

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>PINE STREET CANAL</u>	ProjectID: 01-04
Last Updated:	07/11/02	
City:	Burlington	
County:	Chittenden	
State:	VT	
Country:	USA	
Bodies of Water:	Pine Street Barge Canal and adjoining wetlands; Lake Champlain	
US EPA Region:	I	
Status (Active, Complete, or Monitoring Only):	Active	
Date On NPL:	1983	
ROD/ESD Date:	1998	
Operable Unit:	OU-1	
Areas of Concern (length or acres):	Pine Street Barge Canal - 6 acres; wetlands - additional 14 acres.	
Other Characteristics of Water Body:	The Pine Street Canal study area has been the site of commercial and industrial activity since prior to the Civil War. The barge canal and turning basin were constructed in the mid-1800s to provide access to several sawmills, lumber yards, a boat builder, and a coal yard. The site lies in a topographically low area and includes an abandoned barge canal; a barge turning basin; adjacent filled-in boat slips; and vegetated wetlands south, east, and west of the canal. The canal is hydrologically connected to Lake Champlain through a partially restricted inlet/outlet under an active portion of Vermont Railroad track.	
Contaminants of Concern:	PAHs; VOCs (including benzene, toluene, and xylenes); heavy metals	
Source of Contamination:	Coal gasification plant; plant wastewaters and residual oils and wood chips saturated with organic compounds were directly discharged to or disposed of in the Pine Street Canal wetland. During the 1960s and 1970s, an oil-like material was detected seeping from the wetland into Pine Street Canal, the turning basin, and Maltex Pond.	
Contaminated Area Physical Characteristics:	The Pine Street Barge Canal comprises a portion of the Pine Street Canal, a turning basin, an adjacent filled-in wetland, an area formerly known as Maltex Pond, and an additional portion of land.	
Type of Regulatory Action:	Superfund. Final.	
Overall Status Summary:	<p>The Pine Street Canal study area in Burlington, VT has been the site of commercial and industrial activity since prior to the Civil War. The barge canal and turning basin were constructed in the mid-1800s to provide access to several sawmills, lumberyards, a boat builder, and a coal yard. The site lies in a topographically low area and includes an abandoned barge canal; a barge turning basin; adjacent filled-in boat slips; and about 21 acres of vegetated wetlands south, east, and west of the canal. The canal is hydrologically connected to Lake Champlain through a partially restricted inlet/outlet under an active portion of Vermont Railroad track.</p> <p>The source of contamination is a manufactured gas plant, which operated on the Pine Street Canal Site from 1895 to 1966. The source of the contamination (PAHs, VOCs, and heavy metals) was coal gasification wastes.</p> <p>In 1993, EPA was forced to abandon a proposed dredge and landfill plan due to a strong negative reaction and lack of support from the public and PRPs. That plan was estimated to</p>	

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cost \$14 million (construction cost) and would have involved dredging 1,300 feet of canal (80 feet wide) to a depth of 20 feet and placing the dredged material into a 13-acre dedicated landfill constructed on contaminated wetlands, and then capped. The proposed remedy was dropped by EPA in May 1993 and was declared too intrusive and too destructive of wetlands.

In 1993, representatives of environmental groups, local citizens, the PRPs, EPA, the VT Dept. of Environmental Conservation, and the City of Burlington all joined together to form the "Pine Street Coordinating Council." This group was created with the support of EPA to design studies to fill data gaps regarding the site and consider potential cleanup technologies, and ultimately to develop a consensus on a cleanup proposal in a manner acceptable to the community. The Pine Street Canal Site is one of the first in the country where a public consensus group has been used to develop and recommend a Superfund remedy.

A new FS in 1997 favored in-situ bioremediation or capping remedies. The current proposed remedy, proposed in May 1998, includes covering 5-6 acres of contaminated canal sediments in Subareas 1, 2, and 8 that pose the highest risk to the environment with a subaqueous sand/silt cap. Contaminated wetlands areas (emergent wetlands) near the canal totaling 2-3 acres in Subareas 3 and 7 will also be covered with a sand/silt cap. In addition, a 100 feet by 100 feet area in the uplands/wetlands area found to contain elevated levels of COCs will be covered with topsoil (depth not specified) to reduce exposure. The public comment period on the proposed plan closed July 8, 1998; EPA issued the ROD for the capping remedy on September 29, 1998. Design work was originally scheduled for completion in 1999 and field work was to begin in 2000. This was delayed; design completion and start of field work was re-scheduled for Fall 2001, with field work scheduled for completion by 2003.

In essence, a fund-lead RI/FS and proposed plan were determined to be scientifically indefensible and data-deficient; more than four years and numerous field studies later a new and different remedy was developed by the Coordinating Council and accepted by the EPA.

The Coordinating Council is no longer functioning. It ceased operation once it satisfied its goal of selecting and recommending a publicly acceptable remedy to the EPA. The remedy is being implemented and funded by certain of the PRPs (not yet identified) pursuant to a September 1999 Consent Order. Previously, 17 landowners settled with the major PRPs in an indemnification deal, which is confidential between the landowners and the major PRPs.

Status of field work as of July 2002: Construction of an outlet weir was completed in October 2001 (Phase 1A). Construction of Phase 1B is scheduled to be accomplished from July to November 2002 which will include installation of a sand and topsoil cap in selected wetlands areas, and modifying storm sewer outfalls (Phase 1B). Phase 2, which includes installing a sand cap in the canal and turning basin, is scheduled to start in Spring 2003.

Remedial Action Planned: ☒

Risk Assessment: ☒

Remedial Action Implemented: ☐

Status of Dredging ☐

PRPs: ☒

Contacts: ☒

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<i>Last Updated:</i>	07/11/02	
<i>References:</i>	<input checked="" type="checkbox"/>	
<i>Modeling:</i>	<input type="checkbox"/>	
<i>Fishing Advisory:</i>	<input type="checkbox"/>	
<i>Key Conditions:</i>	capping, more-harm-than-good, wetlands	

REMEDIAL ACTION PLANNED

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Last Updated:	11/06/98	
Target Sediment Cleanup Standards (TSCS):	No numerical levels were set for cap coverage. The edge of the cap is based on ecological risk. In areas to be capped, statistically significant adverse effects were noted in aquatic invertebrates and amphibians.	
How TSCS Established:	N/A	
Target Bank and Floodplain Cleanup Levels (if applicable):	None	
Other Target:	N/A	
Environmental Sample Data References:	Reference A-189	
	<ul style="list-style-type: none">• Sediment:• Water:• Fish:	
Estimated Target Volume:	N/A (planning to cap 5 - 6 acres of contaminated canal sediments and 2 - 3 acres of contaminated wetlands near the canal)	
Planned Disposal Method:	N/A	
Estimated Calendar Time to Implement Remedy:	2001-03 (design 1999 and 2000; construction start 2001)	
Estimated Time to Implement Remedy:	2-3 years	
Estimated Cost to Implement Remedy:	\$4.4 million (\$2.54 million capital costs; \$0.15 million annual O&M costs for 30 years)	
Stated Remedial Action Objectives (and Source):	(Source: Reference A-352) <ol style="list-style-type: none">1. "Construct an underwater cover over canal sediments that present the highest risk to the environment."<ul style="list-style-type: none">• "Place a suitable material over the contaminated canal sediments to prevent aquatic life from coming into contact with contaminants. This type of remedy has been used at several other contaminated sediment sites. Since this will be done while water is in the canal, measures will be taken to prevent sediment from moving to Lake Champlain during cap placement. Potentially historic sunken barges will be further buried under the cap but will be photographed or documented first."2. "Construct a permanent weir at the canal outlet to Lake Champlain to keep the canal at a level which will maintain the wetlands and still allow fish to use the canal for spawning habitat."3. "Place a soil cap over several wetland areas with contaminated soil near the canal."4. "Restrict land use at portions of the site to protect people from coming in contact with contaminants, to avoid interfering with the site remedy, and to prevent contamination from migrating." <ul style="list-style-type: none">• "Through legal mechanisms, place restrictions on portions of the site to prevent	

REMEDIAL ACTION PLANNED

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residential use excavations of highly contaminated soil below 5 feet, the use of groundwater for drinking, and use as a children's day care center in the future."

5. "Redirect and monitor storm water inflow."

- "Construct a spreader to evenly distribute storm water throughout the wetlands at the southern end of the canal. This will reduce erosion and allow the existing wetlands to be more effective in collecting and removing sediment and contaminants before they enter the canal and the lake."

- "Monitor storm water quality and quantity."

6. "Monitor the site."

- "Sample to ensure the cap is working and remains effective over the long term."

- "Sample the surface water and the groundwater to make sure that contamination is not migrating offsite and is not migrating to Lake Champlain."

7. "Define the Superfund site boundary to reflect the nature and extent of contamination and risks found."

- "EPA proposes to define the boundary of the Superfund site, as shown in Figure 1 (in Reference A-352). The site boundary encompasses the area where the manufactured gas plant wastes were found and removes the Superfund designation as a barrier to developing certain parcels along the Pine Street corridor."

Measures of Success to be Used:

Planned Monitoring and Restoration:

Agency Position on Sediment Removal (and Source):

(Source: Reference A-352)

The cleanup plan, which uses capping for containment of contaminated soil and sediments, and land use controls to prevent groundwater use and exposure to contaminated subsurface soil is proposed because it:

- Was developed through an intensive community involvement process and has the consensus support of the Pine Street Barge Canal Coordinating Council;

- Allows for protection of the environment and human health with minimal disturbance of site contaminants;

- Is the best balance of the ... 9 criteria including protecting public health and the environment;

- Restores and protects a valuable and uncommon urban ecosystem in the City of Burlington;

- Allows for reuse of the developable portions of the Pine Street area, with restrictions to insure that people are protected from contaminants remaining on the site and that future

REMEDIAL ACTION PLANNED

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development does not cause contaminants to migrate; and

- Minimizes potential risks to residents and the environment during construction.

Excavation and off-site disposal or treatment of canal sediments were ruled out because of short-term human health risks and cost. Even if EPA were to select these more invasive remedial alternatives, the site would still have to be monitored over the long term.

RISK ASSESSMENT

Project Name ***PINE STREET CANAL***

ProjectID: 01-04

Last Updated: 09/29/98

RA Type: Human Health and Ecological

RA Status: Complete

RA Objectives: For ecological, evaluate the potential effects of site contaminants on ecological receptors for the eight subareas included in the Area of Focus and based on a weight-of-evidence approach

Company Metcalf and Eddy (human health); Roy F. Weston, Inc. (ecological)
Performing RA:

RA Reference Report: Reference A-189

RA Summary and Conclusions: Source: Reference B-225: "The Human Health Baseline Risk Assessment conducted by EPA in 1992 assumed the future use of the land would be commercial, not residential. The 1992 assessment did not find unacceptable risk to most workers at the site or visitors to the site who came in contact with surface soils, however, the Coordinating Council felt that an assessment of additional areas that are particularly accessible to the public should be done. An additional fifty soil samples were tested. Testing did not reveal any areas that posed risk greater than that estimated in the original risk assessment."

"The 1992 risk assessment did not evaluate the risk of exposures to soils at depths greater than five feet. The Coordinating Council agreed with the EPA that exposures were unlikely; as a result, a second risk assessment on subsurface soils was not performed. However, because contamination does exist below five feet, institutional controls such as worker protection requirements, deed and zoning restrictions will be implemented."

Source: Conclusion in Reference A-189: "Based on the multiple lines of evidence (i.e., sediment benchmarks and SEM/AWS ratios; biomarkers; sediment toxicity tests; Avian receptor modeling) and the associated ecological significance, it appears that baseline ecological risks were exceeded in Subareas 1, 2, 3, 7, and 8 of the Area of Focus. While there were findings of ecological significance associated with individual measurement endpoints in subareas 4, 5, and 6, these lines of evidence are not as compelling and do not appear to constitute a baseline ecological risk. Since the results of this risk assessment indicate the potential for substantial ecological impairment in Subareas, 1, 2, 3, 7, and 8, further risk management discussions regarding the need for remediation should focus on these five subareas."

Source: Reference B-225: "Significant ecological risk was found in some areas of the site, but not in others. The Supplemental Baseline Ecological Risk Assessment, completed in 1997, evaluated certain "indicators" which were selected to provide information regarding the overall health of the ecosystem."

"The assessment examined the risk to birds eating insects and fish from the site; the risk to fish from exposure to contaminated sediments; and the risk to bottom dwelling invertebrates and amphibians from exposure to contaminated sediments. Some, but not all, of these organisms showed adverse impacts when exposed to soils and sediments from the site. The information shows that contaminants at the site are causing significant ecological risk in (certain) areas. These areas were the focus of the evaluation of cleanup alternatives."

POTENTIALLY RESPONSIBLE PARTIES

Project Name **PINE STREET CANAL**

ProjectID: 01-04

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **PINE STREET CANAL**

ProjectID: 01-04

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: A

ReferenceID: 113

Title: ***Record of Decision: Pine Street Canal Superfund Site, Burlington, Vermont***

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: September 1998

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 189

Title: ***Pine Street Canal Superfund Site Supplemental Baseline Ecological Risk Assessment***

Location: AEM

Category: Risk Assessment

Prepared by/Author: Roy F. Weston, Inc.

**Preparer/Author
Address:** West Chester, PA

Prepared For: US EPA Region I

Date Published: July 1997

**Key Words and
Phrases:**

Reference Type: A

ReferenceID: 352

Title: ***Cleanup Plan Proposed for Pine Street Barge Canal Superfund Site Burlington, Vermont***

Location: AEM

Category: ROD/Proposed Plan/Action Memo/Decision Document

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:** Boston, MA

Prepared For: General Public

Date Published: May 1998

**Key Words and
Phrases:**

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: B

ReferenceID: 225

Title: *Council Reaches Consensus on Cleanup at the Barge Canal ...
Environmental Projects Proposed
Progress Update #3*

Location: AEM

Category: Site Update

Prepared by/Author: Pine Street Barge Canal Coordinating Council

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: May 1998

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 324

Title: *Pine Street Canal, Vermont*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:** Internet Website

Prepared For: General Public

Date Published: April 1, 1998

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 348

Title: *EPA Selects Cleanup Plan for the Pine Street Canal Superfund
Site: Progress Update #4*

Location: AEM

Category: Site Update

Prepared by/Author: Pine Street Barge Canal Coordinating Council

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: October 1998

**Key Words and
Phrases:**

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: B

ReferenceID: 540

Title: *Construction to begin at Pine Street Barge Canal Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: 2001 Summer

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 716

Title: *Construction to Begin on Phase 1B at the Pine Street Canal Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: July 2002

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 947

Title: *e-mail re: Pine Street Canal Superfund Site: Questions*

Location: AEM

Category: Site Update

Prepared by/Author: Karen Lumino

**Preparer/Author
Address:** US EPA Region I

Prepared For: AEM, Inc.

Date Published: July 24, 2000

**Key Words and
Phrases:**

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: C
Title: *Pine St. corner to get priority*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: April 1, 1994
Key Words and Phrases:

ReferenceID: 97

Reference Type: C
Title: *EPA drops Pine St. Canal plan*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: June 18, 1993
Key Words and Phrases:

ReferenceID: 98

Reference Type: C
Title: *EPA to abandon Pine Street Canal remedy*
Location: AEM
Category: Site Update
Prepared by/Author:
Preparer/Author Address:
Prepared For: Superfund Week
Date Published: May 7, 1993
Key Words and Phrases:

ReferenceID: 99

REFERENCES

Project Name **PINE STREET CANAL**

ProjectID: 01-04

Reference Type: C

ReferenceID: 220

Title: ***Pine St. sediment cleanup eyed***

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: October 20, 1995

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 221

Title: ***Pine Street FS near in Vermont***

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: February 7, 1997

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 246

Title: ***Pine Street Canal sediments get capped***

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author

Address:

Prepared For: Superfund Week

Date Published: June 5, 1998

**Key Words and
Phrases:**

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: C

ReferenceID: 330

Title: *Pine Street Canal ROD Passed, RD for \$4.4M Remedy Beginning Next Year*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: October 16, 1998

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 513

Title: *Vt.: Canal Cap to Prevent Migration*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: September 3, 2001

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 598

Title: *EPA, Justice Department Negotiate Settlement of Vermont NPL Site*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: December 1, 2000

**Key Words and
Phrases:**

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: C

ReferenceID: 668

Title: *Local Opposition Leads to Change In Cleanup Technique Used at Vermont Site*

Location: AEM

Category: Site Update

Prepared by/Author: Judith Jacobs

**Preparer/Author
Address:**

Prepared For: Environmental Reporter (BNA, Inc.)

Date Published: December 3, 1999

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 669

Title: *23 Agree to Cap Contaminated Areas Of Pine Street;
Subcontracting Likely*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Superfund Week

Date Published: December 3, 1999

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 721

Title: *EPA Wants to Complete Design Segment This Fall for Vt. Canal
Superfund Site*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: June 25, 2001

**Key Words and
Phrases:**

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: C

ReferenceID: 834

Title: *Plan calls for cleaning up Vermont canal*

Location: AEM

Category: Site Update

Prepared by/Author: The Associated Press

**Preparer/Author
Address:**

Prepared For: The Worcester (MA) Telegram & Gazette

Date Published: November 25, 1999

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 923

Title: *Vt.: Phase 3 to Begin*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: Hazardous Waste/Superfund Week

Date Published: July 22, 2002

**Key Words and
Phrases:**

Reference Type: D

ReferenceID: 1

Title: *Accord reached on MGP superfund site*

Location: AEM

Category: Site Update

Prepared by/Author: Jerry Ackerman

**Preparer/Author
Address:**

Prepared For: MGP: The Atlantic Reporter

Date Published: December 1997

**Key Words and
Phrases:**

REFERENCES

Project Name PINE STREET CANAL

ProjectID: 01-04

Reference Type: D

ReferenceID: 48

Title: *EPA approves cleanup plan as work moves forward on the Pine Street site*

Location: AEM

Category: Site Update

Prepared by/Author: US EPA Region I

Preparer/Author Address: Boston, MA

Prepared For: Press Release

Date Published: October 1, 1998

Key Words and Phrases:

Reference Type: D

ReferenceID: 180

Title: *Layer of sand holds key to canal's cleanup*

Location: AEM

Category: Site Update

Prepared by/Author: Nancy Bazilchuk

Preparer/Author Address:

Prepared For: The Burlington (VT) Free Press

Date Published: November 13, 2000

Key Words and Phrases:

Reference Type: J

ReferenceID: 6

Title: *US EPA Web Address*

Location: AEM

Category: Contractor and Vendor Information

Prepared by/Author: US EPA Region I

Preparer/Author Address: http://www.epa.gov/region01/remed/sfsites/t_pinest.html

Prepared For:

Date Published: July 22, 1996

Key Words and Phrases:

REFERENCES

Project Name **PINE STREET CANAL**

ProjectID: 01-04

Reference Type: L
Title: ***Memo re: Pine Street Canal***
Location: AEM
Category: Site Update
Prepared by/Author: AEM, Inc.
Preparer/Author Address: Malvern, PA 19355
Prepared For: Internal file
Date Published: August 13, 1997
Key Words and Phrases:

ReferenceID: 1

Reference Type: L
Title: ***Memo re: Summary of Public Participation Process at the Pine Street Barge Canal Superfund Site (VT)***
Location: AEM
Category: Site Update
Prepared by/Author: AEM, Inc.
Preparer/Author Address: Malvern, PA 19355
Prepared For: Distribution
Date Published: July 25, 2000
Key Words and Phrases:

ReferenceID: 65

Reference Type: L
Title: ***Summary of Major Revisions to RODs and Proposed Plans - Sediment Sites***
Location: AEM
Category: ROD/Proposed Plan/Action Memo/Decision Document
Prepared by/Author: AEM, Inc.
Preparer/Author Address: Malvern, PA 19355
Prepared For: Internal Distribution
Date Published: April 13, 2001
Key Words and Phrases:

ReferenceID: 166