Wetlands Delineation Report

5.85 Acres

Haley's Ditch Remediation Area

Akron Airdock Facility, Lockheed Martin Corporation

Akron, Ohio

July, 2008

DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

Wetlands Delineation Report

5.85 Acres
Haley's Ditch Remediation Area

Akron Airdock Facility, Lockheed Martin Corporation
Akron, Ohio

July, 2008

Prepared for:
ARCADIS
11000 Regency Parkway
West Tower, Suite 205
Cary, North Carolina 27518
919-415-2260

Prepared by:
Davey Resource Group
1500 North Mantua Street
P.O. Box 5193
Kent, Ohio 44240
800-828-8312

Table of Contents

Tables

Appendices

Introduction

Site Description and Location

The 5.85-acre site is located in Akron, Ohio (Appendix A). The property is along Haley's Ditch and extends from north of Triplett Boulevard to just south of Archwood Avenue (Appendix B).

The property contains successional woods, upland old fields and shrub thickets, wet meadows, and lowland woods. These semi-natural areas surround Haley's Ditch and are located in a heavily urbanized area.

Haley's Ditch flows north through the study area, entering a culvert at the north end of the site (Photographs 4 and 5, Appendix H). Haley's Ditch continues flowing north through the Goodyear Tire and Rubber Company property, eventually entering Springfield Lake Outlet, which in turn enters the Little Cuyahoga River, a tributary to the Cuyahoga River. The Cuyahoga River has a watershed area of 809 square miles and debouches into Lake Erie in the City of Cleveland.

Secondary Source Information

The property is shown on the Akron East Quadrangle of the United States Geological Survey (USGS) map (Appendix C). Elevations range from approximately 1,030 to 1,040 feet across the site.

The National Wetlands Inventory (NWI) map (Akron East quadrangle) is in Appendix D. No wetlands are mapped for the site.

A map showing soil types from the U. S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey (2007) is found in Appendix E. See Table 1 for a list of soil types mapped for the site.

Table 1. Soil Types Mapped for the Site

Map Unit	Soil Description
Cg	Carlisle muck[1]
CuB	Chili-Urban land complex, undulating
CuC	Chili-Urban land complex, rolling
Ur	Urban land

[1]Hydric soil

Descriptions from the Summit County Soil Survey (Ritchie and Steiger, 1974) and lists of hydric soils and non-hydric soils with hydric inclusions for the soil types found on the site are included in Appendix E.

Methodology

The *Corps of Engineers Wetlands Delineation Manual* (United States Army Engineer Waterways Experiment Station Environmental Laboratory, 1987) was used in delineating wetlands within the study area. The routine on-site determination method for sites over five acres was used. This method is detailed in Section D (page 53) of the *Corps of Engineers Wetlands Delineation Manual.*

The wetlands were delineated and surveyed on June 25, 2008 and July 1, 2008. The wetlands delineation fieldwork, boundary mapping, and data analysis were performed by Todd Crandall and Kristen Bates. Shawn Bruzda prepared the vegetation, soils, and wetlands maps using AutoCAD Map® 2008 and Appendices Maps A–E using ArcGIS® v.9.2. Ruth Ann Sobnosky provided technical oversight and quality control.

Wetlands are identified based on three characteristics: vegetation, soils, and hydrology. An area must meet all three criteria to be considered a jurisdictional wetlands. Six sampling points were established in the field to determine wetlands boundaries. Data sheets reporting the results of soils, vegetation, and hydrology analyses were completed for each sample station.

Soil samples were obtained to determine the extent of hydric soils on the site. A standard Munsell soil color chart was used to determine the hue, value, and chroma of each soil sample. Soil samples were taken at a depth of ten inches or immediately below the A horizon. Criteria established by the National Technical Committee for Hydric Soils (1991) were used to determine hydric soils.

Wetlands hydrology was characterized during this wetlands delineation. Inundation and/or soil saturation were noted for each sample point. Secondary hydrological indicators, including watermarks, drift lines, sediment deposits, wetlands drainage patterns, blackened leaves, and morphological indicators, were also noted. Other hydrological indicators observed include iron/manganese concretions and oxidized root zones within the upper soil layers.

Quantitative vegetation data were collected at each sampling point. Dominance was estimated by percent areal cover. Four strata were considered for each sample point—trees, saplings/shrubs, herbs, and woody vines. Trees are defined as any woody plant having a diameter at breast height (DBH) greater than 3.0 inches. Saplings and shrubs are those woody plants that have a DBH of less than 3.0 inches and are greater than 3.2 feet in height. For each stratum, plant species within a quadrat were identified and percent areal cover was estimated for each species. Fifteen-foot-square quadrats were used for trees, saplings/shrubs, and woody vines. A three-foot-square quadrat was used for herbs.

Any species within a stratum comprising 20 percent or more of the total quadrat areal cover was considered to be dominant. Dominant species within all strata were then added to determine the percentage of wetlands vegetation for each sample point. The wetlands vegetation criterion was met if greater than 50 percent of the dominant vegetation was indicative of wetlands conditions.

Reed (1988) was used to assign indicator statuses to each identified species. Plants with an indicator status of obligate (OBL), facultative wetland (FACW), or facultative (FAC) were considered to be indicative of wetlands conditions. Plants with an indicator status of facultative minus (FAC-), facultative upland (FACU), or upland (UPL) were considered to be indicative of upland conditions. Plants that could only be identified to genus were sometimes assigned an indicator status based on the professional judgment of Davey Resource Group. These plants are classified as wetlands indicator species (WIS) or upland indicator species (UIS). See Appendix F for a more detailed explanation of wetlands vegetation indicator statuses.

Flags were placed at necessary points around each wetlands to accurately depict its boundary. The location of each flag was mapped using a 12-channel Trimble® Pathfinder® Pro XRS™ global positioning system (GPS), which has sub-meter accuracy when used in conjunction with GPS data collected from a base station (a static GPS receiver set over a known point). The field-collected GPS data were compiled and differentially corrected using a desktop computer equipped with Trimble®'s Pathfinder® Office™ software and GPS data collected from an appropriate base station. The corrected GPS latitude-longitude positions were exported into a compatible coordinate system as an AutoCAD® drawing interchange file (*.dxf). The vegetation, soils, and wetlands maps included in this report were prepared using AutoCAD Map® 2008 software.

Results

Vegetation

A map showing the locations of vegetative communities present on the property is in Appendix G. The site contains successional woods, upland old fields and shrub thickets, wet meadows, and lowland woods. Species identifications are based on Braun (1989), Newcomb (1977), and Weishaupt (1971). Reed (1988) was consulted to assign wetlands indicator statuses to plant species.

Successional Woods. Portions of the site are successional woods. Common species found here include *Acer saccharinum* (silver maple, FACW[1]), *Alliaria petiolata* (garlic mustard, FACU-), *Crataegus* sp. (hawthorn, UIS), *Lonicera tatarica* (Tartarian honeysuckle, FACU), *Populus deltoides* (eastern cotton-wood, FAC), *Prunus serotina* (black cherry, FACU), *Robinia psuedoacacia* (black locust, FACU-), *Rosa multiflora* (multiflora rose, FACU), and *Toxicodendron radicans* (poison ivy, FAC).

Upland Old Fields and Shrub Thickets. Portions of the site are upland old field and shrub thicket. Common species include *Cirsium arvense* (creeping thistle, FACU), *Coronilla varia* (crownvetch, FACU), *Lonicera tatarica* (Tartarian honeysuckle, FACU), *Rosa multiflora* (multiflora rose, FACU), and *Solidago* spp. (golden-rods, UIS).

[1] Refer to Appendix F for a description of wetlands vegetation indicator status symbols.

Wet Meadows. All of Wetland C and portions of Wetland A are wet meadows (Photographs 1 and 3, Appendix H). Common species include *Impatiens capensis* (spotted touch-me-not, FACW), *Leersia oryzoides* (rice cutgrass, OBL), and *Polygonum pennsylvanicum* (Pennsylvania smartweed, FACW).

Lowland Woods. All of Wetland B and portions of Wetland A are lowland woods (Photographs 1 and 2, Appendix H). These areas contain *Acer saccharinum* (silver maple, FACW), *Impatiens capensis* (spotted touch-me-not, FACW), *Lysimachia nummularia* (creeping Jennie, FACW-), *Populus deltoides* (eastern cotton-wood, FAC), and *Viburnum recognitum* (northern arrow-wood, FAC).

Soils

The soils on the site are disturbed. There are areas of fill as well as soils that have been disturbed from years of stream dredging and channelization. A large area of soils mapped as Carlisle muck in the northern portion of the site could not be located in the field. A map showing the general locations of soil types as shown on the soil survey and identified in the field is included in Appendix I.

Hydrology

All three of the wetlands are fed by surface water. Wetlands A and C also receive overflow from Haley's Ditch. All of the wetlands are considered non-isolated due to their close proximity to Haley's Ditch. A summary table of sample point data and vegetation, soils, and hydrology data sheets are included in Appendix J.

Conclusions

A map showing the location and size of the jurisdictional wetlands and aquatic features identified on the property, along with the locations of sample points, is shown in Appendix K. Three wetlands totaling 0.839 acre are found within the study area (Table 2). In addition to the wetlands, Haley's Ditch has a length of 1,757 linear feet.

Table 2. Jurisdictional Wetlands Delineated on the Site

Wetlands	Type	Connectivity to Waters of the U. S.[1]	Area (Acres)
A	Lowland woods and wet meadow	Non-isolated	0.722
B	Lowland woods	Non-isolated	0.093
C	Wet meadow	Non-isolated	0.024
Total			0.839

[1] The final determination of a wetlands' connectivity to Waters of the U. S. is made by the U. S. Army Corps of Engineers.

Davey Resource Group is confident that all jurisdictional wetlands and drainageways were identified on this site. No unusual or problem areas were found. All wetlands studies conducted by Davey Resource Group are objective and based strictly on professional judgment. Davey Resource Group and its employees have no vested interest in this property or the proposed project. Appendix L contains references used in the creation of this report, and Appendix M provides profiles of all Davey Resource Group personnel who contributed to this report.

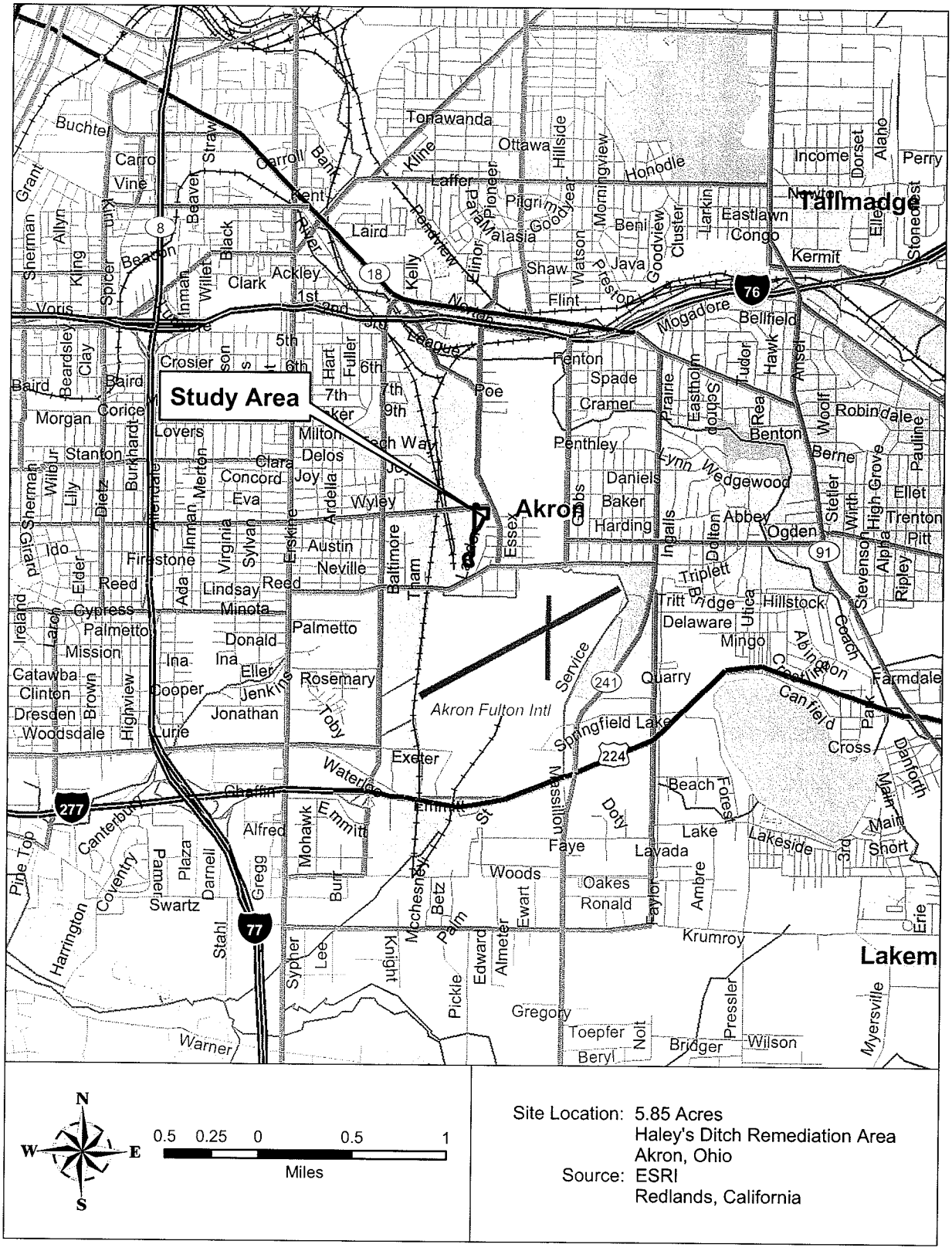
All wetlands delineations must be verified by the U. S. Army Corps of Engineers to be considered official. This wetlands delineation is reflective of environmental conditions at the time the fieldwork was performed. Wetlands are dynamic natural systems; therefore, boundaries may change slightly over time. Wetlands delineations performed during extremely wet or dry weather conditions are subject to slight seasonal changes.

Appendix A
Location of Summit County, Ohio

Site Location: 5.85 Acres
Haley's Ditch Remediation Area
Akron, Ohio

Source: ESRI
Redlands, California

Appendix B
Location of Study Area on Highway Map

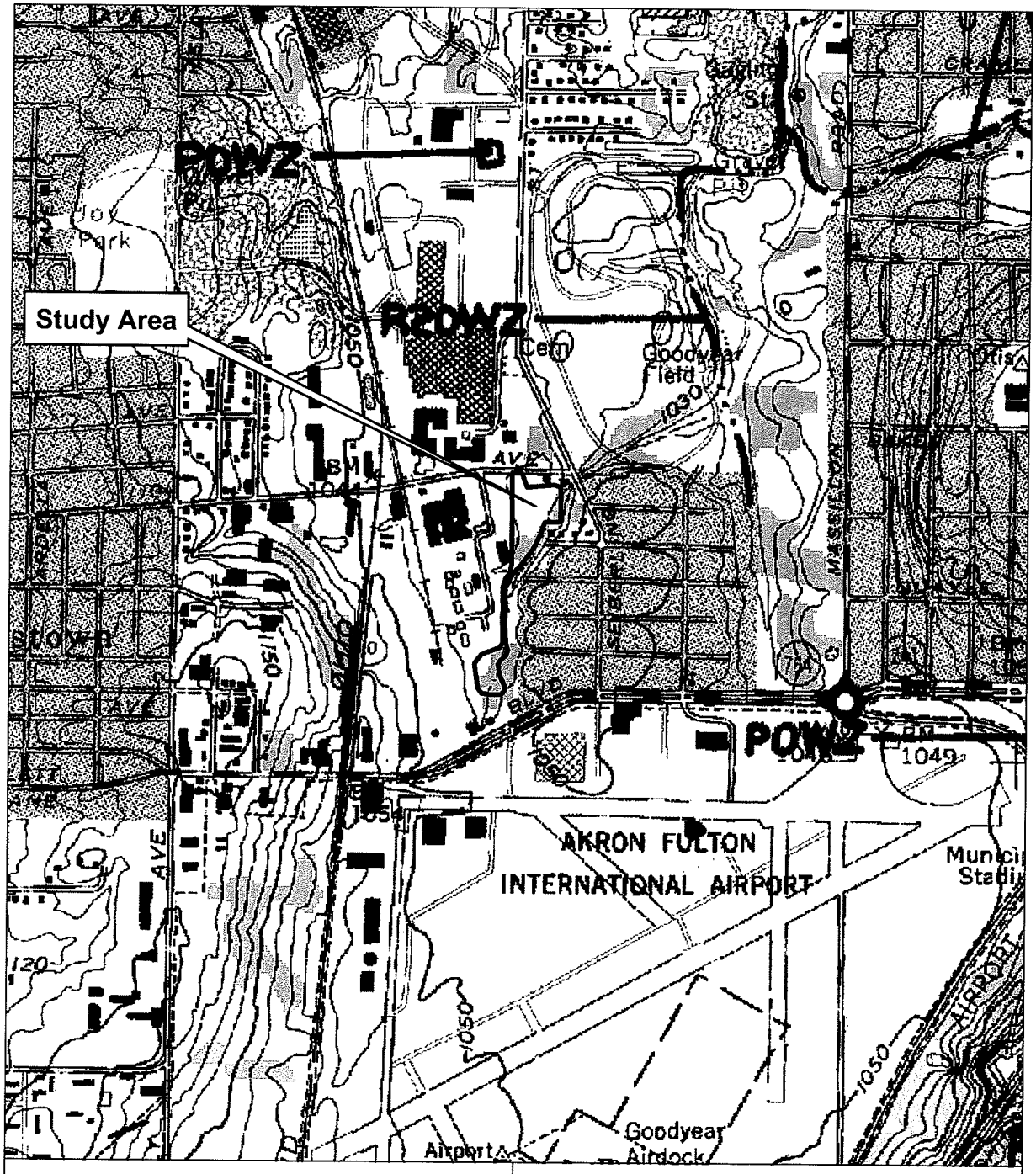


Appendix C
Location of Study Area on
USGS 7.5-Minute Topographic Map
(Akron East Quadrangle)

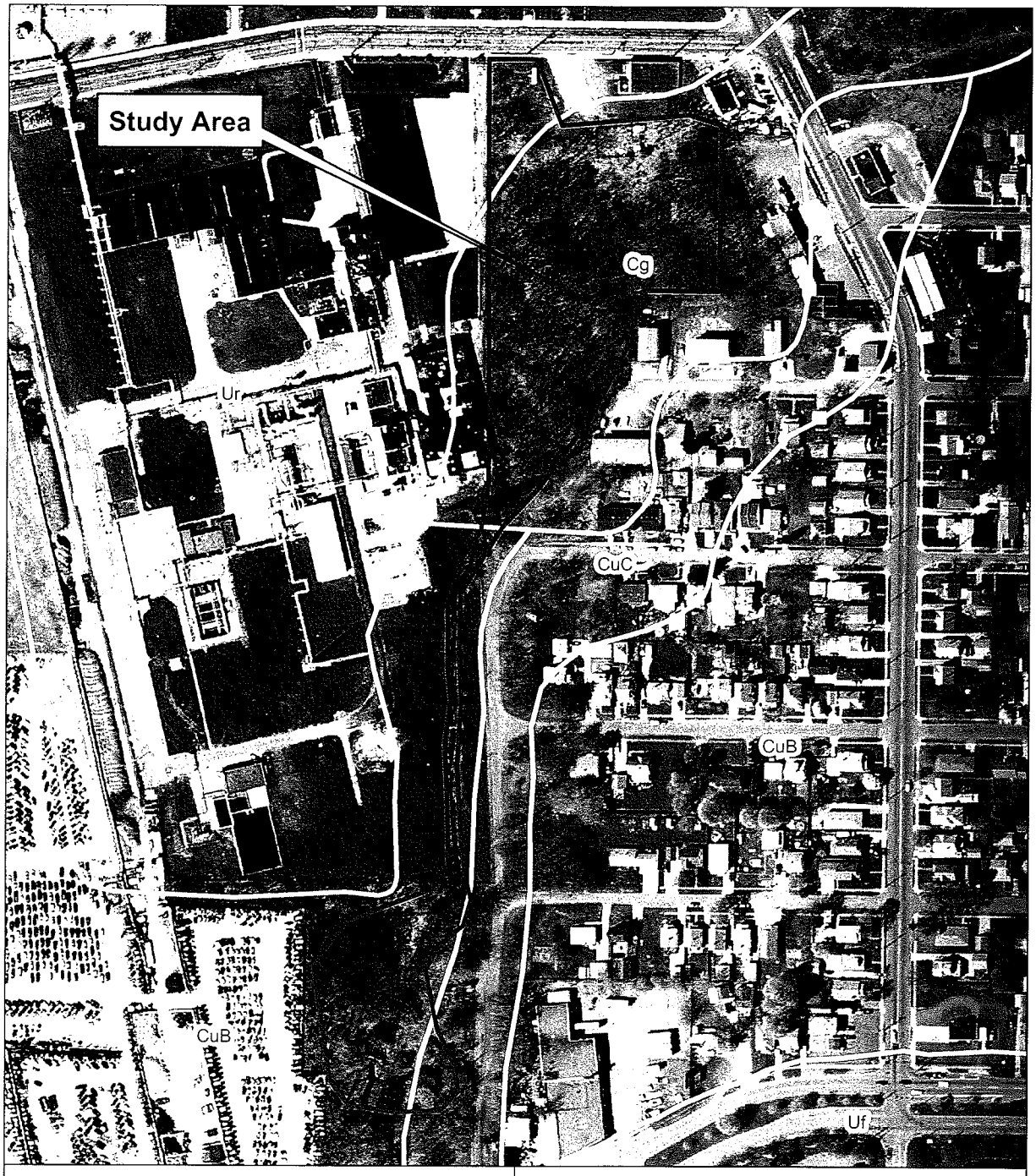
Site Location: 5.85 Acres
Haley's Ditch Remediation Area
Akron, Ohio

Source: U. S. Geological Survey
Reston, Virginia
Photorevised 1984

Appendix D
Location of Study Area on National Wetlands Inventory Map (Akron East Quadrangle)



Appendix E
Soils Information for Study Area



N
W E
S

100 50 0 100 200 300
Feet

Site Location: 5.85 Acres
Haley's Ditch Remediation Area
Akron, Ohio

Source: U. S. Department of Agriculture
Natural Resources Conservation Service
Web Soil Survey
OIT OGRIP Orthophotograph from 2006

Description of Soils Found on the Site from the Summit County Soil Survey (Ritchie and Steiger, 1974).

Carlisle muck (Cg).—Areas of this nearly level to depressional organic soil range from 2 to 1,000 acres in size. The thickness of organic deposit ranges from about 4-1/2 feet to as much as 100 feet in some kettles. In the Copley Swamp area, the organic material is commonly 10 to 30 feet thick. Included in mapping are areas of soils where the organic material is as thin as 40 inches and a few areas of soils that have an overwash of mineral material 6 to 10 inches thick.

This swampy soil is too wet for most uses unless it is drained. It is subject to subsidence and is highly unstable if used for structures. Drained areas, when dry, are subject to severe soil blowing and damage by fire. Crop production on this soil requires intensive management, but the soil is well suited to vegetables if it is drained. Capability unit IIIw-5; woodland suitability group 4.

Chili-Urban land complex, undulating (CuB).—This mapping unit consists of areas where the original Chili soils have been largely destroyed or covered by grading and digging. Most areas are used for urban or industrial development. Borrow or fill areas make up 50 to 75 percent of the mapping unit, but the soils are undisturbed in undeveloped lots, in the back part of developed lots, and in small patches of woodland.

Fill areas typically consists of about 1 to 3 feet of fill material overlying Chili soils or inclusions of Bogart or Oshtemo soils. The fill is loamy material from the subsoil of Chili soils or, in some places, gravelly material. In the borrow areas, the subsoil of these soils or sand and gravel are exposed.

The surface layer of the disturbed soil commonly has a low organic-matter content and poor tilth. It is droughty, and seed germination is generally poor. The hazard of erosion is severe, particularly if the soil is bare of vegetation during construction. Bare areas produce large amounts of sediment and runoff. Other than slope, the mapping unit has few limitations for most nonfarm uses. Capability unit not assigned; woodland suitability group 2o1.

Chili-Urban land complex, rolling (CuC).—This mapping unit consists of areas where the original Chili soils have been largely destroyed or covered by grading and digging. Most areas are used for urban or industrial development. Borrow or fill areas make up 50 to 75 percent of the mapping unit, but the soils are undisturbed in undeveloped lots, in the back part of developed lots, and in small patches of woodland.

Fill areas typically consist of about 1 to 3 feet of fill material overlying undisturbed Chili soils or inclusions of Oshtemo soils. The fill is loamy material from the subsoil or gravelly material from the substratum of the Chili soils. In the borrow areas, the subsoil or substratum of these soils are exposed.

The surface layer of the disturbed soil commonly has a low organic matter content and poor tilth. It is droughty, and seed germination is generally poor. The hazard of erosion is severe, particularly if the soil is bare of vegetation during construction. Through erosion, large amounts of sediment are delivered to adjacent drainageways unless conservation practices are used during construction. Slope is the dominant limitation to many nonfarm uses of this mapping unit. Capability unit not assigned; woodland suitability group 2o1.

Urban land (Ur) consists of areas 10 acres or more in size that are covered by buildings, pavement, or other manmade surfaces. Among these areas are commercial and industrial areas, large factories, shopping centers, warehouses, and railroad yards. The slope ranges from 0 to 25 percent. Most areas have a very low infiltration rate and very rapid runoff. Large areas of Urban land materially increase the volume of water flowing in nearby streams after a rain. Urban land can be a source of pollution in nearby streams unless there is careful management of these areas. Capability unit not assigned; woodland suitability group 4.

List of Hydric Soils for Summit County, Ohio

Map Unit Symbol	Map Unit Name
Ca	Canadice silty clay loam
Cg	Carlisle muck
Da	Damascus loam
Fr	Frenchtown silt loam
Ho	Holly silt loam
Hy	Holly silt loam, alkaline
Ld	Linwood muck
Ln	Lorain silty clay loam
Ly	Luray silt loam
Od	Olmsted loam
Sb	Sebring silt loam
So	Sloan silt loam
Tr	Trumbull silt loam
Wc	Wallkill silt loam
Wt	Willette muck

Supplemental List of Non-Hydric Soil Map Units with Hydric Inclusions for Summit County, Ohio

Map Unit Symbol	Map Unit Name	Where Hydric Soil Component Occurs
CcA	Caneadea silt loam, 0-2% slopes	drainageways and depressions
CcB	Caneadea silt loam, 2-6% slopes	drainageways and depressions
FcA	Fitchville silt loam, 0-2% slopes	drainageways and depressions
Fn	Fitchville-urban land complex	drainageways and depressions
JtA	Jimtown loam, 0-2% slopes	low areas and depressions
Ju	Jimtown-urban land complex	drainageways and depressions
MgA	Mahoning silt loam, 0-2% slopes	depressions and drainageways
Mn	Mahoning-urban land complex	depressions and drainageways
Or	Orrville silt loam	low areas and meandering channels
ReA	Ravenna silt loam, 0-2% slopes	depressions and drainageways
Rn	Ravenna-urban land complex	depressions and drainageways
WaA	Wadsworth silt loam, 0-2% slopes	depressions
WaB	Wadsworth silt loam, 2-6% slopes	depressions and drainageways
Wb	Wadsworth-urban land complex	depressions and drainageways

Appendix F
Definition of Wetlands Vegetation Indicator Status (from Reed, 1988)

Obligate Wetlands (OBL). Occur almost always (estimated probability is greater than 99%) under natural conditions in wetlands.

Facultative Wetlands (FACW). Usually occur in wetlands (estimated probability 67–99%) but occasionally found in non-wetlands.

Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability 34–66%).

Facultative Upland (FACU). Usually occur in non-wetlands (estimated probability 67–99%) but occasionally found in wetlands (estimated probability 1–33%).

Obligate Upland (UPL). Occur in wetlands in another region, but occur almost always (estimated probability > 99%) under natural conditions in non-wetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the *National List.*

Species for which little or no information was available to base an indicator status were assigned a no indicator (NI) status. An asterisk (*) after the indicator status indicates that the indicator status was based on limited ecological information.

The wetlands indicator categories should not be equated to degrees of wetness. Many obligate wetlands species occur in permanently or semipermanently flooded wetlands, but a number of obligates also occur, and some are restricted to wetlands that are only temporarily or seasonally flooded. The facultative upland species include a diverse collection of plants that range from weedy species adapted to exist in a number of environmentally stressful or disturbed sites (including wetlands), to species in which a portion of the gene pool (an ecotype) always occurs in wetlands. Both the weedy and ecotype representatives of the facultative upland category occur in seasonally and semipermanently flooded wetlands.

Davey Resource Group has added two additional indicators for situations when plants can only be identified to genus. A Wetlands Indicator Species (WIS) is a plant that is most likely obligate wetlands, facultative wetlands, or facultative. An Upland Indicator Species (UIS) is a plant that is most likely indicative of upland or facultative upland conditions. These additional indicators are used when species identification is not possible. A variety of factors are part of the UIS and WIS assignments. Indicator statuses of all locally occurring members of the genus in question are considered, as are the health and size of the population and the indicator status of nearby plants.

Appendix G
General Plant Communities on the Site from Field Data

Appendix G

General Plant Communities on the Site from Field Data

Prepared for
ARCADIS

5.85 Acres, Haley's Ditch Remediation Area, Akron Airdock Facility, Lockheed Martin Corporation, Akron, Ohio

Prepared by
DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

Data used to produce this map were collected on June 25 and July 1, 2008

Archwood Avenue
Hobart Avenue
Wildon Avenue
Canadien Avenue
Salem Avenue
Seiberling Street
Landon Street
Triplett Boulevard

Successional Woods
existing culvert
Wetland A
Upland Old Field/Shrub Thicket
Wet Meadow
Lowland Woods
Wetland B
Lowland Woods
Upland Old Field/Shrub Thicket
Successional Woods
Wetland C
Wet Meadow
Upland Old Field/Shrub Thicket

① ② ③ ④ ⑤

= Study area
= Haley's Ditch
= Direction of flow
① = Photograph location and direction of view
= Areas of wetlands delineated within study area

GRAPHIC SCALE
0 100 200
(IN FEET)

N W E S

Appendix H
Photographs of Site

Photograph 1 (6-25-08) Wetland A is a lowland woods and wet meadow.

Photograph 2 (6-25-08) Wetland B is a lowland woods.

Photograph 3 (6-25-08) Wetland C is a wet meadow.

Photograph 4 (6-25-08) Haley's Ditch, the northern portion of the site, is surrounded by successional woods.

Photograph 5 (6-25-08) Haley's Ditch in the central portion of the site is surrounded by a narrow area of upland old field.

Appendix I
Soils Based on Field Data and Soil Survey Map

Appendix I

Soils Based on Field Data and Soil Survey Map

Prepared for
ARCADIS

5.85 Acres, Haley's Ditch Remediation Area, Akron Airdock Facility, Lockheed Martin Corporation, Akron, Ohio

Prepared by
DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

Data used to produce this map were collected on June 25 and July 1, 2008

Archwood Avenue

existing culvert

Disturbed Soils and Fill

Disturbed Soils and Fill

Disturbed Soils and Fill

Disturbed Soils and Fill

Disturbed Soils and Fill

Hobart Avenue

Wildon Avenue

Canadien Avenue

Seiberling Street

Salem Avenue

Landon Street

Triplett Boulevard

= Study area

= Haley's Ditch

= Direction of flow

GRAPHIC SCALE

0 100 200

(IN FEET)

N

W E

S

Appendix J
Vegetation, Hydrology, and Soils Data Sheets

Summary Table of Vegetation, Hydrology, and Soils Sample Point Data

Sample Number	Hydric Soil	Wetlands Hydrology	Percent Wetlands Vegetation	Jurisdictional Wetlands	Comments
1	Yes	Yes	100	Yes	Lowland woods (Wetland A)
2	No	No	40	No	Successional woods
3	Yes	Yes	100	Yes	Lowland woods (Wetland B)
4	No	No	60	No	Successional woods
5	Yes	Yes	100	Yes	Wet meadow (Wetland C)
6	No	No	0	No	Upland old field/shrub thicket

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner: ARCADIS		**County:** Summit
Investigators: Todd Crandall; Kristen Bates		**State:** Ohio
		Plot ID: 1

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Lowland woods (Wetland A)
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Populus deltoides Cotton-Wood,Eastern	Tree	FAC	*Lysimachia nummularia* Jennie,Creeping	Herb	FACW-
Polygonum pensylvanicum Smartweed,Pennsylvania	Herb	FACW			

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%

FAC Neutral: 2/2 = 100.00%

Numeric Index: 7/3 = 2.33

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- NO **Saturated in Upper 12 Inches**
- NO **Water Marks**
- YES **Drift Lines**
- YES **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 1

SOILS

Map Unit Name (Series and Phase): Disturbed soils and fill
Map Symbol: N/A **Drainage Class:** Variable
Taxonomy (Subgroup):
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR4/1	10YR5/8	Few	Distinct	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	UNK **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	UNK **Listed on National Hydric Soils List**
YES **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 2

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Successional woods
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Populus deltoides	Tree	FAC	*Hesperis matronalis*	Herb	FACU-
Cotton-Wood,Eastern			Dame's rocket		
Acer saccharinum	Tree	FACW	*Alliaria petiolata*	Herb	FACU-
Maple,Silver			Mustard,Garlic		
Lonicera tatarica	Shrub	FACU			
Honeysuckle,Tartarian					

Percent of Dominant Species that are OBL, FACW or FAC: **FAC Neutral:** 1/4 = 25.00%
(excluding FAC-) 2/5 = 40.00% **Numeric Index:** 17/5 = 3.40

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- NO **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- NO **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:
No hydrological indicators

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 2

SOILS

Map Unit Name (Series and Phase): Disturbed soils and fill
Map Symbol: N/A **Drainage Class:** Variable
Taxonomy (Subgroup):
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR4/3	N/A	N/A	N/A	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	UNK **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	UNK **Listed on National Hydric Soils List**
NO **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 3

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Lowland woods (Wetland B)
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Acer saccharinum	Tree	FACW	*Lysimachia nummularia*	Herb	FACW-
Maple,Silver			Jennie,Creeping		
Viburnum recognitum	Shrub	FAC	*Impatiens capensis*	Herb	FACW
Arrow-Wood,Northern			Touch-Me-Not,Spotted		

Percent of Dominant Species that are OBL, FACW or FAC: 4/4 = 100.00%
(excluding FAC-)

FAC Neutral: 3/3 = 100.00%
Numeric Index: 9/4 = 2.25

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 2 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- YES **Sediment Deposits**
- YES **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 3

SOILS

Map Unit Name (Series and Phase): Disturbed soils and fill
Map Symbol: N/A **Drainage Class:** Variable **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** (Yes) No
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR5/1	10YR5/8	Few	Distinct	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	UNK **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	UNK **Listed on National Hydric Soils List**
YES **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 4

Do Normal Circumstances exist on the site?	(Yes)	No	**Community ID:** Successional woods
Is the site significantly disturbed (Atypical Situation:)?	Yes	(No)	**Transect ID:**
Is the area a potential Problem Area?	Yes	(No)	**Field Location:**
(If needed, explain on the reverse side)			

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Acer saccharinum	Tree	FACW	*Alliaria petiolata*	Shrub	FACU-
Maple,Silver			Mustard,Garlic		
Prunus serotina	Tree	FACU	*Lysimachia nummularia*	Herb	FACW-
Cherry,Black			Jennie,Creeping		
Viburnum recognitum	Shrub	FAC			
Arrow-Wood,Northern					

Percent of Dominant Species that are OBL, FACW or FAC: 3/5 = 60.00%
(excluding FAC-)

FAC Neutral: 2/4 = 50.00%
Numeric Index: 15/5 = 3.00

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- NO **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- NO **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:
No hydrological indicators

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 4

SOILS

Map Unit Name (Series and Phase): Disturbed soils and fill
Map Symbol: N/A **Drainage Class:** Variable
Taxonomy (Subgroup):
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? (Yes) No

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR5/3	10YR5/6	Few	Distinct	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	UNK **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	UNK **Listed on National Hydric Soils List**
NO **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 5

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Wet meadow (Wetland C)
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Typha latifolia	Herb	OBL	*Impatiens capensis*	Herb	FACW
Cattail,Broad-Leaf			Touch-Me-Not,Spotted		
Leersia oryzoides	Herb	OBL			
Cutgrass,Rice					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%

FAC Neutral: 3/3 = 100.00%

Numeric Index: 4/3 = 1.33

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water: N/A *(in.)*

Depth to Free Water in Pit: = surface *(in.)*

Depth to Saturated Soil: N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- YES **Drift Lines**
- YES **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 5

SOILS

Map Unit Name (Series and Phase): Disturbed soils and fill
Map Symbol: N/A **Drainage Class:** Variable **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR4/1	N/A	N/A	N/A	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	UNK **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	UNK **Listed on National Hydric Soils List**
YES **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 6

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Upland old field/shrub thicket
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		

VEGETATION **(USFWS Region No. 1)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Polygonum cuspidatum	Herb	FACU-	*Alliaria petiolata*	Herb	FACU-
Knotweed,Japanese			Mustard,Garlic		
Rosa multiflora	Shrub	FACU			
Rose,Multiflora					

Percent of Dominant Species that are OBL, FACW or FAC: 0/3 = 0.00%
(excluding FAC-) 0/3 = 0.00%

FAC Neutral: 0/3 = 0.00%
Numeric Index: 12/3 = 4.00

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- NO **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- NO **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:
No hydrological indicators

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Haley's Ditch Remediation Area, Akron	**Project No:**	**Date:** 25-Jun-2008
Applicant/Owner:	ARCADIS		**County:** Summit
Investigators:	Todd Crandall; Kristen Bates		**State:** Ohio
			Plot ID: 6

SOILS

Map Unit Name (Series and Phase): Disturbed soils and fill
Map Symbol: N/A **Drainage Class:** Variable **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR5/2	N/A	N/A	N/A	Silt loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	UNK **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	UNK **Listed on National Hydric Soils List**
NO **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Remarks:

Appendix K
Wetlands Boundaries, Acreages, and Sample Point Locations

Appendix K

Wetlands Boundaries, Acreages, and Sample Point Locations

Prepared for
ARCADIS

5.85 Acres, Haley's Ditch Remediation Area, Akron Airdock Facility, Lockheed Martin Corporation, Akron, Ohio

Prepared by
DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

Data used to produce this map were collected on June 25 and July 1, 2008

Archwood Avenue

existing culvert

Wetland A
(0.722 acre)

1
2

Hobart Avenue

Wildon Avenue

Seiberling Street

Canadien Avenue

Salem Avenue

Landon Street

Triplett Boulevard

3
4

Wetland B
(0.093 acre)

5
6

Wetland C
(0.024 acre)

= Study area

= Haley's Ditch (1,757 linear feet)

= Direction of flow

(1) = Sample point location

= Areas of wetlands delineated within study area (0.839 acre)

NOTE: Wetland sizes and stream lengths could change upon overlay of a boundary survey, especially where these features extend outside of or are in close proximity to the shown study limits. Wetland acreage and stream lengths are calculated for the portion that occurs in the shown study limits.

GRAPHIC SCALE
0 100 200
(IN FEET)

N
W E
S

Appendix L
References

Braun, E. Lucy. 1989 (2nd edition). *The Woody Plants of Ohio: Trees, Shrubs, and Woody Climbers Native, Naturalized, and Escaped.* The Ohio State University Press, Columbus. 362 pp.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1.* United States Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

National Technical Committee for Hydric Soils. 1991. *Hydric Soils of the United States.* United States Department of Agriculture Soil Conservation Service, Washington.

Newcomb, Lawrence. 1977. *Newcomb's Wildflower Guide.* Little, Brown, and Company, Boston. xxii + 490 pp.

Reed, Porter B., Jr. 1988. *National List of Plant Species that Occur in Wetlands: Ohio.* U. S. Fish and Wildlife Service, St. Petersburg.

Ritchie, A., and J.R. Steiger. 1974. *Soil Survey of Summit County, Ohio.* United States Department of Agriculture Soil Conservation Service, Washington.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed August 17, 2007.

Weishaupt, Clara G. 1971 (3rd edition). *The Vascular Plants of Ohio.* Kendall/Hunt Publishing Company, Dubuque. iii + 293 pp.

Appendix M
Davey Resource Group Personnel Profiles

Kristen Bates is a biologist for a variety of natural resource projects, including wetlands monitoring and invasive species control. Ms. Bates is a Certified Commercial Pesticide Applicator in the state of Ohio (License No. 108879). She has been involved in the large-scale eradication of *Typha angustifolia* (narrow-leaf cattail) and *Rhamnus frangula* (glossy buckthorn) within 50 acres of wetlands to be restored along Pond Brook in Twinsburg, Ohio on land managed by Metro Parks, Serving Summit County. She has also been involved in a large exotic plant monitoring study in the Cuyahoga Valley National Park. Ms. Bates joined Davey Resource Group in 2007 and graduated from Kent State University with a Bachelor of Science degree in botany.

Shawn William Bruzda is an urban forester and biologist with Davey Resource Group. Mr. Bruzda serves as an inventory arborist/urban forester for all categories of tree inventory projects, including cemeteries, FEMA-related projects, golf courses, military bases, municipalities, parks, tree preservation inventories and planning and appraisal projects, and university and corporate campuses. He specializes in tree inventories located in the southern United States, as well as southern tree species and tropical and sub-tropical hardwood and palm identification. Mr. Bruzda is also responsible for the creation and dissemination of tree inventory management plans, as well as reports dealing with various applied urban forestry topics. He has extensive experience with both GPS and handheld and pen-based data collection units and their respective software applications. He has served as project manager on numerous large- and small-scale municipal tree inventories throughout the United States. Recently, he has participated in the collection of data for Street Tree Resource Analysis Tool for Urban Forest Managers (STRATUM). STRATUM, developed by the U. S. Forest Service, is a model used for analyzing the benefits of urban street trees as well as the costs of managing them. As a biologist with Davey Resource Group, Mr. Bruzda is responsible for ecological surveys, fish and macroinvertebrate identification and data analysis, general fieldwork, and technical report writing. Proficient with AutoCAD® software, Mr. Bruzda uses these skills to help create maps of wetlands delineations and tree related projects. He also assists in various other areas, such as wetlands delineation surveys, bat mist-netting surveys, endangered species studies, habitat analyses, secondary source reviews, and technical report writing. He is a *Certified Arborist* (OH-1342A) through the International Society of Arboriculture (ISA) and member of the Ohio Chapter of the ISA. Mr. Bruzda is a graduate of Kent State University, having received a Bachelor of Science degree in biological sciences with an emphasis in aquatic ecology.

Todd A. Crandall, M.En., is a senior wetlands scientist that is responsible for all wetlands delineations performed at Davey Resource Group. Mr. Crandall also performs ecological surveys, vegetation cover mapping, plant identification, Section 401/404 and isolated wetlands permitting, and prepares restoration and mitigation plans. Mr. Crandall is responsible for vegetation monitoring at numerous wetlands mitigation sites throughout Ohio. He has completed large-scale wetlands inventories for the Cuyahoga Valley National Park, as well as Cuyahoga, Medina, Portage, and Summit Counties in Ohio. He is certified for wetlands studies by the U. S. Army Wetlands Delineator Certification Program, and is a certified Professional Wetlands Scientist (PWS) through the Society of Wetlands Scientists. He has completed the 40-hour OSHA health and safety training (OSHA Standard 29 CFR 1910.120). Mr. Crandall has also completed training through the Ohio Environmental Protection Agency (EPA) for the following: Headwater Habitat Evaluation Index (HHEI); Qualitative Habitat Evaluation Index (QHEI); Ohio Rapid Assessment Method (ORAM) v.5; and Vegetation Index of Biotic Integrity (VIBI). He has 16 years of experience and holds a bachelor's degree from Hiram College in biology and a master's degree in environmental science from Miami University.

Ruth Ann Sobnosky, M.S., is an environmental planner and project manager for a variety of natural resource projects, including wetlands delineations, wetlands monitoring, wetlands permitting/compliance, ecological surveys, environmental planning studies and grants, and other natural resource consulting projects. Ms. Sobnosky's experience includes working as an environmental planner, public involvement specialist, and community planner. Ms. Sobnosky's responsibilities included the review, evaluation, and reporting of environmental and socio-economic impacts to fulfill National Environmental Policy Act (NEPA) requirements. This required coordination with public agencies, working with engineers, and initiating and attending public involvement meetings necessary for the construction of new roads, bridges, and other important public infrastructure throughout Ohio. Ms. Sobnosky has completed training through the Ohio Department of Transportation for the following: Project Development Process, Categorical Exclusion, Section 106/National Register Eligibility, Section 4(f), and Managing the Environmental and Project Development Process (NEPA). Ms. Sobnosky graduated from Northern Illinois University with a Bachelor of Science degree in geography, and holds a Master of Science degree also in geography from Southern Illinois University at Edwardsville.