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September 24, 2007

Tracy A. Smith
Project Manager
Remedial Bureau B
New York State Department of
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625 Broadway, 12th Floor
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Re: Ballfield Site Revised Remedial Investigation Report – Risk Assessment Screening Results

Dear Mr. Smith:

This letter presents the results of the risk assessment screening for the Honeywell Ballfield Site located in Geddes, New York (Site). In order to meet the requirements set forth in NYCRR subpart 373 for a Qualitative Assessment, a screening-level risk evaluation for the Site was conducted for protection of human health and wildlife. The evaluation consists of comparing constituent concentrations present in Site media to ecological and human health criteria presented in a prior letter from Honeywell to the New York State Department of Environmental Conservation (NYSDEC) dated August 21, 2007. The results of the risk assessment will be used during the feasibility study evaluation of remedial alternatives that will be prepared for the Site and for assisting in making the appropriate risk management decisions for the Site.

The objective of the screening assessment is to identify Constituents of Potential Concern (COPC) and Constituents of Potential Ecological Concern (COPEC) by determining if specific constituents in the environmental media of the site are present at concentrations that require further evaluation. Identification of Site COPC and COPEC was conducted by comparing the maximum detected concentrations of the constituents in media against applicable criteria, as described in the following sections. Constituents that were not detected in any sample in a particular medium were eliminated from consideration in that medium. Sample locations included in the ecological and human health screening are summarized in **Table 1** and **Figure 1**.

1. Ecological Screening

In your August 30, 2007 letter concerning the scope of the risk assessment screening, the NYSDEC requested that a Fish and Wildlife Impact Analysis (FWIA) up to and including Step 2b be performed for the Site. However, an FWIA was previously prepared for the site by Montgomery Watson Harza (MWH) and submitted to the NYSDEC in November, 2003 (MWH 2003). A copy of the FWIA is included with this letter as Attachment A. Although the FWIA prepared by MWH was completed through Step 2b - the Criteria Specific Analysis - Step 2b was performed herein to incorporate recently collected media data and updated screening values. Therefore, we believe the medium-specific risk screening presented herein combined with the FWIA as prepared by MWH through step

2a (Exhibit 1) meets the NYSDEC's objective for a Qualitative Assessment in accordance with NYCRR subpart 373.

1.1 Methods

Media for screening were based on potential receptors and exposure scenarios existing at the Site. For the ecological screening, analytical data representing the most likely areas for ecological exposures was assessed. That is, surface soil samples collected from the 0-6 inch and 6-12 inch were evaluated. An aquatic exposure pathway does not currently exist on the Site; therefore, surface water and ground water data were not evaluated. The sediment data (0-0.5 ft) collected as part of the Preliminary Site Assessment were included in the surface soil data set and compared to surface soil criteria. The locations of these samples are no longer influenced by a water source, and as such, these samples should be classified as soils.

Screening was completed using the following approach: if the maximum medium constituent concentration exceeded the minimum screening value, the constituent was identified as a COPEC. Exceedance of screening values does not, in itself, indicate a risk to wildlife, but is an indication of a need to continue evaluation of potential exposure.

Constituent exposure to plants, soil invertebrates, birds, and mammals were evaluated by comparing detected surface soil constituent concentrations to literature-derived soil screening values for a variety of biotic endpoints. The references described below were used to identify the appropriate ecological soil screening levels. The screening values were chosen based on NYSDEC/USEPA guidance.

Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision (Efroymson *et al.* 1997a). In this report, plant toxicity data are presented and used to derive benchmarks for screening the potential hazard to terrestrial plants caused by the presence of constituents in soil. The report presents phytotoxicity benchmarks for thirty-eight chemicals. The authors of the report intended that constituents in soil at concentrations exceeding both the phytotoxicity benchmark and the background concentration for the soil type be considered further in the assessment process.

References on toxicity to terrestrial plants were compiled from several bibliographic databases, a numeric database, review articles, and conventional literature searches. Reports of toxicity tests of individual chemicals in laboratory, greenhouse, or field settings were obtained. Data presented in this report were derived mainly from primary sources, but secondary sources were used if the primary source cited in the secondary source was unavailable, if only a small amount of data for a particular chemical was available, and if secondary sources suggested that a benchmark derived from limited primary source material was too high.

If a constituent concentration or the reported detection limit exceeds the screening benchmark, additional evaluation is warranted to assess the potential hazards posed by exposure to the soil constituents. Conversely, if the constituent concentration or its detection limit falls below the proposed benchmark, the constituent may be excluded from further study. As stated in this reference, these benchmarks are suitable for screening purposes, but should not be used to establish remedial goals or as final evidence of phytotoxicity.

Soil benchmarks are based on data provided by toxicity studies in the field or in greenhouse and growth chamber settings. Most of the soil concentrations of metals reported from waste sites are from extractions with acids to provide total metal concentrations. Similarly, concentrations of organic contaminants in waste site soils are total concentrations derived from rigorous solvent extractions. However, many metals found in natural soils and contaminants at waste sites exist in biologically unavailable forms, which are not taken up by plants. Therefore, elimination of COPECs based on screening against these benchmarks is assumed to be sufficiently protective of potential adverse impacts to plants in exposed media.

The soil and plant characteristics discussed in the report play a large part in potential plant toxicity. These components should be reviewed and considered before incorporating these benchmarks into detailed, site-specific risk assessments. Site-specific considerations play an important role when evaluating the potential hazards of a chemical to the local flora. If field soils support vigorous and diverse plant communities, but constituent concentrations in the soil exceed one or more of the benchmarks, it is assumed that the benchmark is a poor measure of risk to the plant community at that particular site. The same may also be true if the benchmark calculated in the report is less than the local background soil concentrations for those constituents.

Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes: 1997 Revision (Efroymson *et al.* 1997b). This reference presents toxicologically based benchmarks for soil invertebrates and microbial processes. If a chemical concentration or reported detection limit exceeds the screening benchmark, additional analysis may be needed to assess the hazards to exposed receptors. However, if the concentration or detection limit falls below the calculated benchmark, the constituent may be excluded from further study. The authors of this reference recognize that, due to the diversity of soils, fauna species, chemical forms, and test procedures, it is impossible to estimate concentrations that would constitute thresholds for toxic effects on the invertebrate communities at sites simply from published toxicity data.

References on toxicity to soil and litter dwelling invertebrates, microbes, and microbial processes were obtained from searches of several bibliographical references, review articles, and conventional literature searches. Soil benchmarks are based on data provided by toxicity studies in the field or in laboratory settings. Most of the soil concentrations of metals reported from waste sites are from extractions with acids, which are intended to provide estimates of total metal concentrations. These benchmarks are appropriate for screening purposes only. Since soil and invertebrate characteristics also play a large part in toxicity and therefore should be incorporated in the evaluation of the potential constituent-specific hazards. For example, if constituents concentrations reported in soils supporting many invertebrates exceed one or more of the benchmarks, or if a benchmark is exceeded by background soil concentrations, it is assumed that the benchmark is a poor measure of risk to soil invertebrates at that particular site.

Ecological Soil Screening Levels (USEPA 2005). The United States Environmental Protection Agency has derived ecological soil screening levels (Eco-SSLs) that represent soil concentrations that are protective of several types of biological organisms (plants, invertebrates, birds, and mammals). The Eco-SSL derivation process represents the collaborative effort of a multi-stakeholder workgroup consisting of federal, state, consulting, industry, and academic participants led by the USEPA, Office of Emergency and Remedial Response. It is emphasized that the Eco-SSLs are soil screening numbers, and as such are not appropriate for use as cleanup levels. Screening ecotoxicity values are derived to avoid underestimating risk. Requiring a cleanup based solely on Eco-SSL values would not be technically defensible.

NYSDEC Part 375. The NYSDEC recently (October 2006) approved new regulations to amend 6 NYCRR Part 375 by incorporating soil cleanup objectives, which are contaminant-specific cleanup objectives for soil based on a site's current, intended, or reasonably anticipated future use. Teams of experts from NYSDEC and NYS Department of Health established the soil cleanup standards and use-based tables for remedial programs that are included in these new regulations. Separate sets of soil cleanup objectives were developed in consideration of public health, groundwater, and ecological resources. The objectives for ecological resources were utilized herein in the screening of Site surface soil constituent concentrations.

A number of special considerations were applied to conducting the screening assessment.

- Consistent with USEPA guidance (1989), several essential nutrients were not included as COPCs (i.e., calcium, magnesium, potassium, and sodium).
- Polychlorinated dibenzo-para-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) were summed and normalized to 2,3,7,8-TCDD for consistency, using dioxin equivalency factors from Van den Berg *et al.* (2006) to represent a final concentration in 2,3,7,8-TCDD Toxic Equivalents (TEQs).
- Sample data with the R (rejected) interpreted qualifier were not included in the screening assessment.
- Inorganic constituent concentrations in soil were compared to background concentrations for New York State (McGovern 1983) and were flagged if less than the background concentration.

1.2 Results

As described previously, surface soil data from samples collected from 0-6 inch and 6-12 inch intervals were utilized in this assessment. Screening sources include: Oak Ridge National Laboratory (ORNL; Efroymson *et al.* 1997a,b), Ecological Soil Screening Levels (USEPA 2005; Eco-SSLs), and NYSDEC Part 375. The results of the surface soil ecological screening are presented in **Table 2.1**. A summary of the surface soil screening results is presented below:

- A total of 86 constituents were detected and 61 were retained as COPECs.
- 22 constituents were retained as COPECs because they exceeded the most conservative (lowest) screening value
- 39 constituents were retained as COPECs because they had no established toxicity value.
- 4 detected constituents (calcium, magnesium, potassium, and sodium) were detected, but were excluded due to their status as essential nutrients.

2. Human health screening

2.1 Methods

As with the ecological screening, media for human health screening were based on potential receptors and exposure scenarios existing at the Site, with the following media evaluated:

- surface soil (0-0.5 ft)
- subsurface soil (0.5 ft – 10 ft)
- shallow ground water (0 to 10 ft)
- shallow soil gas (8 ft)
- deep soil gas (20 ft).

Surface soil was evaluated because of potential direct contact by Site receptors. Sediment data (0-0.5 ft) collected as part of the Preliminary Site Assessment were included in the surface soil data set as noted above. Subsurface media (subsurface soil and shallow ground water) were evaluated because of potential direct contact by Site utility workers. Ground water for potable water use was not evaluated because the Site is zoned industrial, public water is available and in use, and future industrial use of ground water as potable water is restricted. However, since Site utility workers were a potential future receptor to groundwater, shallow groundwater samples were evaluated with respect to tap water screening values. Soil gas was evaluated with respect to potential future migration of subsurface vapors into indoor spaces.

Screening was completed using the following approach: if the maximum constituent concentration exceeded the minimum (most conservative) screening value, the constituent was identified as a COPC. Concentrations of constituents in all media were compared with human health-based screening criteria derived by USEPA and NYSDEC:

Region 9 Preliminary Remediation Goals (USEPA 2004)

- Industrial soil
- Soil for groundwater migration (Dilution/Attenuation Factor=20)
- Tap water
- Screening values utilized in the screening process correspond to a cancer risk of 10^{-6} or a hazard quotient of 0.1.

Region 3 Risk-Based Concentration Table (USEPA 2007)

- Industrial Soil
- Soil for groundwater migration (Dilution/Attenuation Factor=20)
- Tap water
- Screening values utilized in the screening process correspond to a cancer risk of 10^{-6} or a hazard quotient of 0.1.

Remedial Program Soil Cleanup Objectives. 6 NYCRR Subpart 375-6 (NYSDEC 2006)

- Protection of public health (Industrial)
- Protection of ground water

USEPA OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (USEPA, 2002)

- Shallow soil gas

- Deep soil gas

NYSDOH (2006) Guidance for Evaluating Soil Vapor Intrusion in the State of New York was also consulted with regard to the potential vapor intrusion exposure pathway. Because the current Site building is used only for storage, it is unoccupied and therefore, indoor air sampling was not conducted.

A number of special considerations were applied in this screening assessment:

- Consistent with USEPA guidance (1989), several essential nutrients were not included as COPCs (i.e., calcium, magnesium, potassium, and sodium).
- Dioxins were summed and normalized to 2,3,7,8-TCDD for consistency, using dioxin equivalency factors (TEFs) from Van dem Berg et al. (2006) to represent a final concentration in 2,3,7,8-TCDD Equivalents.
- Sample data with the R (rejected) interpreted qualifier were not included in the screening assessment.
- All detected Class A carcinogens (arsenic, benzene, chromium) were retained as COPC even if their maximum detected concentration did not exceed their respective screening criteria.
- Inorganic constituent concentrations in soil were compared to background concentrations for New York State (McGovern, 1983) and were flagged if less than the background concentration.

2.2 Results

As described above, surface soil, subsurface soil, shallow ground water, deep soil gas, and shallow soil gas data were utilized in the screening assessment. Screening criteria sources include: USEPA (2007) Region 3 RBC, USEPA (2004) Region 9 PRG, NYSDEC (2006) Part 375, and USEPA (2002) OSWER. The results of the soil screening are presented in **Tables 2.2** through **2.5**, The results of the ground water and soil gas screening are presented in **Table 2.6** and **Tables 2.7** and **2.8**, respectively, below.

*Surface Soil for direct contact (**Table 2.2** - industrial soil):*

- A total of 85 constituents were detected and 20 were retained as COPCs
- 12 constituents were retained as COPCs because they exceeded the most conservative screening value
- 6 constituents were retained because they had no established toxicity value
- 4 detected constituents (calcium, magnesium, potassium, and sodium) were detected, but were excluded due to their status as essential nutrients
- Benzene, although below the most conservative screening value, was retained as a COPC due its status as a Class A carcinogen
- Chromium was retained as a COPC because hexavalent chromium is a known Class A carcinogen

*Surface Soil for migration to groundwater (**Table 2.3**):*

- A total of 85 constituents were detected and 49 were retained as COPCs

- 37 constituents were retained as COPCs because they exceeded the most conservative screening value
- 11 constituents were retained because they had no established toxicity value
- 4 detected constituents (calcium, magnesium, potassium, and sodium) were detected, but were excluded due to their status as essential nutrients
- Chromium was retained as a COPC because hexavalent chromium is a known Class A carcinogen

*Subsurface Soil for direct contact (**Table 2.4** – industrial soils):*

- A total of 64 constituents were detected and 17 were retained as COPCs
- 12 constituents were retained as COPCs because they exceeded the most conservative screening value
- 3 constituents were retained because they had no established toxicity value.
- 4 detected constituents (calcium, magnesium, potassium, and sodium) were detected, but were excluded due to their status as essential nutrients
- Benzene, although below the most conservative screening value, was retained due its status as a Class A carcinogen
- Chromium was retained as a COPC because hexavalent chromium is a known Class A carcinogen

*Subsurface Soil for migration to ground water (**Table 2.5**):*

- A total of 64 constituents were detected and 36 were retained as COPCs
- 28 constituents were retained as COPCs because they exceeded the most conservative screening value
- 6 constituents were retained because they had no established toxicity value
- 4 detected constituents (calcium, magnesium, potassium, and sodium) were detected, but were excluded due to their status as essential nutrients
- Chromium was retained as a COPC because hexavalent chromium is a known Class A carcinogen

*Shallow Ground Water (**Table 2.6**):*

- A total of 15 constituents were detected and 4 were retained as COPCs; however, none of the constituents was above the most conservative screening value
- 3 of the constituents were retained because they had no established toxicity value
- Chromium was retained as a COPC because hexavalent chromium is a known Class A carcinogen
- Calcium was eliminated as a COPEC because of its status as an essential nutrient

*Shallow Soil Gas (**Table 2.7**):*

- A total of 29 constituents were detected and 11 were retained as COPCs
- 8 constituents were retained as COPCs because they exceeded the most conservative screening value
- 3 constituents were retained because they had no established toxicity value

*Deep Soil Gas (**Table 2.8**):*

- A total of 29 constituents were detected and 9 were retained as COPCs
- 4 constituents were retained as COPCs because they exceeded the most conservative screening value
- 4 constituents were retained because they had no established toxicity value.
- Benzene, although below the most conservative screening value, was retained as a COPEC because of its status as a Class A carcinogen.

This screening process has calculated the exceedances in each on-Site medium to which likely human and ecological receptors may be exposed. In addition to being incorporated into the Feasibility Study (FS) evaluation of remedial alternatives that will be prepared for the Site, the results will be used to determine the appropriate short-term and long-term risk management decisions to ensure protection of human health and the environment.

Please contact Chris Calkins of O'Brien & Gere or me to discuss any questions you may have regarding this risk assessment screening.

Sincerely,

John P. McAuliffe

John P. McAuliffe, P.E.
Program Director, Syracuse

cc:

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Mike Spera - TAMS
Robert Nunes – USEPA
Henriette Hamel – NYSDOH
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Table 1
Honeywell
Ballfield Site
Risk Assessment Screening
Ecological and Human Health Screening - Soil, Ground Water, and Soil Gas Samples

Receptor	Medium	Sample ID	Sample Date	Start Depth	End Depth
Ecological	Surface Soil (0 - 1 ft)	BFGP-01A	3/16/01	0	0.17
		BFGP-01B	3/19/01	0	0.17
		BFGP-01C	3/20/01	0	0.17
		BFGP-02A	3/16/01	0	0.17
		BFGP-02B	3/15/01	0	0.17
		BFGP-05	4/10/01	0	0.17
		BFGP-06	4/11/01	0	0.17
		BFGP-07	4/9/01	0	0.17
		BFGP-08	4/9/01	0	0.17
		BFGP-09A	3/29/01	0	0.17
		BFGP-09B	3/29/01	0	0.17
		BFGP-09C	3/30/01	0	0.17
		BFGP-09E	10/27/05	0	0.5
		BFGP-09E	10/27/05	0.5	1
		BFGP-10	4/6/01	0	0.17
		BFGP-11	4/6/01	0	0.17
		BFGP-12	4/3/01	0	0.17
		BFMW-01I	4/4/01	0	0.17
		BFMW-02B	4/11/01	0	0.17
		BFMW-03I	4/5/01	0	0.17
		BFMW-04D	12/5/02	0	0.5
		BFMW-04D	12/5/02	0.5	1
		BFMW-04I	3/30/01	0	0.17
		BFMW-05I	3/28/01	0	0.17
		BFMW-06I	3/14/01	0	0.17
		BFSED-01	5/8/01	0	0.5
		BFSED-02	5/8/01	0	0.5
		BFSS-01	12/10/02	0	0.5
		BFSS-01	12/10/02	0.5	1
		BFSS-02	12/9/02	0	0.5
		BFSS-02	12/9/02	0.5	1
		BFSS-03	12/12/02	0	0.5
		BFSS-03	12/12/02	0.5	1
		BFSS-05	12/16/02	0	0.5
		BFSS-05	12/16/02	0.5	1
		BFSS-06	12/16/02	0	0.5
		BFSS-06	12/16/02	0.5	1
		BFSS-07	12/11/02	0	0.5
		BFSS-07	12/11/02	0.5	1
		BFSS-08	12/16/02	0	0.5
		BFSS-08	12/16/02	0.5	1
		BFSS-09	12/11/02	0	0.5
		BFSS-09	12/11/02	0.5	1

Table 1
Honeywell
Ballfield Site
Risk Assessment Screening
Ecological and Human Health Screening - Soil, Ground Water, and Soil Gas Samples

Receptor	Medium	Sample ID	Sample Date	Start Depth	End Depth
Human Health	Surface Soil (0 - 0.5 ft)	BFGP-01A	3/16/01	0	0.17
		BFGP-01B	3/19/01	0	0.17
		BFGP-01C	3/20/01	0	0.17
		BFGP-02A	3/16/01	0	0.17
		BFGP-02B	3/15/01	0	0.17
		BFGP-05	4/10/01	0	0.17
		BFGP-06	4/11/01	0	0.17
		BFGP-07	4/9/01	0	0.17
		BFGP-08	4/9/01	0	0.17
		BFGP-09A	3/29/01	0	0.17
		BFGP-09B	3/29/01	0	0.17
		BFGP-09C	3/30/01	0	0.17
		BFGP-09E	10/27/05	0	0.5
		BFGP-09E	10/27/05	0	0.5
		BFGP-10	4/6/01	0	0.17
		BFGP-11	4/6/01	0	0.17
		BFGP-12	4/3/01	0	0.17
		BFMW-01I	4/4/01	0	0.17
		BFMW-02B	4/11/01	0	0.17
		BFMW-03I	4/5/01	0	0.17
		BFMW-04D	12/5/02	0	0.5
		BFMW-04I	3/30/01	0	0.17
		BFMW-05I	3/28/01	0	0.17
		BFMW-06I	3/14/01	0	0.17
		BFSED-01	5/8/01	0	0.5
		BFSED-02	5/8/01	0	0.5
		BFSS-01	12/10/02	0	0.5
		BFSS-02	12/9/02	0	0.5
		BFSS-03	12/12/02	0	0.5
		BFSS-05	12/16/02	0	0.5
		BFSS-06	12/16/02	0	0.5
		BFSS-07	12/11/02	0	0.5
		BFSS-08	12/16/02	0	0.5
		BFSS-09	12/11/02	0	0.5

Table 1
Honeywell
Ballfield Site
Risk Assessment Screening
Ecological and Human Health Screening - Soil, Ground Water, and Soil Gas Samples

Receptor	Medium	Sample ID	Sample Date	Start Depth	End Depth
Human Health	Subsurface Soil (0.5 - 10 ft)	BFGP-09E	10/27/05	0.5	1
		BFMW-04D	12/5/02	0.5	1
		BFSS-01	12/10/02	0.5	1
		BFSS-02	12/9/02	0.5	1
		BFSS-03	12/12/02	0.5	1
		BFSS-05	12/16/02	0.5	1
		BFSS-06	12/16/02	0.5	1
		BFSS-07	12/11/02	0.5	1
		BFSS-08	12/16/02	0.5	1
		BFSS-09	12/11/02	0.5	1
		BFTP-02B	3/14/01	8	10
		BFTP-08	3/20/01	10	10
	Shallow Groundwater	BFMW-07S	2/19/03	4	14
		BFMW-07S	8/18/03	4	14
		BFMW-07S	12/28/05	4	14
	Shallow Soil Gas	BFVI-01S	12/15/2005	8	8
		BFVI-02S	12/15/2005	8	8
		BFVI-03S	12/15/2005	8	8
		BFVI-04S	12/15/2005	8	8
		BFVI-05S	12/15/2005	8	8
	Deep Soil Gas	BFVI-01D	12/15/2005	20	20
		BFVI-02D	12/15/2005	20	20
		BFVI-03D	12/15/2005	20	20
		BFVI-04D	12/15/2005	20	20
		BFVI-05D	12/15/2005	20	20

Table 2.1
Honeywell
Ballfield Site
Risk Screening Assessment
Data Summary and COPEC Selection: Ecological Screening for Surface Soil (0 - 1 ft)

											Screening Values									
CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening (mg/kg)	Background Value (McGovern, 1983)	Remedial Program Soil Cleanup Objectives (NYSDEC 2006)	Toxicological Benchmarks Terrestrial Plants (Efroymson 1997a)	Toxicological Benchmarks Terrestrial Invertebrates (Efroymson 1997b)	USEPA (2005) Ecological Soil Screening Levels - Plants	USEPA Ecological Soil Screening Levels - Invertebrates	USEPA Ecological Soil Screening Levels Aves	USEPA Ecological Soil Screening Levels - Mammals	Screening Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[c]
7429-90-5	ALUMINUM	3040	12700	mg/kg	BFSS-01	47/47	-	INORG	1.3E+04	33000	NV	5.0E+01	6.0E+02	NV	NV	NV	NV	5.0E+01	Y	ASL
7440-36-0	ANTIMONY	0.16 J	8.3 J	mg/kg	BFGP-08	24/47	0.16-10.02	INORG	8.3E+00	NV	NV	5.0E+00	NV	NV	7.8E+01	NV	2.7E-01	2.7E-01	Y	ASL
7440-38-2	ARSENIC	2.5	34.6 J	mg/kg	BFSS-09	47/47	-	INORG	3.5E+01	5	1.3E+01	1.0E+01	1.0E+02	1.8E+01	NV	4.3E+01	4.6E+01	1.0E+01	Y	ASL
7440-39-3	BARIUM	27	2950 J	mg/kg	BFSS-02	47/47	-	INORG	3.0E+03	290	4.3E+02	NV	3.0E+03	NV	3.3E+02	NV	2.0E+03	3.3E+02	Y	ASL
7440-41-7	BERYLLIUM	0.3 J	0.82 J	mg/kg	BFSED-02	26/47	0.51-0.83	INORG	8.2E-01	0.6	1.0E+01	1.0E+01	NV	NV	4.0E+01	NV	2.1E+01	1.0E+01	N	BSL
7440-43-9	CADMIUM	0.097 J	2 J	mg/kg	BFSED-02	14/47	0.0277-10.3	INORG	2.0E+00	0.21	4.0E+00	4.0E+00	2.0E+01	3.2E+01	1.4E+02	7.7E-01	3.6E-01	3.6E-01	Y	ASL
7440-70-2	CALCIUM	6340	247000	mg/kg	BFGP-09E	47/47	-	INORG	2.5E+05	NV	NV	NV	NV	NV	NV	NV	NV	NV	N	EN
7440-47-3	CHROMIUM	7.1	124	mg/kg	BFGP-11	45/45	-	INORG	1.2E+02	NV	NV	1.0E+00	1.0E+01	NV	NV	2.6E+01	3.4E+01	1.0E+00	Y	ASL
7440-48-4	COBALT	2.5 J	16.9	mg/kg	BFGP-11	40/47	5.32-6.24	INORG	1.7E+01	NV	NV	2.0E+01	1.0E+03	1.3E+01	NV	1.2E+02	2.3E+02	1.3E+01	Y	ASL
7440-50-8	COPPER	5.2	252 J	mg/kg	BFSS-09	47/47	-	INORG	2.5E+02	NV	5.0E+01	1.0E+02	1.0E+02	NV	NV	NV	NV	5.0E+01	Y	ASL
57-12-5	CYANIDE	0.68	16.4 J	mg/kg	BFSED-02	10/47	0.52-1.41	INORG	1.6E+01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
7439-89-6	IRON	4760	33200	mg/kg	BFGP-11	47/47	-	INORG	3.3E+04	14000	NV	NV	2.0E+02	NV	NV	NV	NV	2.0E+02	Y	ASL
7439-92-1	LEAD	5	577 J	mg/kg	BFGP-08	47/47	-	INORG	5.8E+02	14	6.3E+01	5.0E+01	9.0E+02	1.2E+02	1.7E+03	1.1E+01	5.6E+01	1.1E+01	Y	ASL
7439-95-4	MAGNESIUM	1610	49600 J	mg/kg	BFGP-09A	47/47	-	INORG	5.0E+04	2300	NV	NV	NV	NV	NV	NV	NV	NV	N	EN
7439-96-5	MANGANESE	36.9	929	mg/kg	BFSS-01	47/47	-	INORG	9.3E+02	285	1.6E+03	5.0E+02	1.0E+02	NV	NV	NV	NV	1.0E+02	Y	ASL
7439-97-6	MERCURY	0.031 J	91.9	mg/kg	BFGP-08	46/47	0.04-0.04	INORG	9.2E+01	0.081	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
7440-02-0	NICKEL	7.5	61.9	mg/kg	BFGP-02A	47/47	-	INORG	6.2E+01	12	3.0E+01	3.0E+01	9.0E+01	NV	NV	NV	NV	3.0E+01	Y	ASL
7440-09-7	POTASSIUM	340 J	2670	mg/kg	BFGP-01A	47/47	-	INORG	2.7E+03	12000	NV	NV	NV	NV	NV	NV	NV	NV	N	EN
7782-49-2	SELENIUM	0.22 J	2.4	mg/kg	BFSS-06	30/47	0.44-3.15	INORG	2.4E+00	NV	3.9E+00	1.0E+00	1.0E+02	NV	NV	NV	NV	1.0E+00	Y	ASL
7440-22-4	SILVER	0.099 J	0.89 J	mg/kg	BFSED-02	9/47	0.076-1.67	INORG	8.9E-01	NV	2.0E+00	2.0E+00	5.0E+01	5.6E+02	NV	4.2E+00	1.4E+01	2.0E+00	N	BSL
7440-23-5	SODIUM	71.8 J	1430	mg/kg	BFSS-09	42/47	0.638-78.1	INORG	1.4E+03	NV	NV	NV	NV	NV	NV	NV	NV	NV	N	EN
7440-28-0	THALLIUM	0.54 J	0.54 J	mg/kg	BFGP-09B	1/47	0.38-5.1	INORG	5.4E-01	NV	NV	1.0E+00	NV	NV	NV	NV	NV	1.0E+00	N	BSL
7440-62-2	VANADIUM	10.1	98.9	mg/kg	BFMW-04I	47/47	-	INORG	9.9E+01	43	NV	2.0E+00	2.0E+01	NV	NV	7.8E+00	2.8E+02	2.0E+00	Y	ASL
7440-66-6	ZINC	16.6	453 J	mg/kg	BFGP-11	47/47	-	INORG	4.5E+02	40	1.1E+02	5.0E+01	1.0E+02	NV	NV	NV	NV	5.0E+01	Y	ASL
11097-69-1	AROCLOR-1254	0.009 J	1	mg/kg	BFGP-10, BFMW-06I, BFGP-11	21/47	0.02-8	PCB	1.0E+00	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
11096-82-5	AROCLOR-1260	0.06	0.83	mg/kg	BFSS-09	8/47	0.02-8	PCB	8.3E-01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
11100-14-4	AROCLOR-1268	0.003 J	1 J	mg/kg	BFGP-11	13/47	0.02-8	PCB	1.0E+00	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
1746-01-6	2,3,7,8-TCDD Equivalents [a]	a	a	mg/kg	a	a	a	PCDD/F	3.5E-04	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
72-54-8	4,4'-DDD	0.2 J	0.2 J	mg/kg	BFGP-10	1/47	0.003-0.8	PEST	2.0E-01	NV	3.3E-03	NV	NV	NV	NV	NV	NV	3.3E-03	Y	ASL
72-55-9	4,4'-DDE	0.01 J	0.042	mg/kg	BFSS-09	3/47	0.003-0.8	PEST	4.2E-02	NV	3.3E-03	NV	NV	NV	NV	NV	NV	3.3E-03	Y	ASL
50-29-3	4,4'-DDT	0.066	0.4 J	mg/kg	BFGP-09C	5/47	0.003-0.8	PEST	4.0E-01	NV	3.3E-03	NV	NV	NV	NV	NV	NV	3.3E-03	Y	ASL
72-20-8	ENDRIN	0.025	0.025	mg/kg	BFSS-09	1/47	0.003-0.8	PEST	2.5E-02	NV	1.4E-02	NV	NV	NV	NV	NV	NV	1.4E-02	Y	ASL
5566-34-7	GAMMA-CHLORDANE	0.001 J	0.7	mg/kg	BFGP-05	3/28	0.0018-0.2	PEST	7.0E-01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
120-82-1	1,2,4-TRICHLOROBENZENE	0.049 J	0.5 J	mg/kg	BFSS-03	5/73	0.005-72	SVOC	5.0E-01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
95-50-1	1,2-DICHLOROBENZENE	0.0008 J	0.54 J	mg/kg	BFMW-02B	14/73	0.003-72	SVOC	5.4E-01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
106-46-7	1,4-DICHLOROBENZENE	0.0008 J	1.9	mg/kg	BFMW-02B	31/73	0.003-72	SVOC	1.9E+00	NV	2.0E+01	NV	NV	NV	NV	NV	NV	2.0E+01	N	BSL
51-28-5	2,4-DINITROPHENOL	0.21 J	0.21 J	mg/kg	BFGP-02A	1/47	1.7-360	SVOC	2.1E-01	NV	NV	2.0E+01	NV	NV	NV	NV	NV	2.0E+01	N	BSL
91-57-6	2-METHYLNAPHTHALENE	0.07 J	16 J	mg/kg	BFGP-09C	26/47	0.35-3.7	SVOC	1.6E+01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
83-32-9	ACENAPHTHENE	0.055 J	110	mg/kg	BFGP-09C	25/47	0.35-3.7	SVOC	1.1E+02	NV	2.0E+01	NV	NV	NV	NV	NV	NV	2.0E+01	Y	ASL
208-96-8	ACENAPHTHYLENE	0.047 J	1 J	mg/kg	BFSS-03	26/47	0.35-72	SVOC	1.0E+00	NV	NV	2.0E+01	NV	NV	NV	NV	NV	2.0E+01	N	BSL
120-12-7	ANTHRACENE	0.043 J	110	mg/kg	BFGP-09C	40/47	0.35-0.42	SVOC	1.1E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
56-55-3	BENZO(A)ANTHRACENE	0.04 J	310	mg/kg	BFGP-09C	43/47	0.35-0.38	SVOC	3.1E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
50-32-8	BENZO(A)PYRENE	0.11 J	350	mg/kg	BFGP-09C	42/47	0.35-0.39	SVOC	3.5E+02	NV	2.6E+00	NV	NV	NV	NV	NV	NV	2.6E+00	Y	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.039 J	410	mg/kg	BFGP-09C	43/47	0.35-0.38	SVOC	4.1E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
191-24-2	BENZO(G,H,I)PERYLENE	0.077 J	190	mg/kg	BFGP-09C	43/47	0.37-0.39	SVOC	1.9E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
207-08-9	BENZO(K)FLUORANTHENE	0.039 J	140	mg/kg	BFGP-09C	43/47	0.35-0.38	SVOC	1.4E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
65-85-0	BENZOIC ACID	0.036 J	1 J	mg/kg	BFGP-05	8/17	1.7-360	SVOC	1.0E+00	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
100-51-6	BENZYL ALCOHOL	0.33 J	0.33 J	mg/kg	BFSED-01	1/45	0.35-72	SVOC	3.3E-01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.11 J	2.1 J	mg/kg	BFSS-03	16/47	0.35-72	SVOC	2.1E+00	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
86-74-8	CARBAZOLE	0.053 J	72 J	mg/kg	BFGP-09C	31/47	0.35-3.7	SVOC	7.2E+01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
218-01-9	CHRYSENE	0.14 J	290	mg/kg	BFGP-09C	42/47	0.35-0.39	SVOC	2.9E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
53-70-3	DIBENZO(A,H)ANTHRACENE	0.041 J	63 J	mg/kg	BFGP-09C	40/47	0.35-0.42	SVOC	6.3E+01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
132-64-9	DIBENZOFURAN	0.051 J	33 J	mg/kg	BFGP-09C	26/47	0.35-3.7	SVOC	3.3E+01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
84-74-2	DI-N-BUTYL PHTHALATE	0.05 J	0.24 J	mg/kg	BFMW-04D	6/47	0.35-72	SVOC	2.4E-01	NV	NV	2.0E+02	NV	NV	NV	NV	NV	2.0E+02	N	BSL
206-44-0	FLUORANTHENE	0.063 J	480	mg/kg	BFGP-09C	43/47	0.35-0.38	SVOC	4.8E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
86-73-7	FLUORENE	0.045 J	56 J	mg/kg	BFGP-09C	27/47	0.35-3.7	SVOC	5.6E+01	NV	3.0E+01	NV	NV	NV	NV	NV	NV	3.0E+01	Y	ASL
118-74-1	HEXACHLOROBENZENE	0.12 J	1.7 J	mg/kg	BFGP-08	11/47	0.35-72	SVOC	1.7E+00	NV	NV	NV	1.0E+03	NV	NV	NV	NV	1.0E+03	N	BSL
87-68-3	HEXACHLOROBUTADIENE	0.004 J	0.42 J	mg/kg	BFSS-03	3/73	0.005-72	SVOC	4.2E-01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
67-72-1	HEXACHLOROETHANE	0.061 J	2.3 J	mg/kg	BFSS-03	5/47	0.35-72	SVOC	2.3E+00	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
193-39-5	INDENO(1,2,3-CD)PYRENE	0.078 J	180	mg/kg	BFGP-09C	42/47	0.35-0.39	SVOC	1.8E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
91-20-3	NAPHTHALENE	0.001 J	64 J	mg/kg	BFGP-09C	36/73	0.005-3.7	SVOC	6.4E+01	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX

Table 2.1
Honeywell
Ballfield Site
Risk Screening Assessment
Data Summary and COPEC Selection: Ecological Screening for Surface Soil (0 - 1 ft)

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening (mg/kg)	Background Value (McGovern, 1983)	Screening Values: Remedial Program Soil Cleanup Objectives (NYSDEC 2006)	Screening Values: Toxicological Benchmarks Terrestrial Plants (Efroymson 1997a)	Screening Values: Toxicological Benchmarks Terrestrial Invertebrates (Efroymson 1997b)	Screening Values: USEPA (2005) Ecological Soil Screening Levels - Plants	Screening Values: USEPA Ecological Soil Screening Levels - Invertebrates	Screening Values: USEPA Ecological Soil Screening Levels Aves	Screening Values: USEPA Ecological Soil Screening Levels - Mammals	Screening Values: Screening Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[c]
98-95-3	NITROBENZENE	1.6 J	1.6 J	mg/kg	BFSS-09	1/47	0.35-72	SVOC	1.6E+00	NV	NV	NV	1.0E+03	NV	NV	NV	NV	1.0E+03	N	BSL

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Data Summary and COPEC Selection: Ecological Screening for Surface Soil (0 - 1 ft)

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening (mg/kg)	Background Value (McGovern, 1983)	Screening Values								COPC Flag (Y/N)	Rationale for Selection or Deletion[c]
											Remedial Program Soil Cleanup Objectives (NYSDEC 2006)	Toxicological Benchmarks Terrestrial Plants (Efroymson 1997a)	Toxicological Benchmarks Terrestrial Invertebrates (Efroymson 1997b)	USEPA (2005) Ecological Soil Screening Levels - Plants	USEPA Ecological Soil Screening Levels - Invertebrates	USEPA Ecological Soil Screening Levels Aves	USEPA Ecological Soil Screening Levels - Mammals	Screening Value		
87-86-5	PENTACHLOROPHENOL	0.21 J	0.21 J	mg/kg	BFGP-02A	1/47	1.7-360	SVOC	2.1E-01	NV	8.0E-01	3.0E+00	4.0E+02	NV	NV	NV	NV	8.0E-01	N	BSL
85-01-8	PHENANTHRENE	0.041 J	390	mg/kg	BFGP-09C	43/47	0.35-0.38	SVOC	3.9E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
108-95-2	PHENOL	0.069 J	0.069 J	mg/kg	BFGP-11	1/47	0.35-72	SVOC	6.9E-02	NV	3.0E+01	7.0E+01	1.0E+02	NV	NV	NV	NV	3.0E+01	N	BSL
129-00-0	PYRENE	0.049 J	400	mg/kg	BFGP-09C	43/47	0.35-0.38	SVOC	4.0E+02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
95-63-6	1,2,4-TRIMETHYLBENZENE	0.001 J	0.001 J	mg/kg	BFGP-02A	1/26	0.003-0.006	VOC	1.0E-03	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
108-67-8	1,3,5-TRIMETHYLBENZENE	0.0007 J	0.0007 J	mg/kg	BFGP-09C, BFGP-02A	2/26	0.003-0.006	VOC	7.0E-04	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
78-93-3	2-BUTANONE	0.004 J	0.005 J	mg/kg	BFMW-02B	2/45	0.01-0.022	VOC	5.0E-03	NV	1.0E+02	NV	NV	NV	NV	NV	NV	1.0E+02	N	BSL
67-64-1	ACETONE	0.0036 J	0.009 J	mg/kg	BFGP-01C	6/47	0.01-0.033	VOC	9.0E-03	NV	2.2E+00	NV	NV	NV	NV	NV	NV	2.2E+00	N	BSL
71-43-2	BENZENE	0.0006 J	0.003 J	mg/kg	BFSED-02	4/47	0.003-0.0083	VOC	3.0E-03	NV	7.0E+01	NV	NV	NV	NV	NV	NV	7.0E+01	N	BSL
75-27-4	BROMODICHLOROMETHANE	0.008	0.036 J	mg/kg	BFSED-02	2/47	0.003-0.0083	VOC	3.6E-02	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
75-15-0	CARBON DISULFIDE	0.00056 J	0.00056 J	mg/kg	BFGP-09E	1/21	0.01-0.017	VOC	5.6E-04	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
108-90-7	CHLOROBENZENE	0.001 J	0.001 J	mg/kg	BFGP-09C	1/47	0.003-0.0083	VOC	1.0E-03	NV	4.0E+01	NV	NV	NV	NV	NV	NV	4.0E+01	N	BSL
124-48-1	CHLORODIBROMOMETHANE	0.001 J	0.005 J	mg/kg	BFSED-02	2/47	0.003-0.0083	VOC	5.0E-03	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
67-66-3	CHLOROFORM	0.0007 J	0.32 J	mg/kg	BFSED-02	19/47	0.003-0.0079	VOC	3.2E-01	NV	1.2E+01	NV	NV	NV	NV	NV	NV	1.2E+01	N	BSL
110-82-7	CYCLOHEXANE	0.00077 J	0.00077 J	mg/kg	BFGP-09E	1/2	0.0052-0.0052	VOC	7.7E-04	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
100-41-4	ETHYLBENZENE	0.002 J	0.002 J	mg/kg	BFGP-09C	1/47	0.003-0.0083	VOC	2.0E-03	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
108-87-2	METHYLCYCLOHEXANE	0.00053 J	0.00053 J	mg/kg	BFGP-09E	1/2	0.0052-0.0052	VOC	5.3E-04	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
75-09-2	METHYLENE CHLORIDE	0.011	0.18	mg/kg	BFGP-01A	12/47	0.005-0.016	VOC	1.8E-01	NV	1.2E+01	NV	NV	NV	NV	NV	NV	1.2E+01	N	BSL
95-47-6	O-XYLENE	0.0017 J	0.0017 J	mg/kg	BFSS-07	1/21	0.0052-0.0083	VOC	1.7E-03	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
99-87-6	P-ISOPROPYLTOLUENE	0.0006 J	0.005	mg/kg	BFGP-01B	2/26	0.003-0.006	VOC	5.0E-03	NV	NV	NV	NV	NV	NV	NV	NV	NV	Y	NTX
127-18-4	TETRACHLOROETHENE	0.00049 J	0.023	mg/kg	BFSS-03	22/47	0.003-0.0079	VOC	2.3E-02	NV	2.0E+00	NV	NV	NV	NV	NV	NV	2.0E+00	N	BSL
108-88-3	TOLUENE	0.00063 J	0.0032 J	mg/kg	BFSS-07	7/47	0.003-0.0083	VOC	3.2E-03	NV	3.6E+01	2.0E+02	NV	NV	NV	NV	NV	3.6E+01	N	BSL
79-01-6	TRICHLOROETHENE	0.0006 J	0.0009 J	mg/kg	BFGP-02B	2/47	0.003-0.0083	VOC	9.0E-04	NV	2.0E+00	NV	NV	NV	NV	NV	NV	2.0E+00	N	BSL
1330-20-7	XYLENES, TOTAL	0.0008 J	0.006	mg/kg	BFGP-10	5/26	0.003-0.004	VOC	6.0E-03	NV	2.6E-01	NV	NV	NV	NV	NV	NV	2.6E-01	N	BSL

NOTES:
a = Dioxin equivalent screening value is the sum of all dioxins multiplied by their TCDD equivalency factor. (See Table 3.1)
b = Background Values for metals in soil were derived from Background Concentrations of 20 Elements in Soils with Special Regard for New York State. McGovern (1983)
c = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen
J = Estimated Value, NV = No Value

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Table 2.2
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Surface Soil - Industrial

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for Industrial Soil[ce]	Cancer/ Noncancer[e]	Region 3 RBC Value for Industrial Soil[c]	Cancer/ Noncancer[e]	NYSDEC Soil Cleanup Objective (Industrial)	Screening Value	COPC Flag (Y/N)
7429-90-5	ALUMINUM	3040	11500	mg/kg	BFSS-01	36/36	-	INORG	1.2E+04	3.3E+04	1.0E+05	max	1.0E+05	nc	NV	1.0E+05	N
7440-36-0	ANTIMONY	0.16 J	8.3 J	mg/kg	BFGP-08	24/36	0.16-9.22	INORG	8.3E+00	NV	4.1E+01	nc	4.1E+01	nc	NV	4.1E+01	N
7440-38-2	ARSENIC	2.5	34.6 J	mg/kg	BFSS-09	36/36	-	INORG	3.5E+01	5.0E+00	1.6E+00	ca	1.9E+00	ca	1.6E+01	1.6E+00	Y
7440-39-3	BARIUM	27	2950 J	mg/kg	BFSS-02	36/36	-	INORG	3.0E+03	2.9E+02	6.7E+03	nc	2.0E+04	nc	1.0E+04	6.7E+03	N
7440-41-7	BERYLLIUM	0.3 J	0.82 J	mg/kg	BFSED-02	26/36	0.51-0.77	INORG	8.2E-01	6.0E-01	1.9E+03	ca**	2.0E+02	nc	2.7E+03	2.0E+02	N
7440-43-9	CADMIUM	0.097 J	2 J	mg/kg	BFSED-02	13/36	0.0277-10.2	INORG	2.0E+00	2.1E-01	4.5E+01	nc	5.1E+01	nc	6.0E+01	4.5E+01	N
7440-70-2	CALCIUM	7760	247000	mg/kg	BFGP-09E	36/36	-	INORG	2.5E+05	NV	NV	NV	NV	NV	NV	NV	N
7440-47-3	CHROMIUM	7.1	124	mg/kg	BFGP-11	35/35	-	INORG	1.2E+02	NV	NV	NV	NV	NV	NV	NV	Y
7440-48-4	COBALT	2.5 J	16.9	mg/kg	BFGP-11	32/36	5.42-6.24	INORG	1.7E+01	NV	1.9E+03	ca*	NV	NV	NV	1.9E+03	N
7440-50-8	COPPER	5.2	252 J	mg/kg	BFSS-09	36/36	-	INORG	2.5E+02	NV	4.1E+03	nc	4.1E+03	nc	1.0E+04	4.1E+03	N
57-12-5	CYANIDE	0.68	16.4 J	mg/kg	BFSED-02	8/36	0.52-1.41	INORG	1.6E+01	NV	1.2E+03	nc	2.0E+03	nc	NV	1.2E+03	N
7439-89-6	IRON	4760	33200	mg/kg	BFGP-11	36/36	-	INORG	3.3E+04	1.4E+04	1.0E+05	max	7.2E+04	nc	NV	7.2E+04	N
7439-92-1	LEAD	6.1 J	577 J	mg/kg	BFGP-08	36/36	-	INORG	5.8E+02	1.4E+01	8.0E+01	nc	NV	NV	3.9E+03	8.0E+01	Y
7439-95-4	MAGNESIUM	1610	49600 J	mg/kg	BFGP-09A	36/36	-	INORG	5.0E+04	2.3E+03	NV	NV	NV	NV	NV	NV	N
7439-96-5	MANGANESE	36.9	809	mg/kg	BFSS-01	36/36	-	INORG	8.1E+02	2.9E+02	1.9E+03	nc	2.0E+03	nc	1.0E+04	1.9E+03	N
7439-97-6	MERCURY	0.031 J	91.9	mg/kg	BFGP-08	35/36	0.04-0.04	INORG	9.2E+01	8.1E-02	NV	NV		NV	NV	NV	Y
7440-02-0	NICKEL	7.5	61.9	mg/kg	BFGP-02A	36/36	-	INORG	6.2E+01	1.2E+01	2.0E+03	nc	2.0E+03	nc	1.0E+04	2.0E+03	N
7440-09-7	POTASSIUM	340 J	2670	mg/kg	BFGP-01A	36/36	-	INORG	2.7E+03	1.2E+04	NV	NV	NV	NV	NV	NV	N
7782-49-2	SELENIUM	0.22 J	2.1	mg/kg	BFSS-06	27/36	0.44-3.15	INORG	2.1E+00	NV	5.1E+02	nc	5.1E+02	nc	6.8E+03	5.1E+02	N
7440-22-4	SILVER	0.099 J	0.89 J	mg/kg	BFSED-02	9/36	0.076-1.54	INORG	8.9E-01	NV	5.1E+02	nc	5.1E+02	nc	6.8E+03	5.1E+02	N
7440-23-5	SODIUM	71.8 J	1430	mg/kg	BFSS-09	32/36	0.638-78.1	INORG	1.4E+03	NV	NV	NV	NV	NV	NV	NV	N
7440-28-0	THALLIUM	0.54 J	0.54 J	mg/kg	BFGP-09B	1/36	0.38-5.1	INORG	5.4E-01	NV	6.7E+00	nc	7.2E+00	nc	NV	6.7E+00	N
7440-62-2	VANADIUM	11	98.9	mg/kg	BFMW-04I	36/36	-	INORG	9.9E+01	4.3E+01	1.0E+02	nc	1.0E+02	nc	NV	1.0E+02	N
7440-66-6	ZINC	16.6	453 J	mg/kg	BFGP-11	36/36	-	INORG	4.5E+02	4.0E+01	1.0E+05	max	3.1E+04	nc	1.0E+04	1.0E+04	N
11097-69-1	AROCLOR-1254	0.009 J	1	mg/kg	BFGP-10, BFGP-11, BFMW-06I	19/36	0.02-8	PCB	1.0E+00	NV	7.4E-01	ca*	1.4E+00	ca	NV	7.4E-01	Y
11096-82-5	AROCLOR-1260	0.06	0.83	mg/kg	BFSS-09	6/36	0.02-8	PCB	8.3E-01	NV	NV	NV	1.4E+00	ca	NV	1.4E+00	N
11100-14-4	AROCLOR-1268	0.003 J	1 J	mg/kg	BFGP-11	13/36	0.02-8	PCB	1.0E+00	NV	NV	NV	NV	NV	NV	NV	Y
1746-01-6	2,3,7,8-TCDD Equivalents [a]	a	a	mg/kg	a	a	a	PCDD/F	3.3E-04	NV	1.6E-05	ca	1.9E-05	ca	NV	1.6E-05	Y
72-54-8	4,4'-DDD	0.2 J	0.2 J	mg/kg	BFGP-10	1/36	0.003-0.8	PEST	2.0E-01	NV	1.0E+01	ca	1.2E+01	ca	1.8E+02	1.0E+01	N
72-55-9	4,4'-DDE	0.01 J	0.042	mg/kg	BFSS-09	2/36	0.003-0.8	PEST	4.2E-02	NV	7.0E+00	ca	8.4E+00	ca	1.2E+02	7.0E+00	N
50-29-3	4,4'-DDT	0.07 J	0.4 J	mg/kg	BFGP-09C	4/36	0.003-0.8	PEST	4.0E-01	NV	7.0E+00	ca*	8.4E+00	ca	9.4E+01	7.0E+00	N
72-20-8	ENDRIN	0.025	0.025	mg/kg	BFSS-09	1/36	0.003-0.8	PEST	2.5E-02	NV	1.8E+01	nc	3.1E+01	nc	4.1E+02	1.8E+01	N
5566-34-7	GAMMA-CHLORDANE	0.001 J	0.7	mg/kg	BFGP-05	3/27	0.0018-0.2	PEST	7.0E-01	NV	NV	NV	NV	NV	NV	NV	Y
120-82-1	1,2,4-TRICHLOROBENZENE	0.049 J	0.5 J	mg/kg	BFSS-03	5/62	0.005-72	SVOC	5.0E-01	NV	2.2E+01	nc	1.0E+03	nc	NV	2.2E+01	N
95-50-1	1,2-DICHLOROBENZENE	0.0008 J	0.54 J	mg/kg	BFMW-02B	13/62	0.003-72	SVOC	5.4E-01	NV	6.0E+02	sat	9.2E+03	nc	1.0E+03	6.0E+02	N
106-46-7	1,4-DICHLOROBENZENE	0.0008 J	1.9	mg/kg	BFMW-02B	27/62	0.003-72	SVOC	1.9E+00	NV	7.9E+00	ca	1.2E+02	ca	2.5E+02	7.9E+00	N
51-28-5	2,4-DINITROPHENOL	0.21 J	0.21 J	mg/kg	BFGP-02A	1/36	1.7-360	SVOC	2.1E-01	NV	1.2E+02	nc	2.0E+02	nc	NV	1.2E+02	N
91-57-6	2-METHYLNAPHTHALENE	0.07 J	16 J	mg/kg	BFGP-09C	20/36	0.35-3.7	SVOC	1.6E+01	NV	NV	NV	4.1E+02	nc	NV	4.1E+02	N
83-32-9	ACENAPHTHENE	0.055 J	110	mg/kg	BFGP-09C	20/36	0.35-3.7	SVOC	1.1E+02	NV	2.9E+03	nc	6.1E+03	nc	1.0E+03	1.0E+03	N
208-96-8	ACENAPHTHYLENE	0.047 J	0.56 J	mg/kg	BFSS-03	19/36	0.35-72	SVOC	5.6E-01	NV	NV	NV	NV	NV	1.0E+03	1.0E+03	N
120-12-7	ANTHRACENE	0.043 J	110	mg/kg	BFGP-09C	30/36	0.35-0.42	SVOC	1.1E+02	NV	1.0E+05	max	3.1E+04	nc	1.0E+03	1.0E+03	N
56-55-3	BENZO(A)ANTHRACENE	0.04 J	310	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	3.1E+02	NV	2.1E+00	ca	3.9E+00	ca	1.1E+01	2.1E+00	Y
50-32-8	BENZO(A)PYRENE	0.11 J	350	mg/kg	BFGP-09C	32/36	0.35-0.39	SVOC	3.5E+02	NV	2.1E-01	ca	3.9E-01	ca	1.1E+00	2.1E-01	Y
205-99-2	BENZO(B)FLUORANTHENE	0.039 J	410	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	4.1E+02	NV	2.1E+00	ca	3.9E+00	ca	1.1E+01	2.1E+00	Y
191-24-2	BENZO(G,H,I)PERYLENE	0.077 J	190	mg/kg	BFGP-09C	33/36	0.37-0.39	SVOC	1.9E+02	NV	NV	NV	NV	NV	1.0E+03	1.0E+03	N
207-08-9	BENZO(K)FLUORANTHENE	0.039 J	140	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	1.4E+02	NV	2.1E+01	ca	3.9E+01	ca	1.1E+02	2.1E+01	Y
65-85-0	BENZOIC ACID	0.036 J	1 J	mg/kg	BFGP-05	8/17	1.7-360	SVOC	1.0E+00	NV	1.0E+05	max	4.1E+05	nc	NV	1.0E+05	N
100-51-6	BENZYL ALCOHOL	0.33 J	0.33 J	mg/kg	BFSED-01	1/35	0.35-72	SVOC	3.3E-01	NV	1.0E+05	max	5.1E+04	nc	NV	5.1E+04	N
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.11 J	1.2 J	mg/kg	BFSS-02	8/36	0.35-72	SVOC	1.2E+00	NV	1.2E+02	ca	2.0E+02	ca	NV	1.2E+02	N
86-74-8	CARBAZOLE	0.053 J	72 J	mg/kg	BFGP-09C	24/36	0.35-3.7	SVOC	7.2E+01	NV	8.6E+01	ca	1.4E+02	ca	NV	8.6E+01	N
218-01-9	CHRYSENE	0.14 J	290	mg/kg	BFGP-09C	32/36	0.35-0.39	SVOC	2.9E+02	NV	2.1E+02	ca	3.9E+02	ca	1.1E+02	1.1E+02	Y

Table 2.2
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Surface Soil - Industrial

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for Industrial Soil[ce]	Cancer/ Noncancer[e]	Region 3 RBC Value for Industrial Soil[c]	Cancer/ Noncancer[e]	NYSDEC Soil Cleanup Objective (Industrial)	Screening Value	COPC Flag (Y/N)
53-70-3	DIBENZO(A,H)ANTHRACENE	0.041 J	63 J	mg/kg	BFGP-09C	30/36	0.35-0.42	SVOC	6.3E+01	NV	2.1E-01	ca	3.9E-01	ca	1.1E+00	2.1E-01	Y
132-64-9	DIBENZOFURAN	0.051 J	33 J	mg/kg	BFGP-09C	21/36	0.35-3.7	SVOC	3.3E+01	NV	1.6E+02	nc	1.0E+02	nc	1.0E+03	1.0E+02	N
84-74-2	DI-N-BUTYL PHTHALATE	0.057 J	0.24 J	mg/kg	BFMW-04D	2/36	0.35-72	SVOC	2.4E-01	NV	6.2E+03	nc	1.0E+04	nc	NV	6.2E+03	N
206-44-0	FLUORANTHENE	0.063 J	480	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	4.8E+02	NV	2.2E+03	nc	4.1E+03	nc	1.0E+03	1.0E+03	N
86-73-7	FLUORENE	0.045 J	56 J	mg/kg	BFGP-09C	21/36	0.35-3.7	SVOC	5.6E+01	NV	2.6E+03	nc	4.1E+03	nc	1.0E+03	1.0E+03	N
118-74-1	HEXACHLOROBENZENE	0.14 J	1.7 J	mg/kg	BFGP-08	9/36	0.35-72	SVOC	1.7E+00	NV	1.1E+00	ca	1.8E+00	ca	1.2E+01	1.1E+00	Y
87-68-3	HEXACHLOROBUTADIENE	0.004 J	0.42 J	mg/kg	BFSS-03	3/62	0.005-72	SVOC	4.2E-01	NV	2.2E+01	ca**	3.7E+01	ca	NV	2.2E+01	N
67-72-1	HEXACHLOROETHANE	0.061 J	1.8 J	mg/kg	BFSS-03	4/36	0.35-72	SVOC	1.8E+00	NV	1.2E+02	ca**	2.0E+02	ca	NV	1.2E+02	N
193-39-5	INDENO(1,2,3-CD)PYRENE	0.078 J	180	mg/kg	BFGP-09C	32/36	0.35-0.39	SVOC	1.8E+02	NV	2.1E+00	ca	3.9E+00	ca	1.1E+01	2.1E+00	Y
91-20-3	NAPHTHALENE	0.001 J	64 J	mg/kg	BFGP-09C	30/62	0.005-3.7	SVOC	6.4E+01	NV	1.9E+01	nc	2.0E+03	nc	1.0E+03	1.9E+01	Y
87-86-5	PENTACHLOROPHENOL	0.21 J	0.21 J	mg/kg	BFGP-02A	1/36	1.7-360	SVOC	2.1E-01	NV	9.0E+00	ca	2.4E+01	ca	5.5E+01	9.0E+00	N
85-01-8	PHENANTHRENE	0.041 J	390	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	3.9E+02	NV	NV	NV	NV	NV	1.0E+03	1.0E+03	N
108-95-2	PHENOL	0.069 J	0.069 J	mg/kg	BFGP-11	1/36	0.35-72	SVOC	6.9E-02	NV	1.0E+05	max	3.1E+04	nc	1.0E+03	1.0E+03	N
129-00-0	PYRENE	0.049 J	400	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	4.0E+02	NV	2.9E+03	nc	3.1E+03	nc	1.0E+03	1.0E+03	N
95-63-6	1,2,4-TRIMETHYLBENZENE	0.001 J	0.001 J	mg/kg	BFGP-02A	1/26	0.003-0.006	VOC	1.0E-03	NV	1.7E+01	nc	NV	NV	3.8E+02	1.7E+01	N
108-67-8	1,3,5-TRIMETHYLBENZENE	0.0007 J	0.0007 J	mg/kg	BFGP-09C, BFGP-02A	2/26	0.003-0.006	VOC	7.0E-04	NV	7.0E+00	nc	NV	NV	3.8E+02	7.0E+00	N
78-93-3	2-BUTANONE	0.004 J	0.005 J	mg/kg	BFMW-02B	2/35	0.01-0.022	VOC	5.0E-03	NV	1.1E+04	nc	6.1E+04	nc	1.0E+03	1.0E+03	N
67-64-1	ACETONE	0.0036 J	0.009 J	mg/kg	BFGP-01C	3/36	0.01-0.032	VOC	9.0E-03	NV	5.4E+03	nc	9.2E+04	nc	1.0E+03	1.0E+03	N
71-43-2	BENZENE	0.0006 J	0.003 J	mg/kg	BFSED-02	4/36	0.003-0.0079	VOC	3.0E-03	NV	1.4E+00	ca*	5.2E+01	ca	8.9E+01	1.4E+00	Y
75-27-4	BROMODICHLOROMETHANE	0.008	0.036 J	mg/kg	BFSED-02	2/36	0.003-0.0079	VOC	3.6E-02	NV	1.8E+00	ca	4.6E+01	ca	NV	1.8E+00	N
75-15-0	CARBON DISULFIDE	0.00056 J	0.00056 J	mg/kg	BFGP-09E	1/10	0.011-0.016	VOC	5.6E-04	NV	7.2E+02	sat	1.0E+04	nc	NV	7.2E+02	N
108-90-7	CHLOROBENZENE	0.001 J	0.001 J	mg/kg	BFGP-09C	1/36	0.003-0.0079	VOC	1.0E-03	NV	5.3E+01	nc	2.0E+03	nc	1.0E+03	5.3E+01	N
124-48-1	CHLORODIBROMOMETHANE	0.001 J	0.005 J	mg/kg	BFSED-02	2/36	0.003-0.0079	VOC	5.0E-03	NV	2.6E+00	ca	3.4E+01	ca	NV	2.6E+00	N
67-66-3	CHLOROFORM	0.0007 J	0.32 J	mg/kg	BFSED-02	14/36	0.003-0.0079	VOC	3.2E-01	NV	4.7E-01	ca	1.0E+03	nc	7.0E+02	4.7E-01	N
110-82-7	CYCLOHEXANE	0.00077 J	0.00077 J	mg/kg	BFGP-09E	1/1	-	VOC	7.7E-04	NV	1.4E+02	sat	NV	NV	NV	1.4E+02	N
100-41-4	ETHYLBENZENE	0.002 J	0.002 J	mg/kg	BFGP-09C	1/36	0.003-0.0079	VOC	2.0E-03	NV	4.0E+02	sat	1.0E+04	nc	7.8E+02	4.0E+02	N
108-87-2	METHYLCYCLOHEXANE	0.00053 J	0.00053 J	mg/kg	BFGP-09E	1/1	-	VOC	5.3E-04	NV	8.7E+02	nc	NV	NV	NV	8.7E+02	N
75-09-2	METHYLENE CHLORIDE	0.011	0.18	mg/kg	BFGP-01A	12/36	0.005-0.016	VOC	1.8E-01	NV	2.1E+01	ca	3.8E+02	ca	1.0E+03	2.1E+01	N
95-47-6	O-XYLENE	0.0017 J	0.0017 J	mg/kg	BFSS-07	1/10	0.0052-0.0079	VOC	1.7E-03	NV	NV	NV	NV	NV	NV	NV	Y
99-87-6	P-ISOPROPYLTOLUENE	0.0006 J	0.005	mg/kg	BFGP-01B	2/26	0.003-0.006	VOC	5.0E-03	NV	NV	NV	NV	NV	NV	NV	Y
127-18-4	TETRACHLOROETHENE	0.0009 J	0.014	mg/kg	BFGP-09C	16/36	0.003-0.0079	VOC	1.4E-02	NV	1.3E+00	ca	5.3E+00	ca	3.0E+02	1.3E+00	N
108-88-3	TOLUENE	0.00063 J	0.0032 J	mg/kg	BFSS-07	6/36	0.003-0.0079	VOC	3.2E-03	NV	5.2E+02	sat	8.2E+03	nc	1.0E+03	5.2E+02	N
79-01-6	TRICHLOROETHENE	0.0006 J	0.0009 J	mg/kg	BFGP-02B	2/36	0.003-0.0079	VOC	9.0E-04	NV	1.1E-01	ca	7.2E+00	ca	4.0E+02	1.1E-01	N
1330-20-7	XYLENES, TOTAL	0.0008 J	0.006	mg/kg	BFGP-10	5/26	0.003-0.004	VOC	6.0E-03	NV	4.2E+02	sat	2.0E+04	nc	1.0E+03	4.2E+02	N

NOTES:
a = Dioxin equivalent screening value is the sum of all dioxins multiplied by their TCDD equivalency factor. (See Table 3.2 for details)
b = Background Values for metals in soil were derived from Background Concentrations of 20 Elements in Soils with Special Regard for New York State. McGovern (1983)
c = For those screening value that are non-cancer (NC), the screening value was multiplied by a hazard index of 0.1
d = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen
e = For Cancer/Noncancer criteria: ca=cancer, nc=noncancer, max=ceiling limit, ca* (where: nc < 100X ca), ca** (where: nc < 100X ca), NV=no value
J = Estimated Value

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Rationale for Selection or Deletion [d]
BSL
BSL
ASL,KHC
BSL
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Rationale for Selection or Deletion [d]
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Table 2.3
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Surface Soil - Ground Water Migration

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for GW Migration	Region 3 RBC Value for GW Migration[c]	Cancer/ Noncancer [e]	NYSDEC Soil Cleanup Objective (Protection of Groundwater)	Screening Value	COPC Flag (Y/N)	Rationale for Selection or Deletion [d]
7429-90-5	ALUMINUM	3040	11500	mg/kg	BFSS-01	36/36	-	INORG	1.2E+04	3.3E+04	NV	NV	NV	NV	NV	Y	NTX
7440-36-0	ANTIMONY	0.16 J	8.3 J	mg/kg	BFGP-08	24/36	0.16-9.22	INORG	8.3E+00	NV	5.0E+00	1.3E+00	nc	NV	1.3E+00	Y	ASL
7440-38-2	ARSENIC	2.5	34.6 J	mg/kg	BFSS-09	36/36	-	INORG	3.5E+01	5.0E+00	2.9E+01	2.6E-02	ca	1.6E+01	2.6E-02	Y	ASL,KHC
7440-39-3	BARIUM	27	2950 J	mg/kg	BFSS-02	36/36	-	INORG	3.0E+03	2.9E+02	1.6E+03	6.0E+02	nc	8.2E+02	6.0E+02	Y	ASL
7440-41-7	BERYLLIUM	0.3 J	0.82 J	mg/kg	BFSED-02	26/36	0.51-0.77	INORG	8.2E-01	6.0E-01	6.3E+01	1.2E+02	nc	4.7E+01	4.7E+01	N	BSL
7440-43-9	CADMIUM	0.097 J	2 J	mg/kg	BFSED-02	13/36	0.0277-10.2	INORG	2.0E+00	2.1E-01	8.0E+00	2.7E+00	nc	7.5E+00	2.7E+00	N	BSL
7440-70-2	CALCIUM	7760	247000	mg/kg	BFGP-09E	36/36	-	INORG	2.5E+05	NV	NV	NV	NV	NV	NV	N	EN
7440-47-3	CHROMIUM	7.1	124	mg/kg	BFGP-11	35/35	-	INORG	1.2E+02	NV	NV	NV	NV	NV	NV	Y	NTX,KHC
7440-48-4	COBALT	2.5 J	16.9	mg/kg	BFGP-11	32/36	5.42-6.24	INORG	1.7E+01	NV	NV	NV	NV	NV	NV	Y	NTX
7440-50-8	COPPER	5.2	252 J	mg/kg	BFSS-09	36/36	-	INORG	2.5E+02	NV	NV	1.1E+03	nc	1.7E+03	1.1E+03	N	BSL
57-12-5	CYANIDE	0.68	16.4 J	mg/kg	BFSED-02	8/36	0.52-1.41	INORG	1.6E+01	NV	NV	1.5E+01	nc	NV	1.5E+01	Y	ASL
7439-89-6	IRON	4760	33200	mg/kg	BFGP-11	36/36	-	INORG	3.3E+04	1.4E+04	NV	NV	NV	NV	NV	Y	NTX
7439-92-1	LEAD	6.1 J	577 J	mg/kg	BFGP-08	36/36	-	INORG	5.8E+02	1.4E+01	NV	NV	NV	4.5E+02	4.5E+02	Y	ASL
7439-95-4	MAGNESIUM	1610	49600 J	mg/kg	BFGP-09A	36/36	-	INORG	5.0E+04	2.3E+03	NV	NV	NV	NV	NV	N	EN
7439-96-5	MANGANESE	36.9	809	mg/kg	BFSS-01	36/36	-	INORG	8.1E+02	2.9E+02	NV	9.5E+01	nc	2.0E+03	9.5E+01	Y	ASL
7439-97-6	MERCURY	0.031 J	91.9	mg/kg	BFGP-08	35/36	0.04-0.04	INORG	9.2E+01	8.1E-02	NV	NV	NV	NV	NV	Y	NTX
7440-02-0	NICKEL	7.5	61.9	mg/kg	BFGP-02A	36/36	-	INORG	6.2E+01	1.2E+01	1.3E+02	NV	NV	1.3E+02	1.3E+02	N	BSL
7440-09-7	POTASSIUM	340 J	2670	mg/kg	BFGP-01A	36/36	-	INORG	2.7E+03	1.2E+04	NV	NV	NV	NV	NV	N	EN
7782-49-2	SELENIUM	0.22 J	2.1	mg/kg	BFSS-06	27/36	0.44-3.15	INORG	2.1E+00	NV	5.0E+00	1.9E+00	nc	4.0E+00	1.9E+00	Y	ASL
7440-22-4	SILVER	0.099 J	0.89 J	mg/kg	BFSED-02	9/36	0.076-1.54	INORG	8.9E-01	NV	3.4E+01	3.1E+00	nc	8.3E+00	3.1E+00	N	BSL
7440-23-5	SODIUM	71.8 J	1430	mg/kg	BFSS-09	32/36	0.638-78.1	INORG	1.4E+03	NV	NV	NV	NV	NV	NV	N	EN
7440-28-0	THALLIUM	0.54 J	0.54 J	mg/kg	BFGP-09B	1/36	0.38-5.1	INORG	5.4E-01	NV	NV	3.6E-01	nc	NV	3.6E-01	Y	ASL
7440-62-2	VANADIUM	11	98.9	mg/kg	BFMW-04I	36/36	-	INORG	9.9E+01	4.3E+01	6.0E+03	7.3E+01	nc	NV	7.3E+01	Y	ASL
7440-66-6	ZINC	16.6	453 J	mg/kg	BFGP-11	36/36	-	INORG	4.5E+02	4.0E+01	1.2E+04	1.4E+03	nc	2.5E+03	1.4E+03	N	BSL
11097-69-1	AROCLOR-1254	0.009 J	1	mg/kg	BFGP-10, BFGP-11, BFMW-06I	19/36	0.02-8	PCB	1.0E+00	NV	NV	1.1E+00	ca	NV	1.1E+00	N	BSL
11096-82-5	AROCLOR-1260	0.06	0.83	mg/kg	BFSS-09	6/36	0.02-8	PCB	8.3E-01	NV	NV	NV	NV	NV	NV	Y	NTX
11100-14-4	AROCLOR-1268	0.003 J	1 J	mg/kg	BFGP-11	13/36	0.02-8	PCB	1.0E+00	NV	NV	NV	NV	NV	NV	Y	NTX
1746-01-6	2,3,7,8-TCDD Equivalents [a]	a	a	mg/kg	a	a	a	PCDD/F	3.3E-04	NV	NV	8.6E-06	ca	NV	8.6E-06	Y	ASL
72-54-8	4,4'-DDD	0.2 J	0.2 J	mg/kg	BFGP-10	1/36	0.003-0.8	PEST	2.0E-01	NV	1.6E+01	1.1E+01	ca	1.4E+01	1.1E+01	N	BSL
72-55-9	4,4'-DDE	0.01 J	0.042	mg/kg	BFSS-09	2/36	0.003-0.8	PEST	4.2E-02	NV	5.4E+01	3.5E+01	ca	1.7E+01	1.7E+01	N	BSL
50-29-3	4,4'-DDT	0.07 J	0.4 J	mg/kg	BFGP-09C	4/36	0.003-0.8	PEST	4.0E-01	NV	3.2E+01	1.2E+00	ca	1.4E+02	1.2E+00	N	BSL
72-20-8	ENDRIN	0.025	0.025	mg/kg	BFSS-09	1/36	0.003-0.8	PEST	2.5E-02	NV	1.0E+00	5.4E-01	nc	6.0E-02	6.0E-02	N	BSL
5566-34-7	GAMMA-CHLORDANE	0.001 J	0.7	mg/kg	BFGP-05	3/27	0.0018-0.2	PEST	7.0E-01	NV	NV	NV	NV	NV	NV	Y	NTX
120-82-1	1,2,4-TRICHLOROBENZENE	0.049 J	0.5 J	mg/kg	BFSS-03	5/62	0.005-72	SVOC	5.0E-01	NV	5.0E+00	2.4E-01	nc	NV	2.4E-01	Y	ASL
95-50-1	1,2-DICHLOROBENZENE	0.0008 J	0.54 J	mg/kg	BFMW-02B	13/62	0.003-72	SVOC	5.4E-01	NV	1.7E+01	4.6E-01	nc	1.1E+00	4.6E-01	Y	ASL
106-46-7	1,4-DICHLOROBENZENE	0.0008 J	1.9	mg/kg	BFMW-02B	27/62	0.003-72	SVOC	1.9E+00	NV	2.0E+00	7.1E-03	ca	1.8E+00	7.1E-03	Y	ASL
51-28-5	2,4-DINITROPHENOL	0.21 J	0.21 J	mg/kg	BFGP-02A	1/36	1.7-360	SVOC	2.1E-01	NV	3.0E-01	NV	NV	NV	3.0E-01	N	BSL
91-57-6	2-METHYLNAPHTHALENE	0.07 J	16 J	mg/kg	BFGP-09C	20/36	0.35-3.7	SVOC	1.6E+01	NV	NV	4.4E-01	nc	NV	4.4E-01	Y	ASL
83-32-9	ACENAPHTHENE	0.055 J	110	mg/kg	BFGP-09C	20/36	0.35-3.7	SVOC	1.1E+02	NV	5.7E+02	1.0E+01	nc	9.8E+01	1.0E+01	Y	ASL
208-96-8	ACENAPHTHYLENE	0.047 J	0.56 J	mg/kg	BFSS-03	19/36	0.35-72	SVOC	5.6E-01	NV	NV	NV	NV	1.1E+02	1.1E+02	N	BSL
120-12-7	ANTHRACENE	0.043 J	110	mg/kg	BFGP-09C	30/36	0.35-0.42	SVOC	1.1E+02	NV	1.2E+04	4.7E+01	nc	1.0E+03	4.7E+01	Y	ASL
56-55-3	BENZO(A)ANTHRACENE	0.04 J	310	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	3.1E+02	NV	2.0E+00	4.8E-01	ca	1.0E+00	4.8E-01	Y	ASL
50-32-8	BENZO(A)PYRENE	0.11 J	350	mg/kg	BFGP-09C	32/36	0.35-0.39	SVOC	3.5E+02	NV	8.0E+00	1.2E-01	ca	2.2E+01	1.2E-01	Y	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.039 J	410	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	4.1E+02	NV	5.0E+00	1.5E+00	ca	1.7E+00	1.5E+00	Y	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.077 J	190	mg/kg	BFGP-09C	33/36	0.37-0.39	SVOC	1.9E+02	NV	NV	NV	NV	1.0E+03	1.0E+03	N	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.039 J	140	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	1.4E+02	NV	4.9E+01	1.5E+01	ca	1.7E+00	1.7E+00	Y	ASL
65-85-0	BENZOIC ACID	0.036 J	1 J	mg/kg	BFGP-05	8/17	1.7-360	SVOC	1.0E+00	NV	4.0E+02	NV	NV	NV	4.0E+02	N	BSL
100-51-6	BENZYL ALCOHOL	0.33 J	0.33 J	mg/kg	BFSED-01	1/35	0.35-72	SVOC	3.3E-01	NV	NV	1.5E+01	nc	NV	1.5E+01	N	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.11 J	1.2 J	mg/kg	BFSS-02	8/36	0.35-72	SVOC	1.2E+00	NV	NV	2.9E+03	ca	NV	2.9E+03	N	BSL
86-74-8	CARBAZOLE	0.053 J	72 J	mg/kg	BFGP-09C	24/36	0.35-3.7	SVOC	7.2E+01	NV	6.0E-01	4.7E-01	ca	NV	4.7E-01	Y	ASL
218-01-9	CHRYSENE	0.14 J	290	mg/kg	BFGP-09C	32/36	0.35-0.39	SVOC	2.9E+02	NV	1.6E+02	4.8E+01	ca	1.0E+00	1.0E+00	Y	ASL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.041 J	63 J	mg/kg	BFGP-09C	30/36	0.35-0.42	SVOC	6.3E+01	NV	2.0E+00	4.6E-01	ca	1.0E+03	4.6E-01	Y	ASL
132-64-9	DIBENZOFURAN	0.051 J	33 J	mg/kg	BFGP-09C	21/36	0.35-3.7	SVOC	3.3E+01	NV	NV	NV	NV	2.1E+02	2.1E+02	N	BSL
84-74-2	DI-N-BUTYL PHTHALATE	0.057 J	0.24 J	mg/kg	BFMW-04D	2/36	0.35-72	SVOC	2.4E-01	NV	2.3E+03	5.0E+02	nc	NV	5.0E+02	N	BSL
206-44-0	FLUORANTHENE	0.063 J	480	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	4.8E+02	NV	4.3E+03	6.3E+02	nc	1.0E+03	6.3E+02	N	BSL
86-73-7	FLUORENE	0.045 J	56 J	mg/kg	BFGP-09C	21/36	0.35-3.7	SVOC	5.6E+01	NV	5.6E+02	1.4E+01	nc	3.9E+02	1.4E+01	Y	ASL

Table 2.3
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Surface Soil - Ground Water Migration

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for GW Migration	Region 3 RBC Value for GW Migration[c]	Cancer/ Noncancer[e]	NYSDEC Soil Cleanup Objective (Protection of Groundwater)	Screening Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[d]
118-74-1	HEXACHLOROBENZENE	0.14 J	1.7 J	mg/kg	BFGP-08	9/36	0.35-72	SVOC	1.7E+00	NV	2.0E+00	5.2E-02	ca	3.2E+00	5.2E-02	Y	ASL
87-68-3	HEXACHLOROBUTADIENE	0.004 J	0.42 J	mg/kg	BFSS-03	3/62	0.005-72	SVOC	4.2E-01	NV	2.0E+00	1.8E+00	ca	NV	1.8E+00	N	BSL
67-72-1	HEXACHLOROETHANE	0.061 J	1.8 J	mg/kg	BFSS-03	4/36	0.35-72	SVOC	1.8E+00	NV	5.0E-01	3.6E-01	ca	NV	3.6E-01	Y	ASL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.078 J	180	mg/kg	BFGP-09C	32/36	0.35-0.39	SVOC	1.8E+02	NV	1.4E+01	4.2E+00	ca	8.2E+00	4.2E+00	Y	ASL
91-20-3	NAPHTHALENE	0.001 J	64 J	mg/kg	BFGP-09C	30/62	0.005-3.7	SVOC	6.4E+01	NV	8.4E+01	1.5E-02	nc	1.2E+01	1.5E-02	Y	ASL
87-86-5	PENTACHLOROPHENOL	0.21 J	0.21 J	mg/kg	BFGP-02A	1/36	1.7-360	SVOC	2.1E-01	NV	3.0E-02	NV	NV	8.0E-01	3.0E-02	Y	ASL
85-01-8	PHENANTHRENE	0.041 J	390	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	3.9E+02	NV	NV	NV	NV	1.0E+03	1.0E+03	N	BSL
108-95-2	PHENOL	0.069 J	0.069 J	mg/kg	BFGP-11	1/36	0.35-72	SVOC	6.9E-02	NV	1.0E+02	6.7E+00	nc	3.3E-01	3.3E-01	N	BSL
129-00-0	PYRENE	0.049 J	400	mg/kg	BFGP-09C	33/36	0.35-0.38	SVOC	4.0E+02	NV	4.2E+03	6.8E+01	nc	1.0E+03	6.8E+01	Y	ASL
95-63-6	1,2,4-TRIMETHYLBENZENE	0.001 J	0.001 J	mg/kg	BFGP-09C, BFGP-02A	1/26	0.003-0.006	VOC	1.0E-03	NV	NV	NV	NV	3.6E+00	3.6E+00	N	BSL
108-67-8	1,3,5-TRIMETHYLBENZENE	0.0007 J	0.0007 J	mg/kg	BFGP-09C, BFGP-02A	2/26	0.003-0.006	VOC	7.0E-04	NV	NV	NV	NV	8.4E+00	8.4E+00	N	BSL
78-93-3	2-BUTANONE	0.004 J	0.005 J	mg/kg	BFMW-02B	2/35	0.01-0.022	VOC	5.0E-03	NV	NV	2.9E+00	nc	1.2E-01	1.2E-01	N	BSL
67-64-1	ACETONE	0.0036 J	0.009 J	mg/kg	BFGP-01C	3/36	0.01-0.032	VOC	9.0E-03	NV	1.6E+01	2.2E+00	nc	5.0E-02	5.0E-02	N	BSL
71-43-2	BENZENE	0.0006 J	0.003 J	mg/kg	BFSED-02	4/36	0.003-0.0079	VOC	3.0E-03	NV	3.0E-02	1.9E-03	ca	6.0E-02	1.9E-03	Y	ASL,KHC
75-27-4	BROMODICHLOROMETHANE	0.008	0.036 J	mg/kg	BFSED-02	2/36	0.003-0.0079	VOC	3.6E-02	NV	6.0E-01	1.1E-03	ca	NV	1.1E-03	Y	ASL
75-15-0	CARBON DISULFIDE	0.00056 J	0.00056 J	mg/kg	BFGP-09E	1/10	0.011-0.016	VOC	5.6E-04	NV	3.2E+01	1.9E+00	nc	NV	1.9E+00	N	BSL
108-90-7	CHLOROBENZENE	0.001 J	0.001 J	mg/kg	BFGP-09C	1/36	0.003-0.0079	VOC	1.0E-03	NV	1.0E+00	6.8E-02	nc	1.1E+00	6.8E-02	N	BSL
124-48-1	CHLORODIBROMOMETHANE	0.001 J	0.005 J	mg/kg	BFSED-02	2/36	0.003-0.0079	VOC	5.0E-03	NV	4.0E-01	8.3E-04	ca	NV	8.3E-04	Y	ASL
67-66-3	CHLOROFORM	0.0007 J	0.32 J	mg/kg	BFSED-02	14/36	0.003-0.0079	VOC	3.2E-01	NV	6.0E-01	9.1E-04	ca	3.7E-01	9.1E-04	Y	ASL
110-82-7	CYCLOHEXANE	0.00077 J	0.00077 J	mg/kg	BFGP-09E	1/1	-	VOC	7.7E-04	NV	NV	NV	NV	NV	NV	Y	NTX
100-41-4	ETHYLBENZENE	0.002 J	0.002 J	mg/kg	BFGP-09C	1/36	0.003-0.0079	VOC	2.0E-03	NV	1.3E+01	1.5E+00	nc	1.0E+00	1.0E+00	N	BSL
108-87-2	METHYLCYCLOHEXANE	0.00053 J	0.00053 J	mg/kg	BFGP-09E	1/1	-	VOC	5.3E-04	NV	NV	NV	NV	NV	NV	Y	NTX
75-09-2	METHYLENE CHLORIDE	0.011	0.18	mg/kg	BFGP-01A	12/36	0.005-0.016	VOC	1.8E-01	NV	2.0E-02	1.9E-02	ca	5.0E-02	1.9E-02	Y	ASL
95-47-6	O-XYLENE	0.0017 J	0.0017 J	mg/kg	BFSS-07	1/10	0.0052-0.0079	VOC	1.7E-03	NV	NV	NV	NV	NV	NV	Y	NTX
99-87-6	P-ISOPROPYLTOLUENE	0.0006 J	0.005	mg/kg	BFGP-01B	2/26	0.003-0.006	VOC	5.0E-03	NV	NV	NV	NV	NV	NV	Y	NTX
127-18-4	TETRACHLOROETHENE	0.0009 J	0.014	mg/kg	BFGP-09C	16/36	0.003-0.0079	VOC	1.4E-02	NV	6.0E-02	4.7E-03	ca	1.3E+00	4.7E-03	Y	ASL
108-88-3	TOLUENE	0.00063 J	0.0032 J	mg/kg	BFSS-07	6/36	0.003-0.0079	VOC	3.2E-03	NV	1.2E+01	2.7E+00	nc	7.0E-01	7.0E-01	N	BSL
79-01-6	TRICHLOROETHENE	0.0006 J	0.0009 J	mg/kg	BFGP-02B	2/36	0.003-0.0079	VOC	9.0E-04	NV	6.0E-02	2.6E-04	ca	4.7E-01	2.6E-04	Y	ASL
1330-20-7	XYLENES, TOTAL	0.0008 J	0.006	mg/kg	BFGP-10	5/26	0.003-0.004	VOC	6.0E-03	NV	2.1E+02	3.0E-01	nc	1.6E+00	3.0E-01	N	BSL

NOTES:

a = Dioxin equivalent screening value is the sum of all dioxins multiplied by their TCDD equivalency factor. (See Table 3.2)

b = Background Values for metals in soil were derived from Background Concentrations of 20 Elements in Soils with Special Regard for New York State. McGovern (1983)

c = For those screening value that are non-cancer (NC), the screening value was multiplied by a hazard index of 0.1

d = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen

e = For Cancer/Noncancer criteria: ca=cancer, nc=noncancer, max=ceiling limit, ca* (where: nc < 100X ca), ca** (where: nc < 100X ca), NV=no value

J = Estimated Value

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Table 2.4
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Subsurface Soil - Industrial

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for Industrial Soil[c]	Cancer/ Noncancer[e]	Region 3 RBC Value for Industrial Soil[c]	Cancer/ Noncancer[e]	NYSDEC Soil Cleanup Objective (Industrial)	Screening Value	COPC Flag (Y/N)
7429-90-5	ALUMINUM	2450 J	12700	mg/kg	BFSS-01	13/13	-	INORG	1.3E+04	33000	1.0E+05	max	1.0E+05	nc	NV	1.0E+05	N
7440-36-0	ANTIMONY	1.9 J	66.3 J	mg/kg	BFTP-08	2/13	6.2-10.02	INORG	6.6E+01	NV	4.1E+01	nc	4.1E+01	nc	NV	4.1E+01	Y
7440-38-2	ARSENIC	3.3	32.6 J	mg/kg	BFSS-09	13/13	-	INORG	3.3E+01	5	1.6E+00	ca	1.9E+00	ca	1.6E+01	1.6E+00	Y
7440-39-3	BARIUM	28.1	3030	mg/kg	BFTP-02B	13/13	-	INORG	3.0E+03	290	6.7E+03	nc	2.0E+04	nc	1.0E+04	6.7E+03	N
7440-41-7	BERYLLIUM	0.33 J	0.54 J	mg/kg	BFTP-02B	2/13	0.51-0.83	INORG	5.4E-01	0.6	1.9E+03	ca**	2.0E+02	nc	2.7E+03	2.0E+02	N
7440-43-9	CADMIUM	0.58 J	13.9 J	mg/kg	BFTP-08	3/13	0.53-10.3	INORG	1.4E+01	0.21	4.5E+01	nc	5.1E+01	nc	6.0E+01	4.5E+01	N
7440-70-2	CALCIUM	6340	239000	mg/kg	BFGP-09E	13/13	-	INORG	2.4E+05	NV	NV	NV	NV	NV	NV	NV	N
7440-47-3	CHROMIUM	7.9	45.5 J	mg/kg	BFTP-08	12/12	-	INORG	4.6E+01	NV	NV	NV	NV	NV	NV	NV	Y
7440-48-4	COBALT	5 J	12.6	mg/kg	BFSS-01	10/13	5.32-6.02	INORG	1.3E+01	NV	1.9E+03	ca*	NV	NV	NV	1.9E+03	N
7440-50-8	COPPER	11.4	502 J	mg/kg	BFTP-08	13/13	-	INORG	5.0E+02	NV	4.1E+03	nc	4.1E+03	nc	1.0E+04	4.1E+03	N
57-12-5	CYANIDE	0.91	14.3	mg/kg	BFTP-08	4/13	1.06-1.38	INORG	1.4E+01	NV	1.2E+03	nc	2.0E+03	nc	NV	1.2E+03	N
7439-89-6	IRON	6330 J	106000 J	mg/kg	BFTP-08	13/13	-	INORG	1.1E+05	14000	1.0E+05	max	7.2E+04	nc	NV	7.2E+04	Y
7439-92-1	LEAD	5	948 J	mg/kg	BFTP-08	13/13	-	INORG	9.5E+02	14	8.0E+01	nc	NV	NV	3.9E+03	8.0E+01	Y
7439-95-4	MAGNESIUM	3660	37900 J	mg/kg	BFGP-09E	13/13	-	INORG	3.8E+04	2300	NV	NV	NV	NV	NV	NV	N
7439-96-5	MANGANESE	75.8	929	mg/kg	BFSS-01	13/13	-	INORG	9.3E+02	285	1.9E+03	nc	2.0E+03	nc	1.0E+04	1.9E+03	N
7439-97-6	MERCURY	0.04	84.2	mg/kg	BFSS-03	13/13	-	INORG	8.4E+01	0.081	NV	NV		ca	NV	NV	Y
7440-02-0	NICKEL	9.8	39.9 J	mg/kg	BFTP-08	13/13	-	INORG	4.0E+01	12	2.0E+03	nc	2.0E+03	nc	1.0E+04	2.0E+03	N
7440-09-7	POTASSIUM	497 J	1740	mg/kg	BFTP-02B	13/13	-	INORG	1.7E+03	12000	NV	NV	NV	NV	NV	NV	N
7782-49-2	SELENIUM	0.67 J	2.4	mg/kg	BFSS-06	5/13	0.54-2.95	INORG	2.4E+00	NV	5.1E+02	nc	5.1E+02	nc	6.8E+03	5.1E+02	N
7440-22-4	SILVER	1.6 J	90.2	mg/kg	BFTP-02B	2/13	1-1.67	INORG	9.0E+01	NV	5.1E+02	nc	5.1E+02	nc	6.8E+03	5.1E+02	N
7440-23-5	SODIUM	100	1670	mg/kg	BFTP-02B	12/13	64.96-64.96	INORG	1.7E+03	NV	NV	NV	NV	NV	NV	NV	N
7440-62-2	VANADIUM	10.1	31.8	mg/kg	BFGP-09E, BFTP-02B	13/13	-	INORG	3.2E+01	43	1.0E+02	nc	1.0E+02	nc	NV	1.0E+02	N
7440-66-6	ZINC	20	4530 J	mg/kg	BFTP-08	13/13	-	INORG	4.5E+03	40	1.0E+05	max	3.1E+04	nc	1.0E+04	1.0E+04	N
11097-69-1	AROCLOR-1254	0.05 J	0.24 J	mg/kg	BFMW-04D	3/12	0.035-0.28	PCB	2.4E-01	NV	7.4E-01	ca*	1.4E+00	ca	NV	7.4E-01	N
11096-82-5	AROCLOR-1260	0.11 J	0.26 J	mg/kg	BFMW-04D	2/12	0.035-0.28	PCB	2.6E-01	NV	NV	NV	1.4E+00	ca	NV	1.4E+00	N
35822-46-9	1,2,3,4,6,7,8-HPCDD	3.94	267.623	ng/kg	BFSS-09	6/6	-	PCDD/F	2.7E+02	NV	NV	NV	NV	NV	NV	NV	Y
1746-01-6	2,3,7,8-TCDD Equivalents [a]	a	a	mg/kg	a	a	a	PCDD/F	3.1E-04	NV	1.6E-05	ca	1.9E-05	ca	NV	1.6E-05	Y
72-55-9	4,4'-DDE	0.029	0.029	mg/kg	BFSS-09	1/13	0.0035-0.5	PEST	2.9E-02	NV	7.0E+00	ca	8.4E+00	ca	1.2E+02	7.0E+00	N
50-29-3	4,4'-DDT	0.066	0.066	mg/kg	BFSS-09	1/13	0.0035-0.5	PEST	6.6E-02	NV	7.0E+00	ca*	8.4E+00	ca	9.4E+01	7.0E+00	N
95-50-1	1,2-DICHLOROBENZENE	0.003 J	0.14 J	mg/kg	BFSS-02	2/15	0.0052-440	SVOC	1.4E-01	NV	6.0E+02	sat	9.2E+03	nc	1.0E+03	6.0E+02	N
106-46-7	1,4-DICHLOROBENZENE	0.005	1.2 J	mg/kg	BFTP-08	7/15	0.0052-440	SVOC	1.2E+00	NV	7.9E+00	ca	1.2E+02	ca	2.5E+02	7.9E+00	N
91-57-6	2-METHYLNAPHTHALENE	0.072 J	2.1 J	mg/kg	BFTP-08	7/13	0.37-440	SVOC	2.1E+00	NV	NV	NV	4.1E+02	nc	NV	4.1E+02	N
83-32-9	ACENAPHTHENE	0.14 J	3.6	mg/kg	BFSS-09	6/13	0.37-440	SVOC	3.6E+00	NV	2.9E+03	nc	6.1E+03	nc	1.0E+03	1.0E+03	N
208-96-8	ACENAPHTHYLENE	0.057 J	1 J	mg/kg	BFSS-03	7/13	0.37-440	SVOC	1.0E+00	NV	NV	NV	NV	NV	1.0E+03	1.0E+03	N
120-12-7	ANTHRACENE	0.064 J	6.4	mg/kg	BFSS-09	11/13	0.37-440	SVOC	6.4E+00	NV	1.0E+05	max	3.1E+04	nc	1.0E+03	1.0E+03	N
56-55-3	BENZO(A)ANTHRACENE	0.33 J	17	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.7E+01	NV	2.1E+00	ca	3.9E+00	ca	1.1E+01	2.1E+00	Y
50-32-8	BENZO(A)PYRENE	0.32 J	17	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.7E+01	NV	2.1E-01	ca	3.9E-01	ca	1.1E+00	2.1E-01	Y
205-99-2	BENZO(B)FLUORANTHENE	0.31 J	21 J	mg/kg	BFTP-08	11/13	0.37-440	SVOC	2.1E+01	NV	2.1E+00	ca	3.9E+00	ca	1.1E+01	2.1E+00	Y
191-24-2	BENZO(G,H,I)PERYLENE	0.22 J	10	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.0E+01	NV	NV	NV	NV	NV	1.0E+03	1.0E+03	N
207-08-9	BENZO(K)FLUORANTHENE	0.28 J	13	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.3E+01	NV	2.1E+01	ca	3.9E+01	ca	1.1E+02	2.1E+01	N
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.13 J	2.1 J	mg/kg	BFSS-03	8/13	0.37-440	SVOC	2.1E+00	NV	1.2E+02	ca	2.0E+02	ca	NV	1.2E+02	N
86-74-8	CARBAZOLE	0.065 J	2.9	mg/kg	BFSS-09	8/13	0.37-440	SVOC	2.9E+00	NV	8.6E+01	ca	1.4E+02	ca	NV	8.6E+01	N
218-01-9	CHRYSENE	0.39 J	16	mg/kg	BFSS-03, BFTP-08	11/13	0.37-440	SVOC	1.6E+01	NV	2.1E+02	ca	3.9E+02	ca	1.1E+02	1.1E+02	N
53-70-3	DIBENZO(A,H)ANTHRACENE	0.094 J	3.6 J	mg/kg	BFSS-03	10/13	0.37-440	SVOC	3.6E+00	NV	2.1E-01	ca	3.9E-01	ca	1.1E+00	2.1E-01	Y
132-64-9	DIBENZOFURAN	0.13 J	2.2	mg/kg	BFSS-09, BFTP-08	6/13	0.37-440	SVOC	2.2E+00	NV	1.6E+02	nc	1.0E+02	nc	1.0E+03	1.0E+02	N
84-74-2	DI-N-BUTYL PHTHALATE	0.05 J	0.13 J	mg/kg	BFMW-04D	4/13	0.41-440	SVOC	1.3E-01	NV	6.2E+03	nc	1.0E+04	nc	NV	6.2E+03	N
206-44-0	FLUORANTHENE	0.61	42	mg/kg	BFSS-03	11/13	0.37-440	SVOC	4.2E+01	NV	2.2E+03	nc	4.1E+03	nc	1.0E+03	1.0E+03	N
86-73-7	FLUORENE	0.13 J	2.9	mg/kg	BFSS-09	7/13	0.37-440	SVOC	2.9E+00	NV	2.6E+03	nc	4.1E+03	nc	1.0E+03	1.0E+03	N

Table 2.4
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Subsurface Soil - Industrial

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for Industrial Soil[c]	Cancer/ Noncancer[e]	Region 3 RBC Value for Industrial Soil[c]	Cancer/ Noncancer[e]	NYSDEC Soil Cleanup Objective (Industrial)	Screening Value	COPC Flag (Y/N)
118-74-1	HEXACHLOROBENZENE	0.12 J	1.3 J	mg/kg	BFSS-03	2/13	0.37-440	SVOC	1.3E+00	NV	1.1E+00	ca	1.8E+00	ca	1.2E+01	1.1E+00	Y
67-72-1	HEXACHLOROETHANE	2.3 J	2.3 J	mg/kg	BFSS-03	1/13	0.37-440	SVOC	2.3E+00	NV	1.2E+02	ca**	2.0E+02	ca	NV	1.2E+02	N
193-39-5	INDENO(1,2,3-CD)PYRENE	0.22 J	9.9	mg/kg	BFSS-03	11/13	0.37-440	SVOC	9.9E+00	NV	2.1E+00	ca	3.9E+00	ca	1.1E+01	2.1E+00	Y
91-20-3	NAPHTHALENE	0.075 J	5100	mg/kg	BFTP-02B	10/15	0.37-3.6	SVOC	5.1E+03	NV	1.9E+01	nc	2.0E+03	nc	1.0E+03	1.9E+01	Y
98-95-3	NITROBENZENE	1.6 J	1.6 J	mg/kg	BFSS-09	1/13	0.37-440	SVOC	1.6E+00	NV	1.0E+01	nc	5.1E+01	nc	NV	1.0E+01	N
85-01-8	PHENANTHRENE	0.32 J	21	mg/kg	BFSS-09	11/13	0.37-440	SVOC	2.1E+01	NV	NV	NV	NV	NV	1.0E+03	1.0E+03	N
129-00-0	PYRENE	0.48 J	30	mg/kg	BFSS-03	11/13	0.37-440	SVOC	3.0E+01	NV	2.9E+03	nc	3.1E+03	nc	1.0E+03	1.0E+03	N
95-63-6	1,2,4-TRIMETHYLBENZENE	1	1	mg/kg	BFTP-02B	1/2	0.004-0.004	VOC	1.0E+00	NV	1.7E+01	nc	NV	NV	3.8E+02	1.7E+01	N
108-67-8	1,3,5-TRIMETHYLBENZENE	0.67 J	0.67 J	mg/kg	BFTP-02B	1/2	0.004-0.004	VOC	6.7E-01	NV	7.0E+00	nc	NV	NV	3.8E+02	7.0E+00	N
67-64-1	ACETONE	0.0037 J	0.044 J	mg/kg	BFTP-08	4/13	0.021-2.7	VOC	4.4E-02	NV	5.4E+03	nc	9.2E+04	nc	1.0E+03	1.0E+03	N
71-43-2	BENZENE	0.0009 J	0.89	mg/kg	BFTP-02B	2/13	0.0052-0.0083	VOC	8.9E-01	NV	1.4E+00	ca*	5.2E+01	ca	8.9E+01	1.4E+00	Y
67-66-3	CHLOROFORM	0.0013 J	0.0079	mg/kg	BFSS-03	6/13	0.0052-0.67	VOC	7.9E-03	NV	4.7E-01	ca	1.0E+03	nc	7.0E+02	4.7E-01	N
99-87-6	P-ISOPROPYLTOLUENE	0.86	0.86	mg/kg	BFTP-02B	1/2	0.004-0.004	VOC	8.6E-01	NV	NV	NV	NV	NV	NV	NV	Y
127-18-4	TETRACHLOROETHENE	0.00049 J	0.023	mg/kg	BFSS-03	7/13	0.0055-0.67	VOC	2.3E-02	NV	1.3E+00	ca	5.3E+00	ca	3.0E+02	1.3E+00	N
108-88-3	TOLUENE	0.0008 J	0.63 J	mg/kg	BFTP-02B	3/13	0.0052-0.0083	VOC	6.3E-01	NV	5.2E+02	sat	8.2E+03	nc	1.0E+03	5.2E+02	N
1330-20-7	XYLENES, TOTAL	0.0009 J	1.3	mg/kg	BFTP-02B	2/2	-	VOC	1.3E+00	NV	4.2E+02	sat	2.0E+04	nc	1.0E+03	4.2E+02	N

NOTES:
a = Dioxin equivalent screening value is the sum of all dioxins multiplied by their TCDD equivalency factor. (See Table 3.3)
b = Background Values for metals in soil were derived from Background Concentrations of 20 Elements in Soils with Special Regard for New York State. McGovern (1983)
c = For those screening value that are non-cancer (NC), the screening value was multiplied by a hazard index of 0.1
d = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen
e = For Cancer/Noncancer criteria: ca=cancer, nc=noncancer, max=ceiling limit, ca* (where: nc < 100X ca), ca** (where: nc < 100X ca), NV=no value
J = Estimated Value

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Rationale for Selection or Deletion[d]
BSL
ASL
ASL,KHC
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NTX,KHC
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Rationale for Selection or Deletion[d]
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Table 2.5
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Subsurface Soil - Ground Water Migration

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for GW Migration	Region 3 RBC Value for GW Migration[c]	Cancer/ Noncancer[e]	NYSDEC Soil Cleanup Objective (Protection of Groundwater)	Screening Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[d]
7429-90-5	ALUMINUM	2450 J	12700	mg/kg	BFSS-01	13/13	-	INORG	1.3E+04	33000	NV	NV	NV	NV	NV	Y	NTX
7440-36-0	ANTIMONY	1.9 J	66.3 J	mg/kg	BFTP-08	2/13	6.2-10.02	INORG	6.6E+01	NV	5.0E+00	1.3E+00	nc	NV	1.3E+00	Y	ASL
7440-38-2	ARSENIC	3.3	32.6 J	mg/kg	BFSS-09	13/13	-	INORG	3.3E+01	5	2.9E+01	2.6E-02	ca	16	2.6E-02	Y	ASL,KHC
7440-39-3	BARIUM	28.1	3030	mg/kg	BFTP-02B	13/13	-	INORG	3.0E+03	290	1.6E+03	6.0E+02	nc	820	6.0E+02	Y	ASL
7440-41-7	BERYLLIUM	0.33 J	0.54 J	mg/kg	BFTP-02B	2/13	0.51-0.83	INORG	5.4E-01	0.6	6.3E+01	1.2E+02	nc	47	4.7E+01	N	BSL
7440-43-9	CADMIUM	0.58 J	13.9 J	mg/kg	BFTP-08	3/13	0.53-10.3	INORG	1.4E+01	0.21	8.0E+00	2.7E+00	nc	7.5	2.7E+00	Y	ASL
7440-70-2	CALCIUM	6340	239000	mg/kg	BFGP-09E	13/13	-	INORG	2.4E+05	NV	NV	NV	NV	NV	NV	N	EN
7440-47-3	CHROMIUM	7.9	45.5 J	mg/kg	BFTP-08	12/12	-	INORG	4.6E+01	NV	NV	NV	NV	NV	NV	Y	NTX,KHC
7440-48-4	COBALT	5 J	12.6	mg/kg	BFSS-01	10/13	5.32-6.02	INORG	1.3E+01	NV	NV	NV	NV	NV	NV	Y	NTX
7440-50-8	COPPER	11.4	502 J	mg/kg	BFTP-08	13/13	-	INORG	5.0E+02	NV	NV	1.1E+03	nc	1720	1.1E+03	N	BSL
57-12-5	CYANIDE	0.91	14.3	mg/kg	BFTP-08	4/13	1.06-1.38	INORG	1.4E+01	NV	NV	1.5E+01	nc	NV	1.5E+01	N	BSL
7439-89-6	IRON	6330 J	106000 J	mg/kg	BFTP-08	13/13	-	INORG	1.1E+05	14000	NV	NV	NV	NV	NV	Y	NTX
7439-92-1	LEAD	5	948 J	mg/kg	BFTP-08	13/13	-	INORG	9.5E+02	14	NV	NV	NV	450	4.5E+02	Y	ASL
7439-95-4	MAGNESIUM	3660	37900 J	mg/kg	BFGP-09E	13/13	-	INORG	3.8E+04	2300	NV	NV	NV	NV	NV	N	EN
7439-96-5	MANGANESE	75.8	929	mg/kg	BFSS-01	13/13	-	INORG	9.3E+02	285	NV	9.5E+01	nc	2,000	9.5E+01	Y	ASL
7439-97-6	MERCURY	0.04	84.2	mg/kg	BFSS-03	13/13	-	INORG	8.4E+01	0.081	NV	NV	NV	NV	NV	Y	NTX
7440-02-0	NICKEL	9.8	39.9 J	mg/kg	BFTP-08	13/13	-	INORG	4.0E+01	12	1.3E+02	NV	NV	130	1.3E+02	N	BSL
7440-09-7	POTASSIUM	497 J	1740	mg/kg	BFTP-02B	13/13	-	INORG	1.7E+03	12000	NV	NV	NV	NV	NV	N	EN
7782-49-2	SELENIUM	0.67 J	2.4	mg/kg	BFSS-06	5/13	0.54-2.95	INORG	2.4E+00	NV	5.0E+00	1.9E+00	nc	4	1.9E+00	Y	ASL
7440-22-4	SILVER	1.6 J	90.2	mg/kg	BFTP-02B	2/13	1-1.67	INORG	9.0E+01	NV	3.4E+01	3.1E+00	nc	8.3	3.1E+00	Y	ASL
7440-23-5	SODIUM	100	1670	mg/kg	BFTP-02B	12/13	64.96-64.96	INORG	1.7E+03	NV	NV	NV	NV	NV	NV	N	EN
7440-62-2	VANADIUM	10.1	31.8	mg/kg	BFGP-09E, BFTP-02B	13/13	-	INORG	3.2E+01	43	6.0E+03	7.3E+01	nc	NV	7.3E+01	N	BSL
7440-66-6	ZINC	20	4530 J	mg/kg	BFTP-08	13/13	-	INORG	4.5E+03	40	1.2E+04	1.4E+03	nc	2480	1.4E+03	Y	ASL
11097-69-1	AROCLOR-1254	0.05 J	0.24 J	mg/kg	BFMW-04D	3/12	0.035-0.28	PCB	2.4E-01	NV	NV	1.1E+00	ca	NV	1.1E+00	N	BSL
11096-82-5	AROCLOR-1260	0.11 J	0.26 J	mg/kg	BFMW-04D	2/12	0.035-0.28	PCB	2.6E-01	NV	NV	NV	NV	NV	NV	Y	NTX
35822-46-9	1,2,3,4,6,7,8-HPCDD	3.94	267.623	ng/kg	BFSS-09	6/6	-	PCDD/F	2.7E+02	NV	NV	NV	NV	NV	NV	Y	NTX
1746-01-6	2,3,7,8-TCDD Equivalents[a]	a	a	mg/kg	a	a	a	PCDD/F	3.1E-04	NV	NV	8.6E-06	ca	NV	8.6E-06	Y	ASL
72-55-9	4,4'-DDE	0.029	0.029	mg/kg	BFSS-09	1/13	0.0035-0.5	PEST	2.9E-02	NV	5.4E+01	3.5E+01	ca	17	1.7E+01	N	BSL
50-29-3	4,4'-DDT	0.066	0.066	mg/kg	BFSS-09	1/13	0.0035-0.5	PEST	6.6E-02	NV	3.2E+01	1.2E+00	ca	136	1.2E+00	N	BSL
95-50-1	1,2-DICHLOROBENZENE	0.003 J	0.14 J	mg/kg	BFSS-02	2/15	0.0052-440	SVOC	1.4E-01	NV	1.7E+01	4.6E-01	nc	1.1	4.6E-01	N	BSL
106-46-7	1,4-DICHLOROBENZENE	0.005	1.2 J	mg/kg	BFTP-08	7/15	0.0052-440	SVOC	1.2E+00	NV	2.0E+00	7.1E-03	ca	1.8	7.1E-03	Y	ASL
91-57-6	2-METHYLNAPHTHALENE	0.072 J	2.1 J	mg/kg	BFTP-08	7/13	0.37-440	SVOC	2.1E+00	NV	NV	4.4E-01	nc	NV	4.4E-01	Y	ASL
83-32-9	ACENAPHTHENE	0.14 J	3.6	mg/kg	BFSS-09	6/13	0.37-440	SVOC	3.6E+00	NV	5.7E+02	1.0E+01	nc	98	1.0E+01	N	BSL
208-96-8	ACENAPHTHYLENE	0.057 J	1 J	mg/kg	BFSS-03	7/13	0.37-440	SVOC	1.0E+00	NV	NV	NV	NV	107	1.1E+02	N	BSL
120-12-7	ANTHRACENE	0.064 J	6.4	mg/kg	BFSS-09	11/13	0.37-440	SVOC	6.4E+00	NV	1.2E+04	4.7E+01	nc	1,000	4.7E+01	N	BSL
56-55-3	BENZO(A)ANTHRACENE	0.33 J	17	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.7E+01	NV	2.0E+00	4.8E-01	ca	1	4.8E-01	Y	ASL
50-32-8	BENZO(A)PYRENE	0.32 J	17	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.7E+01	NV	8.0E+00	1.2E-01	ca	22	1.2E-01	Y	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.31 J	21 J	mg/kg	BFTP-08	11/13	0.37-440	SVOC	2.1E+01	NV	5.0E+00	1.5E+00	ca	1.7	1.5E+00	Y	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.22 J	10	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.0E+01	NV	NV	NV	NV	1,000	1.0E+03	N	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.28 J	13	mg/kg	BFSS-03	11/13	0.37-440	SVOC	1.3E+01	NV	4.9E+01	1.5E+01	ca	1.7	1.7E+00	Y	ASL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.13 J	2.1 J	mg/kg	BFSS-03	8/13	0.37-440	SVOC	2.1E+00	NV	NV	2.9E+03	ca	NV	2.9E+03	N	BSL
86-74-8	CARBAZOLE	0.065 J	2.9	mg/kg	BFSS-09	8/13	0.37-440	SVOC	2.9E+00	NV	6.0E-01	4.7E-01	ca	NV	4.7E-01	Y	ASL
218-01-9	CHRYSENE	0.39 J	16	mg/kg	BFSS-03, BFTP-08	11/13	0.37-440	SVOC	1.6E+01	NV	1.6E+02	4.8E+01	ca	1	1.0E+00	Y	ASL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.094 J	3.6 J	mg/kg	BFSS-03	10/13	0.37-440	SVOC	3.6E+00	NV	2.0E+00	4.6E-01	ca	1,000	4.6E-01	Y	ASL
132-64-9	DIBENZOFURAN	0.13 J	2.2	mg/kg	BFSS-09, BFTP-08	6/13	0.37-440	SVOC	2.2E+00	NV	NV	NV	NV	210	2.1E+02	N	BSL

Table 2.5
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Subsurface Soil - Ground Water Migration

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Grouping	Concentration Used for Screening	Background Value[b] (McGovern, 1983)	Region 9 PRG Value for GW Migration	Region 3 RBC Value for GW Migration[c]	Cancer/ Noncancer[e]	NYSDEC Soil Cleanup Objective (Protection of Groundwater)	Screening Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[d]
84-74-2	DI-N-BUTYL PHTHALATE	0.05 J	0.13 J	mg/kg	BFMW-04D	4/13	0.41-440	SVOC	1.3E-01	NV	2.3E+03	5.0E+02	nc	NV	5.0E+02	N	BSL
206-44-0	FLUORANTHENE	0.61	42	mg/kg	BFSS-03	11/13	0.37-440	SVOC	4.2E+01	NV	4.3E+03	6.3E+02	nc	1,000	6.3E+02	N	BSL
86-73-7	FLUORENE	0.13 J	2.9	mg/kg	BFSS-09	7/13	0.37-440	SVOC	2.9E+00	NV	5.6E+02	1.4E+01	nc	386	1.4E+01	N	BSL
118-74-1	HEXACHLOROBENZENE	0.12 J	1.3 J	mg/kg	BFSS-03	2/13	0.37-440	SVOC	1.3E+00	NV	2.0E+00	5.2E-02	ca	3.2	5.2E-02	Y	ASL
67-72-1	HEXACHLOROETHANE	2.3 J	2.3 J	mg/kg	BFSS-03	1/13	0.37-440	SVOC	2.3E+00	NV	5.0E-01	3.6E-01	ca	NV	3.6E-01	Y	ASL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.22 J	9.9	mg/kg	BFSS-03	11/13	0.37-440	SVOC	9.9E+00	NV	1.4E+01	4.2E+00	ca	8.2	4.2E+00	Y	ASL
91-20-3	NAPHTHALENE	0.075 J	5100	mg/kg	BFTP-02B	10/15	0.37-3.6	SVOC	5.1E+03	NV	8.4E+01	1.5E-02	nc	12	1.5E-02	Y	ASL
98-95-3	NITROBENZENE	1.6 J	1.6 J	mg/kg	BFSS-09	1/13	0.37-440	SVOC	1.6E+00	NV	1.0E-01	2.3E-03	nc	NV	2.3E-03	Y	ASL
85-01-8	PHENANTHRENE	0.32 J	21	mg/kg	BFSS-09	11/13	0.37-440	SVOC	2.1E+01	NV	NV	NV	NV	1,000	1.0E+03	N	BSL
129-00-0	PYRENE	0.48 J	30	mg/kg	BFSS-03	11/13	0.37-440	SVOC	3.0E+01	NV	4.2E+03	6.8E+01	nc	1,000	6.8E+01	N	BSL
95-63-6	1,2,4-TRIMETHYLBENZENE	1	1	mg/kg	BFTP-02B	1/2	0.004-0.004	VOC	1.0E+00	NV	NV	NV	NV	3.6	3.6E+00	N	BSL
108-67-8	1,3,5-TRIMETHYLBENZENE	0.67 J	0.67 J	mg/kg	BFTP-02B	1/2	0.004-0.004	VOC	6.7E-01	NV	NV	NV	NV	8.4	8.4E+00	N	BSL
67-64-1	ACETONE	0.0037 J	0.044 J	mg/kg	BFTP-08	4/13	0.021-2.7	VOC	4.4E-02	NV	1.6E+01	2.2E+00	nc	0.05	5.0E-02	N	BSL
71-43-2	BENZENE	0.0009 J	0.89	mg/kg	BFTP-02B	2/13	0.0052-0.0083	VOC	8.9E-01	NV	3.0E-02	1.9E-03	ca	0.06	1.9E-03	Y	ASL,KHC
67-66-3	CHLOROFORM	0.0013 J	0.0079	mg/kg	BFSS-03	6/13	0.0052-0.67	VOC	7.9E-03	NV	6.0E-01	9.1E-04	ca	0.37	9.1E-04	Y	ASL
99-87-6	P-ISOPROPYLTOLUENE	0.86	0.86	mg/kg	BFTP-02B	1/2	0.004-0.004	VOC	8.6E-01	NV	NV	NV	NV	NV	NV	Y	NTX
127-18-4	TETRACHLOROETHENE	0.00049 J	0.023	mg/kg	BFSS-03	7/13	0.0055-0.67	VOC	2.3E-02	NV	6.0E-02	4.7E-03	ca	1.3	4.7E-03	Y	ASL
108-88-3	TOLUENE	0.0008 J	0.63 J	mg/kg	BFTP-02B	3/13	0.0052-0.0083	VOC	6.3E-01	NV	1.2E+01	2.7E+00	nc	0.7	7.0E-01	N	BSL
1330-20-7	XYLENES, TOTAL	0.0009 J	1.3	mg/kg	BFTP-02B	2/2	-	VOC	1.3E+00	NV	2.1E+02	3.0E-01	nc	1.6	3.0E-01	Y	ASL

NOTES:

a = Dioxin equivalent screening value is the sum of all dioxins multiplied by their TCDD equivalency factor. (See Table 3.3)

b = Background Values for metals in soil were derived from Background Concentrations of 20 Elements in Soils with Special Regard for New York State. McGovern (1983)

c = For those screening value that are non-cancer (NC), the screening value was multiplied by a hazard index of 0.1

d = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen

e = For Cancer/Noncancer criteria: ca=cancer, nc=noncancer, max=ceiling limit, ca* (where: nc < 100X ca), ca** (where: nc < 100X ca), NV=no value

J = Estimated Value

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Table 2.6
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Shallow Ground Water

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Grouping	Concentration Used for Screening	Region 9 PRG Value for Tap Water[a]	Cancer/ Noncancer[e]	Region 3 RBC Value for Tap Water[a]	Cancer/ Noncancer	Screening Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[b]
7429-90-5	ALUMINUM	0.000283	0.000283	µg/L	BFMW-07S	1/3	0.1-0.1	INORG	2.83E-04	3.6E+03	nc	3.7E+03	nc	3.6E+03	N	BSL
7440-39-3	BARIUM	0.0000592	0.000074	µg/L	BFMW-07S	3/3	-	INORG	7.40E-05	2.6E+02	nc	7.3E+02	nc	2.6E+02	N	BSL
7440-70-2	CALCIUM	0.789	0.886	µg/L	BFMW-07S	3/3	-	INORG	8.86E-01	NV	NV	NV	NV	NV	N	EN
7440-47-3	CHROMIUM	0.000012	0.000012	µg/L	BFMW-07S	1/3	0.01-0.01	INORG	1.20E-05	NV	NV	NV	NV	NV	Y	NTX,KHC
7440-50-8	COPPER	0.0000261	0.0000261	µg/L	BFMW-07S	1/3	0.02-0.02	INORG	2.61E-05	1.5E+02	nc	1.5E+02	nc	1.5E+02	N	BSL
7439-92-1	LEAD	0.0000059	0.0000059	µg/L	BFMW-07S	1/3	0.005-0.01	INORG	5.90E-06	NV	NV	NV	NV	NV	Y	NTX
7440-09-7	POTASSIUM	0.00414	0.00535	µg/L	BFMW-07S	3/3	-	INORG	5.35E-03	NV	NV	NV	NV	NV	N	EN
7440-23-5	SODIUM	0.0251	0.0316	µg/L	BFMW-07S	3/3	-	INORG	3.16E-02	NV	NV	NV	NV	NV	N	EN
16887-00-6	CHLORIDE	0.0349	0.0388	µg/L	BFMW-07S	3/3	-	OTHER	3.88E-02	NV	NV	NV	NV	NV	Y	NTX
14808-79-8	SULFATE	0.0227	0.0652	µg/L	BFMW-07S	3/3	-	OTHER	6.52E-02	NV	NV	NV	NV	NV	Y	NTX
95-50-1	1,2-DICHLOROBENZENE	0.36 J	0.36 J	µg/L	BFMW-07S	1/3	9.3-9.8	SVOC	3.60E-01	3.7E+01	nc	2.7E+01	nc	2.7E+01	N	BSL
108-95-2	PHENOL	1.8 J	4.2 J	µg/L	BFMW-07S	2/3	9.3-9.3	SVOC	4.20E+00	1.1E+03	nc	1.1E+03	nc	1.1E+03	N	BSL
78-93-3	2-BUTANONE	2 J	6 J	µg/L	BFMW-07S	2/2	-	VOC	6.00E+00	7.0E+02	nc	7.0E+02	nc	7.0E+02	N	BSL
67-64-1	ACETONE	22	78	µg/L	BFMW-07S	3/3	-	VOC	7.80E+01	5.5E+02	nc	5.5E+02	nc	5.5E+02	N	BSL
108-88-3	TOLUENE	0.72 J	2.6 J	µg/L	BFMW-07S	3/3	-	VOC	2.60E+00	7.2E+01	nc	2.3E+02	nc	7.2E+01	N	BSL

NOTES:

a = For those screening value that are non-cancer (NC), the screening value was multiplied by a hazard index of 0.1

b = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen

e = For Cancer/Noncancer criteria: ca=cancer, nc=noncancer, max=ceiling limit, ca* (where: nc < 100X ca), ca** (where: nc < 100X ca), NV=no value

J = Estimated Value

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Table 2.7
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Shallow Soil Gas (8 ft)

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening	Target Shallow Gas Concentration (Soil Gas to Indoor Air Factor = 0.1)	Basis of Target Concentration (Cancer or Noncancer)	COPC Flag (Y/N)	Rationale for Selection or Deletion[b]
71-55-6	1,1,1-TRICHLOROETHANE	2.7 J	3.5 J	µg/m³	BFVI-04S	2/5	0.83-0.83	VOC	3.50E+00	2.2E+03	NC	N	BSL
75-34-3	1,1-DICHLOROETHANE	1.4 J	1.4 J	µg/m³	BFVI-04S	1/5	0.62-0.62	VOC	1.40E+00	5.0E+02	NC	N	BSL
75-35-4	1,1-DICHLOROETHENE	4.6 J	4.6 J	µg/m³	BFVI-04S	1/5	0.6-0.6	VOC	4.60E+00	2.0E+02	NC	N	BSL
95-63-6	1,2,4-TRIMETHYLBENZENE	1.8 J	11	µg/m³	BFVI-02S	5/5	-	VOC	1.10E+01	6.0E+00	NC	Y	ASL
108-67-8	1,3,5-TRIMETHYLBENZENE	0.75 J	4 J	µg/m³	BFVI-02S	5/5	-	VOC	4.00E+00	6.0E+00	NC	N	BSL
540-84-1	2,2,4-TRIMETHYLPENTANE	0.76 J	1.9 J	µg/m³	BFVI-01S, BFVI-02S	5/5	-	VOC	1.90E+00	NV	NV	Y	NTX
622-96-8	4-ETHYLTOLUENE	0.65 J	3.7 J	µg/m³	BFVI-02S	5/5	-	VOC	3.70E+00	NV	NV	Y	NTX
67-64-1	ACETONE	210	290	µg/m³	BFVI-02S	2/5	0.72-0.72	VOC	2.90E+02	3.5E+02	NC	N	BSL
71-43-2	BENZENE	4 J	14	µg/m³	BFVI-02S	5/5	-	VOC	1.40E+01	3.1E+00	C	Y	ASL,KHC
75-27-4	BROMODICHLOROMETHANE	2.6 J	2.6 J	µg/m³	BFVI-04S	1/5	1-1	VOC	2.60E+00	1.4E+00	C	Y	ASL
75-15-0	CARBON DISULFIDE	1.6	3.9	µg/m³	BFVI-03S	5/5	-	VOC	3.90E+00	7.0E+02	NC	N	BSL
56-23-5	CARBON TETRACHLORIDE	0.83 J	560	µg/m³	BFVI-04S	3/5	0.96-0.96	VOC	5.60E+02	1.6E+00	C	Y	ASL
75-00-3	CHLOROETHANE	2.4 J	2.4 J	µg/m³	BFVI-04S	1/5	0.4-0.4	VOC	2.40E+00	1.0E+04	NC	N	BSL
67-66-3	CHLOROFORM	3.9	1600	µg/m³	BFVI-04S	5/5	-	VOC	1.60E+03	1.1E+00	C	Y	ASL
156-59-2	CIS-1,2-DICHLOROETHENE	7.4 J	7.4 J	µg/m³	BFVI-04S	1/5	0.6-0.6	VOC	7.40E+00	3.5E+01	NC	N	BSL
75-71-8	DICHLORODIFLUOROMETHANE	2.9 J	210	µg/m³	BFVI-05S	5/5	-	VOC	2.10E+02	2.0E+02	NC	Y	ASL
100-41-4	ETHYLBENZENE	4.5 J	11	µg/m³	BFVI-02S	5/5	-	VOC	1.10E+01	2.2E+01	C	N	BSL
75-09-2	METHYLENE CHLORIDE	1.1 J	1.9 J	µg/m³	BFVI-04S	5/5	-	VOC	1.90E+00	5.2E+01	C	N	BSL
108-38-3	M-XYLENE	8.7 J	25 J	µg/m³	BFVI-02S	5/5	-	VOC	2.50E+01	7.0E+03	NC	N	BSL
142-82-5	N-HEPTANE	1.8 J	5 J	µg/m³	BFVI-02S	5/5	-	VOC	5.00E+00	NV	NV	Y	NTX
110-54-3	N-HEXANE	2	5.5	µg/m³	BFVI-01S	5/5	-	VOC	5.50E+00	2.0E+02	NC	N	BSL
95-47-6	O-XYLENE	4.1 J	15	µg/m³	BFVI-02S	5/5	-	VOC	1.50E+01	7.0E+03	NC	N	BSL
106-42-3	P-XYLENE	3.5 J	15 J	µg/m³	BFVI-02S	5/5	-	VOC	1.50E+01	7.0E+03	NC	N	BSL
100-42-5	STYRENE	1.2 J	1.2 J	µg/m³	BFVI-04S	1/5	0.65-0.65	VOC	1.20E+00	1.0E+03	NC	N	BSL
127-18-4	TETRACHLOROETHENE	74 J	490	µg/m³	BFVI-02S	5/5	-	VOC	4.90E+02	8.1E+00	C	Y	ASL
108-88-3	TOLUENE	34	110	µg/m³	BFVI-02S	5/5	-	VOC	1.10E+02	4.0E+02	NC	N	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	3 J	3 J	µg/m³	BFVI-04S	1/5	0.6-0.6	VOC	3.00E+00	7.0E+01	NC	N	BSL
79-01-6	TRICHLOROETHENE	0.87 J	68	µg/m³	BFVI-04S	3/5	0.82-0.82	VOC	6.80E+01	2.2E-01	C	Y	ASL
75-69-4	TRICHLOROFLUOROMETHANE	1.4	170	µg/m³	BFVI-03S	5/5	-	VOC	1.70E+02	7.0E+02	NC	N	BSL

NOTES:
a = If the Basis of Target Concentration is NC (Non-Cancer), then the screening value is multiplied by a hazard index of 0.1
b = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen
J = Estimated Value, N=Cancer, NC=Noncancer, NV=No Value

REFERENCES:
United States Environmental Protection Agency (USEPA). 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). EPA530-D-02-004.

Table 2.8
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening Values: Deep Soil Gas (20 ft)

CAS Number	Chemical	Minimum Detected Concentration (Qualifier)	Maximum Detected Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Chemical Grouping	Concentration Used for Screening	Target Deep Gas Concentration (Soil Gas to Indoor Air Factor = 0.01)	Basis of Target Concentration (Cancer or Noncancer)	COPC Flag (Y/N)	Rationale for Selection or Deletion[d]
56-23-5	CARBON TETRACHLORIDE	7.6 J	400 J	μg/m³	BFVI-04D	3/5	0.96-0.96	VOC	4.00E+02	1.6E+01	C	Y	ASL
127-18-4	TETRACHLOROETHENE	210 J	610 J	μg/m³	BFVI-04D	5/5	-	VOC	6.10E+02	8.1E+01	C	Y	ASL
100-41-4	ETHYLBENZENE	7.9 J	14	μg/m³	BFVI-03D	5/5	-	VOC	1.40E+01	2.2E+02	C	N	BSL
67-66-3	CHLOROFORM	2.8 J	1400	μg/m³	BFVI-04D	5/5	-	VOC	1.40E+03	1.1E+01	C	Y	ASL
75-27-4	BROMODICHLOROMETHANE	1.8	2.5	μg/m³	BFVI-04D	2/5	1-1	VOC	2.50E+00	1.4E+01	C	N	BSL
71-43-2	BENZENE	19	31	μg/m³	BFVI-02D	5/5	-	VOC	3.10E+01	3.1E+01	C	Y	KHC
75-09-2	METHYLENE CHLORIDE	2.2 J	4.9	μg/m³	BFVI-04D	5/5	-	VOC	4.90E+00	5.2E+02	C	N	BSL
79-01-6	TRICHLOROETHENE	1.9	71	μg/m³	BFVI-05D	3/5	0.82-0.82	VOC	7.10E+01	2.2E+00	C	Y	ASL
76-13-1	1,1,2-TRICHLOROTRIFLUOROETHANE	0.93 J	0.93 J	μg/m³	BFVI-01D	1/5	1.2-1.2	VOC	9.30E-01	3.0E+05	NC	N	BSL
95-63-6	1,2,4-TRIMETHYLBENZENE	5.5 J	11 J	μg/m³	BFVI-04D	5/5	-	VOC	1.10E+01	6.0E+01	NC	N	BSL
106-42-3	P-XYLENE	7.9 J	12 J	μg/m³	BFVI-05D	5/5	-	VOC	1.20E+01	7.0E+04	NC	N	BSL
75-15-0	CARBON DISULFIDE	2	25 J	μg/m³	BFVI-01D	5/5	-	VOC	2.50E+01	7.0E+03	NC	N	BSL
110-54-3	N-HEXANE	6.5	28 J	μg/m³	BFVI-01D	5/5	-	VOC	2.80E+01	2.0E+03	NC	N	BSL
108-38-3	M-XYLENE	15 J	33 J	μg/m³	BFVI-03D	5/5	-	VOC	3.30E+01	7.0E+04	NC	N	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	1.5	1.5	μg/m³	BFVI-04D	1/5	0.6-0.6	VOC	1.50E+00	7.0E+02	NC	N	BSL
108-88-3	TOLUENE	74 J	150	μg/m³	BFVI-02D	5/5	-	VOC	1.50E+02	4.0E+03	NC	N	BSL
95-47-6	O-XYLENE	9.3 J	16	μg/m³	BFVI-03D	5/5	-	VOC	1.60E+01	7.0E+04	NC	N	BSL
75-00-3	CHLOROETHANE	2.9	2.9	μg/m³	BFVI-04D	1/5	0.4-0.4	VOC	2.90E+00	1.0E+05	NC	N	BSL
75-69-4	TRICHLOROFLUOROMETHANE	2.8 J	220	μg/m³	BFVI-04D	5/5	-	VOC	2.20E+02	7.0E+03	NC	N	BSL
67-64-1	ACETONE	220	270	μg/m³	BFVI-05D	2/5	0.72-0.72	VOC	2.70E+02	3.5E+03	NC	N	BSL
156-59-2	CIS-1,2-DICHLOROETHENE	3.1	3.1	μg/m³	BFVI-04D	1/5	0.6-0.6	VOC	3.10E+00	3.5E+02	NC	N	BSL
75-35-4	1,1-DICHLOROETHENE	3.4	3.4	μg/m³	BFVI-04D	1/5	0.6-0.6	VOC	3.40E+00	2.0E+03	NC	N	BSL
108-67-8	1,3,5-TRIMETHYLBENZENE	2.5	4.4	μg/m³	BFVI-03D, BFVI-02D	5/5	-	VOC	4.40E+00	6.0E+01	NC	N	BSL
75-71-8	DICHLORODIFLUOROMETHANE	3.5	530	μg/m³	BFVI-05D	5/5	-	VOC	5.30E+02	2.0E+03	NC	N	BSL
71-55-6	1,1,1-TRICHLOROETHANE	1.4	7.3	μg/m³	BFVI-04D	3/5	0.83-0.83	VOC	7.30E+00	2.2E+04	NC	N	BSL
540-84-1	2,2,4-TRIMETHYLPENTANE	3.1	6.5 J	μg/m³	BFVI-01D, BFVI-02D	5/5	-	VOC	6.50E+00	NV	NV	Y	NTX
142-82-5	N-HEPTANE	5.1	12 J	μg/m³	BFVI-01D	5/5	-	VOC	1.20E+01	NV	NV	Y	NTX
10061-02-6	TRANS-1,3-DICHLOROPROPENE	2.2	2.2	μg/m³	BFVI-03D	1/5	0.69-0.69	VOC	2.20E+00	NV	NV	Y	NTX
622-96-8	4-ETHYLTOLUENE	2.1	4.5	μg/m³	BFVI-03D	5/5	-	VOC	4.50E+00	NV	NV	Y	NTX

NOTES:
a = If the Basis of Target Concentration is NC (Non-Cancer), then the screening value is multiplied by a hazard index of 0.1
d = Rationale for Selection as COPC based on the following criteria: ASL=above screening level, BSL=below screening level, NTX=no toxicity value, EN=essential nutrient, KHC=known Class A human carcinogen
J = Estimated Value, N=Cancer, NC=Noncancer, NV=No Value

REFERENCES:
United States Environmental Protection Agency (USEPA). 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). EPA530-D-02-004.

Table 3.1
Honeywell
Ballfield Site
Risk Assessment Screening
Ecological Screening for Surface Soil (0 - 1 ft): Toxic Equivalents for PCDD/Fs

Chemical	Minimum Concentration Detected	Maximum Concentration Detected	Units	Location of Maximum Detected Concentration	2,3,7,8-TCDD Equivalency Factor (Van den Berg et al., 2006)	TCDD Equivalent
1,2,3,4,6,7,8-HPCDD	3.94	507.91	ng/kg	BFSS-09	0.01	5.0791
1,2,3,4,6,7,8-HPCDF	1.39 J	241.368	ng/kg	BFSS-03	0.01	2.41368
1,2,3,4,7,8,9-HPCDF	2.308 J	49.22	ng/kg	BFSS-03	0.01	0.4922
1,2,3,4,7,8-HXCDD	0.702 J	11.66	ng/kg	BFSS-08	0.1	1.166
1,2,3,4,7,8-HXCDF	0.42 J	225.108	ng/kg	BFSS-03	0.1	22.5108
1,2,3,6,7,8-HXCDD	1.007 J	75.744	ng/kg	BFSS-03	0.1	7.5744
1,2,3,6,7,8-HXCDF	1.94 J	62.624	ng/kg	BFSS-03	0.1	6.2624
1,2,3,7,8,9-HXCDD	0.634 J	40.077	ng/kg	BFSS-03	0.1	4.0077
1,2,3,7,8,9-HXCDF	0.306 J	28.13	ng/kg	BFSS-03	0.1	2.813
1,2,3,7,8-PECDD	0.823 J	17.337	ng/kg	BFSS-03	1	17.337
1,2,3,7,8-PECDF	7.78	152.548	ng/kg	BFSS-03	0.03	4.57644
2,3,4,6,7,8-HXCDF	0.557 J	35.823	ng/kg	BFSS-03	0.1	3.5823
2,3,4,7,8-PECDF	0.85 J	399.24	ng/kg	BFSS-08	0.3	119.772
2,3,7,8-TCDD	0.236 J,EMPC	4.992	ng/kg	BFSS-03	1	4.992
2,3,7,8-TCDF	2.26	1403.97	ng/kg	BFSS-08	0.1	140.397
OCDD	18.58	12313.7	ng/kg	BFSS-09	0.0003	3.69411
OCDF	1.93 J	417.4	ng/kg	BFSS-03	0.0003	0.12522
2,3,7,8-TCDD Equivalent	**-**	**-**	**mg/kg**	**-**	**-**	3.5E-04

Table 3.2
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening for Surface Soil (0 - 0.5 ft): Toxic Equivalents for PCDD/Fs

Chemical	Minimum Concentration Detected	Maximum Concentration Detected	Units	Location of Maximum Detected Concentration	2,3,7,8-TCDD Equivalency Factor (Van den Berg et al., 2006)	TCDD Equivalent
1,2,3,4,6,7,8-HPCDD	4.25	507.91	ng/kg	BFSS-09	0.01	5.0791
1,2,3,4,6,7,8-HPCDF	1.42 J	241.368	ng/kg	BFSS-03	0.01	2.41368
1,2,3,4,7,8,9-HPCDF	2.642	49.22	ng/kg	BFSS-03	0.01	0.4922
1,2,3,4,7,8-HXCDD	0.845 J	11.66	ng/kg	BFSS-08	0.1	1.166
1,2,3,4,7,8-HXCDF	0.42 J	225.108	ng/kg	BFSS-03	0.1	22.5108
1,2,3,6,7,8-HXCDD	1.126 J,EMPC	75.744	ng/kg	BFSS-03	0.1	7.5744
1,2,3,6,7,8-HXCDF	1.946 J	62.624	ng/kg	BFSS-03	0.1	6.2624
1,2,3,7,8,9-HXCDD	0.935 J	40.077	ng/kg	BFSS-03	0.1	4.0077
1,2,3,7,8,9-HXCDF	0.537 J,EMPC	28.13	ng/kg	BFSS-03	0.1	2.813
1,2,3,7,8-PECDD	1.039 J	17.337	ng/kg	BFSS-03	1	17.337
1,2,3,7,8-PECDF	9.658	152.548	ng/kg	BFSS-03	0.03	4.57644
2,3,4,6,7,8-HXCDF	0.72 J	35.823	ng/kg	BFSS-03	0.1	3.5823
2,3,4,7,8-PECDF	12.299	348.53	ng/kg	BFSS-08	0.3	104.559
2,3,7,8-TCDD	1.39 J	4.992	ng/kg	BFSS-03	1	4.992
2,3,7,8-TCDF	2.26	1403.97	ng/kg	BFSS-08	0.1	140.397
OCDD	21.03	3449.76	ng/kg	BFSS-09	0.0003	1.034928
OCDF	2.83 J	417.4	ng/kg	BFSS-03	0.0003	0.12522
2,3,7,8-TCDD Equivalent	**-**	**-**	**mg/kg**	**-**	**-**	3.3E-04

Table 3.3
Honeywell
Ballfield Site
Risk Assessment Screening
Human Health Screening for Subsurface Soil (0.5 - 10 ft): Toxic Equivalents for PCDD/Fs

Chemical	Minimum Concentration Detected	Maximum Concentration Detected	Units	Location of Maximum Detected Concentration	2,3,7,8-TCDD Equivalency Factor (Van den Berg et al., 2006)	TCDD Equivalent
1,2,3,4,6,7,8-HPCDD	3.94	267.623	ng/kg	BFSS-09	0.01	2.67623
1,2,3,4,6,7,8-HPCDF	1.39 J	190.473	ng/kg	BFSS-03	0.01	1.90473
1,2,3,4,7,8,9-HPCDF	2.308 J	26.977	ng/kg	BFSS-03	0.01	0.26977
1,2,3,4,7,8-HXCDD	0.702 J	9.2	ng/kg	BFSS-08	0.1	0.92
1,2,3,4,7,8-HXCDF	0.49 J	165.727	ng/kg	BFSS-03	0.1	16.5727
1,2,3,6,7,8-HXCDD	1.007 J	35.447	ng/kg	BFSS-03	0.1	3.5447
1,2,3,6,7,8-HXCDF	1.94 J	53.128	ng/kg	BFSS-03	0.1	5.3128
1,2,3,7,8,9-HXCDD	0.634 J	24.351	ng/kg	BFSS-09	0.1	2.4351
1,2,3,7,8,9-HXCDF	0.306 J	21.021	ng/kg	BFSS-09	0.1	2.1021
1,2,3,7,8-PECDD	0.823 J	9.536	ng/kg	BFSS-09	1	9.536
1,2,3,7,8-PECDF	7.78	86.25	ng/kg	BFSS-08	0.03	2.5875
2,3,4,6,7,8-HXCDF	0.557 J	30.92	ng/kg	BFSS-09	0.1	3.092
2,3,4,7,8-PECDF	0.85 J	399.24	ng/kg	BFSS-08	0.3	119.772
2,3,7,8-TCDD	0.236 J,EMPC	2.662	ng/kg	BFSS-03	1	2.662
2,3,7,8-TCDF	2.87	1318.07	ng/kg	BFSS-08	0.1	131.807
OCDD	18.58	12313.7	ng/kg	BFSS-09	0.0003	3.69411
OCDF	1.93 J	327.781	ng/kg	BFSS-03	0.0003	0.0983343
2,3,7,8-TCDD Equivalent	**-**	**-**	**mg/kg**	**-**	**-**	3.1E-04

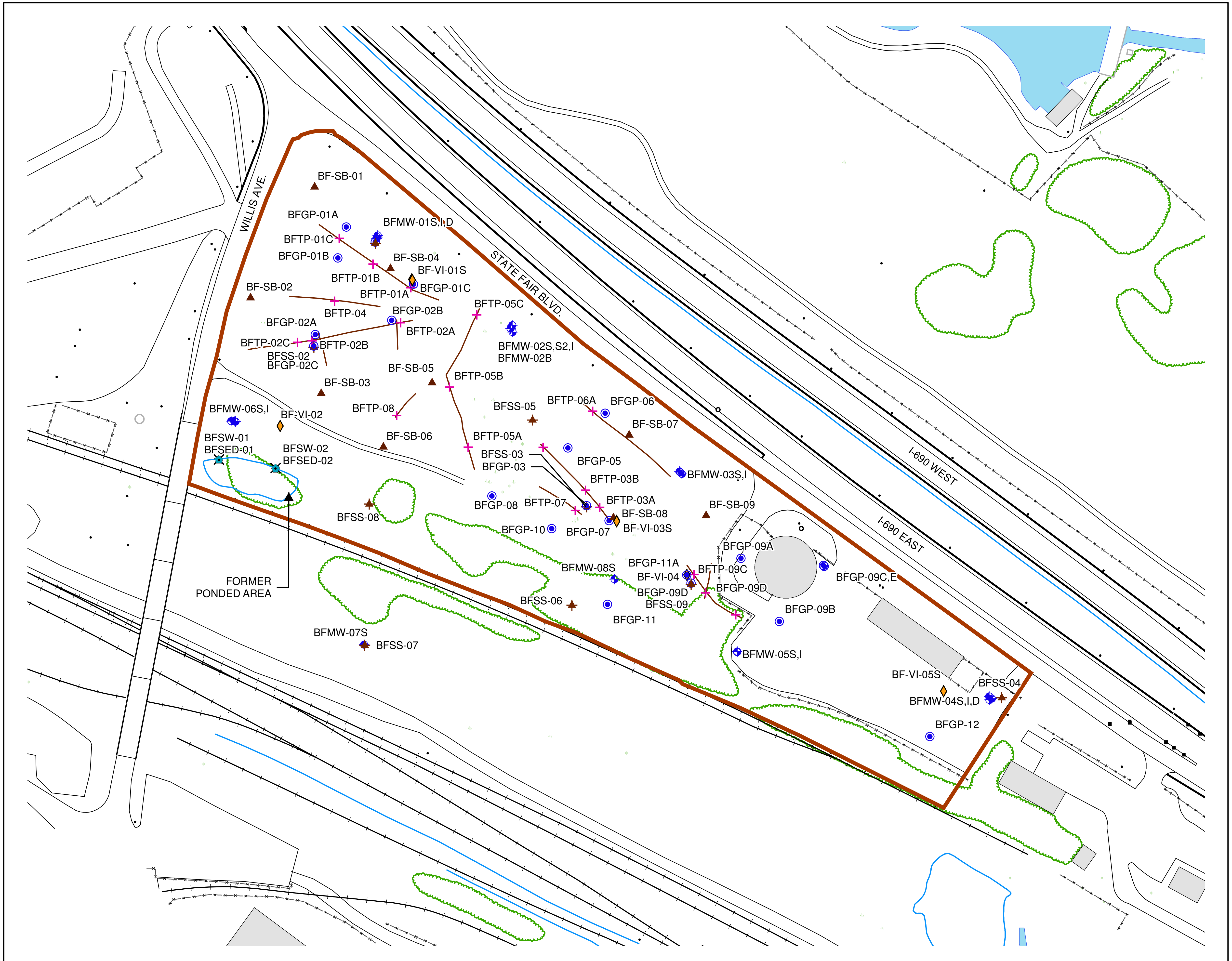

FIGURE 1

LEGEND

BALLFIELD SITE

LOCATION TYPE

- MONITORING WELL
- SOIL BORING
- GEOPROBE
- SURFACE SOIL
- SOIL VAPOR
- TEST PIT
- SURFACE WATER/SEDIMENT
- TEST PIT

HONEYWELL
BALLFIELD SITE
GEDDES, NEW YORK

SAMPLE LOCATION PLAN

0 75 150 300
Feet

JULY 2006
1163.37353

O'BRIEN & GERE ENGINEERS, INC.

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REVISION DATE: 07/05/06 DIV. 732 JPS

Attachment A

Combined Fish and Wildlife Analysis (Step 1) and Screening-Level Ecological Risk Assessment (MWH November 2003)

DRAFT TECHNICAL MEMORANDUM

COMBINED FISH AND WILDLIFE IMPACT ANALYSIS (STEP 1) AND SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

HONEYWELL BALLFIELD SITE
GEDDES, NEW YORK

November 2003

Prepared For:
Honeywell International Inc.

• • •

Prepared By:
MWH

Project No. 4260193.2800

MWH

TECHNICAL MEMORANDUM

COMBINED FISH AND WILDLIFE IMPACT ANALYSIS (STEP 1) AND SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

HONEYWELL BALLFIELD SITE
GEDDES, NEW YORK

November 2003

Prepared by: ______________________ ______________

Sally A. Mayasich
Senior Environmental Scientist

Date

Approved by: ______________________ ______________

Michael W. Kierski, Ph.D.
Supervising Environmental Scientist

Date

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1.0 INTRODUCTION

Based on the comments received by the New York State Department of Environmental Conservation (NYSDEC) on the draft work plan, the first Ecological Risk Assessment (ERA) deliverable consists of a Technical Memorandum (TM). This TM will serve as an interim deliverable to ensure that the ERA is being performed in accordance with NYSDEC and United States Environmental Protection Agency (EPA) requirements. This TM contains the substantive items typically included within a Screening-level ERA (SLERA) report, including the tasks outlined in *Ecological Risk Assessment Guidance for Superfund* (ERAGS; USEPA, 1997) Steps 1 and 2 and New York State Department of Environmental Conservation (NYSDEC, 1994) *Fish and Wildlife Impact Analysis for Hazardous Waste Sites* (FWIA) Steps I through IIB. Steps IIA and IIB coincide with elements of ERAGS Steps 1 and 2. These documents are combined per the NYSDEC *Generic Ecological Risk Assessment Guidance For Onondaga Lake Sites* (NYSDEC, 1998; Lake Sites Guidance), as the "Integrated ERA," and is acceptable to both NYSDEC and EPA and provides for a more focused assessment process.

Tasks performed for this TM include:

- The preparation of covertype and drainage maps.
- Identification of fish and wildlife resources and associated value, associated flora and fauna and observations of stress.
- Identification of applicable fish and wildlife regulatory criteria.
- Pathway analysis.
- Site data comparisons to applicable criteria and ecological screening values, and a screening-level effects evaluation based on exposure concentrations and toxicity data for potential receptors.
- Screening-level exposure estimate and risk calculation, where exposures that represent negligible risk to ecological receptors are screened out and are not further evaluated in the ERA.

1.1 STUDY AREA CHARACTERIZATION

The first part of this document (sections 1 through 5) follows the New York State Department of Environmental Conservation (NYSDEC, 1994) process for evaluating ecological impacts at hazardous waste sites in New York State. The objective of Step I of the NYSDEC FWIA (*Site Description*) is to describe the Site and study area in terms of topography, covertypes, drainage, fish and wildlife resources and value and to identify applicable fish and wildlife screening criteria.

1.2 SITE BACKGROUND

The Ballfield Site is situated to the south and east of the intersection of Willis Avenue and State Fair Boulevard and is approximately 600 feet deep (north-south) and 1,400 feet wide (east-west). The southern portion of the Site borders CSX railroad property. The Site is situated on top of Wastebed C. Historical use of Wastebed C was for the deposition of Solvay Waste, a non-hazardous waste consisting primarily of calcium carbonate, calcium silicate and magnesium hydroxide with lesser amounts of carbonates, sulfates, salts and metal oxides. The bed covers approximately 21.8 acres. Wastebed C received Solvay Waste from approximately 1908 to 1926 (B&B, 1989). The succession of Wastebed C is illustrated by the historical aerial photographs, included in Appendix A of the Work Plan (O'Brien and Gere, 2002). A description of the Site is presented below. A topographic map is included as Figure 1-1.

Fill materials were placed above the Solvay Waste. NYSDEC has reported notification by a former employee of Allied Chemical Corporation (predecessor to AlliedSignal Inc and Honeywell), alleging that the western portion of the Site was used as a landfill for miscellaneous debris during the 1940s. Aerial photographs indicate that fill materials were placed on the Site between 1938 and 1959. During the PSA investigation, fill materials were found in the eastern and western portions of the Site. The fill materials consisted of Allen-Moore diaphragm cell bodies and related graphite, laboratory vials and flasks, construction and demolition debris, miscellaneous metal debris, and boiler slag.

Previous studies in the adjacent Harbor Brook and Willis Avenue Sites have indicated a northeast flow direction toward Onondaga Lake in the deep ground water unit. The shallow, intermediate and deep groundwater show slightly different flow patterns, but the general flow direction is toward Onondaga Lake.

1.3 STUDY AREA DESCRIPTION

Consistent with the FWIA guidance document (NYSDEC 1994), the study area is defined as the Site and the area within a 0.5 mile radius of the Site perimeter.

1.3.1 Off-Site Perimeter Areas

The area south of the Ballfield Site is owned by the CSX Corporation. Aerial photos indicate that the area has not received fill material in the past. Adjacent to the northwest is the Willis Avenue plant, and to the west and east are other areas related to the Willis Avenue Chlorobenzene Site. This site was described in a Screening-Level Ecological Assessment (O'Brien and Gere, July 1999) and a Baseline Ecological Risk Assessment (O'Brien and Gere, January 2003) conducted in accordance with FWIA procedures for AlliedSignal, Inc. The study area also includes the Semet Residue Ponds, Tributary 5A, the upper and lower East Flume, dredge spoils areas, and a portion of Onondaga Lake (Figure 1-2). The dominant land use within the study area is industrial with a number of currently-operating plants, including Crucible Specialty Metals, Solvay Paperboard, General Chemical Corporation, Landis Plastics, and Fibertec. South of the industrial area is a residential area. Interspersed through the study area are small "green" areas currently without man-made structures, including fields, wooded areas and wetlands. Onondaga Lake is the major surface water body within the study area, and has been studied extensively by other entities (e.g., Exponent, Inc.) and is therefore not described further in this document. The other areas are described fully in O'Brien and Gere (1999), and summarized as follows:

1.3.1.1 Willis Avenue Chlorobenzene Site. This site consists of the Willis Avenue Plant Area, the Petroleum Storage Area (PSA), and the Chlorobenzene Hot-spots Area (CHSA). AlliedSignal operated a facility at the plant from 1918 to 1977. The principal business of the facility was chlor-alkali production and the manufacture of chlorinated benzene products. The PSA housed a facility that fractionally distilled coke light oil to produce benzene, toluene, xylenes and naphthalene. After this facility was demolished in 1973, the PSA was used for storage of no. 2 fuel oil. The CHSA is an area where chlorobenzenes were reportedly released via a leaking wastewater pipe.

Additional areas added to Phase 2 of the Remedial Investigation (RI) for the site included Outfalls 004 and 006, and the East Flume and Dredge Spoil Areas (DSA) #1 and #2. Outfalls 004 and 006 and associated drainage ditches have been dry in recent years based on historical information from State Pollution Discharge Elimination System (SPDES) discharge permits, however these areas may have received surface runoff when the plant was in operation. The East Flume lies northeast of the Plant Area along the southern shore of Onondaga Lake, and was originally an excavated ditch which primarily received cooling waters from the Main Plant and Willis Avenue Plant. The East Flume also receives storm and process waters from other sources. The upper East Flume continues to be managed as a holding pond where relatively deep water and the presence of a five-foot dam slow water flow to allow settling. The outlet of the pond is over the top of the dam. The DSAs are associated with the upper and lower East Flumes (Figure 1-2).

1.3.1.2 Tributary 5A. Tributary 5A originates from a culvert north of the railroad tracks on the west side of Willis Avenue and is oriented basically east-west on the south side of the Semet Ponds, flowing west and turning northeast on the west side of the Semet Ponds toward Onondaga Lake. Tributary 5A is considered an industrial effluent stream, receiving discharge from 12 outfalls from Crucible Specialty Metals as well as surface water runoff and shallow groundwater discharge from the Semet Residue Ponds, Willis Avenue Site, and Church and Dwight facility. A tributary takes on the class of the surface water to which it discharges (Onondaga Lake), which is a Class C surface water.

1.3.1.3 Semet Residue Ponds. These ponds are classified as "waste treatment ponds", and were historically used for disposal of organic-based residues. The ponds comprise an area of approximately 12 acres and have an average depth of 20 feet. The surfaces of the ponds are approximately 4 inches thick and appear as weathered black to brown granular material. Below this surface layer is a highly viscous, black material which resembles asphalt tar.

1.3.1.4 General Industrial. The areas south and west of the site consist of currently or formerly operating industrial facilities, including Crucible Specialty Metals, Church and Dwight, General Chemical Corporation, Landis Plastics, and Fibertec.

1.3.1.5 Residential Areas. The area south of the industrial area consists of a typical urban residential area.

1.3.1.6 Green Areas. Small areas currently without man-made structures are interspersed throughout the study area. These include successional fields and wooded areas north and south of the Ballfield Site, shrublands northwest and southeast of the site, and wetlands in the Onondaga lakeshore areas (Figure 1-2).

1.3.2 Ballfield Site

The eastern portion of the Ballfield Site is currently owned and operated by the Butler Fence Company. This portion of the Site contains a building, a gravel parking lot and a large aboveground storage tank that Butler Fence uses as a storage area for fencing and other supplies. During the 1980s, the above ground storage tank was used as a terminal for ammonia-based fertilizer. The fertilizer was sold to local businesses, primarily farmers. The Butler Fence property is surrounded by a 6-foot fence with a locked gate.

The western portion of the Ballfield Site is currently owned by Quality Distribution (formerly Chemical Leaman). This portion of the Site was purchased in 1979, and since that time has not been used for any active purpose. During the 1960s and 1970s the area was used as a baseball field for employees of Allied Chemical, predecessor to Honeywell.

2.0 COVERTYPE DELINEATION

A covertype is defined as an area characterized by a distinct pattern of natural or cultural land use (Reschke 1990). Covertype designations for the site have been applied based on the dominant vegetation and other physical features observed during the site visit conducted on October 25, 2002 by an MWH ecologist, and from previous habitat assessments by O'Brien and Gere conducted in 1991, 1993, 1997, and 1998. Covertype designations follow the ecological community descriptions presented in the New York Natural Heritage Program (NYNHP) document *Ecological Communities of New York State* (Reschke 1990). The description of each identified covertype includes a list of plant species observed during the site visit and previous habitat assessments. A total of 13 cultural and natural covertypes were identified separated into seven categories: terrestrial cultural, riverine cultural, natural lakes and ponds, lacustrine cultural, industrial ponds, terrestrial open uplands, and terrestrial forested uplands. Each covertype is discussed below.

2.1 TERRESTRIAL CULTURAL COVERTYPES

The majority of the upland communities within the study area are considered terrestrial cultural covertypes. This designation reflects the extent of human disturbance to the study area for land uses such as residences, parks, roadways, and commercial businesses. Residential areas consist of 0.25 to 0.5-acre lots with paved driveways and access roads. Commercial businesses, recreational parks, and schools are present in portions of the study area, with essentially the same physical characteristics as the residential areas (Figure 1-2).

2.1.1 Urban Vacant Lot

The Willis Avenue Plant Area, PSA and CHSA properties are defined as *Urban vacant lot* in Reschke (1990), consisting of an open site that has been cleared following the demolition of a building. Fill, paved areas, and building foundations are the substrate for the majority of this covertype. Vegetation when present in these areas consists of wildflowers, grasses and weeds such as goldenrod (*Solidago* spp.), squawroot (*Conopholis americana*), wild carrot (*Daucus carota*), thistle (*Centaurea* spp.), blueweed (*Echium vulgare*), asters (*Aster* spp.), and common evening primrose (*Oenothera biennis*), as well as seedlings and saplings of Eastern cottonwood (*Populus deltoides*) and alternate-leaf dogwood (*Cornus alternifolia*) (O'Brien and Gere 1991, 1993, 1997). The southern portion of the Plant Area, including areas surrounding the guard shack and helipad, consist of mowed lawn. The overall wildlife habitat quality of the Plant Area is poor, primarily due to the lack of appropriate cover, nesting areas and food sources. However, the vegetation existing on portions of the Plant Area likely provides a potential food source for songbirds (O'Brien and Gere, 1999).

Urban structure exterior. This covertype is characterized by the exterior surfaces of structures such as commercial buildings, apartment buildings, and bridges in an urban or densely-populated suburban area (Reschke, 1990). This covertype in the study area also includes sub-communities typical of the *Paved and unpaved road/path* covertypes (Reschke, 1990). Based on the covertype mapping performed as a component of the Willis Avenue Chlorobenzene Site, the eastern portion of the Ballfield Site is classified as urban structure exterior (O'Brien and Gere, 1999). This was confirmed during the October 25, 2002 site visit. Within the surrounding study area, buildings associated with Crucible Specialty Metals, the former AlliedSignal Plant Site, a portion of the Church and Dwight facility, the PSA, and CHSA fall into this designation. This covertype is not typically vegetated but may contain plants of disturbed communities similar to those in the urban vacant lot (O'Brien and Gere, 1999).

Mowed lawn with trees. This covertype is described in Reschke (1990) as residential, recreational, or commercial land in which the ground cover is dominated by mowed grasses and is shaded by at least 30% tree cover. Vegetation may also consist of ornamental or native shrubs with less than 50% cover. This covertype is concentrated in the southern portion of the study area.

Mowed roadside/pathway. This covertype consists of grasses, sedges, vines and low shrubs characteristic of mowed roadsides or paths. Strips of this covertype are present throughout the study area, and include Outfall 004 and associated drainage ditch.

Dredge spoils. Two areas on the south side of the East Flume consist of dredge spoils. Dredge spoils area No. 1 is at the western end of the Upper East Flume and is vegetated almost exclusively with *Phragmites*. Dredge spoils area No.2 lies below the dam and adjacent to the Lower East Flume and is vegetated with *Phragmites* and woody plant species including dogwood, cottonwood and box elder (*Acer negundo*) (O'Brien and Gere, 1999; Figure 1-2).

Brushy cleared land. O'Brien and Gere (1999) observed *brushy cleared land* on and adjacent to the Willis Avenue Plant Area, at Outfall 006, drainage ditch, and the mounded area extending south of the Plant Area boundary. The ditch is dry throughout the year and vegetation is patchy with scattered pioneer grasses, wild flowers, and tree saplings.

2.2 RIVERINE CULTURAL

Industrial effluent stream. This covertype is defined as a stream in which "the temperature, chemistry, or transparency of the water is significantly modified by discharge of effluent from an industrial, commercial or sewage treatment plant" (Reschke, 1990). Tributary 5A, south and west of the Semet Residue Ponds area, and the lower East Flume were classified as industrial effluent streams (O'Brien and Gere, 1999) based on water quality measurements and receiving effluent discharge from several sources.

2.3 NATURAL LAKES AND PONDS

Eutrophic dimictic lake. Onondaga Lake is specifically cited by Reschke (1990) as an example of a eutrophic dimictic lake. This covertype is described as a nutrient rich lake that occurs in a broad, shallow basin. A dimictic lake has two periods of mixing or turnover (spring and fall). Onondaga Lake has been the subject of ecological study by other entities (e.g., Exponent, Inc.).

2.4 LACUSTRINE CULTURAL

Industrial cooling pond.
Industrial cooling ponds are artificial ponds constructed as holding ponds for cooling of industrial effluents (Reschke, 1990). The upper East Flume meets these criteria.

2.5 INDUSTRIAL PONDS

Residue Ponds. The Semet Residue Ponds do not fit into community classifications designated by Reschke (1990). The Ponds were determined as unsuitable wildlife habitat due to the inability to support vegetation, although deer tracks and a small central patch of grass and cottonwood sapling vegetation have been observed (O'Brien and Gere, 1999).

2.6 TERRESTRIAL OPEN UPLAND COVERTYPES

Successional old field. This covertype is described as a meadow dominated by forbs and grasses on cleared and then abandoned sites; shrubs may be present but comprise less than 50% of the cover in the community (Reschke, 1990). There are several locations where this covertype occurs in the study area, as shown in Figure 1-2. Based on the covertype mapping performed by O'Brien and Gere (1999) for the Willis Avenue Chlorobenzene Site, the western portion of the Ballfield Site is classified as successional old field. This was confirmed during the site visit by a MWH ecologist on October 25, 2002. The dominant vegetation consists of goldenrod (*Solidago* spp.), Queen Anne's lace (*Daucus carota*), teasle (*Dipsacus sylvestris*) and various grasses, with scattered sumac (*Rhus* sp.), common buckthorn (*Rhamnus cathartica*), black locust (*Robinia pseudoaccacia*) trees and cottonwood saplings. Photographs of the site are attached in Appendix A.

Successional shrubland. This covertype is described by Reschke (1990) as a community of at least 50% shrub cover on sites that were previously cleared or otherwise disturbed. This covertype is present within the border of the Semet Ponds area and northwest of the Willis Avenue Plant Site, and also southeast of the Ballfield Site (Figure 1-2). Vegetation was in these areas characterized by Obrien and Gere (1999) as consisting of dogwood (*Cornus* sp.), common buckthorn, goldenrod, *Phragmites*, and eastern cottonwood.

2.7 TERRESTRIAL FORESTED UPLANDS

Successional northern hardwoods. Reschke (1990) describes this covertype as a hardwood or mixed forest community on a previously cleared or disturbed site. Based on the covertype mapping performed by O'Brien and Gere for the Willis Avenue Chlorobenzene Site, the central portion of the Ballfield Site and the area adjacent to the south is classified as successional northern hardwoods. This was confirmed during the site visit by a MWH ecologist on October 25, 2002. This covertype also found northeast of the site near Onondaga Lake, bordered by successional old fields (Figure 1-2).

2.8 OBSERVATIONS OF RELATED STRESS

No evidence of contamination-related stress, such as reduced vegetative growth or density, stained soils, leachate seeps, exposed waste, or changes in vegetative communities was observed in the study area during the site visit.

3.0 DESCRIPTION OF FISH AND WILDLIFE RESOURCES

3.1 FISH AND WILDLIFE RESOURCES IN STUDY AREA

The presence of fish and wildlife resources in the study area was assessed by O'Brien and Gere (1999) through study area visits (1991, 1993, 1997, and 1998), contact with regulatory agencies, and literature review. A site visit was also performed by a MWH biologist in 2002. During the various site visits, wildlife were identified based on actual sightings, audible indicators such as bird songs, and other indicators such as tracks, burrows, or scat. Fish and wildlife identified by O'Brien and Gere are presented in Table 3-1.

During the MWH 2002 site visit, scat, possibly from a fox, was found on the entry trail on the western (*successional old field*) side of the Ballfield Site. Common birds noted included the American robin, song sparrow, and mourning dove. A deer bed and a mammal burrow were found in the south central area of the site within the *successional northern hardwoods* covertype.

Fish and wildlife were not identified from the following covertypes due to the lack of vegetation and basic habitat elements or location within a developed area:

- Urban structure exterior
- Mowed lawn with trees
- Former waste treatment ponds

Fauna identified from the *urban vacant lot* covertype as part of previous habitat assessments by O'Brien and Gere included red tailed hawk (*Buteo jamaicensis*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), starling (*Sturnus vulgaris*), northern mockingbird (*Mimus polyglottus*), ring-billed gull (*Larus delawarensis*), ruffed grouse (*Bonasa umbellus*), American robin (*Turdus migratorius*) and white-tailed deer (*Odocoileus virginianus*). Due to the lack of significant vegetation and the dominance of fill material, viable wildlife habitat is limited in this covertype.

Several aquatic birds and fish species were observed in the *industrial cooling pond* (upper east flume) *industrial effluent stream* (Tributary 5A and lower east flume) and *eutrophic dimictic lake* (Onondaga Lake) covertypes, as listed on Table 3-1. Additionally, fish species that have been previously identified from Onondaga Lake (1989-1991) are listed in Table 3-2 (Auer *et al.*, 1996).

3.2 FAUNA EXPECTED TO INHABIT STUDY AREA COVERTYPES

In addition to the observed wildlife, wildlife expected to inhabit the covertypes within the study area were identified using published literature (Chambers 1983). A list of wildlife species identified in the literature as potentially inhabiting the terrestrial covertypes of the study area is presented in Tables 3-3 and 3-4.

3.3 OTHER RESOURCES

Step I of the NYSDEC (1994) FWIA guidance requires identification of other fish and wildlife resources that may be present within 2 miles of the site. These may include significant wildlife habitats, endangered or threatened species, regulated wetlands, or special surface waters. Additionally, the guidance requires the identification of major resources that exist farther than 2 miles downstream of the site if they can be affected by site-related releases. Special resources were identified by O'Brien and Gere (1999) through contact with regulatory agencies and review of New York State Freshwater Wetlands and National Wetland Inventory (NWI) Maps. The results of these efforts are discussed below.

Information concerning protected species and significant ecological communities has been obtained from USFWS and New York Natural Heritage Program (NYNHP). As part of the RI/FS Work Plan development, O'Brien & Gere obtained from NYNHP dated May 2, 2001 a report summarizing the presence of rare ecological resources within a two-mile radius of the Site. Based on the information presented by the NYSDEC, the USFWS has determined that no federally-listed or proposed threatened or endangered flora or fauna are known to exist within the vicinity of the Site.

Two rare natural plant communities have been recorded adjacent to the Onondaga Lake shoreline within 2 miles of the Site. However, plant communities are not protected in New York State (NYNHP, 1997). These communities are the Inland Salt Marsh and the Inland Salt Pond on the north of Onondaga Lake, east of Liverpool. NYNHP does not provide locations of identified resources, however the general area of the marsh and pond is identified on Figure 3-1.

Based on a review of the New York State Freshwater Wetlands Map for the area, no State-regulated wetlands exist at the Site (Figure 3-1). Additionally, no wetland habitats were identified on or immediately adjacent to the Site on the applicable U.S. Fish and Wildlife Service National Wetlands Inventory Map (Figure 3-2). Field observations confirmed these maps. No jurisdictional wetlands were found on the site during the field survey on October 25, 2002. Two wet areas were observed supporting *Phragmites* growth, probably on poorly drained buried materials, but these areas were too small to be of concern.

Several wetland areas exist within two miles of the Ballfield Site, as shown in Figures 3-1 and 3-2, most prominent of these being along the shores of Onondaga Lake and to the west surrounding Geddes Brook. There are seven state and 26 NWI wetlands within two miles of the site perimeter. There are additional state regulated wetlands located more than two miles downstream of the site, however the existence of Onondaga Lake between the Site and these wetlands may eliminate potential impacts from the site to these resources. These wetlands are located northwest of the Site along the Seneca River.

Surface waters within 2 miles of the Site include Onondaga Lake, Tributary 5A, and the East Flume, Geddes Brook and Ninemile Creek. The southern basin of Onondaga Lake is classified "C" by New York State (6 NYCRR Part 895). Class "C" waters shall be suitable for fish propagation and survival, and primary and secondary contact recreation (6 NYCRR Part 701). According to these regulations, if a water body is not classified, it receives the classification of the water body to which it is tributary. Therefore, the East Flume and Tributary 5A also would be classified "C", however the class C standard need only be met at the point where the stream enters the classified water body.

The Seneca River is located approximately 5 miles northwest of the Site. The Seneca River is a class B water (6 NYCRR Part 895). Class B waters shall be suitable for fish propagation and survival, primary and secondary recreation, and fishing (6 NYCRR Part 701). The Seneca River is hydraulically connected to Onondaga Lake.

Groundwater and surface water elevations measured in May of 2001 showed flow patterns consistent with what would be expected from the surface topography. There are five basic hydrogeologic units in the unconsolidated deposits at the Site, including the shallow fill unit, the intermediate marl unit, a silt and clay confining unit and the deep unit consisting of the silt and sand and the sand and gravel units immediately above till. The shallow, intermediate and deep groundwater show slightly different flow patterns, but the general flow direction is toward Onondaga Lake.

4.0 VALUE OF FISH AND WILDLIFE RESOURCES

The value of the covertypes to wildlife and society was evaluated based on habitat requirements of identified wildlife species and potential resource utilization by humans. In accordance with the FWIA Step I guidance, habitat requirements such as feeding preferences, home range, and cover for species identified in the study area were considered. Field observations used to evaluate habitat quality included: 1) the diversity of observed wildlife, 2) the availability of suitable habitat in the study area, 3) the size of the habitat, and 4) adjacent land-use patterns.

4.1 VALUE OF HABITAT TO ASSOCIATED FAUNA

O'Brien and Gere (1999) evaluated the value of habitat associated with the Willis Avenue Chlorobenzene Plant Site and associated areas, including the East Flume, Tributary 5A, and Onondaga Lake. A detailed discussion of the habitat value of those areas can be found in the SLERA for that site, and is summarized here. The Willis Avenue Plant Site and other industrial exterior areas held generally low habitat quality due to hard packed parking lots, driveways and buildings. Habitat is also limited in the terrestrial cultural covertypes. Tributary 5A may provide habitat for fish, although movement between Onondaga Lake and Tributary 5A is difficult, if not physically impossible, due to the 400 foot culvert from State Fair Boulevard to Onondaga Lake. Water quality parameters are suitable to support fish survival, but restricted access precludes a diverse community. Only one pumpkinseed (pan fish) was captured in an electroshocking and minnow trapping effort conducted by PTI (1993). The upper East flume has limited value to support the fish community as it was built as an effluent cooling pond, and has low dissolved oxygen. The dam between the upper and lower East Flume restricts fish movement. The lower East Flume has value as a nursery area for young fish, particularly sunfish and black bass. The Onondaga Lake community provides valuable habitat for wildlife species and fish species, including fur-bearing wildlife such as muskrat and beaver, waterfowl, and numerous fish species, although water quality is unsuitable in the hypolimnion in the summer and throughout the majority of the lake during fall turnover for fish. As a result, many fish species leave the lake during this period (O'Brien and Gere, 1999).

The most valuable terrestrial habitat in the study area was found on the Ballfield Site and other areas predominated by the successional northern hardwoods and successional old field covertypes, due to the abundance of vegetation. These covertypes are considered valued habitats for a variety of wildlife species, but their proximity to urbanized areas likely limit their utilization. Canopy and ground feeding bird and small mammal species find suitable food and cover, and there are indicators of use of this covertype by larger mammals such as muskrat, fox, and deer that were observed during site visits.

4.2 VALUE OF RESOURCES TO HUMANS

The Ballfield Site and other "green" areas within the study area have some value to humans as open areas, however the Ballfield Site is no longer used for recreation. At the time of the site visit there was a presumably homeless person living in a makeshift shack on the Site (see photolog, Appendix A).

Onondaga Lake is a unique feature in an urban area. Most of the land surrounding the Lake is owned by Onondaga County, while a small portion is privately owned by Honeywell (formerly AlliedSignal). There is a fish advisory in effect, which as of June 1999 allows people older than 14 years to eat 1 fish from the Lake per month, except for walleye which should not be eaten. Children and pregnant women are advised not to consume any fish from the lake. Onondaga Lake Park is located on the north shore of the Lake, and provides paved and unpaved paths for bikers and pedestrians. The Lake is in the New York State barge canal system; boaters can access Cross Lake, Oneida Lake, Lake Ontario, and the St. Lawrence River through the canal system.

The other surface water features in the study area have little or no value to humans except as support to the Onondaga Lake fishery provided by Tributary 5A and the lower East Flume. There is limited wildlife and also limited access due to natural physical barriers or locked gates (O'Brien and Gere, 1999).

5.0 APPLICABLE FISH AND WILDLIFE SCREENING CRITERIA

Sources of criteria and guidance values potentially applicable to the evaluation of potential impacts to fish and wildlife resources as a result of exposure to chemicals in environmental media are listed below. It should be noted that NYSDEC has no established ecologically-based soil criteria. The ecological criteria listed below our standard benchmarks used for performing SLERAs.

5.1 SOIL

- Efroymson, *et al.* 1997a. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Oak Ridge National Laboratory (ORNL).
- Efroymson, *et al.* 1997a. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. Oak Ridge National Laboratory (ORNL).
- USEPA Region 5 RCRA Ecological Screening Levels (July 17, 2003).

5.2 SURFACE WATER AND SEDIMENT

Note there is no surface water or sediment on the site. Sampling has been done in offsite areas at the Wastebed B/Harbor Brook Site, and groundwater-to-surface water pathways are being investigated separately.

6.0 SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

This section presents the screening –level ecological risk assessment (SLERA) for the Site. An outline of the ERA regulatory guidance and proposed initial steps that compose a SLERA is included.

6.1 ERA REGULATORY PROCESS

The ERA process, as it pertains to the Ballfield Site, is outlined in the following regulatory guidance documents:

- USEPA's *Ecological Risk Assessment Guidance for Superfund* (USEPA, 1997b; ERAGS).
- NYSDEC's *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (FWIA)(NYSDEC, 1994a).
- NYSDEC's *Generic Ecological Risk Assessment Guidance For Onondaga Lake Sites* (NYSDEC, 1998; Lake Sites Guidance).
- USEPA's *Guidelines for Ecological Risk Assessment* (USEPA, 1998).

Each of the above documents offers a step-wise approach for the completion of an ERA. The ERA steps detailed in each of the guidance documents discussed above are summarized below. Greater detail concerning the initial stages of the ERA process is presented, as these steps are applicable to this SLERA.

6.1.1 ERAGS

The ERAGS document provides guidance on the process of designing and conducting technically defensible ecological risk assessments for the Superfund Program (USEPA 1997a). The ERAGS document outlines an eight-step ERA process, as presented in Figure 6-1. The first two steps of the process are the primary SLERA steps, which are covered in this report. Step 1 of the ERAGS guidance (Screening-Level Problem Formulation and Ecological Effects Evaluation) incorporates efforts related to site characterization and ecological receptor evaluation into screening-level problem formulation. Step 1 of ERAGS also includes a screening-level effects evaluation based on conservative exposure concentrations and toxicity data for potential receptors. Step 2 of ERAGS (Screening-Level Exposure Estimate and Risk Calculation) identifies if exposures represent negligible risk to ecological receptors and can, therefore, be "screened-out" and not further evaluated in the ERA. Step 3 of ERAGS (Baseline Risk Assessment Problem Formulation) includes the refinement of the preliminary constituents of potential ecological concern, further characterization of the potential ecological effects of constituents, review and refinement of the information about constituent fate and transport, evaluation of complete exposure pathways and ecosystems potentially at risk, refinement of assessment endpoints and development of a conceptual model with working hypotheses or questions to be addressed by further investigation.

As presented on Figure 6-1, Steps 1 through 2 of the ERAGS are associated with the SLERA, while Steps 3 through 7 consist of the tasks related to the preparation of a baseline ERA (BERA) Work Plan and BERA Report. The products of Step 4 (*Study Design and Data Quality Objectives*) and Step 5 (*Field Verification of Sampling Design*) are the BERA Work Plan (WP) and Sampling and Analysis Plan (SAP). The product of Steps 6 and 7 (*Site Investigation and Analysis* and *Risk Characterization,* respectively) is the BERA Report. During Step 8 of the ERAGS (*Risk Management*), the ERA team evaluates whether or not to clean up the Site and to what level, if necessary. Steps 3 through 7 are outside the scope of this report, and the need for a BERA report will be discussed below in the Conclusions and Recommendations section.

6.1.2 FWIA

NYSDEC (1994) describes a five-step process for evaluating ecological impacts at hazardous waste sites in New York State. The objective of Step I of the NYSDEC FWIA (*Site Description*) is to describe the Site and study area in terms of topography, covertypes, drainage, fish and wildlife resources and value and to identify applicable fish and wildlife screening criteria. Step II (*Contaminant-Specific Impact Assessment*) is performed to evaluate the impacts of Site-related constituents on the identified fish and wildlife resources. Step I of the process was completed and comprises the first five sections of this document. Step II is completed in part during the SLERA (i.e., through Step IIb), while the remaining Step II parts are completed during the BERA, if a BERA is required, and is not a part of this TM.

6.1.3 Lake Sites Guidance

The NYSDEC and the USEPA recommend that the overall ERA process for Onondaga Lake Subsites be a combination of the FWIA guidance and the ERAGS guidance. This combination approach, referred to in the NYSDEC Lake Sites Guidance as the "Integrated ERA," is acceptable to both agencies and provides for a more focused assessment process.

The stages described in the Lake Sites Guidance are tied to the RI/FS process and report deliverables, as summarized below:

- *Pre-RI Work Plan.* The two components of the ERA performed at this stage include a Screening Assessment and Problem Formulation. The Screening Assessment includes FWIA Step I through IIb and ERAGS Steps 1 and 2. For the Problem Formulation, ERAGS Step 3 is conducted. Tasks performed for these steps are described in the respective subsections above. These are the steps that are completed as part of this Report.

- *RI Work Plan.* Steps 4 and 5 of the ERAGS process (BERA WP and SAP) are performed for this stage, or as a separate work plan since the RI Work Plan is already complete.

- *RI Report.* Perform Steps 6 and 7 of the ERAGS process.

- *FS Report.* Perform Step 8 of the ERAGS process and FWIA Step III – Evaluation of Alternatives.

- *Design.* Perform FWIA Step IV – Design and Construction.

- *Operation, Maintenance and Monitoring.* Perform FWIA Step V – Monitoring Program.

6.1.4 USEPA's Guidelines Document

Unlike ERAGS, USEPA's Guidelines Document is not a program-specific guidance, but was developed to describe general ERA principles and provide flexibility to USEPA's regions and programs for development of specific ERA guidelines suited to their needs. The Guidelines Document presents a four-part framework for ERA that is consistent with the approaches of the guidance documents previously described. The "Phases" detailed in the Guidelines Document are summarized below:

- *Problem Formulation*: Tasks performed for this initial ERA Phase include the integration of Site information such as assessment endpoints, a conceptual model and an analysis plan. This Phase is analogous to ERAGS Steps 1, 2 and 3 and FWIA Step I.

- *Analysis*: This Phase addresses how to evaluate potential ecological exposures and characterize the effects of the exposures

- *Risk Characterization:* Includes ecological risk description and estimation and an uncertainty discussion. The combined *Analysis* and *Risk Characterization* Phases are analogous to ERAGS Steps 4 through 7 and FWIA Step II.

- *Risk Management*: Similar to ERAGS Step 8 and FWIA Steps III and IV, decisions relating to the Site's clean-up are made by the risk management team in this Phase.

As discussed, the principles contained in each of the regulatory guidance documents are similar, with the common overall objective of identifying and characterizing potential risks to local ecological receptors posed by Site-related stressors. Another objective stressed within each of the guidance documents is to assure that the preparation of the ERA report is an iterative process with continual inputs from the various members of the ERA team (*i.e.* representatives from Honeywell, NYSDEC and USEPA). These periodic discussions are referred to in the ERAGS guidance document as scientific/management decision points (SMDPs). SMDPs occur following critical steps of the process to evaluate the scope of further ERA tasks. Typically, the SMDP consists of a meeting between members of the ERA team to evaluate and approve the assessment's findings up to that point. SMDPs are recommended following nearly each step of the ERAGS process. The first SMDP comes after this SLERA is completed and submitted for review by NYSDEC.

6.2 SITE-SPECIFIC ERA APPROACH

The ERA outline described herein provides a focused, Site-specific approach that incorporates the principles of the state and federal guidance documents listed above. This section details the tasks to be performed as part of the preparation of the Ballfield ERA report deliverables, including the review of available data, collection of additional data, if necessary, and report preparation.

6.2.1 Data Review

A significant amount of abiotic media data and Site characterization information have been collected to date from the Ballfield Site, primarily as part of PSA activities. Section 3.1 of this RI Work Plan provides a summary of previous study data, which along with data generated during the RI, will be utilized in the ERA process. Additionally, reviews have been conducted of information obtained from remedial investigative reports prepared for other Superfund sites associated with Onondaga Lake (*e.g.* Willis Avenue Chlorobenzene Site).

Although review of Site-related data and information is on-going, the information reviewed to date provides significant insight as to the direction of future ERA steps. Based on a preliminary review of the data described above, it is reasonable to conclude the following concerning the Ballfield Site:

- Chemical constituents have been detected in Site surface soils.
- Current Ballfield Site conditions are similar to those of other Onondaga Lake Subsites. Such similar characteristics include, but are not limited to, chemically impacted abiotic media (surface and subsurface soils), close proximity to Onondaga Lake, and potential exposures to terrestrial receptors.
- Potentially impacted ecosystems at the Site include those associated with the surface soils of the upland areas of the Site. Within the system, terrestrial flora and fauna are potentially at risk from exposures to constituents in these media, and prey organisms exposed to these media.
- Aquatic habitats are not present on-site.

After performance of the initial steps of the ERA, modifications may be made to these conclusions, as appropriate.

6.2.3 Food Chain Modeling

For the purposes of the SLERA, the toxic effects posed to ecological receptors at the site will be evaluated through the performance of a screening-level risk calculation using food chain modeling. Food chain models are a commonly used tool for assessing the transfer of detected constituents from the source to receptors in different trophic levels. In food chain modeling, the chemical body burden in selected receptors at various trophic levels is estimated based on site-specific data, receptor specific information (such as feeding habits, habitat utilization, life history information), and measured or modeled estimates of constituents in media to which the receptors are exposed (soil/sediment, water, food base). The Total Daily Intake (TDI) or body burden of chemicals to identified receptors via feeding and direct contact is then calculated and compared to No Observed Adverse Effects Levels (NOAEL) to derive a Hazard Quotient (HQ). The HQ is a unitless ratio of a receptor's TDI (mg/kg/day) to the NOAEL (mg/kg/day). HQ results less than 1 indicate adverse effects are not likely to the trophic level represented by the selected receptors. HQ results equal to or greater than 1 do not necessarily indicate ecological impact, but indicate that the exposure pathway may require further evaluation

If the SLERA indicates that there is the potential for adverse ecological effects at the site, additional activities associated with the performance of the ecological risk assessment, such as refinement of the food chain model to be reflective of actual site conditions or the collection of additional site media data, may be required. Additional ERA steps beyond the SLERA would occur after the first SDMP. Therefore, if it is determined that additional ERA steps are warranted, consultation between the involved parties will occur following submittal of the SLERA.

6.3 SCREENING LEVEL PROBLEM FORMULATION

Problem Formulation is the first phase of the SLERA and involves site characterization with emphasis on ecological receptors; evaluation of contaminant sources, transport, fate and pathways of receptor exposure; characterization of contaminants of potential ecological concern. Assessment and measurement endpoints are also selected. The site characterization and discussions of flora and fauna potentially present are contained in the first three sections of this document, as part of the FWIA Step I.

6.3.1 Site Conceptual Model

The site conceptual model (SCM) is a summary of those exposure pathways that are potentially complete, meaning those exposure pathways that cause ecological receptors to become exposed to a contaminated medium or multiple contaminated media. Once the complete exposure pathways are determined, a selection of appropriate assessment endpoints and measurement endpoints is made.

The SCM for the Ballfield Site is depicted in Figure 6-2. Ecological exposure pathways are evaluated in Table 6-1. Soil is the media of concern for exposure to terrestrial biota, including plants and terrestrial wildlife such as mammals, birds and soil invertebrates. Plants take up contaminants through their root systems. Mammals and birds may ingest soil incidentally while feeding, and may ingest contaminants in the tissues of their prey. Soil invertebrates such as earthworms ingest soils directly, and have direct dermal contact with soils. Burrowing animals may inhale volatile contaminants in their burrows or tunnels.

There are no known seeps or springs on the site, so wildlife does not have access to groundwater, which exists well below the surface soils. Groundwater flows in the general direction of Onondaga Lake. The potential for migration of contaminants from Site groundwater to surface waters of the Lake is being evaluated by Honeywell as a separate study, and therefore will not be evaluated further in this document.

6.3.2 Selection of Receptors

Potential ecological receptors are those plants and animals discussed in sections 1 through 3 that were observed or could potentially exist in the successional old field or successional northern hardwoods covertypes. Fauna of these areas is listed in Tables 3-1, 3-3 and 3-4. "Plants" in general are selected as a receptor, because there is no one representative species targeted in the literature for which toxicological data has been generated. Soil invertebrates are not specifically listed, however they are sensitive receptors due to ingestion of and direct contact with Site surface soils.

Small mammals are good representative mammalian receptors, because they may burrow, have small home ranges wholly contained within the Site, and are sensitive to Site contaminants. The masked shrew (Sorex cinerus) is expected to inhabit Site covertypes. This species was chosen to represent small mammals at the Site, because it is likely present at the Site, and it was one of the receptors used in calculating the available mammalian screening benchmarks. Shrews have been evaluated widely as receptors because they feed on soil-dwelling invertebrates such as earthworms, which have been shown to bioaccumulate heavy metals and organic chemicals. The masked shrew is similar to the short-tailed shrew (Blarina brevicauda), which has been used in other Onondaga Lake area risk assessments. The short-tailed shrew is larger (weighing 14-29 grams) but has a similar diet and habitat. It is assumed for purposes of this SLERA that the shrew is also conservatively representative of the exposure that might be expected to be received by birds. Additionally, there are fewer toxicological data available for avian species. For some COPECs, the herbivorous meadow vole (Microtus pennsylvanicus) was evaluated as the receptor.

6.3.3 Assessment and Measurement Endpoints

Assessment endpoints are "explicit expressions of environmental values to be protected" at the site (US EPA, 1998). The purpose of identifying assessment endpoints is to focus the

ERA and define the scope of the assessment. An example of an assessment endpoint for the Ballfield Site would be health of soil invertebrates. Assessment endpoints cannot usually be measured directly, so measurement endpoints are selected which are indirect measures of whether the assessment endpoint is being achieved. For a given assessment endpoint, a number of lines of evidence (both qualitative and quantitative), may be used to determine if an assessment endpoint is being achieved. The selection of assessment endpoints and measurement endpoints is dependent upon the nature of the contamination and ecology of a specific site, and the risk managers and stakeholders desired end use for the site. For this SLERA, lines of evidence will be limited to information derived from the literature rather than direct measurement of effects on biota in the field.

Assessment endpoints for this SLERA are:

- Plant health, growth and yield,
- Soil invertebrate health, growth and reproduction, and
- Mammal and bird health.

Measurement endpoints for all of the receptors are comparisons of literature-derived benchmarks (based on toxicity information and calculations of exposure) to media concentrations.

6.3.4 Selection of Constituents of Potential Concern (COPEC)

Chemical analyses of surface soils was conducted for inorganic analytes (metals and cyanide), volatile organic compounds, semi-volatile organic compounds, pesticides and polychlorinated biphenyls (PCBs), and dioxins and furans. The minimum and maximum concentrations of detected constituents and the analytical limits for constituents not detected are shown in Tables 6-2, 6-3, 6-4, 6-5, and 6-6, respectively.

The approach recommended in the *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)* (U.S. EPA, 1989), with modification, is valid for the selection of COPECs, and is consistent with the ERAGS (1997) guidance. Validated analytical data, including elimination of unusable data, from both the Preliminary Site Assessment (PSA) conducted by O'Brien and Gere in the winter and spring of 2001 and the Remedial Investigation (RI) conducted by MWH in 2003 were utilized as a combined dataset. Constituents were evaluated based on the following criteria:

- Non-detected chemicals with applicable soil benchmarks (discussed below in Section 6.4) **not exceeding** analytical limits can be eliminated from further concern.
- Non-detected chemicals with applicable soil benchmarks **exceeding** analytical limits are selected as COPECs.

- Non-detected chemicals with no applicable soil benchmarks are eliminated from further concern. Benchmarks are often not developed for chemicals not usually considered toxic except at extremely high concentrations. The uncertainty associated with this approach is discussed later within this section.

- Chemicals that were detected infrequently (i.e., in less than 5 percent of the samples) and at low levels are eliminated from further concern. Some of these were VOCs or SVOCs that are often considered laboratory contaminants. None of the chemicals that were detected infrequently were detected in the most recent (RI) round of data collection.

- Detected inorganic chemicals present at levels below the applicable soil benchmarks or background, or that are considered essential nutrients (including calcium, magnesium, potassium, and sodium) are removed from the data set. Background values from TAGM 4046, Determination of Soil Cleanup Objectives and Cleanup Levels (January 24, 1994) or Shacklette and Boerngen (1984) were utilized.

- Detected organic chemicals present at levels below the applicable soil benchmarks, are not considered COPECs.

- All chemicals more than once, present at concentrations exceeding the benchmark and background, that were not eliminated on another basis as discussed above, were selected as COPECs.

On these bases, 16 metals, 28 SVOCs, 3 pesticides, 3 PCBs, and 9 dioxins/furans were selected as COPECs. No VOCs were selected as COPECs. There were no earthworm benchmarks for any VOCs, and plant benchmarks for only styrene and toluene, however there were small mammal benchmarks for all but four compounds. All of the metals selected as COPECs were detected in several or all samples. Of the 28 SVOCs selected as COPECs, 4 compounds were not detected in any samples. Three SVOCs and one VOC were eliminated because they were detected only in one sample out of 39. The three pesticides 4,4'-DDT, dieldrin, and gamma-chlordane were selected as COPECs, and PCB Aroclors 1254, 1260, and 1268 were selected individually. The total PCB concentration also exceeded the total PCB benchmarks available for plants and the shrew. Five dioxin and 5 furan compounds were selected as COPECs, and 3 dioxins and 5 furans were eliminated due to concentrations not exceeding the benchmark. All of the dioxin/furan compounds for which analyses were conducted were detected in most samples.

6.4 EFFECTS ASSESSMENT

The potential for effects of the COPECs on the selected receptors was evaluated through the comparisons of soil ecological benchmarks to the concentration in surface soils. The screening benchmark values are discussed as follows. Note that the lowest value across the benchmarks was used for the selection of COPECs. Values were not available for all compounds, for all receptors (see discussion in Section 6.7, Uncertainties).

6.4.1 Plants

Screening values for plants were based on the ORNL document *Toxicological Benchmarks for Screening Contaminants of Potential Concern on Terrestrial Plants: 1997 Revision* (Efroymson et al., 1997a). They are based on a 20% reduction in growth or yield as the threshold for significant effects.

6.4.2 Soil Invertebrates

Screening values for plants were based on the ORNL document *Toxicological Benchmarks for Screening Contaminants of Potential Concern on Soil Invertebrates and Heterotrophic Processes1997 Revision* (Efroymson et al., 1997b). These benchmarks are based on a 20% reduction in growth, reproduction, or activity of invertebrates.

6.4.3 Small Mammals

Screening values for small mammals were for the shrew, from *Ecological Screening Levels (ESLs) for RCRA Appendix IX Hazardous Constituents* (USEPA Region 5, 1999). Calculations were made for the masked shrew or the meadow vole, using no observed adverse effect levels (NOAEL) based on chronic target species as toxicity reference values (TRV). The adjusted TRV is the most relevant and available toxicological result adjusted with UFs as appropriate to be equivalent to a chronic NOAEL for the selected receptor. EPA Region 5 adjusted the TRVs using three uncertainty factors (UF):

UF1 – scaling factor (test species → target species)
UF2 – endpoint (test endpoint → NOAEL)
UF3 – duration (test duration → chronic exposure)

EPA Region 5 calculated the adjusted TRV (TRVa) by the following equation:

$$\text{TRVa} = \frac{(\text{TRV x UF1})}{(\text{UF2 x UF3})}$$

The shrew ESLs incorporate the uptake of analytes from soil through prey items as well as incidental soil ingestion, while consuming prey. This is further discussed under the Exposure Assessment.

6.5 EXPOSURE ASSESSMENT

Exposure of site COPECs to the ecological receptors was assessed under the conservative assumption that all contaminants in soils were 100% bioavailable, and would be 100 % absorbed with no depuration once in the organism. Benchmarks for the plant and earthworm were generally based on toxicity tests where highly bioavailable forms of the contaminants were used, and are not adjusted for physical factors in the site soil that might reduce bioavailability.

Exposures to the vole and shrew were calculated for the ESLs with a simple, three-step ingestion and accumulation model (USEPA Region 5, 1999). Incidental ingestion of soil while feeding and grooming was accounted for in the model. The meadow vole was the receptor for three compounds: acetone, methylene chloride and N-nitrosodimethylamine. This was because it had the lowest of the values calculated for those compounds among the four receptors used in developing the soil ESLs (plants, soil invertebrates, meadow vole, and masked shrew) (USEPA Region 5, 1999). The vole is a herbivore estimated to ingest approximately 10 grams of grasses and sedges per day, with soil intake at a rate of about 2.4 percent of its dietary intake (0.3 g/day). The vole weighs approximately 37 grams and has a home range of about 0.02 to 0.21 acres. The bioconcentration factor (BCF) used was calculated from Travis and Arms (1988). EPA Region 5 calculated the ESL (equal to C_{soil}) using the following equations:

$$\text{Adjusted TRV (mg/kg/day)} = \frac{C_{soil}\,[IR_{soil} + (IR_{plant} \times BCF)]}{BW}$$

$$C_{soil} = \frac{BW \times TRVa}{[IR_{soil} + (IR_{plant} \times BCF)]}$$

Where

C_{soil} = Chemical and receptor-specific ESL in soil (mg/kg)
BW = Receptor-specific body weight (kg)
TRVa = Adjusted toxicity reference value (mg/kg/day)
IR_{soil} = Receptor-specific soil ingestion rate (kg/day)
IR_{plant} = Receptor-specific plant ingestion rate (kg/day)
BCF = Soil-to-plant bioconcentration factor (kg soil/kg plant).

The carnivorous masked shrew has a body weight of approximately 4 grams and a home range size of about 400 square meters. The shrew eats about three times its body weight (12 grams) per day. Earthworms make up a significant portion of its diet. The shrew is conservatively assumed to consume soil at a rate of 6 percent of its dietary intake (0.7 g/day). The BCF was estimated using an equation from Bysshe (1982):

$$\log BCF = 0.819 \log K_{ow} - 1.146$$

EPA Region 5 calculated the ESL (equal to C_{soil}) using the following equations:

$$\text{Adjusted TRV (mg/kg/day)} = \frac{C_{soil}\,[IR_{soil} + (IR_{prey} \times BCF)]}{BW}$$

$$C_{soil} = \frac{BW \times TRVa}{[IR_{soil} + (IR_{prey} \times BCF)]}$$

Where

IR_{prey} = Receptor-specific prey ingestion rate (kg/day).

The polychlorinated dibenzo-p-dioxin and polychlorinated dibenzo-p-furan compounds were evaluated using toxicity equivalency factors (TEFs) to normalize all compounds to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) according to the method of Van den Berg, et al., (1998) using the TEF developed by World Health Organization (WHO). Refer to Table 6-6 for the congener-specific TEFs. TCDD is the most toxic compound, while most of the other compounds are less toxic. The benchmark is therefore multiplied by the fractional TEF to result in a reduced benchmark for the other compound. The TCDD benchmark used was the ORNL preliminary remediation goal (PRG) for the shrew (Efroymson, et al., 1997c).

6.6 RISK CHARACTERIZATION

HQs are a means of relating the estimated level of exposure to the stressor-response relationship, for each COPEC and receptor. In the screening process, HQ values were determined as the ratio of the maximum concentration of a constituent in a media to its corresponding screening value. HQs were calculated only for those constituents selected as COPECs (i.e., those that exceeded applicable benchmarks).

The equation used to calculate HQs is as follows:

$$HQ = Max\ C_{soil}/Benchmark$$

Where:

HQ = Hazard Quotient (unitless)

Max C_{soil} = Maximum detected concentration or analytical limit in surface soil (units vary depending on constituent)

Benchmark = Lowest of available benchmarks (mg/kg).

According to USEPA (1997), the lower bound, or threshold, below which risk is assumed to be insignificant is based on conservative assumptions and NOAEL-based toxicity values. A NOAEL corresponds to a dose that is *not associated with adverse effects*. Therefore, NOAEL-based HQs greater than 1 represent the lower end of the potential risk range. All of the HQs presented here are above one since HQs were only calculated for the selected COPECs (those constituents for which the maximum detected concentration or analytical limit exceeded the benchmark).

A useful approach for assessing the relative impacts indicated by HQs comes from Menzie et al. (1992). This approach considers a "range of effects," which is ranked on a logarithmic scale, such that

- if $HQ < 1$, then no adverse effects on the receptor are anticipated;
- if $1 \leq HQ < 10$, then limited potential for adverse effects on the receptor are anticipated;
- if $10 \leq HQ < 100$, then there is a potential for adverse effects on the receptor; and

if $HQ \geq 100$, then there is significant potential for adverse effects on the receptor.

For inorganics, the highest HQ was for lead at 11540. Barium had an HQ of 2950, and the mercury HQ was 919. Cadmium, chromium and cobalt also had HQs above 100 at 600, 310, and 121, respectively. Antimony, copper, selenium, vanadium and zinc had HQs greater than 10 but less than 100. There is a potential for adverse effects from these COPECs. Arsenic, cyanide, manganese, and nickel all had HQs less than 10 (Table 6-7).

N-nitrosodimethylamine has the highest HQ of the SVOCs at 10280. Three compounds, 2,4-dimethylphenol, 2,6-dinitrotoluene, and 2-chloronaphthalene has HQs greater than 1000 at 7200, 2195, and 5902, respectively. Naphthalene has an HQ of 644, butyl benzyl phthalate 301, 2-chlorophenol 296, and benzo(a)pyrene 230. Benzo(a)anthracene, chrysene, and indeno(1,2,3-cd)pyrene has HQs greater than 10 but less than 100. There is a potential for adverse effects from these compounds. Fifteen compounds had HQs less than 10, and three compounds have no HQs because there is no benchmark for those compounds (Table 6-8).

The three PCB Aroclor COPECs have HQs of 3012 for Aroclor 1254, 2500 for Aroclor 1260, and 3012 for Aroclor 1268. The pesticides 4,4'-DDT and dieldrin had HQs of 114 and 336, respectively, while gamma-chlordane has an HQ of 3.1 (Table 6-9).

The HQ for 2,3,7,8-TCDD is 265, and the HQ for pentachlorodibenzo-p-dioxin (PeCDF) is 63.4. The other compounds have HQs less than 10 (Table 6-10).

6.7 UNCERTAINTIES

There are uncertainties inherent in any risk assessment, many originating from sampling and analytical techniques. Although it was assumed that contaminants in soil were 100% bioavailable, it is potentially true of weathered contaminants in soil that a contaminant may be completely unavailable for uptake.

In most cases, benchmarks were compared to the method detection limit (MDL), because it is analytically possible to detect the compound at that concentration. However, this level is less certain than the reporting or practical quantitation limit (PQL). Therefore, it is possible that a compound could be present in a sample at a concentration above the MDL but below the PQL without being "seen" by the instrument under the specified method. There is some uncertainty in using the MDL, however it is not analytically feasible for many organic compounds for laboratories to provide PQLs that are below the toxicological benchmarks.

There were no benchmarks available for plants and only two benchmarks for earthworms for VOCs. There were plant benchmarks for only 10, and earthworm benchmarks for only 12 of the 66 SVOCs. There were no benchmarks for either receptor for pesticides, and only a benchmark for total PCBs for plants. Many of the metals were also missing benchmarks for either or both receptors. However, there were ESLs for most chemicals. The ESLs were calculated by EPA Region 5 for plants, invertebrates, the meadow vole, and the masked shrew where literature toxicity data were available. The lowest value was selected as the ESL, which was usually the shrew value. Therefore, for most chemicals, all receptors were considered, although there are uncertainties wherever toxicity data were not available for the development of a benchmark.

Some VOCs were analyzed in the PSA for which there were no analyses in the RI. Most were not detected, and those detected were present at very low (part per billion) levels. These were eliminated from further evaluation without comparison to benchmarks, however most benchmarks for VOCs were at high part per million levels, and these compound likely require high concentrations for toxicity to occur. There is uncertainty since these compounds were not fully evaluated.

No exposure calculations were made nor were benchmarks available for avian wildlife. It was assumed that for most contaminants the shrew was a sensitive enough receptor, with a home range size that could be contained wholly within the Site, that it could conservatively represent avian receptors. However, there is some uncertainty that there may be contaminants for which birds would be more sensitive.

6.8 CONCLUSIONS AND RECOMMENDATIONS

This TM (i.e., FWIA and SLERA) reports on the covertypes and habitat value found on the site and within the study area. There is some wildlife habitat value on the Site, which is comprised of successional old field and successional northern hardwoods covertypes. Contaminants have been detected in the surface soils at the Site. The maximum concentrations of these contaminants were compared to screening ecotoxicological benchmark values, and those contaminants present at concentrations exceeding the benchmarks were selected as COPECs.

Hazard Quotients (HQ) were calculated and several COPECs have HQs greater than 1000. These were lead and barium for metals, N-nitrosodimethylamine, 2,4-dimethylphenol, 2,6-dinitrotoluene, and 2-chloronaphthalene for SVOCs, and the PCB Aroclors 1254, 1260 and 1268 (and total PCBs). Cadmium, chromium, cobalt, naphthalene, butyl benzyl phthalate, 2-chlorophenol, benzo(a)pyrene, 2,3,7,8-TCDD, 4,4'-DDT, and dieldrin had HQs greater than 100 but less than 1000. All these compounds have a significant potential for adverse effects on receptors at the Ballfield Site. Nine COPECs with HQs greater than 10 but less than 100 also have a potential to cause adverse effects. Twenty-seven COPECs had HQs less than 10 but greater than one.

In light of these results, it is recommended that these COPECs be further evaluated by conducting a Baseline Ecological Risk Assessment (BERA). The elements to be included in the BERA can be decided by the stakeholders at this Scientific-Management Decision Point, upon which a BERA Work Plan will be developed.

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SAM/vlr/MWK/AN/GM
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TABLE 3-1

Species Identified by O'Brien and Gere During Site Visits

Common Name	Scientific Name	Covertype
Fish		
carp	*Cyprinus carpio*	East Flume
banded killifish	*Fundulus diaphanus*	Tributary 5A
sunfish	*Lepomis sp.*	Onondaga Lake
Birds		
northern flicker	*Colaptes auratus*	Tributary 5A
blackbacked gull	*Larus spp.*	Onondaga Lake
ring billed gull	*Larus delawarensis*	Onondaga Lake
herring gull	*Larus argentatus*	Onondaga Lake
double-crested cormorant	*Phalacrocorax auritus*	Onondaga Lake
common merganser	*Mergus merganser*	Onondaga Lake
mallard	*Anas platyrhynchos*	Onondaga Lake
house sparrow	*Passer domesticus*	Tributary 5A
American kestrel	*Falco sparverius*	Tributary 5A
great blue heron	*Ardea herodias*	East Flume
mourning dove	*Zenaida macroura*	Succ. Northern Hardwoods/Urban Vacant Lot
red-winged blackbird	*Agelaius phoeniceus*	Succ. Northern Hardwoods
eastern phoebe	*Sayornis phoebe*	Succ. Northern Hardwoods
flycatcher	*Empidonax spp.*	Succ. Northern Hardwoods
house finch	*Carpodacus mexicanus*	Succ. Northern Hardwoods
American goldfinch	*Caruelis tristis*	Succ. Northern Hardwoods
song sparrow	*Melospiza melodia*	Succ. Northern Hardwoods
rock dove	*Columba livia*	Succ. Northern Hardwoods
gray catbird	*Dumetella carolinensis*	Succ. Old Field
American crow	*Corvus brachyrhynchos*	Succ. Old Field
cedar waxwing	*Bombycilla cedrorum*	Succ. Old Field
European starling	*Sturnus vulgaris*	Urban Vacant Lot
red-tailed hawk	*Buteo jamicensis*	Succ. Shrubland
northern mocking bird	*Mimus polyglottus*	Succ. Shrubland
ruffed grouse	*Bonasa umbellus*	Succ. Shrubland

TABLE 3-1
(Continued)

Common Name	Scientific Name	Covertype
Mammals		
gray fox	*Urocyon cinereoargneteus*	Succ. Northern Hardwoods
muskrat (den)	*Ondatra zibethicus*	Succ. Northern Hardwoods
house mouse	*Mus musculus*	Succ. Northern Hardwoods
white tailed deer (tracks)	*Odocoileus virginianus*	Succ. Northern Hardwoods/Old Field
river otter*	*Lutra canadensis*	Nine Mile Creek

Source: O'Brien & Gere Engineers, Inc. 1991, 1993, 1997, 1998 (See O'Brien and Gere, 1999).

*reportedly trapped by private trapper and reported to NYSDEC.

TABLE 3-2

Fish Species Identified from Onondaga Lake 1989-1991

Common Name	Scientific Name
sea lamprey	*Petromyzon marinus*
longnose gar	*Lepisosteus osseus*
bowfin	*Amia calva*
American eel	*Anguilla rostrata*
alewife	*Alose pseudoharengus*
gizzard shad	*Dorosoma cepedianum*
channel catfish	*Ictalurus punctatus*
brown bullhead	*Ameiurus nebulosus*
yellow bullhead	*Ameiurus natalis*
white sucker	*Catastomus commersoni*
shorthead redhorse	*Moxostoma macrolepidotum*
carp	*Cyprinus carpio*
creek chub	*Semotilus atromaculatus*
spottail shiner	*Notropis hudsonius*
spotfin shiner	*Cyprinella spiloptera*
golden shiner	*Notemigonus crysoleucas*
emerald shiner	*Notropis atherinoides*
fathead minnow	*Pimephales promelas*
rudd	*Scardinius erthrophthalmus*
brown trout	*Salmo trutta*
rainbow trout	*Oncorhynchus mykiss*
tiger trout	*Saimo trutta x Salvelinus fontinalis*
rainbow smelt	*Osmerus mordax*
central mudminnow	*Umbra limi*
chain pickerel	*Esox niger*
northern pike	*Esox lucius*
tiger muskellunge	*Esoc lucius x Esox masquinongy*
burbot	*Lota lota*
branded killifish	*Fundulus diaphanus*
brook silverside	*Labidesthes sicculus*
brook stickleback	*Culaea inconstans*

TABLE 3-2
(Continued)

Common Name	Scientific Name
white perch	*Morone americana*
white bass	*Marone chrysops*
smallmouth bass	*Micropterus dolomieu*
largemouth bass	*Micropterus salmoides*
white crappie	*Pomoxis annularis*
black crappie	*Pomoxis nigromaculatus*
rock bass	*Ambloplites rupestris*
bluegill	*Lepomis macrochirus*
green sunfish	*Lepomis cyanellus*
pumpkinseed	*Lepomis gibbosus*
tesselated darter	*Etheostoma olmstedi*
logperch	*Percina caprodes*
yellow perch	*Perca flavesens*
walleye	*Stizostedion vitreum*
freshwater drum	*Aplodinotus grunniens*
Source: O'Brien and Gere, 1999 (From Auer et al. 1996.)	

TABLE 3-3

Wildlife Associated with Successional Old Fields and Shrublands

Common Name	Scientific Name
Reptiles/Amphibians	
gray tree frog	*Hyla versicolor and Hyla chrysoscellis*
rat snake	*Elaphe obsoleta*
Birds	
ruffed grouse	*Bonesa umbellius*
bobwhite quail	*Colinus virginianus*
American woodcock	*Scolopax minor*
mourning dove	*Zenaida macroura*
yellow billed cuckoo	*Coccyzus americanus*
black-billed cuckoo	*Coccyzus erythropthalmus*
eastern kingbird	*Tyrannus tyrannus*
eastern phoebe	*Sayomis phoebe*
willow flycatcher	*Empidonax traillii*
alder flycatcher	*Empidonax alnorum*
northern mockingbird	*Mimus polyglottus*
gray catbird	*Dumetella carolinensis*
brown thrasher	*Toxostoma rufum*
eastern bluebird	*Sialia sialis*
cedar waxwing	*Bombycilla cedrorum*
American robin	*Turdus migratorius*
loggerhead shrike	*Lanius ludovicianus*
white eyed vireo	*Vitreo griseus*
golden-winged warbler	*Vermivora chrysoptera*
blue-winged warbler	*Vermivora pinus*
Tennessee warbler	*Vermivora peregrina*
Nashville warbler	*Vermivora ruficapilla*
yellow warbler	*Dendroica petechia*
Magnolia warbler	*Dendroica magnolia*
bay breasted warbler	*Dendroica castanea*
chestnut sided warbler	*Dendroica pensylvanica*
prairie warbler	*Dendroica discolor*

TABLE 3-3
(Continued)

Common Name	Scientific Name
mourning warbler	*Oporomis philadelphia*
common yellowthroat	*Geothlypis trichas*
yellow breasted chat	*Icteria virens*
northern cardinal	*Cardinalis cardinalis*
indigo bunting	*Passerina cyanea*
American goldfinch	*Carduelis tristis*
rufous sided towhee	*Pipilo erythrophthalmus*
northern junco	*Junco spp.*
chipping sparrow	*Spizella passerina*
field sparrow	*Spizella pusilla*
white-throated sparrow	*Zonotrichia albicollis*
swamp sparrow	*Melospiza georgiana*
song sparrow	*Melospiza melodia*
Mammals	
meadow vole	*Microtus pennsylvania*
eatern cottontail	*Sylvilagus floridanus*
New England cottontail	*Sylvilagus transitionalis*
Source: Chambers 1983 - as species associated with early stage forest growth, Reschke 1990. (From O'Brien and Gere, 1999)	

TABLE 3-4

Wildlife Associated with Successional Northern Hardwoods

Common Name	Scientific Name
Reptiles/Amphibians	
common snapping turtle	*Cheldra serpenina*
wood turtle	*Clemmys insculpta*
eastern box turtle	*Terrapene carolina bauri*
five lined skink	*Eumeces fasciatus*
coal skink	*Eumeces anthracinus*
northern water snake	*Natrix sipedon sipedon*
northern brown snake	*Storeria dekayi dekayi*
northern redbelly snake	*Storeria occiptomaculata*
eastern garter snake	*Thamnophis sirtalis sirtalis*
northern ringneck snake	*Diadophis punctatus edwardsi*
eastern worm snake	*Carphophis amoenus amoenus*
northern black racer	*Coluber constrictor constrictor*
eastern smooth green snake	*Opheodrys vemalis*
black rat snake	*Elaphe obsoleta obsoletea*
eastern milk snake	*Lampropeltis triangulum trangumlum*
Jefferson salamander	*Ambystoma jeffersonianum*
redback salamander	*Plethodon cinereus*
American toad	*Bufo americanus*
wood frog	*Rana sylvatica*
Birds	
great blue heron	*Ardea herodias*
green heron	*Butorides striatus*
little blue heron	*Egretta caerulea*
great egret	*Casmerodius albus*
snowy egret	*Egretta thula*
tricolored heron	*Egretta tricolor*
black crowned night heron	*Nycticorax nycticorax*
yellow crowned night heron	*Nyctanassa violacea*
mallard	*Anas platyrhynchos*
American black duck	*Anas rubripes*

TABLE 3-4
(Continued)

Common Name	Scientific Name
wood duck	*Aix Sponse*
common merganser	*Mergus merganser*
hooded merganser	*Lophodytes cucullatus*
northern goshawk	*Accipiter gentilis*
Cooper's hawk	*Accipiter cooperii*
red tailed hawk	*Buteo jamaicensis*
red shouldered hawk	*Buteo lineatus*
board winged hawk	*Buteo platypterus*
bald eagle	*Hiliaeetus leucocephalus*
osprey	*Pandion haliaetus*
peregrine falcon	*Falco peregrinus*
American Kestrel	*Falco sparverius*
ruffed grouse	*Bonasa umbellus*
common bobwhite	*Colinus virginianus*
American woodcock	*Scolopax minor*
mourning dove	*Zenaida macroura*
yellow billed cuckoo	*Coccyzus americanus*
black billed cuckoo	*Coccyzus erythropthalmus*
barn owl	*Tyto alba*
common screech owl	*Otus asio*
great horned owl	*Bubo virginianus*
long eared owl	*Asio otus*
saw-whet owl	*Aegolium acadicus*
whip-poor-will	*Caprimulgus vociferus*
common nighthawk	*Chordelles minor*
common flicker	*Colaptes auratus*
pileated woodpecker	*Dryocopus pileatus*
red bellied woodpecker	*Melanerpes carolinus*
red headed woodpecker	*Melanerpes erythrocephalus*
yellow bellied sapsucker	*Sphyrapicus varius*
hairy woodpecker	*Picoides villosus*

TABLE 3-4
(Continued)

Common Name	Scientific Name
downy woodpecker	*Picoides pubescens*
eastern kingbird	*Tyrannus tyrannus*
great crested flycatcher	*Myiarchus crinitus*
eastern phoebe	*Sayomis phoebe*
acadian flycatcher	*Empidonax virescens*
willow flycatcher	*Empidonax traillii*
alder flycatcher	*Empidonax alnorum*
least flycatcher	*Empidonax minimus*
eastern pewee	*Contopus virens*
tree swallow	*Tachycineta bicolor*
blue jay	*Cyanocitta cristata*
American crow	*Corvus brachyrhynchos*
black capped chickadee	*Parus atricapillus*
white breasted nuthatch	*Sitta carolinensis*
brown creeper	*Certhia americana*
house wren	*Troglodytes aedon*
winter wren	*Troglodytes troglodytes*
Carolina wren	*Thryothorus ludovicianus*
gray catbird	*Dumetella carolinensis*
brown thrasher	*Toxostoma rufum*
American robin	*Turdus mirgratorius*
wood thrush	*Hylocichla mustelina*
hermit thrush	*Catharus guttatus*
Swainson's thrush	*Catharus ustulatus*
veery	*Catharus fuscescens*
eastern bluebird	*Sailia sialis*
cedar waxwing	*Bombycilla cedrorum*
loggerhead shrike	*Lanius ludovicianus*
white eyed vireo	*Vireo flavifrons*
red-eyed vireo	*Viero olivaceus*
Philadelphia vireo	*Vireo philadelphicus*

TABLE 3-4
(Continued)

Common Name	Scientific Name
warbling vireo	*Vireo gilvus*
black and white warbler	*Mriotilta varia*
worm eating warbler	*Helmitheros vermivorus*
golden winged warbler	*Vermivora chrysoptera*
bluewinged warbler	*Vermivora pinus*
Tennessee warbler	*Vermivora peregrina*
Nashville warbler	*Vermivora ruficapilla*
yellow warbler	*Dendroica petechia*
chestnut sided warbler	*Dendroica pensylvanica*
prairie warbler	*Dendroica discolor*
ovenbird	*Seiurus aurocapillus*
mourning warbler	*Oporomis philadelphia*
common yellowthroat	*Geothlypis trichas*
yellow breasted chat	*Icteria virens*
Canada warbler	*Wilsonia canadensis*
American redstart	*Setophaga ruticilla*
common grackle	*Quiscalus quiscula*
brown headed cowbird	*Molothrus ater*
scarlet tanager	*Piranga olivacea*
northern cardinal	*Cardinalis cardinalis*
rose breasted grosbeak	*Pheucticus ludovicianus*
indigo bunting	*Passerina cyanea*
American goldfinch	*Carduelis tristis*
rufous sided towhee	*Pipilo erythrophthalmus*
chipping sparrow	*Spizella passerina*
field sparrow	*Spizella pusilla*
white throated sparrow	*Zonotrichia albicollis*
swamp sparrow	*Melospiza georgiana*
song sparrow	*Melospiza melodia*
Mammals	
masked shrew	*Sorex cinerus*

TABLE 3-4
(Continued)

Common Name	Scientific Name
smoky shrew	*Sorex fumeus*
northern water shrew	*Sorex palustris*
least shrew	*Cryptotis parva*
shorttail shrew	*Blarina brevicauda*
hairytail mole	*Parascalops breweri*
little brown myotis	*Myotis lucifugus*
keen myotis	*Myotis keeni*
small footed myotis	*Myotis subulatus*
silver haired bat	*Lasionycteris noctivagans*
eastern pipistrelle	*Pipistrellus subflauvus*
big brown bat	*Eptesicus fuscus*
red bat	*Lasiurus borealis*
hoary bat	*Lasiurus cinereus*
raccoon	*Procyon lotor*
shorttail weasel	*Mustela erminea*
longtail weasel	*Mustela frenata*
mink	*Mustela vison*
striped skunk	*Mephitis mephitis*
coyote	*Canis latrans*
red fox	*Vulpes fulva*
gray fox	*Urocyon cinereoargenteus*
woodchuck	*Marmota monax*
eastern chipmunk	*Tamias striatus*
red squirrel	*Terniasciurus hudsonicus*
southern flying squirrel	*Glaucomys volans*
northern flying squirrel	*Glaucomys sabrinus*
beaver	*Castor canadensis*
deer mouse	*Peromyscus maniculatus*
white footed mouse	*Peromyscus leucopus*
boreal red backed vole	*Clethrionomys gapperi*
meadow vole	*Microtus pennsylvanicus*

TABLE 3-4
(Continued)

Common Name	Scientific Name
pine vole	*Pitymys pinetorum*
meadow jumping mouse	*Zapus hudsonius*
woodland jumping mouse	*Napaeozapus insignis*
porcupine	*Erethizon dorsatum*
snowshoe hare	*Lepus americanus*
eastern cottontail	*Sylvilagus floridanus*
New England cottontail	*Sylvilagus transitionalis*
white-tailed deer	*Odocoileus virginianus*
Source: O'Brien and Gere, 1999 (From Chambers 1983).	

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TABLE 6-1

Evaluation of Ecological Exposure Pathways
Honeywell Ballfield Site
Geddes, New York

Exposure Media/ Exposure Route	Exposure Scenario/Release Mechanism	Potential Receptors	Potentially Complete Pathway	Rationale
AIR				
Inhalation of volatile organic compounds (VOCs) and/or particulates (fugitive dust)	Emissions from soil; wind or animal activities in site soils	Aquatic	No	Dust and organic vapors are unlikely to be a concern for potential receptors offsite at Onondaga Lake. The site is covered by vegetation, which would prevent significant fugitive emissions.
		Terrestrial	Yes	Contamination of surface soils is present but is usually assumed to be dispersed creating negligible inhalation risk, however burrowing animals may be exposed to dust while digging and vapors in their burrows. The pathway will be evaluated qualitatively in light of risks to direct ingestion of soil, which is considered a more significant exposure pathway.
SOIL				
Direct dermal contact or ingestion of soil	Direct exposure to contaminated soil or dust	Aquatic	No	No aquatic receptors present on the Site. Sediments in the offsite areas (wetlands and Onondaga Lake) are considered as part of the surface water pathway.
		Terrestrial	Yes	Contamination of surface soils is present; birds, mammals, soil invertebrates, and/or plants may be exposed. The pathway will be evaluated quantitatively.
GROUNDWATER				
Ingestion/dermal contact with groundwater.	Onsite wildlife has no access to groundwater.	Aquatic	No	No aquatic receptors occur on site, because there are no surface water bodies.
		Terrestrial	No	There are no known seeps or springs; onsite wildlife have no access to groundwater. The pathway will not be evaluated.

TABLE 6-1

Evaluation of Ecological Exposure Pathways
Honeywell Ballfield Site
Geddes, New York

Exposure Media/ Exposure Route	Exposure Scenario/Release Mechanism	Exposure Points/ Potential Receptors	Potentially Complete Pathway	Rationale
SURFACE WATER				
Ingestion/dermal contact/inhalation	Contaminant source to groundwater to surface water, or	Aquatic	Yes	Contamination from site could potentially be reaching Onondaga lake surface water. Fish, fish-eating birds and mammals, aquatic invertebrates and plants are potential receptors. The pathway is currently being evaluated separately and will not be evaluated in this SLERA.
	Contaminant source directly to surface water/sediments (runoff)	Terrestrial	Yes	Terrestrial animals (e.g., racoons, terrestrial birds) may be exposed directly to surface water and sediments in Lake Onondaga. The pathway is currently being evaluated separately and will not be evaluated in this SLERA.
BIOTA				
Contaminated tissue	Groundwater to surface water and bioconcentration through the aquatic food chain.	Aquatic	Yes	Some contaminants detected in site groundwater are considered to be bioaccumulative, however the pathway is currently being evaluated separately and will not be evaluated in this SLERA.
	Exposure to contaminated soils and bioconcentration through the terrestrial food chain.	Terrestrial	Yes	Some contaminants detected in site soils are considered to be bioaccumulative. The pathway will be evaluated quantitatively.

TABLE 6-2

Selection of Constituents of Potential Ecological Concern for Surface Soils (0-1 foot)

Metals

Honeywell Ballfield Site

Geddes, New York

Compound (mg/kg)	Eastern U.S. Background Range[1]	Eastern U.S. Background Mean[2]	ORNL Earthworm Benchmark[3]	ORNL Phytotoxicity Benchmark[4]	EPA Region 5 Shrew ESL[5]		RI Minimum Detected Concentration	PSA Maximum Detected Concentration	RI Maximum Detected Concentration	Overall Maximum Detected Concentration	Overall Number of Analyses	Overall Frequency of Detection	Contstituent of Potential Ecological Concern?[6]
Aluminum, Total	33000	33000	N/A	50	N/A		3040	11300	12700	12700	39	39	No - ac
Antimony, Total	N/A	0.52	N/A	5	0.14		6.3	8.3	10	10	39	19	Yes
Arsenic, Total	3-12**	4.8	60	10	5.7		3.3	31.7	34.6	34.6	39	39	Yes
Barium, Total	15-600	290	N/A	500	1		27	1570	2950	2950	39	39	Yes
Beryllium, Total	0-1.75	0.55	N/A	10	1		0.53	0.77	0.83	0.83	39	21	No - c
Cadmium, Total	0.1-1	N/A	20	4	0.002		0.76	1.2	0.98	1.2	39	11	Yes
Calcium, Total	130-35000	N/A	N/A	N/A	N/A		6340	222000	131000	222000	39	39	No - d
Chromium, Total	1.5-40**	33	0.4	1	0.4	worm	7.1	124	35.1	124	39	39	Yes
Cobalt, Total	2.5-60**	5.9	N/A	20	0.14		5.8	16.9	13.3	16.9	39	32	Yes
Copper, Total	1-50	13	60	N/A	5.4		16.1	205	252	252	39	39	Yes
Cyanide	N/A	N/A	N/A	N/A	1.3	vole	1.24	8.4	2	8.4	39	8	Yes
Iron, Total	2000-5.5E+5	14000	N/A	N/A	N/A		9860	33200	27000	33200	39	39	Yes
Lead, Total	200-500	14	500	50	0.05		5	577	249	577	39	39	Yes
Magnesium, Total	100-5000	N/A	N/A	N/A	N/A		1610	49600	46000	49600	39	39	No - d
Manganese, Total	50-5000	260	N/A	500	N/A		36.9	604	929	929	39	39	Yes
Mercury, Total	0.001-0.2	0.08	0.1	0.3	0.1	worm	0.04	91.9	84.2	91.9	39	38	Yes
Nickel, Total	0.5-25	11	200	30	13.6		9.8	61.9	34.7	61.9	39	39	Yes
Potassium, Total	8500-43000**	N/A	N/A	N/A	N/A		340	2670	1570	2670	39	39	No - d
Selenium, Total	0.1-3.9	0.3	70	1	0.03		0.67	1.8	2.4	2.4	39	25	Yes
Silver, Total	N/A	N/A	N/A	2	4		1.06	0.78	1.67	1.67	39	6	No - bc
Sodium, Total	6000-8000	N/A	N/A	N/A	N/A		100	1250	1430	1430	39	34	No - d
Thallium, Total	N/A	7.7	N/A	1	0.06		1.06	0.54	1.67	1.67	39	1	No - c
Vanadium, Total	1-300	43	N/A	2	1.6		10.1	98.9	26.9	98.9	39	39	Yes
Zinc, Total	9-50	40	200	50	6.6	worm	20	453	161	453	33	33	Yes

[1] Source - NYSDEC TAGM# 4046, Heavy Metals Soil Clean-up Criteria Tables, from 1984 survey of reference materials by E. Carol McGovern, NYSDEC. ** - New York State background. For lead, urban background range is given.

[2] Source - Shacklette and Boerngen, 1984, U.S. Geological Survey.

[3] Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory.

[4] Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory.

[5] Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are base on toxicity to the masked shrew except where noted. See text for detailed discussion.

[6] Rationale for elimination of constituent:

- a - aluminum is not bioavailable at soil pH above 5.5 (USEPA, 2000).
- b - not detected in any sample.
- c - did not exceed benchmark and background.
- d - essential nutrient - only toxic at extremely high concentrations.

N/A - Not available.

* - Indicates the laboratory duplicate analysis was not within control limits.

U - Indicates analyte result less than the instrument detection limit (IDL) indicated.

N - Indicates the spiked sample recovery was not within control limits.

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TABLE 6-3

Selection of Constituents of Potential Ecological Concern in Surface Soils (0-1 foot)
Volatile Organic Compounds
Honeywell Ballfield Site - Geddes, New York

Compound (ug/kg)	ORNL Earthworm Benchmark[1]	ORNL Phytotoxicity Benchmark[2]	EPA Region 5 Shrew ESL[3]		RI Minimum Detected Concentration	RI Data Qualifier	PSA Maximum Detected Concentration	RI Maximum Detected Concentration	Overall Maximum Detected Concentration	RI Data Qualifier	Overall Number of Analyses	Overall Frequency of Detection	Constituent of Potential Ecological Concern?[4]
1,1,1-Trichloroethane (TCA)			29800		5	U	4	5		U	39	0	No
1,1,2,2-Tetrachloroethane			127		5	U	4	5		U	39	0	No
1,1,2-Trichloroethane			28600		5	U	4	5		U	39	0	No
1,1-Dichloroethane (1,1-DCA)			20100		5	U	4	5		U	39	0	No
1,1-Dichloroethene (1,1-DCE)			8280		5	U	4	5		U	39	0	No
1,2-Dichloroethane			21200		5	U	4	5	5	U	39	0	No
1,2-Dichloropropane			32700		5	U	4	5	5	U	39	0	No
2-Butanone (MEK)			N/A		10	U	5	10	10	U	39	1	No - FD
2-Hexanone			12600		10	U	7	10	10	U	39	0	No
4-Methyl-2-pentanone (MIBK)			443000		10	U	7	10	10	U	39	0	No
Acetone			2500	vole	3.6	J	9	6.2	9	J	39	4	No
Benzene			255		5	U	1	5	5	U	39	3	No
Bromodichloromethane			540		5	U	4	5	5	U	39	0	No
Bromoform			15940		5	U	4	5	5	U	39	0	No
Bromomethane			N/A		5	U	7	5	7	U	39	0	No
Carbon Disulfide			94.1		10	U	0	10	10	U	18	0	No
Carbon Tetrachloride			2980		5	U	4	5	5	U	39	0	No
Chlorobenzene			13100		5	U	1	5	5	U	39	1	No
Chloroethane			N/A		5	U	7	5	7	U	39	0	No
Chloroform			1190		1.3	J	8	7.9	8	J	39	16	No
Chloromethane			N/A		5	U	7	5	7	U	39	0	No
cis-1,2-Dichloroethene			784	trans	5	U	4	5	5	U	39	0	No
cis-1,3-Dichloropropene			398		5	U	4	5	5	U	39	0	No
Dibromochloromethane			2050		5	U	4	5	5	U	39	0	No
Dichloromethane (Methylene Chloride)			4050	vole	5	U	180	5	180	U	39	10	No
Ethylbenzene			5160		5	U	2	5	5	U	39	1	No
m,p-Xylenes			10000	total	5	J	6	5	6	U	39	4	No
o-Xylene			10000	total	5	J	6	5	6	U	39	4	No
Styrene		300000	4690		5	U	4	5	5	U	39	0	No
Tetrachloroethene (PCE)			9920		1.7	J	14	23	23	J	39	19	No
Toluene		200000	5450		1	J	1	3.2	3.2	J	39	5	No
trans-1,2-Dichloroethene			784		5	U	4	5	5	U	39	0	No
trans-1,3-Dichloropropene			398		5	U	4	5	5	U	39	0	No
Trichloroethene (TCE)			12400		5	U	0.9	5	5	U	39	2	No
Vinyl Chloride			646		5	U	7	5	7	U	39	0	No

[1]Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory. No values available for these compounds.
[2]Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory. No values available except for total PCBs.
[3]Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are base on toxicity to the masked shrew except where noted. See text for detailed discussion.
[4]Rationale for elimination of all constituents was that maximum concentrations of those detected, and detection limits of those not detected in any sample did not exceed the benchmark.
Also if analyte was detected less than 5 percent of the time in the medium, it was eliminated as a COPEC (I.e., denoted by NO-FD).
U - Not detected below the reporting limit. Method detection limit is shown.
J - The compound was analyzed for and determined to be present in the sample because the mass spectrum of the compound meets the identification criteria of the method. The

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TABLE 6-4

Selection of Constituents of Potential Ecological Concern in Surface Soils (0-1 foot)
Semi-volatile Organic Compounds
Honeywell Ballfield Site - Geddes, New York

Compound (ug/kg)	ORNL Earthworm Benchmark[1]		ORNL Phytotoxicity Benchmark[2]		EPA Region 5 Shrew ESL[3]		Min Benchmark	RI Minimum Detected Concentration	PSA Maximum Detected Concentration	RI Maximum Detected Concentration	Overall Maximum Detected Concentration	Overall Number of Analyses	Overall Frequency of Detection	Contstituent of Potential Ecological Concern?[4]
1,2,4-Trichlorobenzene	20000				11100		11100	330	140	330	330	39	4	No
1,2-Dichlorobenzene					37700		37700	330	540	330	540	39	8	No
1,3-Dichlorobenzene					2960		2960	330	72000	330	72000	39	0	No
1,4-Dichlorobenzene	20000				546		546	170	1900	630	1900	39	22	Yes
2,4,5-Trichlorophenol			4000		14100		4000	330	360000	330	360000	39	0	No
2,4,6-Trichlorophenol			4000	**	9940		4000	330	72000	330	72000	39	0	No
2,4-Dichlorophenol			20000	**	87500		20000	330	72000	330	72000	39	0	No
2,4-Dimethylphenol					10	plant	10	330	72000	330	72000	39	0	Yes
2,4-Dinitrophenol			20000		60.9		60.9	1700	210	1700	1700	39	1	No-FD
2,4-Dinitrotoluene					1280		1280	330	72000	330	72000	39	0	No
2,6-Dinitrotoluene					32.8		32.8	330	72000	330	72000	39	0	Yes
2-Chloronaphthalene					12.2		12.2	330	72000	330	72000	39	0	Yes
2-Chlorophenol	10000	**	7000	**	243		243	330	72000	330	72000	39	0	Yes
2-Methylnaphthalene					3240		3240	72	16000	2200	16000	39	21	Yes
2-Methylphenol					N/A		0	330	72000	330	72000	39	0	No
2-Nitroaniline					74100		74100	1700	360000	1700	360000	39	0	No
2-Nitrophenol					1600		1600	330	72000	330	72000	39	0	No
3+4-Methylphenol					N/A		0	330	72000	330	72000	39	0	No
3,3'-Dichlorobenzidine					646		646	330	140000	330	140000	39	0	No
3-Nitroaniline					3160		3160	1700	360000	1700	360000	39	0	No
4,6-Dinitro-2-methylphenol					N/A		0	1700	360000	1700	360000	39	0	No
4-Bromophenyl Phenyl Ether					N/A		0	330	72000	330	72000	39	0	No
4-Chloro-3-methylphenol					N/A		0	330	72000	330	72000	39	0	No
4-Chloroaniline	30000	**	20000	**	1100		1100	330	72000	330	72000	39	0	No
4-Chlorophenyl Phenyl Ether					N/A		0	330	72000	330	72000	39	0	No
4-Nitroaniline					21900		21900	1700	360000	1700	360000	39	0	No
4-Nitrophenol	7000				5120		5120	1700	360000	1700	360000	39	0	No
Acenaphthene			20000		682000		20000	72	110000	5200	110000	39	20	Yes
Acenaphthylene					682000		682000	57	410	1000	1000	39	21	No
Anthracene					1480000		1480000	45	110000	8200	110000	39	32	No
Benz(a)anthracene					5210		5210	200	310000	17000	310000	39	35	Yes
Benzo(a)pyrene					1520		1520	220	350000	17000	350000	39	34	Yes
Benzo(b)fluoranthene					59800		59800	190	410000	13000	410000	39	35	Yes
Benzo(g,h,i)perylene					119000		119000	160	190000	10000	190000	39	35	Yes
Benzo(k)fluoranthene					148000		148000	190	140000	13000	140000	39	35	No
Benzyl Alcohol					65800		65800	330	72000	330	72000	39	0	No
Bis(2-chloroethoxy)methane					N/A		0	330	72000	330	72000	39	0	No
Bis(2-chloroethyl) Ether					23700		23700	330	72000	330	72000	39	0	No
Bis(2-chloroisopropyl) Ether					N/A		0	330	72000	330	72000	39	0	No
Bis(2-ethylhexyl) Phthalate					925		925	110	160	2100	2100	39	14	Yes
Butyl Benzyl Phthalate					239		239	330	72000	330	72000	39	0	Yes
Carbazole					N/A		0	65	72000	4100	72000	39	25	Yes
Chrysene					4730		4730	250	290000	16000	290000	39	34	Yes
Di-n-butyl Phthalate			200000		150		150	50	57	240	240	39	5	Yes
Di-n-octyl Phthalate					709000		709000	330	72000	330	72000	39	0	No
Dibenz(a,h)anthracene					18400		18400	52	63000	3600	63000	39	32	Yes
Dibenzofuran					N/A		0	51	33000	3200	33000	39	21	Yes

TABLE 6-4

Selection of Constituents of Potential Ecological Concern in Surface Soils (0-1 foot)
Semi-volatile Organic Compounds
Honeywell Ballfield Site - Geddes, New York

Compound (ug/kg)	ORNL Earthworm Benchmark[1]	ORNL Phytotoxicity Benchmark[2]	EPA Region 5 Shrew ESL[3]		Min Benchmark	RI Minimum Detected Concentration	PSA Maximum Detected Concentration	RI Maximum Detected Concentration	Overall Maximum Detected Concentration	Overall Number of Analyses	Overall Frequency of Detection	Constituent of Potential Ecological Concern?[4]
Diethyl Phthalate		100000	24800		24800	330	72000	330	72000	39	0	No
Dimethyl Phthalate	200000		734000		200000	330	72000	330	72000	39	0	No
Fluoranthene			122000		122000	410	480000	42000	480000	39	35	Yes
Fluorene	30000		122000		30000	47	56000	4400	56000	39	21	Yes
Hexachlorobenzene			199		199	120	1700	1300	1700	39	10	Yes
Hexachlorobutadiene			39.8		39.8	330	170	330	330	39	1	No-FD
Hexachlorocyclopentadiene		10000	755		755	330	72000	330	72000	38	0	No
Hexachloroethane			596		596	1800	670	2300	2300	39	5	Yes
Indeno(1,2,3-cd)pyrene			10900		10900	150	180000	9900	180000	39	34	Yes
Isophorone			139000		139000	330	72000	330	72000	39	0	No
N-Nitrosodi-n-propylamine					0	330	72000	330	72000	39	0	No
N-Nitrosodimethylamine			0.0321	vole	0.0321	330	0	330	330	18	0	Yes
N-Nitrosodiphenylamine			545		545	330	72000	330	72000	39	0	No
Naphthalene			99.4		99.4	75	64000	7500	64000	39	24	Yes
Nitrobenzene	40000		1310		1310	330	72000	330	72000	39	0	No
Pentachlorophenol (PCP)	6000	3000	119		119	1700	210	1700	1700	39	1	No-FD
Phenanthrene			45700		45700	190	390000	26000	390000	39	35	Yes
Phenol	30000	70000	120000		30000	330	69	330	330	39	1	No
Pyrene			78500		78500	330	400000	30000	400000	39	35	Yes
Benzoic acid			N/A		0	NA	1000		1000	14	6	Yes

[1] Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory. Blank cell - no values available for these compounds.
[2] Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory. Blank cell - no values available for these compounds.
[3] Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are base on toxicity to the masked shrew except where noted. See text for detailed discussion.
[4] Rationale for elimination of all constituents was that maximum concentrations of those detected, and detection limits of those not detected in any sample did not exceed the benchmark.
Non-detected constituents with no benchmark were eliminated, while detected constituents with no benchmark were retained as COPECs.
Also if analyte was detected less than 5 percent of the time in the medium, it was eliminated as a COPEC (I.e., denoted by No-FD).
U - Not detected below the reporting limit. Method detection limit is shown.
J - The compound was analyzed for and determined to be present in the sample because the mass spectrum of the compound meets the identification criteria of the method. The concentration reported is an estimated value, less than the practical quantitation limit for the sample.

TABLE 6-5

Selection of Constituents of Potential Ecological Concern in Surface Soils (0-1 foot)
Pesticides and PCBs
Honeywell Ballfield Site - Geddes, New York

Compound (ug/kg)	ORNL Earthworm Benchmark[1]	ORNL Phytotoxicity Benchmark[2]	EPA Region 5 Shrew ESL[3]	RI Minimum Detected Concentration	PSA Maximum Detected Concentration	RI Maximum Detected Concentration	Overall Maximum Detected Concentration	Overall Number of Analyses	Overall Frequency of Detection	Contstituent of Potential Ecological Concern?[4]
Pesticides										
4,4'-DDD			758	3.3	200	3.3	200	39	1	No
4,4'-DDE			596	29	10	42	42	39	3	No
4,4'-DDT			3.5	66	400	140	400	39	5	Yes
Aldrin			3.32	1.7	400	1.7	400	39	0	No
alpha-BHC			99.4	1.7	400	1.7	400	39	0	No
alpha-Chlordane			224 (total)	1.7	200	1.7	200	39	2	No
beta-BHC			3.98	1.7	400	1.7	400	39	0	No
delta-BHC			9940	1.7	400	1.7	400	39	0	No
Dieldrin			2.38	3.3	800	3.3	800	39	0	Yes
Endosulfan I			119	1.7	400	1.7	400	39	0	No
Endosulfan II			119	3.3	800	3.3	800	39	0	No
Endosulfan Sulfate			35.8	3.3	800	3.3	800	39	0	No
Endrin			10.1	3.3	800	3.3	800	39	0	No
Endrin Aldehyde			10.5	3.3	800	3.3	800	39	0	No
Endrin Ketone			10.1 (endrin)	3.3	800	3.3	800	39	0	No
gamma-BHC (Lindane)			5 (plants)	1.7	400	1.7	400	39	0	No
gamma-Chlordane			224 (total)	1.7	700	1.7	700	39	2	Yes
Heptachlor			5.98	1.7	400	1.7	400	39	0	No
Heptachlor Epoxide			152	1.7	400	1.7	400	39	0	No
Methoxychlor			19.9	17	4000	17	4000	39	0	No
Toxaphene			119	33	4000	33	4000	39	0	No
PCBs TOTAL		40000	0.332							
Aroclor 1016			N/A	33	8000	33	8000	39	0	No
Aroclor 1221			N/A	33	8000	33	8000	39	0	No
Aroclor 1232			N/A	33	8000	33	8000	39	0	No
Aroclor 1242			N/A	33	8000	33	8000	39	0	No
Aroclor 1248			N/A	33	8000	33	8000	39	0	No
Aroclor 1254			N/A	44	1000	240	1000	39	16	Yes
Aroclor 1260			N/A	110	200	830	830	39	8	Yes
Aroclor 1268			N/A	33	1000	33	1000	39	10	Yes

[1]Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory. No values available for these compounds.

[2]Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory. No values available except for total PCBs.

[3]Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are base on toxicity to the masked shrew except where noted. See text for detailed discussion.

[4]Rationale for elimination of all constituents except 4,4'-DDT and gamma-Chlordane was that none were detected in any sample above benchmarks, and the detection limits for nondetects (except PCBs) did not exceed the benchmark.

The detection limits for PCBs exceeded the total PCB benchmark for the shrew, so total PCBs and Aroclors 1254, 1260, and 1268 are COPECs.

N/A - No value available.

TABLE 6-6

Selection of Constituents of Potential Ecological Concern for Surface Soils (0-1 foot)
Dioxins and Furans
Honeywell Ballfield Site
Geddes, New York

ORNL shrew PRG for TCDD = 3.15 ng/kg Compound (ng/kg)	WHO Consensus TEFs for Mammals[1]	Toxicity Equivalent ORNL shrew Benchmark[2]	RI Minimum Detected Concentration	RI Data Qualifier	RI Maximum Detected Concentration	RI Data Qualifier	Number of Analyses	Frequency of Detection	Contstituent of Potential Ecological Concern?[3]
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.01	315.00	3.935		267.623		9	9	No
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	315.00	1.393	B	241.368	J	10	10	No
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	315.00	3.211	K	49.22	K	10	7	No
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	31.50	1.421	JK	11.665	K	10	7	No
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	31.50	0.417	JK	225.108	K	10	10	Yes
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	31.50	3.051		75.744		10	8	Yes
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	31.50	3.144	K	62.624	K	10	8	Yes
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	31.50	4.705	K	40.077	K	10	7	Yes
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	31.50	4.4		28.13		10	6	No
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD	1	3.15	0.987	J	17.337	K	10	8	Yes
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.05	63.00	7.778	K	152.548	K	10	8	Yes
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	31.50	2.883		35.823		10	7	Yes
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.5	6.30	0.848	JK	399.236	JK	9	8	Yes
2,3,7,8-TCDD	1	3.15	504.44		834.37		10	10	Yes
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	3.15	1.387	K	4.992	K	10	5	Yes
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	31.50	0.268	C	20.483	C	4	4	No
Heptachlorodibenzo-p-dioxins (HpCDD), Total	N/A		7.491		1124.176		10	10	N/A
Heptachlorodibenzofurans (HpCDF), Total	N/A		2.404		440.21		10	10	N/A
Hexachlorodibenzo-p-dioxins (HxCDD), Total	N/A		0.405		513.92		10	9	N/A
Hexachlorodibenzofurans (HxCDF), Total	N/A		0.776		581.774		10	9	N/A
Octachlorodibenzo-p-dioxin (OCDD)	0.0001	31500.00	18.577	B	592.79	B	8	8	No
Octachlorodibenzofuran (OCDF)	0.0001	31500.00	1.929	B	417.4	JK	10	10	No
Pentachlorodibenzo-p-dioxin (PeCDD), Total	N/A		37.542		296.744		10	8	N/A
Pentachlorodibenzofurans (PeCDF), Total	N/A		1.356		1047.322		10	9	N/A
Tetrachlorodibenzo-p-dioxins (TCDD), Total	N/A		46.823		273.312		10	8	N/A
Tetrachlorodibenzofurans (TCDF), Total	N/A		2.26		3500.46		10	10	N/A

Note that polychlorinated dibenzo-p-dioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) were not analyzed for as part of the PSA.
[1] The World Health Organization (WHO) Toxic Equivalency Factors (TEFs) (Van den Berg, et al., (1998)) were used to rate the relative toxicity of each PCDD and PCDF. 2,3,7,8- TCDD is considered to be the most toxic of all the PCDD and PCDF congeners, and its TEF is set equal to one (1).
[2] A Toxicity Equivalent ORNL shrew ecological benchmark was derived by dividing the ecological benchmark provide for 2,3,7,8 -TCDD by the congeners respective TEF.
[3] Rationale for elimination of all constituents was that maximum concentrations of those detected, and detection limits of those not detected in any sample did not exceed the benchmark.
B - Analyte was found in the extraction or analysis blank, as well as in the sample.
C - The value for 2,3,7,8-TCDF required confirmation using a DB-225 column. The value reported from the DB-225 column was used when calculating the TEQ.
J - The value is estimated. The analyte concentration is below the method reporting limit (MRL), but above the method detection limit (MDL).
K - Estimated maximum possible concentration.
N/A means that there was no TEF available form WHO to evaluate the relative toxicity of the congener.

TABLE 6-7

Hazard Quotients for Inorganic COPECs in Surface Soils
Honeywell Ballfield Site
Geddes, New York

Compound (mg/kg)	Eastern U.S. Background Range[1]	Eastern U.S. Background Mean[2]	ORNL Earthworm Benchmark[3]	ORNL Phytotoxicity Benchmark[4]	EPA Region 5 Shrew ESL[5]	Min Benchmark[6]	Overall Maximum Detected Concentration[7]	Hazard Quotient[8]
Antimony, Total	N/A	0.52	N/A	5	0.14	0.14	10	71
Arsenic, Total	3-12**	4.8	60	10	5.7	5.7	34.6	6.1
Barium, Total	15-600	290	N/A	500	1	1	2950	2950
Cadmium, Total	0.1-1	N/A	20	4	0.002	0.002	1.2	600
Chromium, Total	1.5-40**	33	0.4	1	0.4 worm	0.4	124	310
Cobalt, Total	2.5-60**	5.9	N/A	20	0.14	0.14	16.9	121
Copper, Total	1-50	13	60	N/A	5.4	5.4	252	47
Cyanide	N/A	N/A	N/A	N/A	1.3 vole	1.3	8.4	6.5
Iron, Total	2000-5.5E+5	14000	N/A	N/A	N/A	N/A	33200	
Lead, Total	200-500	14	500	50	0.05	0.05	577	11540
Manganese, Total	50-5000	260	N/A	500	N/A	500	929	1.9
Mercury, Total	0.001-0.2	0.08	0.1	0.3	0.1 worm	0.1	91.9	919
Nickel, Total	0.5-25	11	200	30	13.6	13.6	61.9	4.6
Selenium, Total	0.1-3.9	0.3	70	1	0.03	0.03	2.4	80
Vanadium, Total	1-300	43	N/A	2	1.6	1.6	98.9	62
Zinc, Total	9-50	40	200	50	6.6 worm	6.6	453	69

[1]Source - NYSDEC TAGM# 4046, Heavy Metals Soil Clean-up Criteria Tables, from 1984 survey of reference materials by E. Carol McGovern, NYSDEC. ** - New York State background. For lead, urban background range is given.

[2]Source - Shacklette and Boerngen, 1984, U.S. Geological Survey.

[3]Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory.

[4]Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory.

[5]Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are based on toxicity to the masked shrew except where noted. See text for detailed discussion.

[6]Min Benchmark is the lowest of the available ecological benchmarks listed.

[7]Overall Maximum is maximum analyte concentration from the combined PSA and RI data set.

[8]Hazard quotient represents the maximum analyte concentration divided by the minimum ecological benchmark. An HQ> 1 indicates a potential ecological concern and a need for further evaluation.

TABLE 6-8

Hazard Quotients for SVOC COPECs in Surface Soils
Honeywell Ballfield Site - Geddes, New York

Compound (ug/kg)	ORNL Earthworm Benchmark[1]	ORNL Phytotoxicity Benchmark[2]	EPA Region 5 Shrew ESL[3]	Min Benchmark[4]	Overall Maximum Detected Concentration[5]
1,4-Dichlorobenzene	20000		546	546	1900
2,4-Dimethylphenol			10 plant	10	72000
2,4-Dinitrophenol		20000	60.9	60.9	1700
2,6-Dinitrotoluene			32.8	32.8	72000
2-Chloronaphthalene			12.2	12.2	72000
2-Chlorophenol	10000 **	7000 **	243	243	72000
2-Methylnaphthalene			3240	3240	16000
Acenaphthene		20000	682000	20000	110000
Benz(a)anthracene			5210	5210	310000
Benzo(a)pyrene			1520	1520	350000
Benzo(b)fluoranthene			59800	59800	410000
Benzo(g,h,i)perylene			119000	119000	190000
Bis(2-ethylhexyl) Phthalate			925	925	2100
Butyl Benzyl Phthalate			239	239	72000
Carbazole			N/A	N/A	72000
Chrysene			4730	4730	290000
Di-n-butyl Phthalate		200000	150	150	240
Dibenz(a,h)anthracene			18400	18400	63000
Dibenzofuran			N/A	N/A	33000
Fluoranthene			122000	122000	480000
Fluorene	30000		122000	30000	56000
Hexachlorobenzene			199	199	1700
Hexachlorobutadiene			39.8	39.8	330
Hexachloroethane			596	596	2300
Indeno(1,2,3-cd)pyrene			10900	10900	180000
N-Nitrosodimethylamine			0.0321 vole	0.0321	330
Naphthalene			99.4	99.4	64000
Phenanthrene			45700	45700	390000
Pyrene			78500	78500	400000
Benzoic acid			N/A	N/A	1000

[1]Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory. Blank cell - no values available for these compounds.
[2]Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory. Blank cell - no values available for these compound
[3]Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are based on toxicity to the masked shrew except wher noted. See text for detailed discussion.
[4]Min Benchmark is the lowest of the available ecological benchmarks listed.
[5]Overall Maximum is maximum analyte concentration from the combined PSA and RI data set.
[6]Hazard quotient represents the maximum analyte concentration divided by the minimum ecological benchmark. An HQ> 1 indicated a potential ecological concern and a need for further evaluation.

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TABLE 6-8

Hazard Quotients for SVOC COPECs in Surface Soils
Honeywell Ballfield Site - Geddes, New York

Compound (ug/kg)	ORNL Earthworm Benchmark[1]	ORNL Phytotoxicity Benchmark[2]	EPA Region 5 Shrew ESL[3]	Min Benchmark[4]	Hazard Quotient[6]
1,4-Dichlorobenzene	20000		546	546	3.5
2,4-Dimethylphenol			10 plant	10	7200
2,4-Dinitrophenol		20000	60.9	60.9	27.9
2,6-Dinitrotoluene			32.8	32.8	2195
2-Chloronaphthalene			12.2	12.2	5902
2-Chlorophenol	10000 **	7000 **	243	243	296
2-Methylnaphthalene			3240	3240	4.9
Acenaphthene		20000	682000	20000	5.5
Benz(a)anthracene			5210	5210	60
Benzo(a)pyrene			1520	1520	230
Benzo(b)fluoranthene			59800	59800	6.9
Benzo(g,h,i)perylene			119000	119000	1.6
Bis(2-ethylhexyl) Phthalate			925	925	2.3
Butyl Benzyl Phthalate			239	239	301
Carbazole			N/A	N/A	--
Chrysene			4730	4730	61
Di-n-butyl Phthalate		200000	150	150	1.6
Dibenz(a,h)anthracene			18400	18400	3.4
Dibenzofuran			N/A	N/A	--
Fluoranthene			122000	122000	3.9
Fluorene	30000		122000	30000	1.9
Hexachlorobenzene			199	199	8.5
Hexachlorobutadiene			39.8	39.8	8.3
Hexachloroethane			596	596	3.9
Indeno(1,2,3-cd)pyrene			10900	10900	17
N-Nitrosodimethylamine			0.0321 vole	0.0321	10280
Naphthalene			99.4	99.4	644
Phenanthrene			45700	45700	8.5
Pyrene			78500	78500	5.1
Benzoic acid			N/A	N/A	--

[1]Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory. Blank cell - no values available for thes

[2]Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory. Blank cell - no values availabl.

[3]Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are based on toxicity to the maske noted. See text for detailed discussion.

[4]Min Benchmark is the lowest of the available ecological benchmarks listed.

[5]Overall Maximum is maximum analyte concentration from the combined PSA and RI data set.

[6]Hazard quotient represents the maximum analyte concentration divided by the minimum ecological benchmark. An potential ecological concern and a need for further evaluation.

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TABLE 6-9

Hazard Quotients for Pesticide and PCB COPECs in Surface Soils Honeywell Ballfield Site Geddes, New York

Compound (ug/kg)	ORNL Earthworm Benchmark[1]	ORNL Phytotoxicity Benchmark[2]	EPA Region 5 Shrew ESL[3]		Overall Maximum Detected Concentration[4]	Hazard Quotient[5]
Pesticides						
4,4'-DDT			3.5		400	114
Dieldrin			2.38		800	336
gamma-Chlordane			224	total	700	3.1
PCBs *TOTAL-*		40000	0.332			
Aroclor 1254			0.332	total	1000	3012
Aroclor 1260			0.332	total	830	2500
Aroclor 1268			0.332	total	1000	3012

[1]Source - Efroymson, Will, and Suter, 1997, Oak Ridge National Laboratory. No values available for these compounds.
[2]Source - Efroymson, Will, Suter, and Wooten, 1997, Oak Ridge National Laboratory. No values available except for total PCBs.
[3]Source - EPA Region 5 RCRA Ecological Screening Levels, July 17, 2003. Values are based on toxicity to the masked shrew except where noted. See text for detailed discussion.
[4]Overall Maximum is maximum analyte concentration from the combined PSA and RI data set.
[5]Hazard quotient represents the maximum analyte concentration divided by the minimum ecological benchmark. An HQ> 1 indicates a potential ecological concern and a need for further evaluation.

total - the benchmark available for total chlordane or PCBs was used for the respective isomers or congener mixtures to represent their toxicity.

TABLE 6-10

Hazard Quotients for Dioxin and Furan COPECs in Surface Soils Honeywell Ballfield Site Geddes, New York

ORNL shrew PRG for TCDD = 3.15 ng/kg Compound (ng/kg)	WHO Consensus TEFs for Mammals[1]	Toxicity Equivalent ORNL shrew Benchmark[2]	RI Maximum Detected Concentration[3]	Hazard Quotient[4]
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	31.50	225.108	7.1
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	31.50	75.744	2.4
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	31.50	62.624	2.0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	31.50	40.077	1.3
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD	1	3.15	17.337	5.5
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.05	63.00	152.548	2.4
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	31.50	35.823	1.1
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.5	6.30	399.236	63.4
2,3,7,8-TCDD	1	3.15	834.37	264.9
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	3.15	4.992	1.6

Note that polychlorinated dibenzo-p-dioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) were not analyzed for as part of the PSA.

[1] The World Health Organization (WHO) Toxic Equivalency Factors (TEFs) (WHO 1998) were used to rate the relative toxicity of each PCDD and PCDF. 2,3,7,8- TCDD is considered to be the most toxic of all the PCDD and PCDF congeners, and its TEF is set equal to one (1).

[2] A Toxicity Equivalent ORNL shrew ecological benchmark was derived by dividing the ecological benchmark provided for 2,3,7,8 -TCDD by the congener's respective TEF.

[3] RI Maximum Detected Concentration is maximum analyte concentration from the RI.

[4] Hazard quotient represents the maximum analyte concentration divided by the minimum ecological benchmark. An HQ> 1 indicates a potential ecological concern and a need for further evaluation.

Eight-step Ecological Risk Assessment Process for Superfund

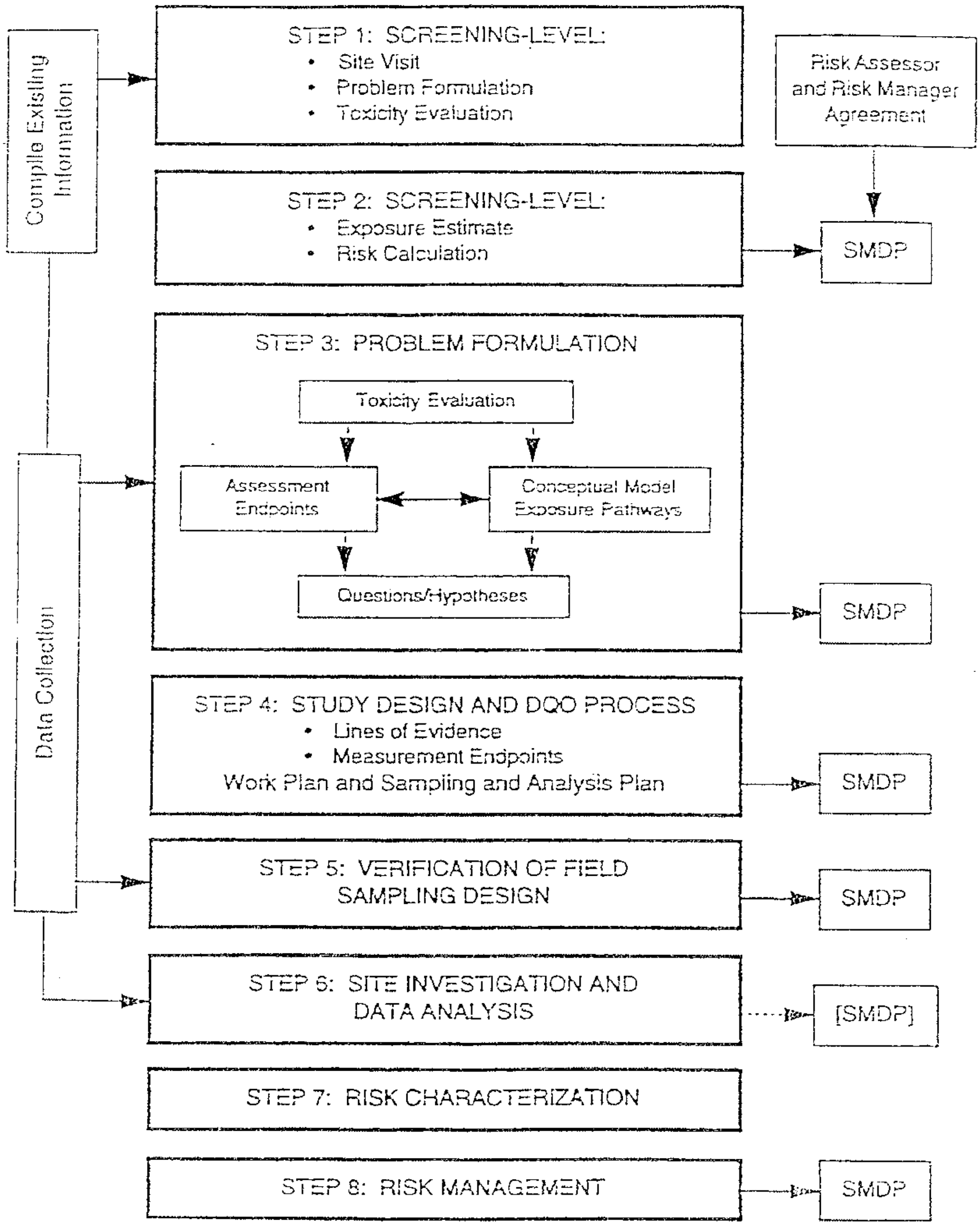


FIGURE 6-1

(USEPA 1997)

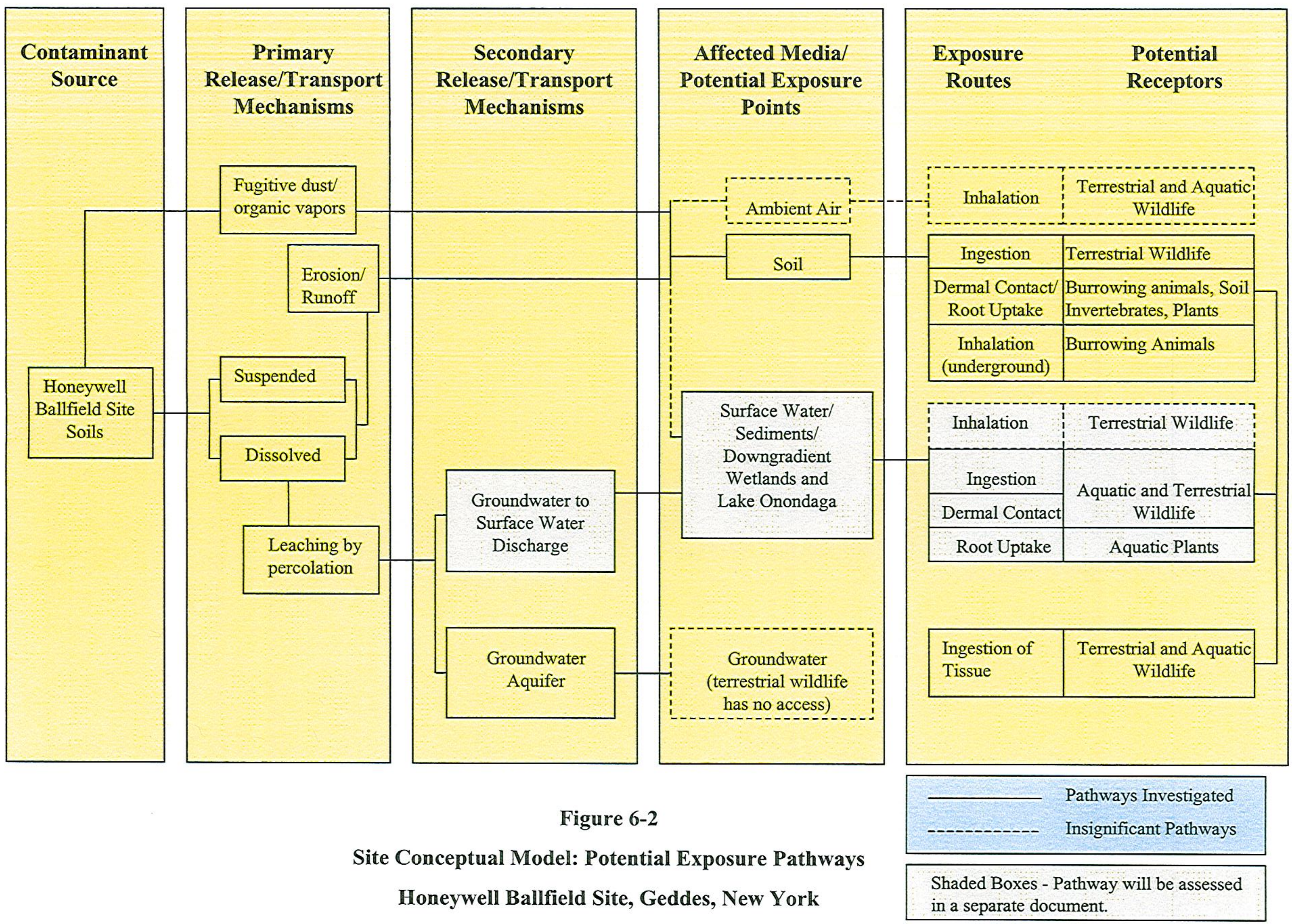


Figure 6-2

Site Conceptual Model: Potential Exposure Pathways

Honeywell Ballfield Site, Geddes, New York

SOURCE: ADAPTED FROM U.S.G.S. QUADRANGLE, SYRACUSE WEST (PHOTO REVISED 1978).

7/8/99

FIGURE 1-1

LEGEND

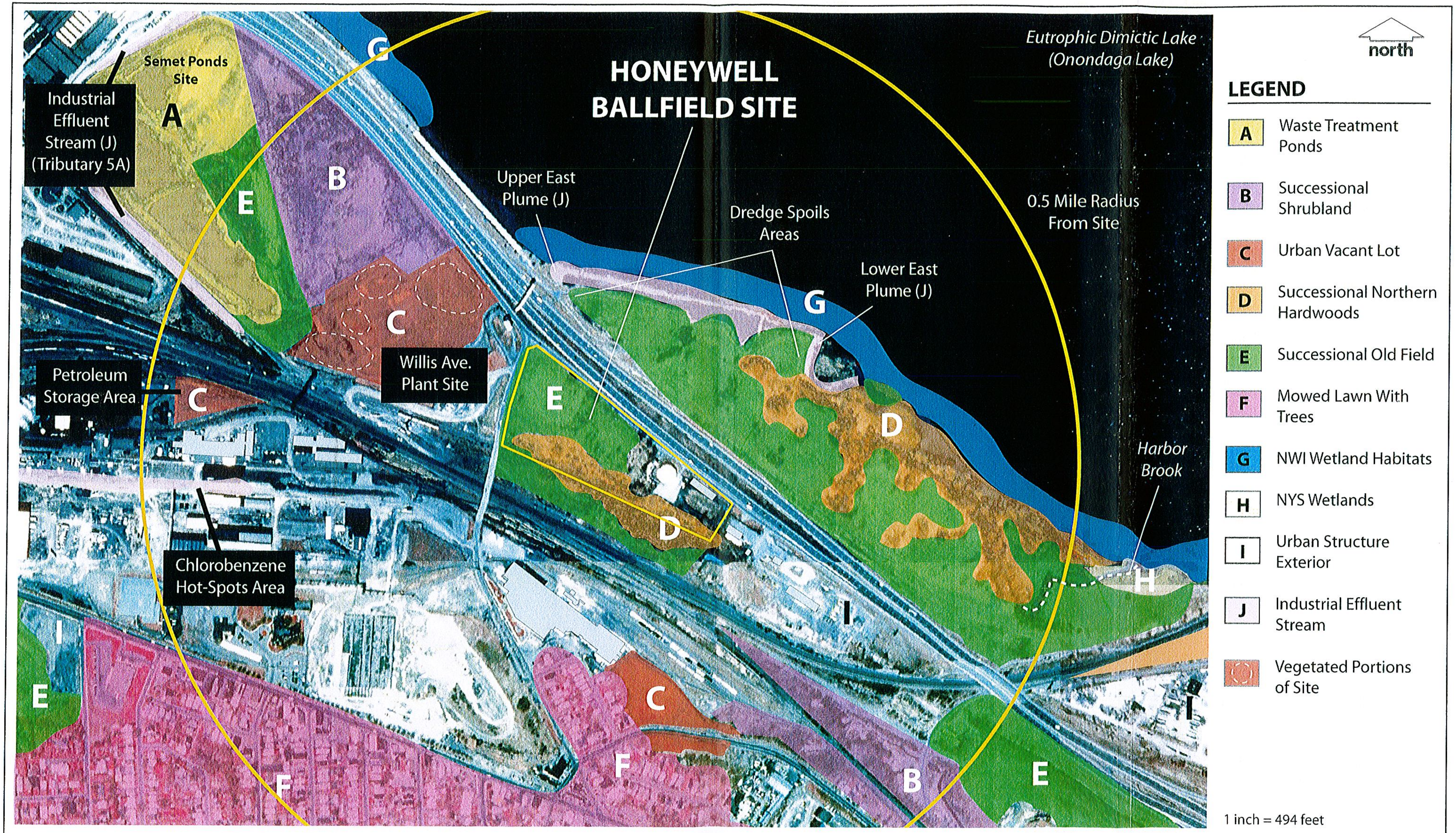
MWH

Honeywell Ballfield Site
GEDDES, NEW YORK

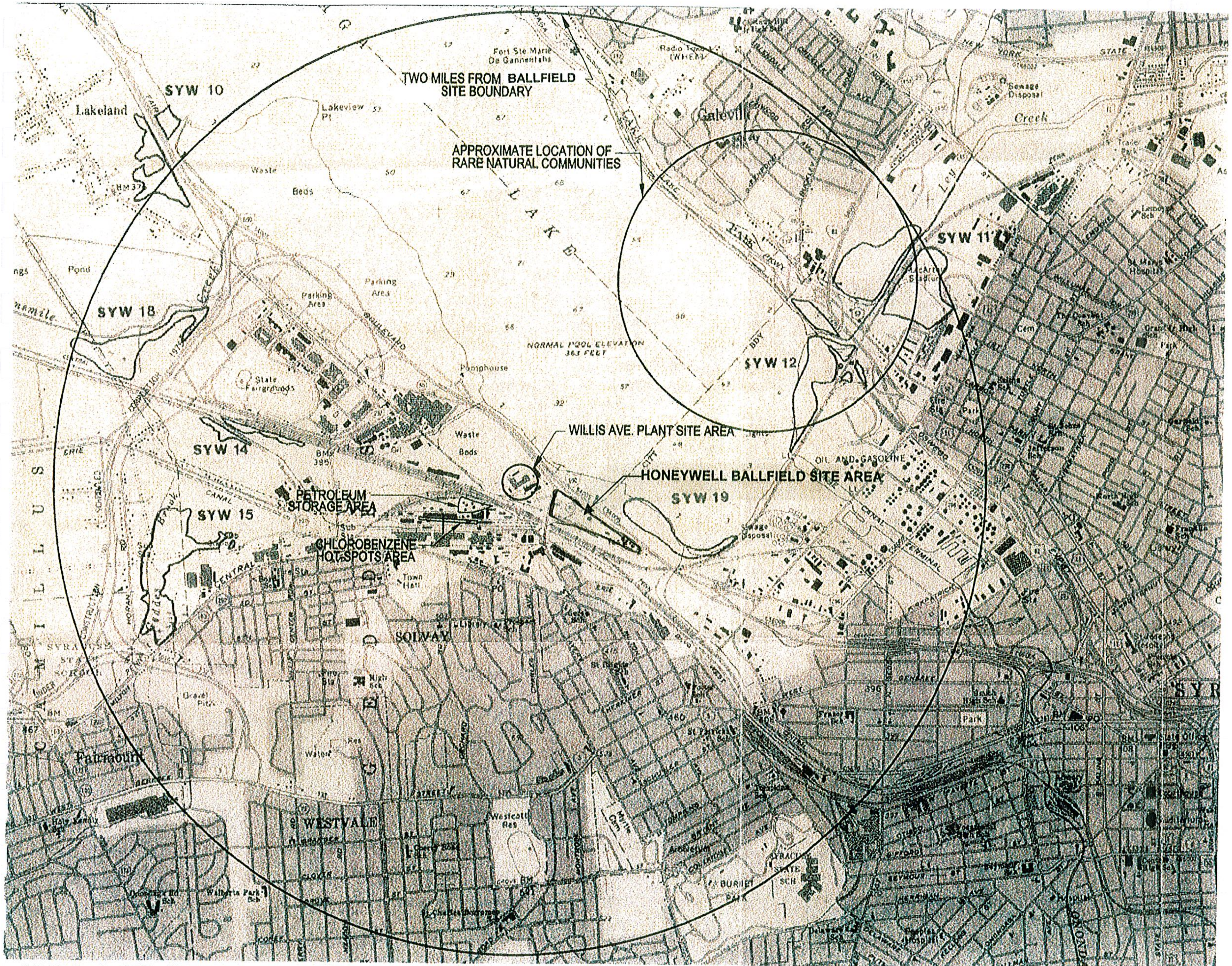
SITE LOCATION
MAP

2000 0 2000
APPROX. SCALE IN FEET

Source: O'Brien and Gere (1999)
Willis Avenue Chlorobenzene Site
Screening-Level Ecological Assessment



MWH	HONEYWELL BALLFIELD SITE REMEDIAL INVESTIGATION FEASIBILITY STUDY GEDDES, NEW YORK	FIGURE 1-2 STUDY AREA COVERTYPES



SOURCE: ADAPTED FROM NEW YORK STATE FRESHWATER WETLANDS ONONDAGA COUNTY MAP 9 (1973), AND NYS NATURAL HERITAGE PROGRAM. 7/8/99

FIGURE 3-1

LEGEND

SYW 19 NEW YORK STATE WETLAND

MWH

Honeywell Ballfield Site
Geddes, New York

SPECIAL NATURAL RESOURCES

2200 0 2200
APPROX. SCALE IN FEET

Source: O'Brien and Gere (1999)
Willis Avenue Chlorobenzene Site
Screening-Level Ecological Assessment

FIGURE 3-2

LEGEND

PEMICs

NWI WETLAND

MWH

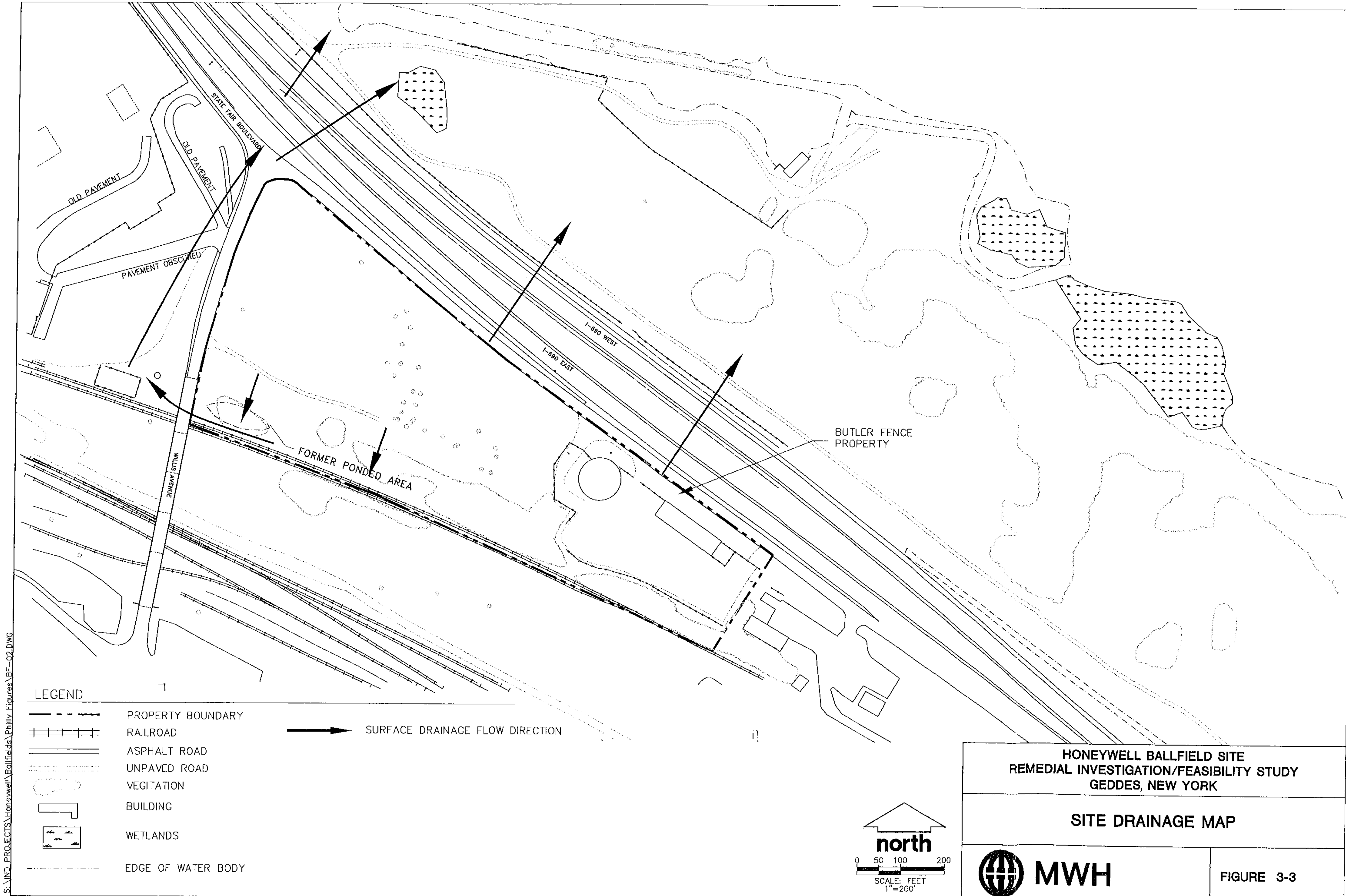
Honeywell Ballfield Site
Geddes, New York

NWI WETLAND
MAP

2200 0 2200

APPROX. SCALE IN FEET

Source: O'Brien and Gere (1999)
Willis Avenue Chlorobenzene Site
Screening-Level Ecological Assessment

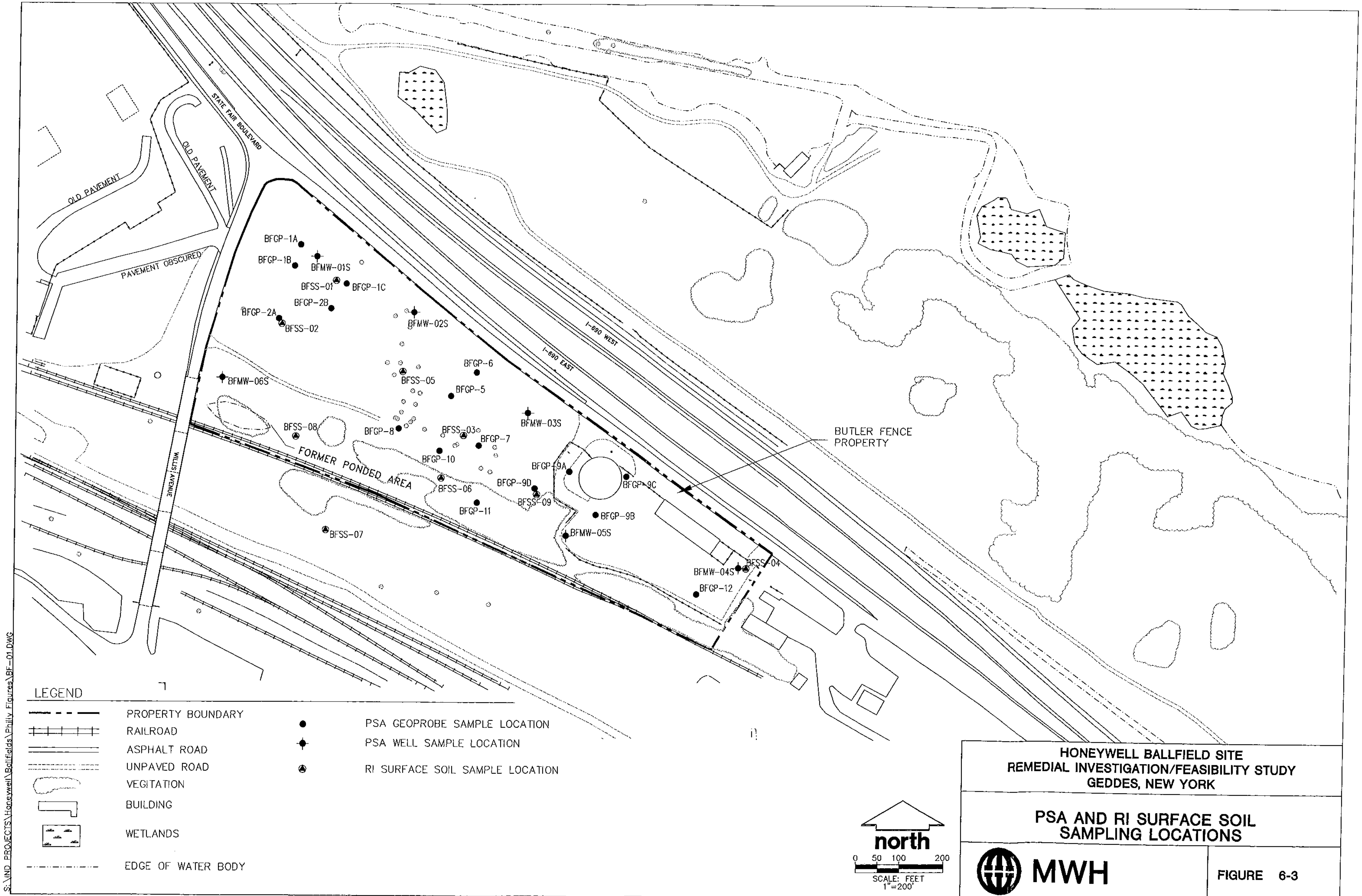


HONEYWELL BALLFIELD SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEDDES, NEW YORK

SITE DRAINAGE MAP

MWH

FIGURE 3-3



HONEYWELL BALLFIELD SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEDDES, NEW YORK

PSA AND RI SURFACE SOIL SAMPLING LOCATIONS

MWH

FIGURE 6-3

A

PHOTODOCUMENTATION

1. Looking east on access road at entry to site off Willis Avenue.

2. Central area of site along access road. Successional northern hardwoods (Big tooth aspen *Populus grandidentata*).

3. Small wet area with *Phragmites* in southeast-central area of site.

4. Inhabited shack in scrub thicket on south side of site where grade drops down to railroad tracks.

5. Former ponded area with monitoring wells.

6. Central old-field area looking south.

7. Looking north down Willis Avenue toward Lake Onondaga along west edge of site.

8. Looking southeast at northeast corner of site along State Fair Boulevard.

Looking north at Lake

Pan of Ballfield Site NNE (L. Onondaga) to SE at railroad tracks from bridge on Willis