;” City of Oakland, July 1992.

#### **Other resources**

- California CUPA Forum ([www.calcupa.net](http://www.calcupa.net))
- DTSC site mitigation and brownfields reuse program database  
([www.dtsc.ca.gov/database/Calsites/Index.cfm](http://www.dtsc.ca.gov/database/Calsites/Index.cfm))
- GeoTracker ([www.geotracker.swrcb.ca.gov](http://www.geotracker.swrcb.ca.gov))
- Oakland Urban Land Redevelopment program ([www.oaklandpw.com/ulrprogram](http://www.oaklandpw.com/ulrprogram))

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