

Impact Area Groundwater Study Program

REVISED DRAFT FEASIBILITY STUDY DEMO 1 GROUNDWATER OPERABLE UNIT

JUNE 2004

FACT SHEET 2004-4

This fact sheet provides information on the Impact Area Groundwater Study Program's ongoing investigation and clean up at Demolition Area 1 (Demo 1) and the **Revised Draft Feasibility Study Demo 1 Groundwater Operable Unit**. The Revised Draft Feasibility Study provides an overview and comparison of comprehensive cleanup alternatives for groundwater contamination migrating from Demo 1.

This summer, the Groundwater Study Program is scheduled to begin an interim or Rapid Response Action clean up of groundwater contamination at Demo 1, using a modular system with both granular activated carbon and ion exchange mediums for treatment.

U.S. Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (MADEP) approvals and public input on the Revised Draft Feasibility study will be obtained prior to selection of a preferred alternative. The preferred alternative and the rationale for its selection will be presented in the "Remedy Selection Plan." (See page 4 for further information on public comment periods and future steps in the decision-making process.)

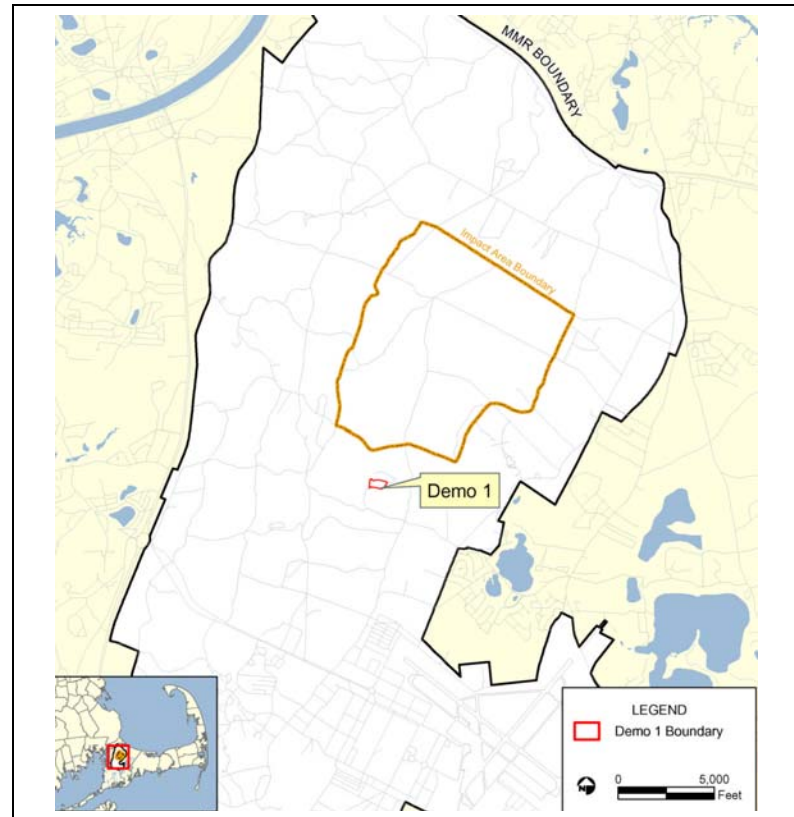
DEMOLITION AREA 1

Demolition Area 1 is a 7.4-acre site located approximately one mile south of the Camp Edwards Impact Area. Demo 1 is located in a natural topographic depression or kettle hole. The site was used from the mid 1970s to late 1990s primarily for open burning and disposal of munitions, and training of explosive munitions disposal technicians.

Groundwater Study Program investigations have identified and delineated a plume of groundwater contamination emanating from the Demo 1 site that extends more than 9,200 feet west. It is approximately 1,400 feet wide and 100 feet deep in the aquifer. Specific contaminants of concern for groundwater at Demo 1 include the explosives chemicals RDX and TNT, and perchlorate, a water soluble salt used as an oxidizer.

Detections of RDX in the Demo 1 plume range from the detection limit of 0.25 parts per billion (ppb) to 370 ppb. Perchlorate detections range from the detection limit of 0.35 ppb to 500 ppb.

The lifetime federal health advisory for RDX in drinking water is 2 ppb. There currently is no federal or state drinking water standard for perchlorate. EPA interim guidance on perchlorate would equate to a range of 4 to 18 ppb in drinking water. The MADEP perchlorate advice level for sensitive populations (children, pregnant women and individuals with hypothyroidism) is 1 ppb.

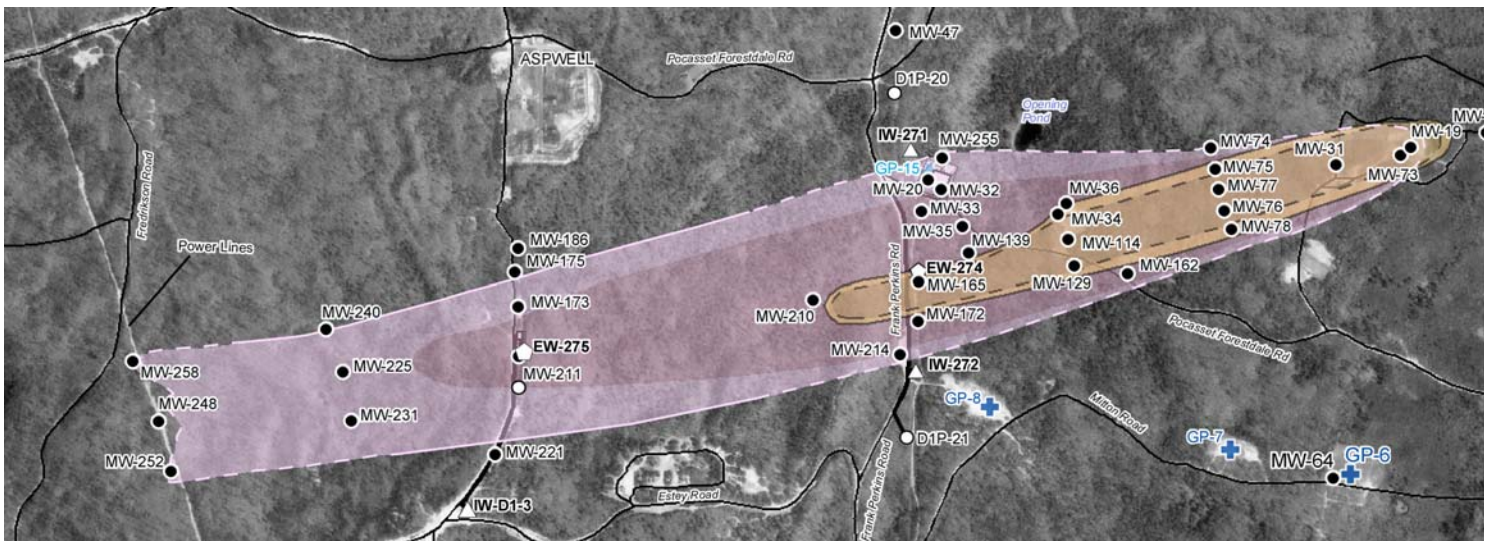


FEASIBILITY STUDY

The Feasibility Study is the formal process used to evaluate and select final cleanup solutions for the reduction and cleanup of contamination from a site. The EPA Administrative Order requires the development of a range of remedial alternatives that reduce contaminant concentrations to different cleanup goals within different timeframes.

The **Revised Draft Feasibility Study Demo 1 Groundwater Operable Unit** evaluates six alternatives proposed by the Impact Area Groundwater Study Program for addressing groundwater contamination at Demo 1. Following a public comment period (see page 4) an alternative will be selected and presented to the public for review before finalization of the Remedy Selection Plan for Demo 1 groundwater cleanup.

The six alternatives presented in the **Revised Draft Feasibility Study Demo 1 Groundwater Operable Unit** are designed to prevent the potential ingestion of water containing contaminants that represent an unacceptable human health risk and to restore the aquifer to its beneficial use as a drinking water supply within a reasonable timeframe.



The Rapid Response Action extraction, treatment and reinjection systems at Frank Perkins and Pew Roads, shown by white dots, will continue to operate as part of Alternatives 2 – 6. (Contour lines dashed where inferred.)

EVALUATION CRITERIA

The **Revised Draft Feasibility Study Demo 1 Groundwater Operable Unit** evaluates and compares the six alternatives with respect to the following criteria:

- Overall protection of human health and the environment. This includes prevention of the movement of contaminants into the aquifer and its preservation as a public drinking water supply.
- Compliance with regulations
- Long-term effectiveness and permanence of cleanup
- Reduction of toxicity, mobility and volume of contamination through treatment
- Short-term effectiveness of cleanup action
- Ability to implement
- Cost to implement

Two other criteria – state and community acceptance – will be accessed based upon input to the Revised Draft Feasibility Study.

PROPOSED ALTERNATIVES

All six alternatives include long-term monitoring and implementation of legal or other measures to prevent groundwater use for any water supply purpose until the remedial goals are achieved. The extraction, treatment and reinjection systems will all use granular activated carbon and ion exchange resin to remove contaminants.

Alternatives 2 - 6 also include a new permanent structure to house the treatment system.

Variations in the alternatives include:

Alternative 1 – Minimal Action

Alternative 1 is a minimal action alternative. This alternative calls for:

- Operation of the two Rapid Response Action extraction, treatment and reinjection systems being installed at Frank Perkins Road and Pew Road for four years, after which the extraction, treatment and reinjection system would be shut down.
- Installation of six additional monitoring wells for long-term monitoring of the groundwater plume.
- Periodic monitoring at 12 of monitoring wells.

Alternative 2 – Baseline

Alternative 2 provides a baseline alternative that makes use of the Rapid Response Action systems as a final cleanup solution. This alternative includes:

- Continued operation of the two Rapid Response Action extraction, treatment and reinjection systems.
- Extraction of groundwater at the total pumping rate of 320 gallons per minute (gpm).
- Recharge of the treated groundwater into the aquifer using three injection wells.

This alternative would return groundwater to regulatory and risk-based concentrations for contaminants of concern within 36 years.

Regulatory and risk-based concentrations for the contaminants of concern are:

- RDX - 0.6 ppb
- TNT - 2 ppb
- Perchlorate - 1 ppb

Alternative 3 - Background

Alternative 3 provides an alternative that would be expected to return groundwater to regulatory and risk-based concentrations for the contaminants of concern in less than 23 years and the alternative goal of background levels in less than 30 years.

This alternative would include:

- Continued operation of the two Rapid Response Action extraction, treatment and reinjection systems
- Installation of two additional extraction wells.
- Extraction of groundwater from the four wells at a total pumping rate of 472 gpm.
- Recharge of treated groundwater into the aquifer using a total of four injection wells (three from Rapid Response Action systems plus one new well)

Proposed background levels 0.25 ppb for RDX and TNT and 0.35 ppb for perchlorate.

NEXT STEPS/UPCOMING ACTIVITIES

The next steps toward selection and implementation of an alternative for addressing groundwater contamination at Demolition Area 1 include:

- Public comment period on Revised Draft Feasibility Study Demo 1 Operable Unit – June 22 to July 7, 2004
- Review of comments and selection of preferred alternative
- Completion of Draft Remedy Selection Plan summarizing the preferred alternative
- Present Remedy Selection Plan and hold 30-day public comment period on Remedy Selection Plan
- Finalize Decision Document outlining final remedy selection - Will include Responsiveness Summary
- Begin design of alternative system selected to complete cleanup of contamination

Alternative 4 – 10 Year

Alternative 4 provides the most aggressive cleanup scenario evaluated in this Feasibility Study. It is designed to achieve regulatory and risk-based standards for the contaminants of concern within 10 years. This alternative calls for:

- Continued operation of the two Rapid Response Action extraction, treatment and reinjection systems.
- Installation of three additional extraction wells.
- Extraction of groundwater from the five wells at a total pumping rate of 1417 gpm.
- Recharge of the treated groundwater into the aquifer using a total of four injection wells (three Rapid Response Action wells plus one new well).

The following Additional Alternatives present design variations that also achieve regulatory and risk-based concentrations for contaminants of concern.

Alternative 5 – Additional Alternative A

Alternative 5 provides a variation of Alternative 4 that is expected to achieve regulatory and risk-based standards for the contaminants of concern within approximately 14 years, by reducing pumping rates. This alternative calls for:

- Continued operation of the two Rapid Response Action extraction, treatment and reinjection systems
- Installation of three additional extraction wells
- Extraction of groundwater at a total pumping rate of 906 gpm.
- Recharge of the treated groundwater into the aquifer using a total of four injection wells (three Rapid Response Action wells, plus one new well)

Alternative 6 – Additional Alternative B

Alternative 6 provides a design that is expected to return groundwater to regulatory or risk-based standards for the contaminants of concern in approximately 13 years. This alternative includes:

- Continued operation of the two Rapid Response Action extraction, treatment and reinjection systems
- Installation of four new extraction wells
- Extraction of groundwater at a total pumping rate of 981 gpm
- Recharge of the treated groundwater into the aquifer using a total of four injection wells (three Rapid Response Action wells plus one new well)

FOR MORE INFORMATION

Contact the following individuals for more information:

Kris Curley – Impact Area Groundwater Study Program
508-968-5626

Ellie Grillo – MA Department of Environmental Protection
508-946-2866

Jim Murphy – U.S. Environmental Protection Agency
617-918-1028

Or visit the Groundwater Study Program Web site at:
www.groundwaterprogram.org

Information repositories have been established in five local libraries to make information on the program available to the public. The repositories are updated to ensure that all necessary documents including copies of work plans, sampling results, site reports, fact sheets, meeting minutes and other materials are available.

The repositories are located at:

Falmouth Public Library
123 Katharine Lee Bates Road
Falmouth, MA 02540

Sandwich Public Library
142 Main Street
Sandwich, MA 02563

Mashpee Public Library
Steeple Street, Mashpee Commons
Mashpee, MA 02649

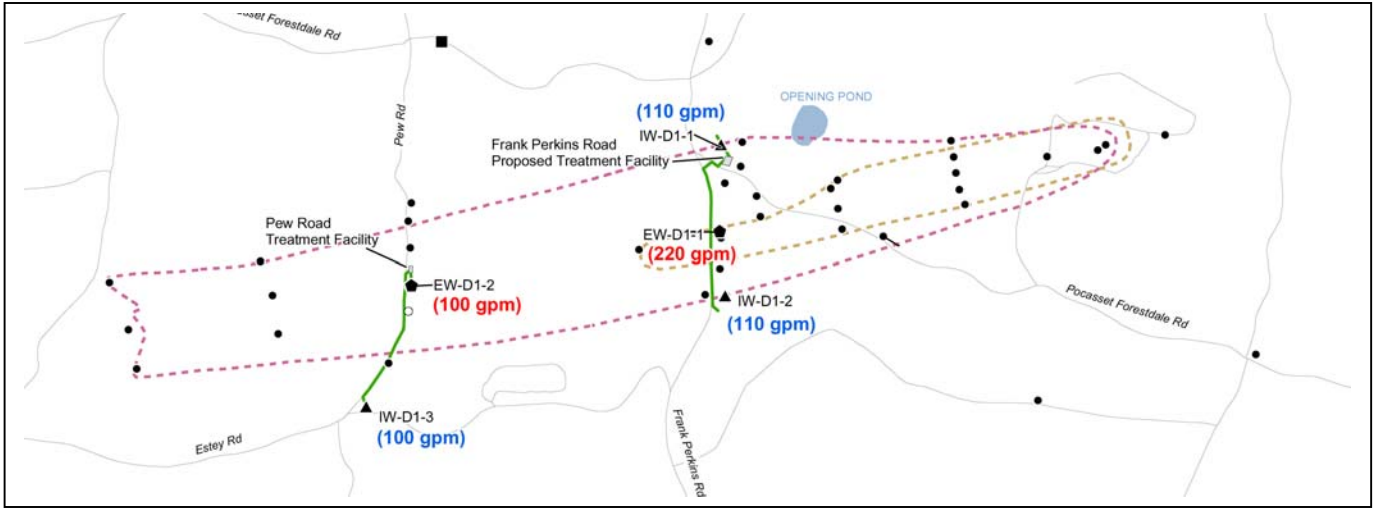
Jonathan Bourne Library
19 Sandwich Road
Bourne, MA 02532

OPPORTUNITIES FOR PUBLIC COMMENT

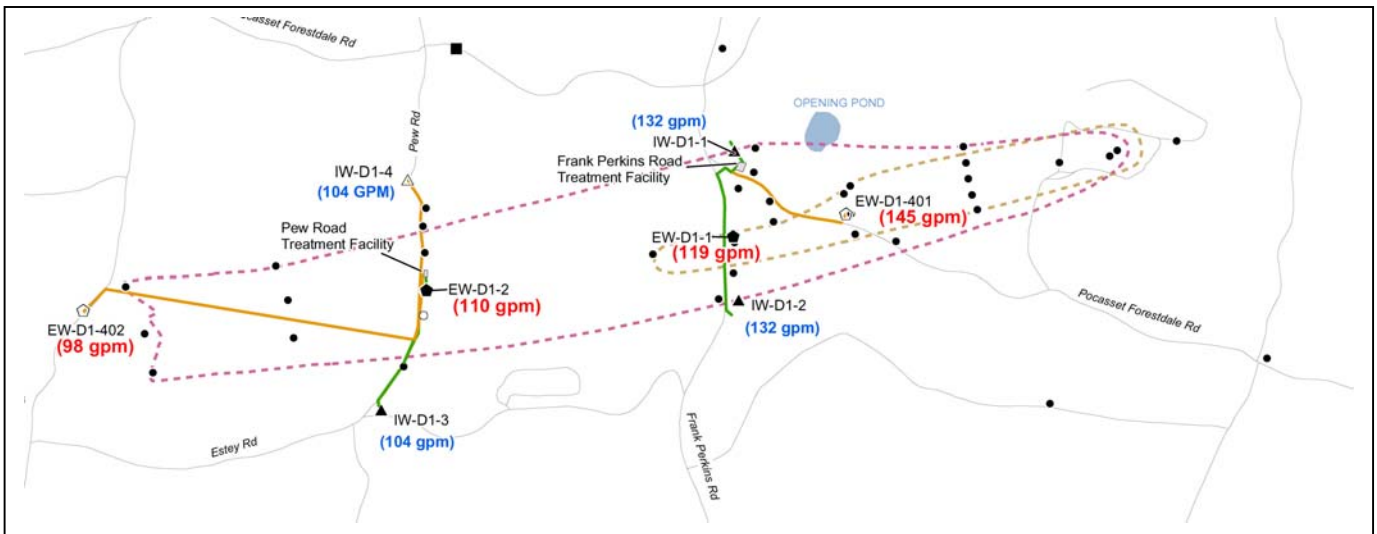
There will be opportunities for the public to provide comment on the Revised Draft Feasibility Study Demo 1 Groundwater Operable Unit and the Draft Remedy Selection Plan for Demo 1 Groundwater Operable Unit. A 15-day public comment period will be held on the Revised Draft Feasibility Study June 22 – July 7, 2004. Information on the 30-day public comment period for the Remedy Selection Plan will be announced when the Plan is ready for review.

During public comment periods, comments can be submitted as follows:

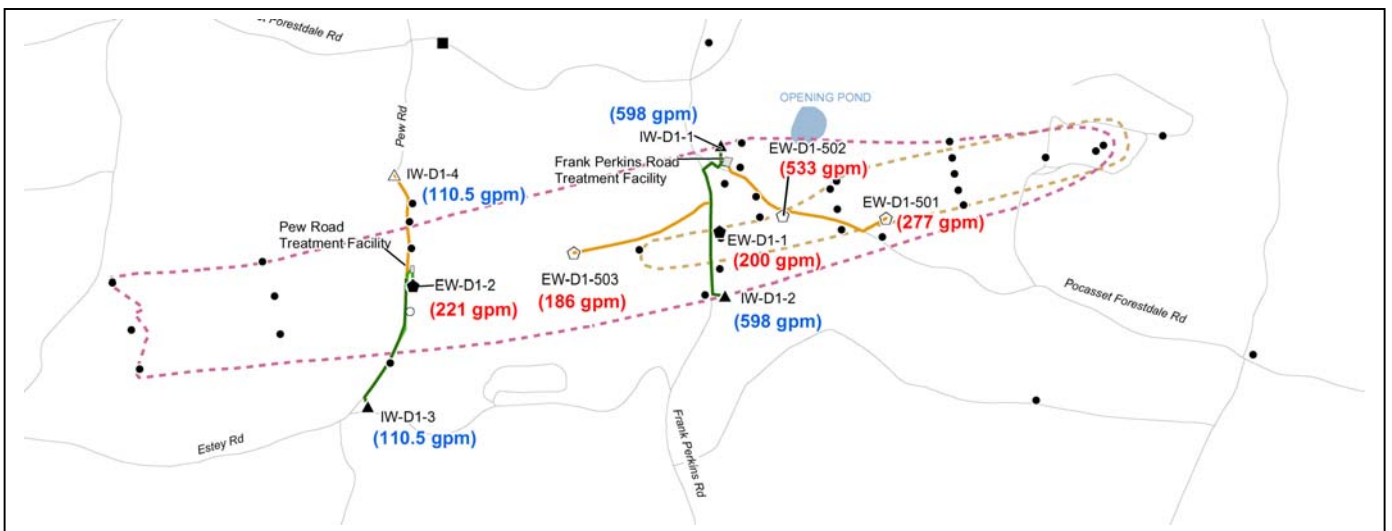
- On the Groundwater Study Program Web site:
www.groundwaterprogram.org
- By fax to 508-968-5286
- By mail to: IAGWSP
1803 West Outer Road
Camp Edwards, MA 02542-5003
- By e-mail to: kristina.curley@ma.ngb.army.mil



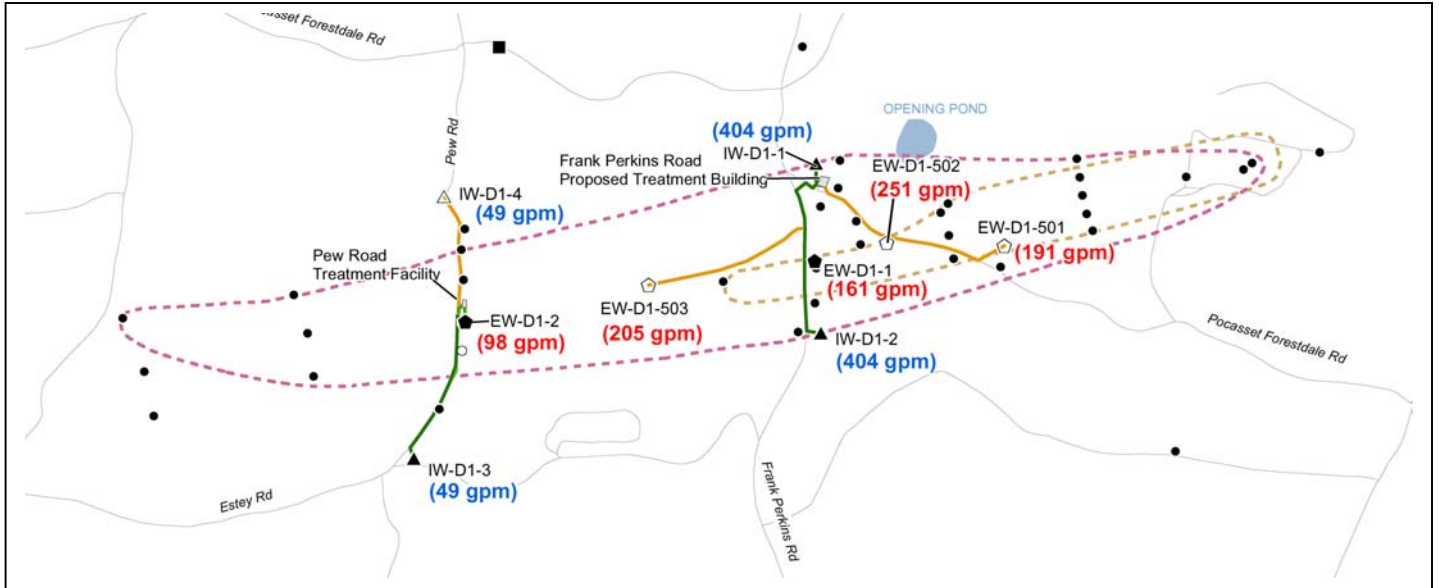
ALTERNATIVE 2 - BASELINE



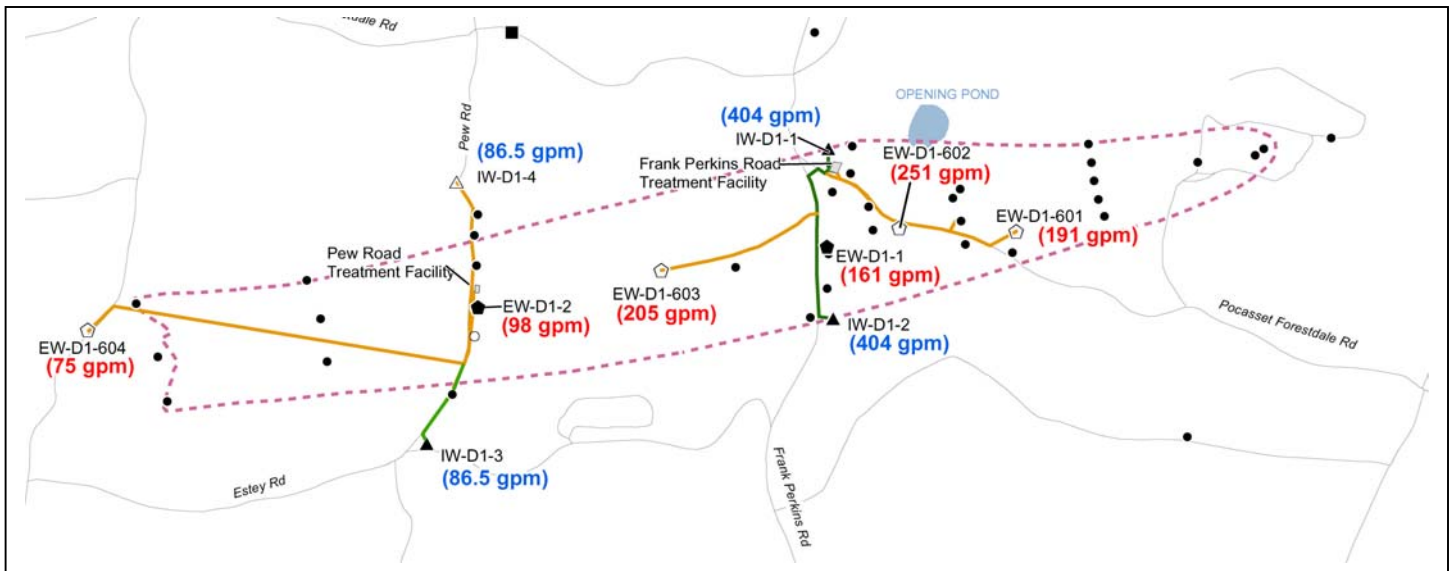
ALTERNATIVE 3 - BACKGROUND



ALTERNATIVE 4 - 10 YEAR



ALTERNATIVE 5 – ADDITIONAL ALTERNATIVE A



ALTERNATIVE 6 – ADDITIONAL ALTERNATIVE B

Design Alternatives	Concentration Objectives	Design Details				RDX Remediation			Perchlorate Remediation		
		Number of Extraction Wells	Total Pumping Rate (gpm)	Number of Injection Wells	Estimated Cost (millions)	Years to Achieve RBC	Years to Achieve Background	% of Mass Removed After 10 Years	Years to Achieve RBC	Years to Achieve Background	% of Mass Removed After 10 Years
Alternative 1 Minimal Action	--	0	0	0	\$ 2.9	>100	>100	17.0	>100	>100	34.0
Alternative 2 Baseline	--	2	320	3	\$15.0	36	50	67.5	25	35/>50*	80.2
Alternative 3 Background	Background	4	472	4	\$20.3	23	27	92.7	18	23/21*	92.7
Alternative 4 10 Year	Risk-based	5	1,417	4	\$25.7	10.7	15	99.7	10	15	98.3
Alternative 5 Additional Alternative A	Risk-based	5	906	4	\$21.1	14	16	98.8	13	15/20*	98.3
Alternative 6 Additional Alternative B	Background	6	981	4	\$26.6	14	16	99.0	13	15/17*	97.9

**Upgradient/downgradient of Pew Road

RBC = Risk-based concentrations (RDX = 0.6 ppb, TNT = 2 ppb, Perchlorate = 1 ppb)

Background or naturally occurring concentrations are less than or equal to detectable concentrations (RDX = 0.25, TNT = 0.25, Perchlorate = 0.35)

gpm = gallons per minute

Notes:

All percentages reflect cumulative mass removed including 4 years of operation of the Rapid Response Action system prior to start of selected alternative.

All estimates of years to achieve either risk-based or background concentrations are based on groundwater modeling performed during the completion of this feasibility study.