





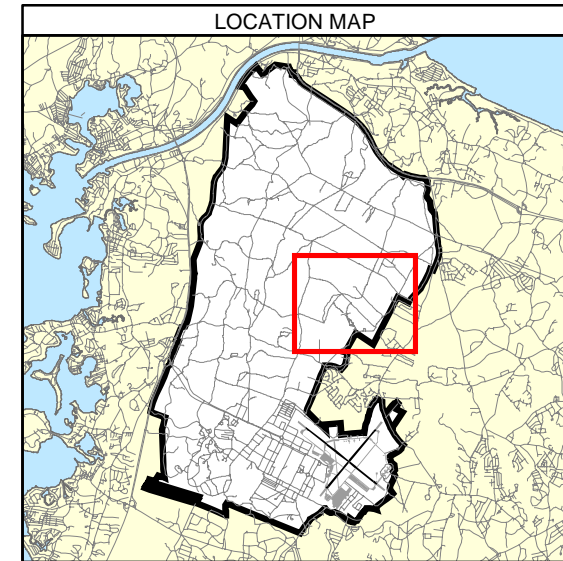
MMR J-1 Range Location Map



 **Impact Area
Groundwater Study Program**

LEGEND

-  J-1 Soil RI Study Area Boundaries
-  MMR Boundary
-  Impact Area Boundary
-  Roads



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG and MassGIS

TITLE

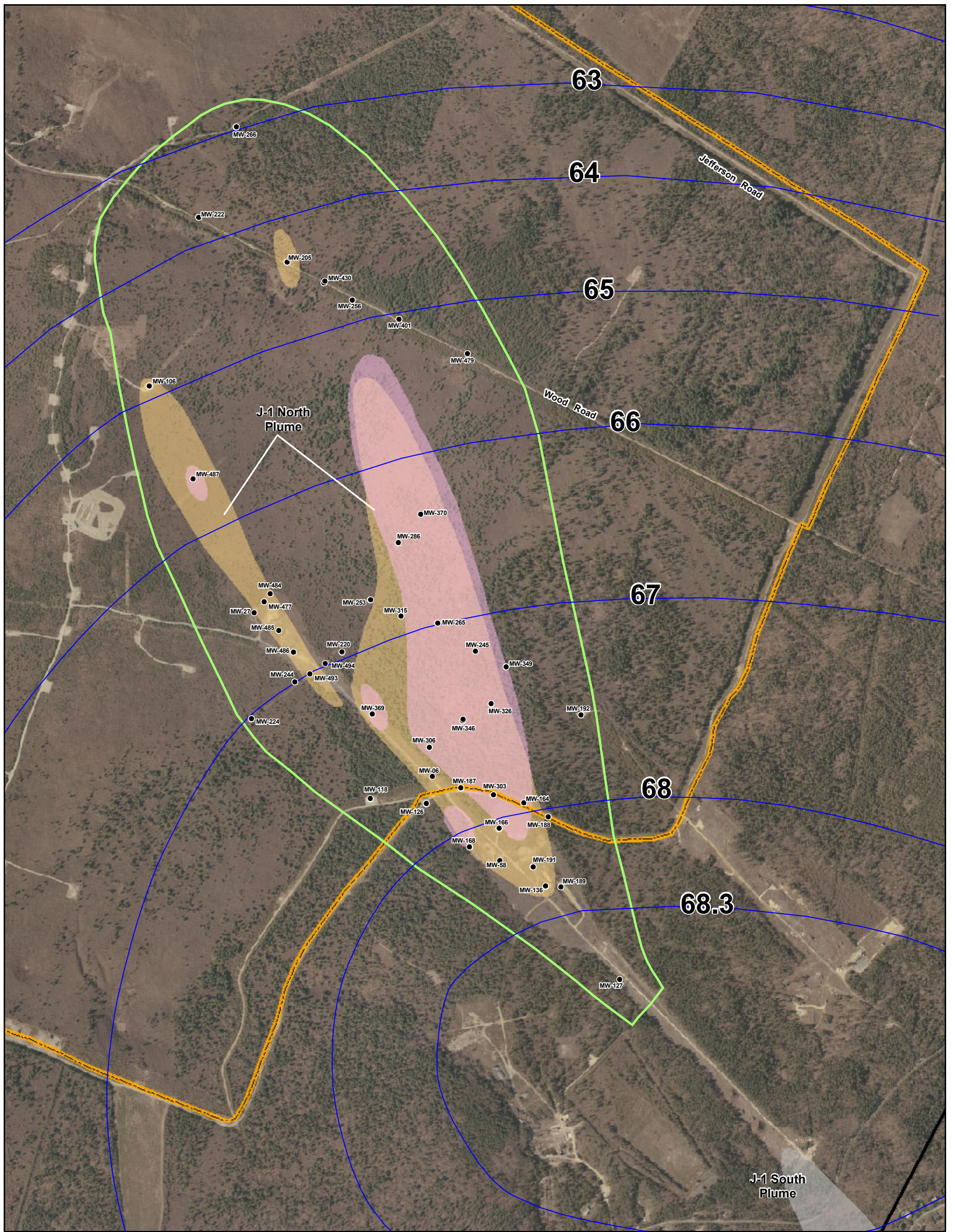
**J-1 Range
Soil Study Areas**



ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
 C:\TERC_GIS\CTO002\J1_SoilRI\J1CombinedRI_Figs\
 J1RI_Section2\Fig2-2_J1Range_StudyAreas.mxd
 December 2008 Drawn by JYK Checked by PF

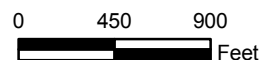
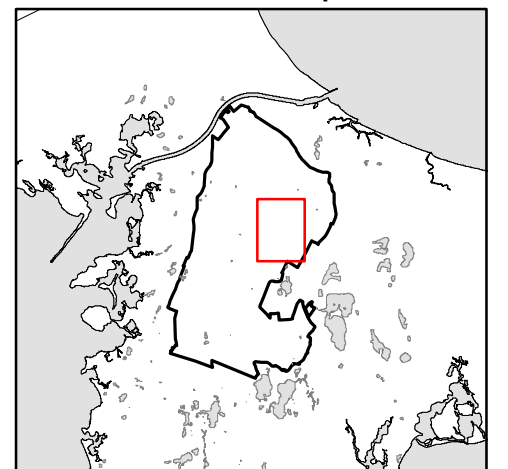
FIGURE
2-2



LEGEND

- Monitoring Well
- 68 2003 Synoptic Water Table Contour (ft msl)
- Impact Area Boundary
- MMR Boundary
- J-1 North Perchlorate Plume (shown to nondetect)
- J-1 North RDX Plume (shown to nondetect)
- J-1 South RDX Plume (shown to nondetect)
- J-1 Range North Groundwater Study Area

Location Map



J-1 Range North Groundwater Study Area

FIGURE

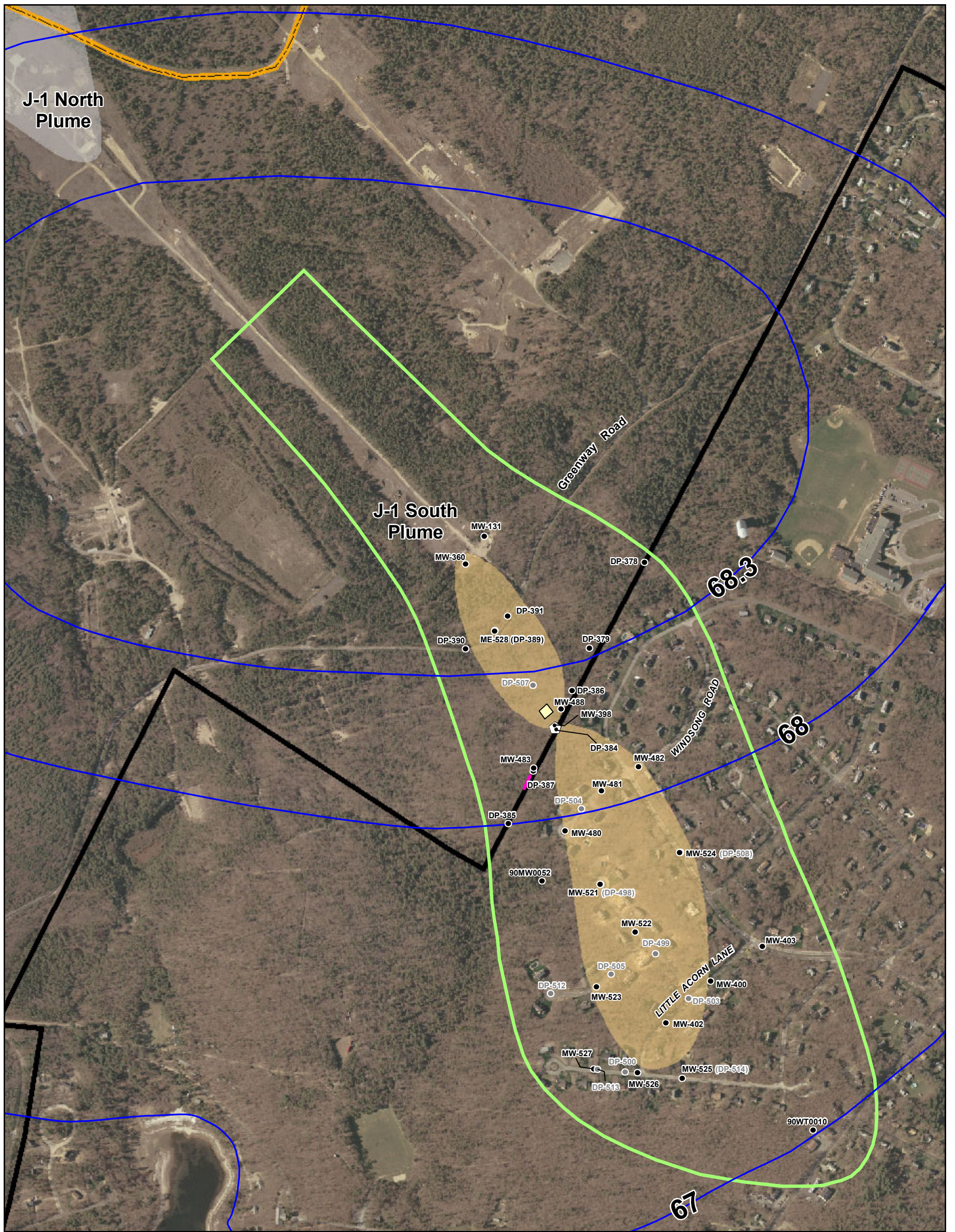
2-3

Data mapped to UTM Zone 19, map grid units in meters.

Jacobs
 Bourne, Massachusetts
 Y:\IA_TERRI\Projects\35AY\3102\20100708\ArcGIS
 j1_north_per_rdx_study_area_final.mxd
 July 8, 2010/jpicuito Checked by Katie Thomas



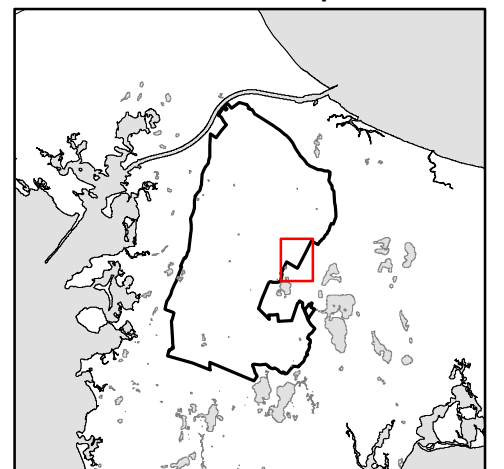
**Impact Area
 Groundwater Study Program**



LEGEND

- Monitoring Well
- Drive Point Location (abandoned)
- ◊ Extraction Well
- 68 2003 Synoptic Water Table Contour (ft msl)
- Impact Area Boundary
- MMR Boundary
- Infiltration Trench
- J-1 South RDX Plume (shown to nondetect)
- J-1 North Plume Composite of RDX and Perchlorate (shown to nondetect)
- J-1 Range South Groundwater Study Area
- Groundwater Treatment Facility

Location Map



J-1 Range South Groundwater Study Area

FIGURE

2-4

Data mapped to UTM Zone 19, map grid units in meters.

Jacobs
 Bourne, Massachusetts
 Y:\IA_TERR\Projects\35AY\3\02\20100708\ArcGIS
 j1_south_rdx_gw_study_area_final.mxd
 July 8, 2010/jpiccuito Checked by Katie Thomas



**Impact Area
 Groundwater Study Program**



**Impact Area
Groundwater Study Program**

LEGEND

- Depression
- Bunker
- Popper Kettle
- Wastewater Discharge
- Firing Point 3
- Steel-lined Pit
- Mortar Disposal
- 1000 m Range Firing Point
- 100m Range Target
- Firing Point 2
- Mortar Position
- Munitions Disposal Area
- Approx. Location of Water Saw
- Range Tower
- Berms
- Roads
- J-1 Soil RI Study Area Boundaries
- Impact Area Boundary
- J-1 Range Grids

LOCATION MAP



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from MA ARNG.

TITLE

**J-1 Range
Layout**

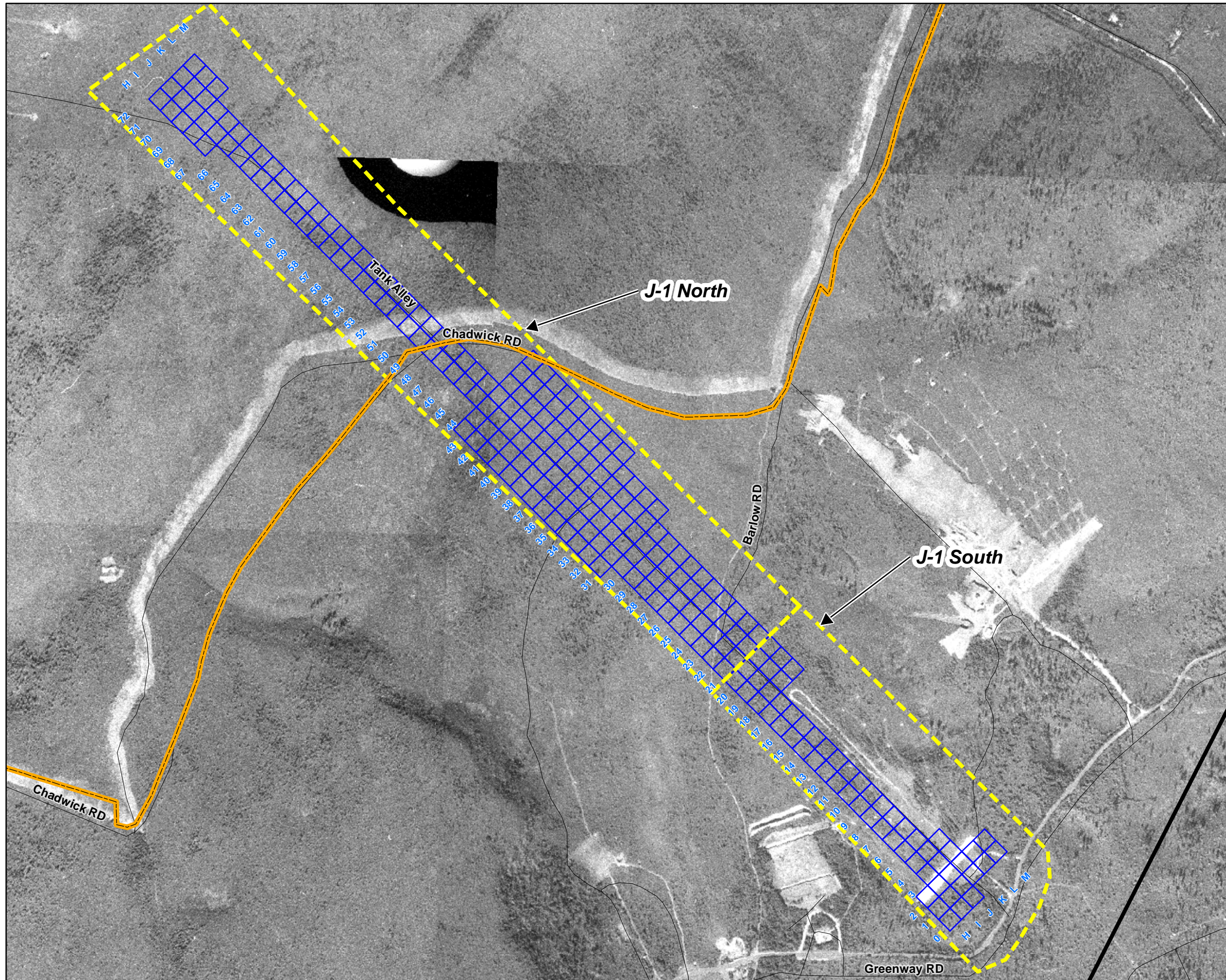


ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
C:\ERC_GIS\CTO002\J1_SoilRI\J1CombinedRI_Figs\
J1RI_Section2\Fig2-5_J1Range_Layout.mxd
April 2010 Drawn by JYK Checked by MJG

FIGURE

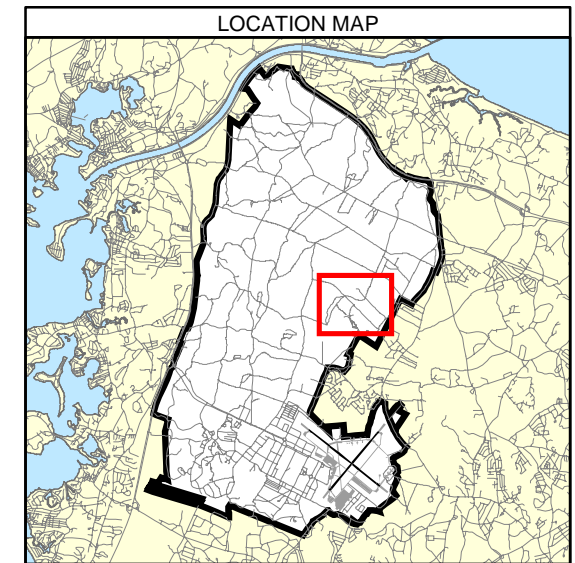
2-5



**Impact Area
Groundwater Study Program**

LEGEND

- J-1 Soil RI Study Area Boundary
- J-1 Range Grids
- MMR Boundary
- Impact Area Boundary
- Roads



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG and MassGIS

TITLE

**J-1 Range
Aerial Photograph
1955**

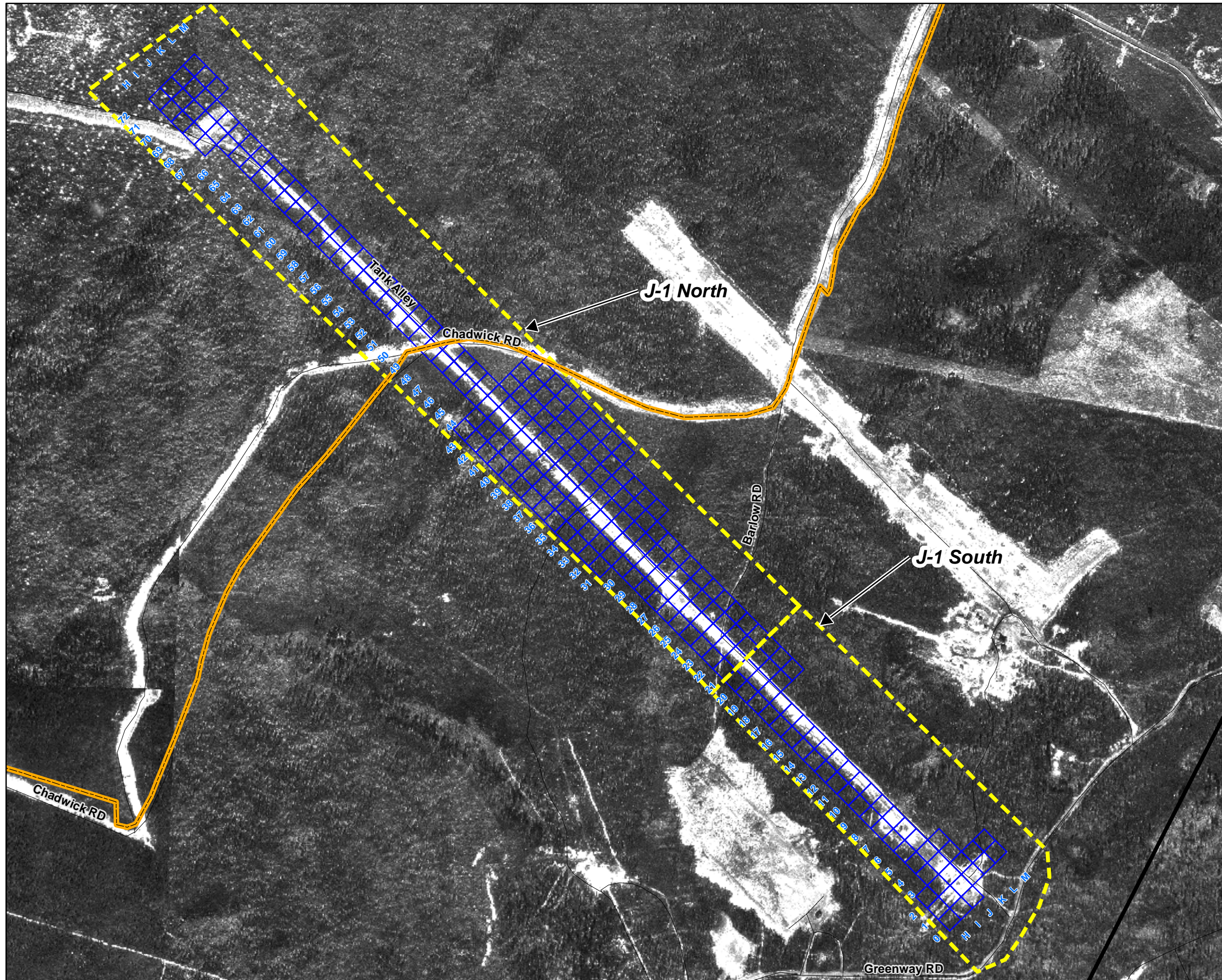


ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
 C:\TERC_GIS\CTO002J1_SoilRI\J1CombinedRI_Figs\
 J1RI_Section2\Fig2-6_J1Range_1955.mxd
 November 2008 Drawn by JYK Checked by PF

FIGURE

2-6



**Impact Area
Groundwater Study Program**

LEGEND

- J-1 Soil RI Study Area Boundary
- J-1 Range Grids
- MMR Boundary
- Impact Area Boundary
- Roads

LOCATION MAP



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from MA ARNG and MassGIS

TITLE

**J-1 Range
Aerial Photograph
1966**

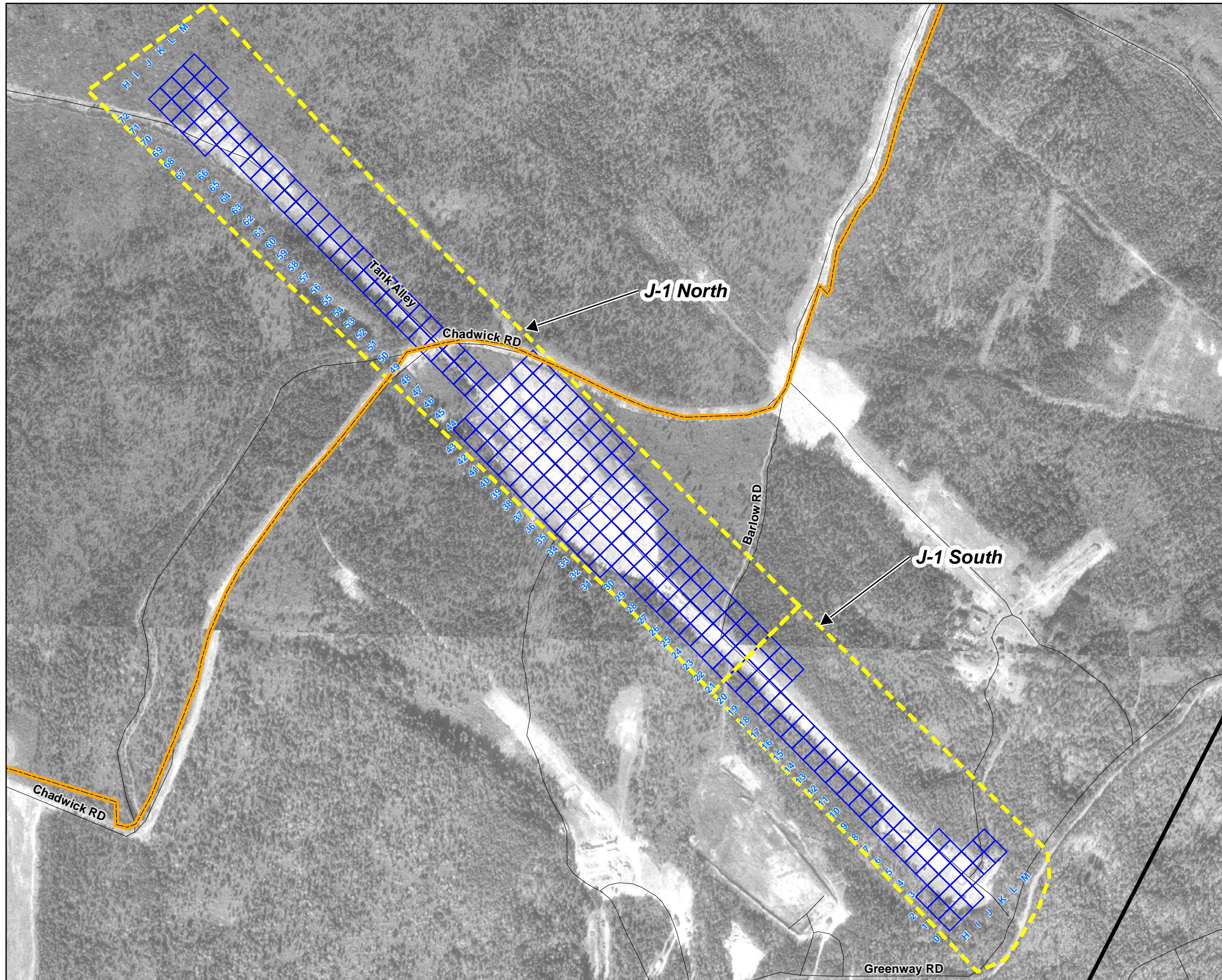


ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
C:\TERC_GIS\CTO002J1_SoilRI\J1CombinedRI_Figs\
J1RI_Section2\Fig2-7_J1Range_1966.mxd
November 2008 Drawn by JYK Checked by PF

FIGURE

2-7



**Impact Area
Groundwater Study Program**

LEGEND

- J-1 Soil RI Study Area Boundary
- J-1 Range Grids
- MMR Boundary
- Impact Area Boundary
- Roads

LOCATION MAP



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from MA ARNG and MassGIS

TITLE

**J-1 Range
Aerial Photograph
1977**

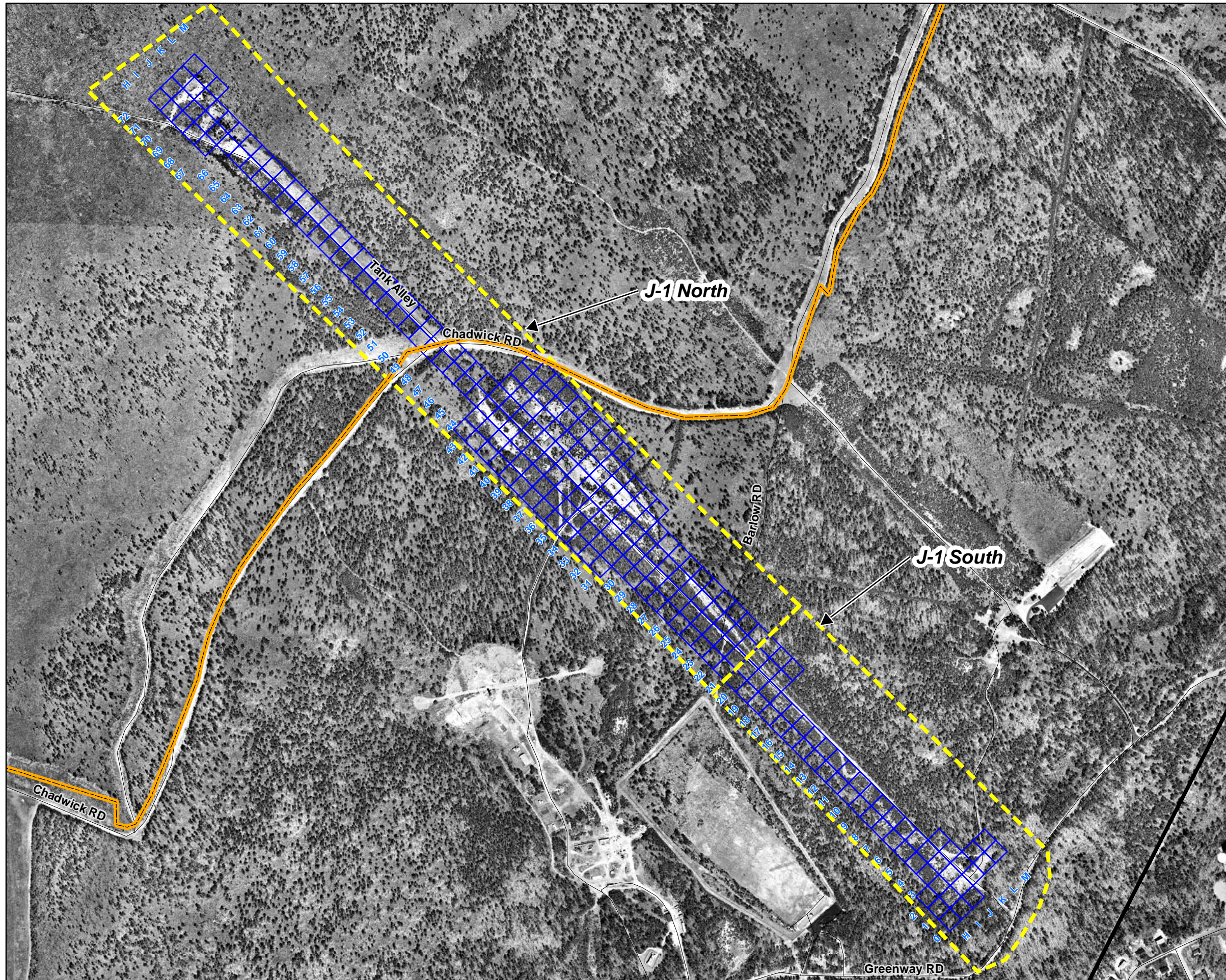


ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
C:\TERC_GIS\CTO002J1_SoilRI\J1CombinedRI_Figs\
J1RI_Section2\Fig2-8_J1Range_1977.mxd
November 2008 Drawn by JYK Checked by PF






FIGURE

2-8



**Impact Area
Groundwater Study Program**

LEGEND

-  J-1 Soil RI Study Area Boundary
-  J-1 Range Grids
-  MMR Boundary
-  Impact Area Boundary
-  Roads

LOCATION MAP



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from MA ARNG and MassGIS

TITLE

**J-1 Range
Aerial Photograph
1997**

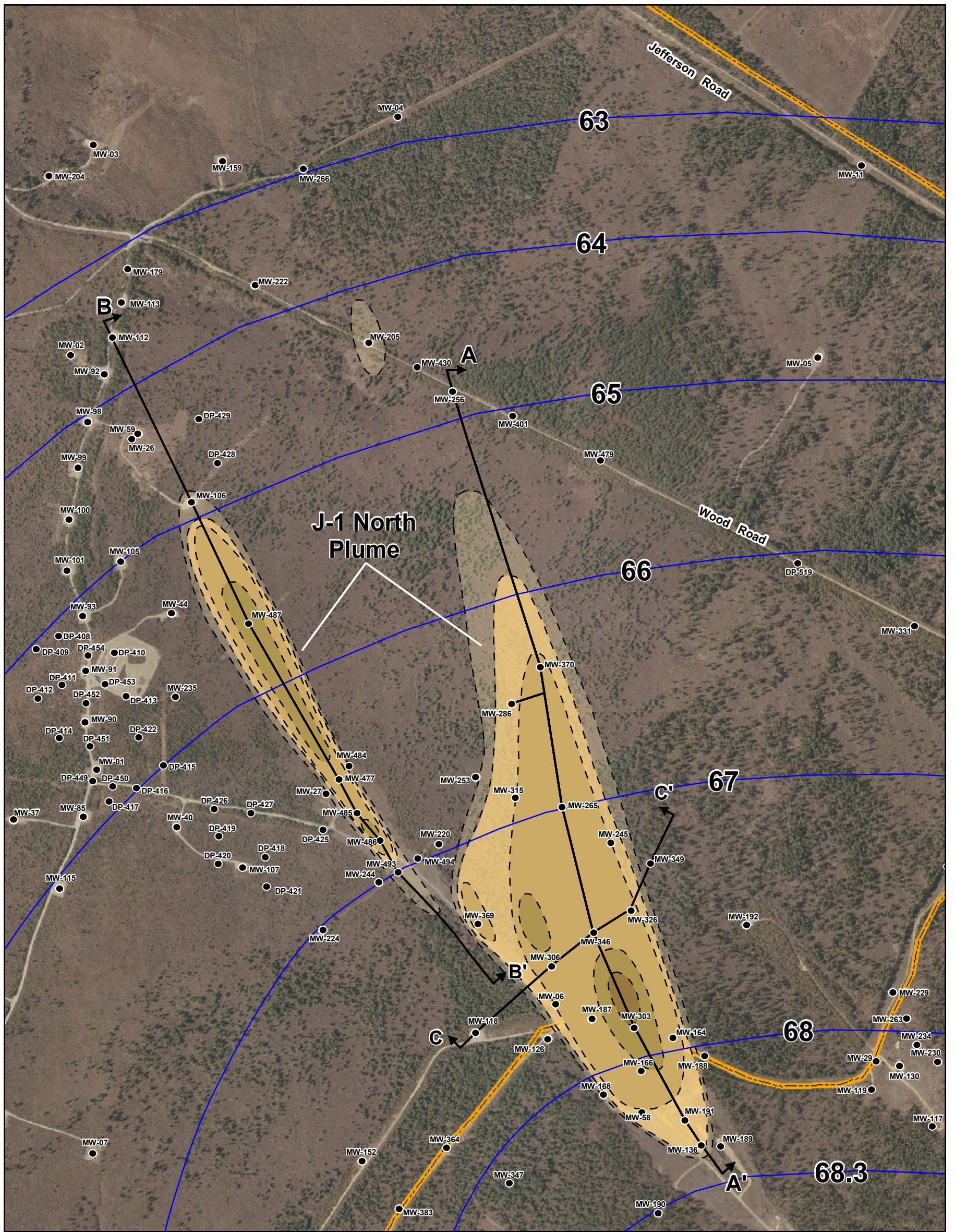


ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
C:\TERC_GIS\CTO002J1_SoilRI\J1CombinedRI_Figs\
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November 2008 Drawn by JYK Checked by PF

FIGURE

2-9



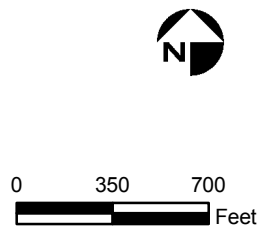
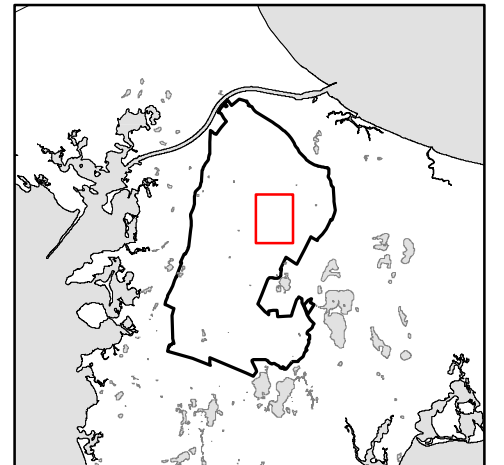
LEGEND

- Monitoring Well
- Line of Cross Section
- 2003 Synoptic Water Table Contour (ft msl)
- Impact Area Boundary

RDX Detection

- Nondetect to 0.6 µg/L
- 0.6-2 µg/L
- 2-6 µg/L
- 6-20 µg/L
- 20-200 µg/L

Location Map



J-1 Range North RDX Plume and Lines of Cross Section

FIGURE

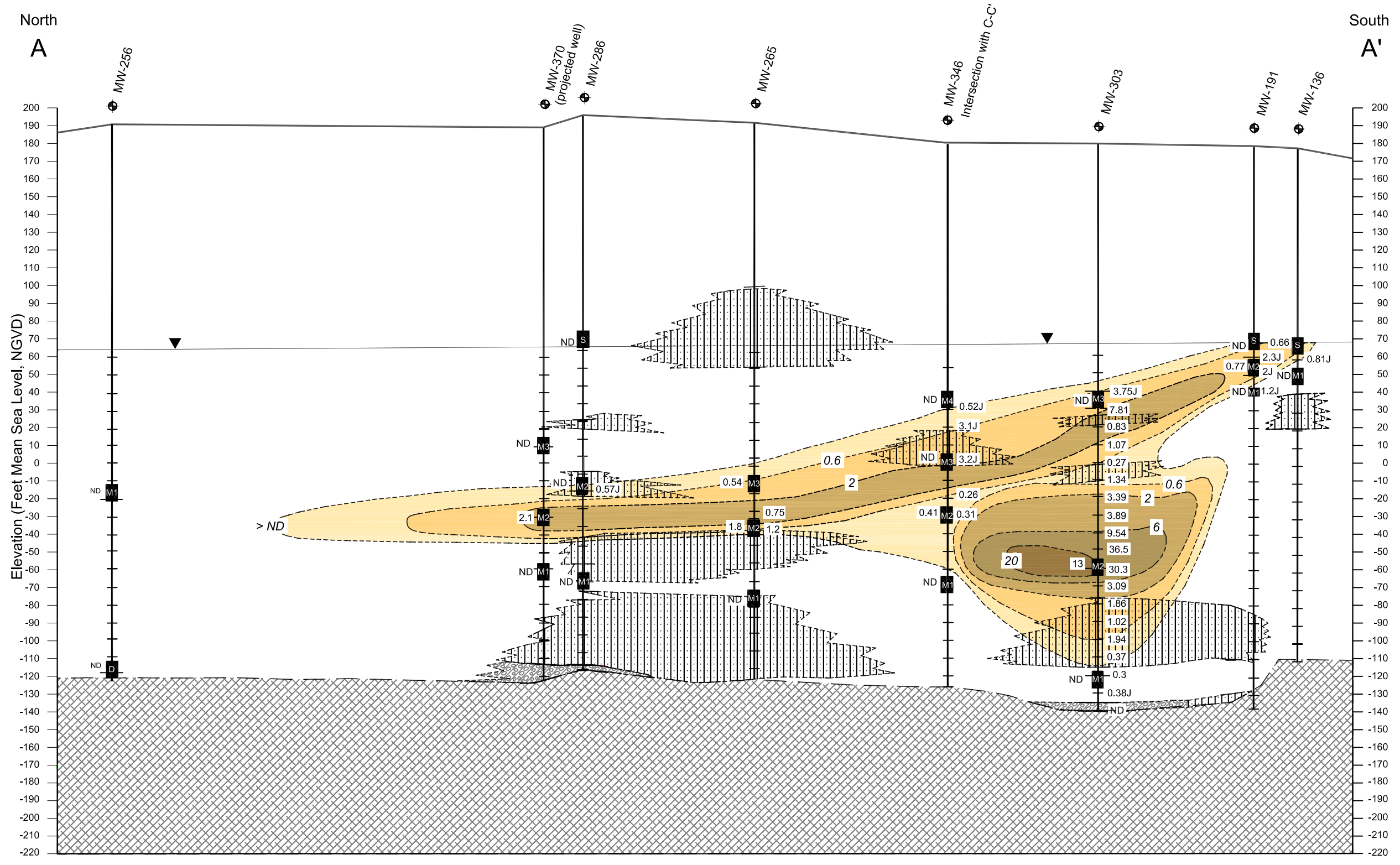
2-10

Data mapped to UTM Zone 19, map grid units in meters.

Jacobs
 Bourne, Massachusetts
 Y:\IA_TERRI\Projects\35AY\3102\20100708\ArcGIS
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 July 8, 2010 jpicuito Checked by Katie Thomas



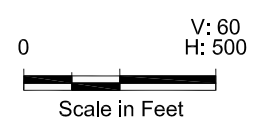
**Impact Area
 Groundwater Study Program**



Y:\IA_TERC\Projects\35AY\5302\20100708\AutoCAD\section_11_aa_rdx_rf_fs_final.dwg
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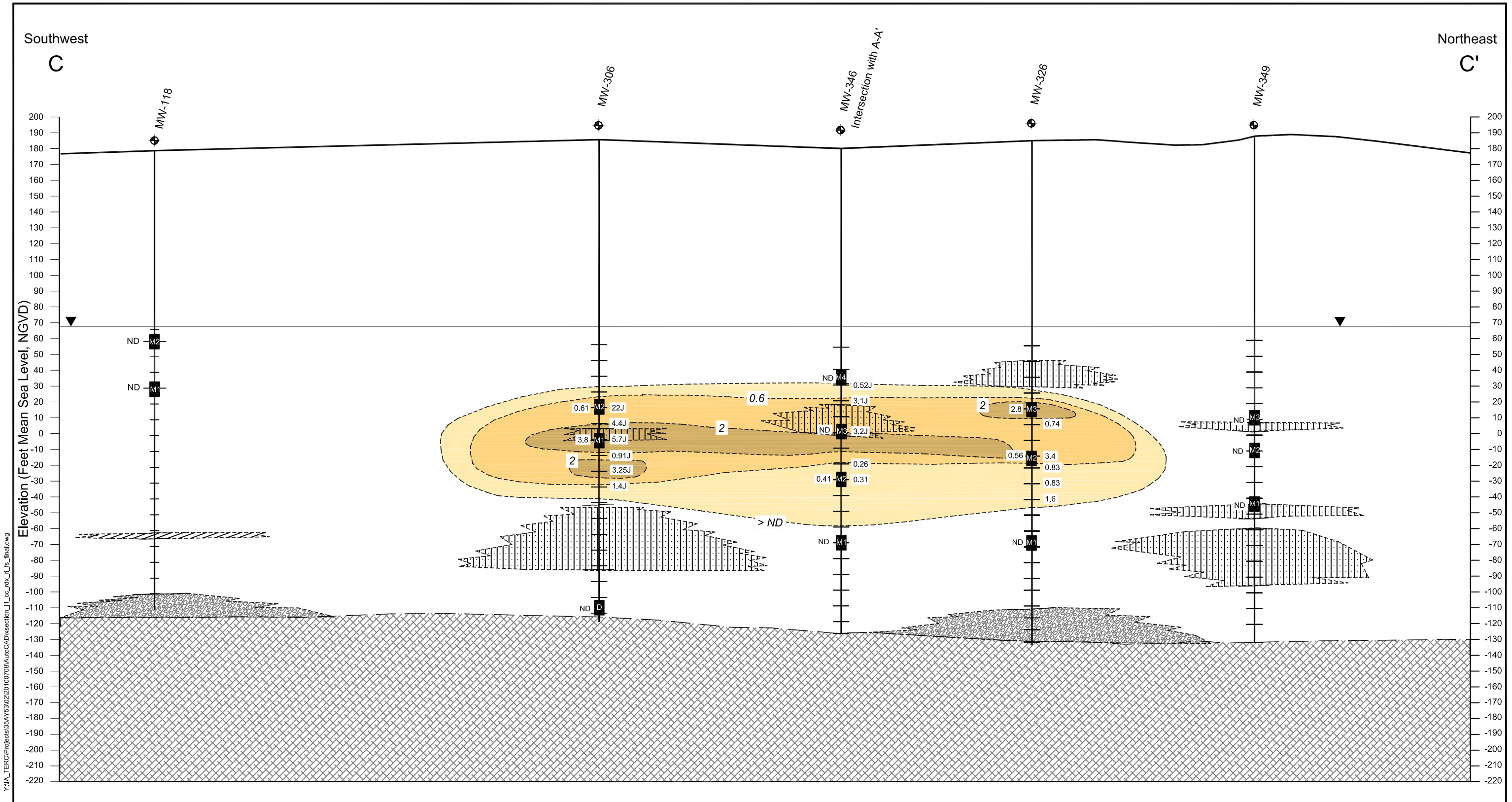
Data Sources: ECC/Jacobs, 12 June 2008, Site Environmental Evaluation (SEE) Database.

Legend Monitoring Well Water table Well screen ID NGVD National Geodetic Vertical Datum	Borehole Screening Interval Data (µg/L) 2 J Estimated Concentration ND Nondetect µg/L Micrograms per liter	Sand Silt/Clay Sand and Silt/Clay Basal Gravel/Sand Bedrock Note: Unlabelled borehole intervals indicate nondetects during screening.	Nondetect to 0.6 µg/L 0.6-2 µg/L 2-6 µg/L 6-20 µg/L 20-200 µg/L — Geologic Contact (dashed where inferred)
--	---	--	---



Impact Area Groundwater Study Program
J-1 Range North Plume Cross Section A-A'
Illustrating RDX Distributions
 Massachusetts Military Reservation
 Cape Cod, Massachusetts
07/08/10 JP xsection_j1_aa_rdx_rf_fs_final.dwg

Figure 2-11

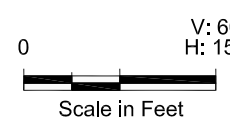


last modified: 07/08/10
 printext: 07/08/10 by jp
 Y:\IA_TERC\Projects\35AY5302\20100708\AutoCAD\section_11_cc_rdx_r1_fs_final.dwg

Legend

Monitoring Well	Drilling Profile Interval Data (µg/L)	J Estimated Concentration	Sand	Nondetect to 0.6 µg/L	Data Sources: ECC/Jacobs, 12 June 2008, Site Environmental Evaluation (SEE) Database.
Water table	Well screen ID	ND Nondetect	Silt/Clay	0.6-2 µg/L	Geologic Contact (dashed where inferred)
NGVD National Geodetic Vertical Datum		µg/L Micrograms per liter	Sand and Silt/Clay	2-6 µg/L	
			Basal Gravel/Sand		
			Bedrock		

Note: Unlabelled drilling profile intervals indicate nondetects during screening.

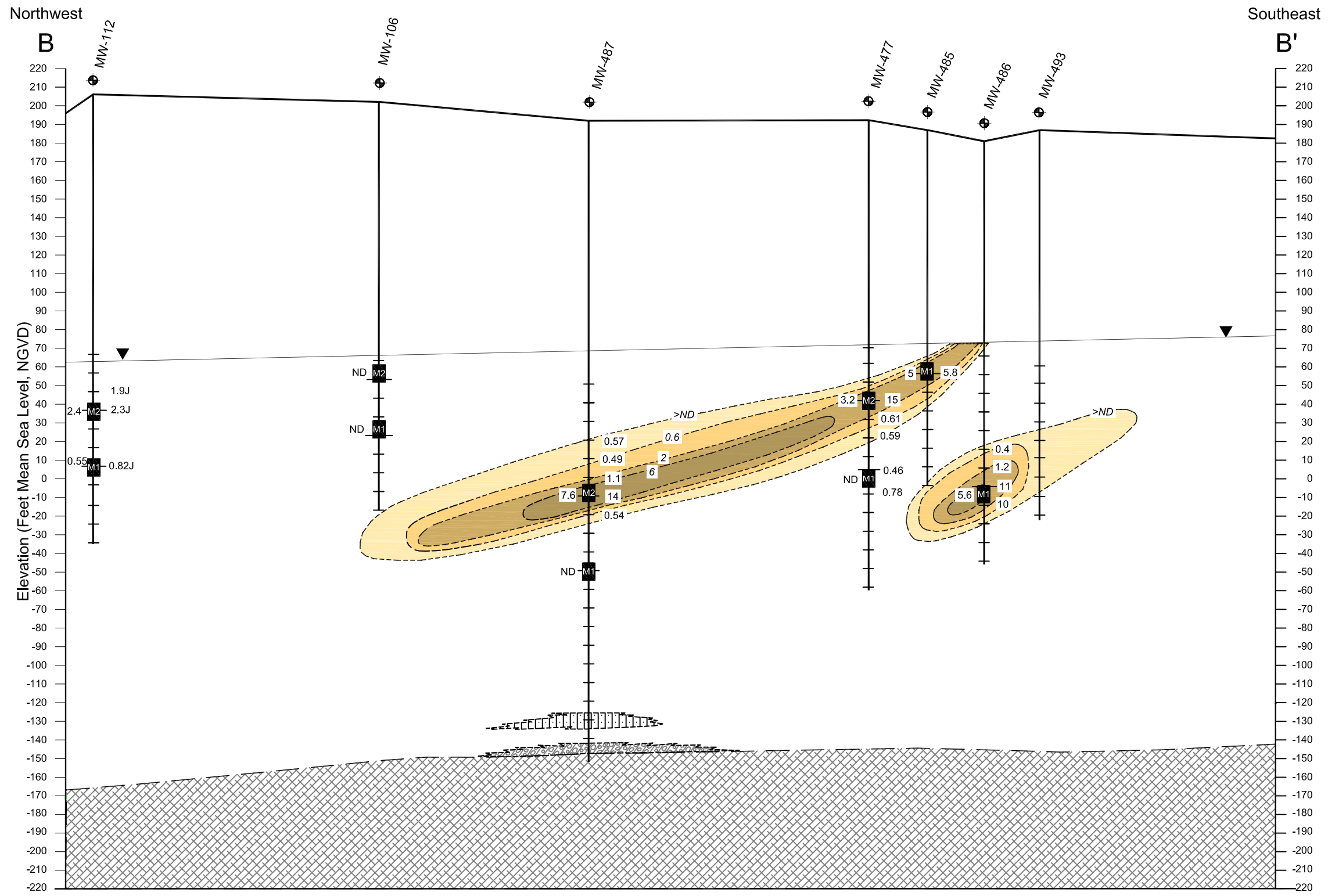


Impact Area Groundwater Study Program

J-1 Range North Plume Cross Section C-C'
 Illustrating RDX Distributions

Massachusetts Military Reservation
 Cape Cod, Massachusetts

07/08/10 JP xsection_11_cc_rdx_r1_fs_final.dwg **Figure 2-12**



Y:\IA_TERC\Projects\35AY5302\20100708\AutoCAD\section_11_bb_rdx_rf_fs_final.dwg
 last modified: 07/08/10 by jp

Legend

- | | | | | | | | |
|--|-----------------|--|---|--|--------------------|--|-----------------------|
| | Monitoring Well | | Borehole Screening Interval Data (µg/L) | | Sand | | Nondetect to 0.6 µg/L |
| | Water table | | J Estimated Concentration | | Silt/Clay | | 0.6-2 µg/L |
| | Well screen ID | | ND Nondetect | | Sand and Silt/Clay | | 2-6 µg/L |
| | | | µg/L Micrograms per liter | | Basal Gravel/Sand | | 6-20 µg/L |
| | | | | | Bedrock | | |
- Note: Unlabelled borehole intervals indicate nondetects during screening.

Data Sources: ECC/Jacobs, 12 June 2008, Site Environmental Evaluation (SEE) Database.



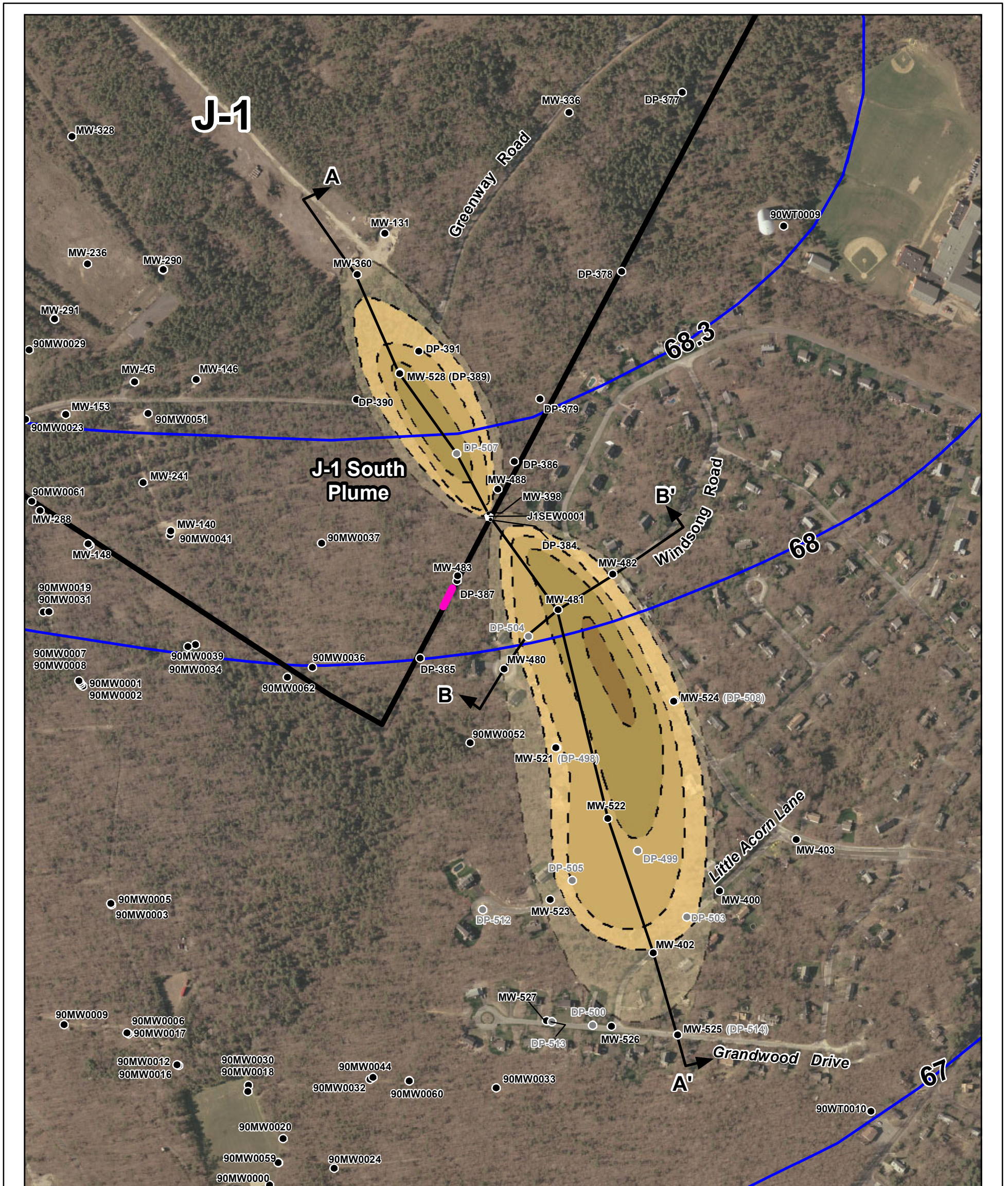
Impact Area Groundwater Study Program

J-1 Range North Plume Cross Section B-B' Illustrating RDX Distributions

Massachusetts Military Reservation
Cape Cod, Massachusetts

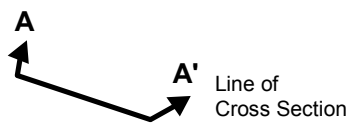
07/08/10 JP xsection_j1_bb_rdx_rf_fs_final.dwg

Figure 2-13



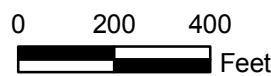
Legend

- Monitoring Well
- Drive Point Location (abandoned)
- Extraction Well
- 68 2003 Synoptic Water Table Contour (ft msl)
- ▭ MMR Boundary
- Infiltration Trench

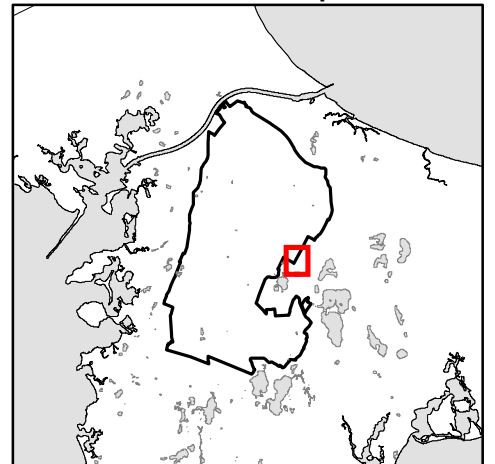


RDX Detection

- Nondetect to 0.6 µg/L
- 0.6-2 µg/L
- 2-6 µg/L
- 6-20 µg/L
- > 20 µg/L



Location Map



J-1 Range South Plume RDX and Lines of Cross Section

FIGURE

2-14

Data mapped to UTM Zone 19, map grid units in meters.

JACOBS
 Bourne, Massachusetts
 Y:\IA_TERRC\Projects\36AY\302020\100708\ArcGIS
 J1_south_plume_fig_20100216_final.mxd
 July 8, 2010 jrculto Checked by Katie Thomas



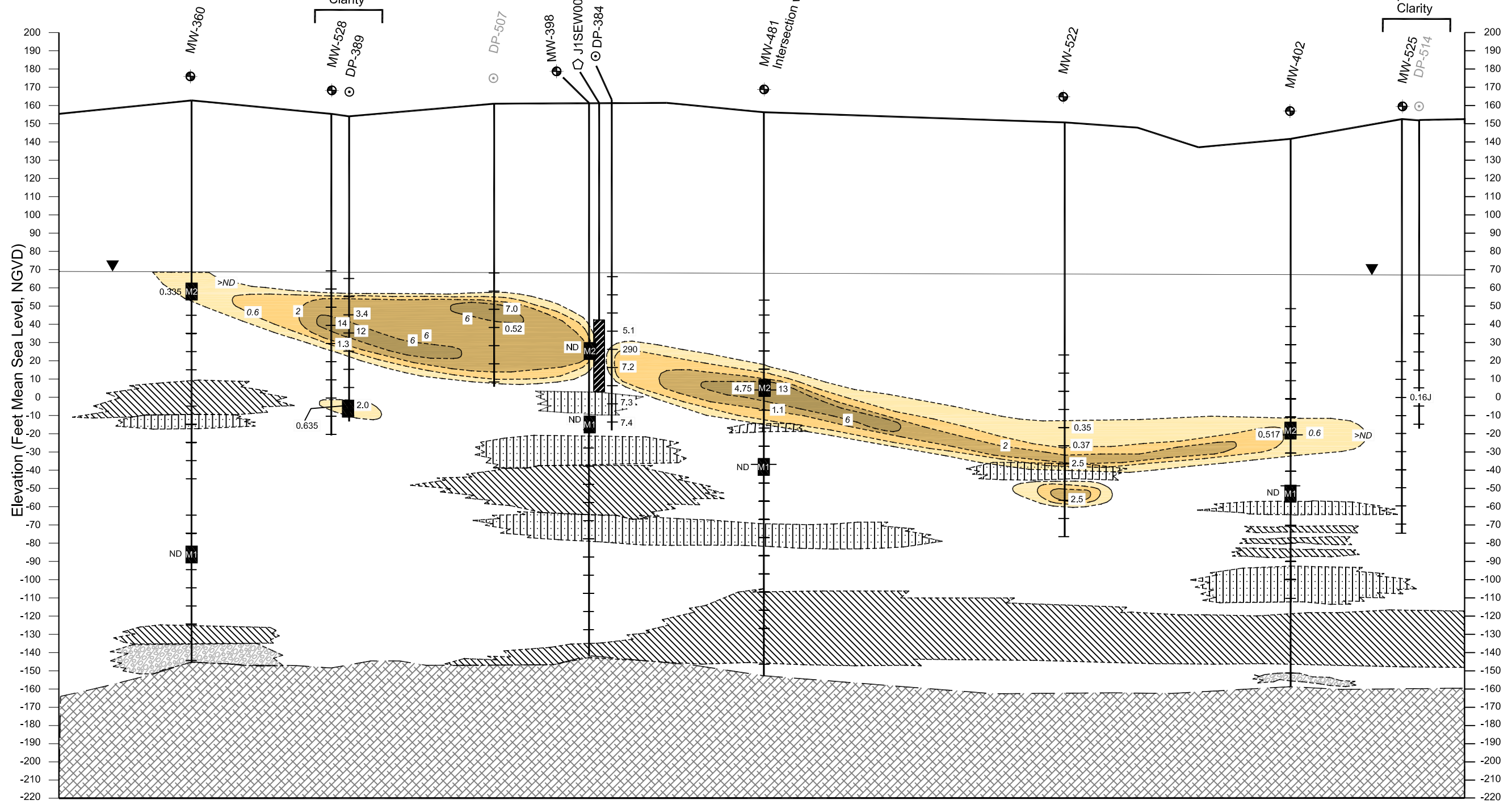
**Impact Area
 Groundwater Study Program**

NORTHWEST

SOUTHEAST

A

A'



Y:\IA_TERC\Projects\35AY\53020100708\AutoCAD\section_1_south_aa_rdx_final.dwg
Last modified: 07/08/10 by jp
printext: 07/08/10

Legend

- ⊕ Monitoring Well
- ⊙ Drive Point Location
- ⊙ Drive Point Location (abandoned)
- ⊕ Extraction Well
- ▽ Water table
- M1 Well screen ID

- Drilling Profile Interval Data (µg/L)
- +
- +
- +
- +
- Extraction Well Screen

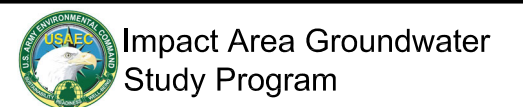
- J Estimated Concentration
- ND Nondetect
- µg/L Micrograms per liter

- Sand
- ▨ Silt/Clay
- ▤ Sand and Silt/Clay
- ▧ Basal Gravel/Sand
- ▩ Bedrock

- Nondetect to 0.6 µg/L
- 0.6-2 µg/L
- 2-6 µg/L
- 6-20 µg/L

Note: Unlabelled drilling profile intervals indicate nondetects during screening.

Data Sources: ECC/Jacobs, 09 February 2010, EDMS Database.



J-1 Range South Plume Cross Section
A-A' Illustrating RDX Distributions
Massachusetts Military Reservation
Cape Cod, Massachusetts



07/08/10 JP xsection_j1_south_aa_rdx_final.dwg

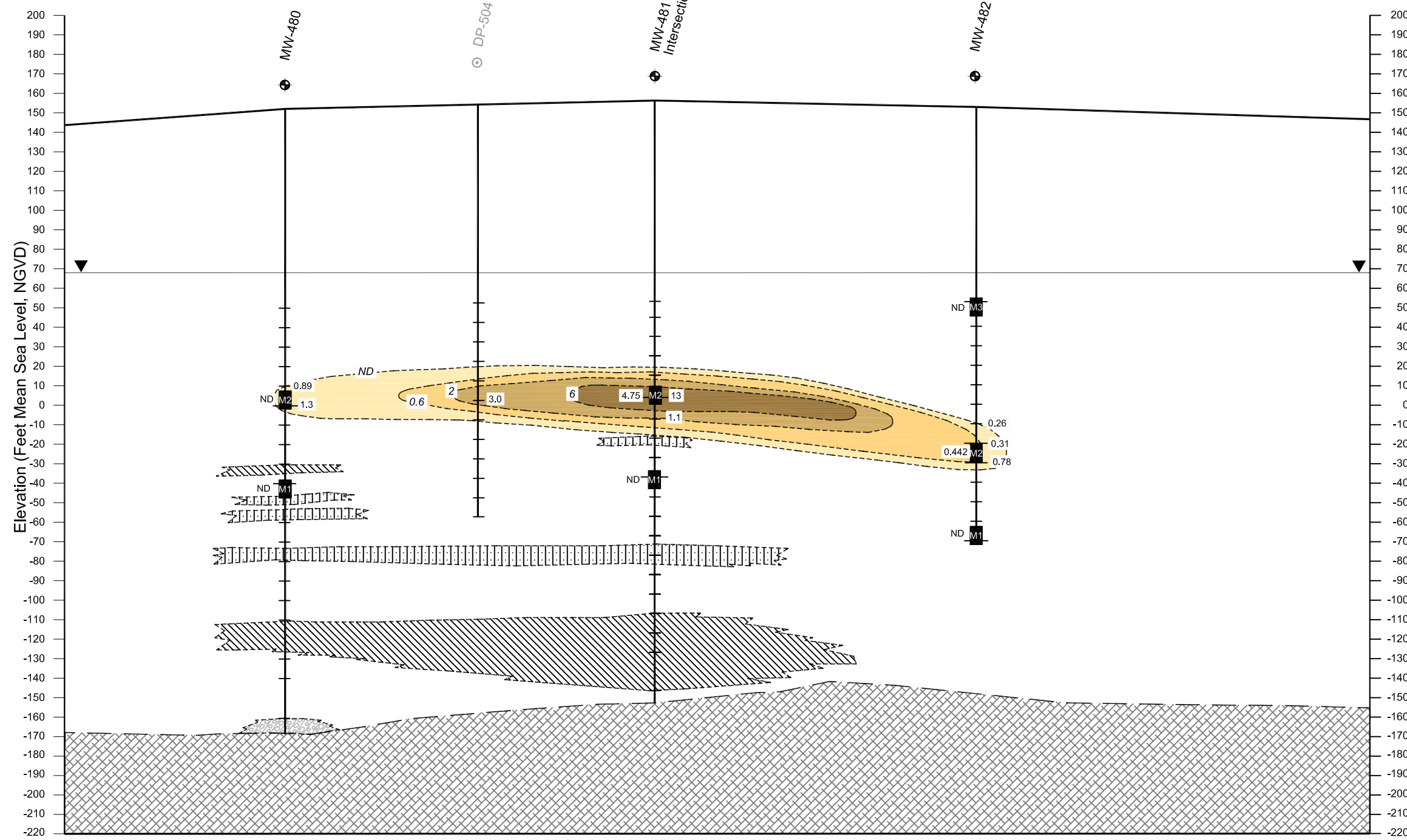
Figure 2-15

SOUTHWEST

B

NORTHEAST

B'



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last modified: 07/08/10 by jp

Legend

- ⊕ Monitoring Well
- Drive Point Location (abandoned)
- ▼ Water table
- M1 Well screen ID

Drilling Profile
Interval Data
(µg/L)

+

+

J Estimated Concentration

ND Nondetect

µg/L Micrograms per liter

- Sand
- ▨ Silt/Clay
- ▤ Sand and Silt/Clay
- ▧ Basal Gravel/Sand
- ▩ Bedrock

- Nondetect to 0.6 µg/L
- 0.6-2 µg/L
- 2-6 µg/L
- 6-20 µg/L

Data Sources: ECC/Jacobs, 09 February 2010, EDMS Database.



Impact Area Groundwater Study Program

J-1 Range South Plume Cross Section
B-B' Illustrating RDX Distributions

Massachusetts Military Reservation
Cape Cod, Massachusetts



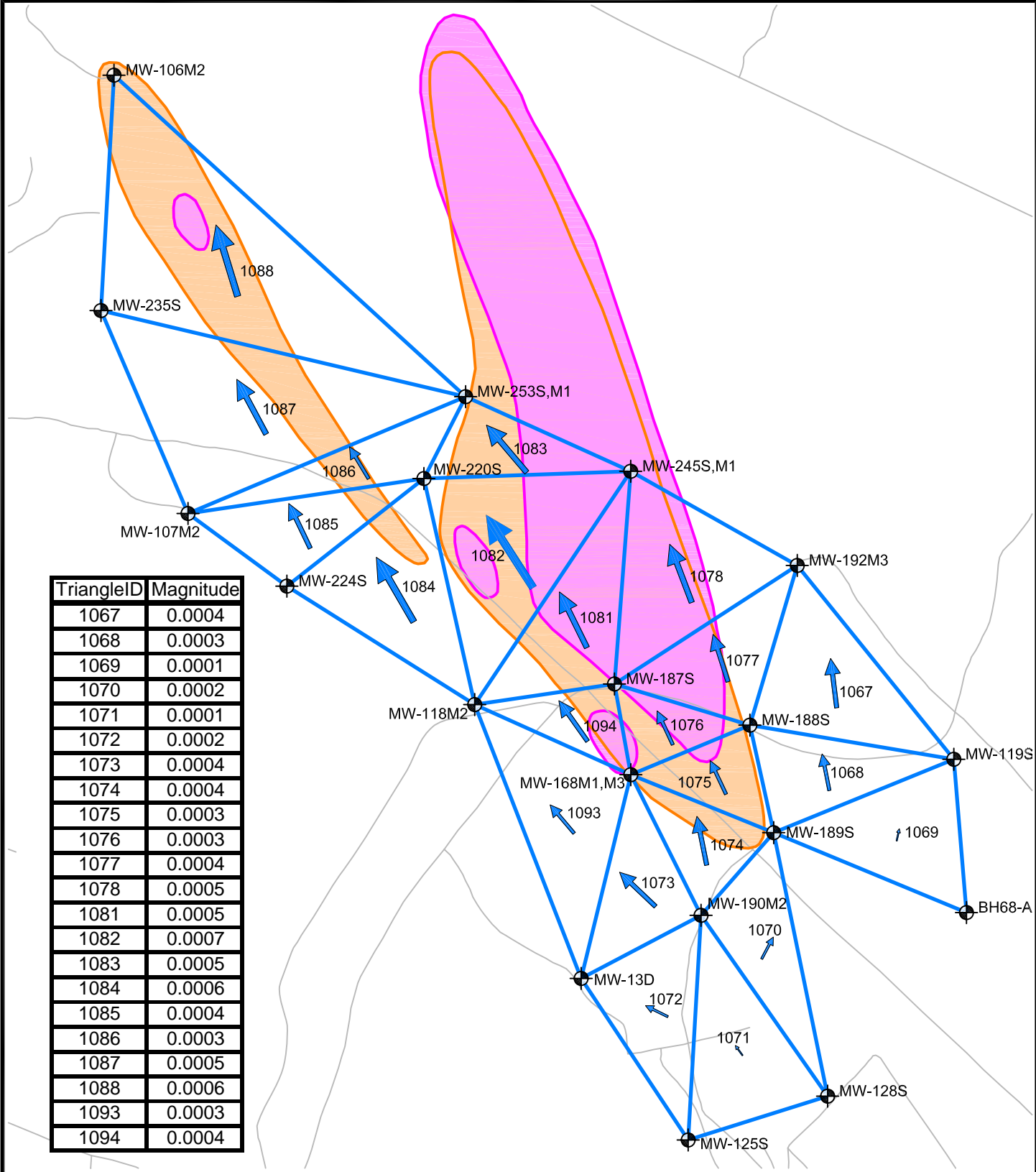
07/08/10 JP xsection_j1_south_bb_rdx_final.dwg

Figure 2-16

Note: Unlabelled drilling profile intervals indicate nondetects during screening.

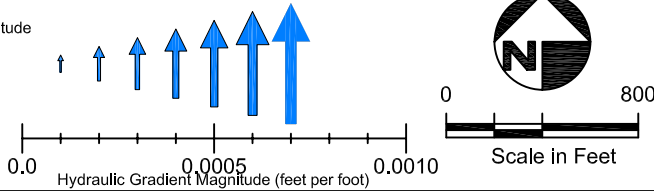
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 Y:\M_TERC\Projects\35AY53\0120100708\Autocad\Fig_2-17 J-1N May04 ObsGrad_Rev1.dwg

TriangleID	Magnitude
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1068	0.0003
1069	0.0001
1070	0.0002
1071	0.0001
1072	0.0002
1073	0.0004
1074	0.0004
1075	0.0003
1076	0.0003
1077	0.0004
1078	0.0005
1081	0.0005
1082	0.0007
1083	0.0005
1084	0.0006
1085	0.0004
1086	0.0003
1087	0.0005
1088	0.0006
1093	0.0003
1094	0.0004



Legend

- Monitoring Well
- May 2004 Observed Gradient Direction and Magnitude
- Perchlorate Plume (shown to nondetect)
- RDX Plume (shown to nondetect)



**Impact Area
Groundwater Study Program**

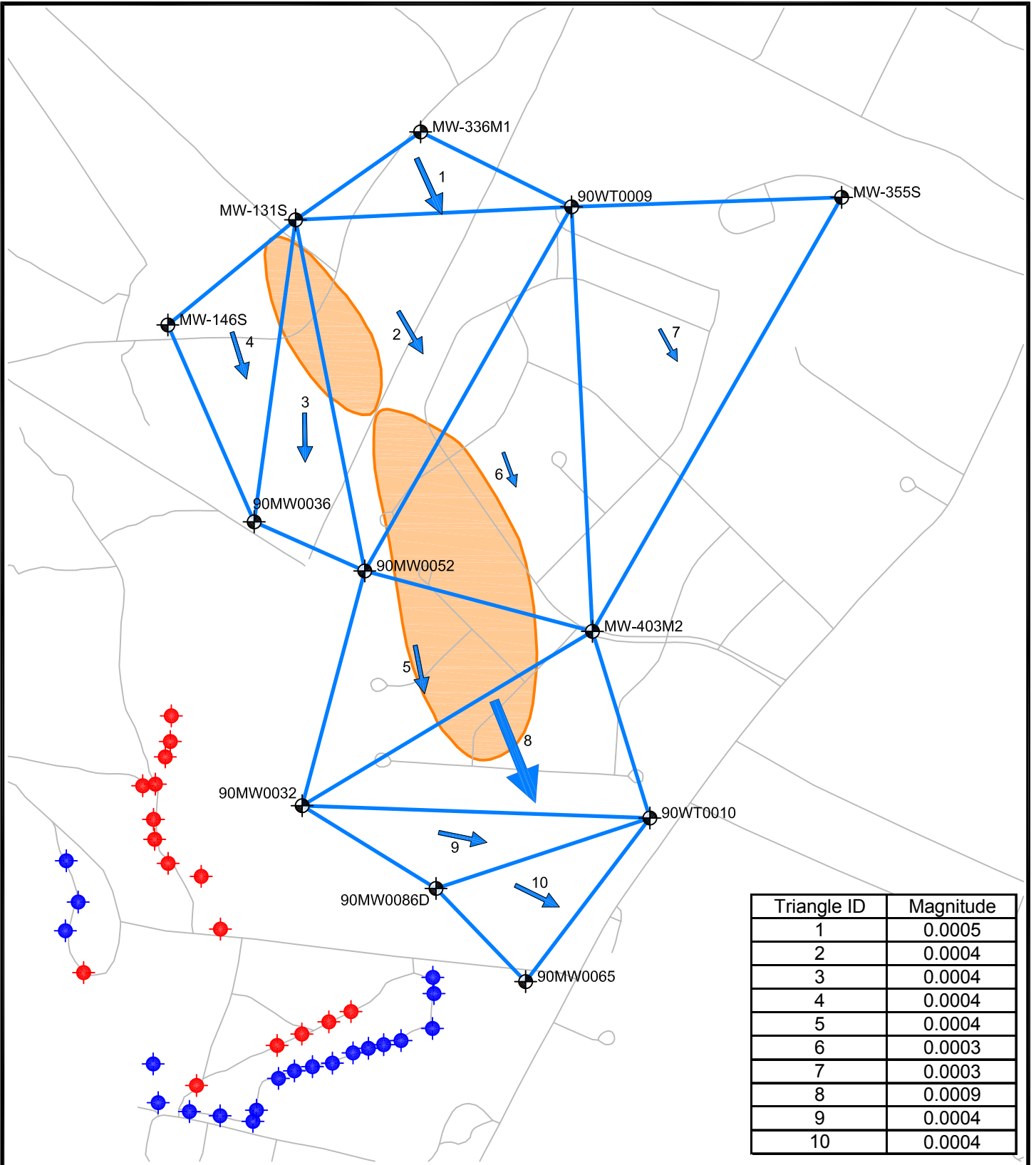
**J-1 Range North
May 2004 Observed Hydraulic
Gradients for Triangular Elements**

Massachusetts Military Reservation
Cape Cod, Massachusetts







07/09/10 JD
Fig_2-17 J-1N May04 ObsGrad_Rev1.dwg

Figure 2-17

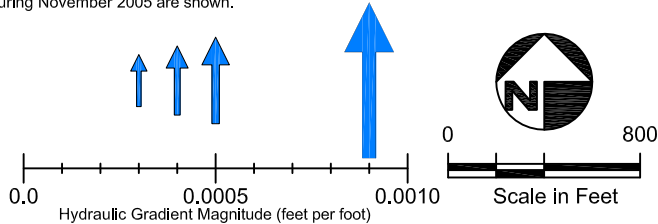
Y:\IA_TERC\Projects\35AY5302\20100708\AutoCAD\J-1S Nov05 ObsGrad2_final.dwg
 last modified: 07/08/10 print: 07/08/10 by: jp



Legend

-  Monitoring Well
-  November 2005 Observed Gradient Direction and Magnitude
-  RDX Plume Outline (shown to nondetect)
-  MMR Boundary
-  FS-12 Extraction Well
-  FS-12 ReInjection Well

Note:
Only those FS-12 extraction and reinjection wells which were active during November 2005 are shown.



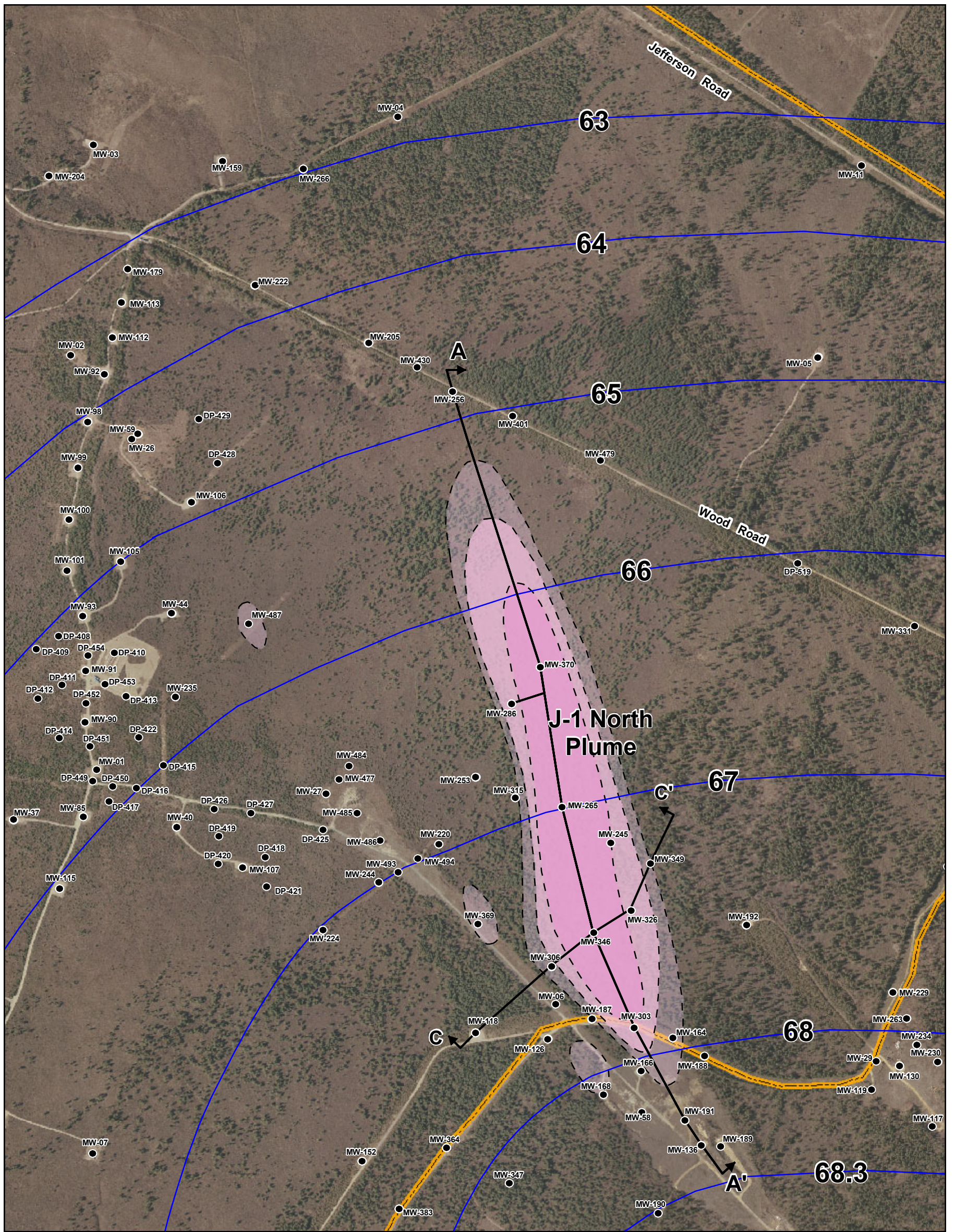
**Impact Area
Groundwater Study Program**

J-1 Range South November 2005
Observed Hydraulic Gradients for
Triangular Elements

Massachusetts Military Reservation
Cape Cod, Massachusetts

07/08/10 JP
J-1S Nov05 ObsGrad2_final.dwg

Figure 2-18



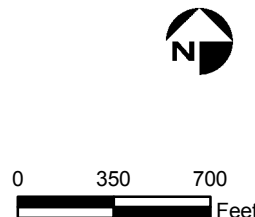
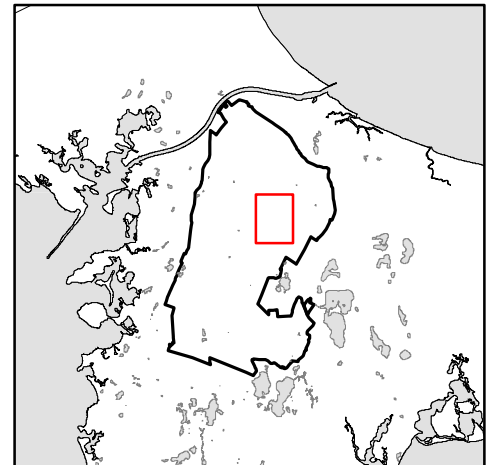
LEGEND

- Monitoring Well
- B — B' — Line of Cross Section
- 68 — 2003 Synoptic Water Table Contour (ft msl)
- — Impact Area Boundary

Perchlorate Detection

- Nondetect to 2 µg/L
- 2-15 µg/L
- 15-200 µg/L

Location Map



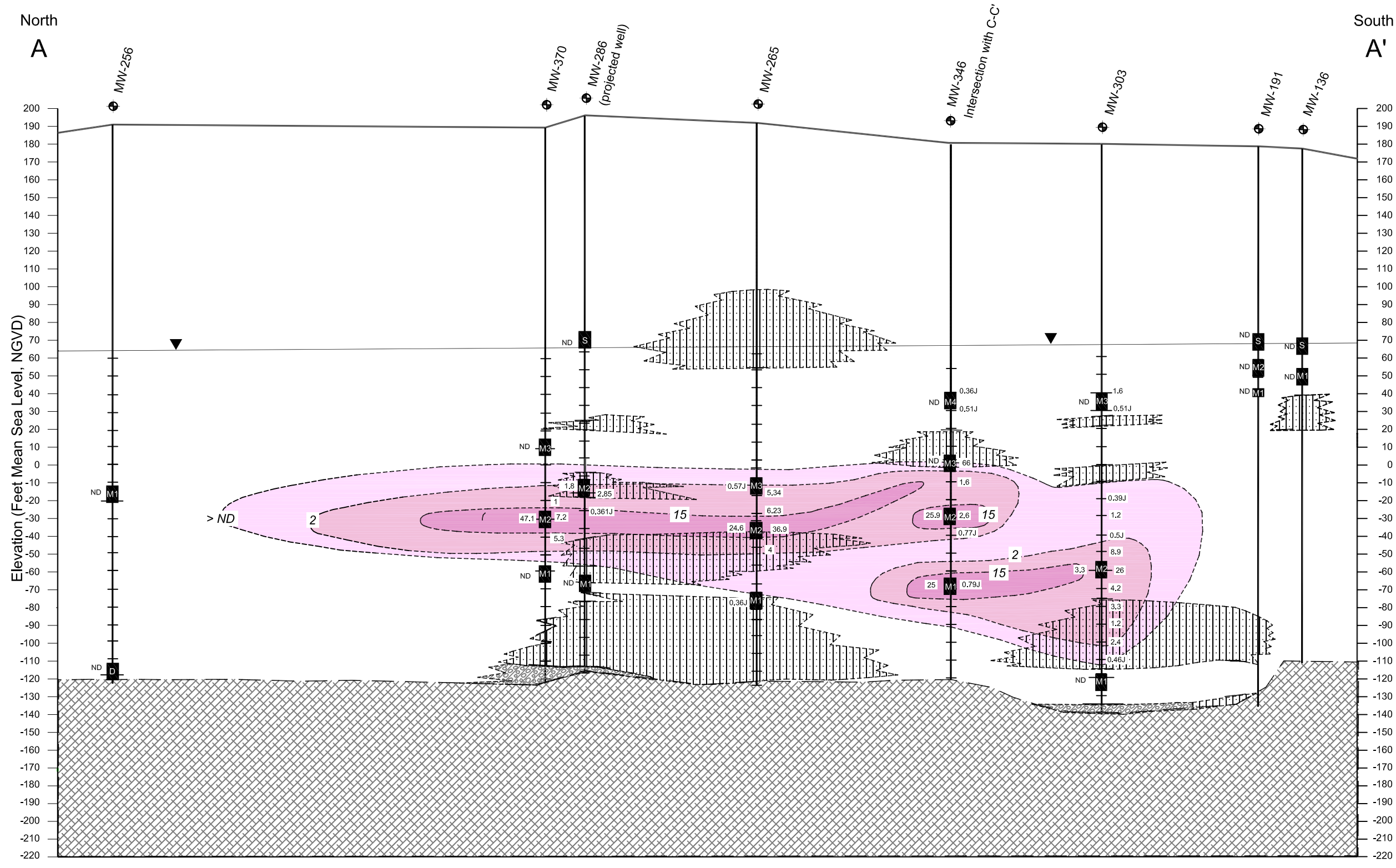
J-1 Range North Perchlorate Plume and Lines of Cross Section

FIGURE

3-1

Data mapped to UTM Zone 19, map grid units in meters.

Jacobs
 Bourne, Massachusetts
 Y:\IA_TERRI\Projects\35AY\302\20100708\ArcGIS
 j1_plume_per_section_20100708.mxd
 July 8, 2010 jpiccuito Checked by Katie Thomas



Y:\IA_TERC\Projects\35AY\53020\20100708\AutoCAD\section_11_aa_per_20091109_final.dwg
 last modified: 07/08/10 by jp

Legend

	Monitoring Well		Water table		Well screen ID		Sand		Silt/Clay		Sand and Silt/Clay		Basal Gravel/Sand		Bedrock		Nondetect to 2 µg/L		2-15 µg/L		15-200 µg/L
	Monitoring Well		Water table		Well screen ID		Sand		Silt/Clay		Sand and Silt/Clay		Basal Gravel/Sand		Bedrock		Nondetect to 2 µg/L		2-15 µg/L		15-200 µg/L
	Monitoring Well		Water table		Well screen ID		Sand		Silt/Clay		Sand and Silt/Clay		Basal Gravel/Sand		Bedrock		Nondetect to 2 µg/L		2-15 µg/L		15-200 µg/L

Borehole Screening Interval Data (µg/L): 1, 2
 J Estimated Concentration, ND Nondetect, µg/L Micrograms per liter
 NGVD National Geodetic Vertical Datum
 Note: Unlabelled borehole intervals indicate nondetects during screening.

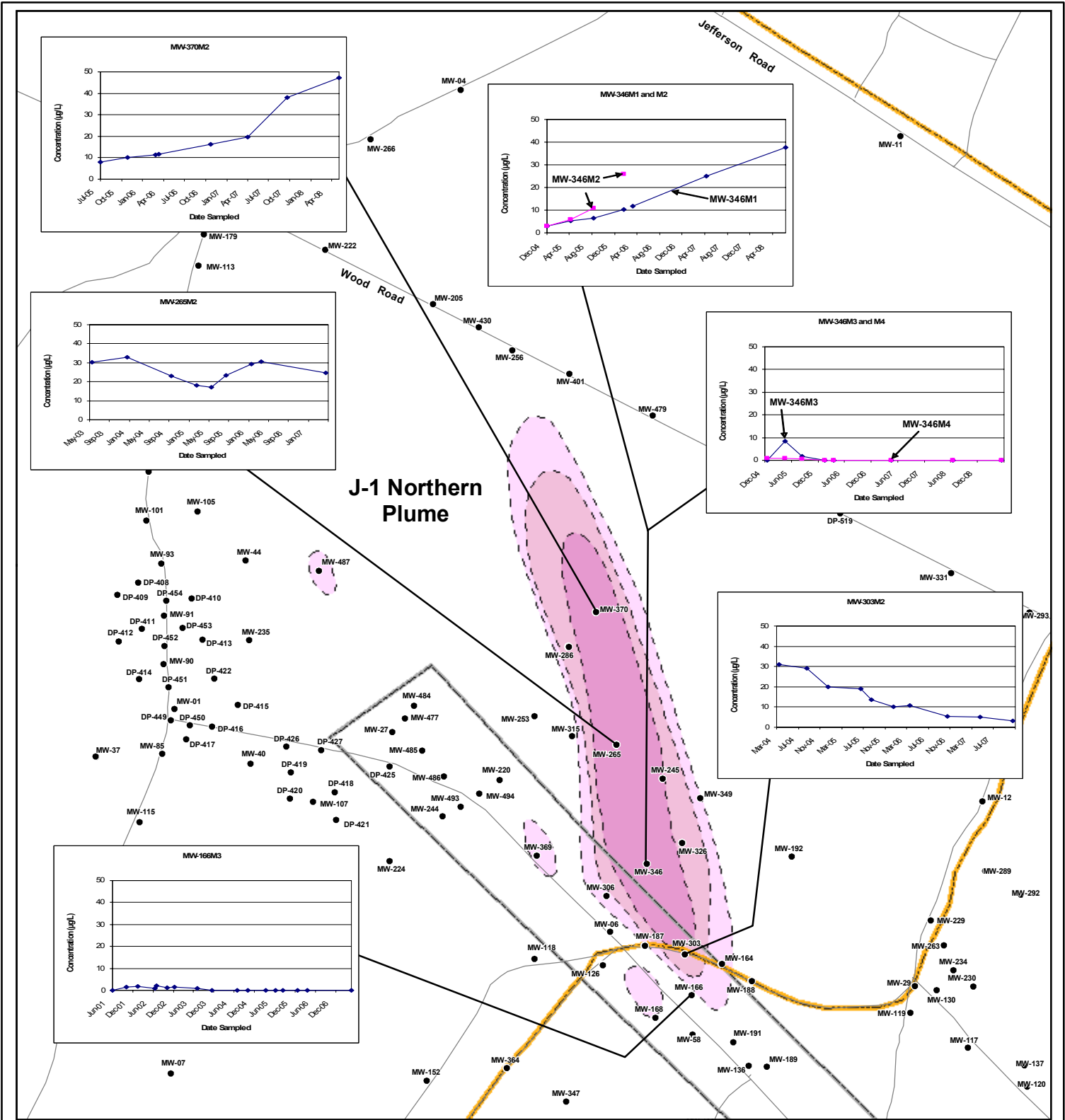
Data Sources: ECC/Jacobs, 12 June 2008, Site Environmental Evaluation (SEE) Database.
 — Geologic Contact (dashed where inferred)



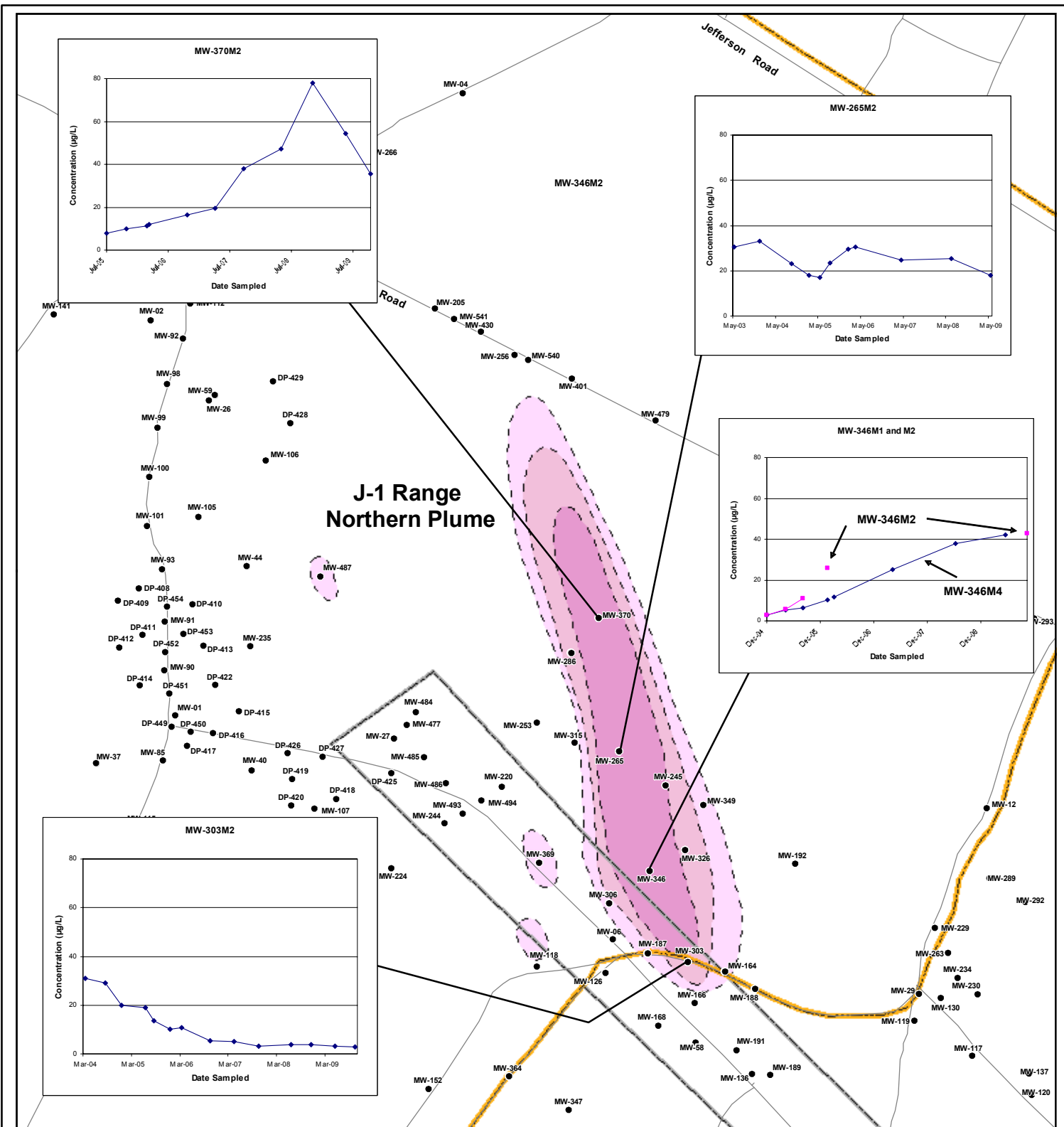
Impact Area Groundwater Study Program

J-1 Range North Plume Cross Section A-A'
 Illustrating Perchlorate Distributions
 Massachusetts Military Reservation
 Cape Cod, Massachusetts

07/08/10 JP xsection_j1_aa_per_20091109_final.dwg **Figure 3-2**

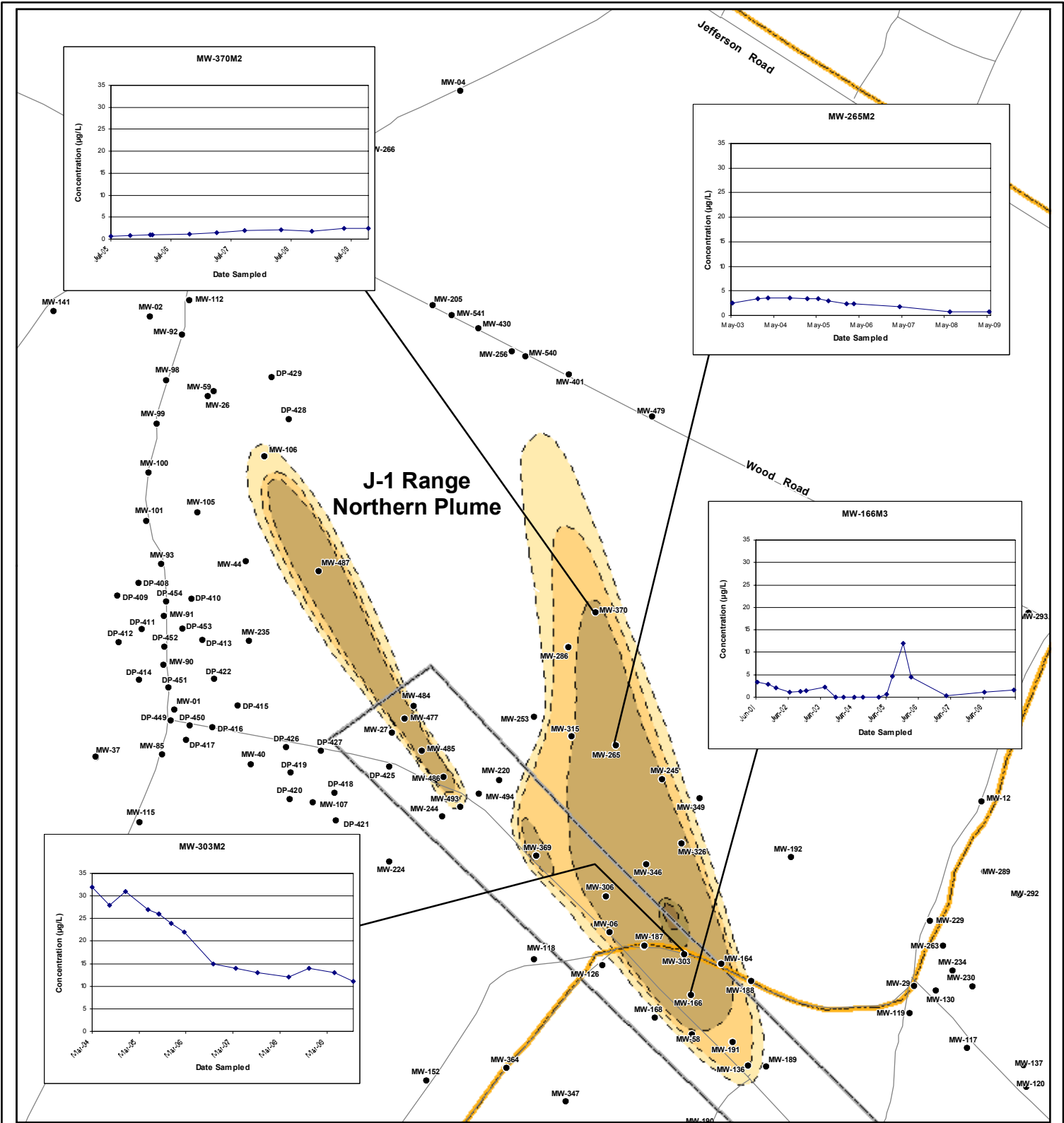


J-1 Range Northern Groundwater Perchlorate Trends



2009 J-1 Range Northern Perchlorate Plume

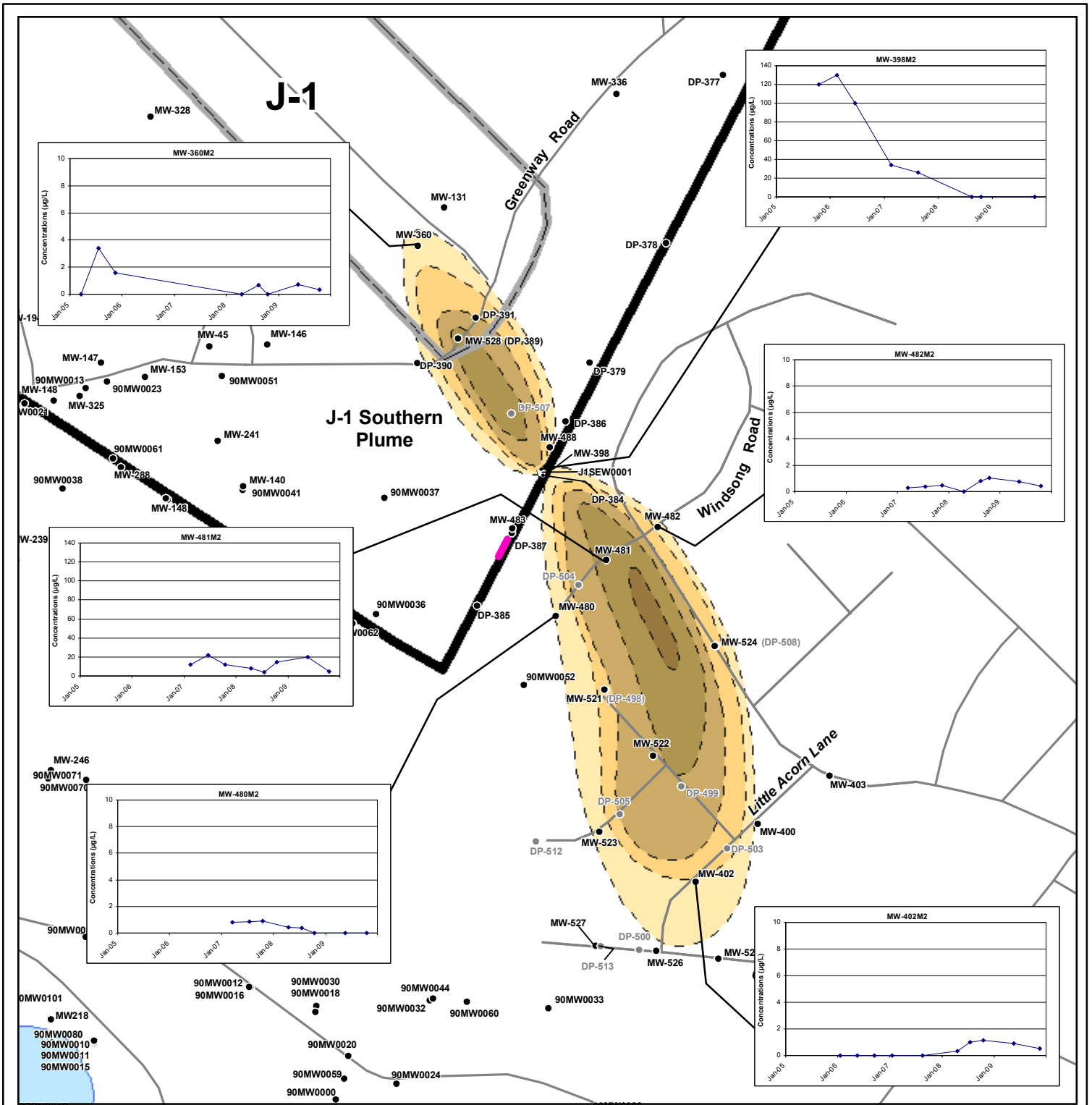




2009 J-1 Range Northern RDX Plume

FIGURE 3-7

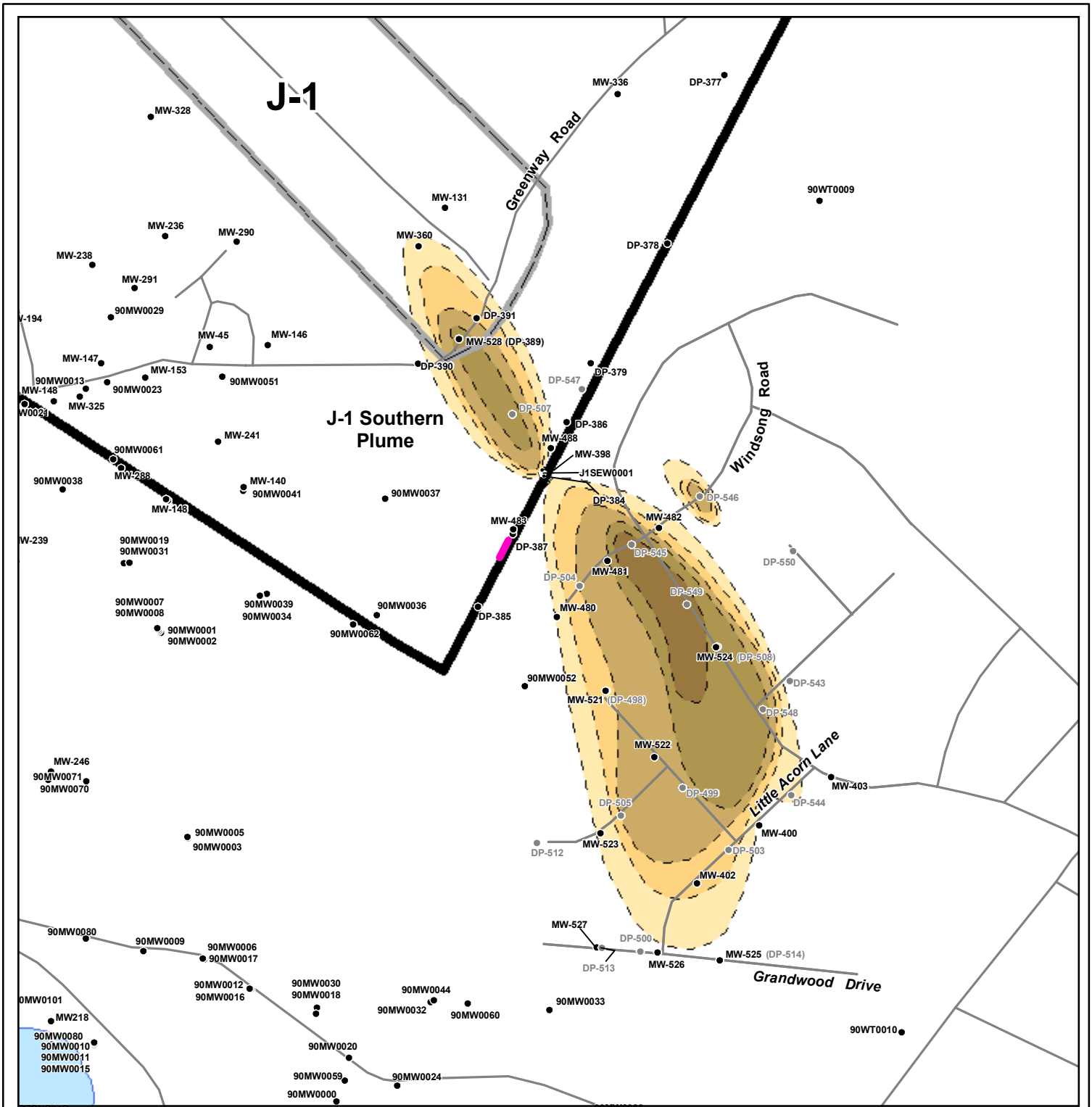




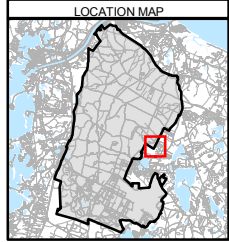
J-1 Range Southern Groundwater RDX Trends

FIGURE
3-8





LEGEND	
●	Monitoring Well
○	Drive Point Location (abandoned)
◻	Extraction Well
▭	J-1 Range Boundary
▭	MMR Boundary
▭	Impact Area Boundary
—	Infiltration Trench
RDX Detection	
□	Nondetect to 0.6 µg/L
□	0.6-2 µg/L
□	2-6 µg/L
□	6-20 µg/L
□	> 20 µg/L



0 600 Feet

NOTES & SOURCES
Map Projection: NAD83 UTM, Zone 19N, meters
Basemap data from ARNG

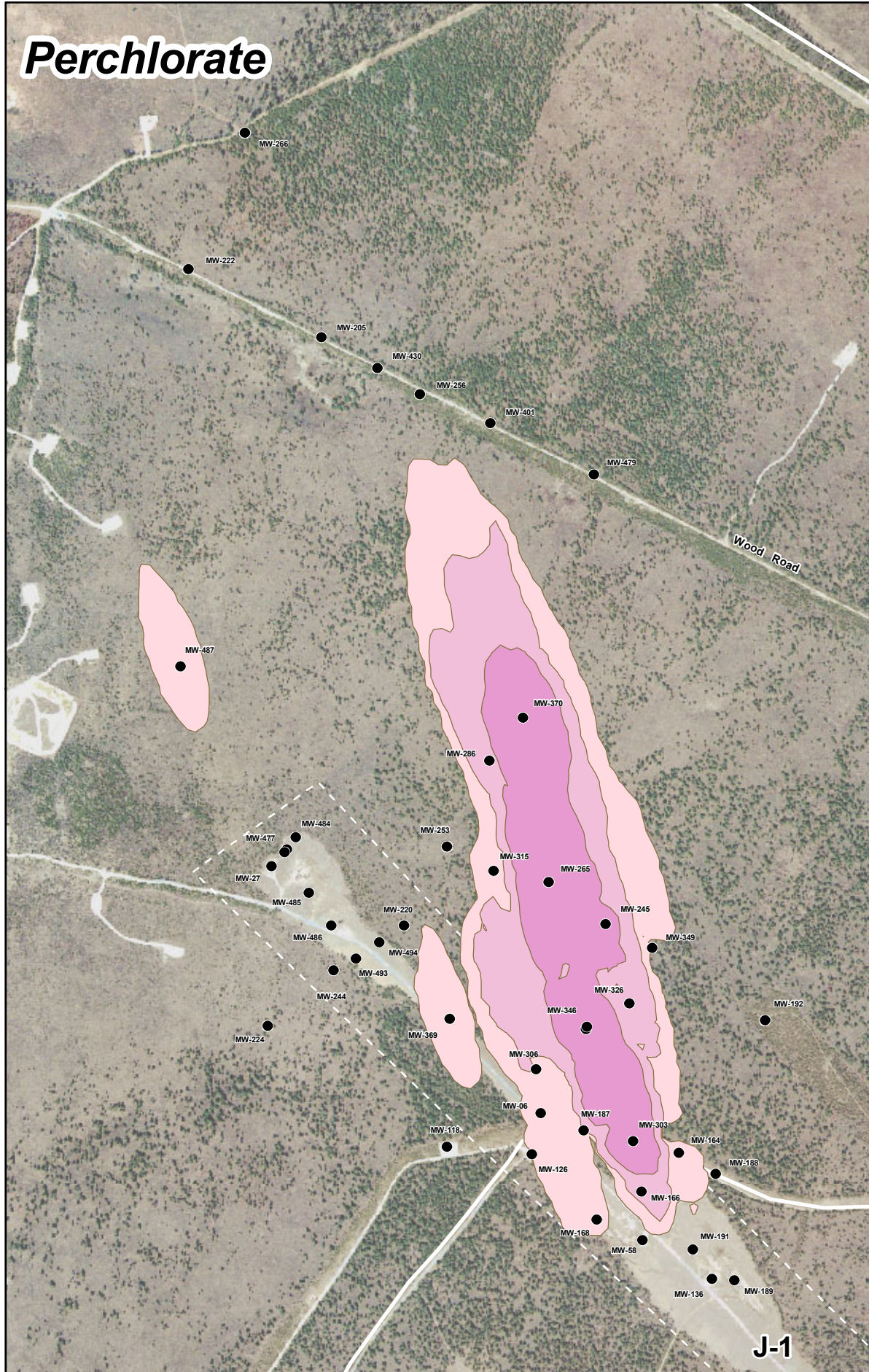
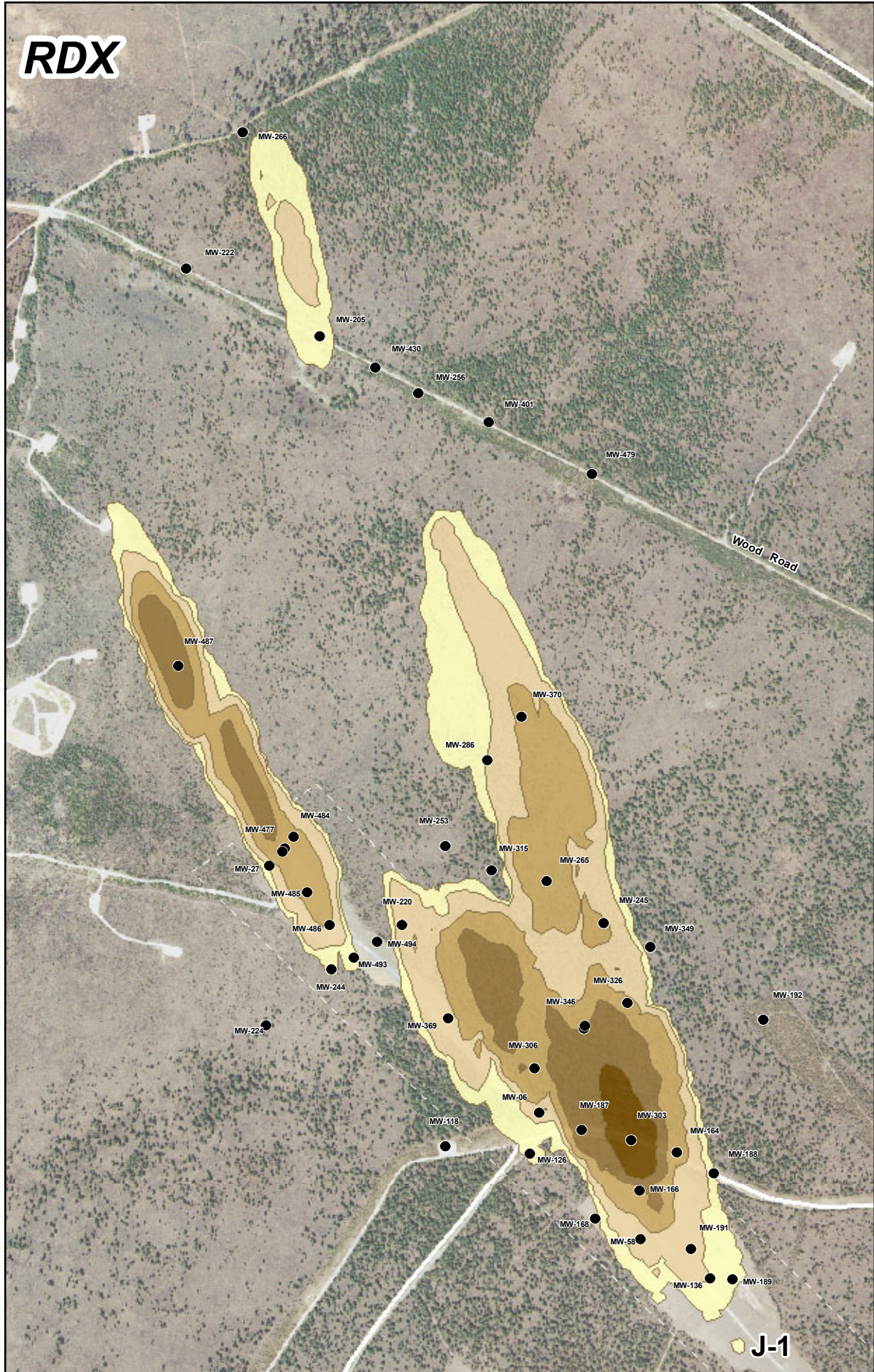
April 2010 J-1 Range Southern RDX Groundwater Plume

FIGURE 3-9

JACOBS
Bourne, Massachusetts
Y:\A_TERC\Projects\35A\5302.20\00708\ArcGIS
J1_south_plume_20100422_final.mxd
July 8, 2010 Jim Piroletti Checked by Katie Thomas

RDX

Perchlorate



Impact Area Groundwater Study Program

LEGEND

Perchlorate Concentration

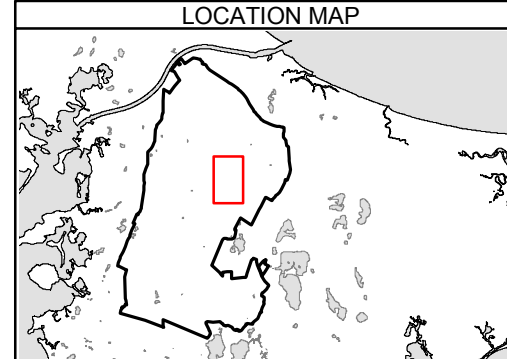
- 0.35 µg/L
- 2 µg/L
- 15 µg/L

RDX Concentration

- 0.25 µg/L
- 0.60 µg/L
- 2 µg/L
- 6 µg/L
- 20 µg/L

- Monitoring Well
- Range Boundary
- Impact Area Boundary

µg/L = micrograms per liter
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from US Geological Survey 7 1/2 minute
Topographic Map Source: MassGIS

TITLE

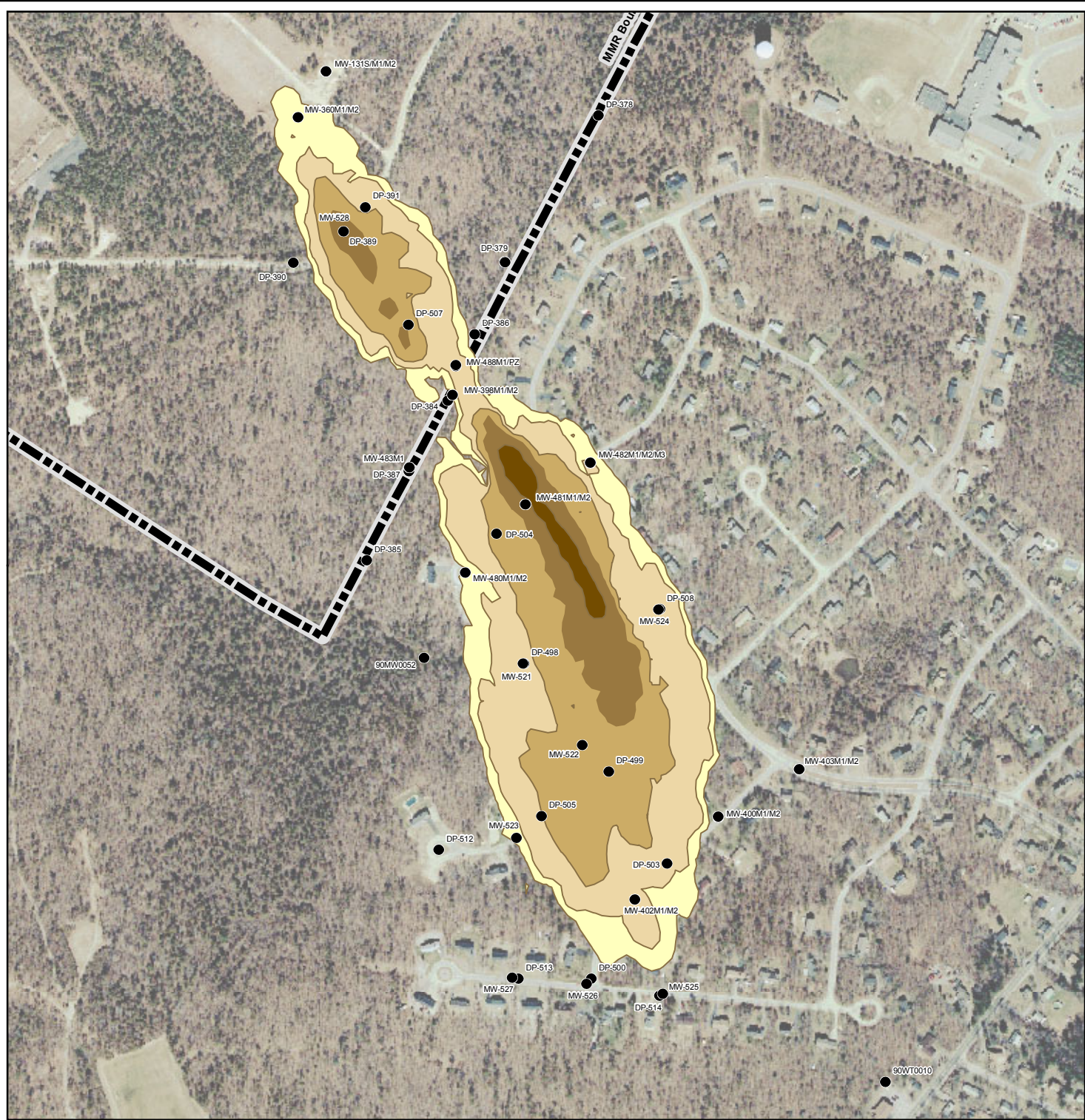
J-1 Range Northern Plume
2008 Plume Shells

0 500
Feet

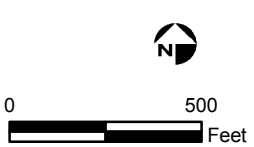
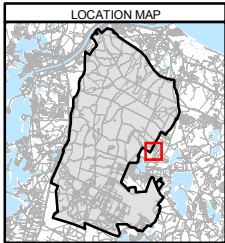
Jacobs
Bourne, Massachusetts

Y:\IA_TERC\Projects\35AY53\0220100708\ArcGIS\J1N_2008-RIFS_rdx_per_shell_final.mxd July 8, 2010
DWN BY: JPicullo CHKD BY: KThomas

FIGURE
3-10



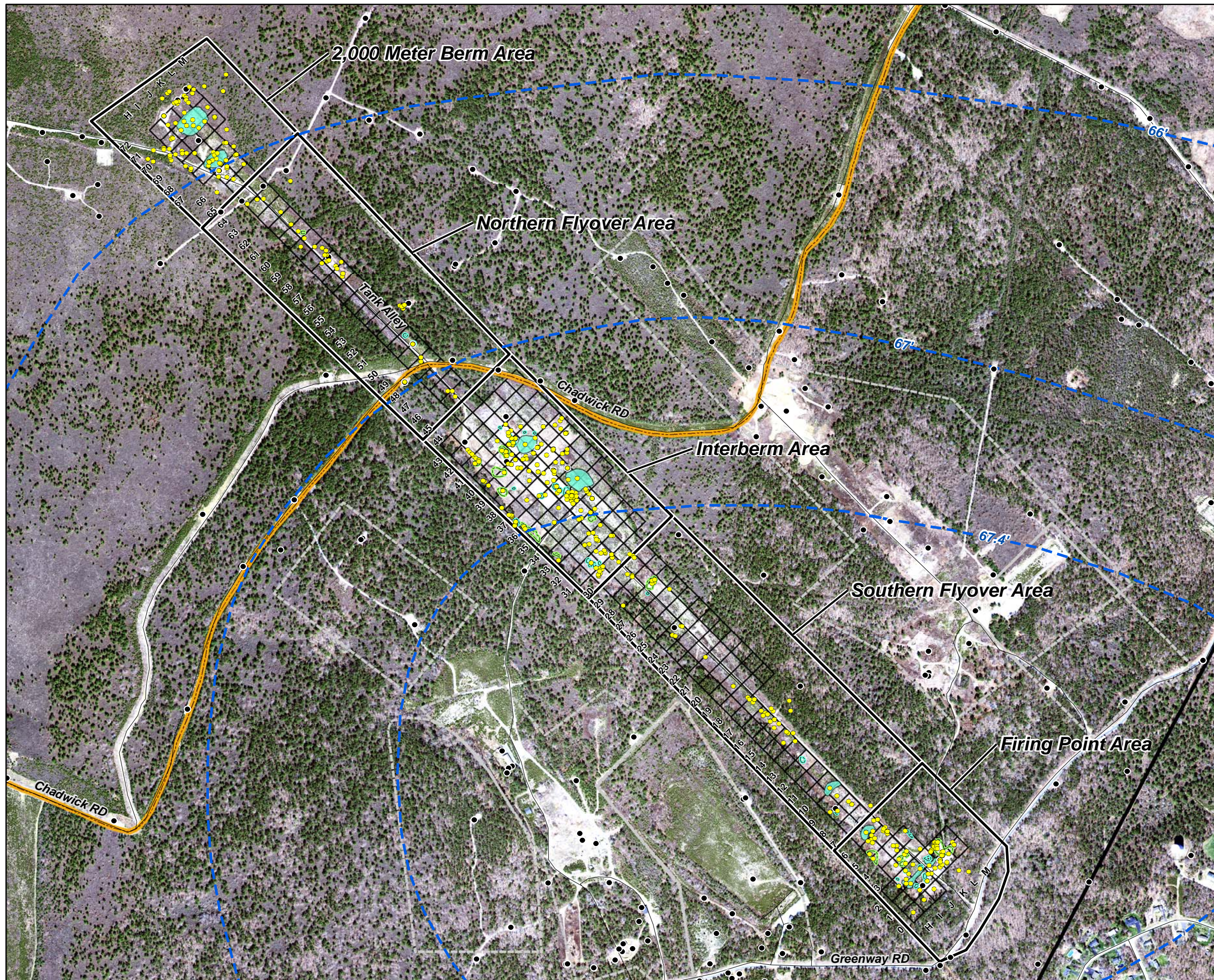
LEGEND	
	Monitoring Well / Drivepoint
	MMR Boundary
µg/L = micrograms per liter RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine	
RDX Concentration	
	0.25 µg/L
	0.60 µg/L
	2 µg/L
	6 µg/L
	20 µg/L



NOTES & SOURCES
 Map Projection: NAD83 UTM, Zone 19N, meters
 Basemap data from ARNG

J-1 Range Southern Plume 2010 Plume Shell

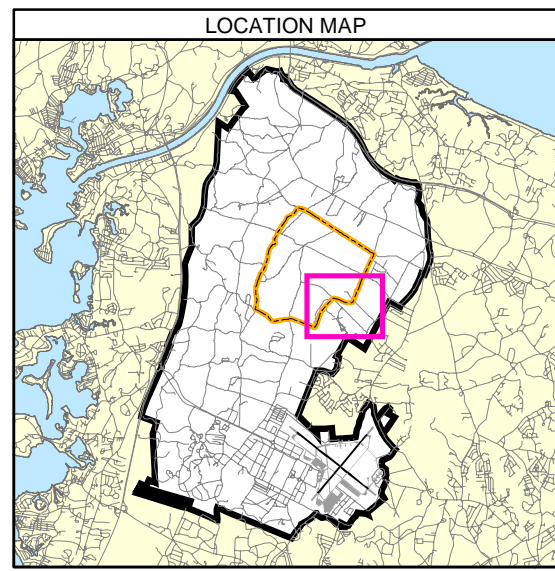
FIGURE
 3-12



**Impact Area
Groundwater Study Program**

LEGEND

- Sample Location
- Existing Monitoring Well
- Groundwater Contours (2004)
- Roads
- J-1 Soil RI Study Areas (5)
- MSP Phase III Polygons
- Additional Polygons
- Berms
- Impact Area Boundary
- J-1 Range Grids
- Southeast Ranges Boundaries

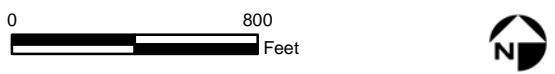


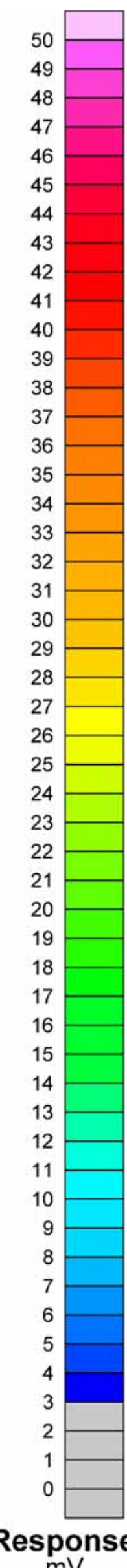
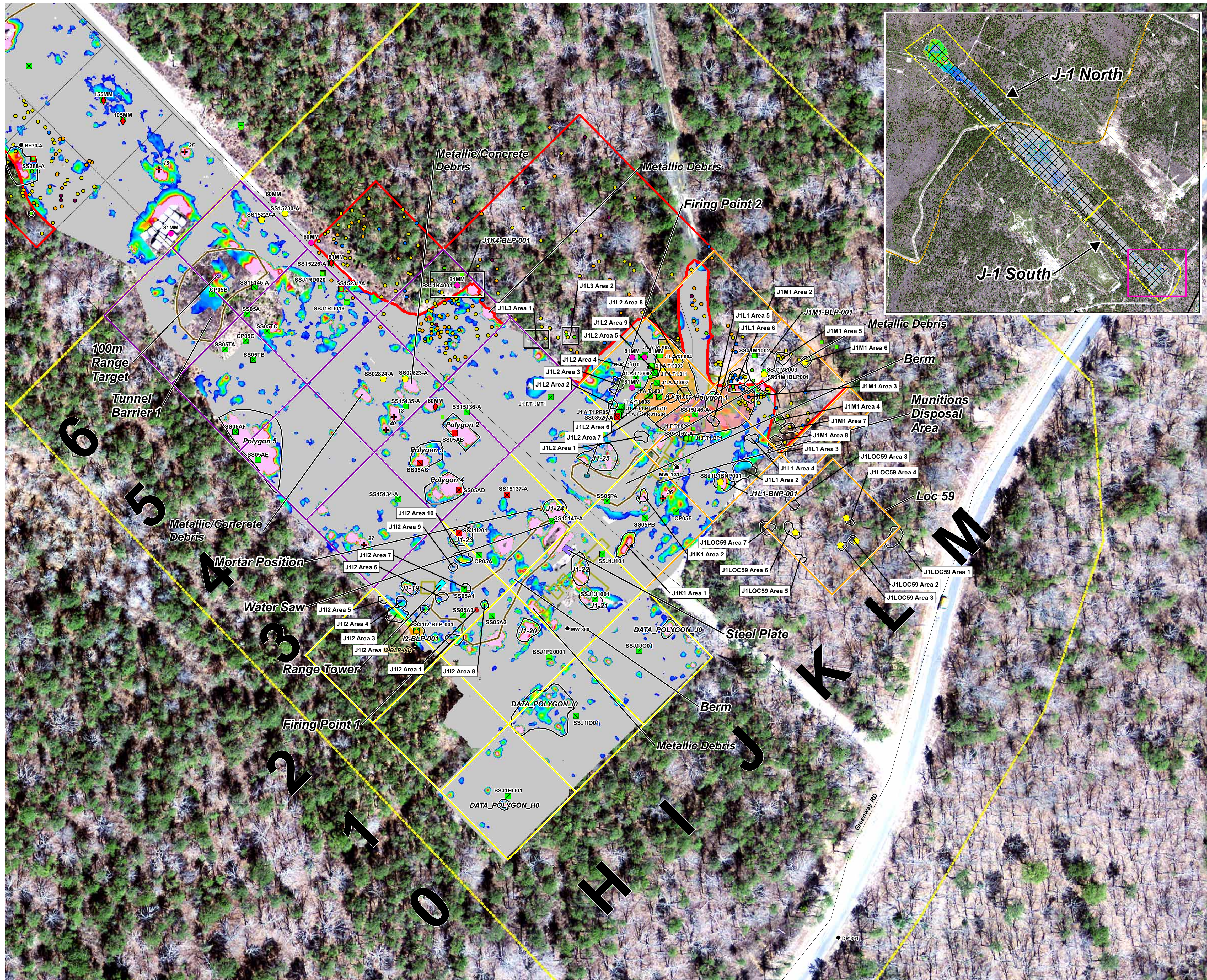
NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG
 Groundwater contours data from JEG

TITLE

**J-1 Range
Soil/Geophysical RI
Study Areas**





Impact Area Groundwater Study Program

LEGEND

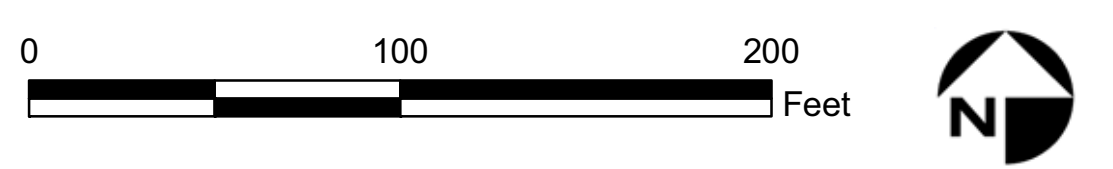
- Potential Pit Anomalies
- Existing Monitoring Well
- Munitions in Firing Point Area**
 - HE
 - Possible HE
 - Propellant/Energetic
 - Small Quantity Energetic
 - Inert
- Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
 - Rows 3 through 6
 - Firing Points, Administration Area for Munitions Testing
 - Disposal Areas
 - Geophysical Investigation Areas
- Detailed Reconnaissance Investigation**
 - Subsurface- A (<6")
 - Subsurface- B (6"-1')
 - Subsurface- C (1'-3')
 - Subsurface- D (3'-6')
 - Subsurface- E (6'-13')
 - Subsurface- F (>13')
- Areas of Recon
- Roads
- Berms
- Burial Pit
- Burn Pit
- Former Buildings
- J-1 Range Grids
- J-1 Soil RI Study Area Boundaries
- EM-61 Signal Data

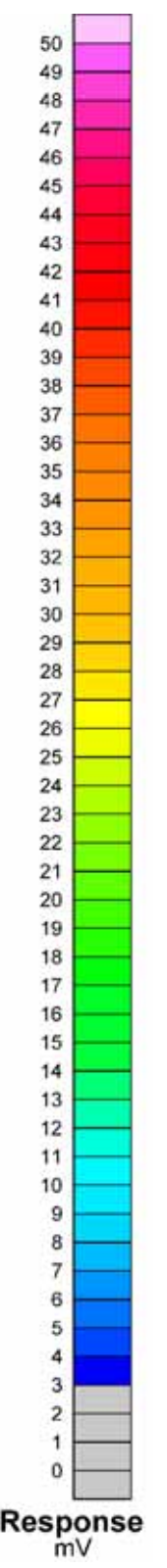
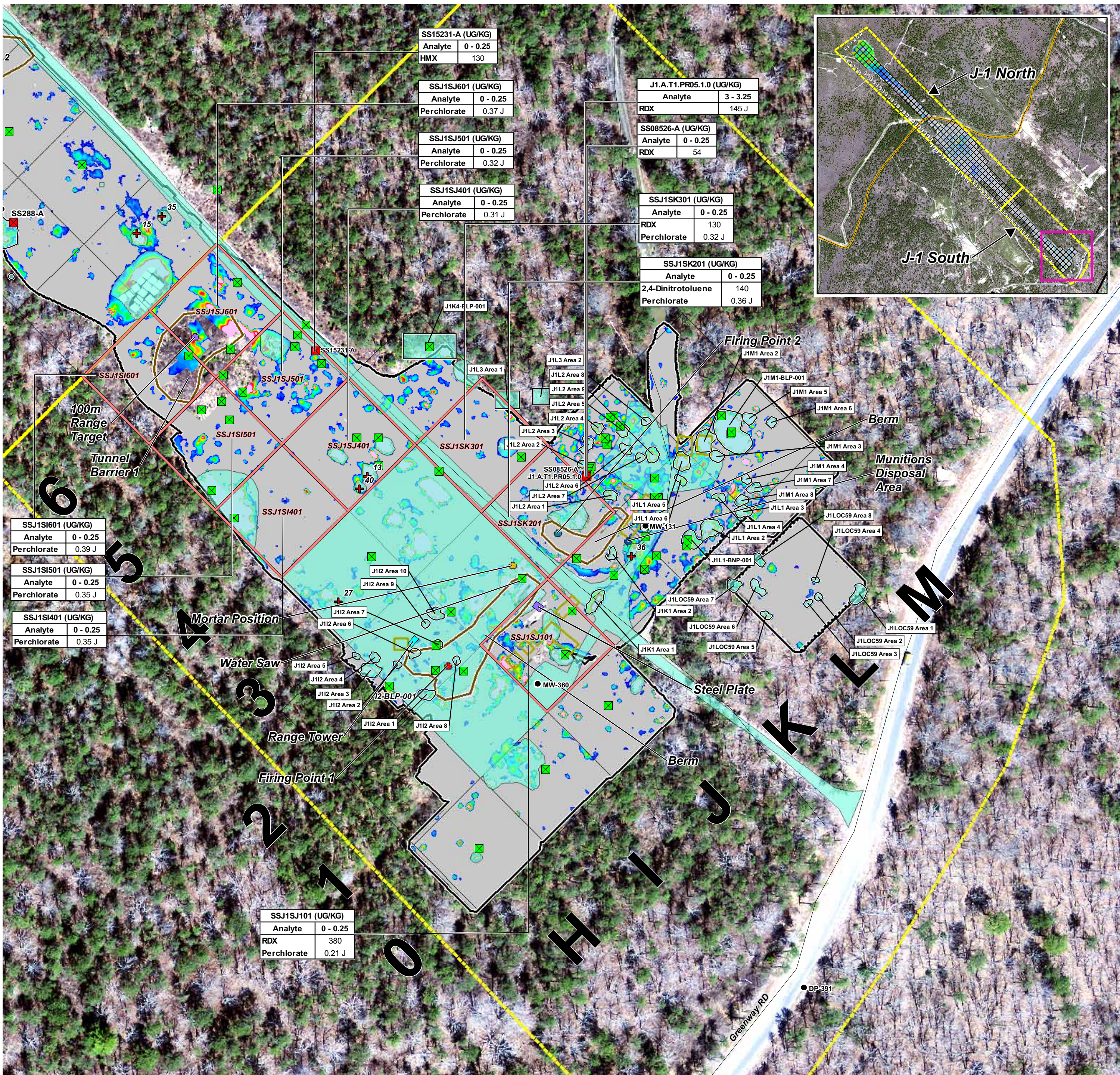
NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

J-1 Range Firing Point Area (Rows 0 to 6) Characterization Summary

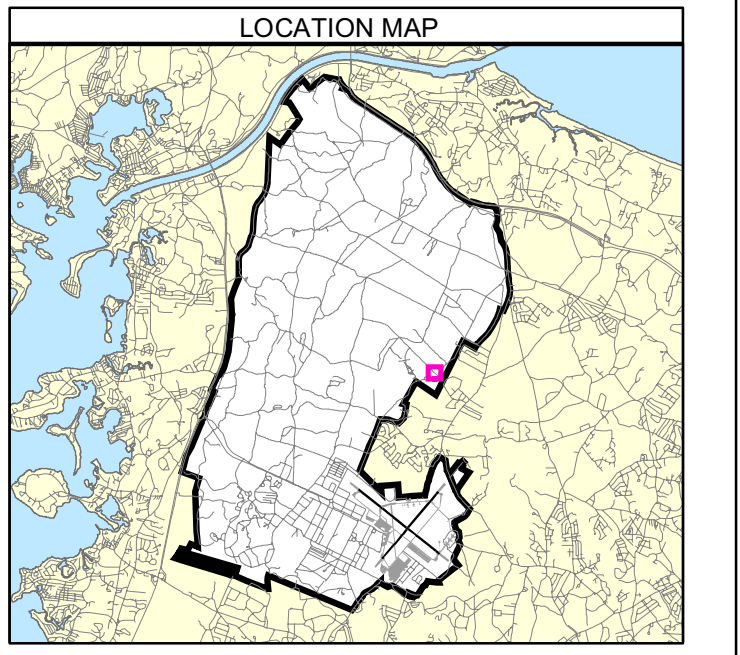




Impact Area Groundwater Study Program

LEGEND

- ⊕ Potential Pit Anomalies
- Existing Monitoring Well
- Remaining Soil Sample Locations
 - ⊠ Detections for Explosives and/or Perchlorate
 - ⊠ Nondetections for Explosives and Perchlorate
- MIS Sampling Grids
- QC Target Grids Re-Surveyed in 2007
- Roads
- Berms
- Former Buildings
- Geophysical Anomalies Removed Areas
- Geophysically Surveyed Boundary
- J-1 Range Grids
- J-1 Soil RI Study Area Boundaries
- EM-61 Signal Data

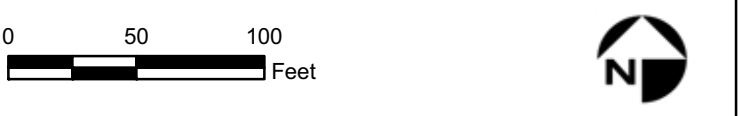


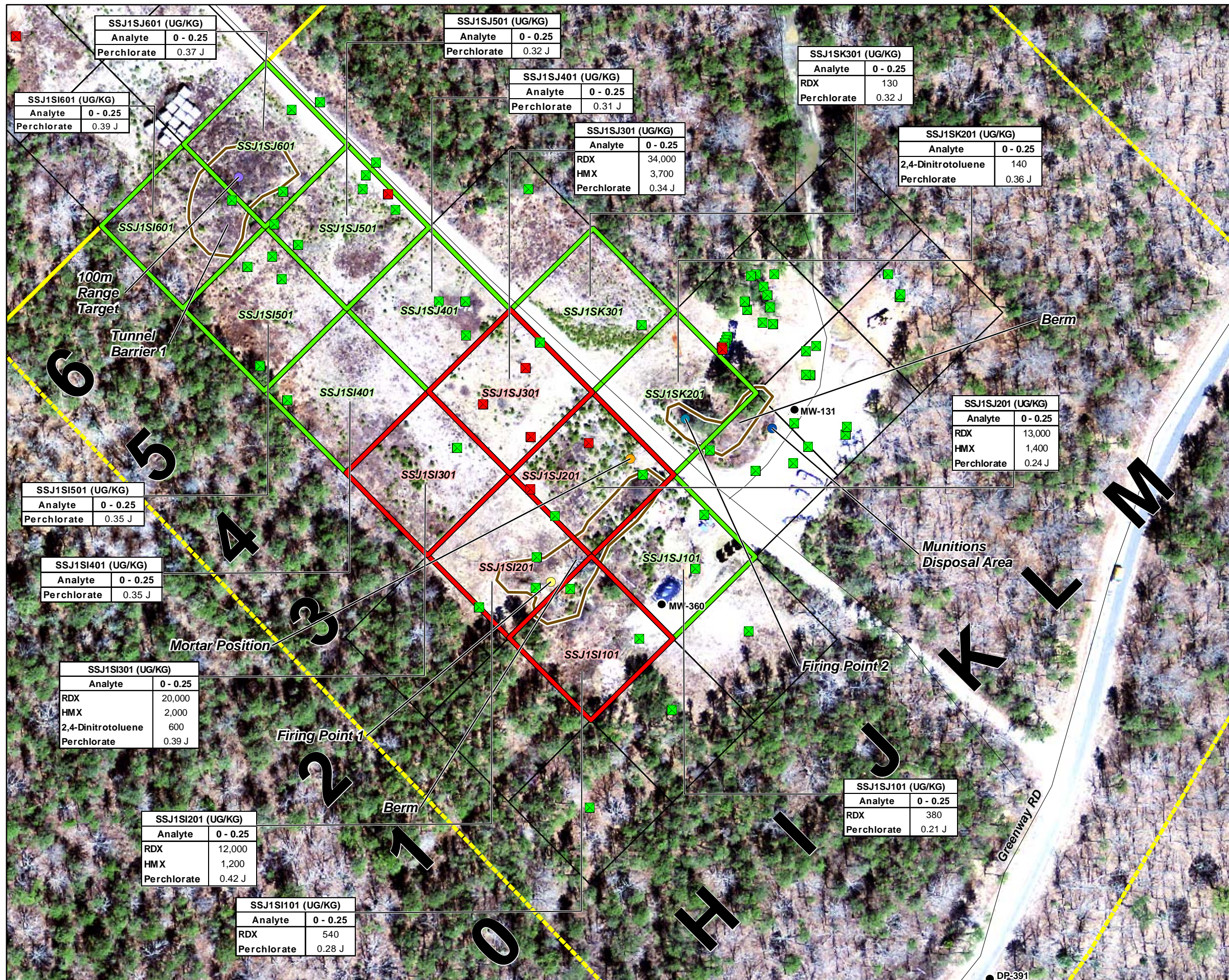
NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

J-1 Range Firing Point Area (Rows 0 to 6) Existing Conditions Summary



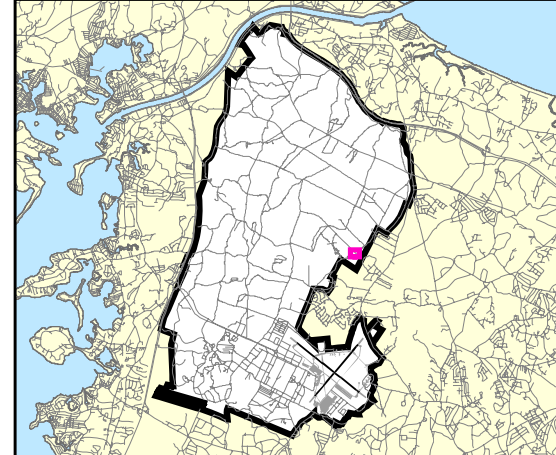


Impact Area Groundwater Study Program

LEGEND

- Existing Monitoring Well
- Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
- MIS Sampling Grids**
 - Excavated Grids
 - Not Excavated Grids
 - Berms
 - J-1 Range Grids
 - J-1 Soil RI Study Area Boundaries

LOCATION MAP



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

**J-1 Range Firing Point Area
 (Rows 0 to 6)
 MIS Sampling Results**

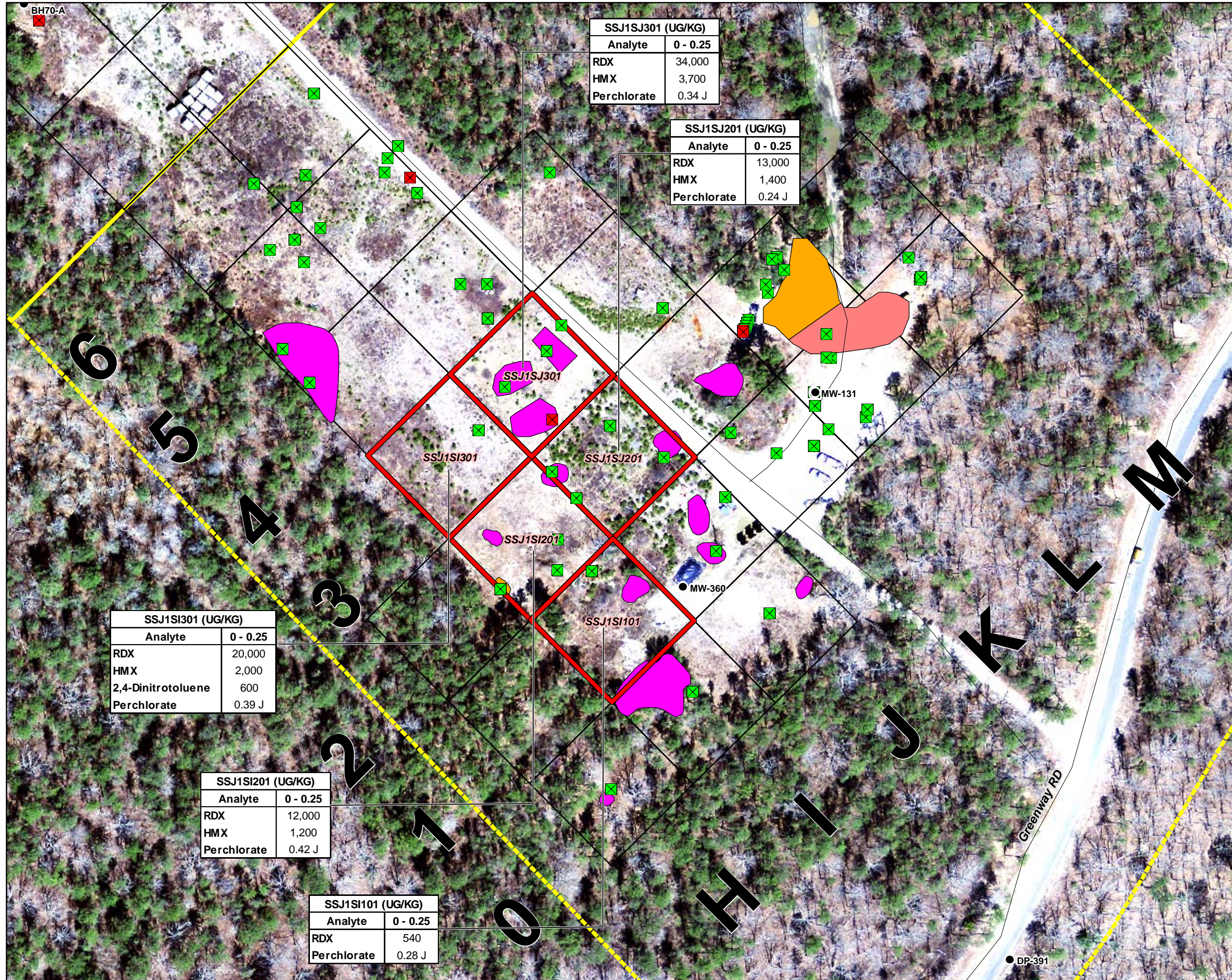


ECC MMR
 Cape Cod, Massachusetts

ECC GIS Server
 C:\ERC_GIS\CTO002\J1_SoilRI\J1CombinedRI_Figs\J1RI_Section04\Fig4-04_J1MIS_Subarea1.mxd
 December 2009 Drawn By JYK Checked by PF

FIGURE

4-4



SSJ1SJ301 (UG/KG)	
Analyte	0 - 0.25
RDX	34,000
HMX	3,700
Perchlorate	0.34 J

SSJ1SJ201 (UG/KG)	
Analyte	0 - 0.25
RDX	13,000
HMX	1,400
Perchlorate	0.24 J

SSJ1SI301 (UG/KG)	
Analyte	0 - 0.25
RDX	20,000
HMX	2,000
2,4-Dinitrotoluene	600
Perchlorate	0.39 J

SSJ1SI201 (UG/KG)	
Analyte	0 - 0.25
RDX	12,000
HMX	1,200
Perchlorate	0.42 J

SSJ1SI101 (UG/KG)	
Analyte	0 - 0.25
RDX	540
Perchlorate	0.28 J

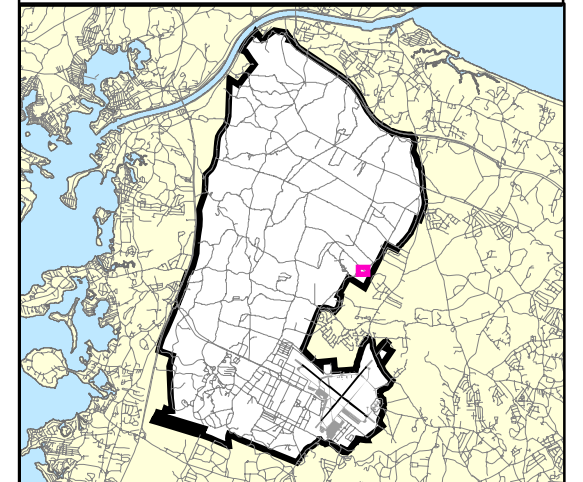


Impact Area Groundwater Study Program

LEGEND

- Existing Monitoring Well
- Detections for Explosives and/or Perchlorate
- Nondetections for Explosives and Perchlorate
- Excavated Areas
- Roads
- Previously Investigated Polygons
- Burial Pit
- Burn Pit
- J-1 Range Grids
- J-1 Soil RI Study Area Boundaries

LOCATION MAP



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

**J-1 Range Firing Point Area
 (Rows 0 to 6)
 Excavated Areas Based on
 MIS Sample Results**

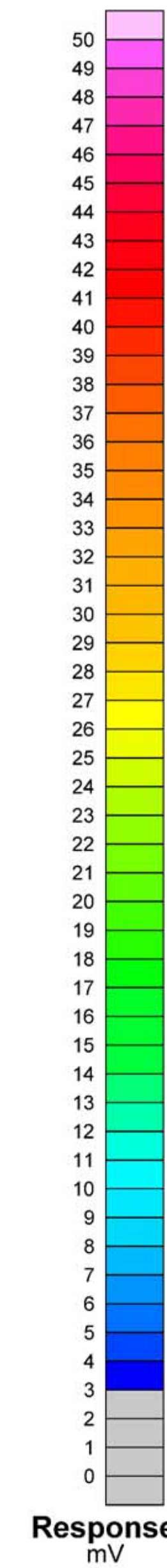
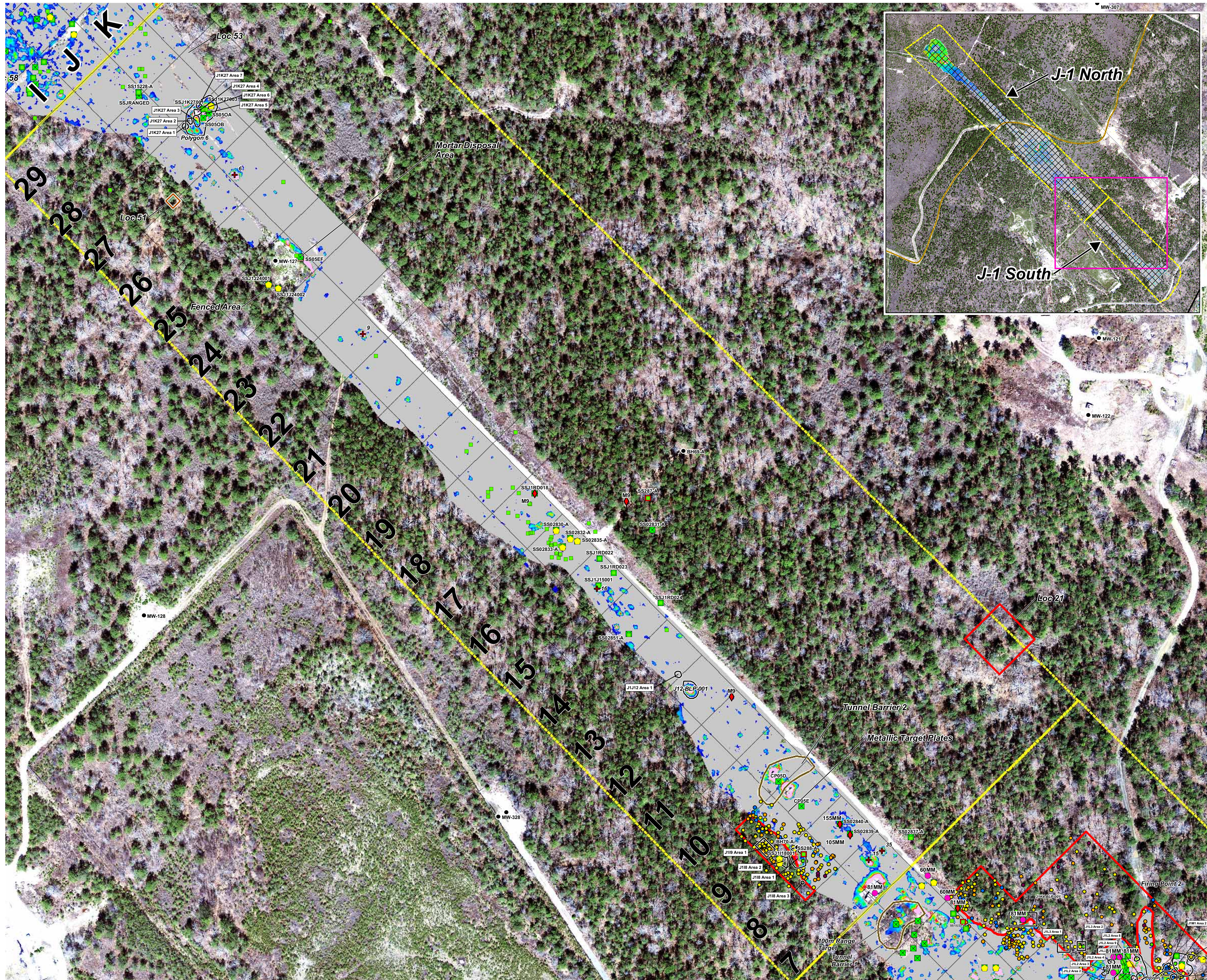


ECC MMR
 Cape Cod, Massachusetts

ECC GIS Server
 C:\TERC_GIS\CTO002J1_SoilRI\J1CombinedRI_Figs\
 J1RI_Section04\Fig4-05_J1Excavation_Subarea1.mxd
 April 2010 Drawn By JYK Checked by PF

FIGURE

4-5



Impact Area Groundwater Study Program

LEGEND

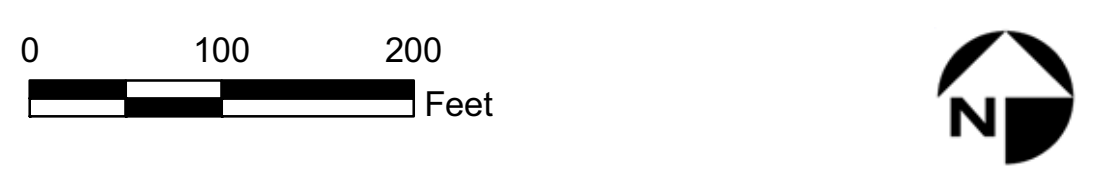
- Potential Pit Anomalies
- Existing Monitoring Well
- Munitions in Southern Flyover Area**
 - HE
 - Possible HE
 - Propellant/Energetic
 - Small Quantity Energetic
 - Inert
- Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
- Aerial Assessment Investigation**
 - Intrusive Investigation (20 ft X 20 ft)
 - Areas of Detailed Recon
 - Geophysical Investigation Areas
- Detailed Reconnaissance Investigation**
 - Subsurface- A (<6")
 - Subsurface- B (6"-1')
 - Subsurface- C (1'-3')
 - Subsurface- D (3'-6')
 - Subsurface- E (6'-13')
 - Subsurface- F (>13')
- Berms
- Former Buildings
- J-1 Range Grids
- J-1 Soil RI Study Area Boundaries
- EM-61 Signal Data

NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

**J-1 Range
 Southern Flyover Area
 (Rows 7 to 29)
 Characterization Summary**

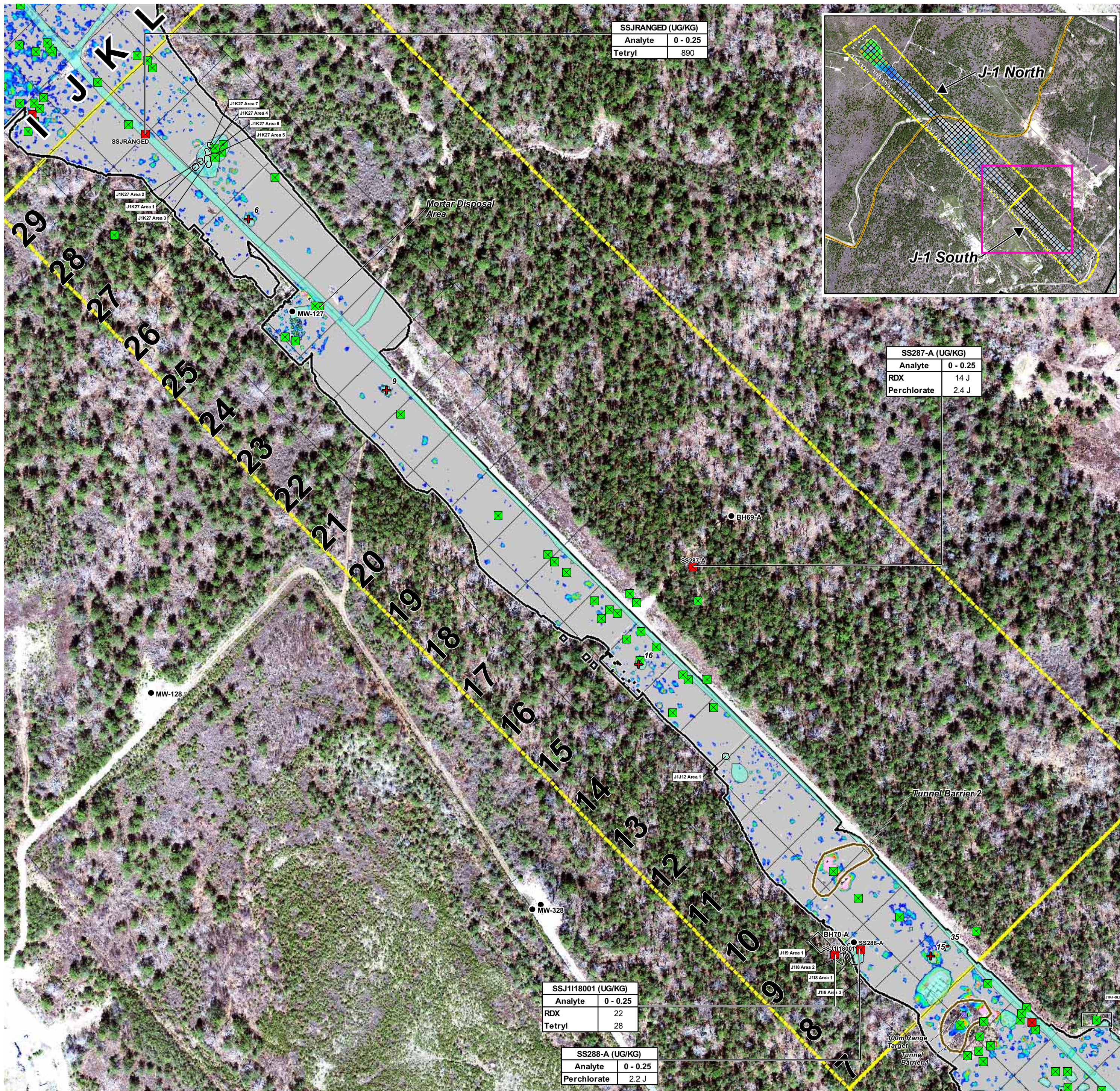


ECC MMR
 Cape Cod, Massachusetts

ECC GIS Server
 C:\TERC_GIS\CTO002\J1_SoilRI\J1CombinedRI_Figs\J1RI_Section04
 Fig4-06_J1Char_Subarea2_D.mxd
 December 2009 Drawn by JYK Checked by PF

FIGURE

4-6

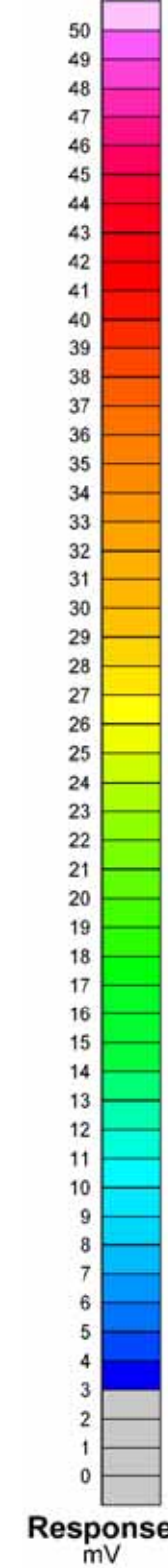


SSJRANGED (UG/KG)	
Analyte	0 - 0.25
Tetryl	890

SS287-A (UG/KG)	
Analyte	0 - 0.25
RDX	14 J
Perchlorate	2.4 J

SSJ118001 (UG/KG)	
Analyte	0 - 0.25
RDX	22
Tetryl	28

SS288-A (UG/KG)	
Analyte	0 - 0.25
Perchlorate	2.2 J



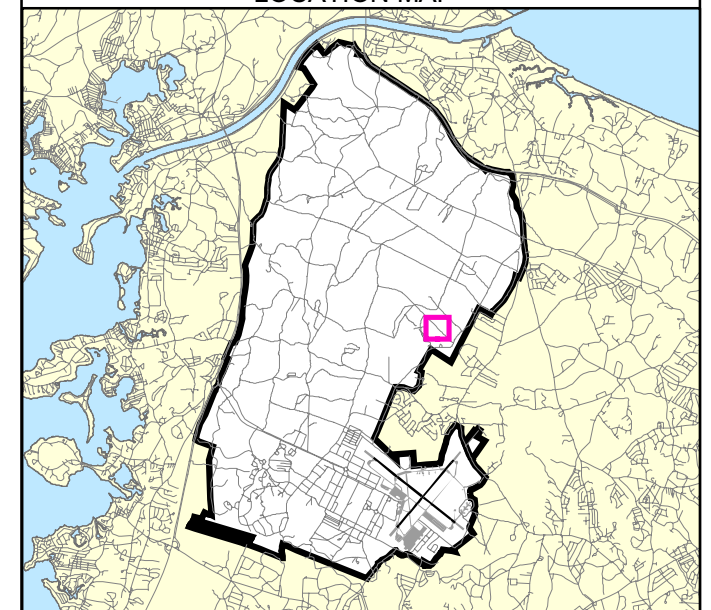
Response
mV

**Impact Area
Groundwater Study Program**

LEGEND

- + Potential Pit Anomalies
- Existing Monitoring Well
- Remaining Soil Sample Locations**
- Detections for Explosives and/or Perchlorate
- Nondetections for Explosives and Perchlorate
- QC Target Grids Re-Surveyed in 2007
- Berms
- Former Buildings
- Geophysical Anomalies Removed Areas
- Geophysically Surveyed Boundary
- J-1 Range Grids
- J-1 Soil RI Study Area Boundaries
- EM-61 Signal Data

LOCATION MAP

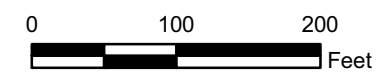


NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from MA ARNG

TITLE

**J-1 Range
Southern Flyover Area
(Rows 7 to 29)
Existing Conditions
Summary**

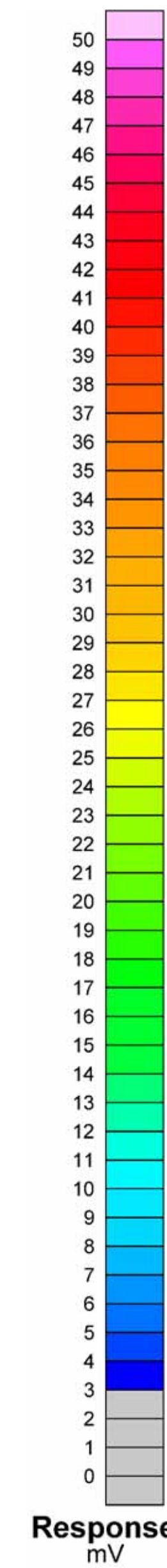
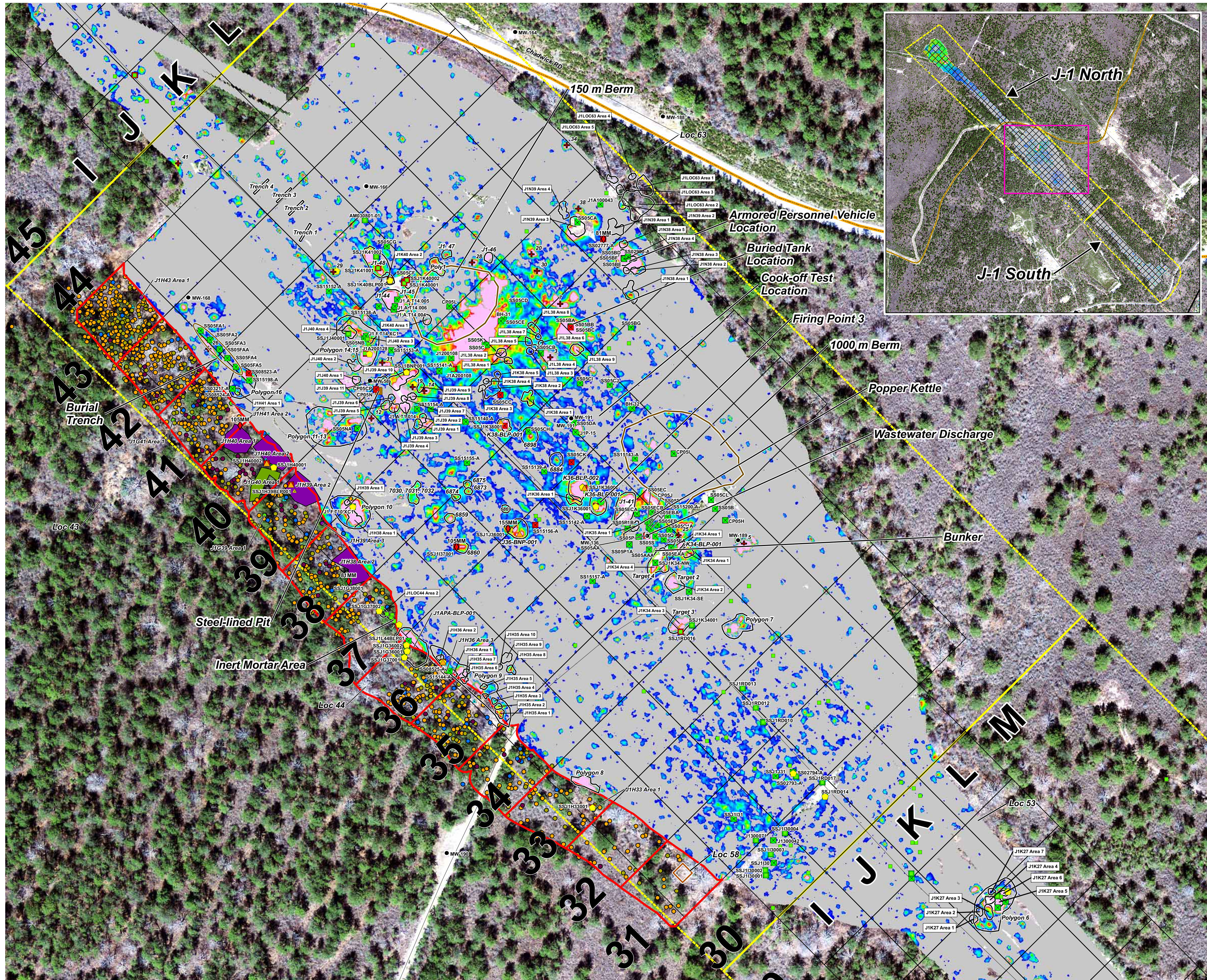


ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
C:\TERC_GIS\CT0002\J1_SoilRI\U1CombinedRI_Figs\U1RI_Section04
Fig4-07_J1ExCond_Subarea2_C.mxd
December 2009 Drawn by JVK Checked by PF

FIGURE

4-7



Impact Area Groundwater Study Program

LEGEND

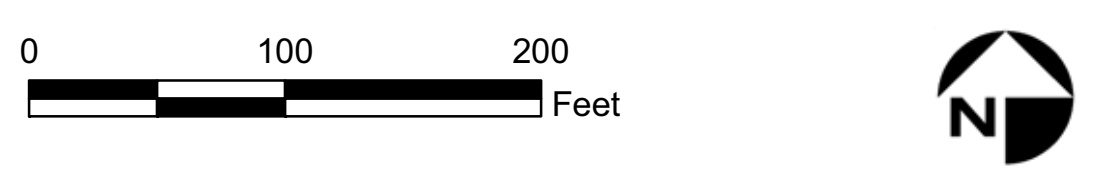
- Potential Pit Anomalies
- Existing Monitoring Well
- Munitions in Interberm Area**
 - HE
 - Possible HE
 - Propellant/Energetic
 - Small Quantity Energetic
 - Inert
- Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
- Aerial Assessment Investigation**
 - Intrusive Investigation (20 ft X 20 ft)
 - Areas of Detailed Recon
 - Geophysical Investigation Areas
- Detailed Reconnaissance Investigation**
 - Subsurface- A (<6")
 - Subsurface- B (6"-1')
 - Subsurface- C (1'-3')
 - Subsurface- D (3'-6')
 - Subsurface- E (6'-13')
 - Subsurface- F (>13')
 - Surface MD
 - Surface RRD
 - Subsurface Polygon Anomaly
 - Surface Polygon Anomaly
 - Berms
 - Roads
 - Impact Area Boundary
 - J-1 Range Grids
 - J-1 Soil RI Study Area Boundaries
 - EM-61 Signal Data

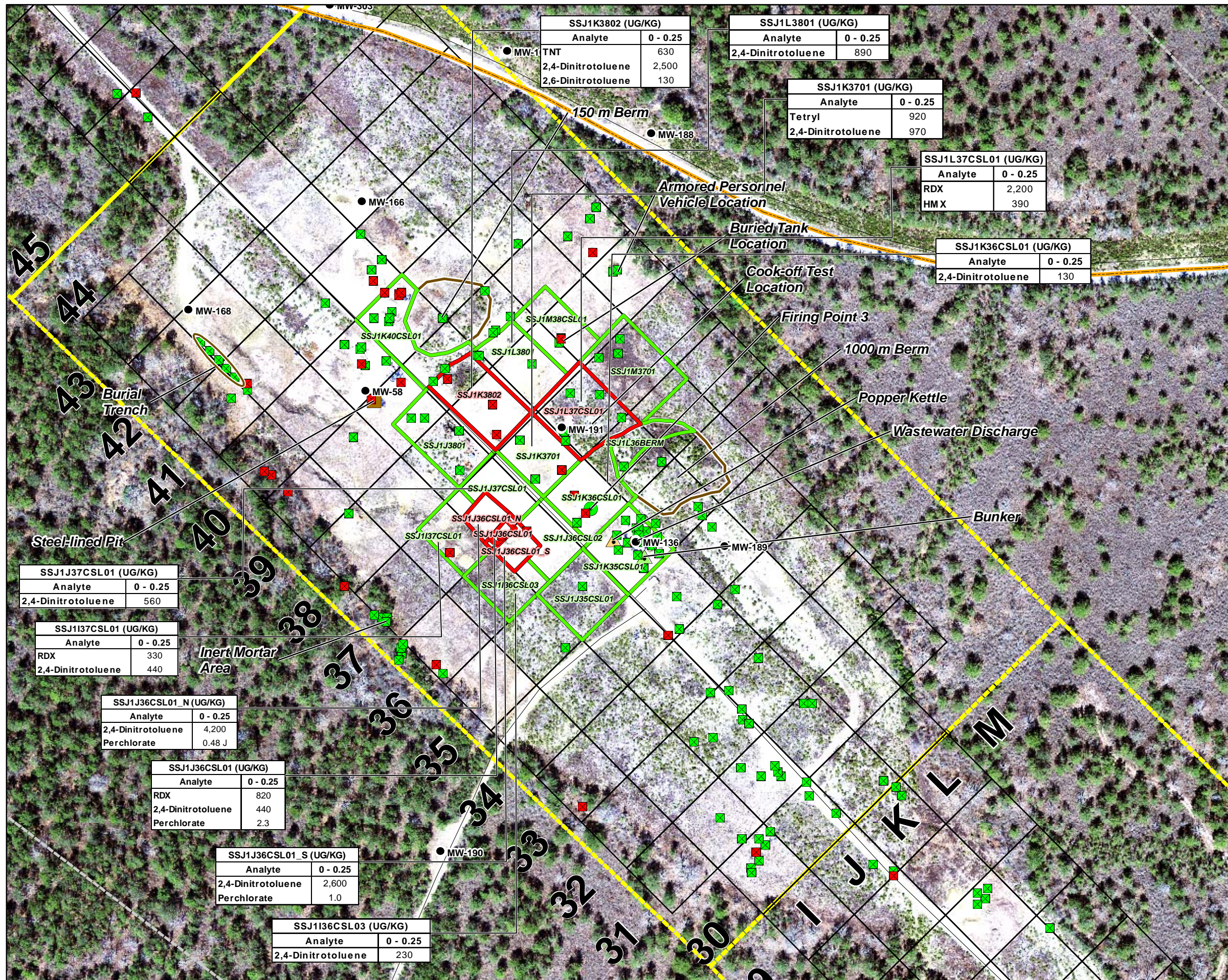
NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

J-1 Range Interberm Area (Rows 30 to 44) Characterization Summary





SSJ1K3802 (UG/KG)	
Analyte	0 - 0.25
TNT	630
2,4-Dinitrotoluene	2,500
2,6-Dinitrotoluene	130

SSJ1L3801 (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	890

SSJ1K3701 (UG/KG)	
Analyte	0 - 0.25
Tetryl	920
2,4-Dinitrotoluene	970

SSJ1L37CSL01 (UG/KG)	
Analyte	0 - 0.25
RDX	2,200
HM X	390

SSJ1K36CSL01 (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	130

SSJ1J37CSL01 (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	560

SSJ1I37CSL01 (UG/KG)	
Analyte	0 - 0.25
RDX	330
2,4-Dinitrotoluene	440

SSJ1J36CSL01_N (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	4,200
Perchlorate	0.48 J

SSJ1J36CSL01 (UG/KG)	
Analyte	0 - 0.25
RDX	820
2,4-Dinitrotoluene	440
Perchlorate	2.3

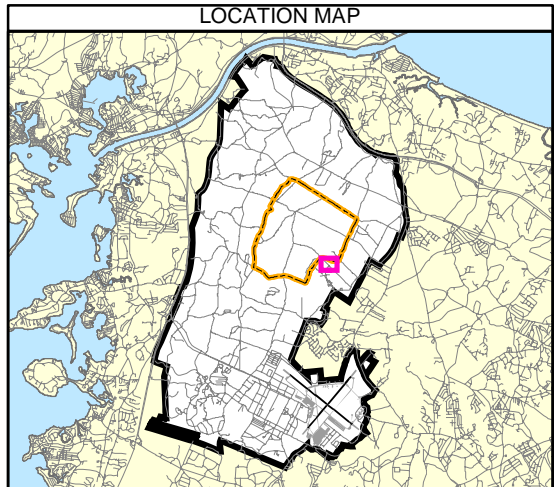
SSJ1J36CSL01_S (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	2,600
Perchlorate	1.0

SSJ1I36CSL03 (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	230

Impact Area Groundwater Study Program

LEGEND

- Existing Monitoring Well
- Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
- MIS Sampling Grids**
 - Excavated Grids
 - Not Excavated Grids
 - Berms
 - Impact Area Boundary
 - J-1 Range Grids
 - J-1 Soil RI Study Area Boundaries

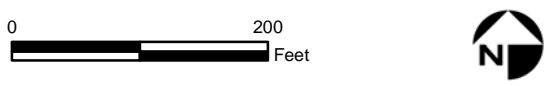


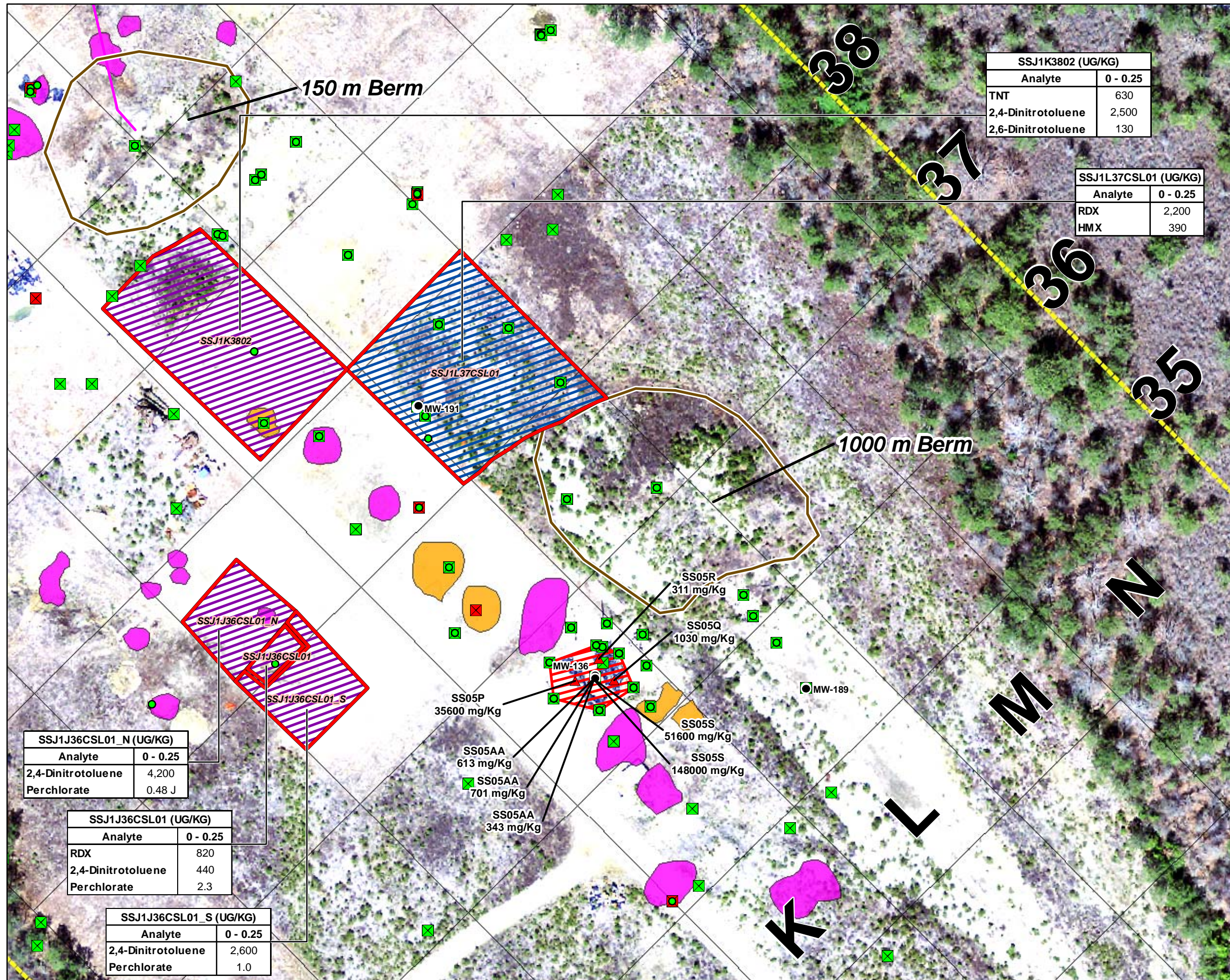
NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

J-1 Range Interberm Area (Rows 30 to 44) MIS Sampling Results





SSJ1K3802 (UG/KG)	
Analyte	0 - 0.25
TNT	630
2,4-Dinitrotoluene	2,500
2,6-Dinitrotoluene	130

SSJ1L37CSL01 (UG/KG)	
Analyte	0 - 0.25
RDX	2,200
HMX	390

SSJ1J36CSL01_N (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	4,200
Perchlorate	0.48 J

SSJ1J36CSL01 (UG/KG)	
Analyte	0 - 0.25
RDX	820
2,4-Dinitrotoluene	440
Perchlorate	2.3

SSJ1J36CSL01_S (UG/KG)	
Analyte	0 - 0.25
2,4-Dinitrotoluene	2,600
Perchlorate	1.0

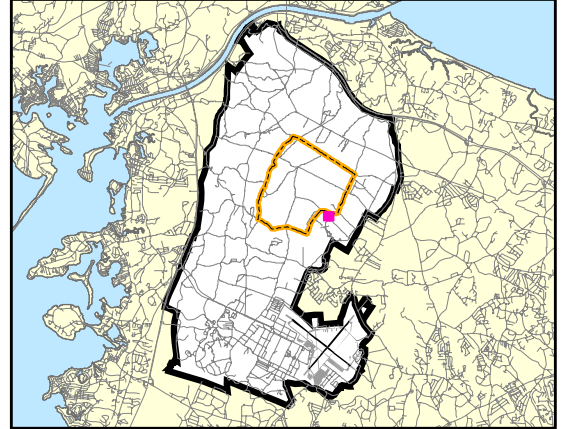
SS05P	35600 mg/Kg
SS05AA	613 mg/Kg
SS05AA	701 mg/Kg
SS05AA	343 mg/Kg
SS05R	311 mg/Kg
SS05Q	1030 mg/Kg
SS05S	51600 mg/Kg
SS05S	148000 mg/Kg

Impact Area Groundwater Study Program

LEGEND

- Existing Monitoring Well
- Lead Sample Locations (Pre-excavation)**
- ▲ ≥ 300 mg/kg
- < 300 mg/kg
- Remaining Soil Sample Locations**
- ☒ Detections for Explosives and/or Perchlorate
- ☑ Nondetections for Explosives and Perchlorate
- ☐ Excavated MIS Sampling Grids
- Excavated Areas**
- ▨ Excavation Depth - 0.5 ft bgs (RDX)
- ▨ Excavation Depth - 0.5 ft bgs (2,4-DNT)
- ▨ Excavation Depth - 1 ft bgs (Lead)
- Berms
- Trenches
- ◊ Previously Investigated Polygons
- Burial Pit
- J-1 Range Grids
- ▭ J-1 Soil RI Study Area Boundaries

LOCATION MAP



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG and MassGIS

TITLE

**J-1 Range Interberm Area
 (Rows 30 to 44)
 Excavated Areas Based on
 MIS Sample Results**

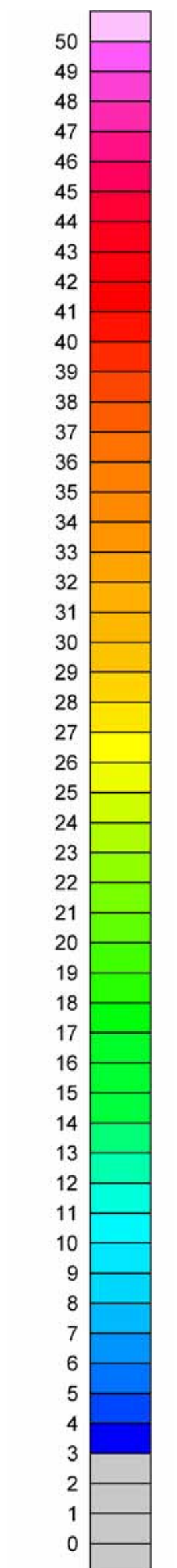
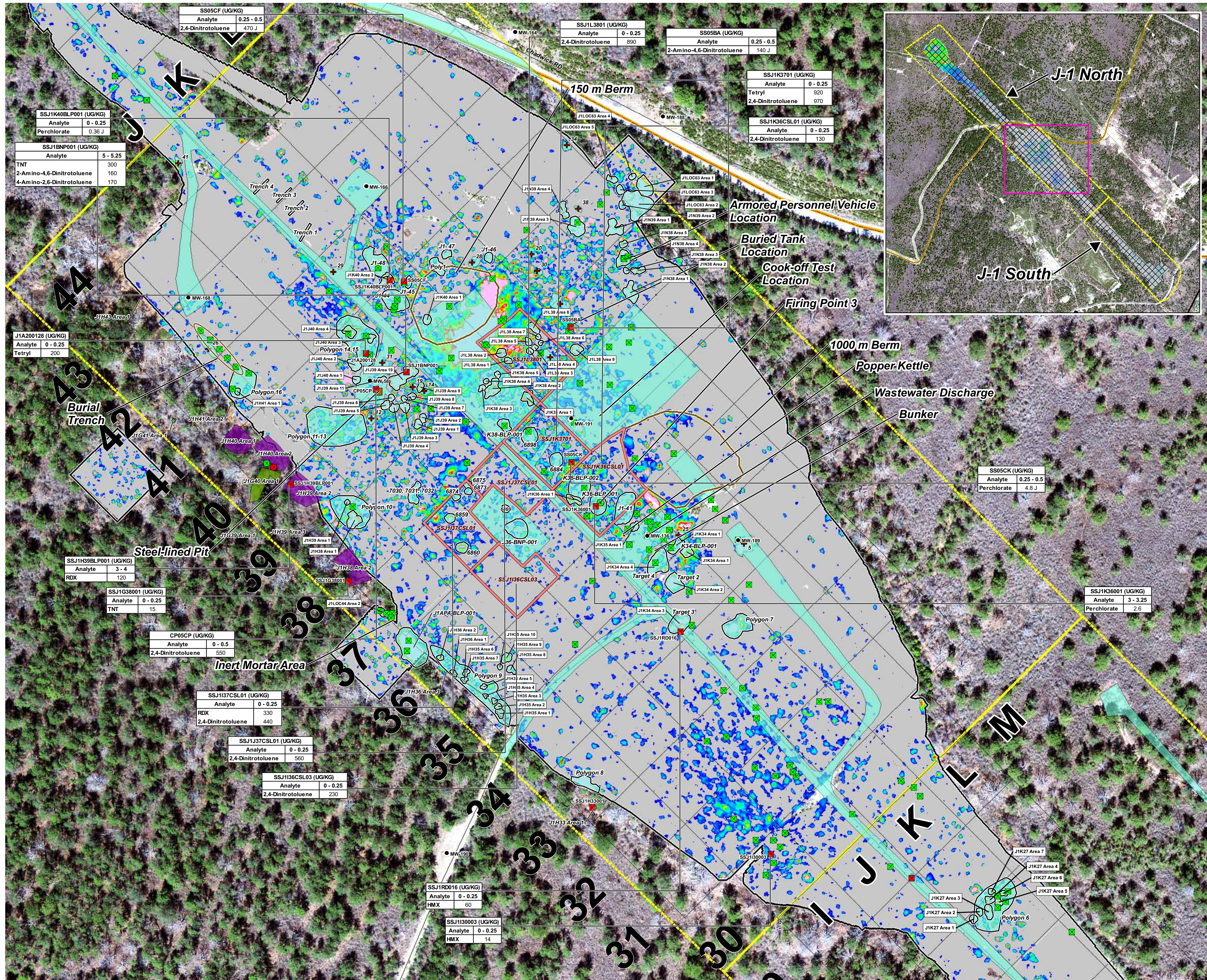


ECC MMR
 Cape Cod, Massachusetts

ECC GIS Server
 C:\TERC_GIS\CT002J1_SoilRI\J1CombinedRI_Figs
 J1RI_Section4\Fig4-10_J1Excavation_Subarea3.mxd
 April 2010 Drawn by JYK Checked by PF

FIGURE

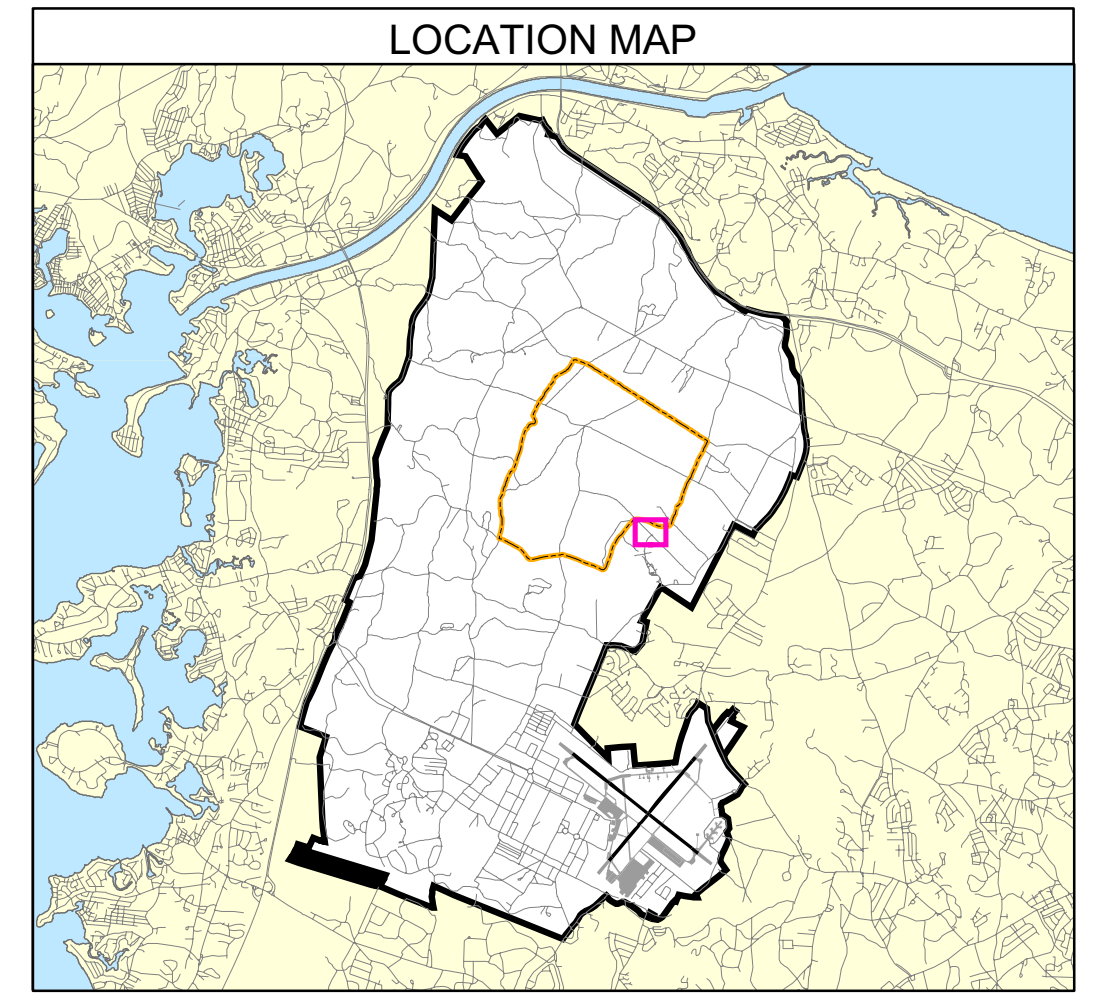
4-10



Impact Area Groundwater Study Program

LEGEND

- ⊕ Potential Pit Anomalies
- Existing Monitoring Well
- Remaining Soil Sample Locations**
- Detections for Explosives and/or Perchlorate
- Nondetections for Explosives and Perchlorate
- MIS Sampling Grids
- Geophysical Investigation Areas
- Detailed Reconnaissance Investigation**
- Subsurface Polygon Anomaly
- Surface Polygon Anomaly
- Berms
- Geophysical Anomalies Removed Areas
- Geophysically Surveyed Boundary
- Roads
- Impact Area Boundary
- J-1 Range Grids
- J-1 Soil RI Study Area Boundaries
- EM-61 Signal Data



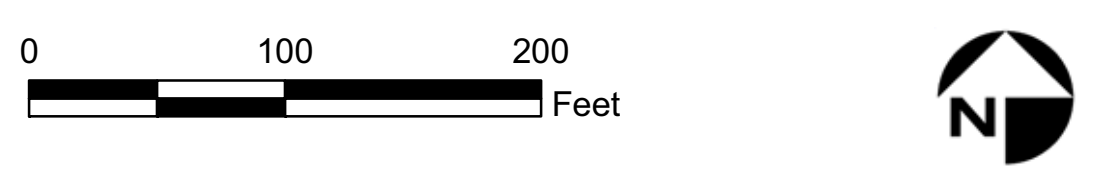
NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

J-1 Range Interberm Area (Rows 30 to 44)

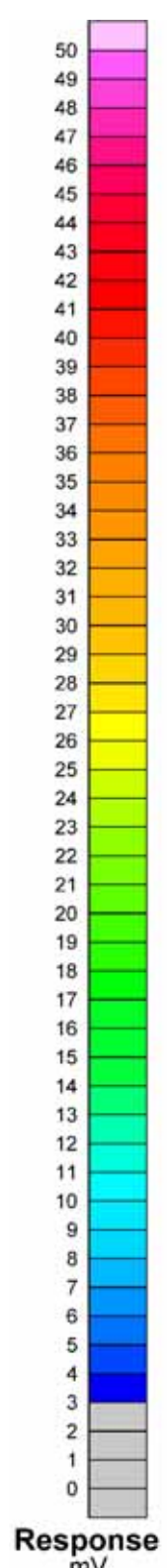
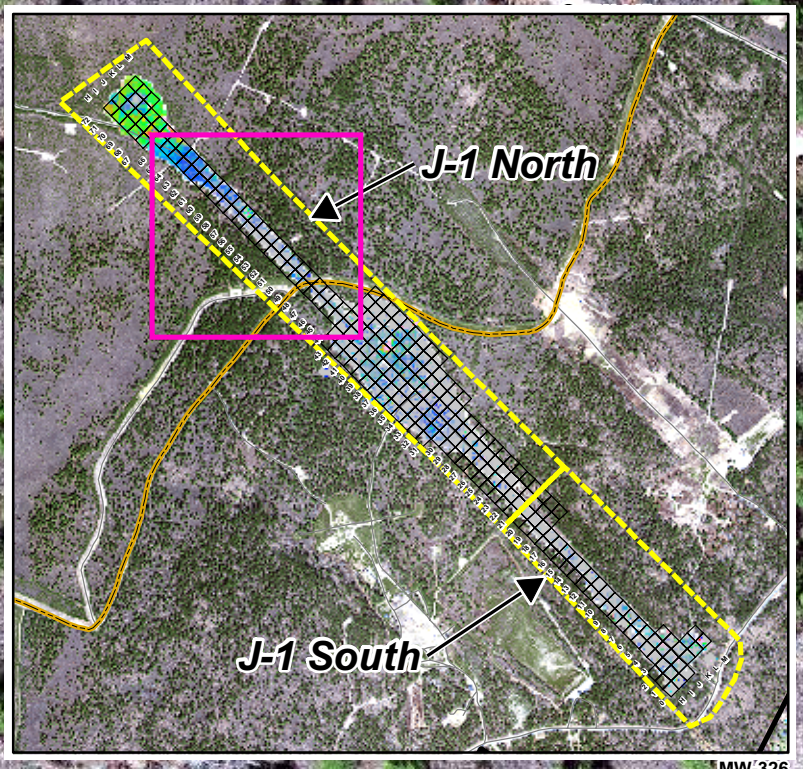
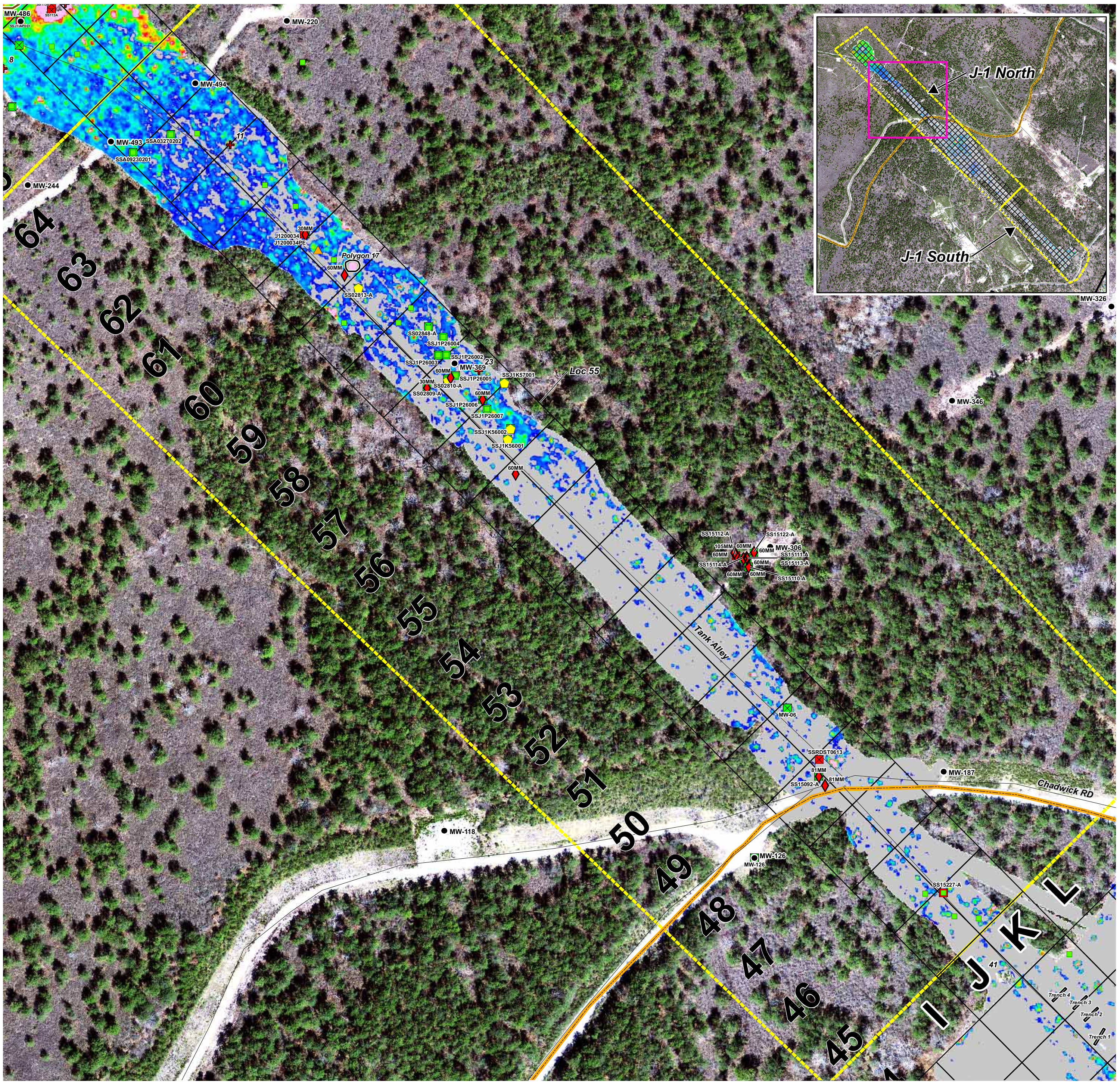
Existing Conditions Summary



ECC MMR
 Cape Cod, Massachusetts

ECC GIS Server
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 Fig4-11_J1ExCond_Subarea3_D.mxd
 April 2010 Drawn by JYK Checked by PF

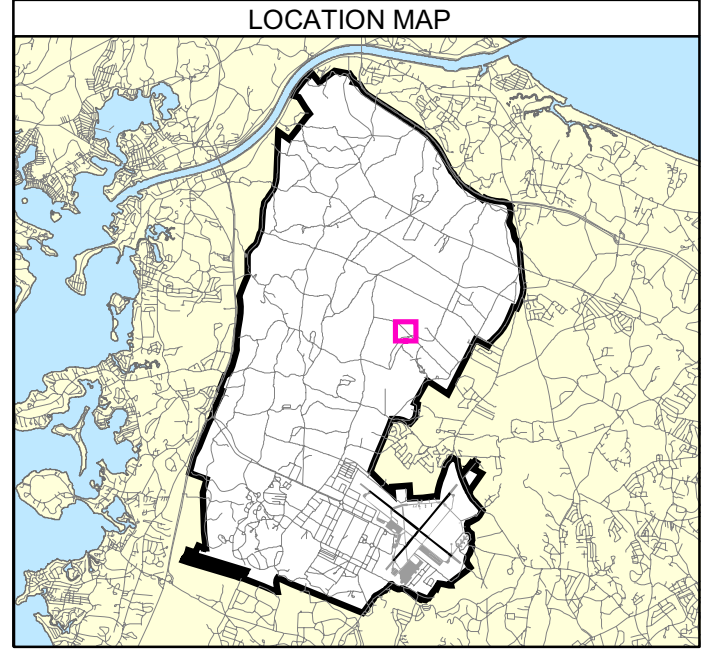
FIGURE
4-11



Impact Area Groundwater Study Program

LEGEND

- ⊕ Potential Pit Anomalies
- Existing Monitoring Well
- Munitions in Northern Flyover Area**
 - ◆ HE
 - Possible HE
 - ▲ Propellant/Energetic
 - ▲ Small Quantity Energetic
 - Inert
- Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
- Aerial Assessment Investigation**
 - ⊕ Geophysical Investigation Areas
 - Berms
 - Roads
 - Impact Area Boundary
 - J-1 Range Grids
 - J-1 Soil RI Study Area Boundaries
 - EM-61 Signal Data

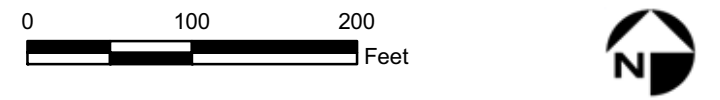


NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

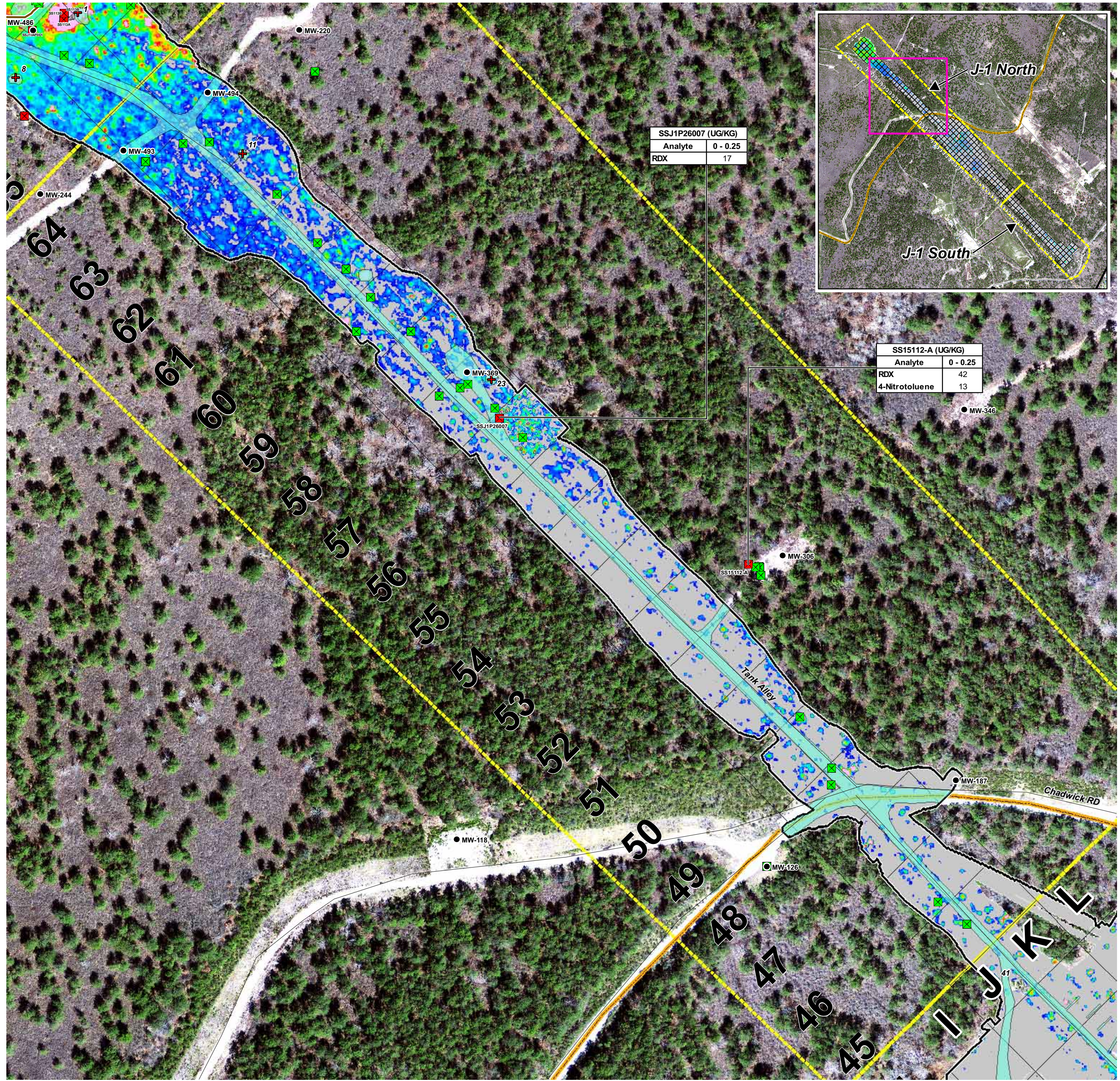
J-1 Range Northern Flyover Area (Rows 45 to 64) Characterization Summary



ECC MMR
 Cape Cod, Massachusetts

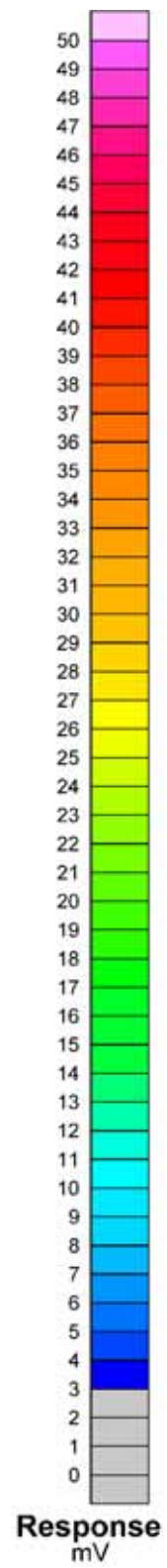
ECC GIS Server
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 Fig4-12_11Char_Subarea4_C.mxd
 April 2010 Drawn by JYK Checked by PF

FIGURE 4-12



SSJ1P26007 (UG/KG)	
Analyte	0 - 0.25
RDX	17

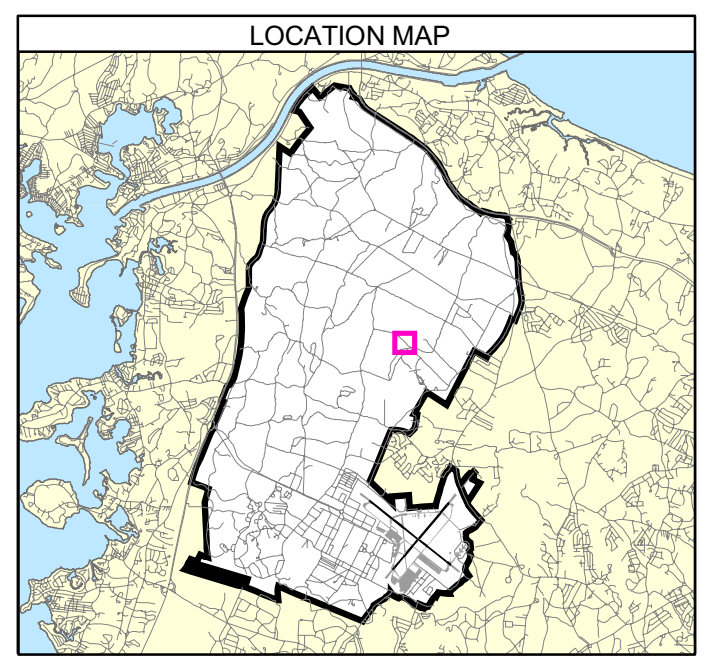
SS15112-A (UG/KG)	
Analyte	0 - 0.25
RDX	42
4-Nitrotoluene	13



Impact Area Groundwater Study Program

LEGEND

- Potential Pit Anomalies
- Existing Monitoring Well
- Remaining Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
- QC Target Grids Re-Surveyed in 2007
- Berms
- Roads
- Geophysical Anomalies Removed Areas
- Geophysically Surveyed Boundary
- Impact Area Boundary
- J-1 Range Grids
- J-1 Soil RI Study Area Boundaries
- EM-61 Signal Data

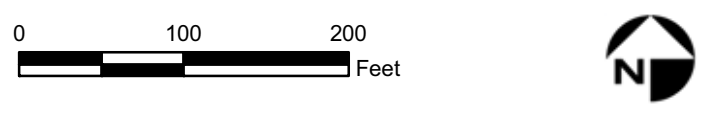


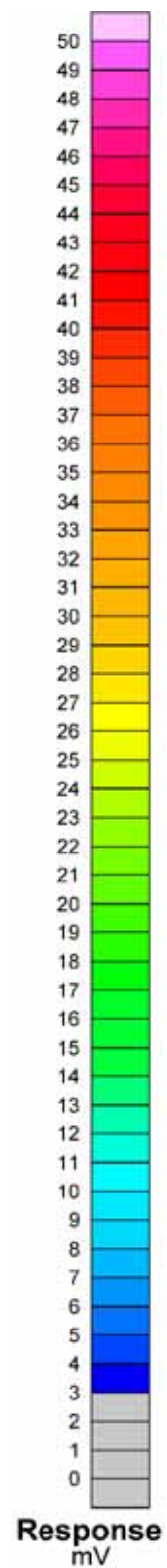
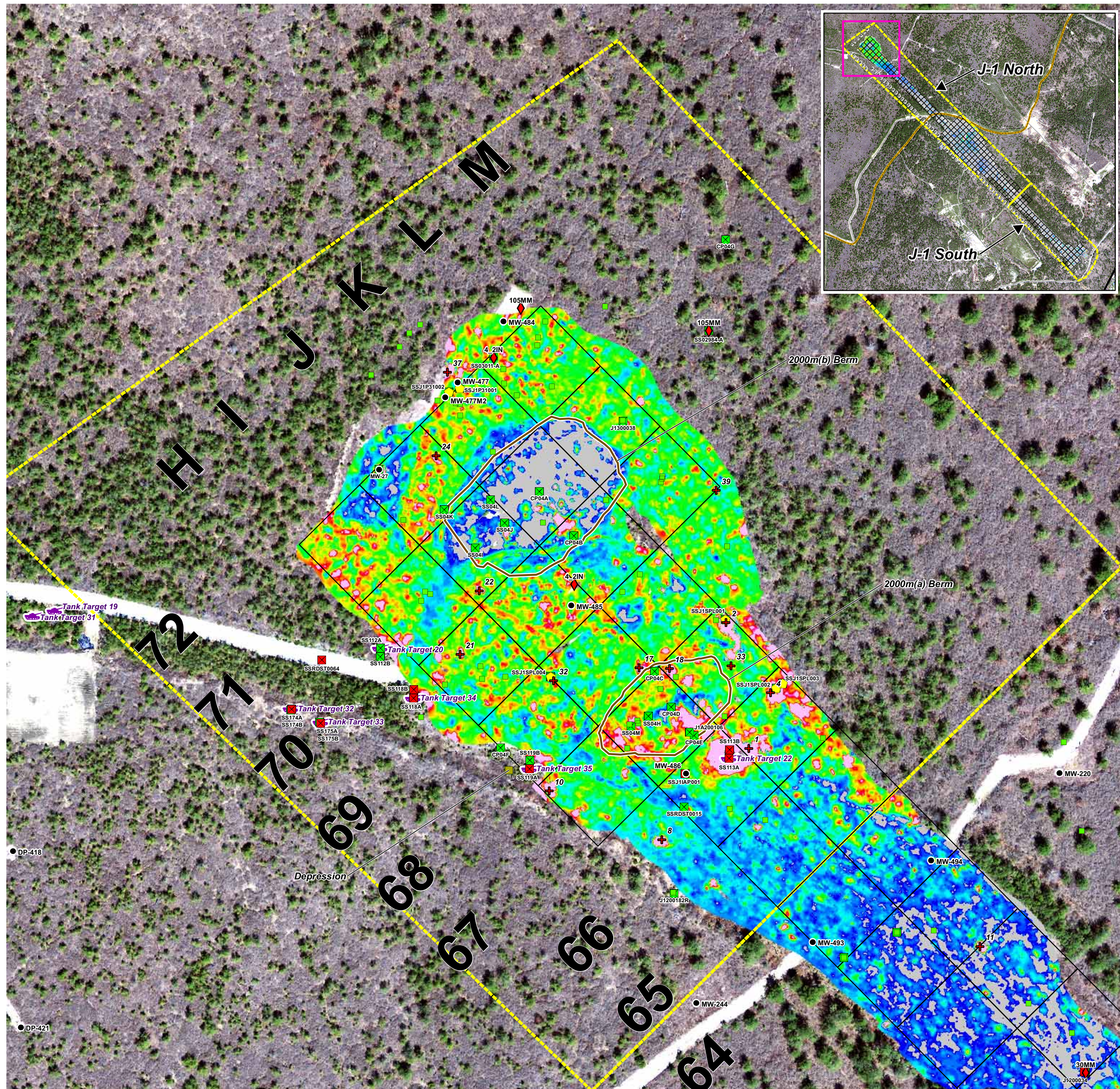
NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

TITLE

**J-1 Range
 Northern Flyover Area
 (Rows 45 to 64)
 Existing Conditions
 Summary**



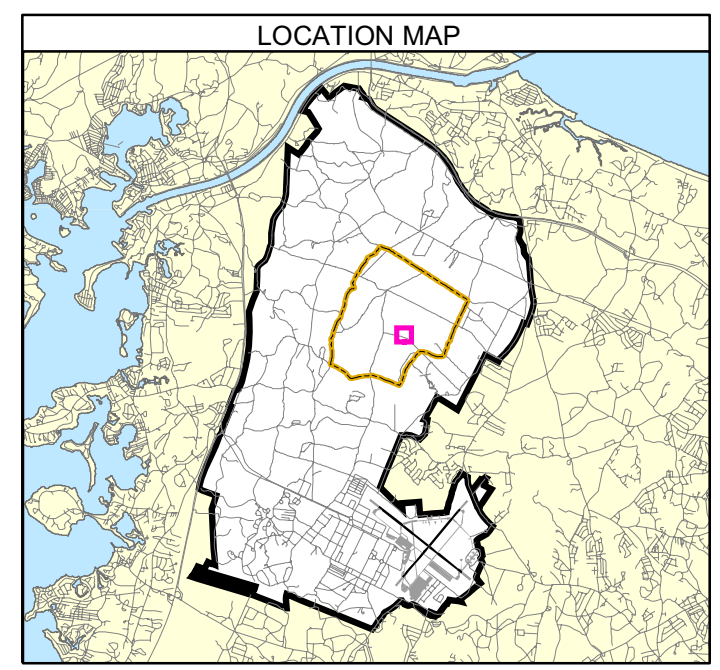


Response
mV

**Impact Area
Groundwater Study Program**

LEGEND

- ⊕ Potential Pit Anomalies
- Existing Monitoring Well
- Munitions in 2,000 Meter Berm Area**
 - ◆ HE
 - Possible HE
 - ▲ Propellant/Energetic
 - ▲ Small Quantity Energetic
 - Inert
- Soil Sample Locations**
 - Detections for Explosives and/or Perchlorate
 - Nondetections for Explosives and Perchlorate
 - Tank Target Location
- ⊖ Geophysical Investigation Areas
- Berms
- J-1 Range Grids
- ▭ J-1 Soil RI Study Area Boundaries
- EM-61 Signal Data



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from MA ARNG

TITLE

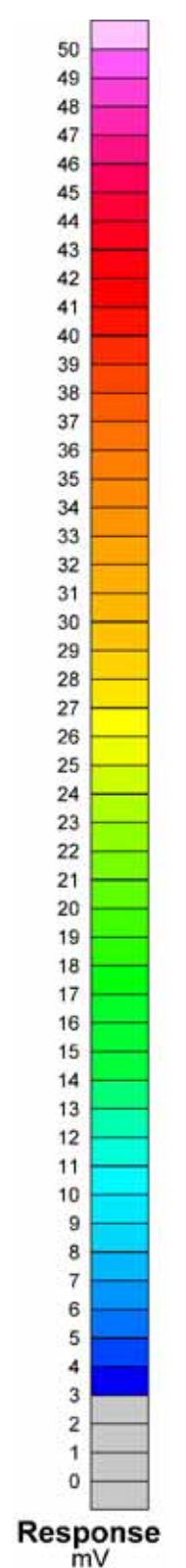
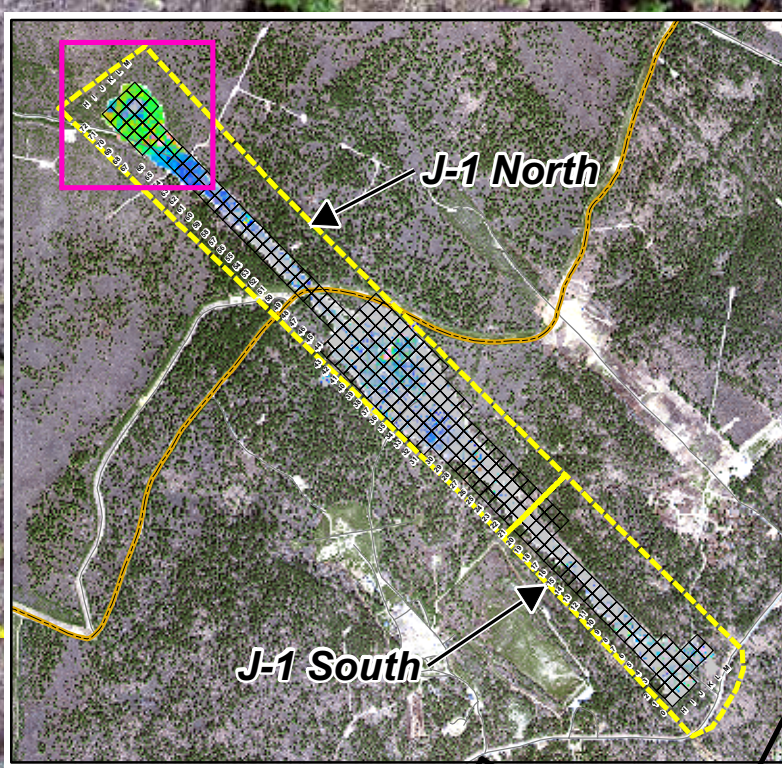
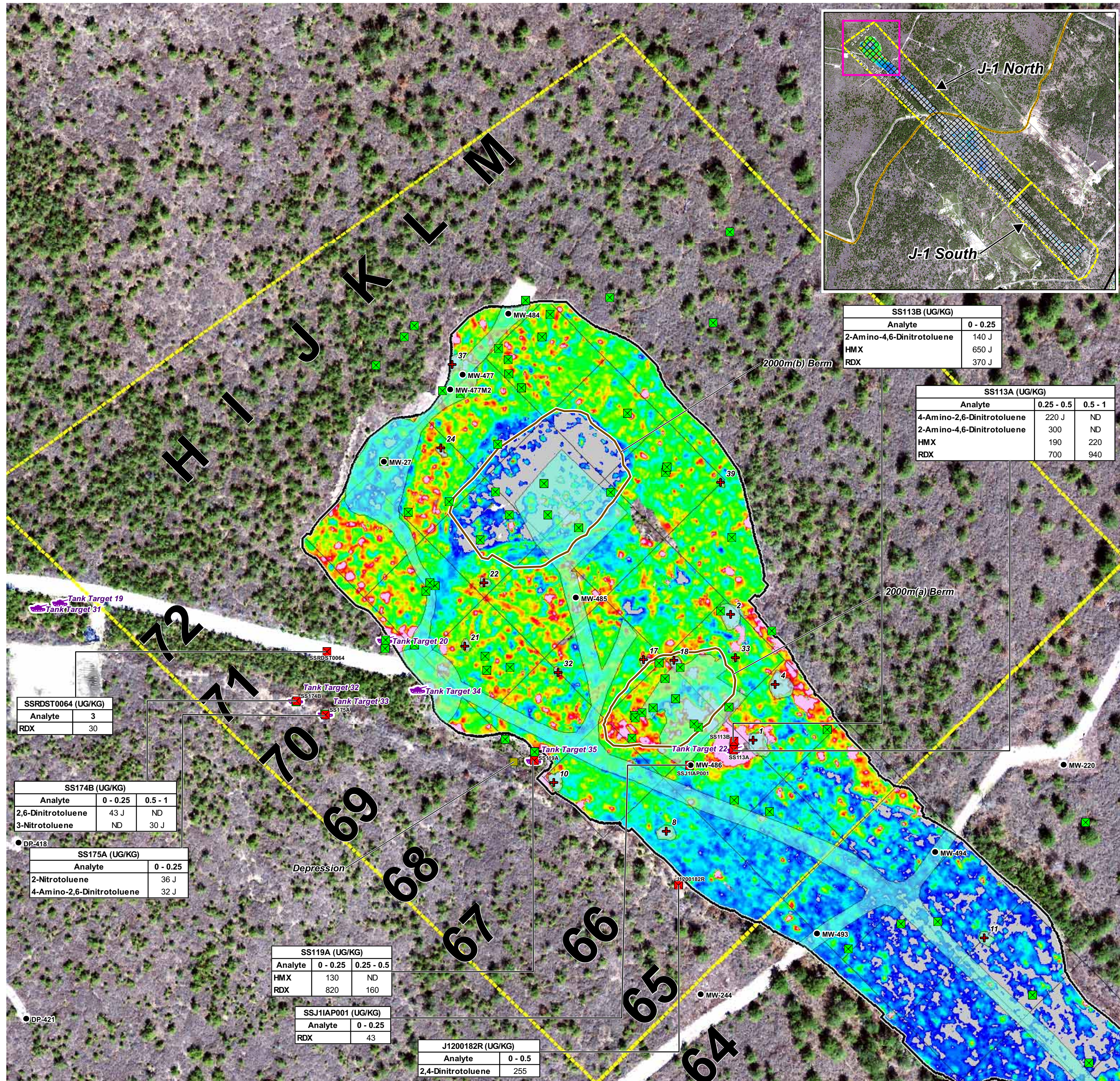
**J-1 Range
2,000 Meter Berm Area
(Rows 65 to 72)
Characterization
Summary**



ECC MMR
Cape Cod, Massachusetts

ECC GIS Server
C:\TERC_GIS\CTO002\J1_SoilRI\J1CombinedRI_Figs\J1RI_Section04
Fig4-14_J1Char_Subarea5_C.mxd
December 2009 Drawn by JYK Checked by PF

FIGURE
4-14



Impact Area Groundwater Study Program

LEGEND

- ⊕ Potential Pit Anomalies
- Existing Monitoring Well
- Remaining Soil Sample Locations**
- ⊠ Detections for Explosives and/or Perchlorate
- ⊡ Nondetections for Explosives and Perchlorate
- ⊞ Tank Target Location
- Berms
- Geophysical Anomalies Removed Areas
- Geophysically Surveyed Boundary
- ▭ J-1 Range Grids
- ▭ J-1 Soil RI Study Area Boundaries
- ⊞ EM-61 Signal Data

SS113B (UG/KG)	
Analyte	0 - 0.25
2-Amino-4,6-Dinitrotoluene	140 J
HMX	650 J
RDX	370 J

SS113A (UG/KG)		
Analyte	0.25 - 0.5	0.5 - 1
4-Amino-2,6-Dinitrotoluene	220 J	ND
2-Amino-4,6-Dinitrotoluene	300	ND
HMX	190	220
RDX	700	940

SSRDST0064 (UG/KG)	
Analyte	3
RDX	30

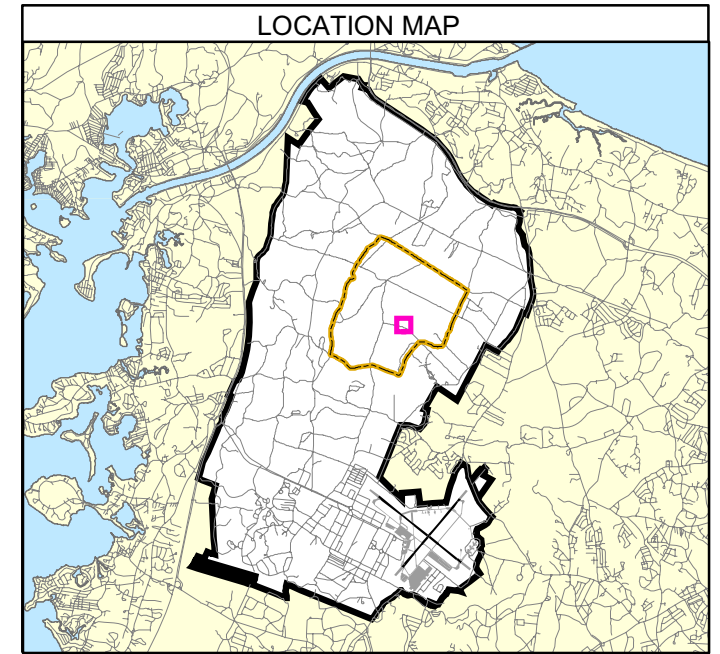
SS174B (UG/KG)		
Analyte	0 - 0.25	0.5 - 1
2,6-Dinitrotoluene	43 J	ND
3-Nitrotoluene	ND	30 J

SS175A (UG/KG)	
Analyte	0 - 0.25
2-Nitrotoluene	36 J
4-Amino-2,6-Dinitrotoluene	32 J

SS119A (UG/KG)		
Analyte	0 - 0.25	0.25 - 0.5
HMX	130	ND
RDX	820	160

SSJ11AP001 (UG/KG)	
Analyte	0 - 0.25
RDX	43

J1200182R (UG/KG)	
Analyte	0 - 0.5
2,4-Dinitrotoluene	255

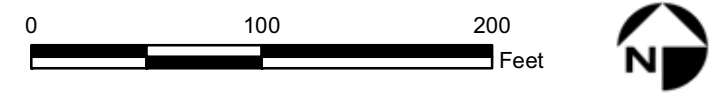


NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from MA ARNG

TITLE

J-1 Range 2,000 Meter Berm Area (Rows 65 to 72) Existing Conditions Summary

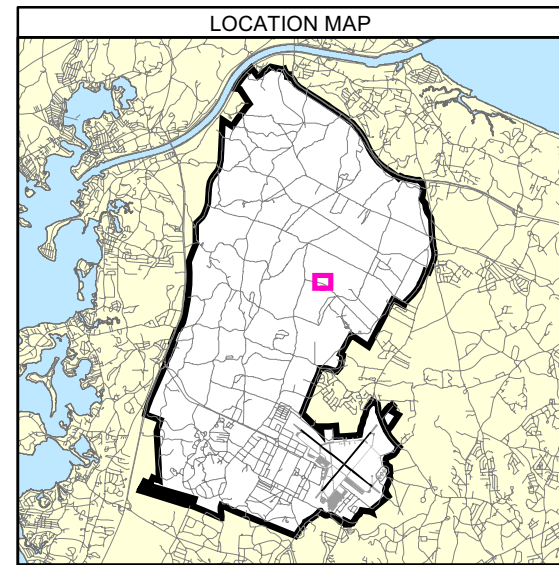




**Impact Area
Groundwater Study Program**

LEGEND

- Existing Monitoring Well
- 🚛 Tank Target Location
- Excavated Area**
- 🌀 Excavation Depth - 1.5 ft bgs
- 🌀 Berms
- Roads
- ▭ J-1 Range Grids
- 🟡 J-1 Soil RI Study Area Boundaries



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from MA ARNG

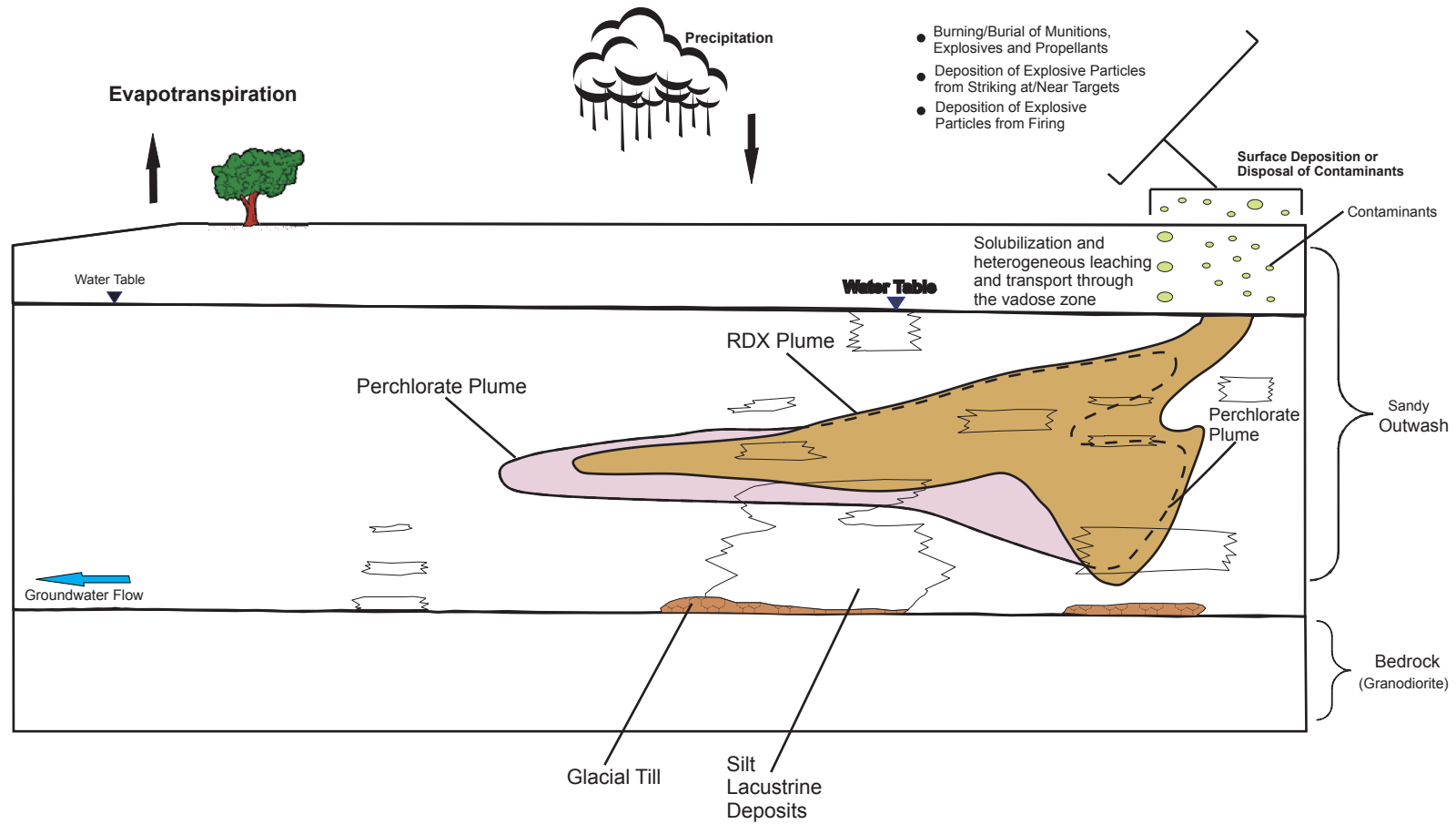
TITLE

**J-1 Range
2,000 Meter Berm Area
(Rows 65 to 72)
Excavated Area**



Northwest

Southeast



Y:\IA_TERC\Projects\35AY53\02\20100708\Core\J1_range_conceptual_model_final.cdr



Impact Area
Groundwater Study Program

J-1 Range North Groundwater Conceptual Model

Massachusetts Military Reservation
Cape Cod, Massachusetts

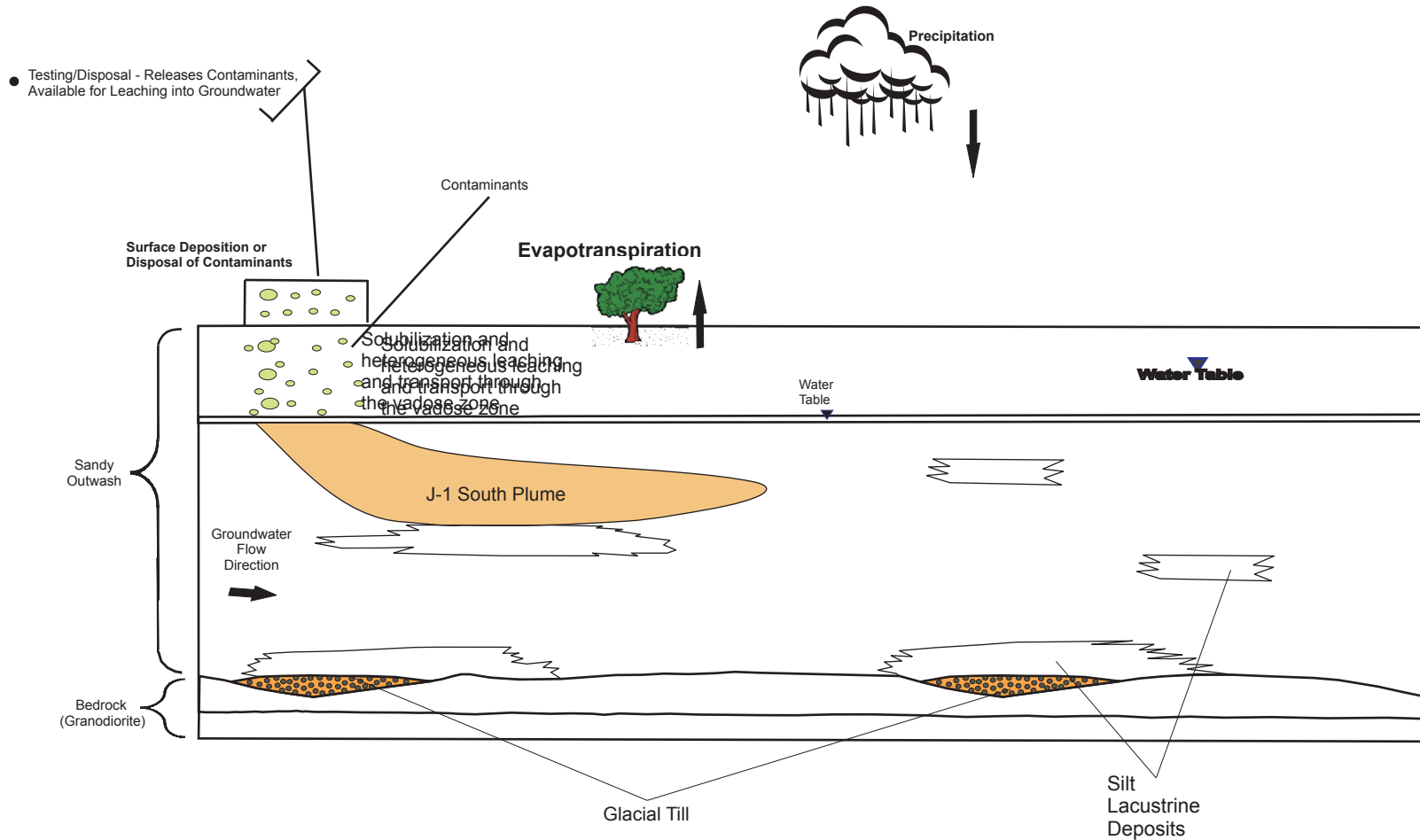
Note: Model is not to scale, vertical
dimension is exaggerated.

File: Y:\IA_TERC\Projects\35AY53\02\20100708\Core\J1_range_conceptual_model_final.cdr jp 07/08/10

Figure 5-1

Northwest

Southeast



**Impact Area
Groundwater Study Program**

**J-1 Range South Groundwater
Conceptual Model**

Massachusetts Military Reservation
Cape Cod, Massachusetts

Note: Model is not to scale, vertical
dimension is exaggerated.

File: Y:\IA_TERC\Projects\35AY53\02\20100708\Core\J1_south_conceptual_model_final.cdr jp 07/8/10

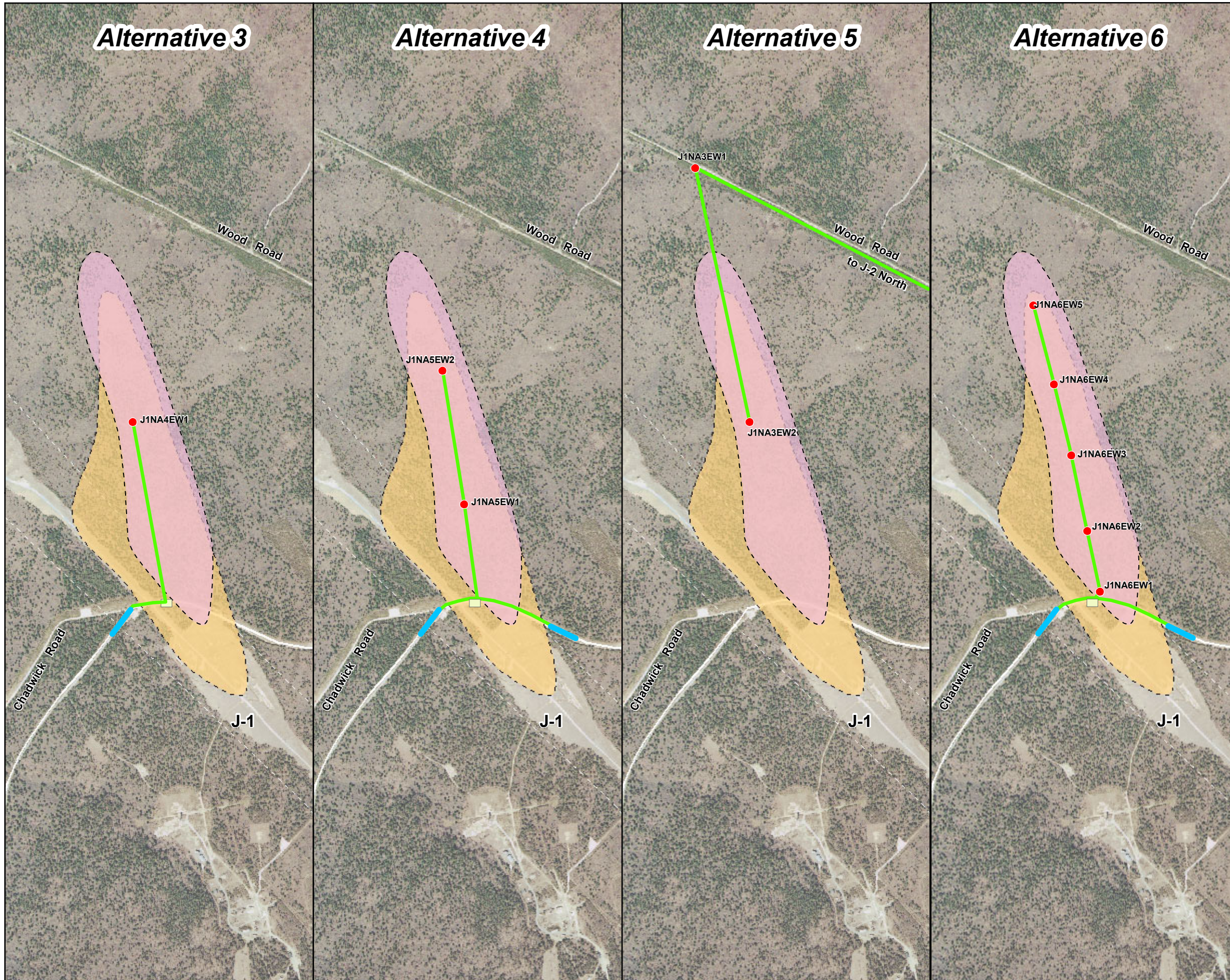
Figure 5-2

Alternative 3

Alternative 4

Alternative 5

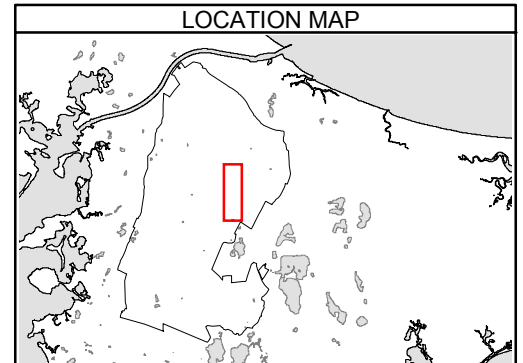
Alternative 6



Impact Area Groundwater Study Program

LEGEND	
RDX Detection	
	0.6 µg/L
Perchlorate Detection	
	2 µg/L
	Conceptual Location of Mobile Treatment Units
	Conceptual Extraction Well
	Conceptual Pipeline
	Conceptual Infiltration Trench
	Range Boundary
	Impact Area Boundary

µg/L = micrograms per liter
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine



NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
Basemap data from US Geological Survey 7 1/2 minute

TITLE

J-1 Range North Conceptual Design
Groundwater Alternatives 3, 4, 5 and 6



Jacobs
Bourne, Massachusetts
Y:\IA_TERC\Projects\35AY53\02\20100708\ArcGIS\j1_north_alternatives_final.mxd July 8, 2010
DWN BY: JPICCUITO CHKD BY: KThomas

FIGURE
9-1



Impact Area Groundwater Study Program

LEGEND

RDX Detection
 0.6 µg/L

Extraction Well

Conceptual Location of Mobile Treatment Units

Conceptual Extraction Well

Existing Infiltration Trench

Conceptual Pipeline

Conceptual Infiltration Trench

Existing Pipeline

MMR Boundary

Range Boundary

µg/L = micrograms per liter
 RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine

LOCATION MAP

NOTES & SOURCES

Map Coordinates: NAD 83, UTM, Zone 19N, Meters
 Basemap data from US Geological Survey 7 1/2 minute

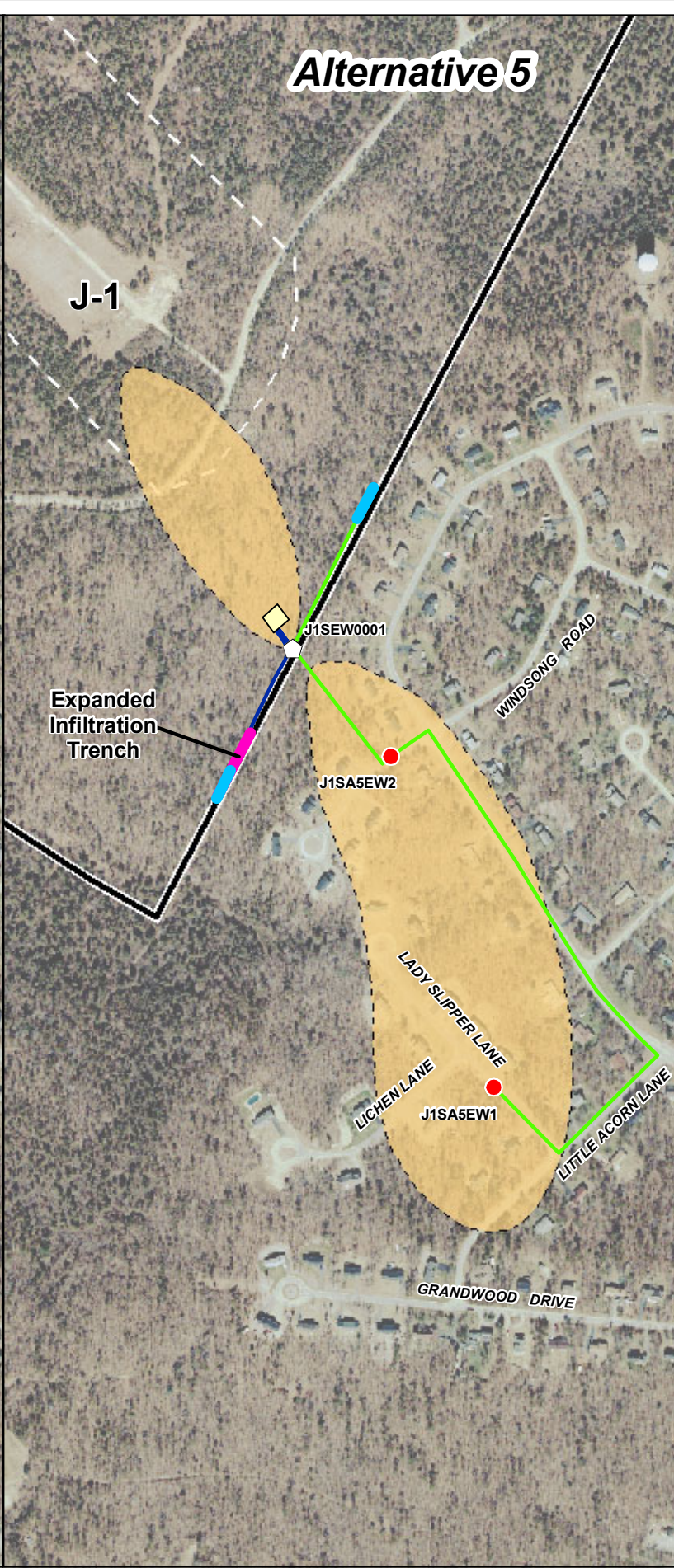
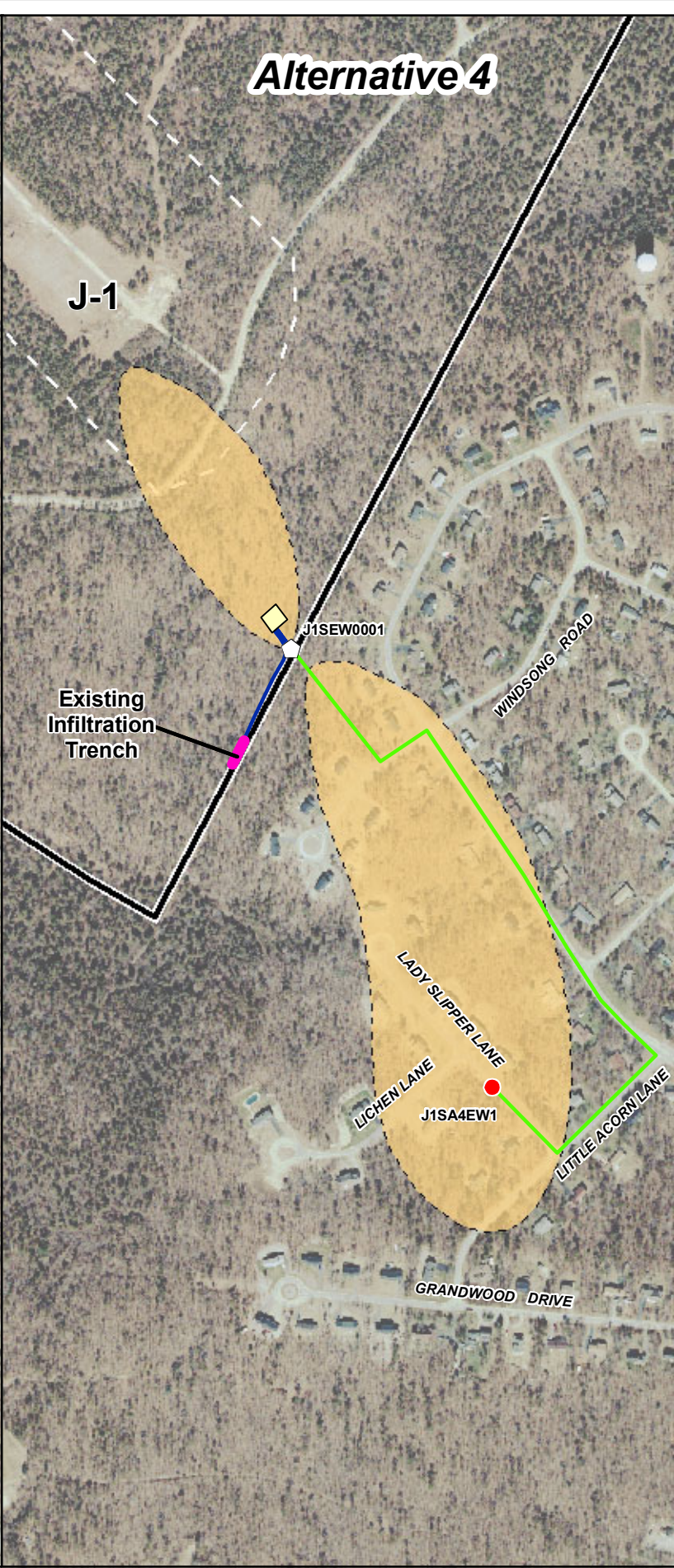
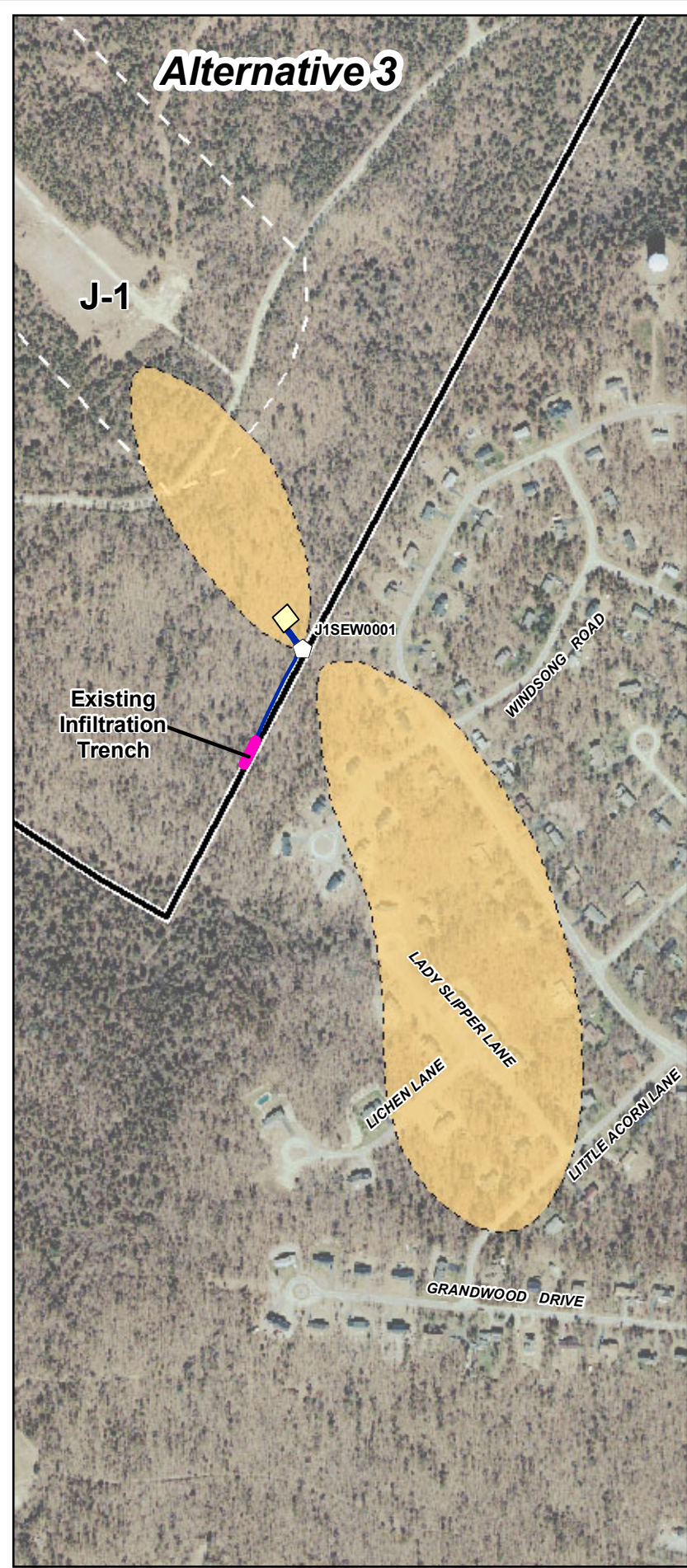
TITLE

J-1 Range South Conceptual Design
 Groundwater Alternatives 3, 4 and 5

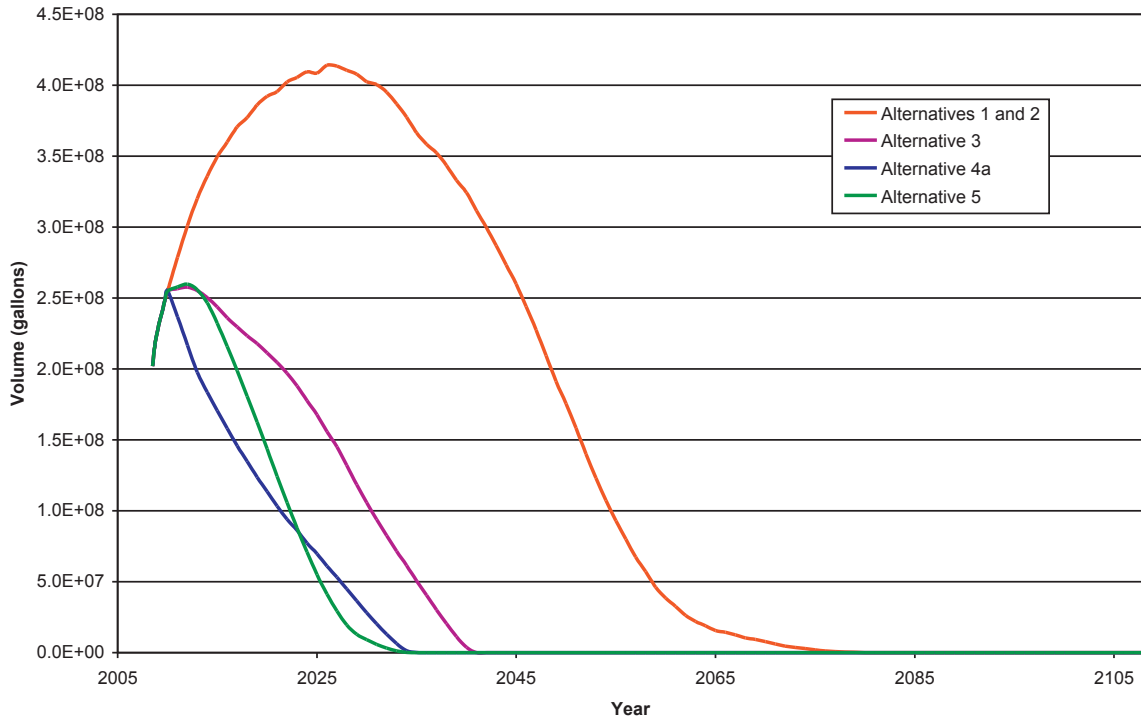
0 500 Feet

Jacobs
 Bourne, Massachusetts
 Y:\IA_TERC\Projects\35AY53\02\20100708\ArcGIS\j1_south_alternatives_20100317_final.mxd July 8, 2010
 DWN BY: JPICCUITO CHKD BY: KTHOMAS

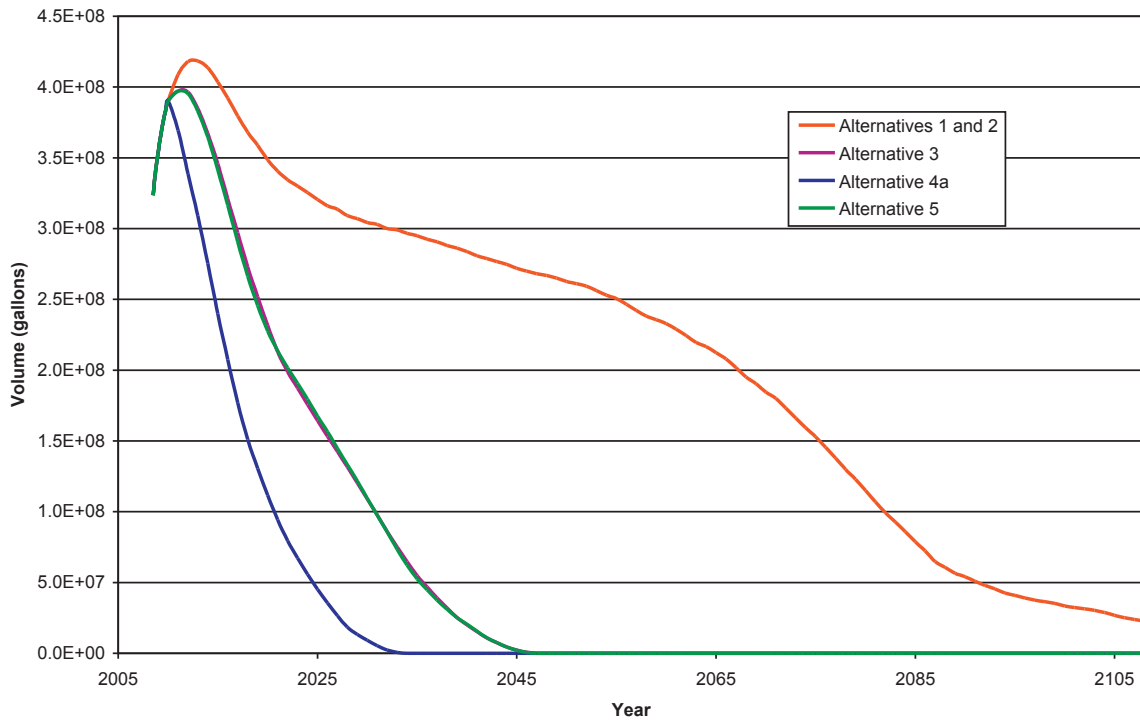
FIGURE
 9-2



J-1 Range Northern Perchlorate Plume Contaminated Volume > 2 micrograms per liter



J-1 Range Northern RDX Plume Contaminated Volume > 0.6 micrograms per liter



Legend



**Impact Area
Groundwater Study Program**

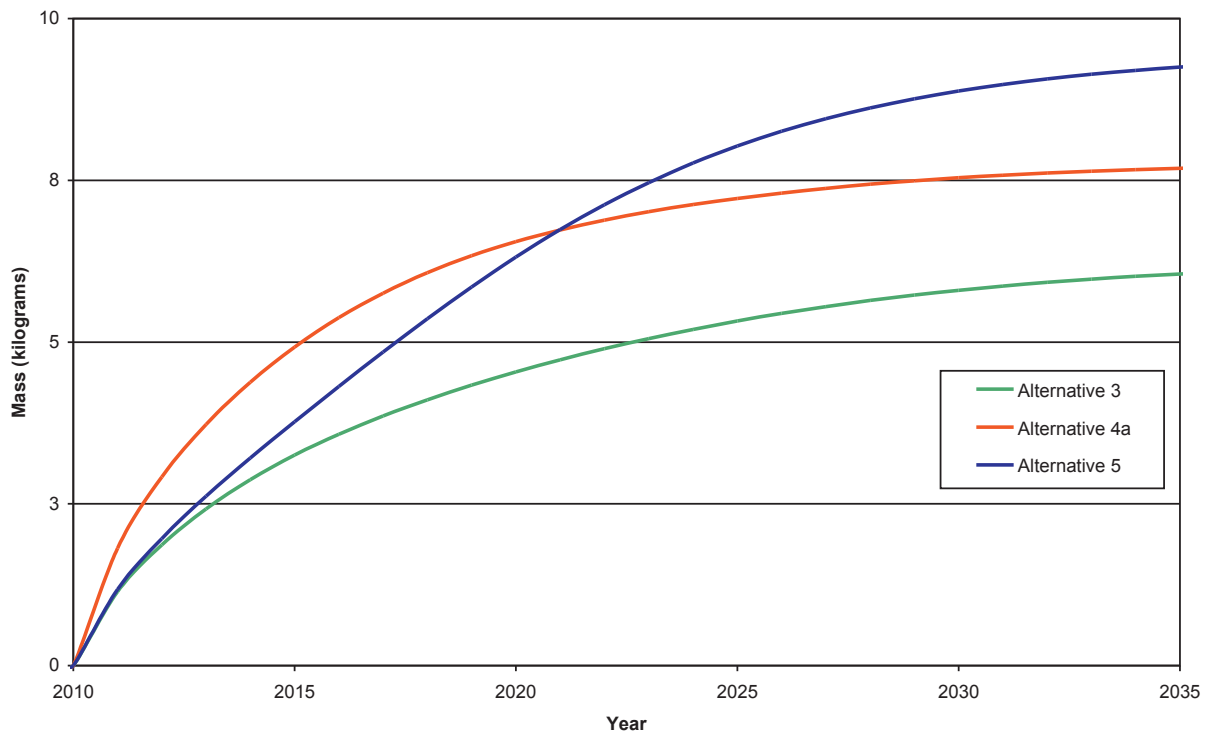
**J-1 Range Northern Plume
Volume Over Time**

Massachusetts Military Reservation
Cape Cod, Massachusetts

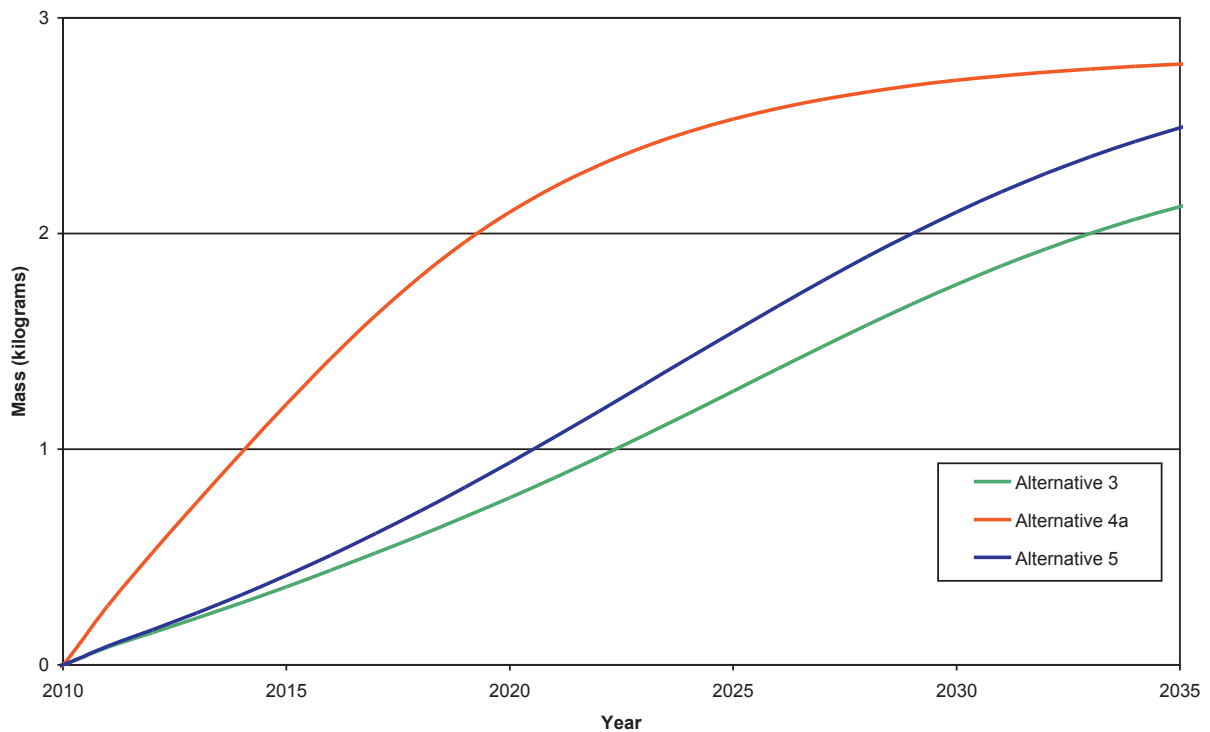
07/08/10 JP
j1n_volume_20100421_final.cdr

Figure 10-1

J-1 Range Northern Perchlorate Plume Total Mass Removal



J-1 Range Northern RDX Plume Total Mass Removal



Legend



**Impact Area
Groundwater Study Program**

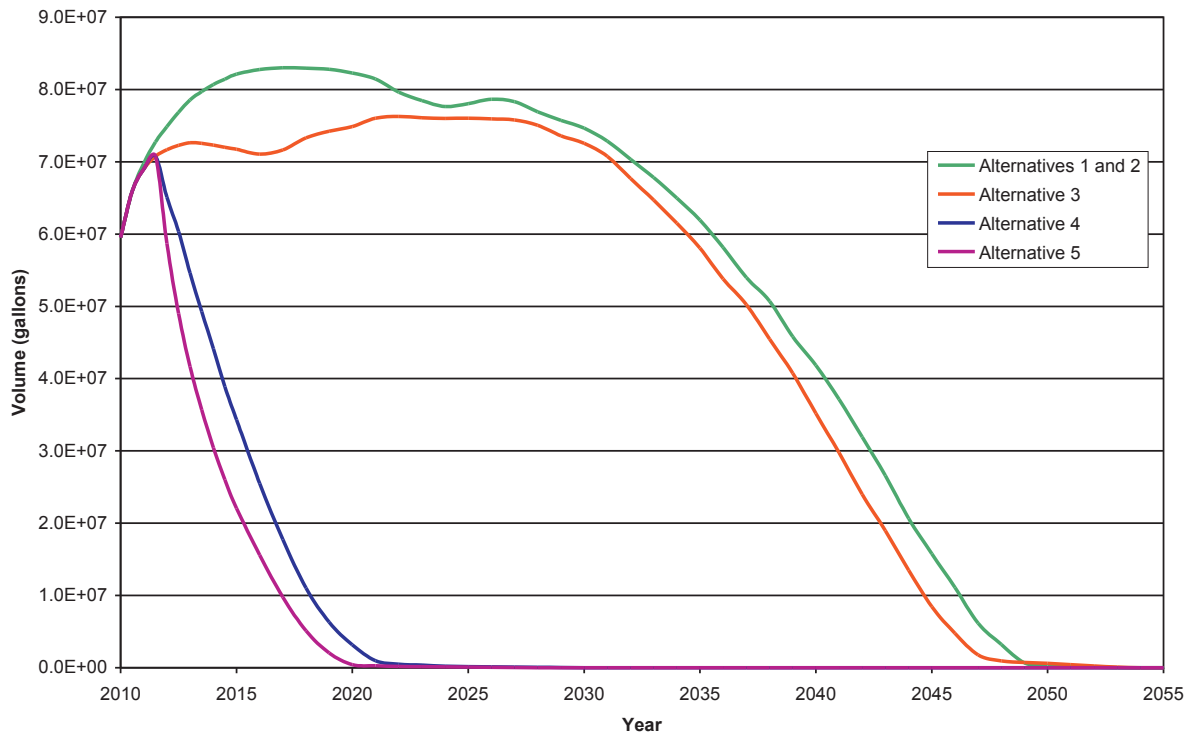
**J-1 Range Northern Plume
Mass Capture**

Massachusetts Military Reservation
Cape Cod, Massachusetts

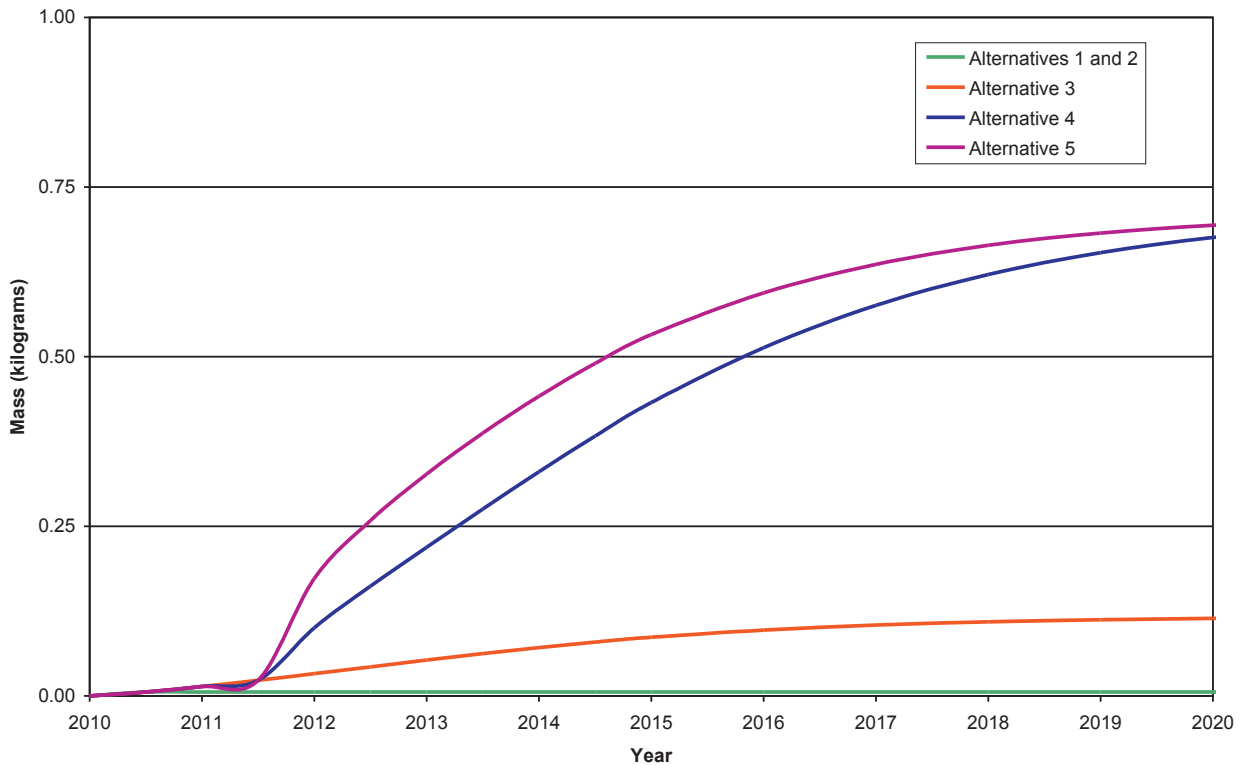
07/08/10 JP
j1n_mass_20100421_final.cdr

Figure 10-2

J-1 Range Southern RDX Plume Contaminated Volume > 0.6 micrograms per liter



J-1 Range Southern RDX Plume Total Mass Removal



Legend



**Impact Area
Groundwater Study Program**

**J-1 Range Southern Plume
Volume and Mass Capture Over Time**

Massachusetts Military Reservation
Cape Cod, Massachusetts

07/08/10 JP
j1s_mass_volume_20100421_final.cdr

Figure 10-3