

Health Consultation

Public Health Evaluation of Soil Data

BUNKER HILL PARK (SCHOFIELD PARK)

WATERBURY, NEW HAVEN COUNTY, CONNECTICUT

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

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Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

Public Health Evaluation of Soil Data

BUNKER HILL PARK (SCHOFIELD PARK)

WATERBURY, NEW HAVEN COUNTY, CONNECTICUT

Prepared by:

Connecticut Department of Public Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

The conclusions and recommendations in this health consultation are based on the data and information made available to the Connecticut Department of Public Health and the Agency for Toxic Substances and Disease Registry. The Connecticut Department of Public Health and the Agency for Toxic Substances and Disease Registry will review additional information when received. The review of additional data could change the conclusions and recommendations listed in this document.

BACKGROUND AND STATEMENT OF ISSUE

The Connecticut Department of Public Health (CT DPH) was asked by the Waterbury Health Department, the Town of Waterbury and the CT Department of Environmental Protection (CT DEP) to evaluate the public health significance of environmental contamination of soil around the Bunker Hill Park (The Park), located at 265 Bunker Hill Ave. The Park is located at the intersection of Bunker Hill Ave and Windsor St, across from the Bunker Hill Congregational Church, in Waterbury Connecticut. The Park is approximately 4 acres in size. Since July 2000, it has been closed and access is limited by a chain-link fence. Facilities at the park include two tennis courts, a basketball court, a ball-field, and a playground area.

The Park has been in existence since 1947, at the site of the former Waterbury Ash Removing Company. This company collected residential and industrial ash and buried it on-site. After the ash removal company went out of business, the site was purchased by the Bunker Hill Congregational Church. From 1947 to July 1st, 2000, The Church leased the site to the City of Waterbury for a fee of one dollar per year. When the City of Waterbury received funds for park improvements, the State required that the City purchase the property or enter into a long-term lease agreement. In December 2000, the state purchased The Park and transferred custody and control of the property to the City of Waterbury on February 22, 2001.

Money for sampling and assessment of the soils and groundwater at the Park was provided by the EPA's Brownfields program. Assessment included a limited Phase I Assessment and a Phase II subsurface investigation. According to results of the Phase I assessment, the property has been an open space (vacant land) or a recreation site for the nearby community. The site had no known releases and no other sites appear to have had an environmental impact on it. For the Phase II portion of the assessment, soils in the ball-field and playground area were sampled for contamination. Relatively thin layers of ash material (2" to 5" thick) were encountered in two borings at depths between 6" and one foot. Thicker layers of ash material (five to seven feet thick) were identified in borings at depths between four and twelve feet (Waterbury Health Dept., 2001). With some exceptions (discussed below), surface soils were generally clean. A site plan showing selected sampling locations is included with this report (Attachment A).

The park is in an urban residential area. Both children and adults have used the site. Based on the size of the facilities, about 50 or so people could be expected to be in The Park at a busy time. Based on results of the 1990 census, about 12,230 people live in the proximity; i.e., one half mile from, The Park. Of this total, approximately 1,308 individuals are below the age of six.

Site data

In April of 2000, a consulting firm contracted by DEP (Handex of Monroe CT) sampled surface (0-6 inches) soil at eight locations designated SB-1 through SB-8 (Attachment A). The samples were submitted and analyzed for the presence of volatile organic compounds (VOC), semi-volatile organic compounds (SVOCs), cyanide, polychlorinated biphenyls (PCBs), and metals. In the analysis of the eight samples collected from 0" to 6" below grade, results of only one sample, SB-4, indicated the presence of PAHs (a type of SVOC) above CT RSR values for residential exposure. No other chemicals were detected in concentrations greater than the RSRs. SB-4 contained three PAHs in excess of RSR standards; benzo(a)anthracene, benzo(b)fluoranthene, and benzo(a)pyrene.

As a follow up to the April round of sampling, Handex conducted additional sampling of The Park on July 27th, 2001. Thirteen more samples were taken from a depth of 0" to 6" and submitted for SVOC and metal analysis. Nine of these samples (SB-9 to SB-17) were taken from locations not previously sampled, while four samples (SB-4N, SB-4S, SB-4E, SB-4W) were collected from the area surrounding a previously sampled location (SB-4). Results showed that SB-4S, SB-9, SB10, and SB-12 contained PAHs in excess of RSR standards. No other chemicals were detected in concentrations greater than the RSRs.

To evaluate potential exposures at The Park, CT DPH considered the available environmental data for the site and how people might come into contact with contaminants. Because it is not reasonable to expect that people using The Park would be exposed to contaminants below the surface layer of soil, CT DPH is most concerned with contaminant concentrations in the surface layer of soil. To evaluate the public health significance of surface soil contamination at The Park, soil concentrations were compared with health-protective guidelines (Comparison Values). Comparison values are screening levels, below which, there is little likelihood of adverse health effects from exposure. When contaminant concentrations exceed comparison values, exposures are evaluated further. The primary comparison values used for this study are the Connecticut residential criteria for direct exposure to soil (CT RSRs). These values assume that contact with soil occurs every day over the long term (30 years).

Tables 1 & 2 summarize the soil sampling results (CT DEP, 2001). Maximum concentrations are included in Table 1 and mean concentrations are included in Table 2. Comparison values are also shown. Contaminants detected below comparison values are not included in Tables 1 & 2.

Table 1. Maximum detected surface soil concentrations for contaminants at Bunker Hill Park. The four PAHs listed were the only contaminants found in concentrations greater than the Comparison Value.

Contaminant	Max. conc. in Surface Soil (0" to 6") (mg/kg)	Comparison Value (mg/kg)	Comparison Value Source *	Number of samples exceeding Comparison Value
Benzo(a)Anthracene	2.0	1	CT RSR	3 of 21
Benzo(b)Fluoranthene	3.7	1	CT RSR	5 of 21
Benzo(a)Pyrene	2.3	1	CT RSR	4 of 21
Indeno(1,2,3-CD)Pyrene	1.4	1	CT RSR	1 of 21

*CT RSR = Connecticut residential criteria for direct exposure to soil; 365 days/year exposure for 30 years.

Table 2. Mean detected surface soil concentrations for contaminants at Bunker Hill Park. The four PAHs listed were the only contaminants found with maximum concentrations greater than the Comparison Value. Maximum concentrations are listed in Table 1..

Contaminant	Mean conc. in Surface Soil (0" to 6") (mg/kg)	TEF*	TEF-adjusted concentration (mg/kg)	Comparison Value** (mg/kg)
Benzo(a)Anthracene	0.514	0.1	0.051	1
Benzo(b)Fluoranthene	0.934	0.1	0.093	1
Benzo(a)Pyrene	0.593	1	0.593	1
Indeno(1,2,3-CD)Pyrene	0.324	0.1	0.032	1

* TEF= Toxicity Equivalent Factor (ATSDR, 1995).

**Taken from the Connecticut residential criteria for direct exposure to soil (CT RSR); 365 days/year exposure for 30 years.

DISCUSSION—Adult and Children’s Health Issues

Sampling Results

Some PAHs (Benzo(a)Anthracene, Benzo(b)Fluoranthene, Benzo(a)Pyrene, and Indeno(1,2,3-CD)Pyrene) were detected in a small number of surface soil locations in concentrations exceeding the Comparison Values (Table 1). PAHs are present in soil almost everywhere people live. PAH levels found at The Park are within the range of background reported for urban soils (ATSDR, 1995). Automobile and diesel emissions, tire wear and asphalt are major sources in soil near roadways. Residential wood burning, power plants, and incinerators are sources of PAHs in air. Airborne PAHs attach to suspended particles and eventually settle out onto the ground.

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of over 100 different chemicals that are formed when coal, oil, garbage, tobacco, food or any other organic substance is burned. Some PAHs have caused cancer in laboratory animals when exposed for a long period of time, and these chemicals are likely to be human carcinogens. Regarding non-cancer effects from exposure to PAHs, animal studies have shown that PAHs can cause harmful effects on the skin, liver and immune system. Such effects have not been seen in humans. The toxicity of the various PAHs is ranked relative to benzo(a)pyrene (BaP). The other common PAHs are assigned a Toxicity Equivalent Factor (TEF) that represents its potency relative to BaP. The values in the TEF column of Table 2 indicate that the other contaminants of concern are assumed to be ten times less toxic than BaP.

Comparison Values

The primary comparison values used for this study are the Connecticut residential criteria for direct exposure to soil (CT RSRs). These values assume that contact with soil occurs every day over the long term (30 years). As people do not use The Park every day for this long, the total exposure from the use of The Park should be less than that assumed for the residential criteria. Furthermore, because the PAH contamination was not widespread, an individual is not likely to be exposed to the maximum concentration on a chronic basis. Actual exposure would thus likely be much less, and a comparison with the mean concentration is therefore more appropriate (Table 2).

Exposure Pathways

In order to be exposed to soil contaminants at the The Park, one must come into direct contact with the soil by touching it (dermal contact), breathing in soil particles (inhalation) or eating soil adhered to fingers or food items (ingestion). Under current conditions, exposure is minimal because access to The Park is restricted by a locked fence. Under past site conditions (i.e., before The Park was closed), it is possible that exposure to PAHs in surface soil occurred through dermal contact, inhalation or ingestion.

As mentioned above, sampling results show that disposed ash is found in layers below the surface. Digging would have had to occur in order for deeper soils to be contacted. It is therefore reasonable to assume that in the past, people would not have been exposed on a regular and continuing basis to ash found at deeper levels.

Public Health Implications

While significant amount of ash waste is found at depth, data from the Phase II investigation indicates that surface soil contamination does not pose a public health risk. Although a few individual samples were higher than Comparison Values, DPH does not expect that children or adults who used The Park need to be concerned about toxicity due to PAH exposure. There are two primary reasons for this: 1) The comparison values are based on conservative assumptions regarding the amount of exposure at this site, and 2), the average of the mean values for the four contaminants of concern (Table 2), is considerably lower than Comparison Values. Furthermore, the concentrations detected are within the range considered as background for urban soils (ATSDR, 1995). Therefore, people who have used the park would not be expected to be exposed to PAHs more than their neighbors who participated in similar activities elsewhere.

Even though PAHs in the soil at The Park are extremely unlikely to cause adverse health impacts, CT DPH did risk calculations to assess the theoretical cancer and noncancer risks associated with exposure to the average concentration of PAHs in The Park. Results show an insignificant increase in cancer and non-cancer risk.

COMMUNITY HEALTH CONCERNS

The Waterbury Health Department was asked if the community had health concerns about The Park. Because this was often used by young people, there is concern that exposure to contamination could have an adverse effect on human development. DPH believes it is highly unlikely that past exposures caused adverse effects of this nature. This is because evidence that PAHs cause developmental effects is weak, and past exposures at The Park are many thousands of times lower than the level where there may be some adverse effects.

CONCLUSIONS

Under current conditions, the site presents no public health threat because limited access to the site minimizes exposure to soil in The Park. Under past site conditions (i.e.; before The Park closed), it is unlikely that exposures to soil contaminants would have been great enough to result in adverse health impacts.

ATSDR has a categorization scheme whereby the level of public health hazard at a site is assigned to one of five conclusion categories. ATSDR conclusion categories are included as Attachment B to this report. CT DPH has concluded that soils at the site currently, and in the past, present "No Public Health Hazard."

RECOMMENDATIONS

Because significant quantities of ash remain below the surface, erosion of the surface soils should be prevented. CT DPH recommends, to prevent erosion, that The Park's cover of grass and shrubs be well-maintained. Signs should be posted instructing maintenance and construction personnel to call the Waterbury Health Department before digging.

PUBLIC HEALTH ACTION PLAN

Actions Planned

CT DPH will continue to work with the Waterbury Health Department, CT DEP and EPA in responding to public health concerns and questions.

CT DPH will review additional data that may be collected in the future from The Park.

CT DPH will make this Health Consultation available to all interested parties.

Actions Taken

CT DPH has provided Waterbury Health Department, CT DEP, and EPA with technical assistance in reviewing environmental data from the site, and evaluated the public health implications from exposure to contaminants at The Park.

REFERENCES

ATSDR, 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs), US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, August 1995.

CT DEP, 2001. Summary data obtained from DEP Division of Permitting, Enforcement & Remediation (T. Bobowicz), received 9/20/01.

Waterbury Health Department, 2001. Letter from Director of Hazardous Materials (D.N. Jabbour), for general release, dated 5/9/01.

CERTIFICATION

The Health Consultation for the Bunker Hill Park, Waterbury, Connecticut was prepared by the Connecticut Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.



Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Health Consultation and concurs with its findings.



Chief, SSAB, DHAC, ATSDR

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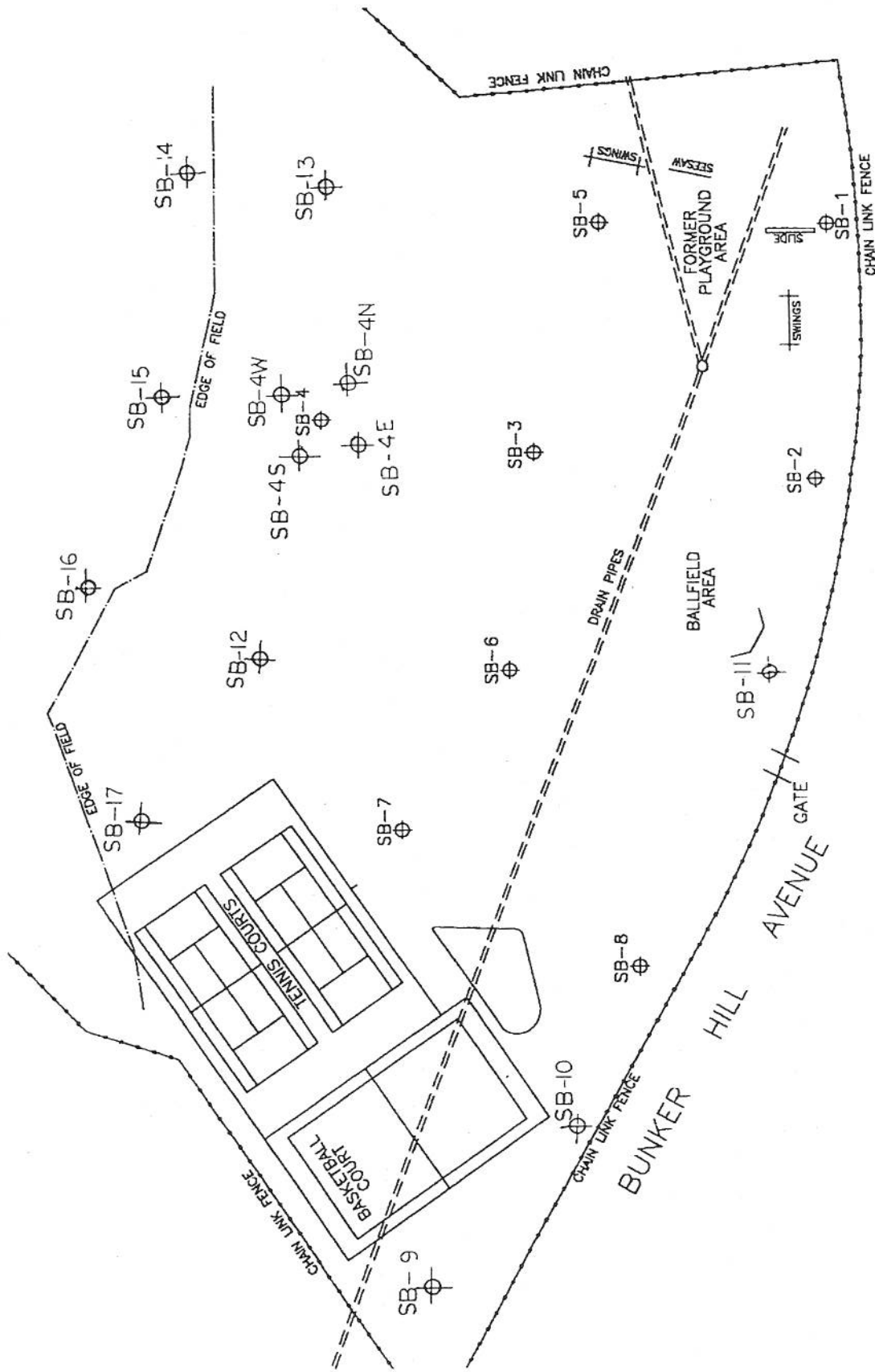
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Attachment A: Diagram of Bunker Hill Park with soil sample locations indicated. Adapted from a map by Handex.



ATTACHMENT B: ATSDR Public Health Hazard Categories

Category	Definition	Criteria
A. Urgent public health hazard	This category is used for sites that pose an urgent public health hazard as the result of short-term exposures to hazardous substances.	evidence exists that exposures have occurred, are occurring, or are likely to occur in the future AND estimated exposures are to a substance(s) at concentrations in the environment that, upon short-term exposures, can cause adverse health effects to any segment of the receptor population AND/OR community-specific health outcome data indicate that the site has had an adverse impact on human health that requires rapid intervention AND/OR physical hazards at the site pose an imminent risk of physical injury
B. Public health hazard	This category is used for sites that pose a public health hazard as the result of long-term exposures to hazardous substances.	evidence exists that exposures have occurred, are occurring, or are likely to occur in the future AND estimated exposures are to a substance(s) at concentrations in the environment that, upon long-term exposures, can cause adverse health effects to any segment of the receptor population AND/OR community-specific health outcome data indicate that the site has had an adverse impact on human health that requires intervention
C. Indeterminate public health hazard	This category is used for sites with incomplete information.	limited available data do not indicate that humans are being or have been exposed to levels of contamination that would be expected to cause adverse health effects; data or information are not available for all environmental media to which humans may be exposed AND there are insufficient or no community-specific health outcome data to indicate that the site has had an adverse impact on human health

D. No apparent public health hazard	This category is used for sites where human exposure to contaminated media is occurring or has occurred in the past, but the exposure is below a level of health hazard.	exposures do not exceed an ATSDR chronic MRL or other comparable value AND data are available for all environmental media to which humans are being exposed AND there are no community-specific health outcome data to indicate that the site has had an adverse impact on human health
E. No public health hazard	This category is used for sites that do not pose a public health hazard.	no evidence of current or past human exposure to contaminated media AND future exposures to contaminated media are not likely to occur AND there are no community-specific health outcome data to indicate that the site has had an adverse impact on human health