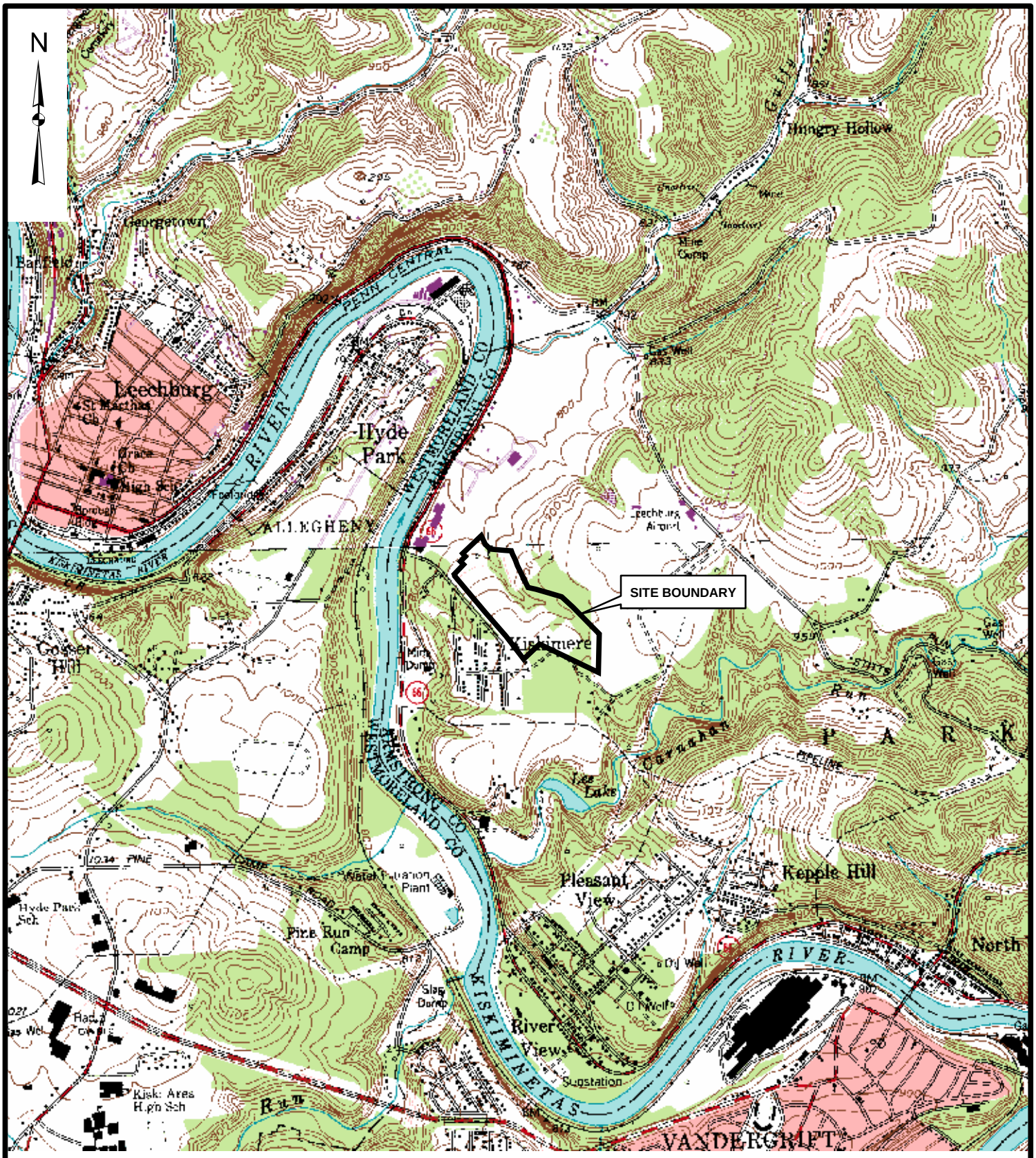
FIGURES



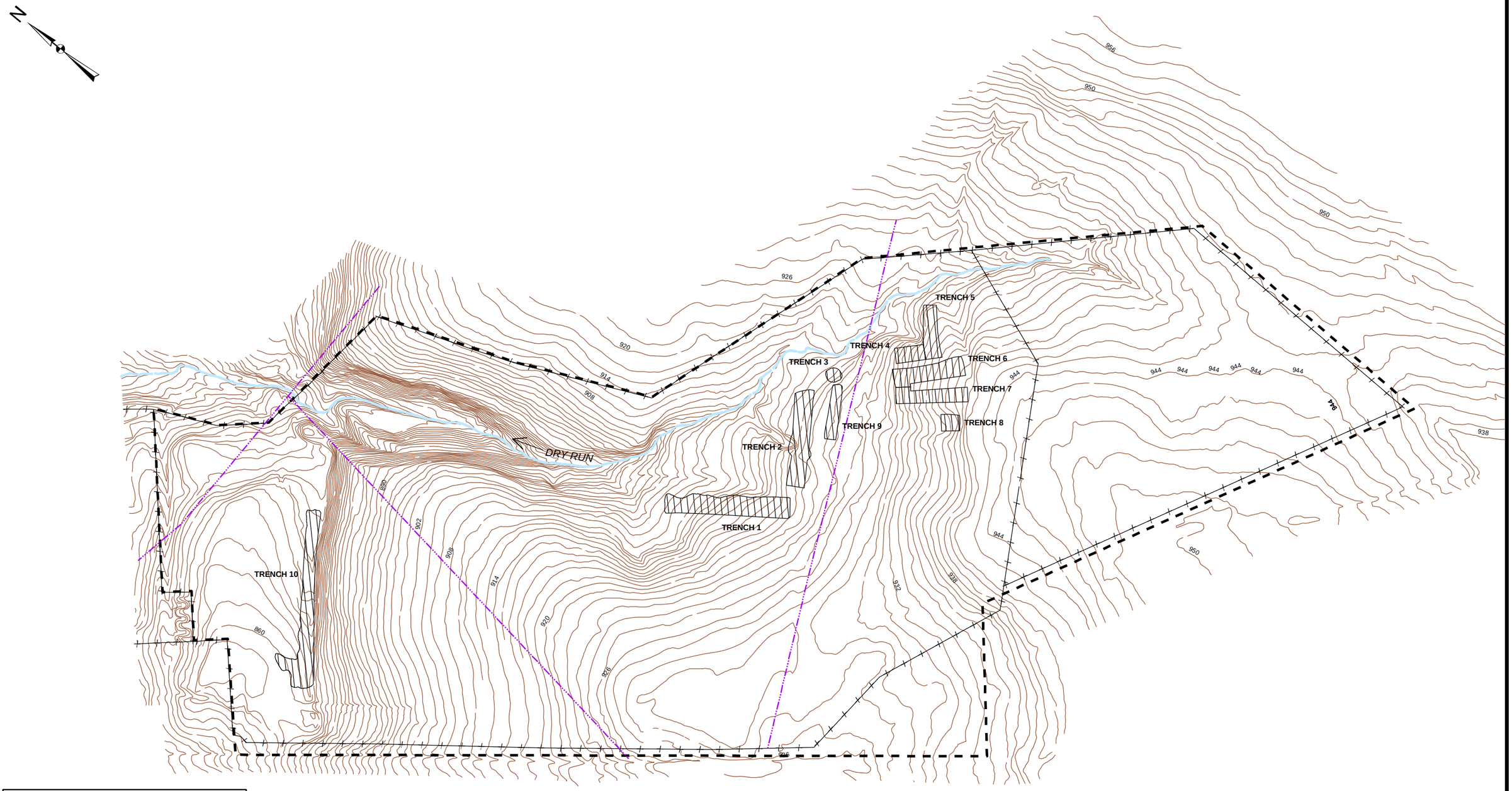
Source: USGS 7.5' Topographic Quadrangles
Vandergrift, PA, 1953 (revised 1979)
Leechburg, PA, 1954 (revised 1969)

0 1,000 2,000 4,000 Feet

SHALLOW LAND DISPOSAL AREA
SITE LOCATION MAP

FIGURE 1-1

N:\11171431.00000\GIS\ArcMap\sitelocation.mxd Date: 02/11/04 11:03:45 AM



Legend

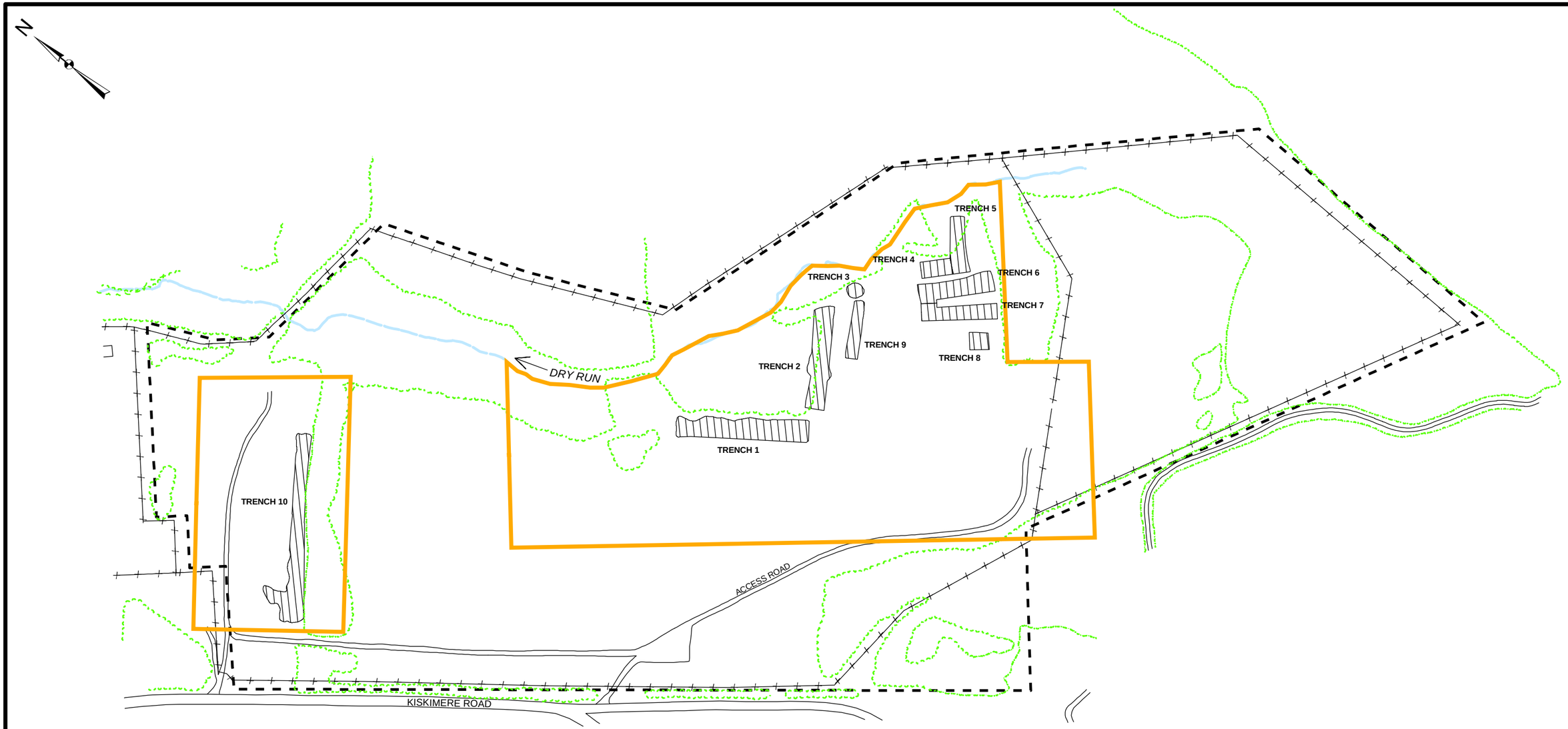
- Vegetation Line (Typ.)
- Buried Gas Line
- Chain Link Fence
- Site Boundary
- SLDA Disposal Trenches

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
SITE PLAN

FIGURE 1-2

N:\11171431.00000\GIS\ArcMap\siteplan.mxd Date: 07/28/04 12:25:40 PM



Legend

- Gamma and Ground Penetrating Radar Survey Area
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- SLDA Disposal Trenches

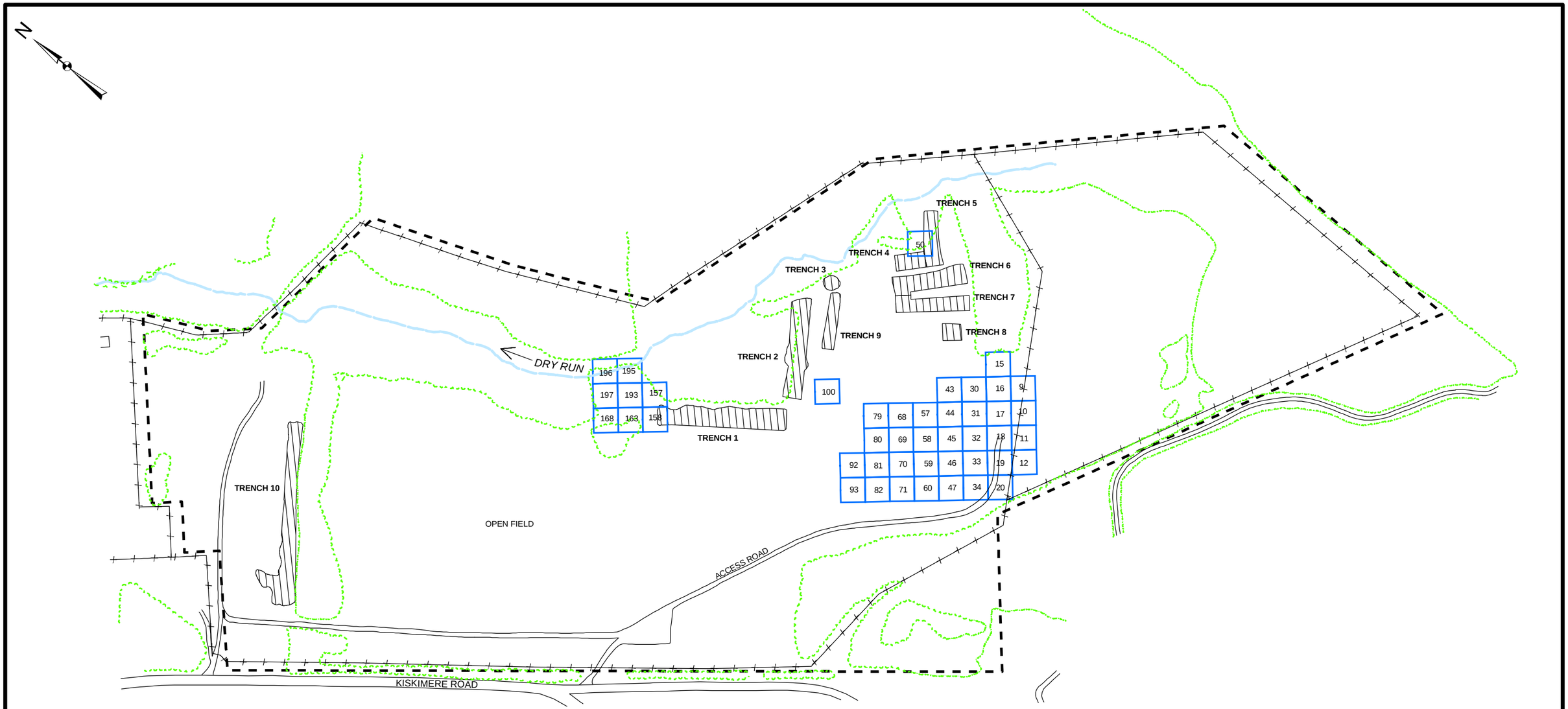
NOTE: Survey Areas were located in accordance with ORAU 1982.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
1981 GAMMA AND GROUND PENETRATING RADAR SURVEY AREAS

FIGURE 2-1

N:\11171431.00000\GIS\ArcMap\RI_Figures\1981_gammasurvey.mxd Date: 04/13/04 2:37:40 PM



Legend

- 79 Surface Soil Remediation Area
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- SLDA Disposal Trenches

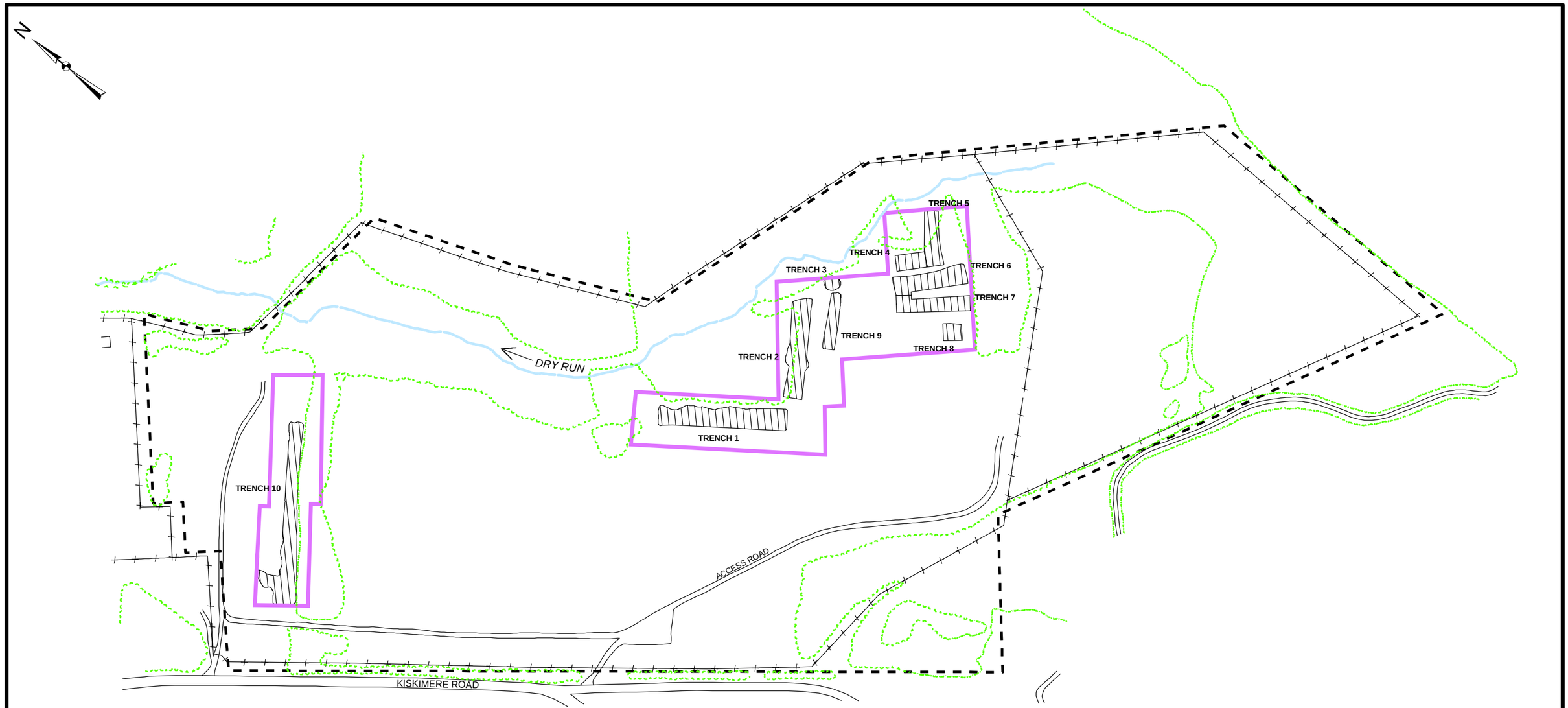
NOTE: Soil Remediation Areas were located in accordance with ORAU 1987, 1990.

0 105 210 420 Feet

SHALLOW LAND DISPOSAL AREA
LIMITS OF SURFACE SOIL REMEDIATION
COMPLETED BY B&W IN 1986 AND 1989

FIGURE 2-2

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_remediation.mxd Date: 04/13/04 1:24:57 PM



Legend

- Ground Penetrating Radar, Magnetometry and Terrain Conductivity Survey Area
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- SLDA Disposal Trenches

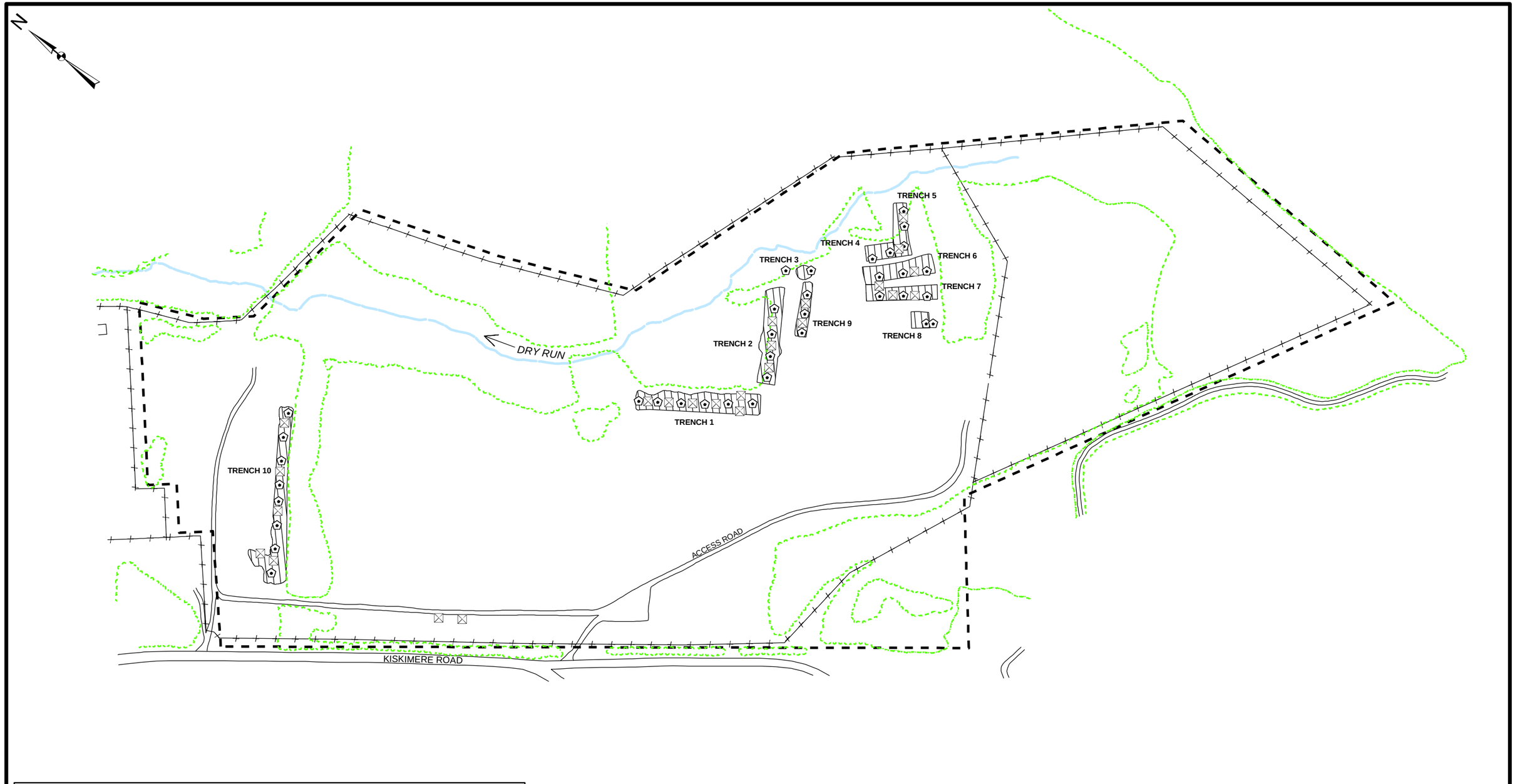
NOTE: Survey Areas were located in accordance with ARCO/Babcock & Wilcox 1995.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
LIMITS OF GEOPHYSICAL SURVEY AREAS EVALUATED IN 1992 DURING THE SITE CHARACTERIZATION

FIGURE 2-3

N:\11171431.00000\GIS\ArcMap\RI_Figures\geo_survey.mxd Date: 04/13/04 3:46:08 PM



Legend

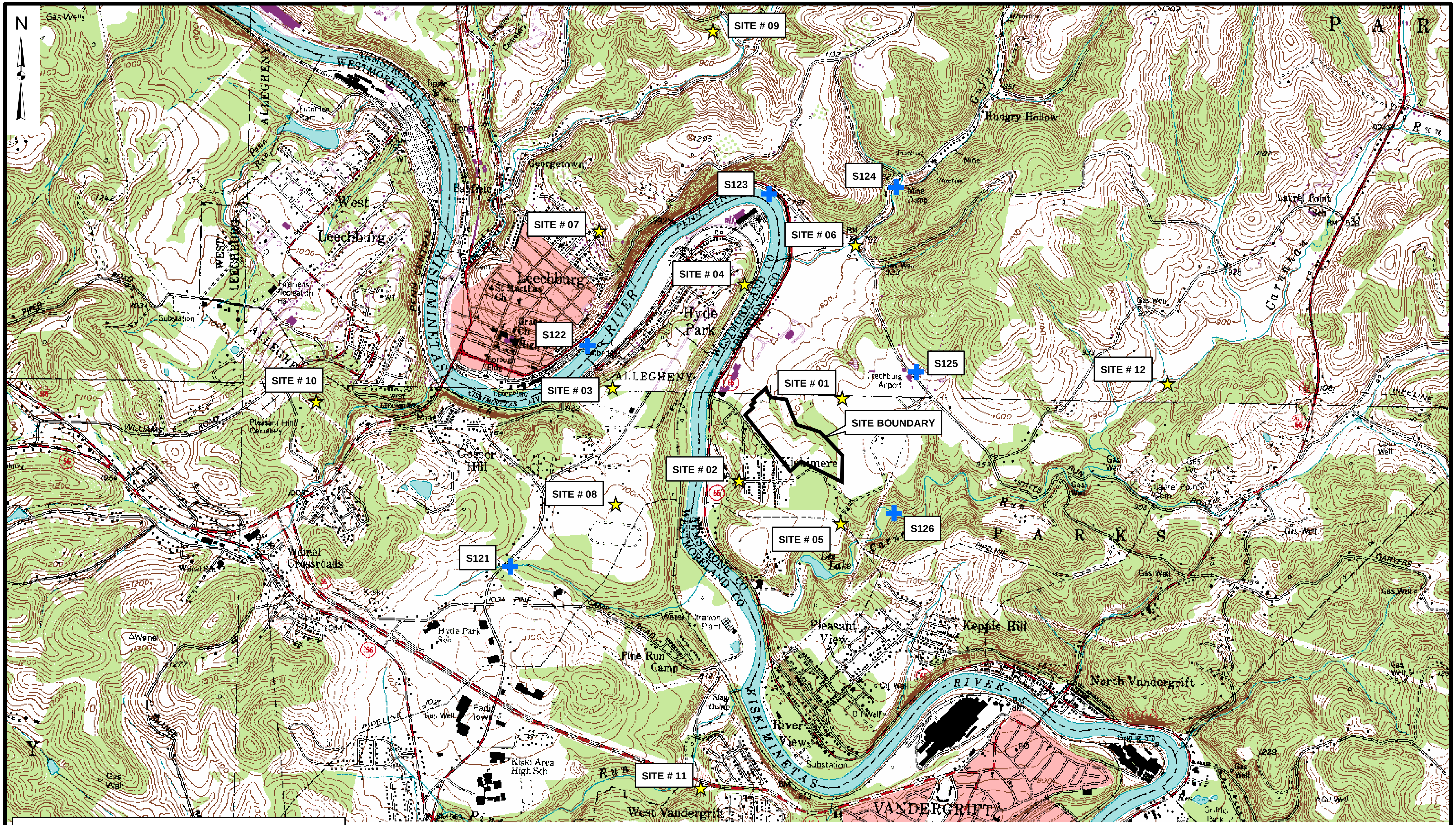
- 2 Inch Diameter Temporary Waste Sampling Points Installed in 1993
- 4 Inch Diameter Temporary Waste Sampling Points Installed in 1995
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- SLDA Disposal Trenches

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
LOCATION OF TEMPORARY WASTE SAMPLING POINTS

FIGURE 2-4

N:\11171431.00000\GIS\ArcMap\RI_Figures\twsp_dates.mxd Date: 04/13/04 3:20:45 PM



Legend

- ★ Sample Collected by ARCO in 1993
- ✚ Sample Collected by Oak Ridge Associated Universities in 1981

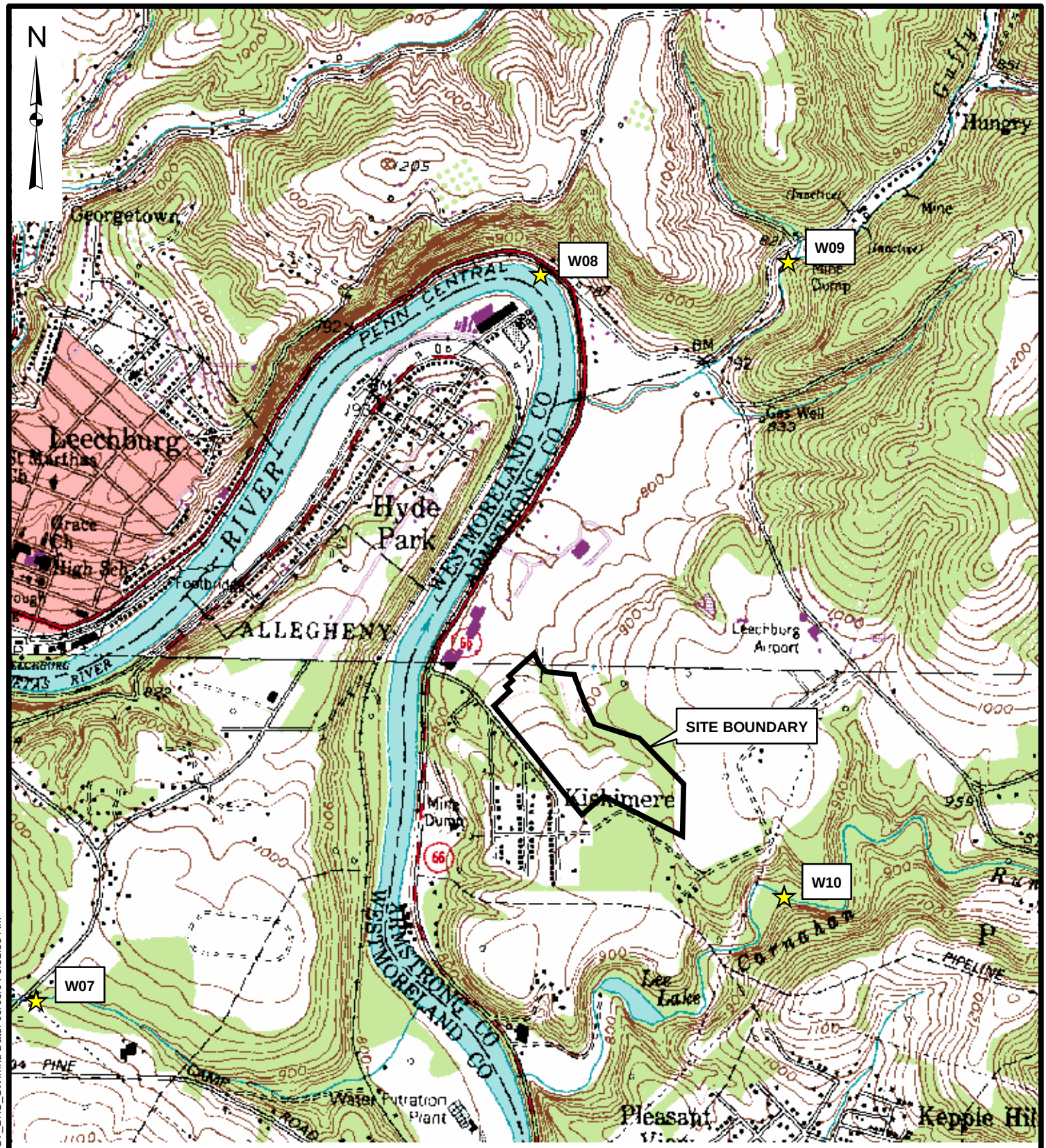
Source: USGS 7.5' Topographic Quadrangles
Vandergrift, PA, 1953 (revised 1979)
Leechburg, PA, 1954 (revised 1969)

0 1,000 2,000 4,000 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL OFF-SITE BACKGROUND SURFACE SOIL
SAMPLE LOCATIONS

FIGURE 2-5

N:\11171431.00000\GIS\ArcMap\RI_Figures\HIST_BKG_SURSO.mxd Date: 07/28/04 9:36:25 AM



Source: USGS 7.5' Topographic Quadrangles
Vandergrift, PA, 1953 (revised 1979)
Leechburg, PA, 1954 (revised 1969)

Legend

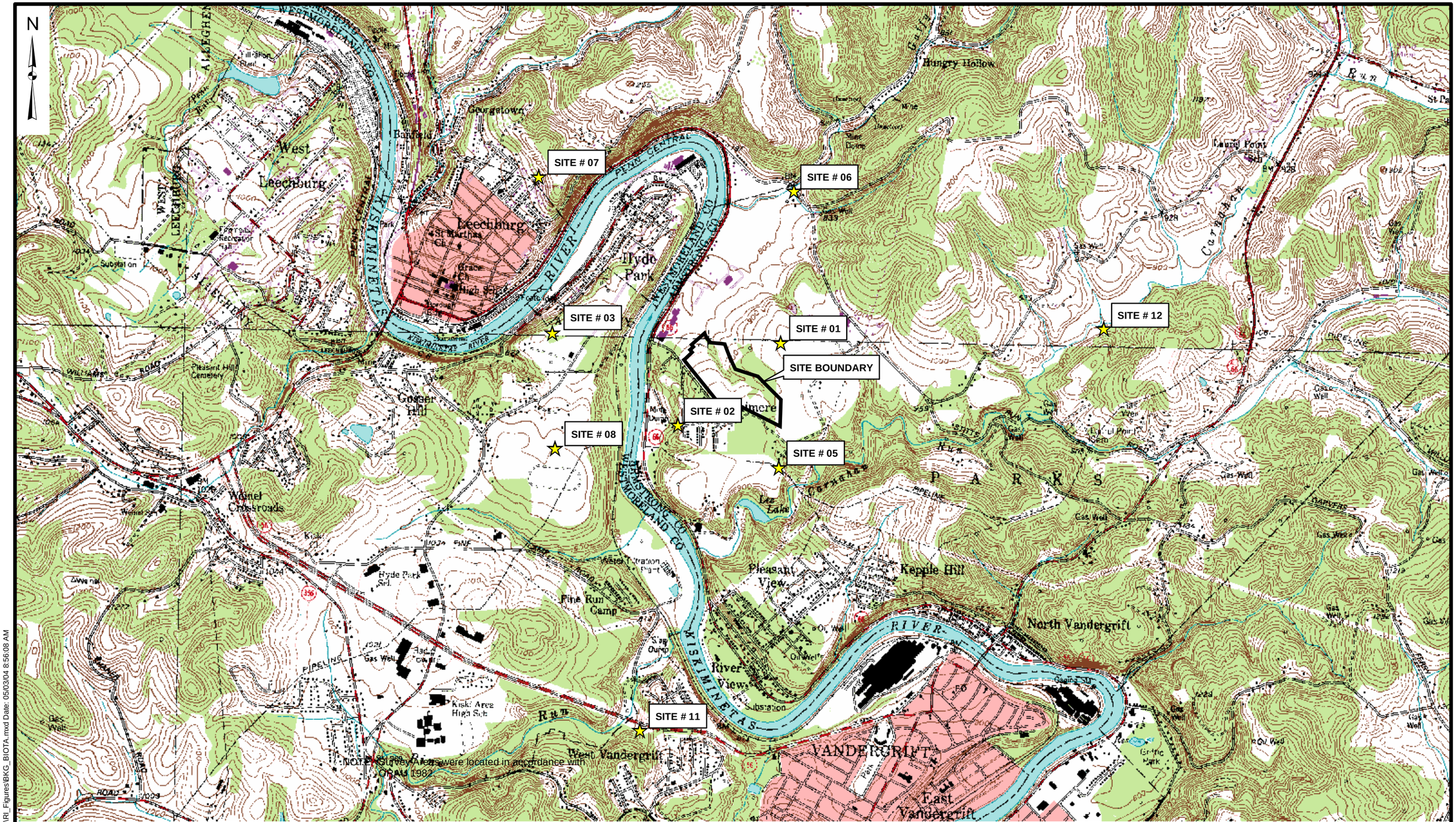
★ Background Surface Water Sample Location

0 750 1,500 3,000 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL OFF-SITE BACKGROUND SURFACE WATER
SAMPLE LOCATIONS

FIGURE 2-6

N:\11171431.00000\GIS\ArcMap\RI_Figures\HIST_BKG_SW.mxd Date: 05/03/04 9:31:58 AM



Legend

★ Background Biota Sample Location

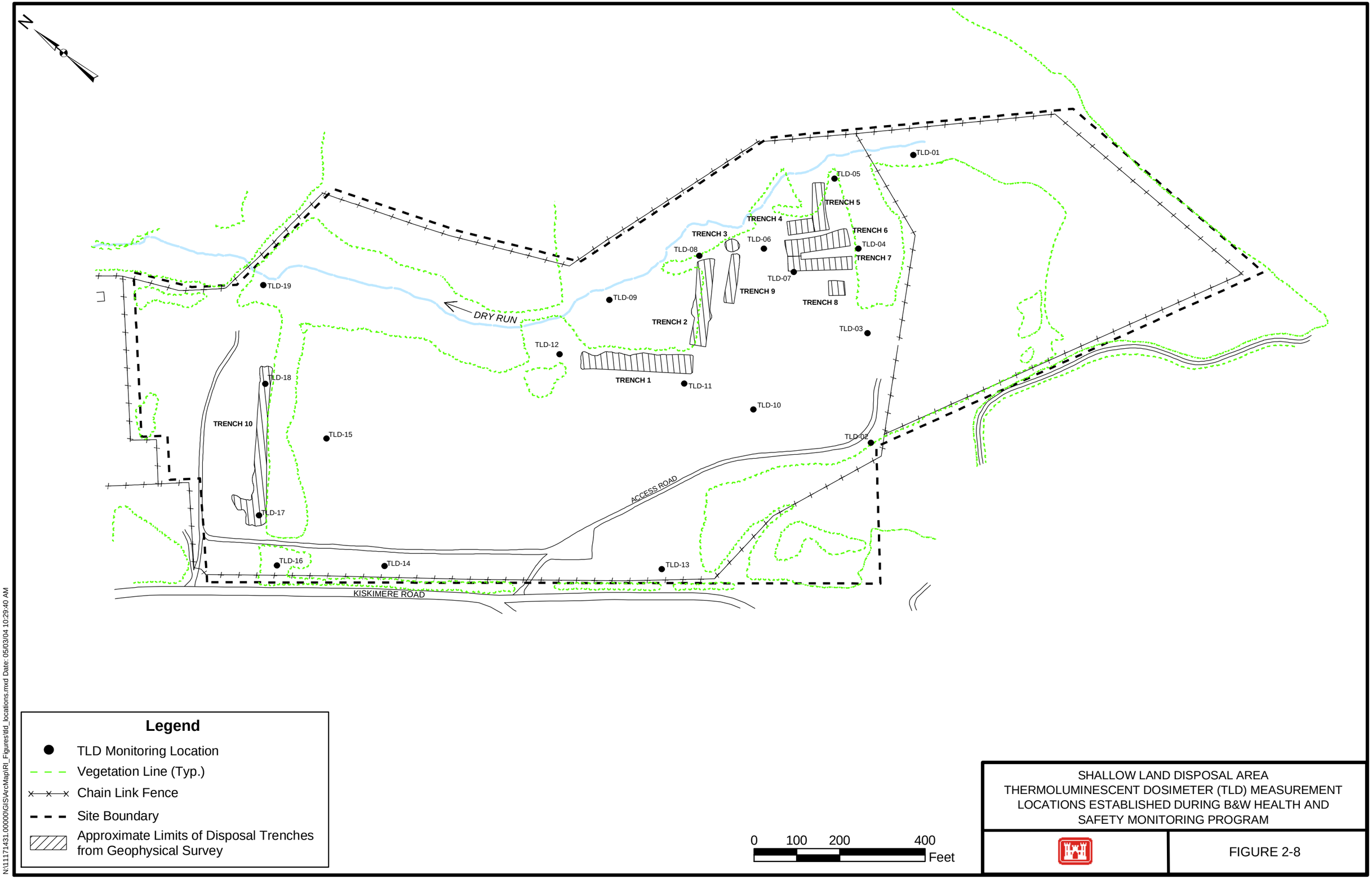
Source: USGS 7.5' Topographic Quadrangles
Vandergrift, PA, 1953 (revised 1979)
Leechburg, PA, 1954 (revised 1969)

0 1,000 2,000 4,000 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL OFF-SITE BIOTA SAMPLE LOCATIONS

FIGURE 2-7

N:\11171431.00000\GIS\ArcMap\RI_Figures\BKG_BIOTA.mxd Date: 05/03/04 8:56:08 AM



SHALLOW LAND DISPOSAL AREA
THERMOLUMINESCENT DOSIMETER (TLD) MEASUREMENT LOCATIONS ESTABLISHED DURING B&W HEALTH AND SAFETY MONITORING PROGRAM

FIGURE 2-8

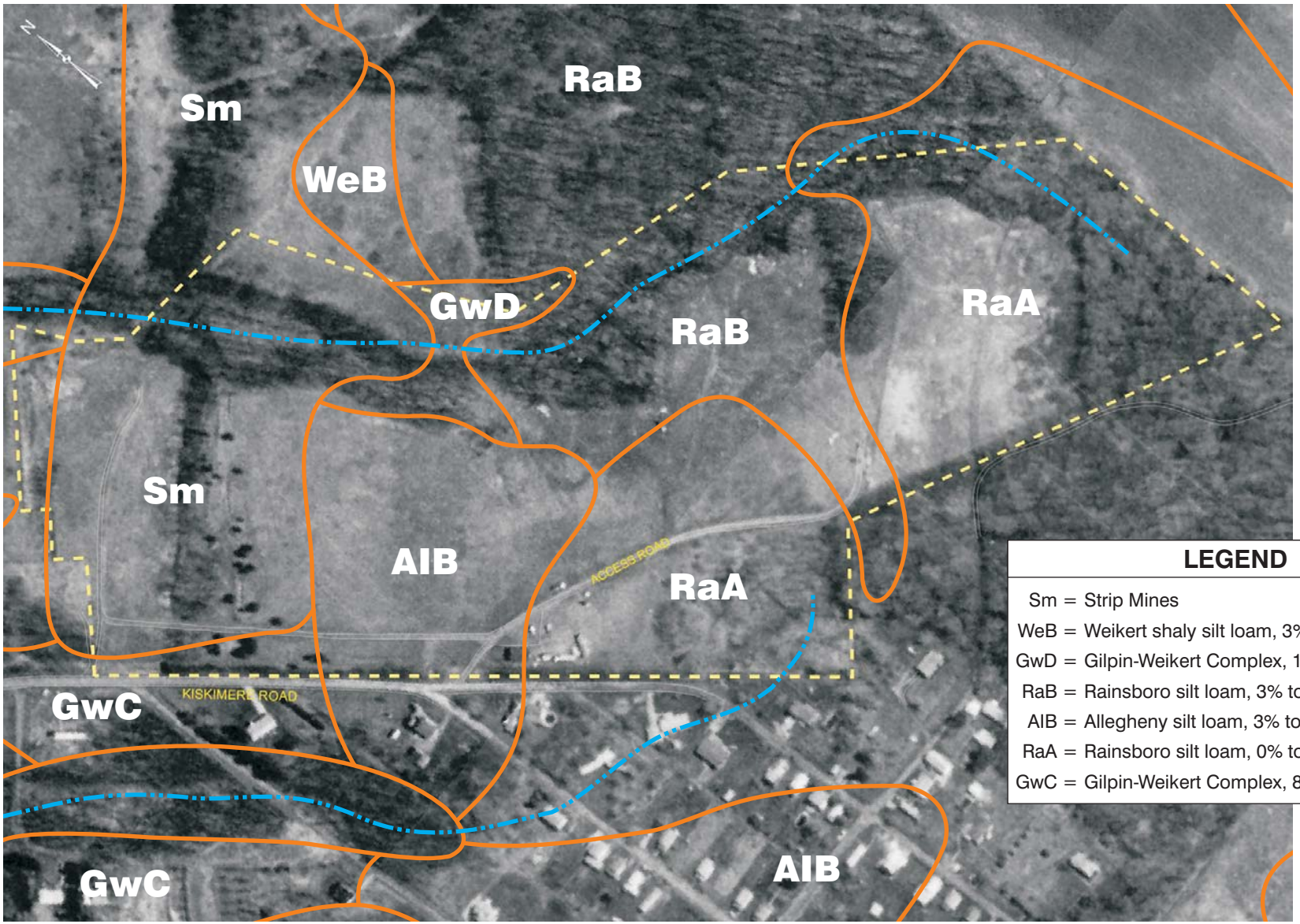
N:\11171431.00000\GIS\ArcMap\RI_Figures\tld_locations.mxd Date: 05/03/04 10:29:40 AM

FIGURE 2-9

SLDA STRATIGRAPHIC COLUMN

System	Group	Member	Section	Unit Description	Approximate Unit Thickness (ft)	Water Bearing (WB) or Aquitard
Quaternary				Surface soils: generally brown, cohesive, clayey to silty loam, low permeability soils, stiff.	0 - 10	NA
				Subsoil: clay, sand with weathered bedrock fragments, generally saturated, slightly more permeable than surficial soils	5 - 10	WB
Pennsylvanian (P)	Conemaugh (Pc)	Glenshaw		Weathered Bedrock: shale bedrock weathered in-place, fractures infilled with silt and clay, stiff and generally dry	5 - 15	Aquitard
				First Shallow Bedrock - Primarily Shale with interbeds of Sandstone and Siltstone. Defined primarily by distribution of pieziometric head elevations. Horizontal bedding predominates. Some minor vertical fractures may exist in sandstone layers.	5 - 20	WB
				Upper Shale - interbedded with Siltstone and Sandstone	5 - 25	Aquitard
				Second Shallow Bedrock - defined also by distribution of pieziometric head elevations. Shale with interbeds of Sandstone and Siltstone. Horizontal bedding predominates. Some minor vertical fractures may exist in sandstone layers.	10 - 25	WB
				Lower Shale - generally massive shale	10 - 25	Aquitard
	Allegheny (Pa)	Freeport		Upper Freeport Coal (void where removed)	0 - 5	WB
				Claystone	2 - 3	Aquitard
				Shale/Siltstone interbeds	20 - 30	Aquitard
				Deep Bedrock: Shaly Sandstone (possible Butler and Freeport Sandstone) Shale with interbedded sandsone	20	WB

AG18574-11173429-051404-GCM



LEGEND

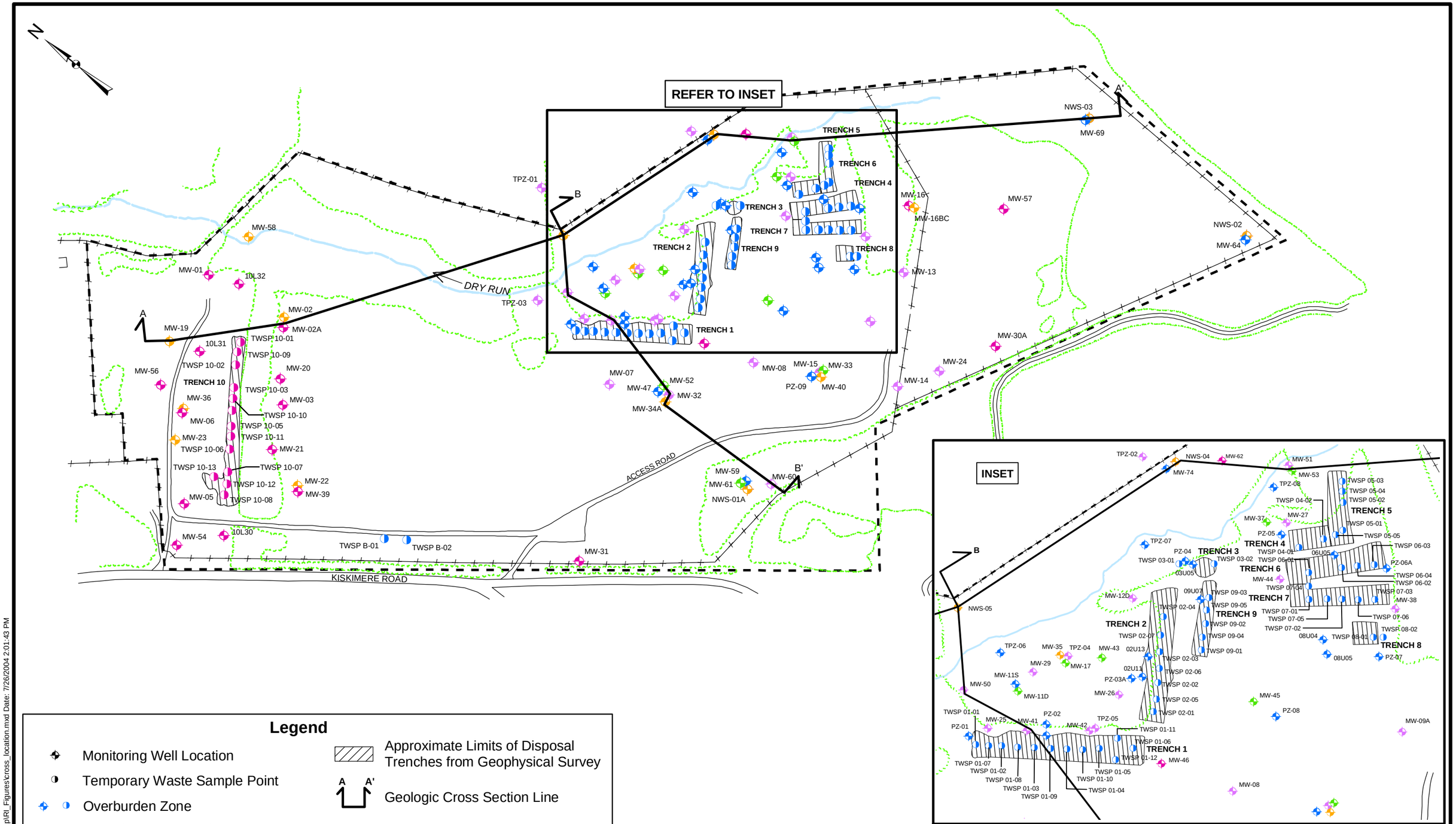
Sm	=	Strip Mines
WeB	=	Weikert shaly silt loam, 3% to 8% slopes
GwD	=	Gilpin-Weikert Complex, 15% to 25% slopes
RaB	=	Rainsboro silt loam, 3% to 8% slopes
AIB	=	Allegheny silt loam, 3% to 8% slopes
RaA	=	Rainsboro silt loam, 0% to 3% slopes
GwC	=	Gilpin-Weikert Complex, 8% to 15% slopes

SOURCE: Soils information obtained from Soil Survey prepared for Armstrong County, Pennsylvania

United States Army Corps of Engineers

SLDA SOILS MAP

FIGURE 2-10



Legend

- Monitoring Well Location
- Temporary Waste Sample Point
- Overburden Zone
- First Shallow Bedrock Zone
- Second Shallow Bedrock Zone
- Upper Freeport Zone
- Deep Bedrock Zone
- Approximate Limits of Disposal Trenches from Geophysical Survey
- A A' Geologic Cross Section Line

SHALLOW LAND DISPOSAL AREA
SECTION LOCATION MAP

FIGURE 2-11

N:\11171431.00000\GIS\ArcMap\RI_Figures\cross_location.mxd Date: 7/26/2004 2:01:43 PM

WEST

EAST

ELEVATION (FEET ABOVE MEAN SEA LEVEL)

950

900

850

800

750

TRENCH 10

MW-19

MW-02A

MW-02

DRY RUN

NWS-05

NWS-04

DRY RUN

MW-51

MW-53

NWS-03

893.33

886.08

868.68

865.95

837.91

838.77

829.95

807.71

812.38

815.39

811.44

805.77

795.73

?

?

?

Legend

Geologic Layer

- Overburden
- Weathered Shale
- Upper Bedrock
- Mine Fill
- Tight Zone
- Black Shale
- Upper Freeport
- Underclay
- Lower Tight Zone
- Siltstone with Sandstone Beds

Location ID — MW-19

Water Level In Well

Interpolated Potentiometric Surface

Monitoring Well Screen

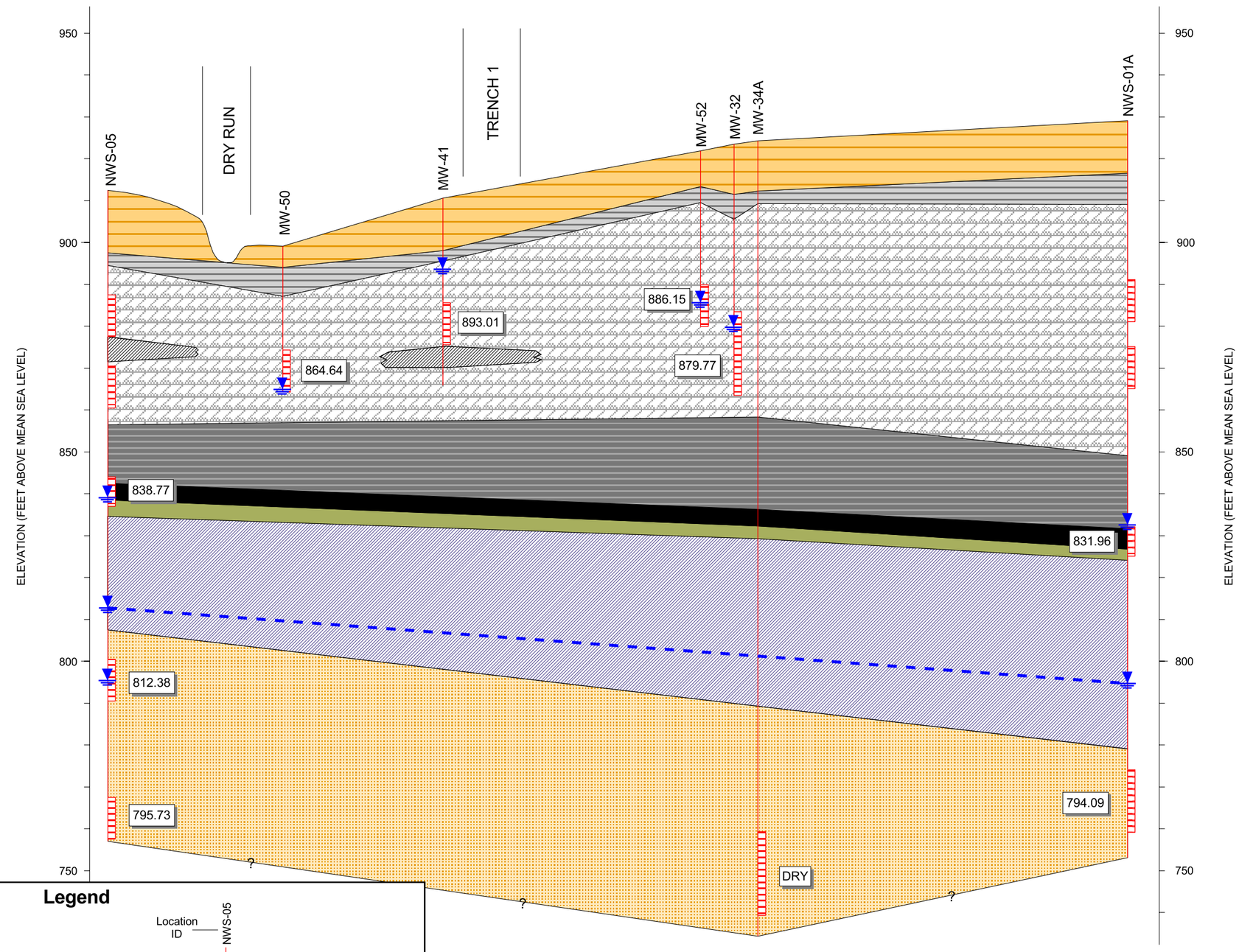
805.77 — Groundwater Elevation (ft amsl)

HORIZONTAL SCALE: 1 INCH = 150 FEET
VERTICAL EXAGGERATION: 5X

SHALLOW LAND DISPOSAL AREA
STRATIGRAPHIC CROSS SECTION A-A'

FIGURE 2-12

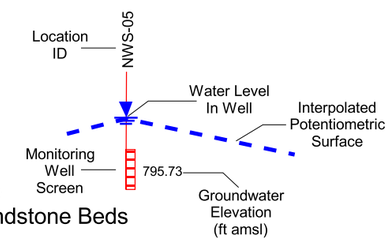
N:\11171431.00000\GIS\ArcView\x_section.apr A-A' REVISED
5/19/2004



Legend

Geologic Layer

- Overburden
- Weathered Shale
- Upper Bedrock
- Tight Zone
- Black Shale
- Upper Freeport
- Underclay
- Lower Tight Zone
- Siltstone with Sandstone Beds

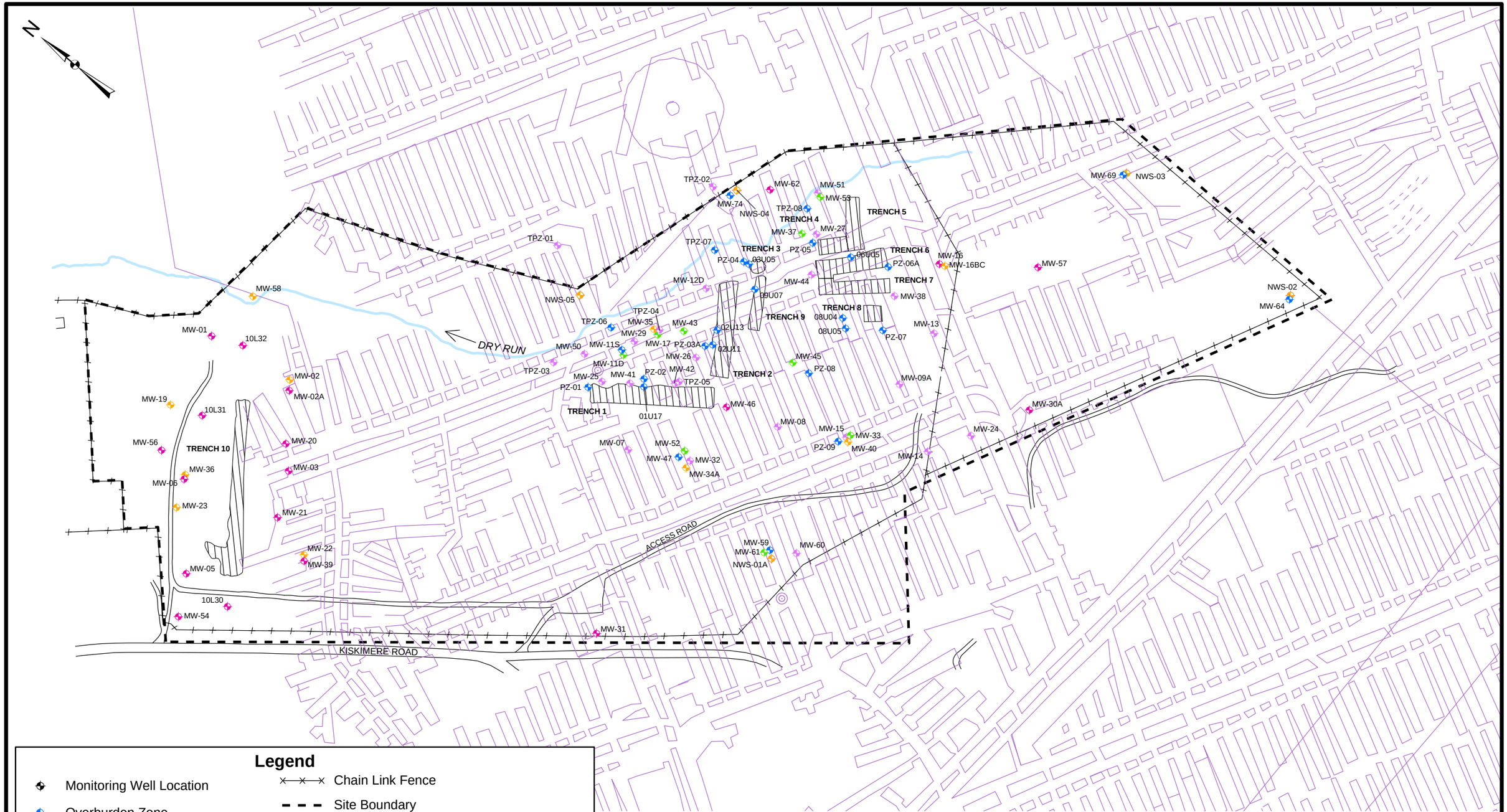


HORIZONTAL SCALE: 1 INCH = 80 FEET
VERTICAL EXAGGERATION: 3X

SHALLOW LAND DISPOSAL AREA
STRATIGRAPHIC CROSS SECTION B-B'

FIGURE 2-13

N:\11171431.00000\GIS\ArcView\x_section.apr B-B'
5/19/2004



Legend

- Monitoring Well Location
- Overburden Zone
- First Shallow Bedrock Zone
- Second Shallow Bedrock Zone
- Upper Freeport Zone
- Deep Bedrock Zone
- Flute Multiport Sampling System (1SB, 2SB, UF, and DB Zones)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Mine Workings

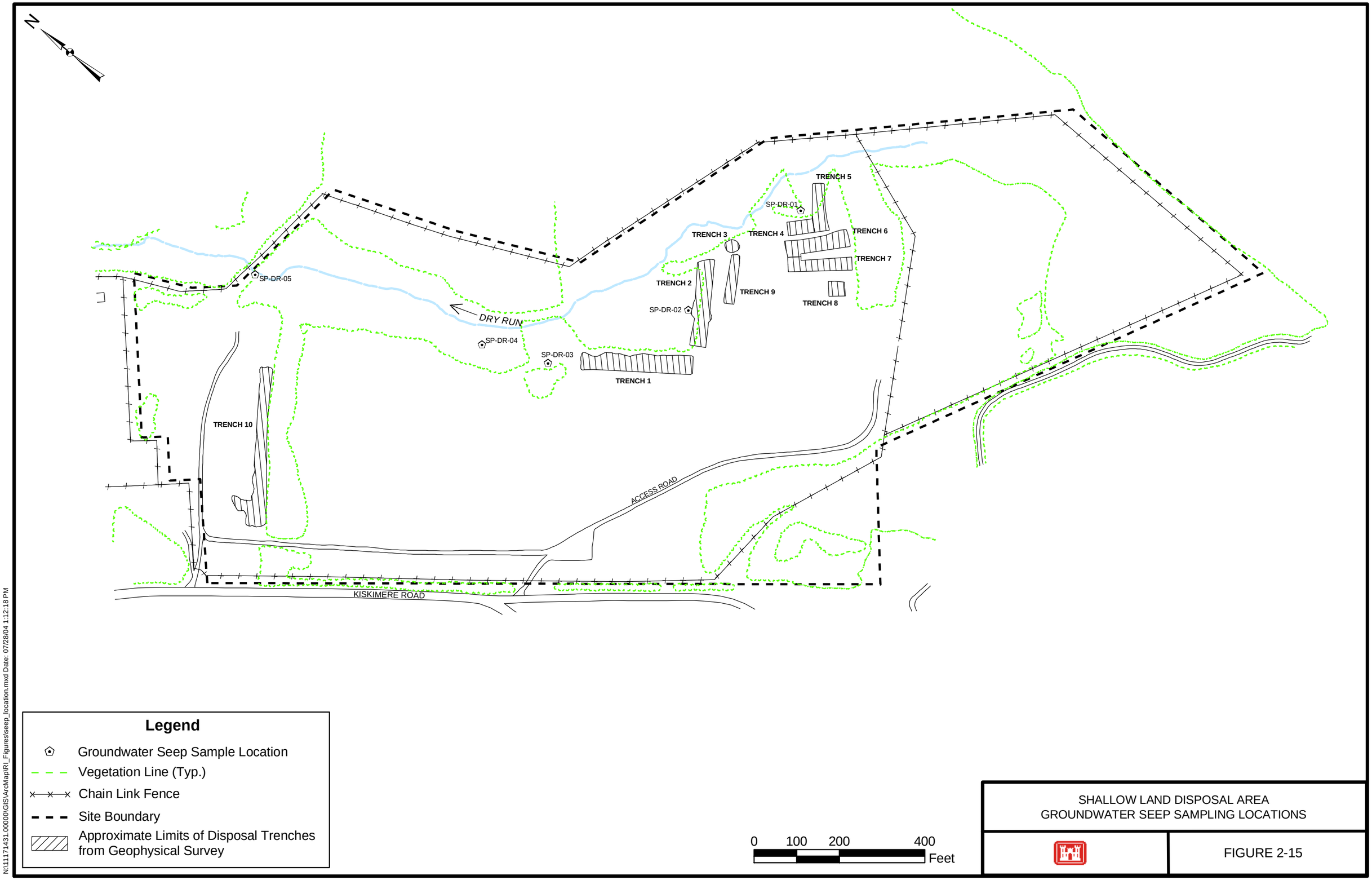
NOTE: Mine workings were reproduced from electronic files provided by ARCO.

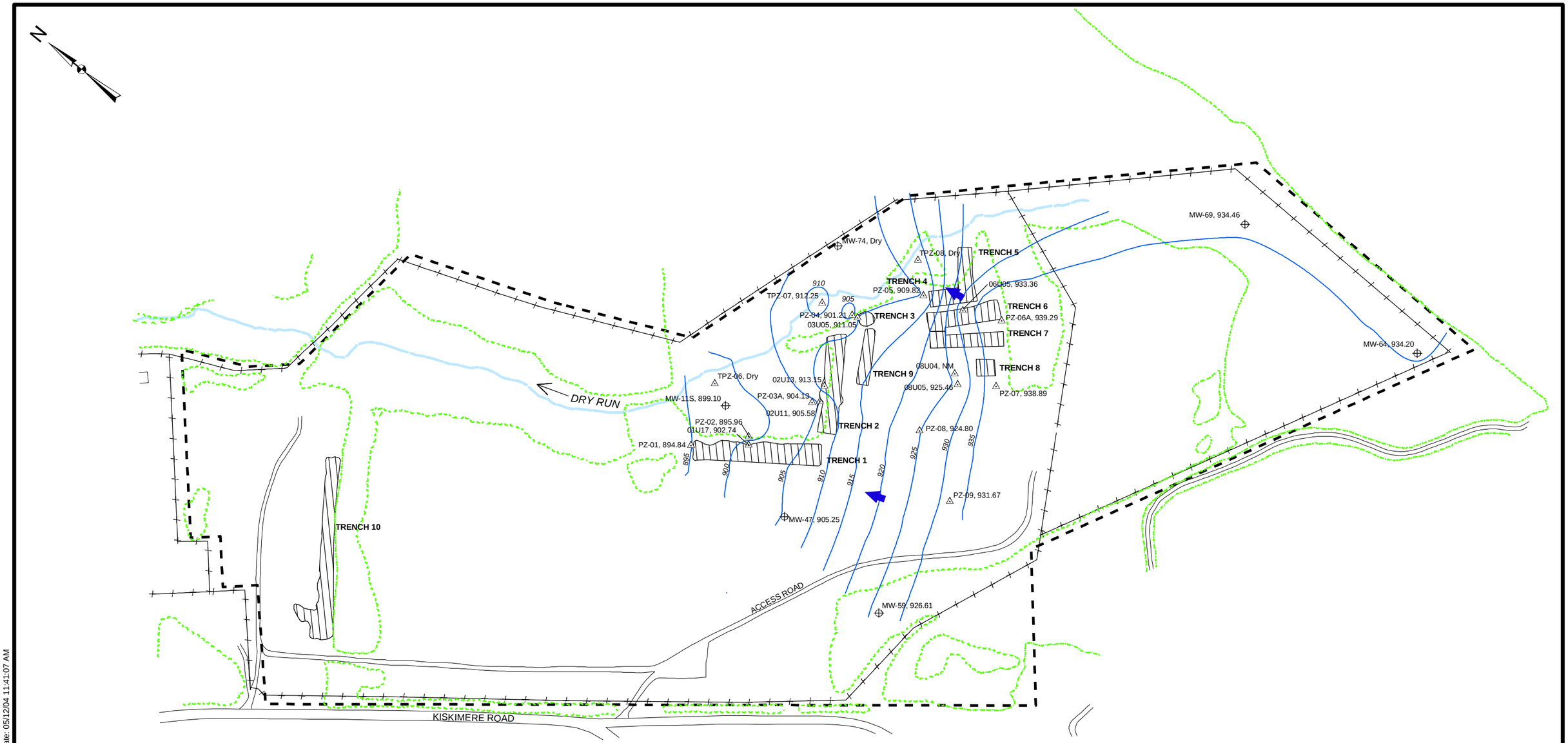
0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
MINE WORKINGS

FIGURE 2-14

N:\11171431.00000\GIS\ArcMap\RI_Figures\mine_map.mxd
06/07/04


N
TRENCH 5
SP-DR-01
TRENCH 3
TRENCH 4
TRENCH 6
TRENCH 7
TRENCH 2
TRENCH 9
TRENCH 8
SP-DR-02
SP-DR-05
DRY RUN
SP-DR-04
SP-DR-03
TRENCH 1
TRENCH 10
ACCESS ROAD
KISKIMERE ROAD
Legend
Groundwater Seep Sample Location
Vegetation Line (Typ.)
Chain Link Fence
Site Boundary
Approximate Limits of Disposal Trenches from Geophysical Survey
0
100
200
400
Feet
SHALLOW LAND DISPOSAL AREA
GROUNDWATER SEEP SAMPLING LOCATIONS
FIGURE 2-15
N:\11171431.00000\GIS\ArcMap\RI_Figures\seep_location.mxd Date: 07/28/04 1:12:18 PM



Legend

- Monitoring Well
- Piezometer
- 935 Groundwater Elevation Contour
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction

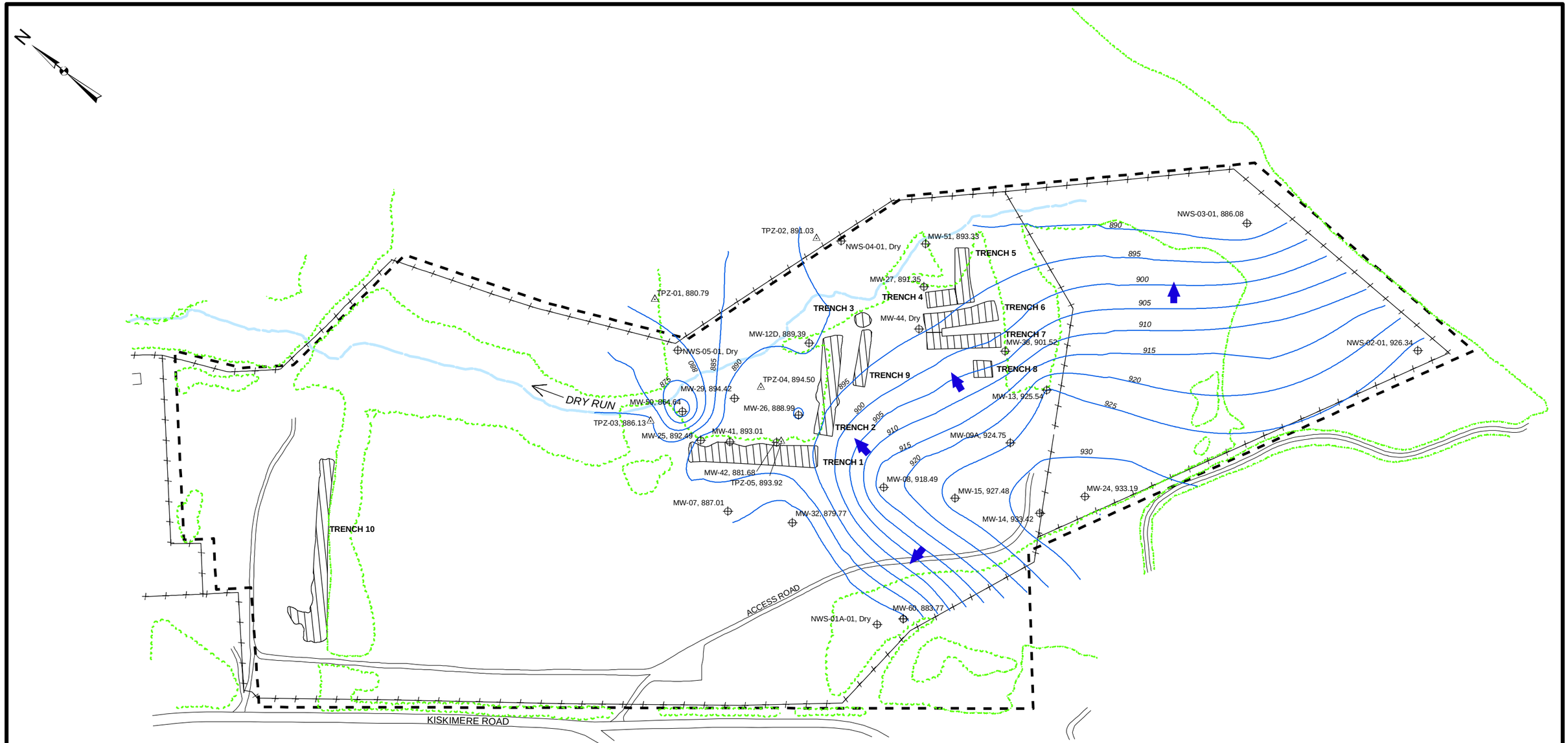
MW-47, 905.25
Location ID
Groundwater Elevation (ft amsl)

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - OVERBURDEN
(JANUARY 2004)

FIGURE 2-16

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_11104_SS.mxd Date: 05/12/04 11:41:07 AM



Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction

MW-32, 879.77
Location ID
Groundwater Elevation (ft amsl)

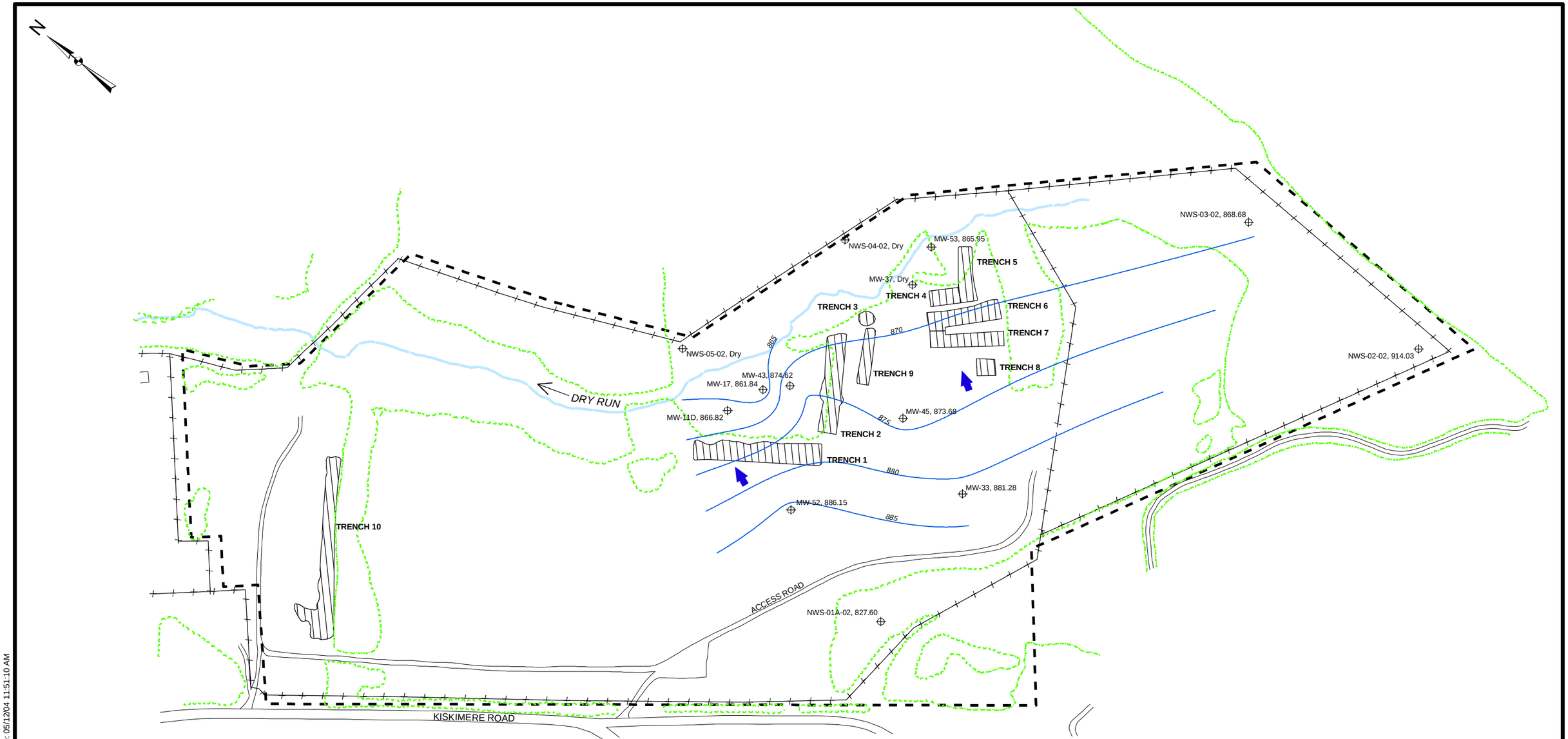
Notes:
1) MW-42 was not used to generate groundwater elevation contours due to a possible anomalous reading.
2) Groundwater elevation contour data includes data from FLUTe locations.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - FIRST SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-17

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_11104_1S_AD.mxd Date: 05/12/04 11:48:10 AM



Legend

- Monitoring Well
- Groundwater Flow Direction
- 890 Groundwater Elevation Contour
- MW-52, 886.15 (Location ID: MW-52; Groundwater Elevation (ft amsl): 886.15)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

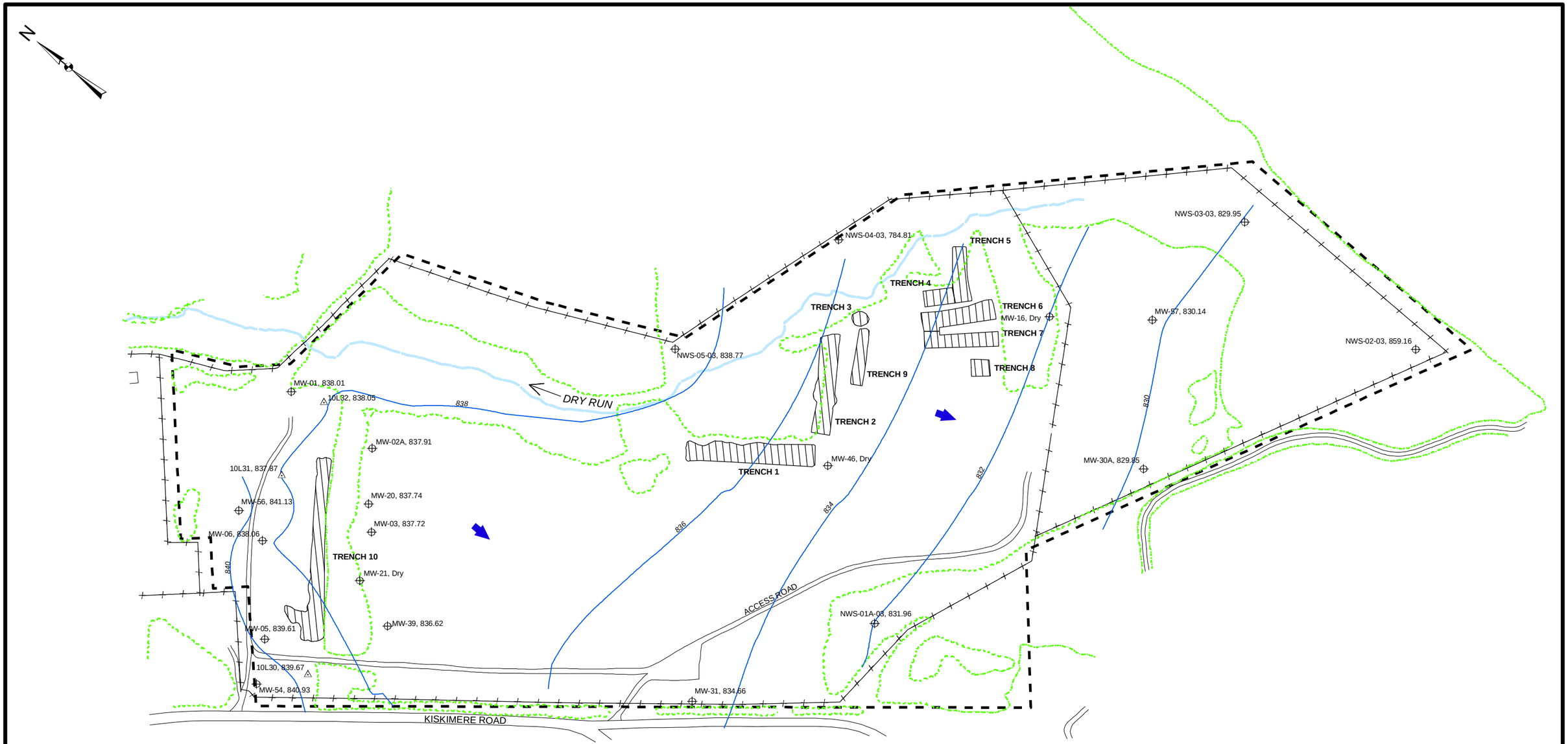
Notes:
1) NWS-02-02 and NWS-01A-02 were not used to generate groundwater elevation contours due to a possible anomalous reading.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - SECOND SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-18

N:\11171431.00000\GIS\ArcMap\WaterlevelsWGC_11104_2S.mxd Date: 05/12/04 11:51:10 AM



Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Groundwater Flow Direction
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Site Boundary

MW-52, 886.15
Location ID
Groundwater Elevation (ft amsl)

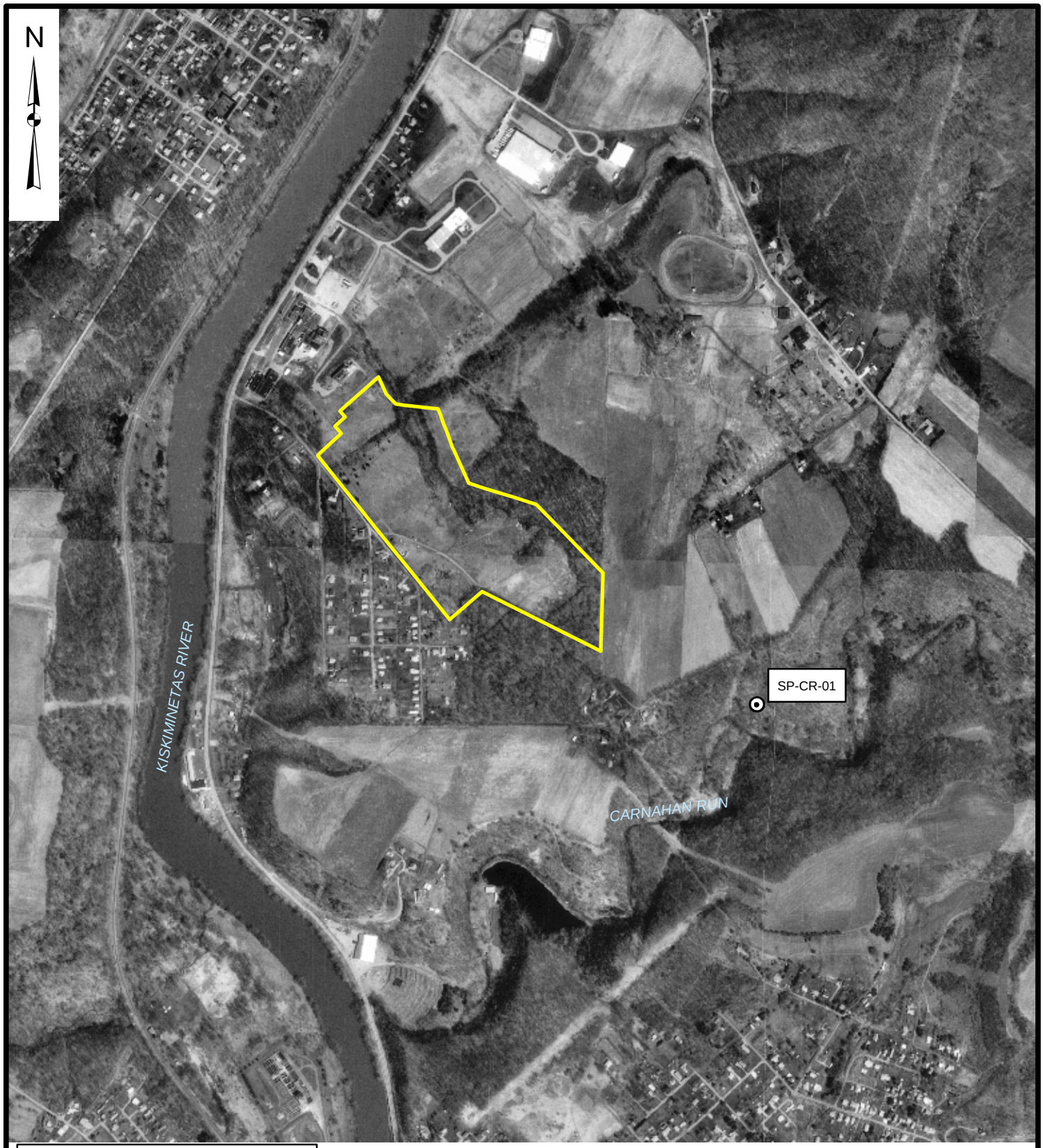
Notes:
1) NWS-02-03 and NWS-04-03 were not used to generate groundwater elevation contours due to a possible anomalous reading.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - UPPER FREEPORT COAL HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-19

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_11104_UF.mxd Date: 05/12/04 11:53:34 AM



Legend

Mine Outfall Location

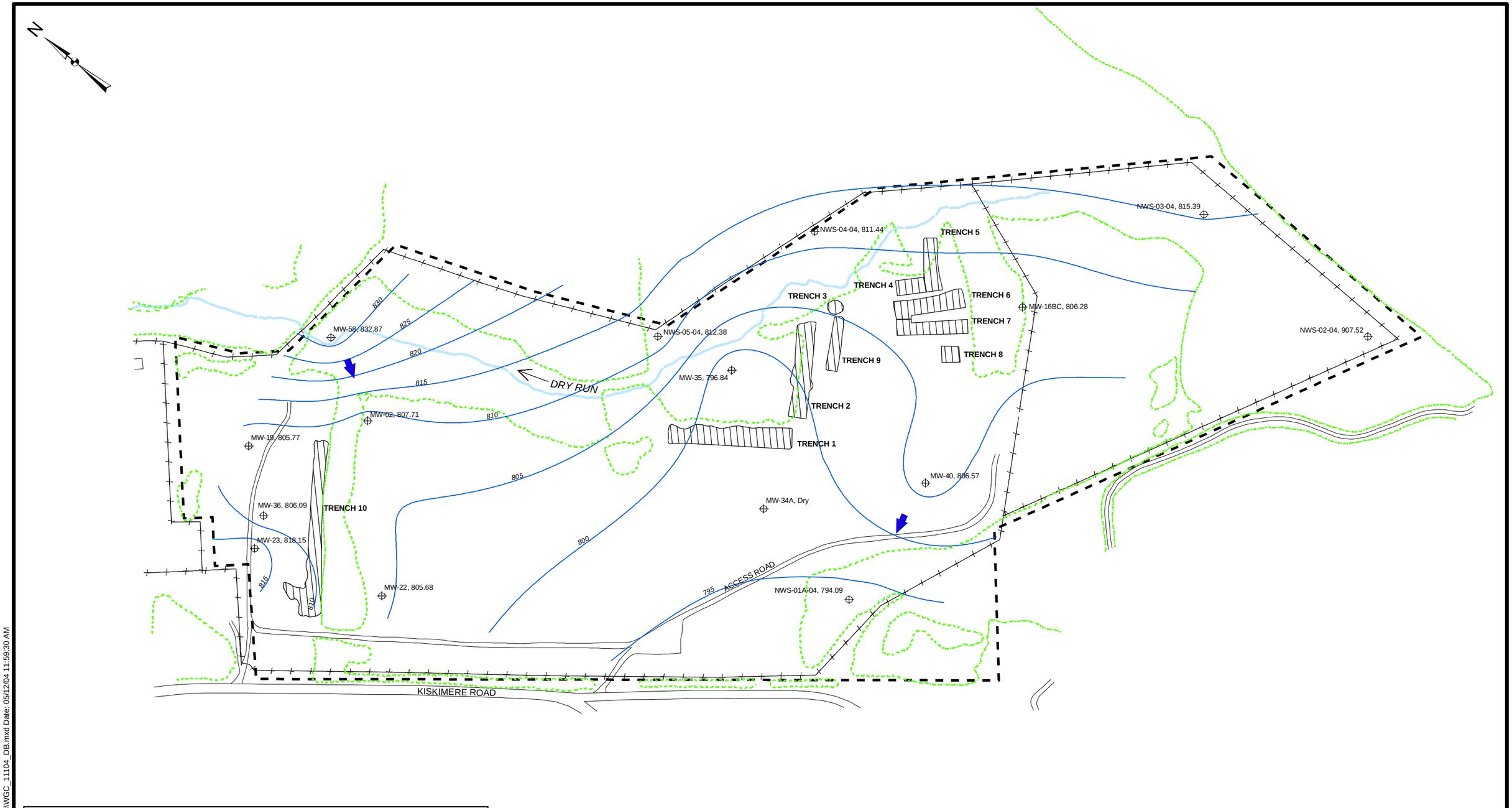
Site Boundary

0 500 1,000 2,000 Feet

SHALLOW LAND DISPOSAL AREA
MINE OUTFALL LOCATION MAP

FIGURE 2-20

N:\11171431.00000\GIS\ArcMap\RI_Figures\OUTFALL.mxd Date: 05/12/04 3:39:00 PM



Legend

- Monitoring Well
- Groundwater Flow Direction
- 890 Groundwater Elevation Contour
- MW-22, 805.68 (Location ID: MW-22; Groundwater Elevation (ft amsl): 805.68)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

Notes:
1) NWS-02-04 was not used to generate groundwater elevation contours due to a possible anomalous reading.

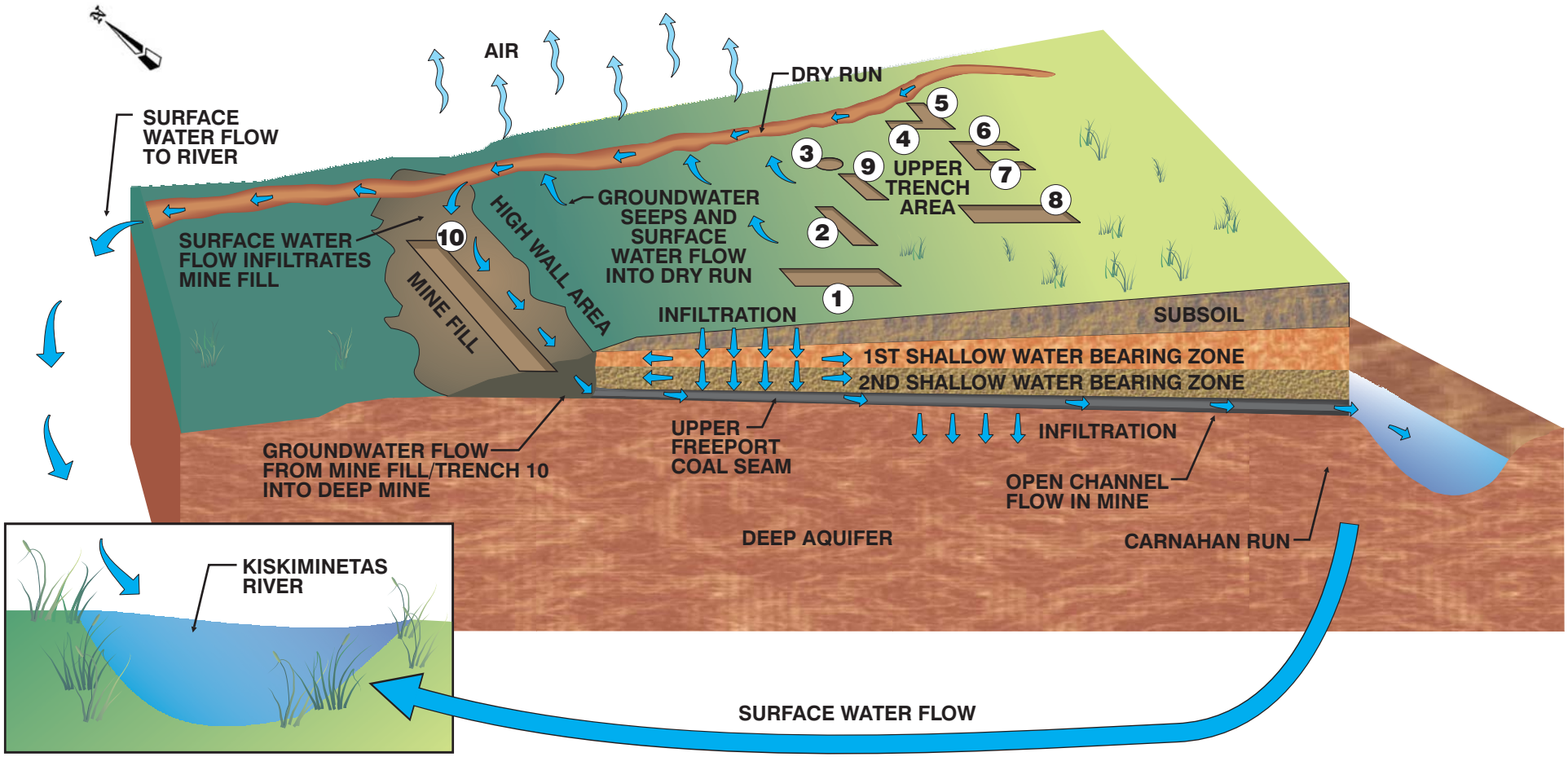
0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - DEEP BEDROCK HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-21

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_11104_DB.mxd Date: 05/12/04 11:59:30 AM

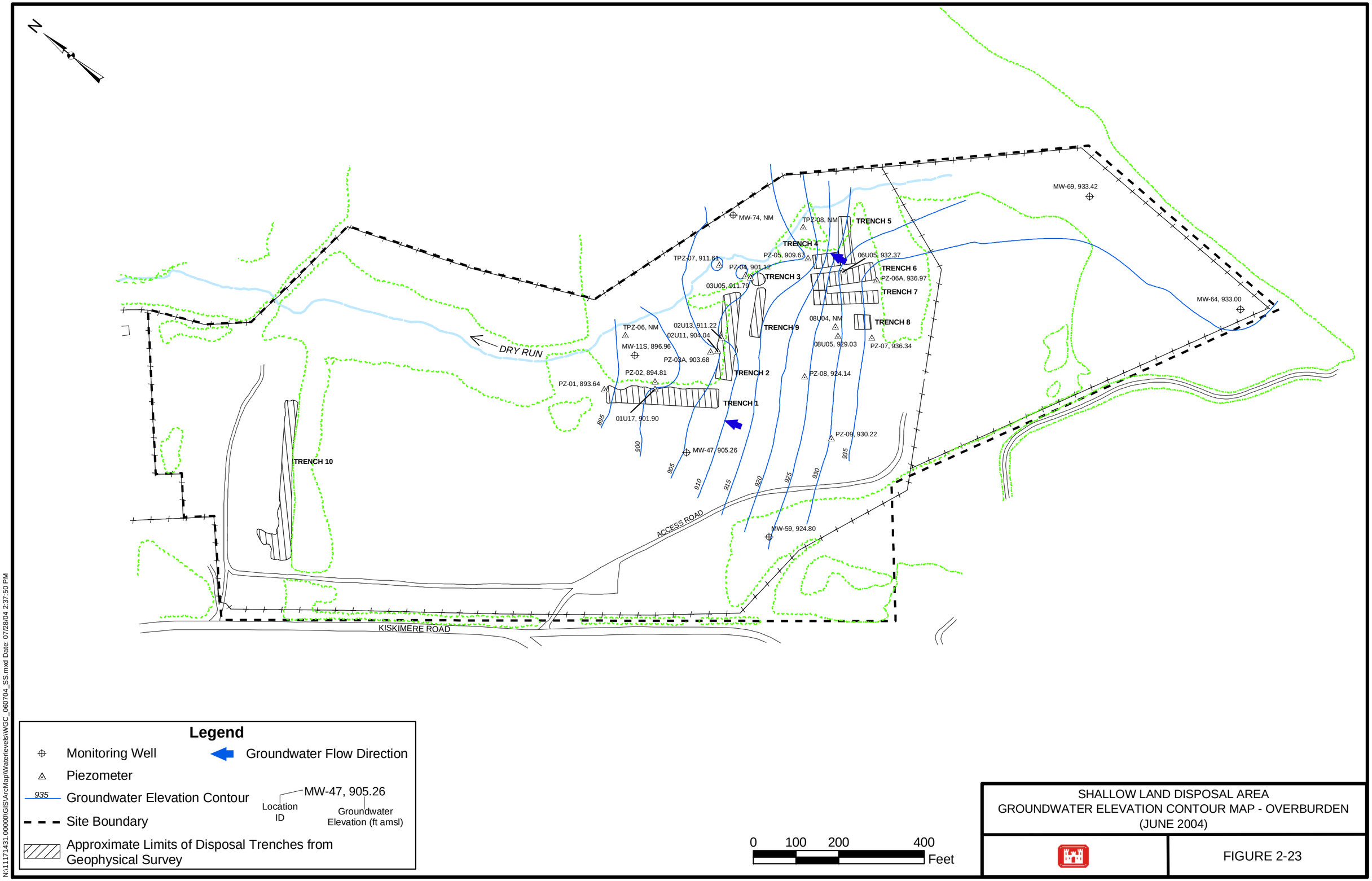
AG18569-11173429-051204-GCM



United States Army Corps of Engineers

SLDA CONCEPTUAL SITE MODEL

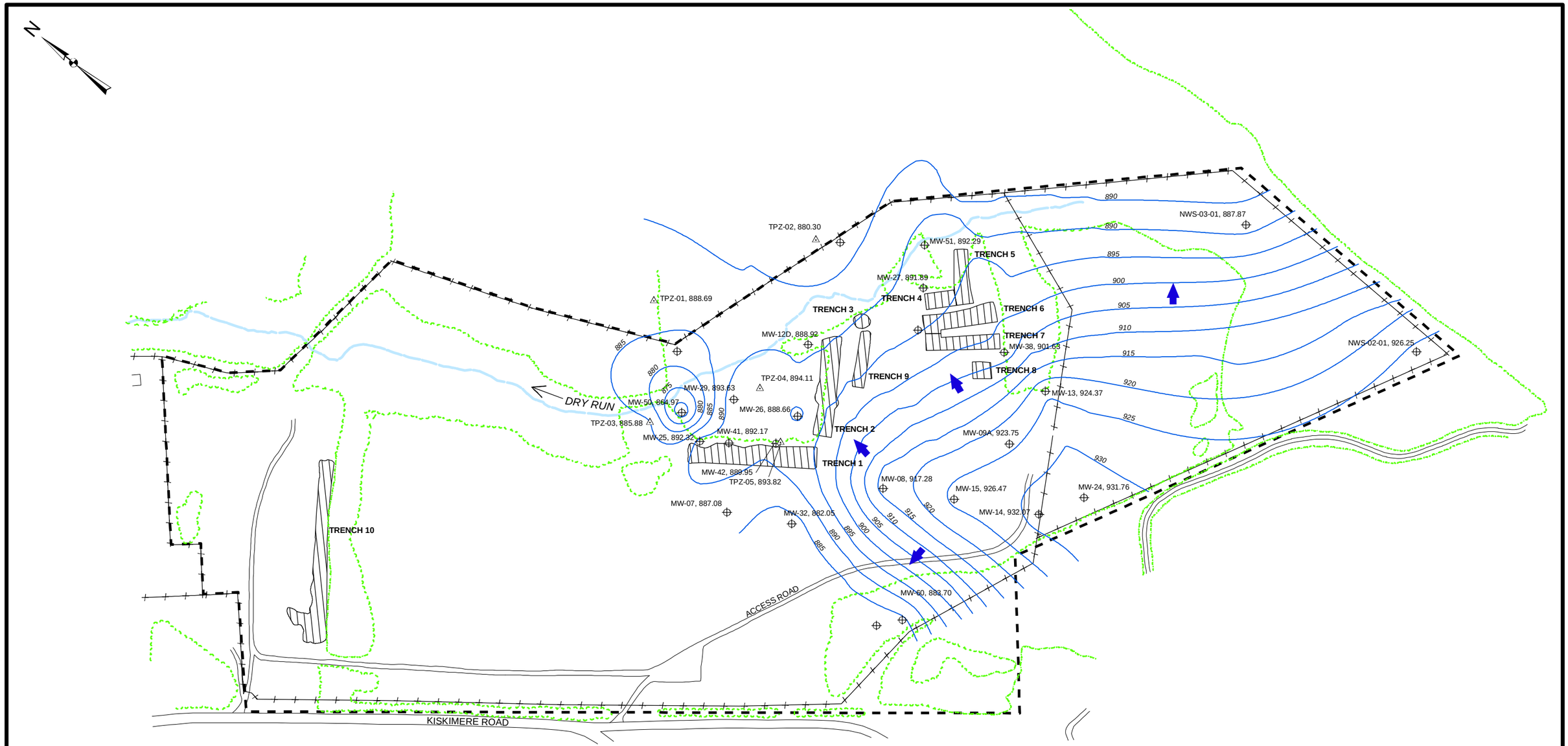
FIGURE 2-22



SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - OVERBURDEN
(JUNE 2004)

FIGURE 2-23

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_060704_SS.mxd Date: 07/28/04 2:37:50 PM



Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction
- MW-32, 882.05 (Location ID: MW-32; Groundwater Elevation (ft amsl): 882.05)

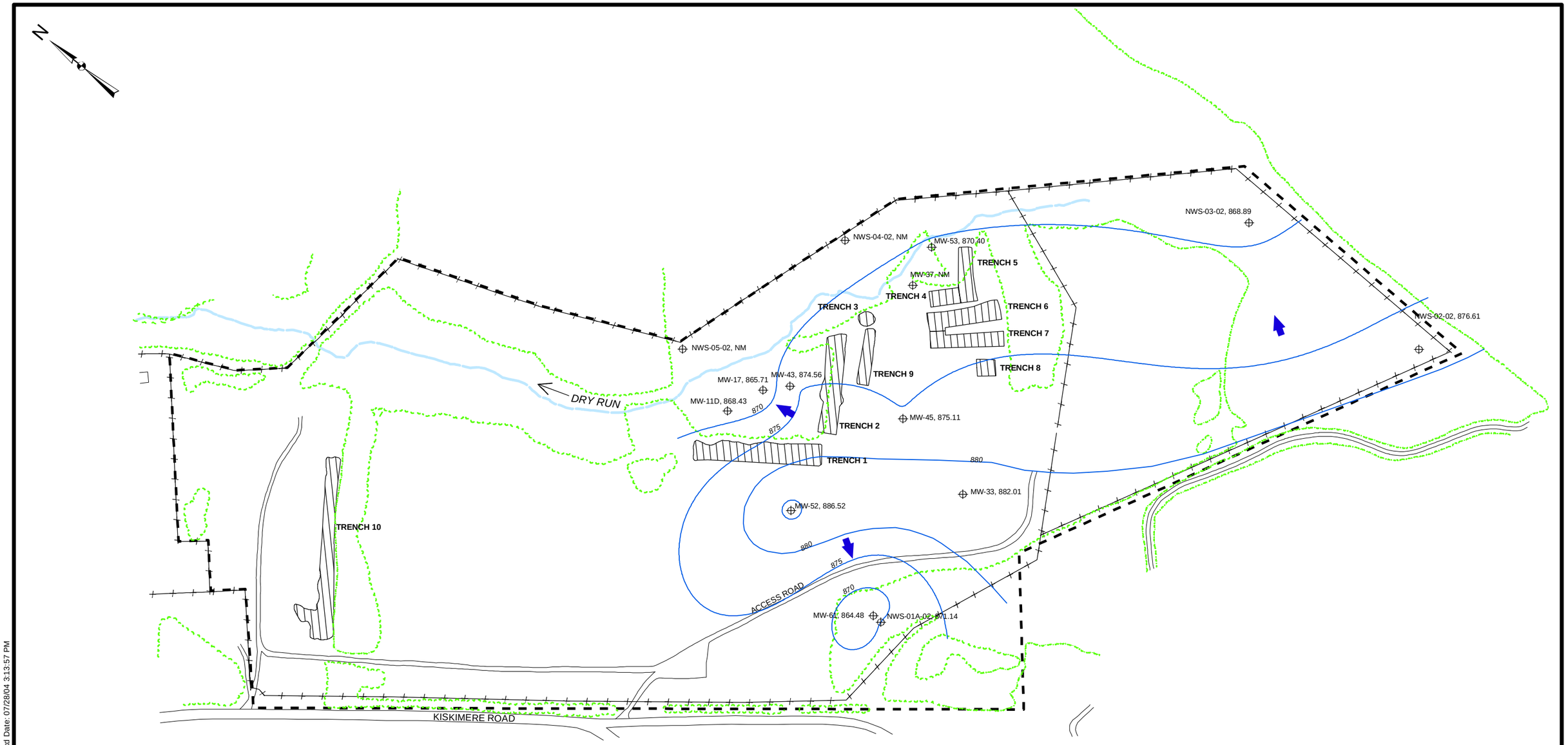
Notes:
1) MW-42 was not used to generate groundwater elevation contours due to a possible anomalous reading.
2) Groundwater elevation contour data includes data from FLUTe locations NWS-02 and NWS-03

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - FIRST SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-24

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_060704_1S_AD.mxd Date: 07/28/04 2:40:02 PM



Legend

- Monitoring Well
- Groundwater Flow Direction
- 890 Groundwater Elevation Contour
- Site Boundary
- SLDA Disposal Trenches
- MW-52, 886.52 (Location ID: MW-52; Groundwater Elevation (ft amsl): 886.52)

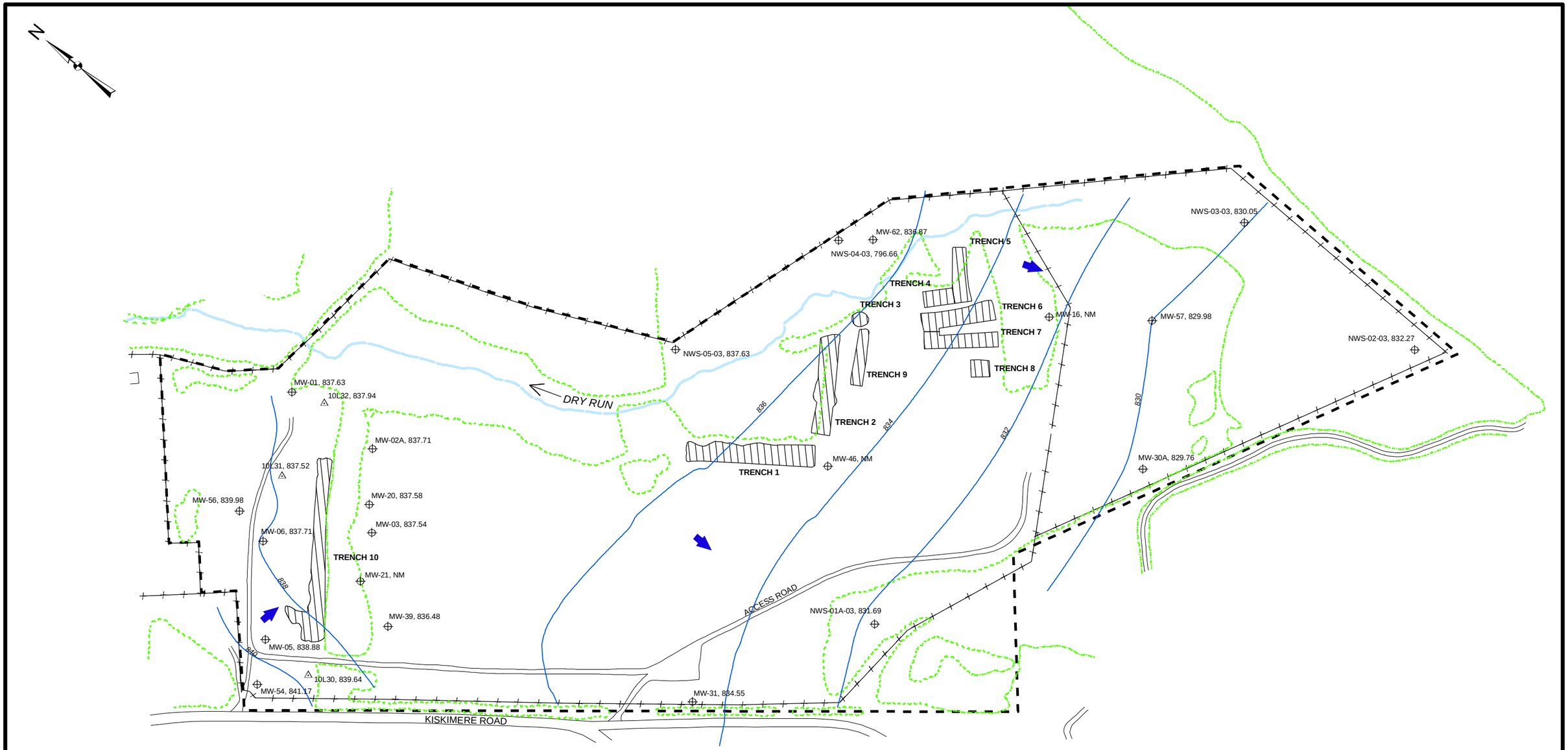
Notes:
1) Groundwater elevation contour data includes data from FLUTe locations.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - SECOND SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-25

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_060704_2S_AD.mxd Date: 07/28/04 3:13:57 PM



Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Groundwater Flow Direction
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Site Boundary

MW-52, 886.52
Location ID
Groundwater Elevation (ft amsl)

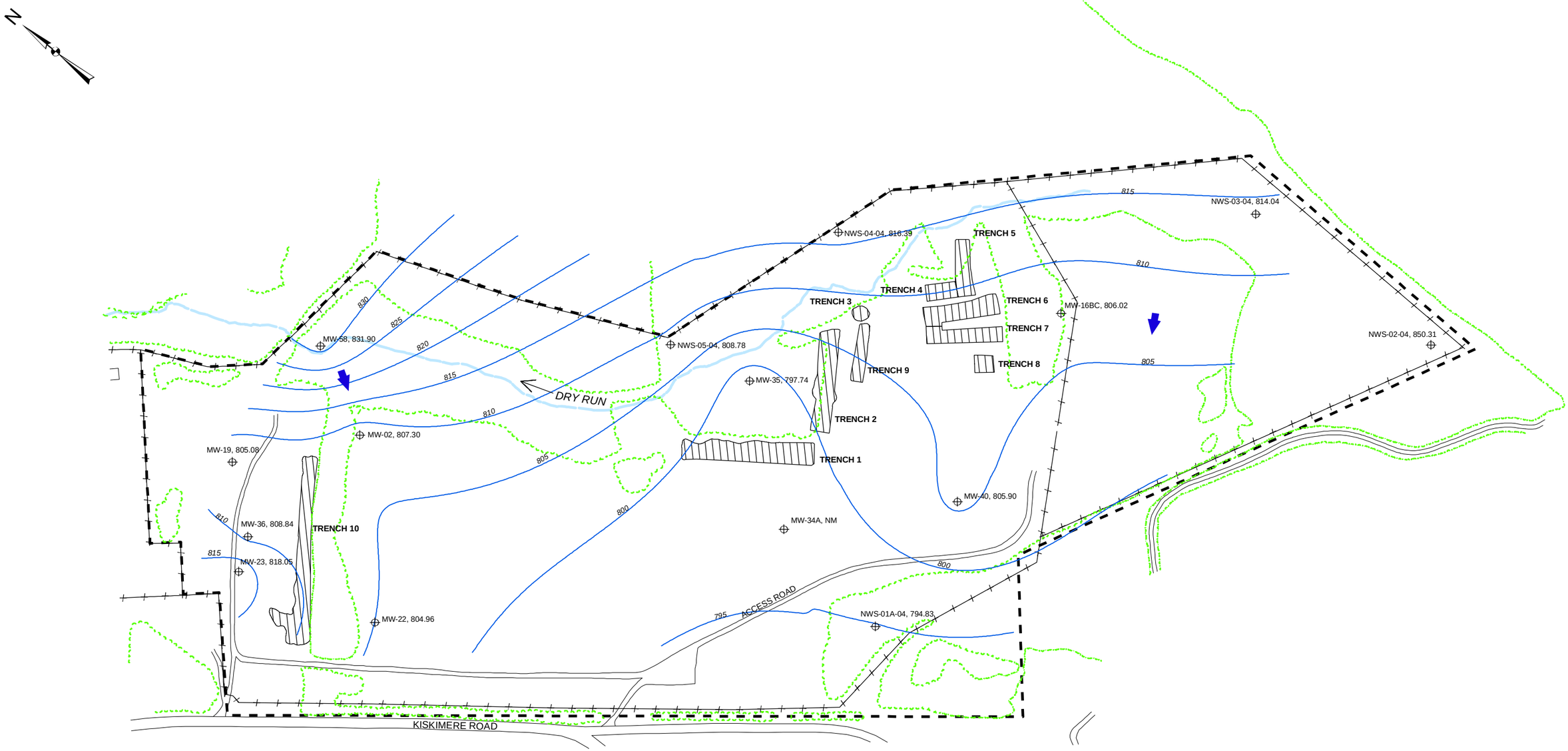
Notes:
1) NWS-02-03 and NWS-04-03 were not used to generate groundwater elevation contours due to a possible anomalous reading.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - UPPER FREEPORT COAL HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-26

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_060704_UF.mxd Date: 07/28/04 3:22:57 PM



Legend

- Monitoring Well
- Groundwater Flow Direction
- 890 Groundwater Elevation Contour
- Site Boundary
- SLDA Disposal Trenches

MW-22, 804.96
Location ID
Groundwater Elevation (ft amsl)

Notes:
1) Groundwater elevation contour data includes data from FLUTe locations.
2) NWS-02 was not used to generate groundwater elevation contours due to a possible anomalous reading.

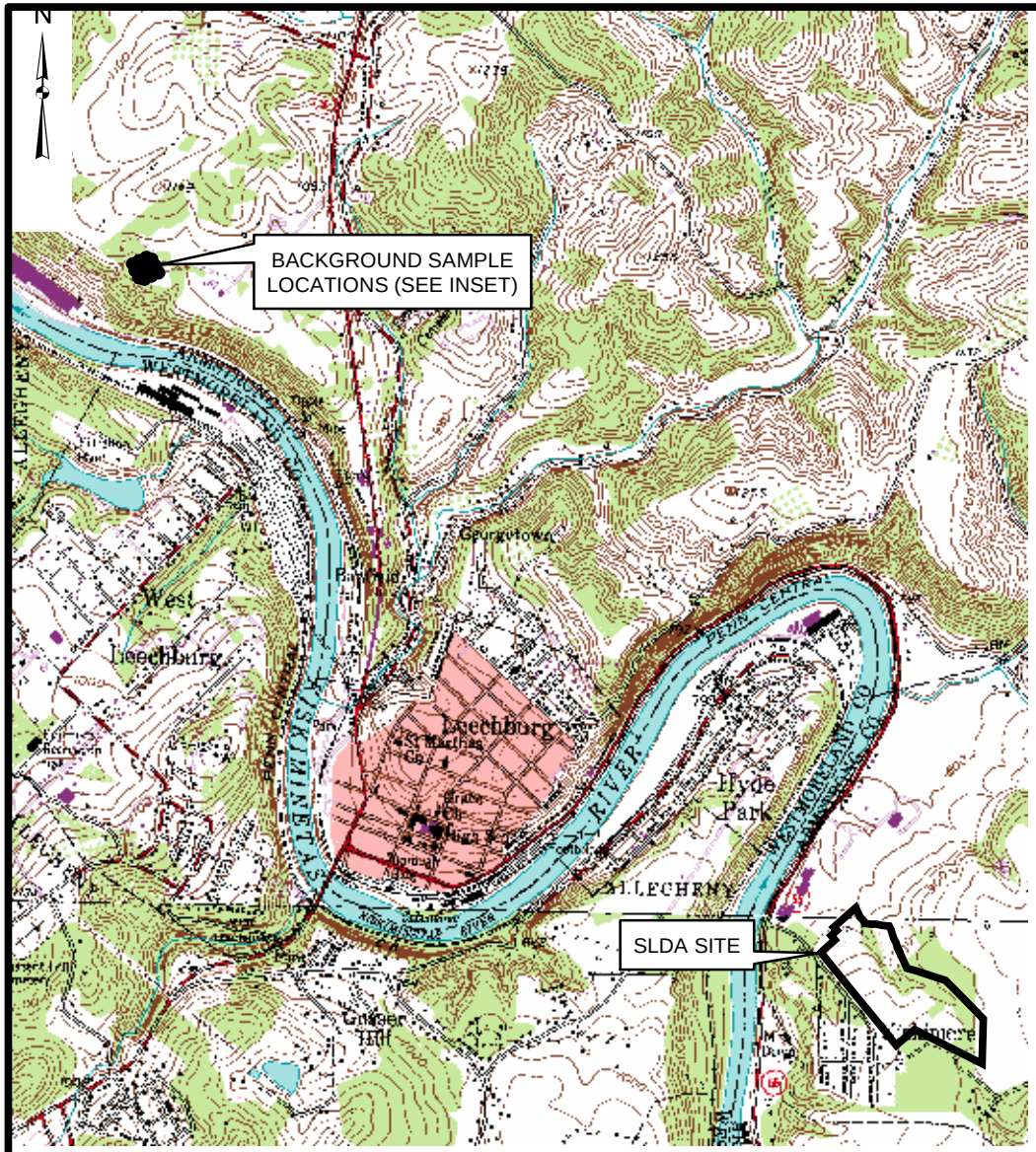
0 100 200 400 Feet

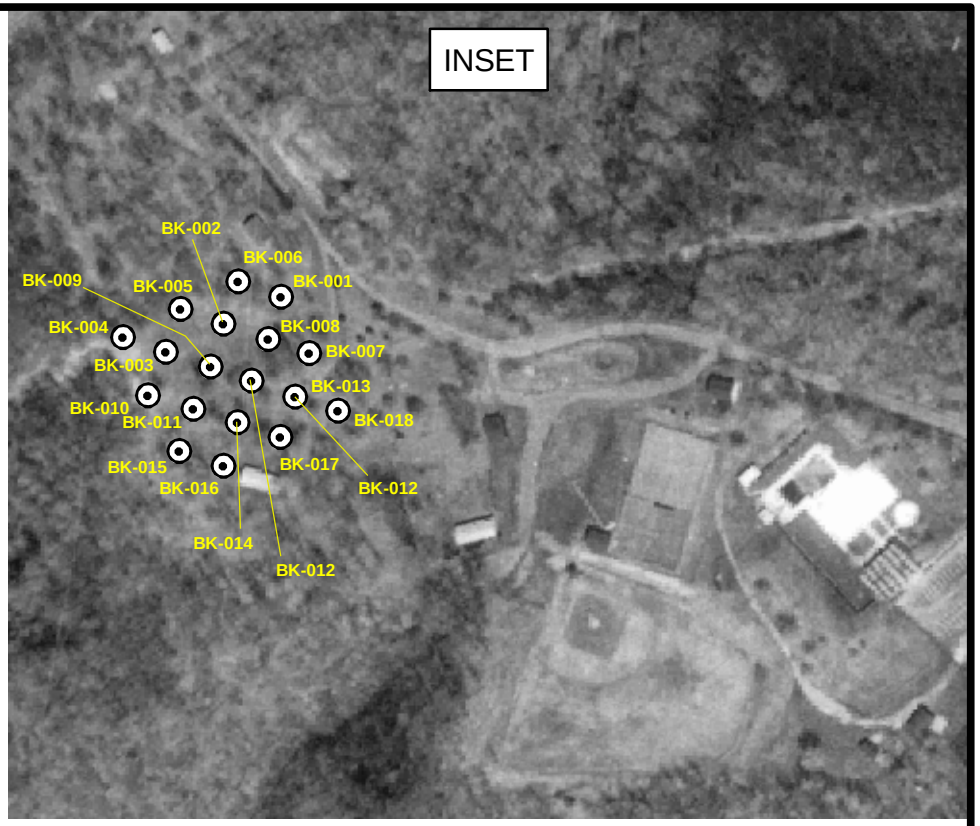
SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - DEEP BEDROCK HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-27

N:\11171431.00000\GIS\ArcMap\Waterlevels\WGC_060704_DB_AD.mxd Date: 07/28/04 3:32:51 PM

N:\11171431.00000\GIS\ArcMap\RI_Figures\backgroundlocations.mxd
05/20/04





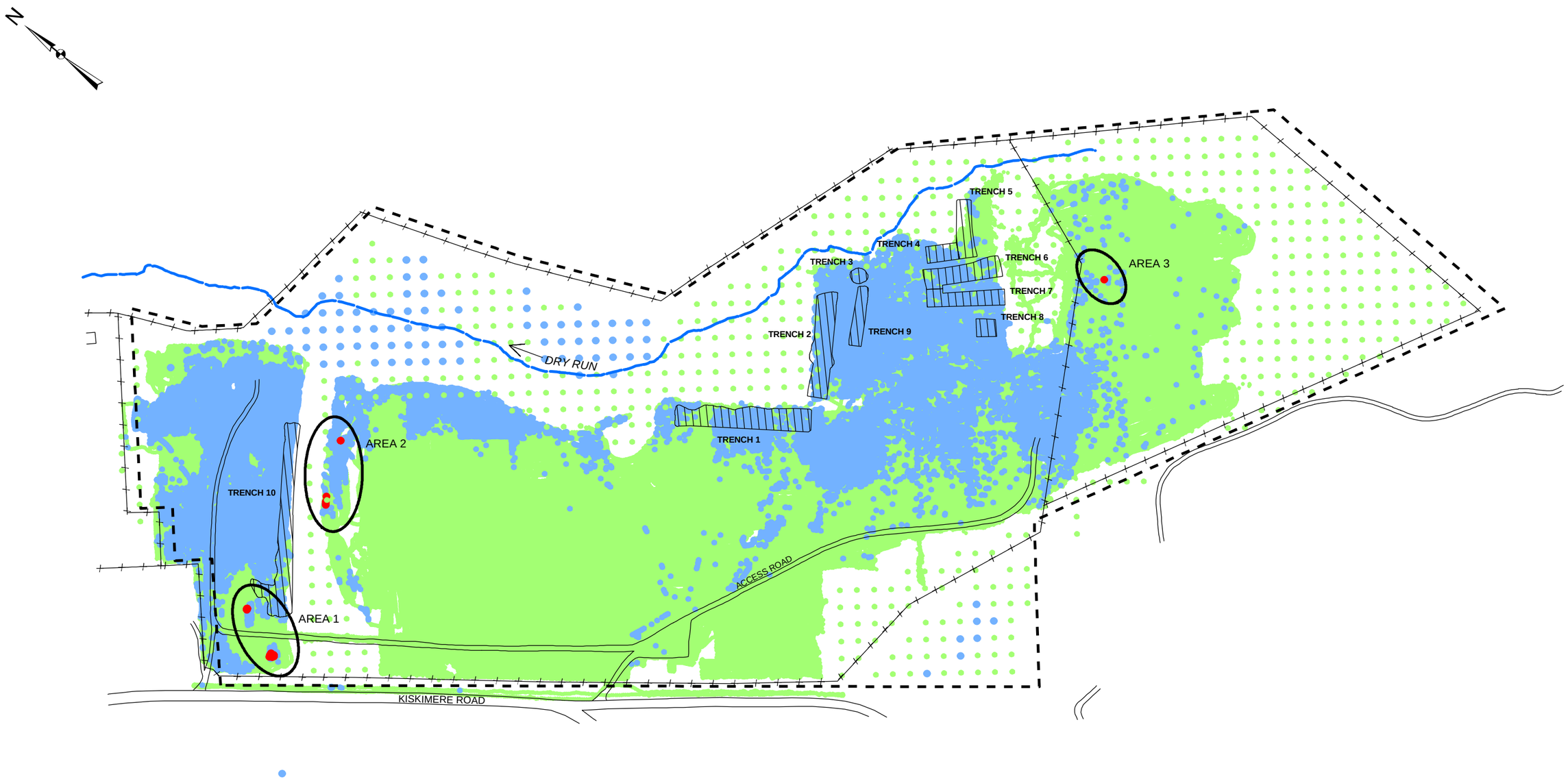
0 155 310 Feet

Legend

- Background Soil Sample Location
- Site Boundary

SHALLOW LAND DISPOSAL AREA
RI BACKGROUND SOIL SAMPLING LOCATIONS

FIGURE 3-1



Legend

- Gamma Result <= UTL
- Gamma Result > UTL and <= Twice the Mean
- Gamma Result > Twice the Mean
- Gamma Results in Forested Area
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Site Boundary

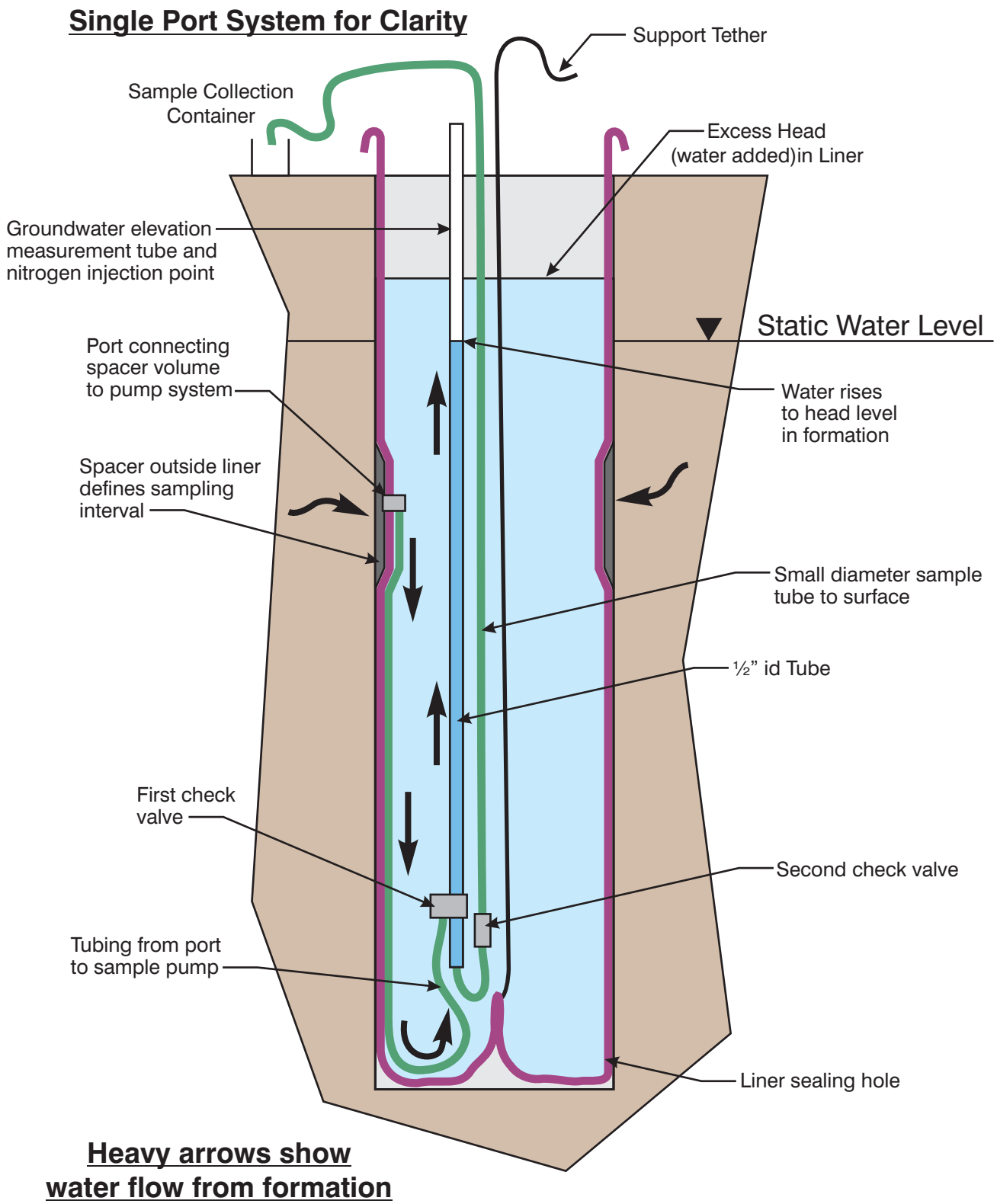
NOTE: The Gamma results in the forested areas were collected without GPS in 10x10 meter grids (i.e., from 100 to 400 points per grid). The maximum value from each grid was compared to background, resulting in only one point (maximum) shown on this drawing per forested grid.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RI GAMMA SURVEY RESULTS - FIDLER DATA

FIGURE 3-2

N:\11171431.00000\GIS\ArcMap\RI_Figures\FIDLER_RES.mxd Date: 05/11/04 10:33:27 AM



SOURCE: Flexible Underground Liner Technology Company Literature

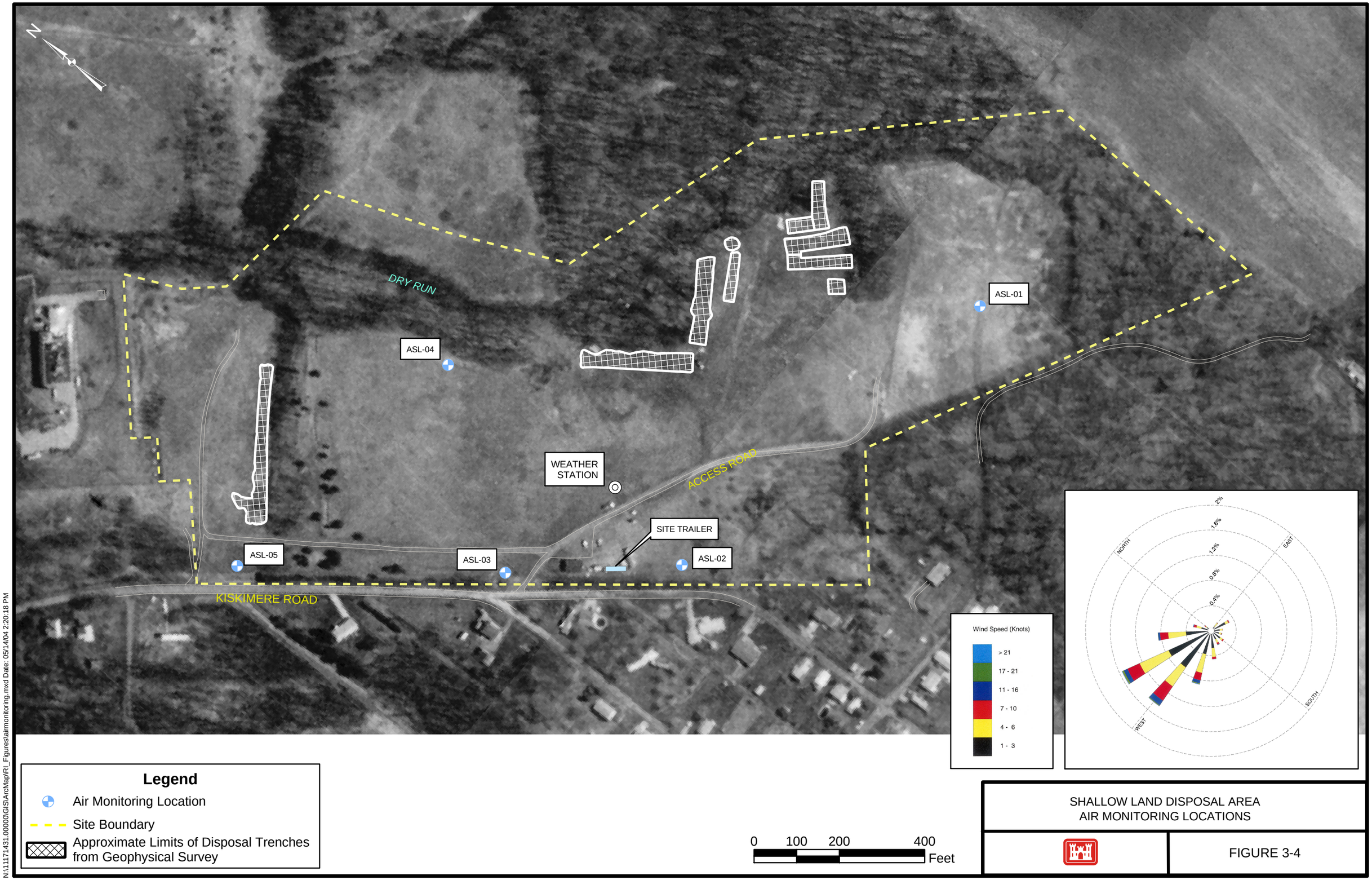
NOTE: Only one "spacer" and sample port shown for simplicity

United States Army Corps of Engineers

SINGLE PORT FLUTe SYSTEM

FIGURE 3-3

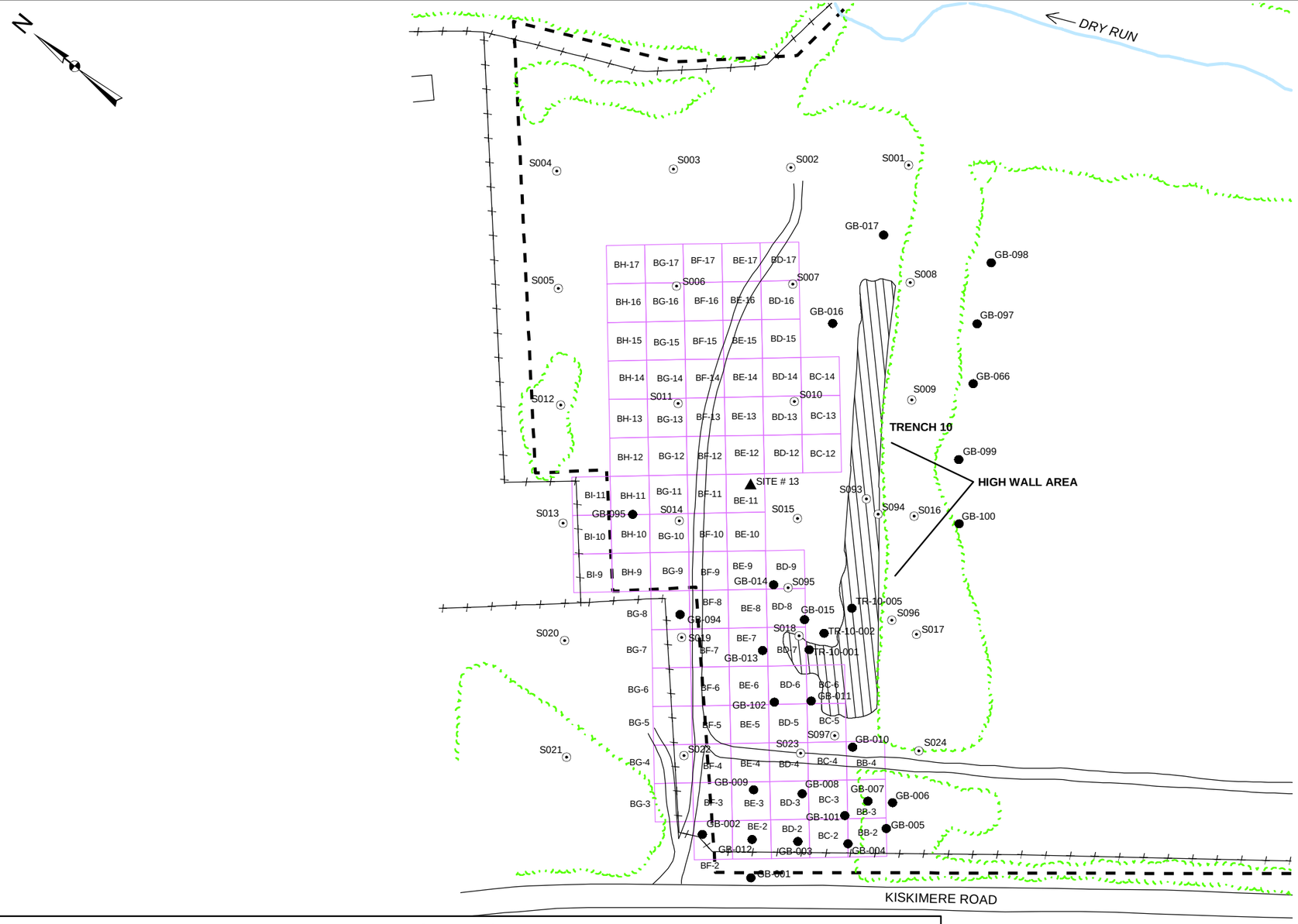
AG18570-111173429-051204-GCM



SHALLOW LAND DISPOSAL AREA
AIR MONITORING LOCATIONS

FIGURE 3-4

N:\11171431.00000\GIS\ArcMap\RI_Figures\airmonitoring.mxd Date: 05/14/04 2:20:18 PM



Legend

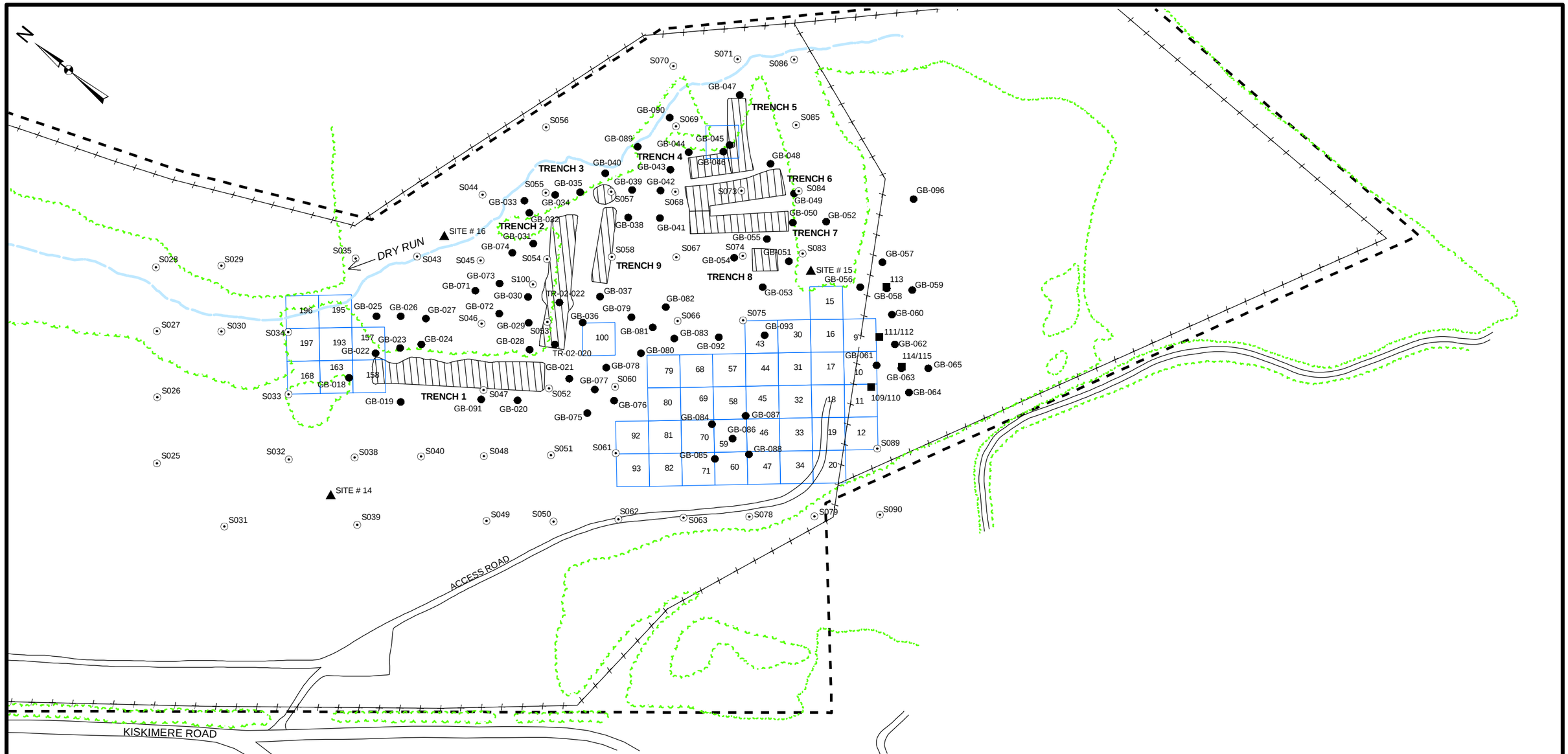
- Surface Soil Sample Location Collected During the USACE RI (September - December 2003)
- Surface Soil Sample Collected During the Oak Ridge Institute for Science and Education Investigation (2000)
- Surface Soil Sample Collected During the ARCO/BWXT Site Characterization (1990 - 1993)
- Surface Soil Sample Collected During the Oak Ridge Associated Universities Study (1981)
- Sample Grid Established During 1995 Investigation
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 50 100 200 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI SURFACE SOIL SAMPLING
LOCATIONS - TRENCH 10 AREA

FIGURE 4-1

N:\11171431.00000\GIS\ArcMap\RI_Figures\T10_surfacesoil.mxd Date: 04/28/04 4:42:54 PM



Legend

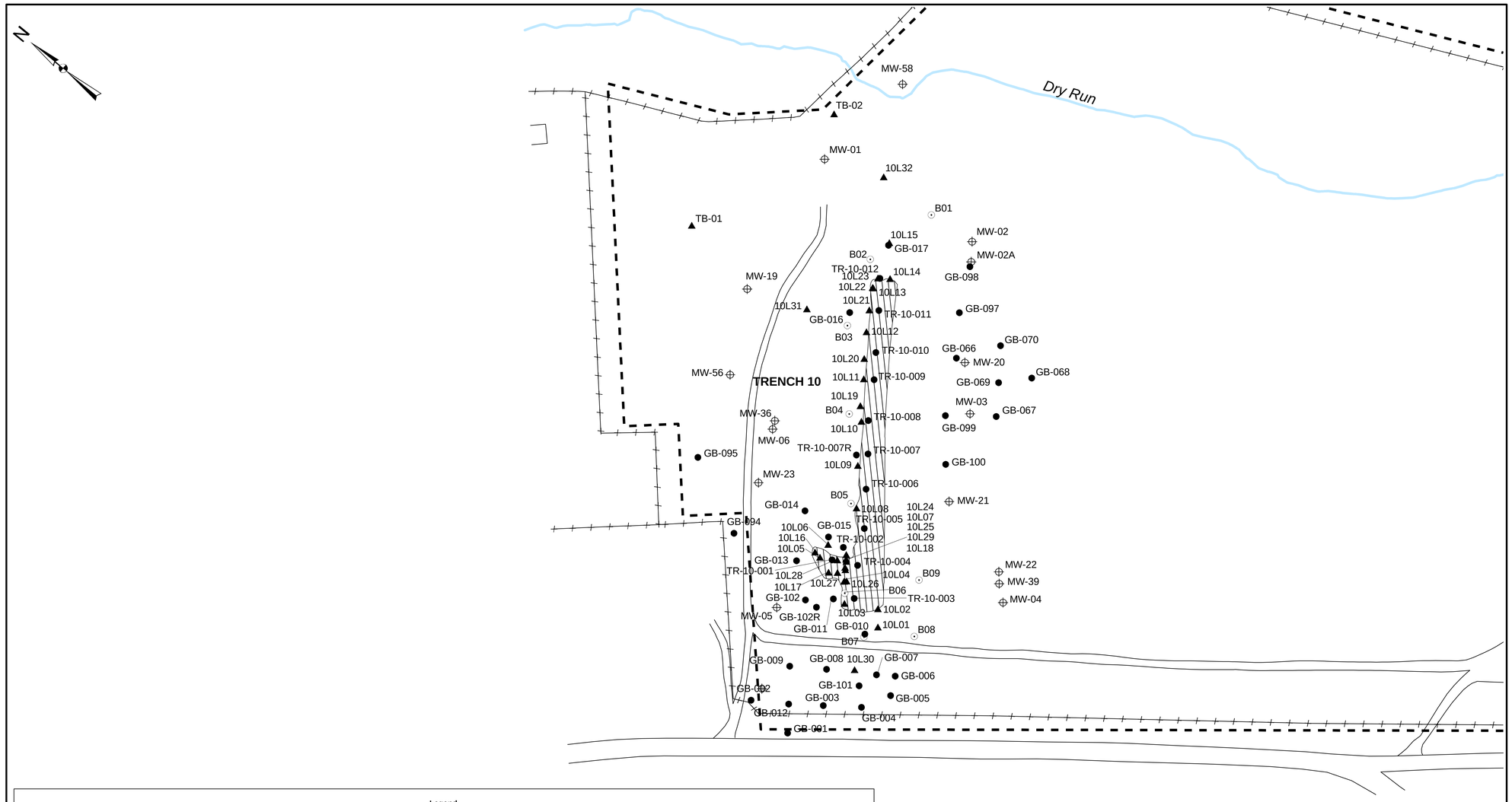
- Surface Soil Sample Location Collected During the USACE RI (September - December 2003)
- Surface Soil Sample Collected During the Oak Ridge Institute for Science and Education Investigation (2000)
- Surface Soil Sample Collected During the ARCO/BWXT Site Characterization (1990 - 1993)
- Surface Soil Sample Collected During the Oak Ridge Associated Universities Study (1981)
- Sample Grid Established During 1986 and 1989 Investigations. Surface Soils in These Areas Were Previously Remediated Through Excavation and Offsite Disposal
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 75 150 300 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI SURFACE SOIL SAMPLING
LOCATIONS - UPPER TRENCH AREA

FIGURE 4-2

N:\11171431.00000\GIS\ArcMap\RI_Figures\UT_surfacesoil.mxd Date: 04/30/04 10:48:45 AM



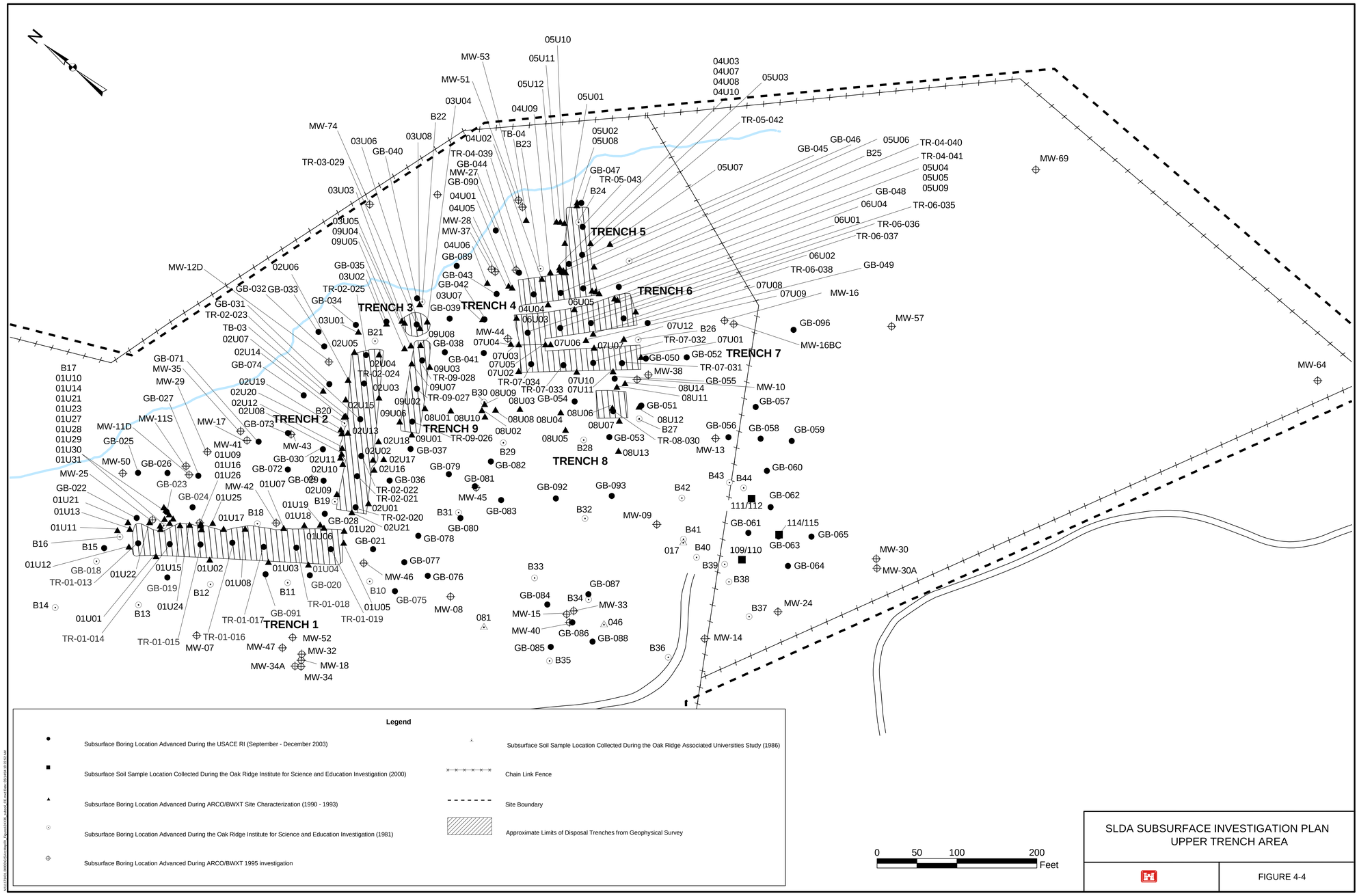
Legend

- Subsurface Boring Location Advanced During the USACE RI (September - December 2003)
- Subsurface Soil Sample Location Collected During the Oak Ridge Institute for Science and Education Investigation (2000)
- Subsurface Boring Location Advanced During ARCO/BWXT Site Characterization (1990 - 1993)
- Subsurface Boring Location Advanced During the Oak Ridge Institute for Science and Education Investigation (1981)
- Subsurface Boring Location Advanced During ARCO/BWXT 1995 investigation
- Subsurface Soil Sample Location Collected During the Oak Ridge Associated Universities Study (1986)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 50 100 200 Feet

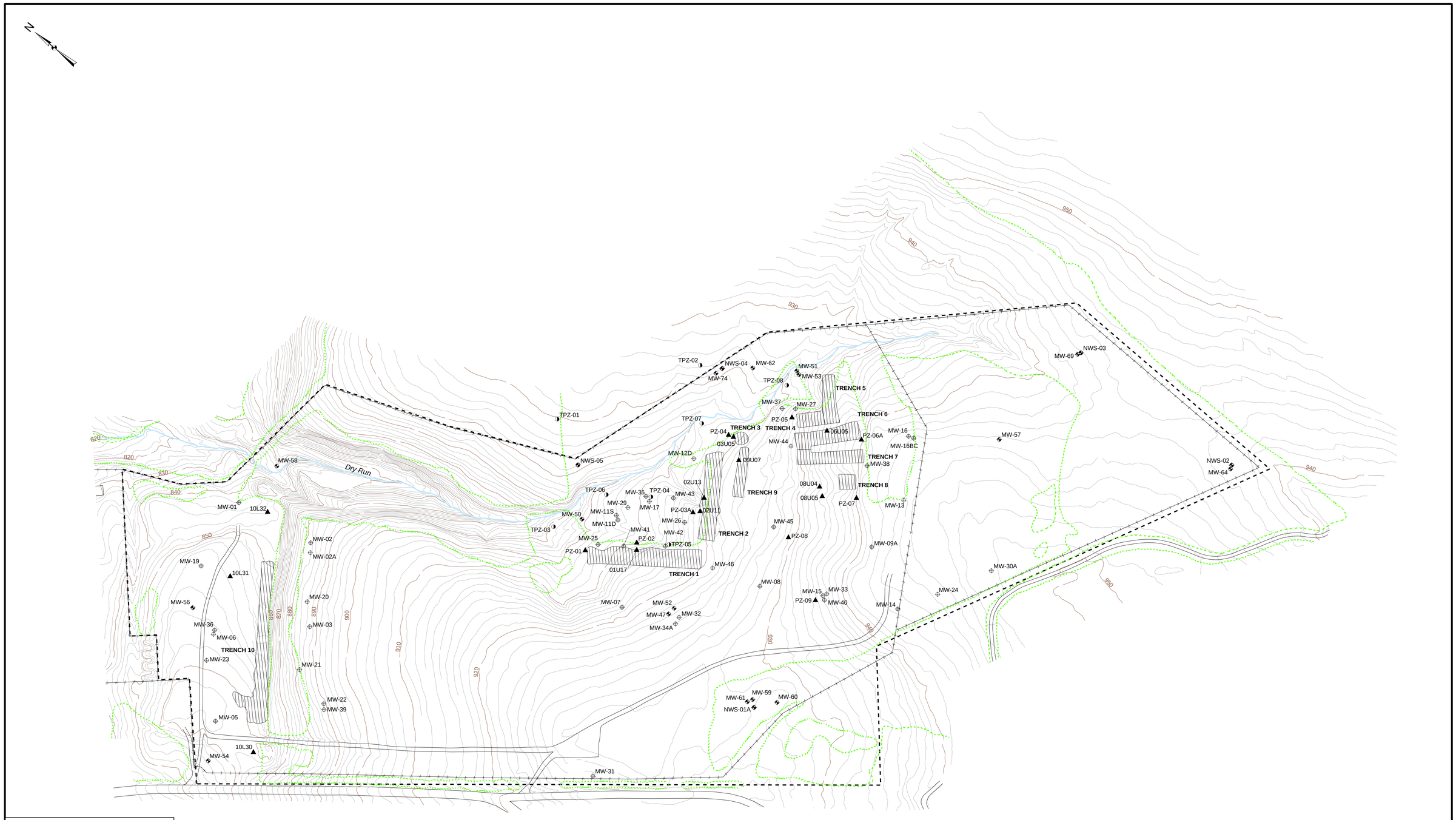
SLDA SUBSURFACE INVESTIGATION PLAN
TRENCH 10 AREA

FIGURE 4-3



SLDA SUBSURFACE INVESTIGATION PLAN
UPPER TRENCH AREA

FIGURE 4-4



Legend

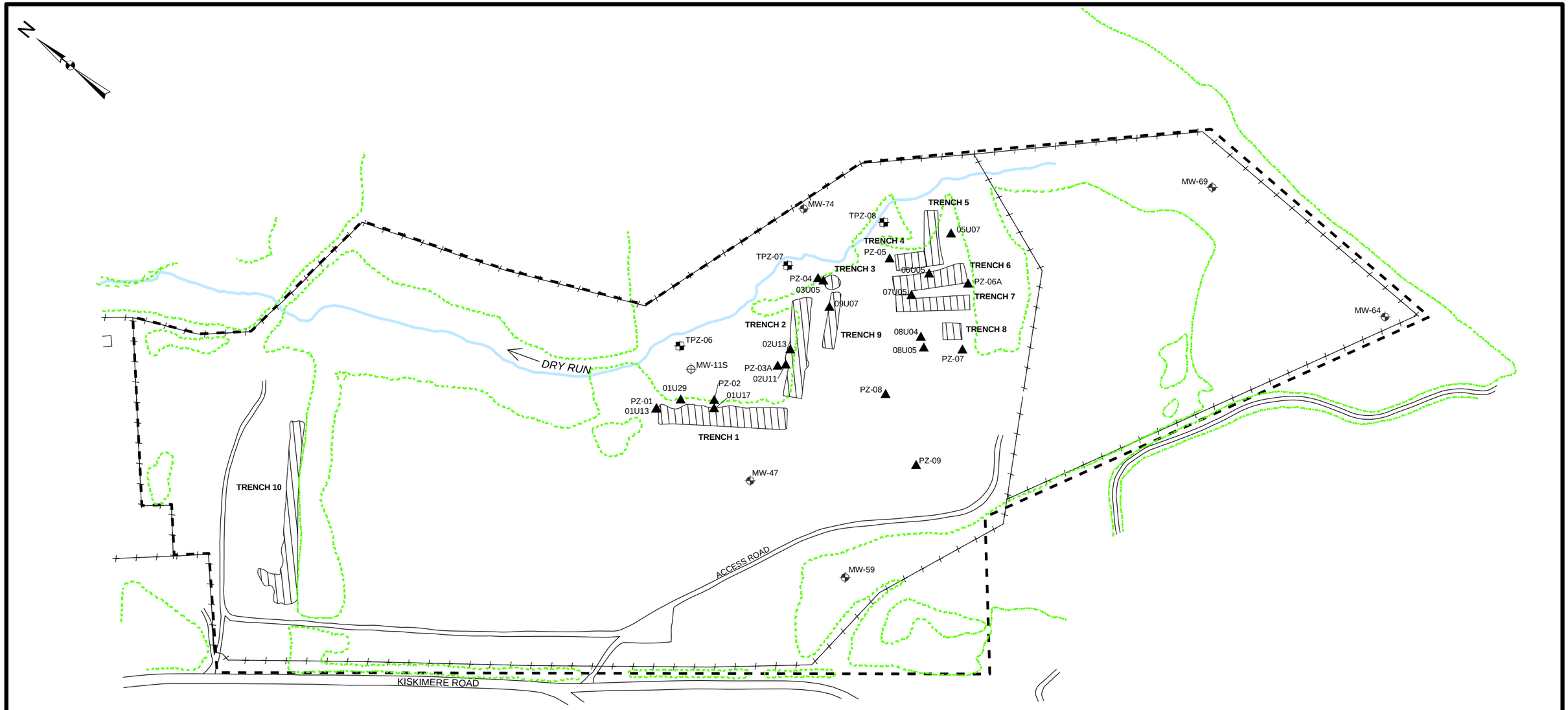
- RI Monitoring Well
- Historical Monitoring Well
- Piezometer
- Temporary Piezometer
- Site Boundary
- Chain Link Fence
- Vegetation Line (Typ.)
- Approximate Limits of Disposal Trenches from Geophysical Survey

Note:
Refer to Table 4-26 for list of monitoring wells sampled during the RI in December 2003 and June 2004.

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI MONITORING WELL, FLUTe AND PIEZOMETER LOCATIONS

FIGURE 4-5

LRS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\24X36_wellocations3.mxd Date: 7/28/2004 2:24:27 PM Name: Eith, C



Legend

- RI Monitoring Well Location
- Historical Monitoring Well Location
- Piezometer Location
- Temporary Piezometer Location
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

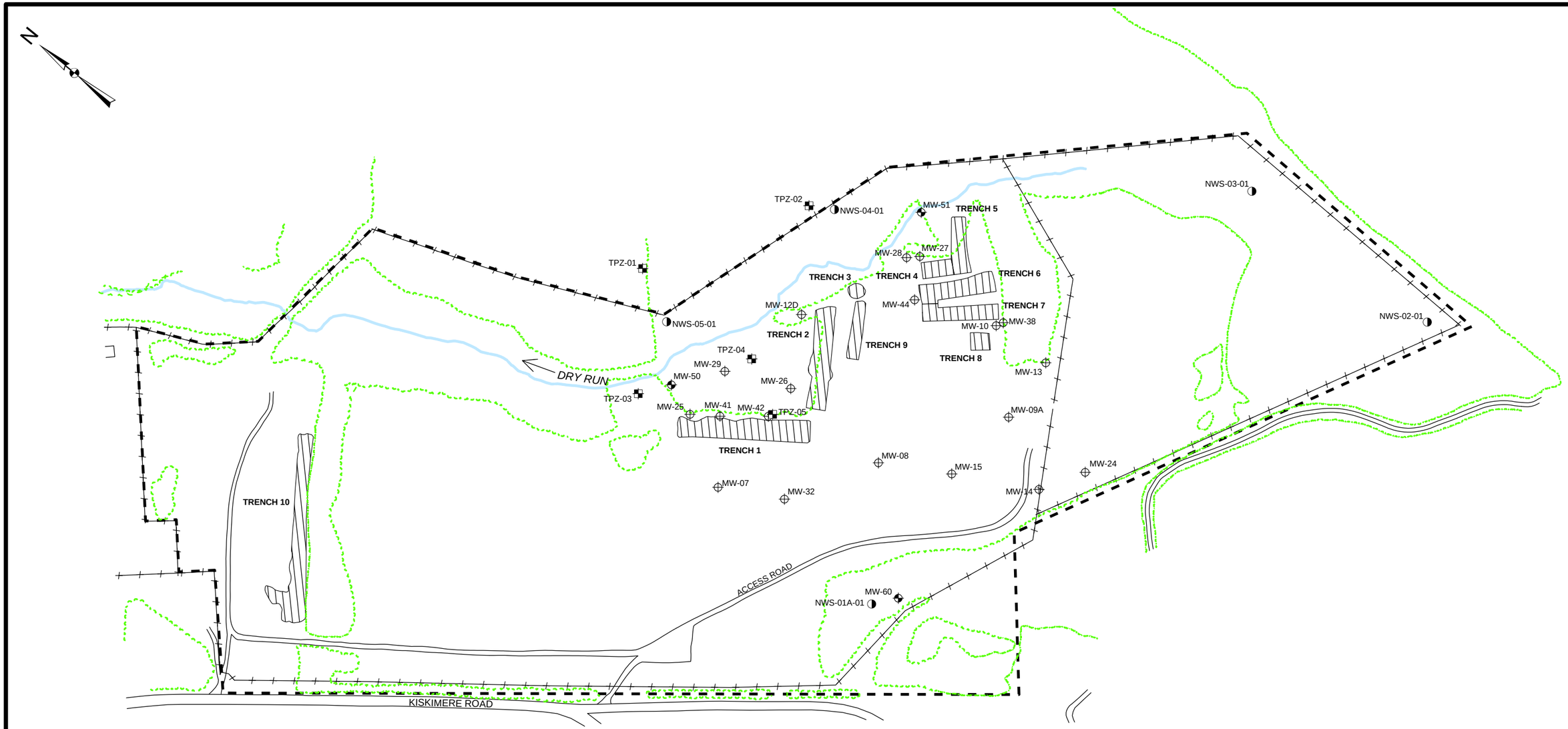
Note:
Refer to Table 4-26 for list of monitoring wells sampled during the RI in December 2003 and June 2004.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI MONITORING WELL
AND PIEZOMETER LOCATIONS - SUBSOIL ZONE

FIGURE 4-6

N:\11171431.00000\GIS\ArcMap\RI_Figures\well_ss.mxd Date: 05/03/04 3:57:23 PM



Legend

- RI Monitoring Well Location
- Historical Monitoring Well Location
- Flexible Liner Underground Technology (FLUTe) Monitoring Location
- Temporary Piezometer Location
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

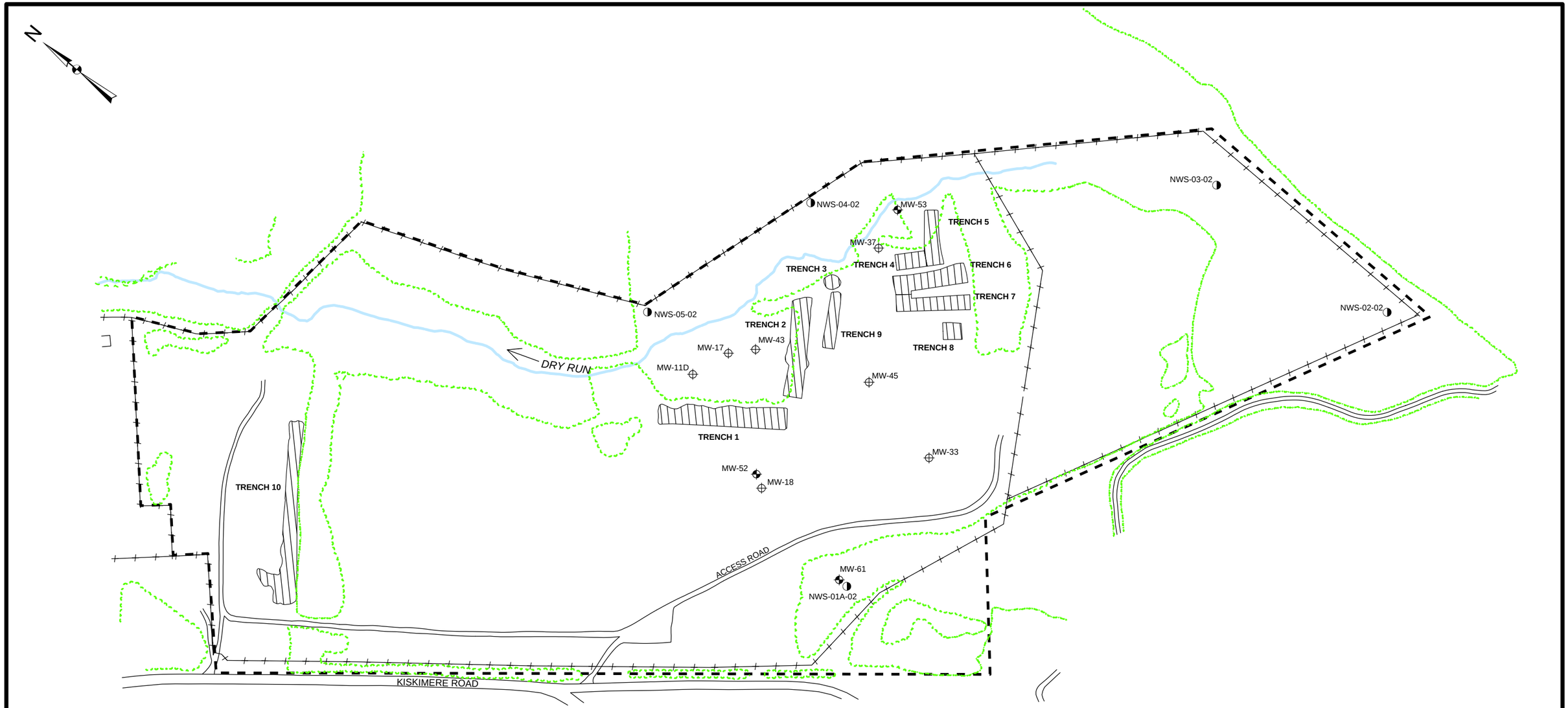
Note:
Refer to Table 4-26 for list of monitoring wells sampled during the RI in December 2003 and June 2004.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI MONITORING WELL, FLUTe AND
PIEZOMETER LOCATIONS - FIRST SHALLOW BEDROCK ZONE

FIGURE 4-7

N:\11171431.00000\GIS\ArcMap\RI_Figures\well_1s.mxd Date: 05/03/04 4:42:33 PM



Legend

- RI Monitoring Well Location
- Historical Monitoring Well Location
- Flexible Liner Underground Technology (FLUTe) Monitoring Location
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

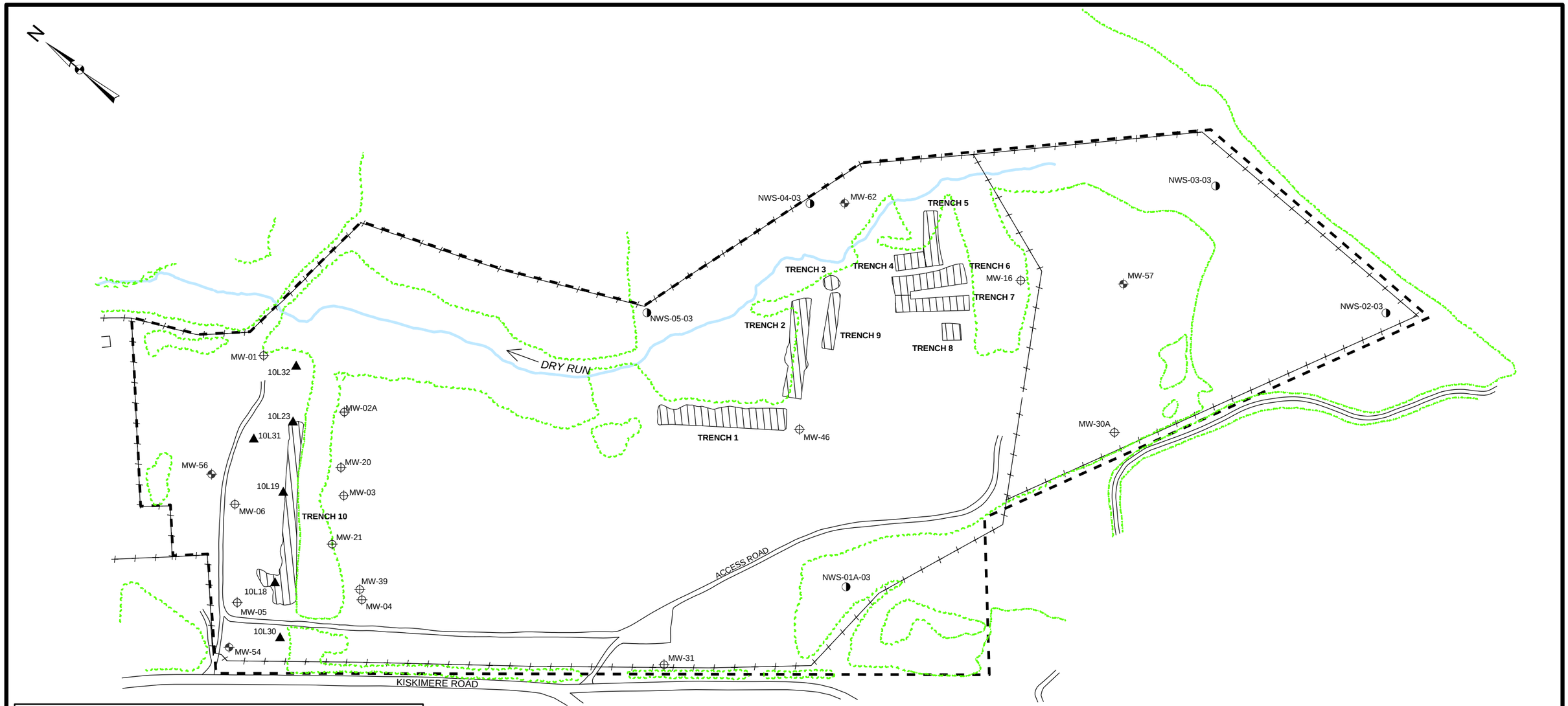
Note:
Refer to Table 4-26 for list of monitoring wells sampled during the RI in December 2003 and June 2004.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI MONITORING WELL AND FLUTe
LOCATIONS - SECOND SHALLOW BEDROCK ZONE

FIGURE 4-8

N:\11171431.00000\GIS\ArcMap\RI_Figures\well_2s.mxd Date: 05/03/04 4:02:40 PM



Legend

- RI Monitoring Well Location
- Historical Monitoring Well Location
- Flexible Liner Underground Technology (FLUTe) Monitoring Location
- Piezometer Location
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

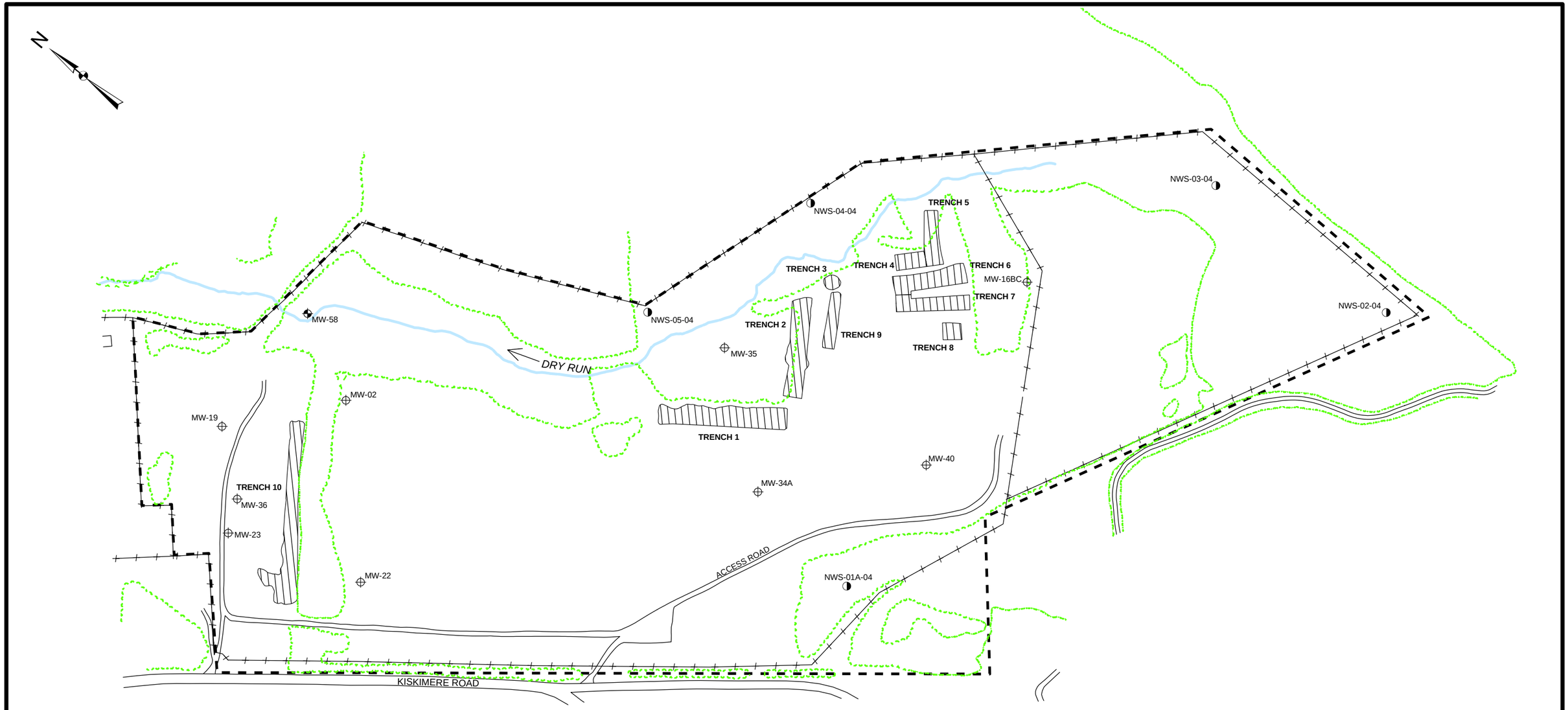
Note:
Refer to Table 4-26 for list of monitoring wells sampled during the RI in December 2003 and June 2004.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI MONITORING WELL, FLUTe
AND PIEZOMETER LOCATIONS - UPPER FREEPORT ZONE

FIGURE 4-9

N:\11171431.00000\GIS\ArcMap\RI_Figures\well_uf.mxd Date: 05/03/04 3:40:15 PM



Legend

- RI Monitoring Well Location
- Historical Monitoring Well Location
- Flexible Liner Underground Technology (FLUTe) Monitoring Location
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

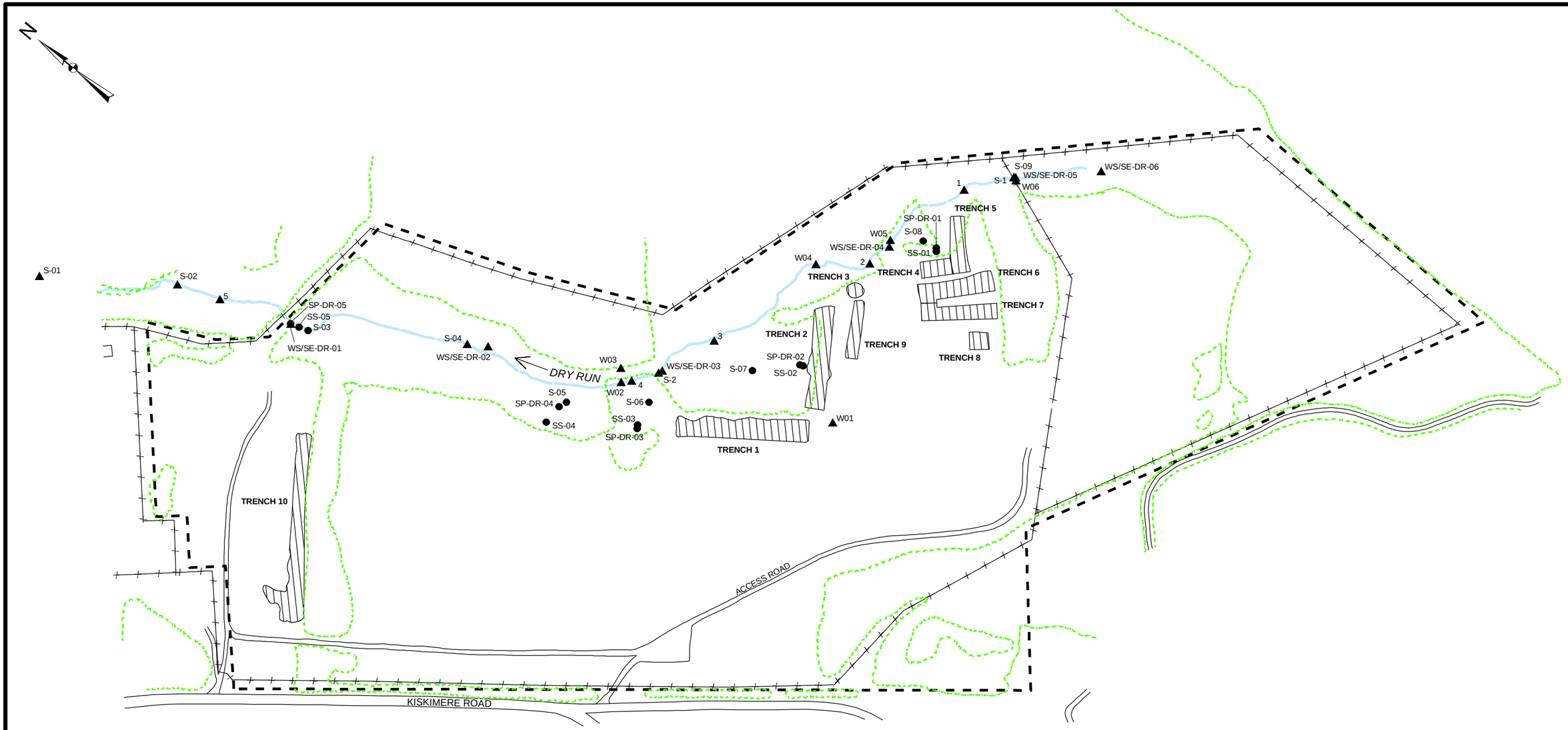
Note:
Refer to Table 4-26 for list of monitoring wells sampled during the RI om December 2003 and June 2004.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI MONITORING WELL
AND FLUTe LOCATIONS - DEEP BEDROCK ZONE

FIGURE 4-10

N:\11171431.00000\GIS\ArcMap\RI_Figures\well_db.mxd Date: 05/03/04 3:45:01 PM



Legend

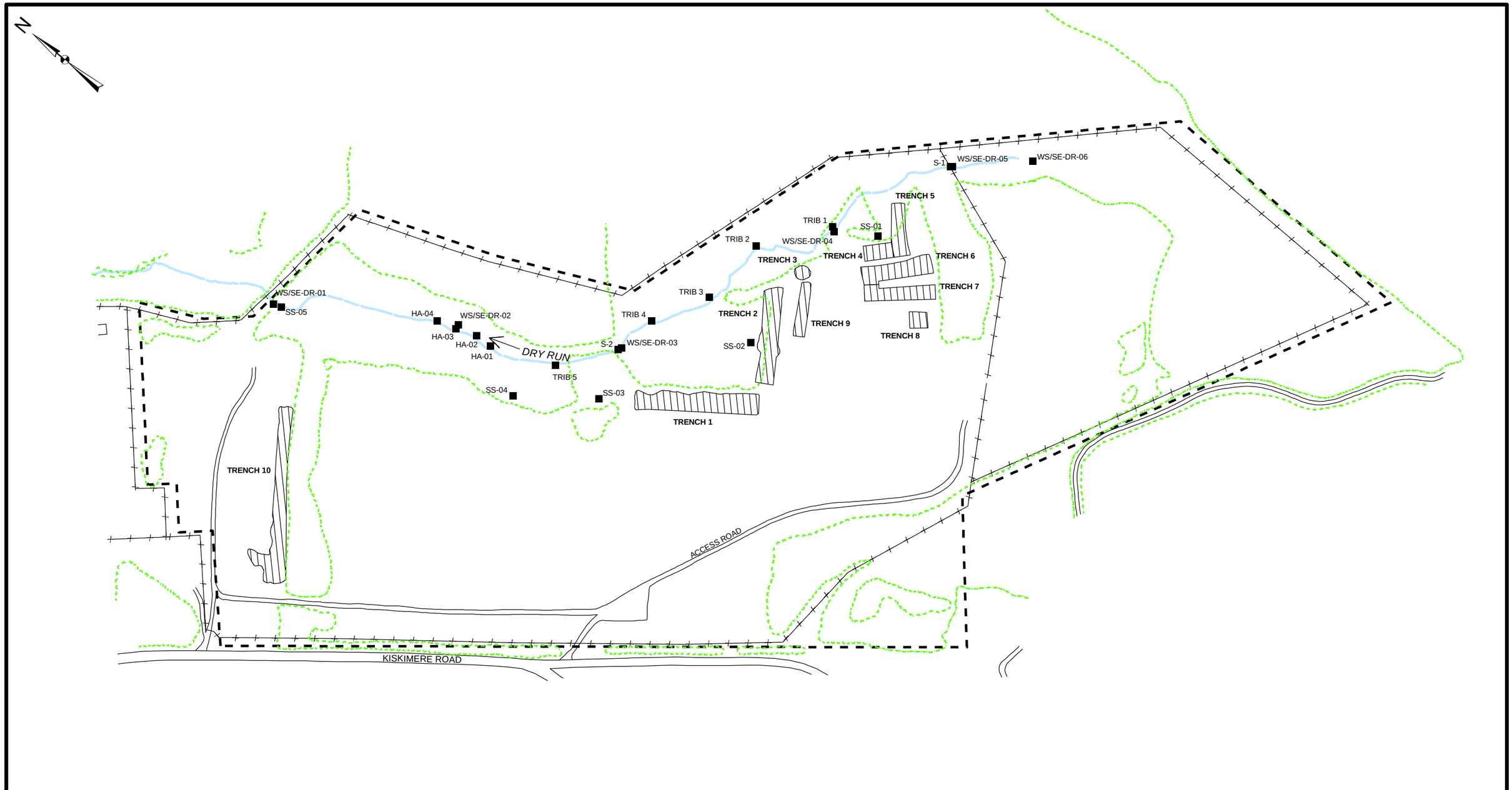
- ▲ Surface Water Sample Location
- ● Groundwater Seep Sample Location
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI SURFACE WATER/SEEP
SAMPLING LOCATIONS

FIGURE 4-11

N:\11171431.00000\GIS\ArcMap\RI_Figures\surfwater.mxd Date: 05/03/04 11:34:05 AM



Legend

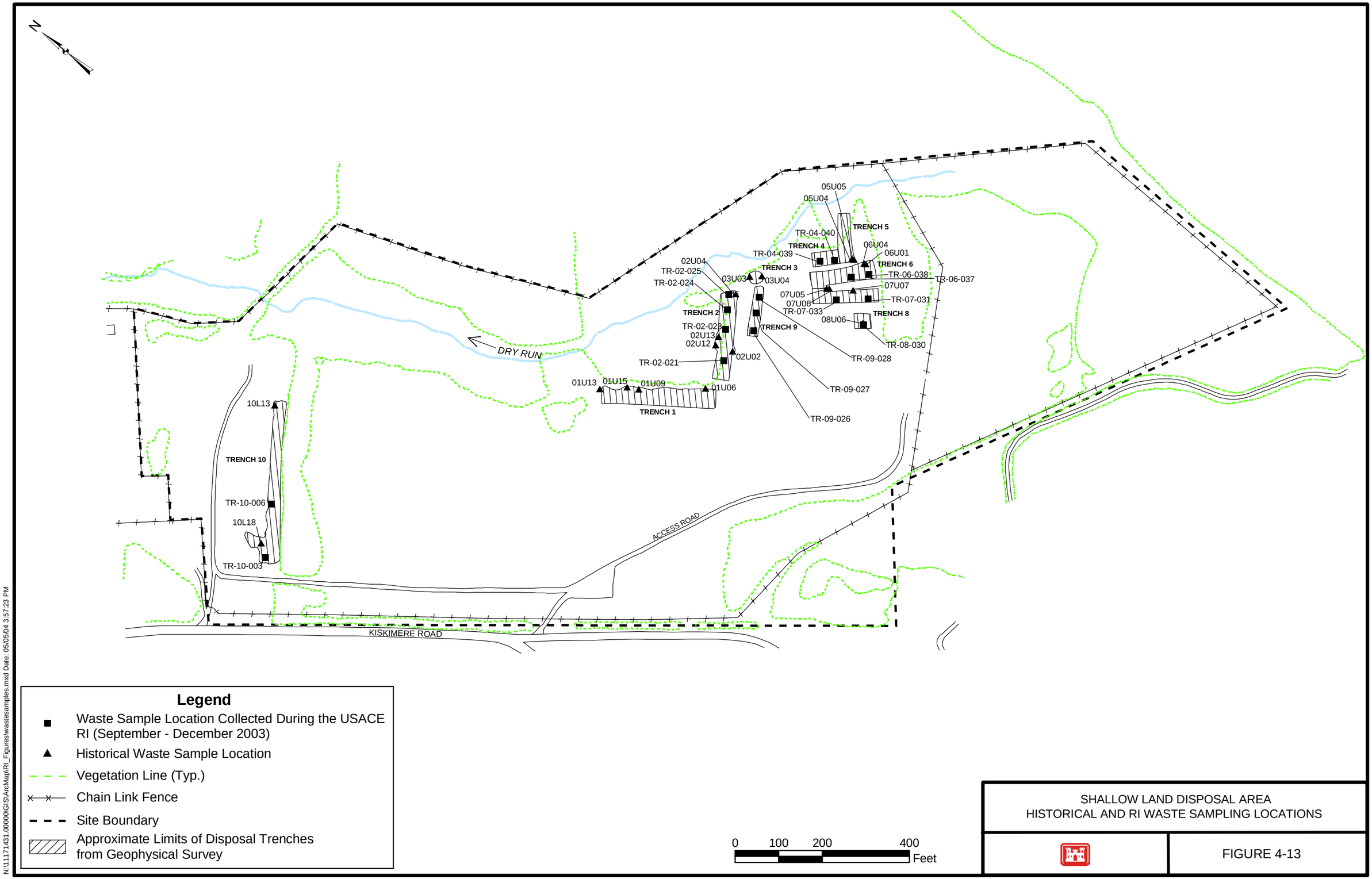
- Sediment Sample Location
- Vegetation Line (Typ.)
- Chain Link Fence
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI SEDIMENT SAMPLING LOCATIONS

FIGURE 4-12

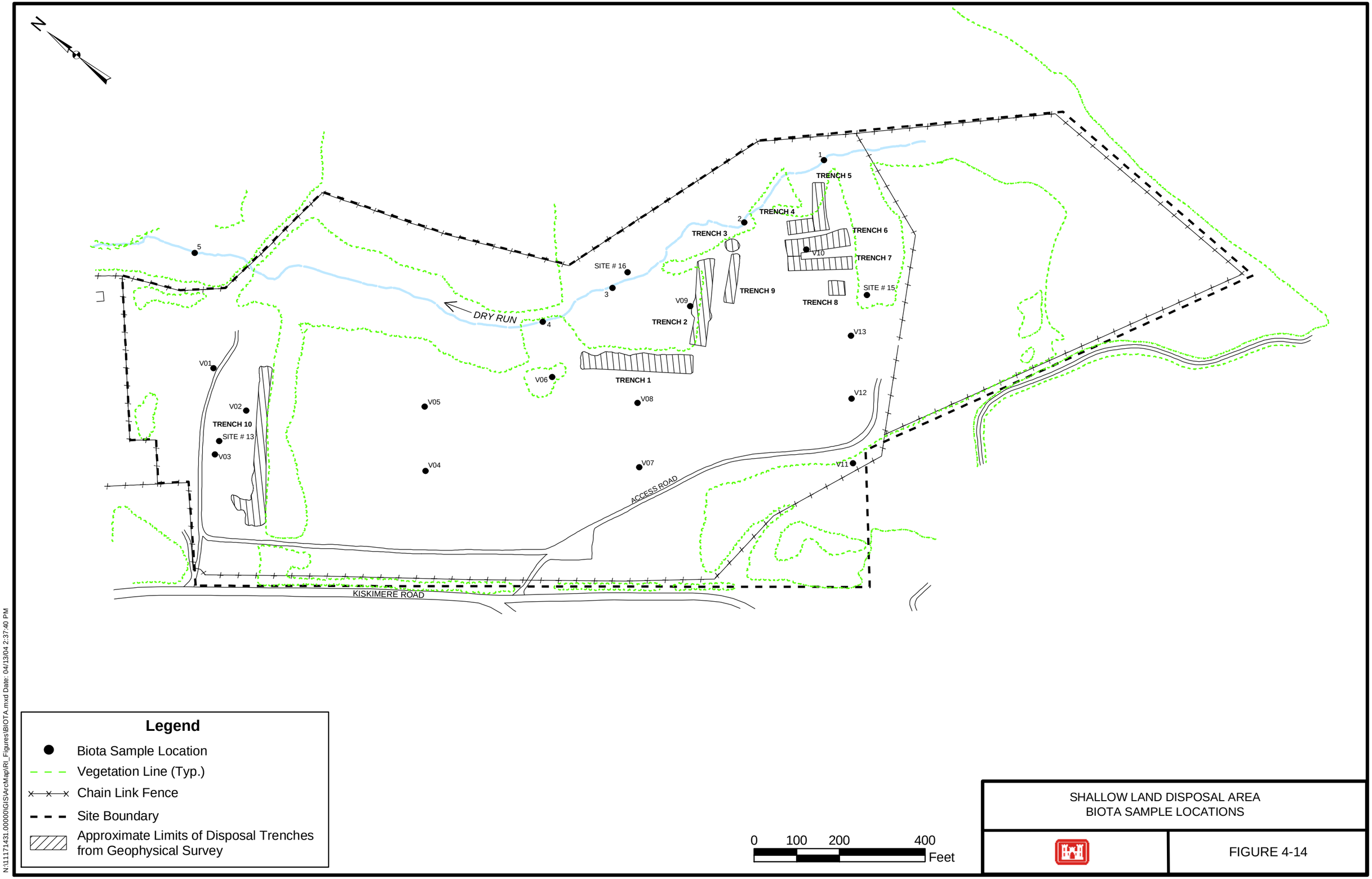
N:\11171431.00000\GIS\ArcMap\RI_Figures\SEDIMENT.mxd Date: 05/03/04 11:54:28 AM



SHALLOW LAND DISPOSAL AREA
HISTORICAL AND RI WASTE SAMPLING LOCATIONS

FIGURE 4-13

N:\11171431.00000\GIS\ArcMap\RI_Figures\wastesamples.mxd Date: 05/05/04 3:57:23 PM


N
DRY RUN
TRENCH 1
TRENCH 2
TRENCH 3
TRENCH 4
TRENCH 5
TRENCH 6
TRENCH 7
TRENCH 8
TRENCH 9
TRENCH 10
SITE # 13
SITE # 15
SITE # 16
ACCESS ROAD
KISKIMERE ROAD
1
2
3
4
5
V01
V02
V03
V04
V05
V06
V07
V08
V09
V10
V11
V12
V13
Legend
Biota Sample Location
Vegetation Line (Typ.)
Chain Link Fence
Site Boundary
Approximate Limits of Disposal Trenches from Geophysical Survey
0
100
200
400
Feet
SHALLOW LAND DISPOSAL AREA
BIOTA SAMPLE LOCATIONS
FIGURE 4-14
N:\11171431.00000\GIS\ArcMap\RI_Figures\BIOTA.mxd Date: 04/13/04 2:37:40 PM

Legend

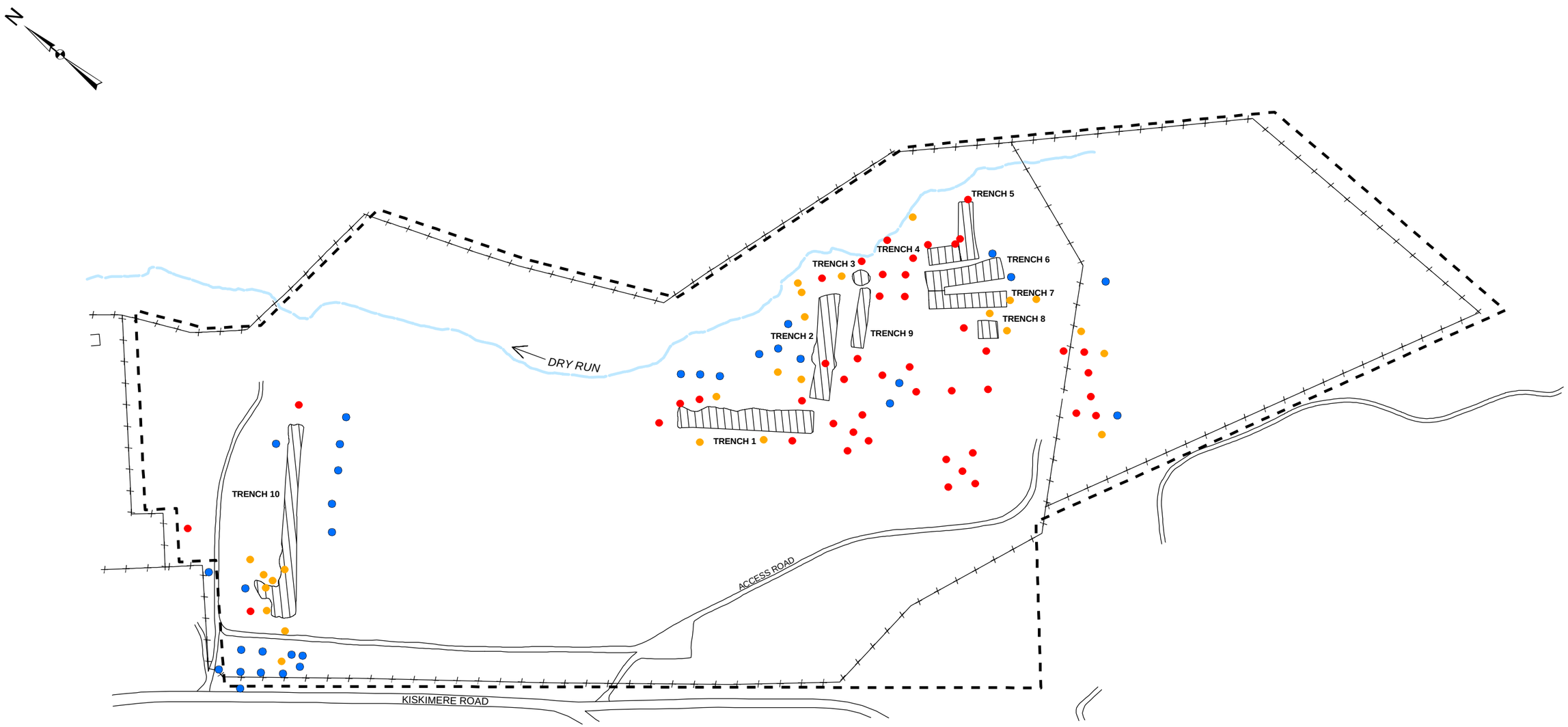
- Surface Water/Sediment Sample Location
- Mine Outfall Sample Location
- Site Boundary

0 300 600 1,200 Feet

SHALLOW LAND DISPOSAL AREA
SURFACE WATER, SEDIMENT, AND MINE OUTFALL SAMPLE LOCATIONS FROM CARNAHAN RUN

FIGURE 4-15

N:\11171431.00000\GIS\ArcMap\RI_Figures\carnahanrun.mxd Date: 05/14/04 10:22:44 AM



Legend

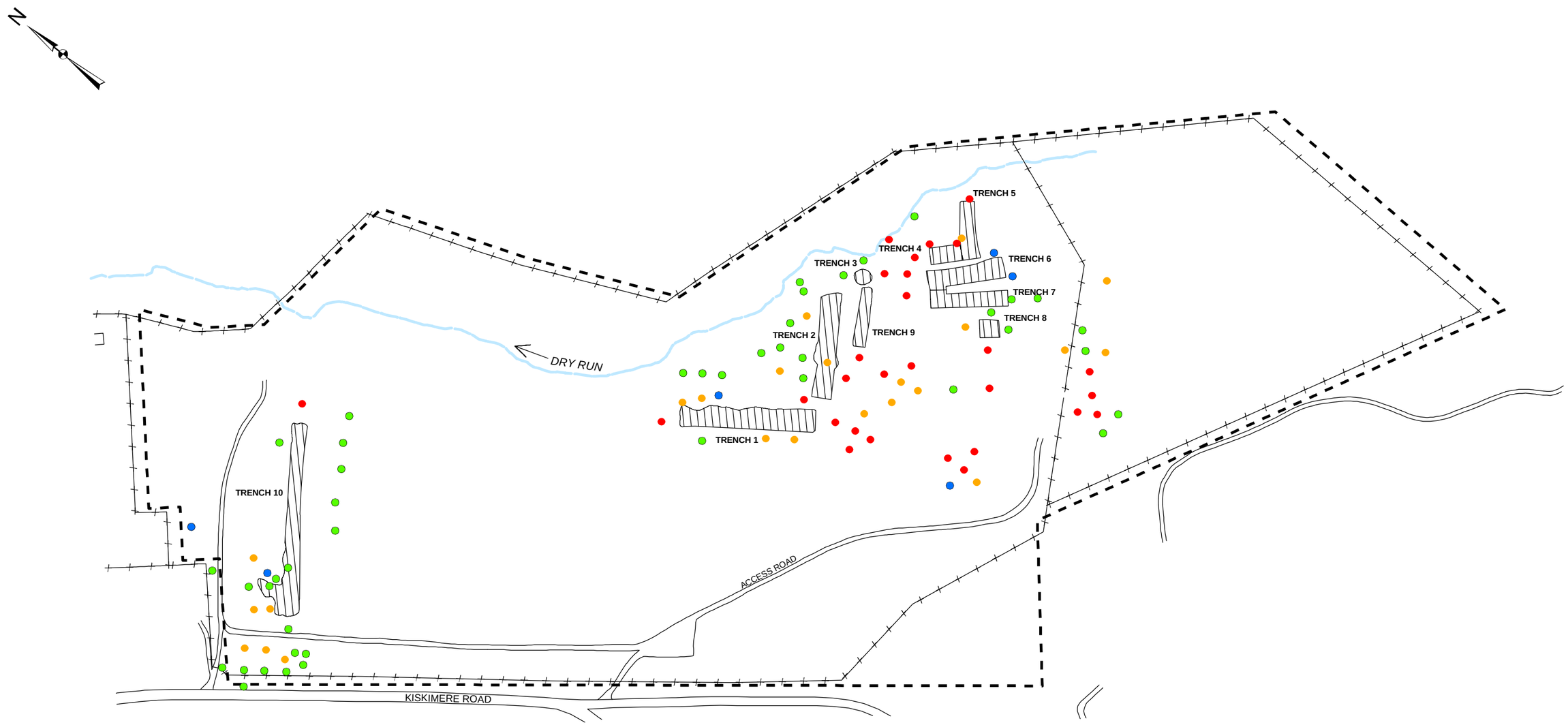
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.32 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.32 - 2.64 pCi/g)
- Radionuclide Detected Above Twice Background (>2.64 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 234 IN SURFACE SOILS

FIGURE 4-16

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_U234_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

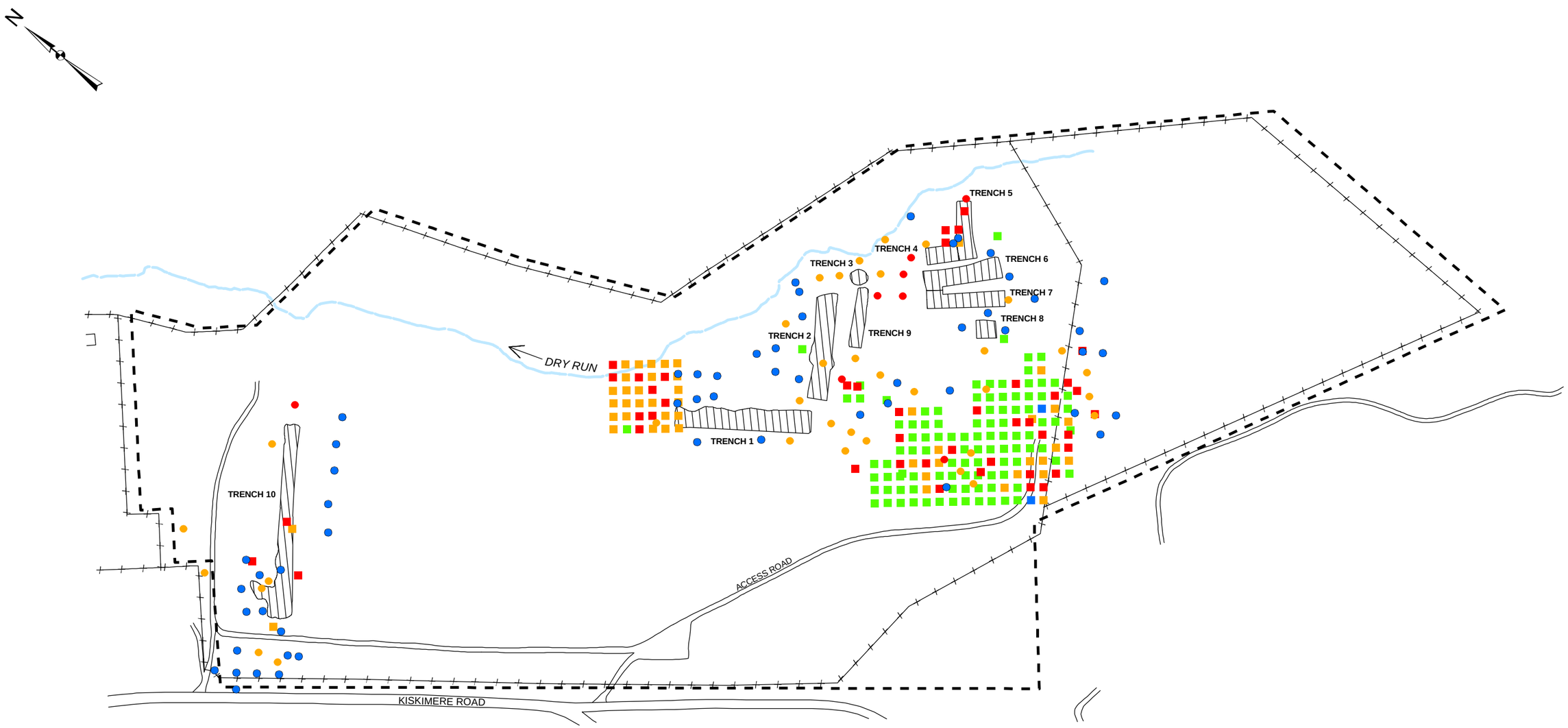
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (0.19 pCi/g)
- Radionuclide Detected Between Background and Twice Background (0.19 - 0.38 pCi/g)
- Radionuclide Detected Above Twice Background (>0.38 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 235 (ALPHA) IN SURFACE SOILS

FIGURE 4-17

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_U235a_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

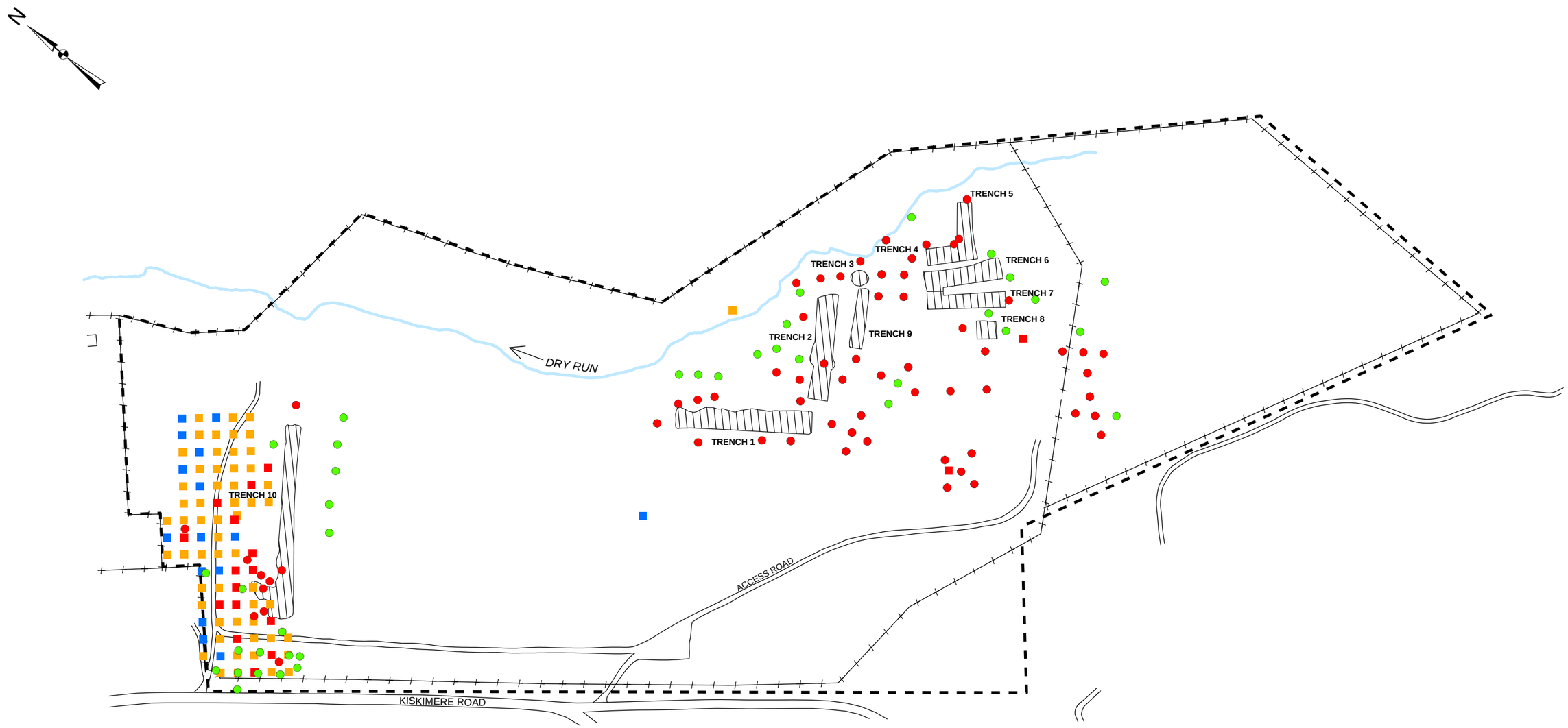
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.25 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.25 - 2.5 pCi/g)
- Radionuclide Detected Above Twice Background (>2.5 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 238 IN SURFACE SOILS

FIGURE 4-18

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_U238_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

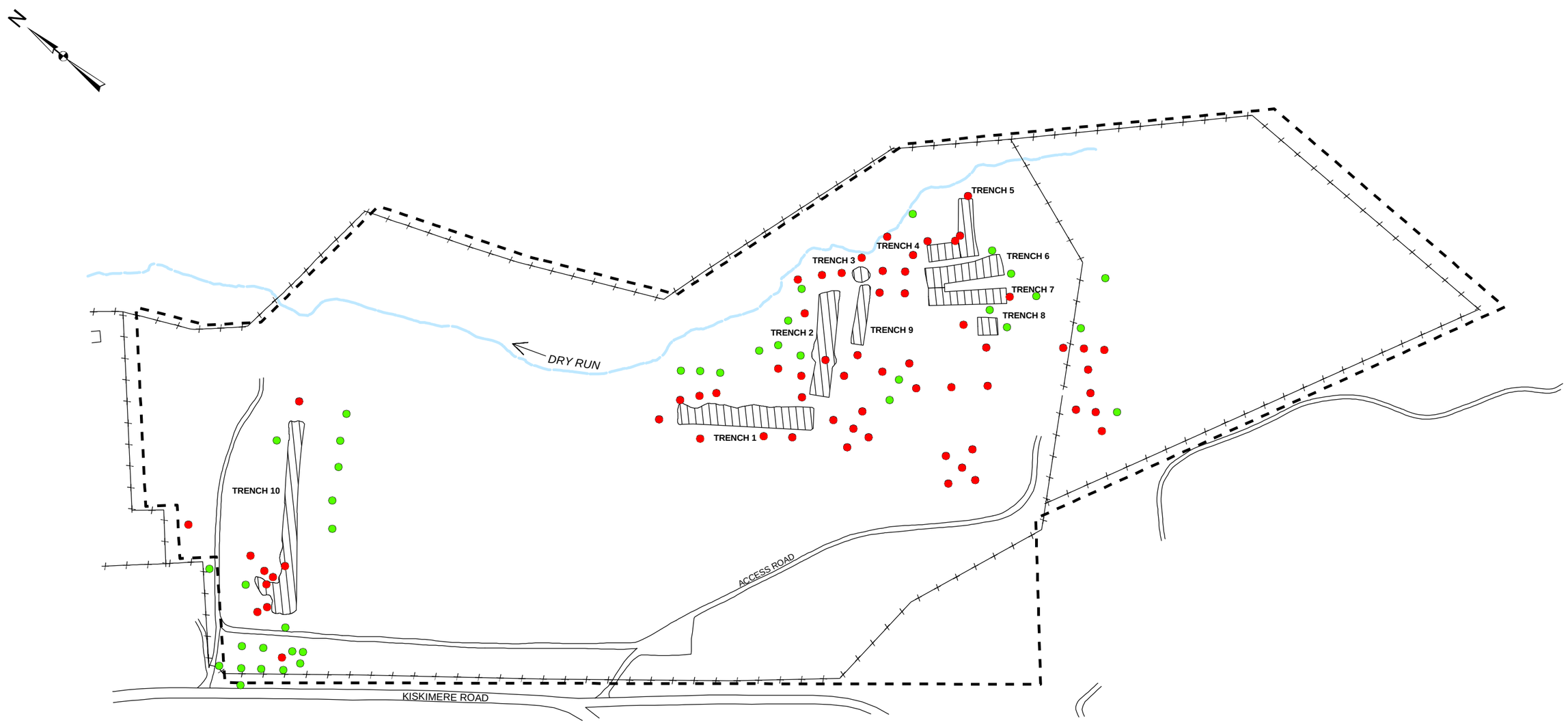
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.760 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.760 - 5.520 pCi/g)
- Radionuclide Detected Above Twice Background (>5.520 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL URANIUM AND TOTAL ISOTOPIC URANIUM IN SURFACE SOILS

FIGURE 4-19

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_Utot_JC.mxd Date: 05/19/04 11:36:45 AM



Legend

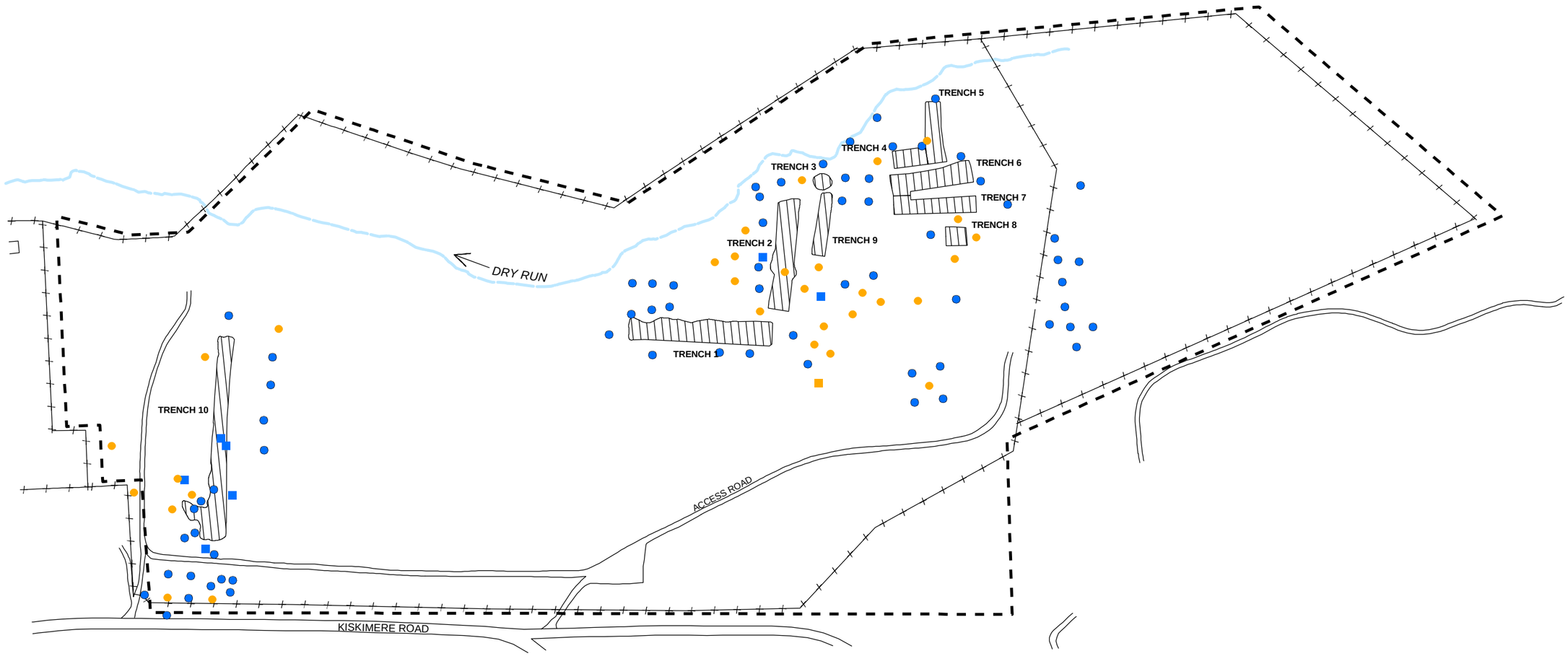
- RI Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.76 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.76 - 5.52 pCi/g)
- Radionuclide Detected Above Twice Background (>5.52 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL ISOTOPIC URANIUM IN SURFACE SOILS

FIGURE 4-20

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_ISOUtot_CE.mxd Date: 7/28/2004 10:35:04 AM Name: Eich_C



Legend

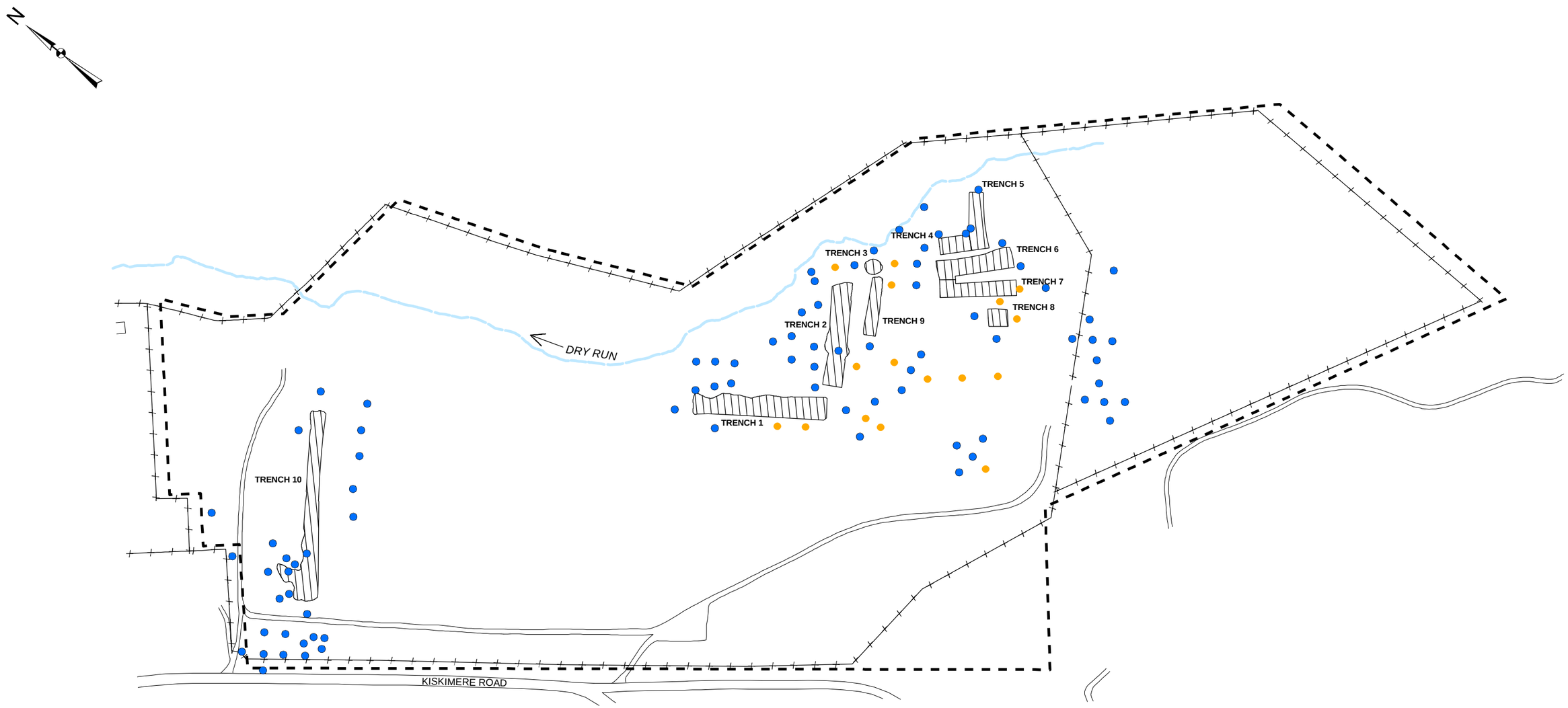
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.31 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.31 - 2.62 pCi/g)
- Radionuclide Detected Above Twice Background (>2.62 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
THORIUM 232 IN SURFACE SOILS

FIGURE 4-21

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_TH232_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

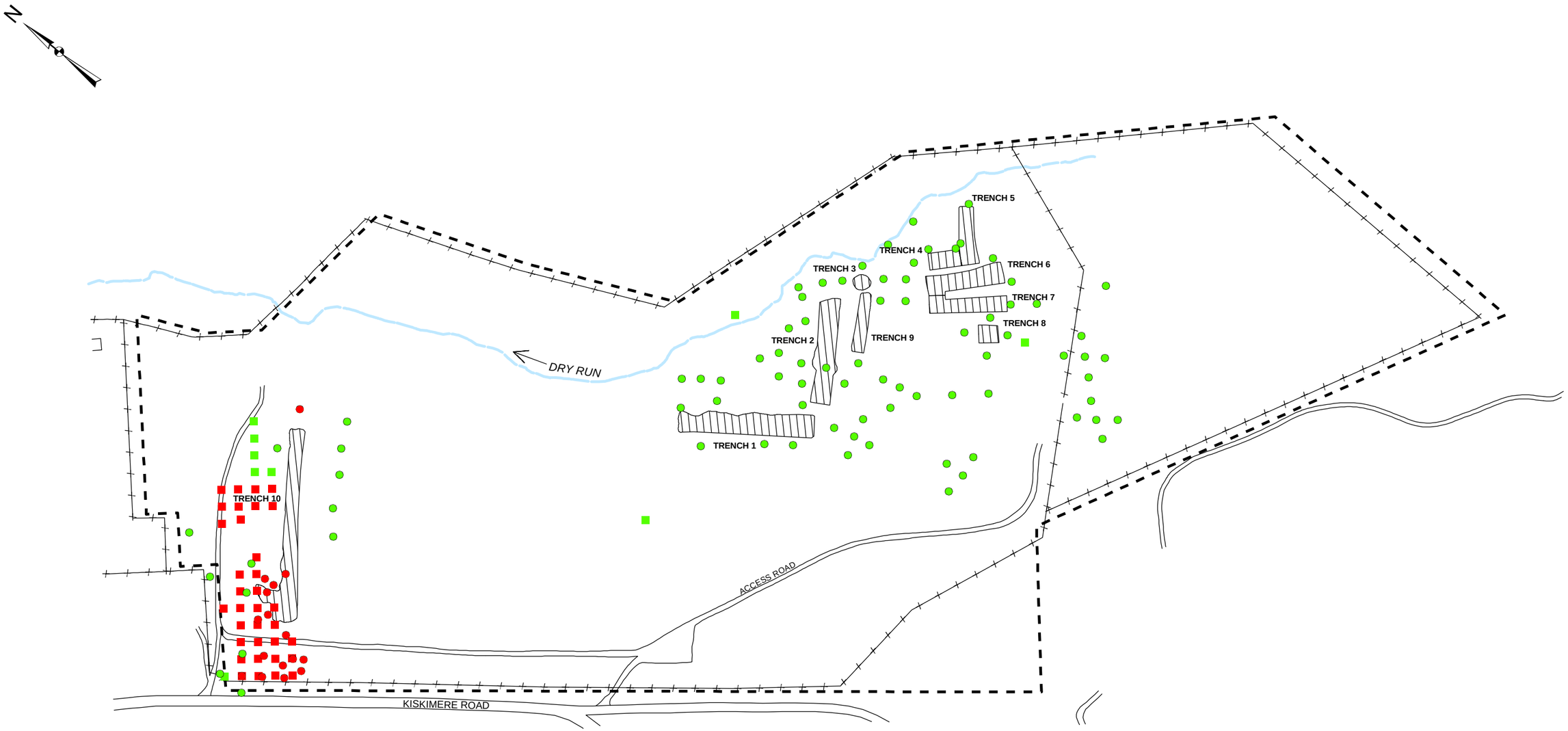
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.415 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.415 - 2.83 pCi/g)
- Radionuclide Detected Above Twice Background (>2.83 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RADIUM 228 IN SURFACE SOILS

FIGURE 4-22

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_RD228_CE.mxd Date: 05/19/04 11:53:18 AM



Legend

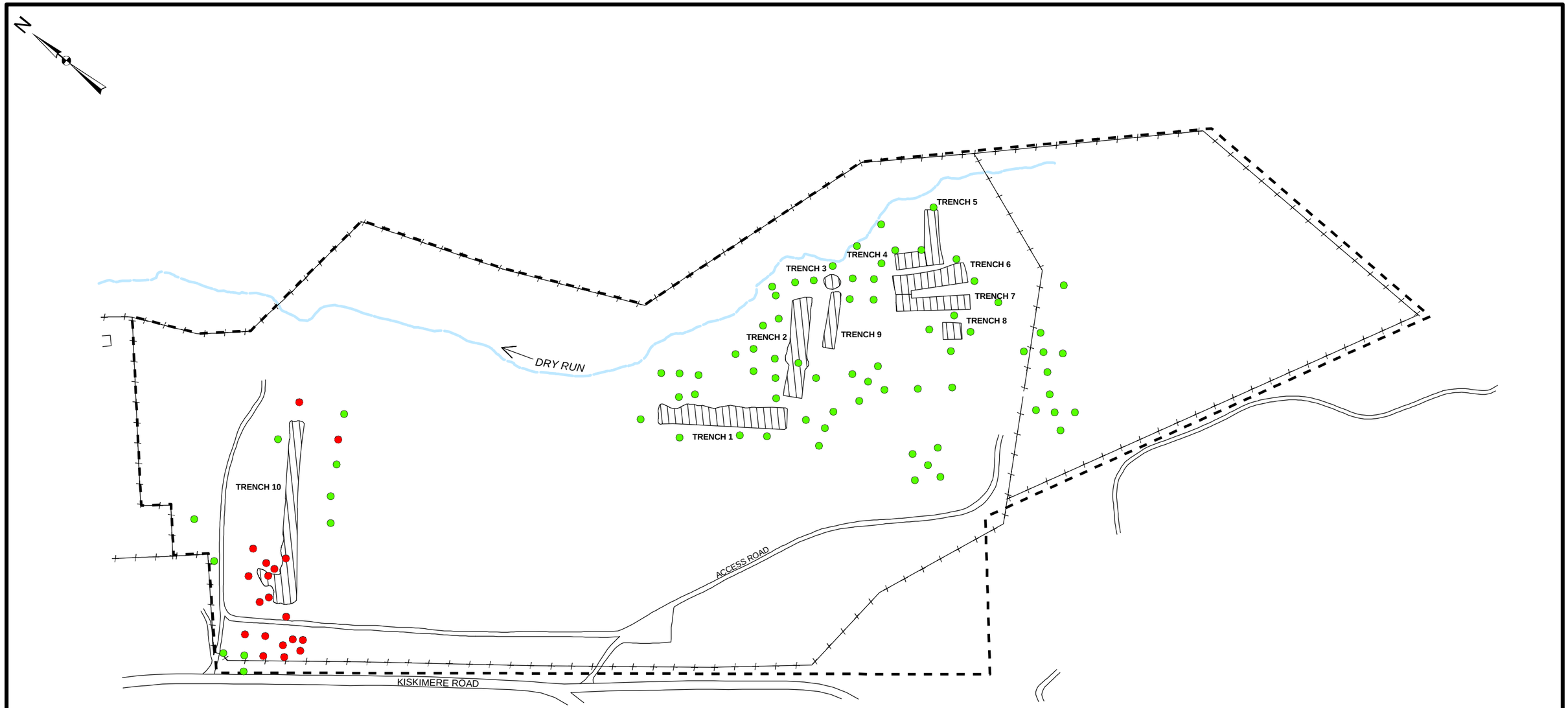
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Exceeds Background (0.00 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
AMERICIUM 241 IN SURFACE SOILS

FIGURE 4-23

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_AM241_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

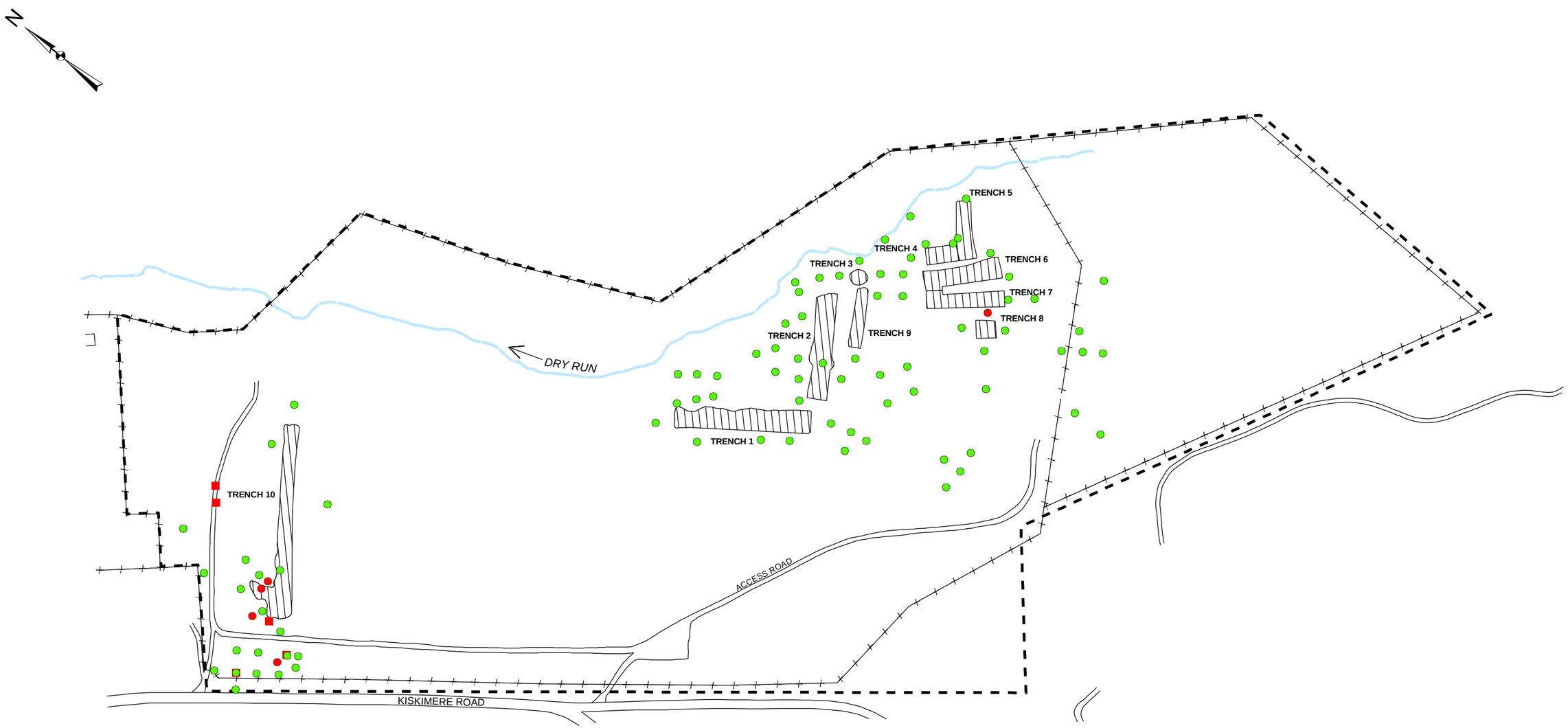
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Exceeds Background (0.00 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 239 IN SURFACE SOILS

FIGURE 4-24

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_PU239_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

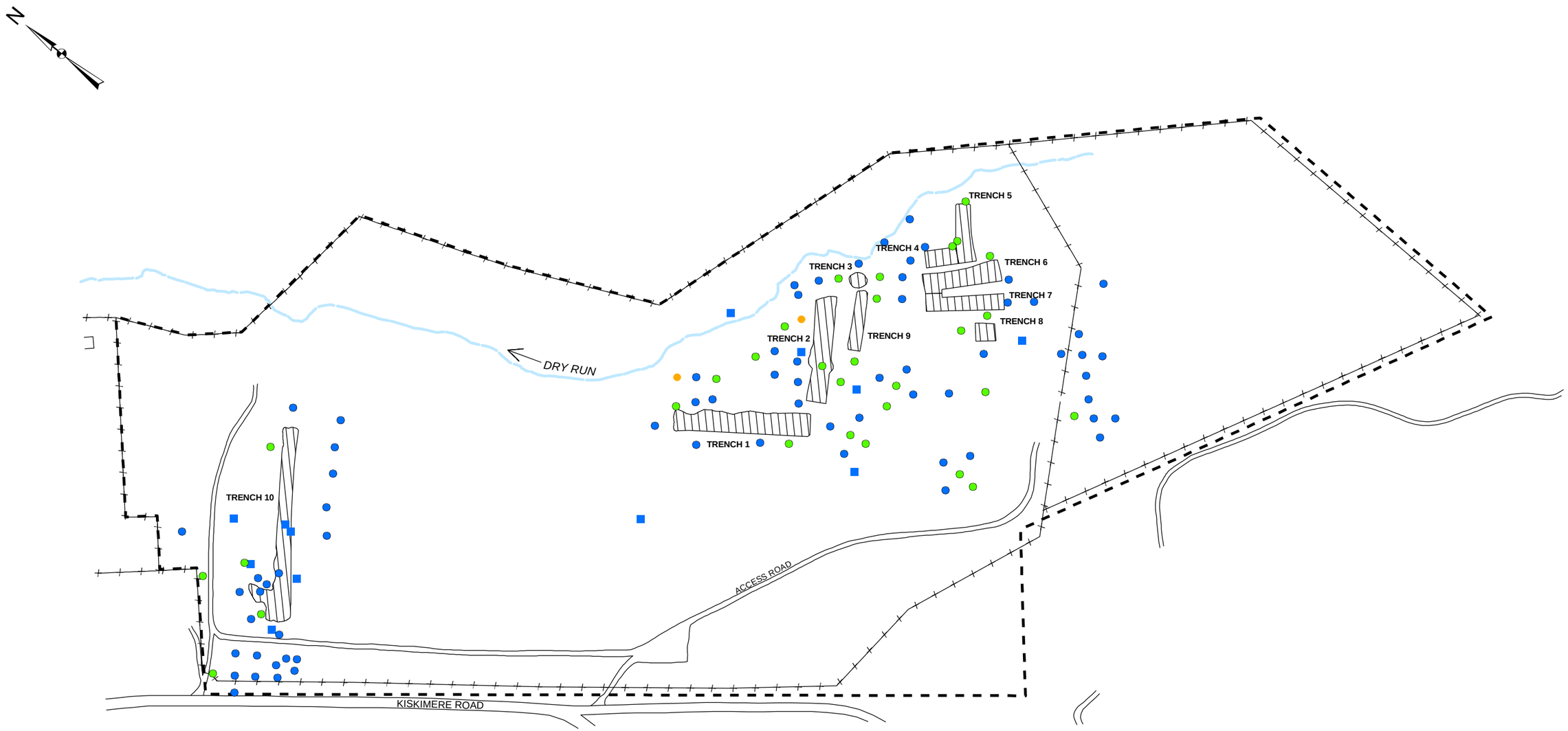
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Exceeds Background (0.00 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 241 IN SURFACE SOILS

FIGURE 4-25

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_PU241_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

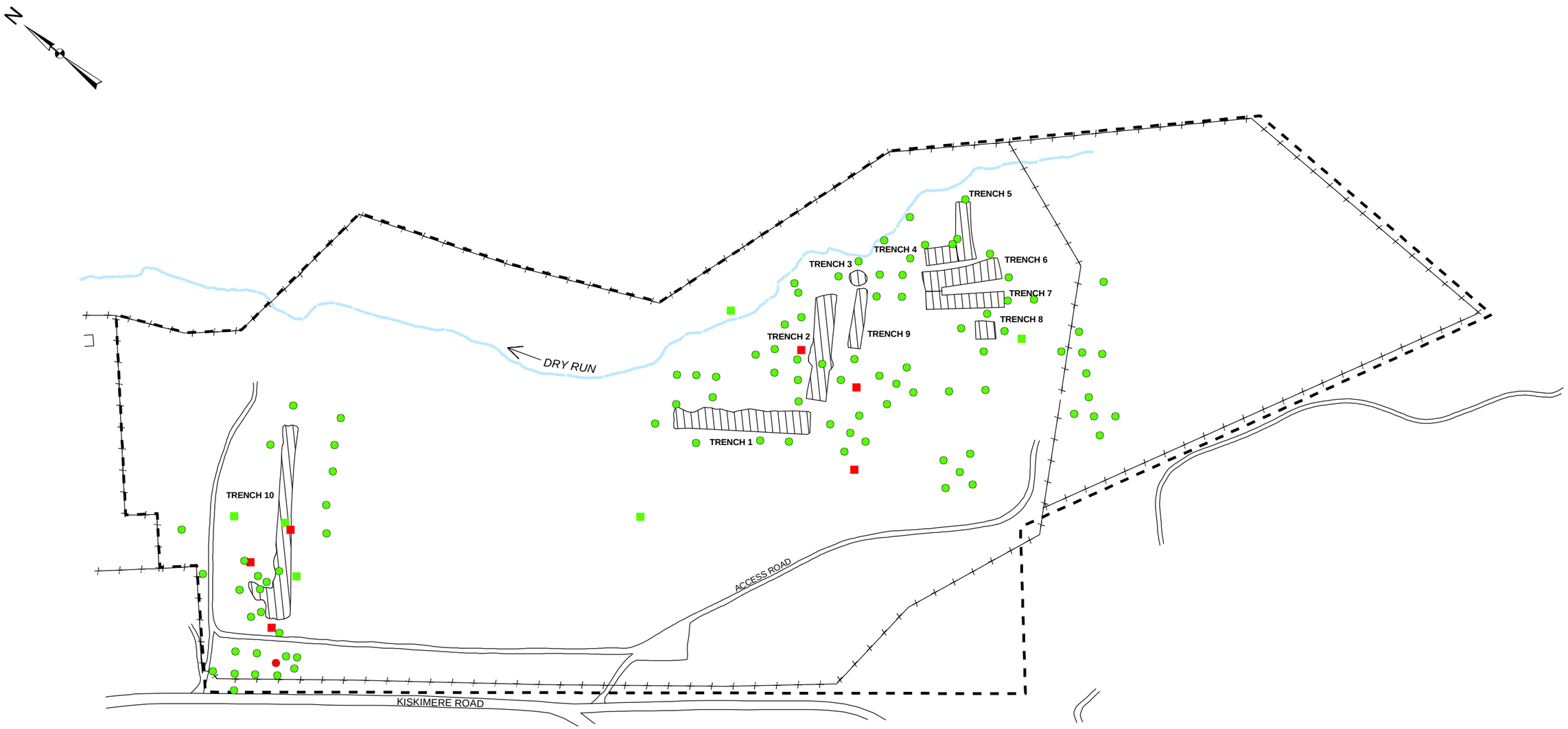
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (0.791 pCi/g)
- Radionuclide Detected Between Background and Twice Background (0.791 - 1.582 pCi/g)
- Radionuclide Detected Above Twice Background (>1.582 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
CESIUM 137 IN SURFACE SOILS

FIGURE 4-26

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_CS137_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

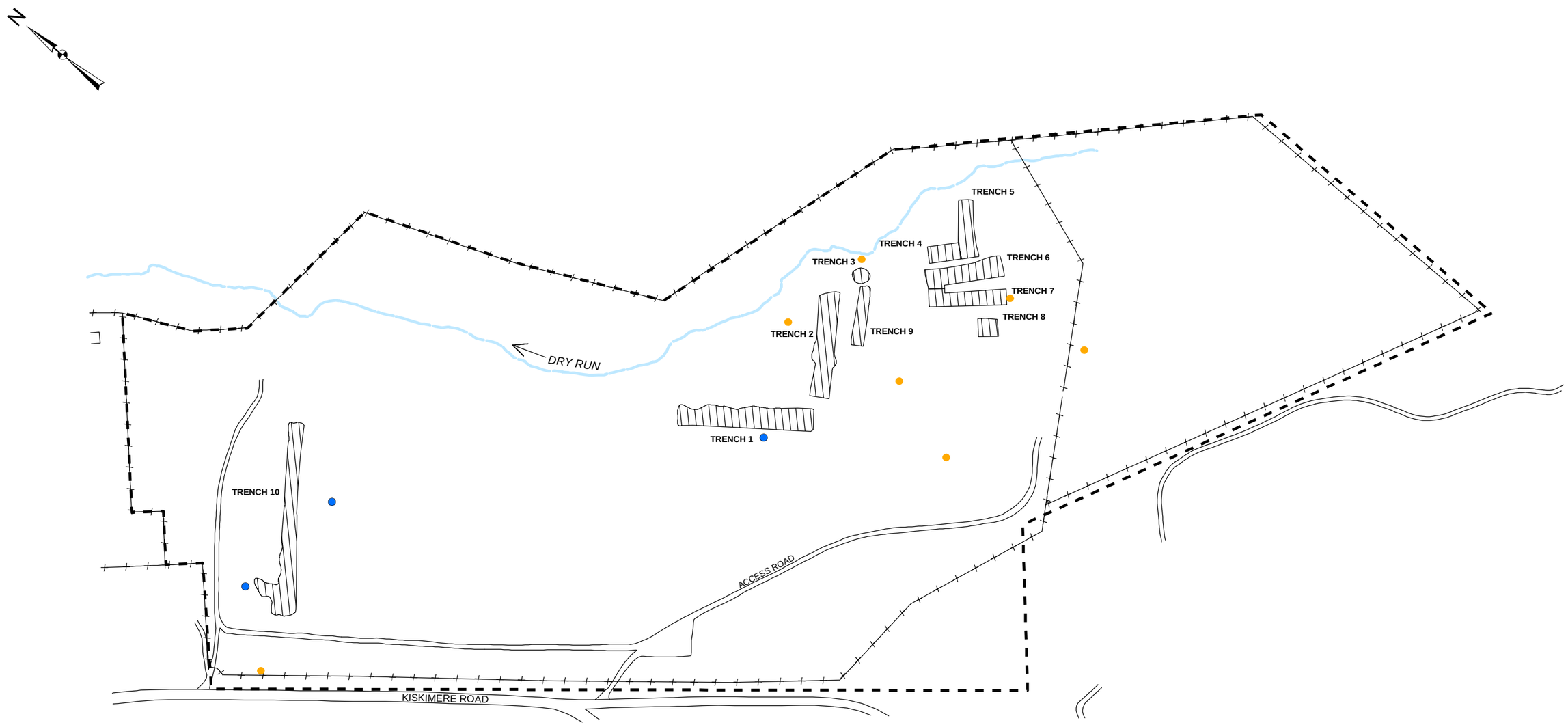
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Exceeds Background (0.00 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
COBALT 60 IN SURFACE SOILS

FIGURE 4-27

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_CO60_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

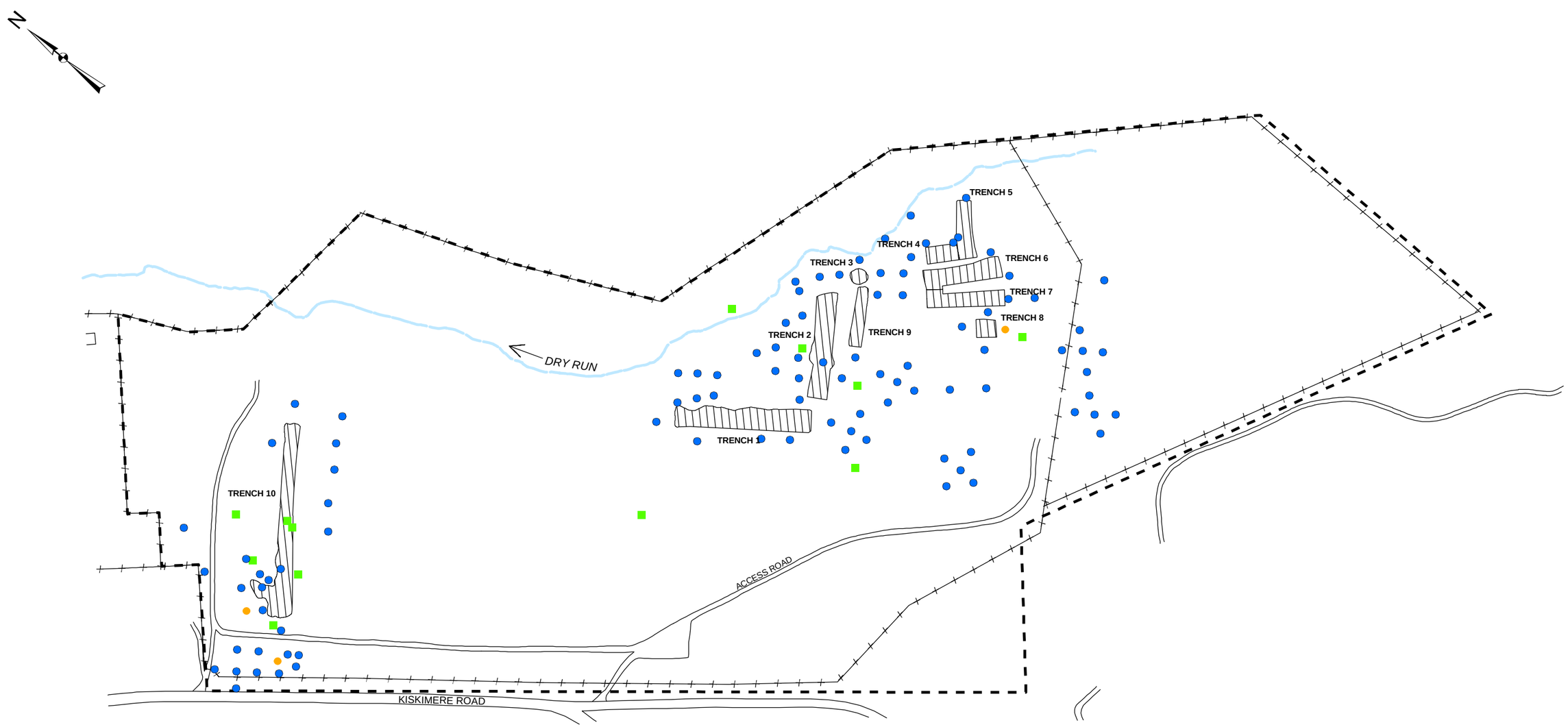
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.24 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.24 - 2.48 pCi/g)
- Radionuclide Detected Above Twice Background (>2.48 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
THORIUM 230 IN SURFACE SOILS

FIGURE 4-28

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_TH230_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

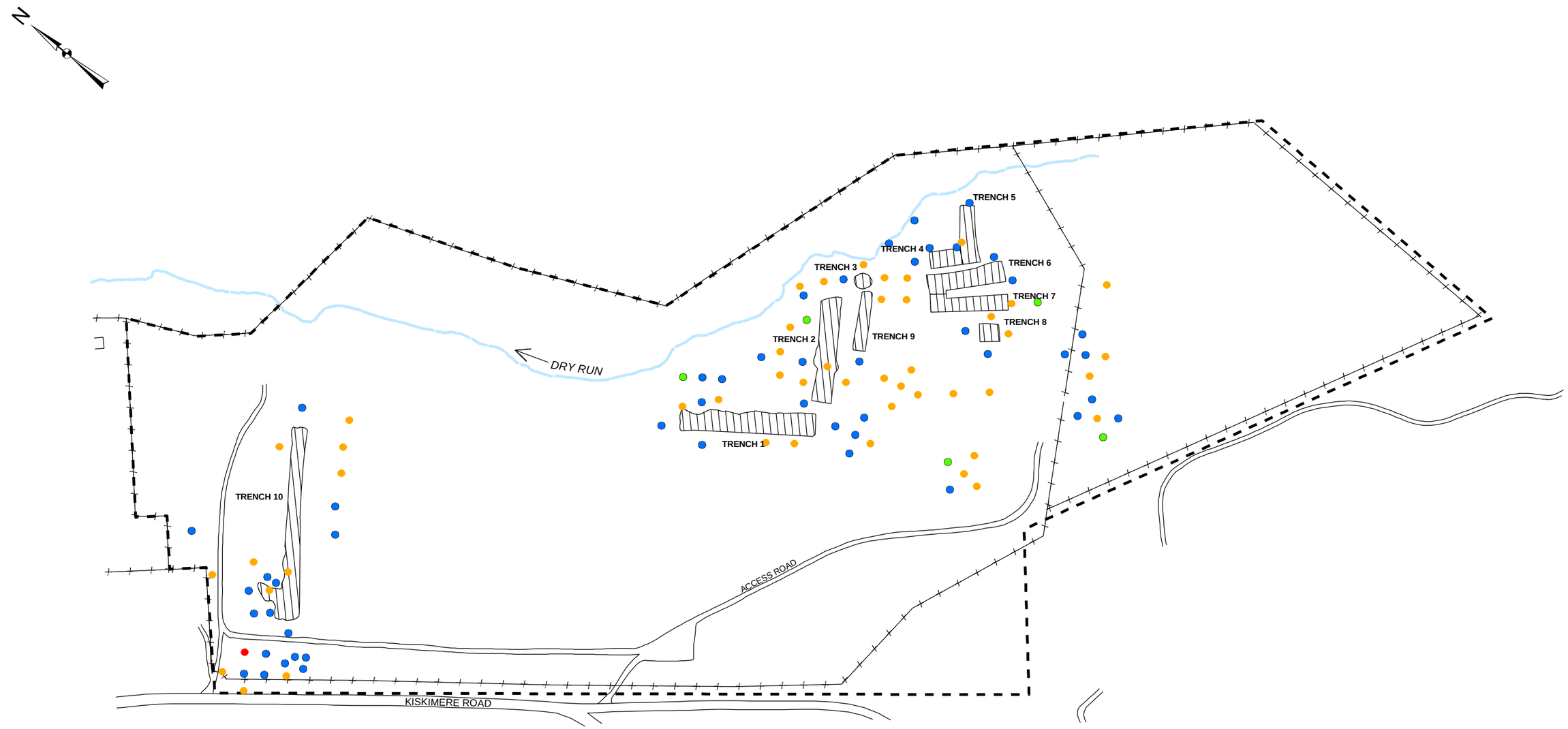
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.32 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.32 - 2.64 pCi/g)
- Radionuclide Detected Above Twice Background (>2.64 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RADIUM 226 IN SURFACE SOILS

FIGURE 4-29

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_RD226_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

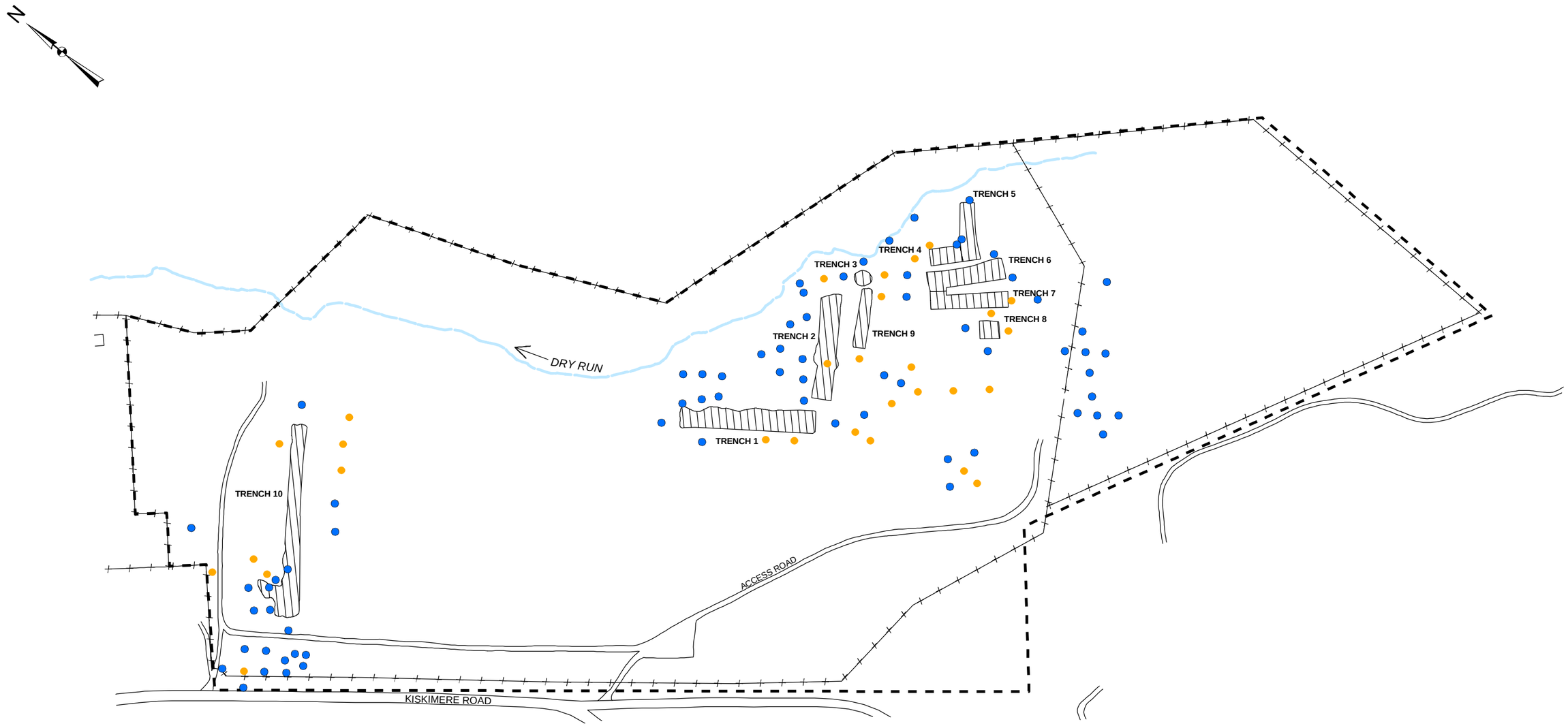
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (0.876 pCi/g)
- Radionuclide Detected Between Background and Twice Background (0.876 - 1.734 pCi/g)
- Radionuclide Detected Above Twice Background (>1.734 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
BISMUTH 212 IN SURFACE SOILS

FIGURE 4-30

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_Bi212.mxd Date: 05/19/04 11:36:45 AM



Legend

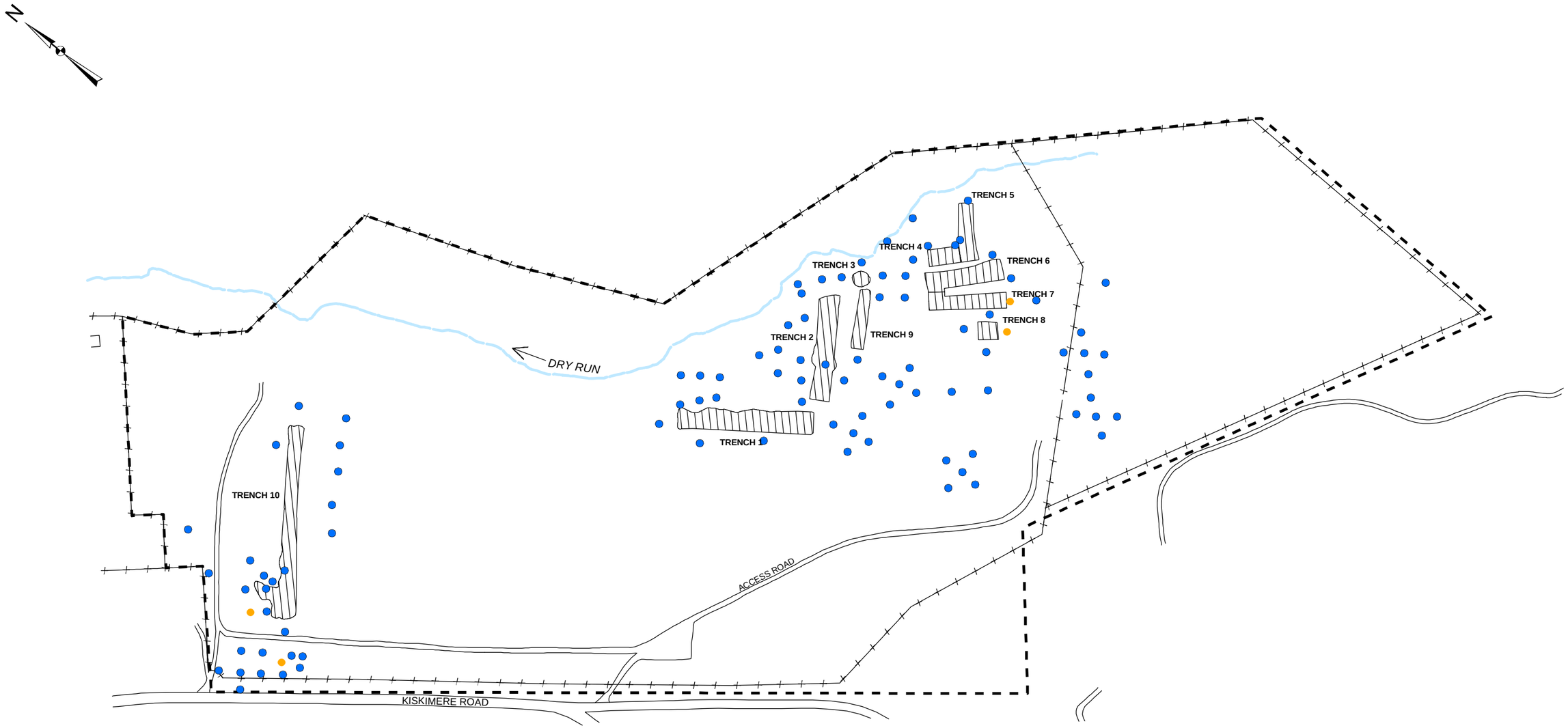
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.47 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.47 - 2.94 pCi/g)
- Radionuclide Detected Above Twice Background (>2.94 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
LEAD 212 IN SURFACE SOILS

FIGURE 4-31

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_PB212_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

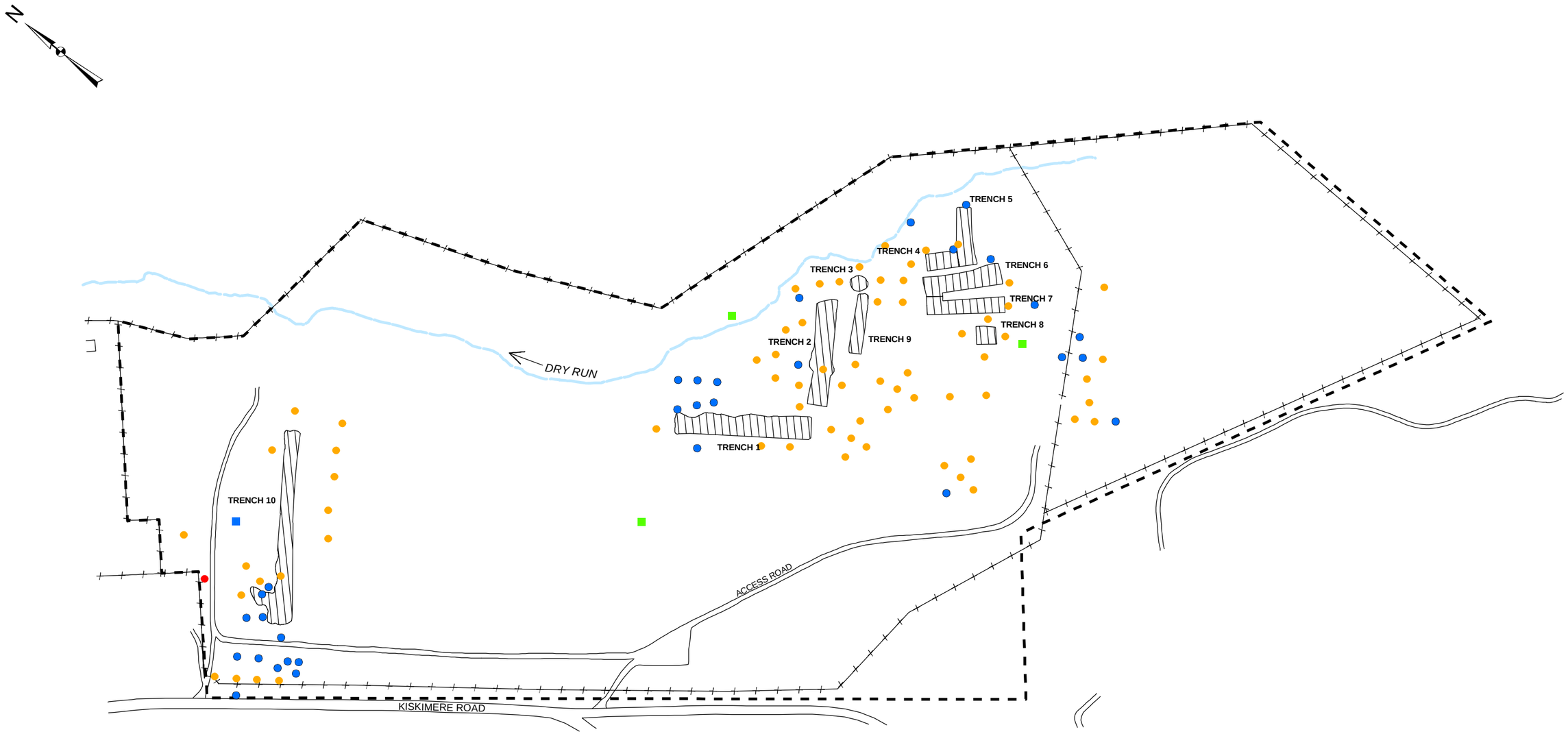
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.46 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.46 - 2.94 pCi/g)
- Radionuclide Detected Above Twice Background (>2.92 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
LEAD 214 IN SURFACE SOILS

FIGURE 4-32

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_PB214_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

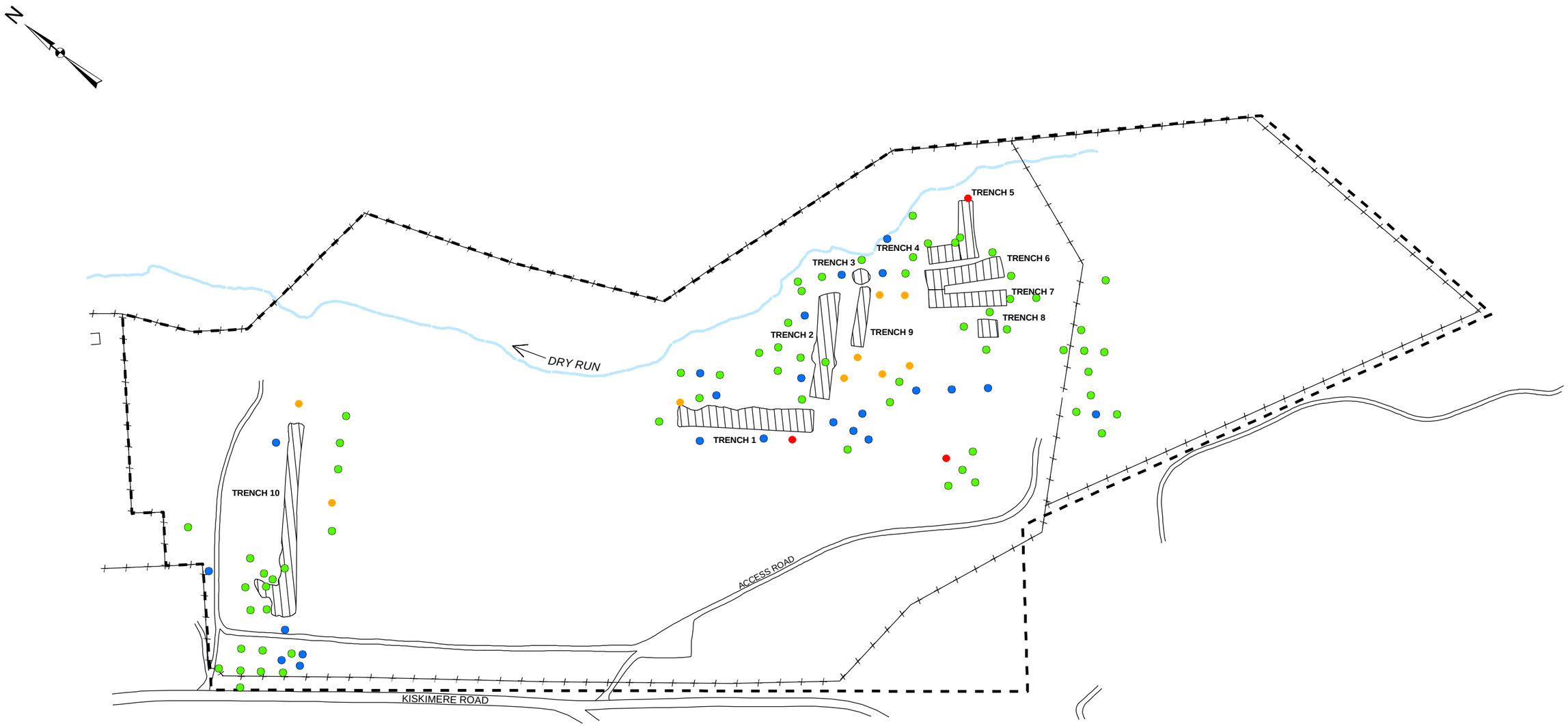
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (12.7 pCi/g)
- Radionuclide Detected Between Background and Twice Background (12.7 - 25.4 pCi/g)
- Radionuclide Detected Above Twice Background (>25.4 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
POTASSIUM 40 IN SURFACE SOILS

FIGURE 4-33

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_K40_CE.mxd Date: 05/19/04 11:36:45 AM



Legend

- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.23 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.23 - 4.46 pCi/g)
- Radionuclide Detected Above Twice Background (>4.46 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

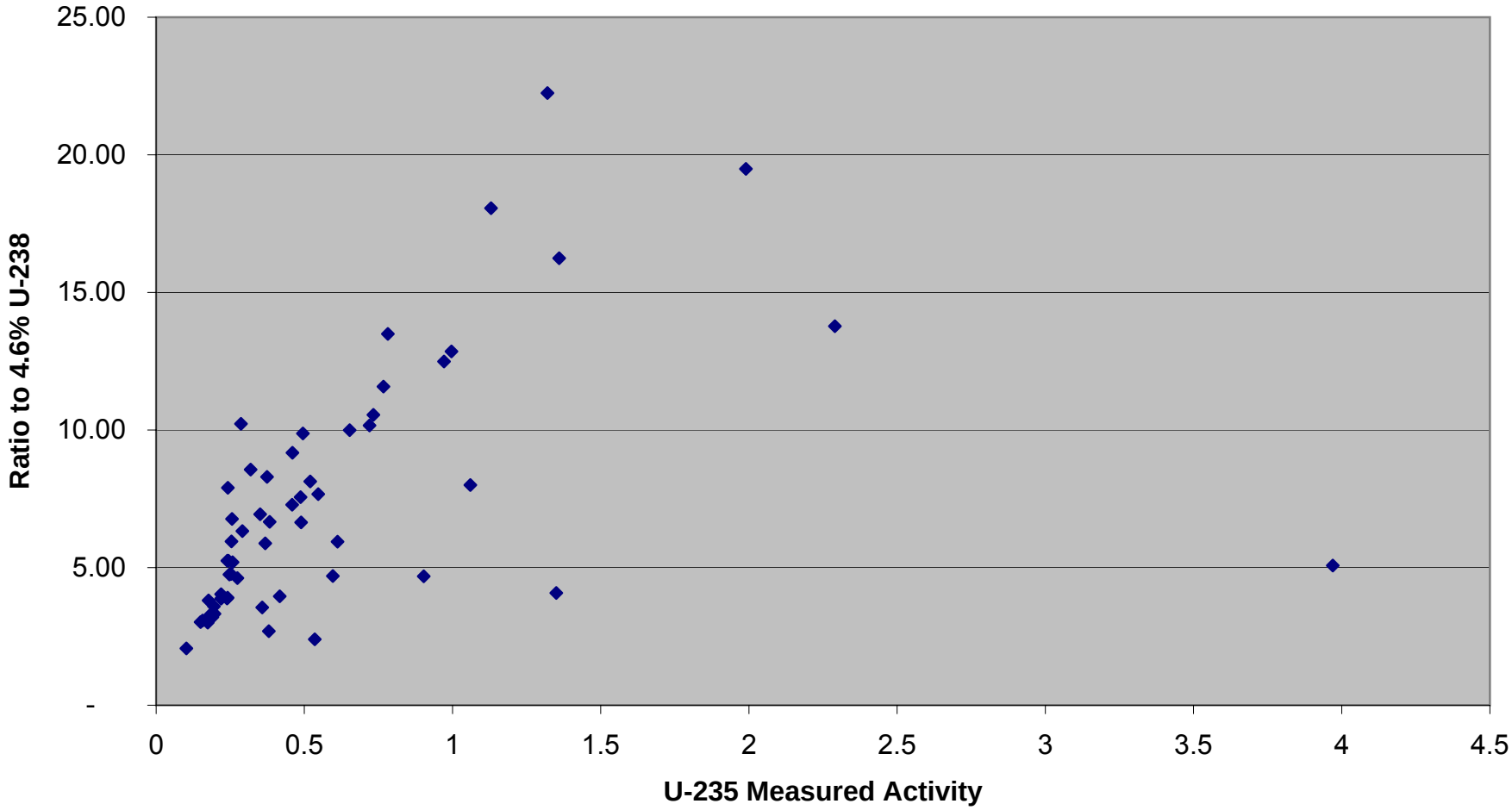
0 100 200 400 Feet

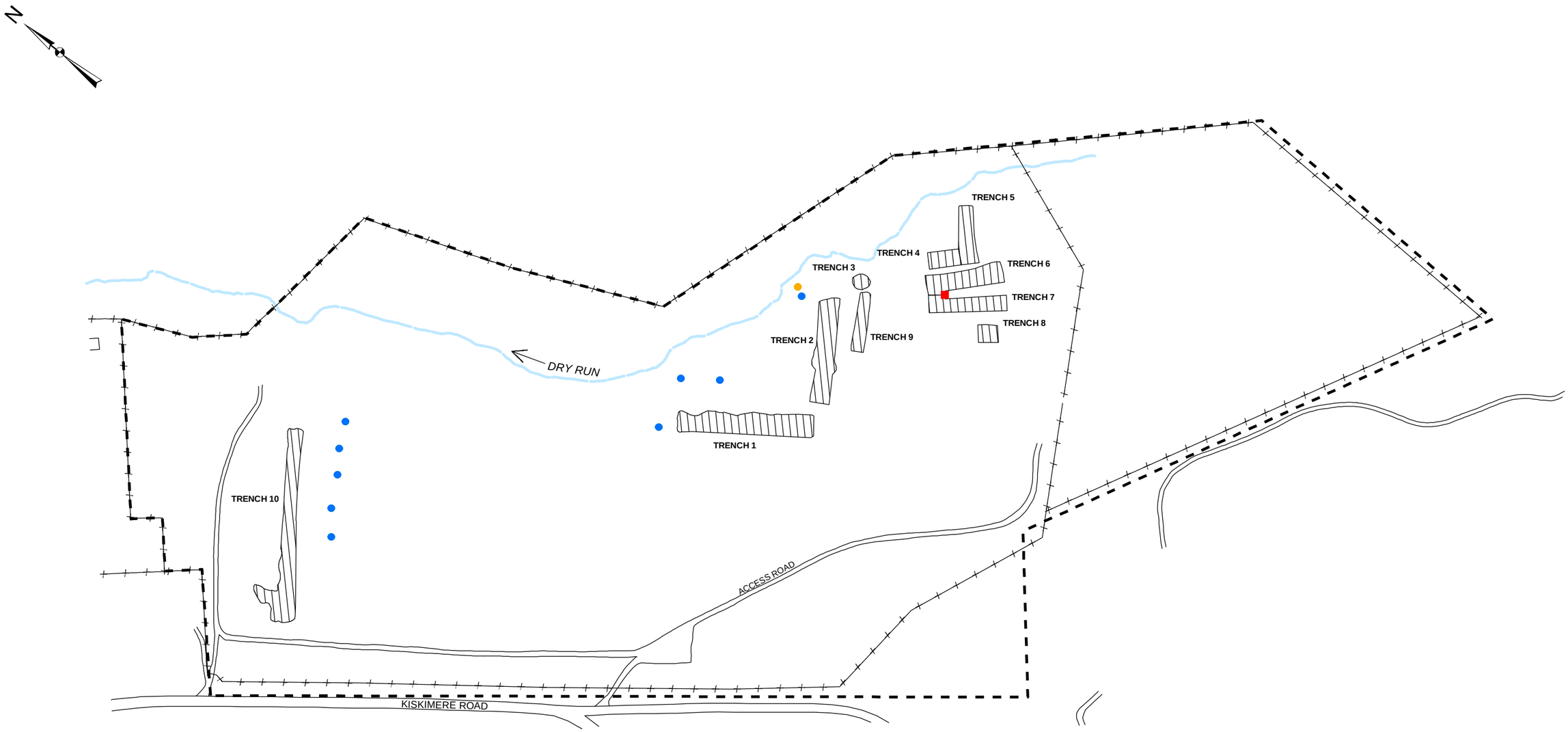
SHALLOW LAND DISPOSAL AREA
THORIUM 234 IN SURFACE SOILS

FIGURE 4-34

N:\11171431.00000\GIS\ArcMap\RI_Figures\ss_TH234_CE.mxd Date: 05/19/04 11:36:45 AM

FIGURE 4-35
U-235 Activity Ratio to Natural Uranium in Surface Soils
(Based on Measured U-238)





Legend

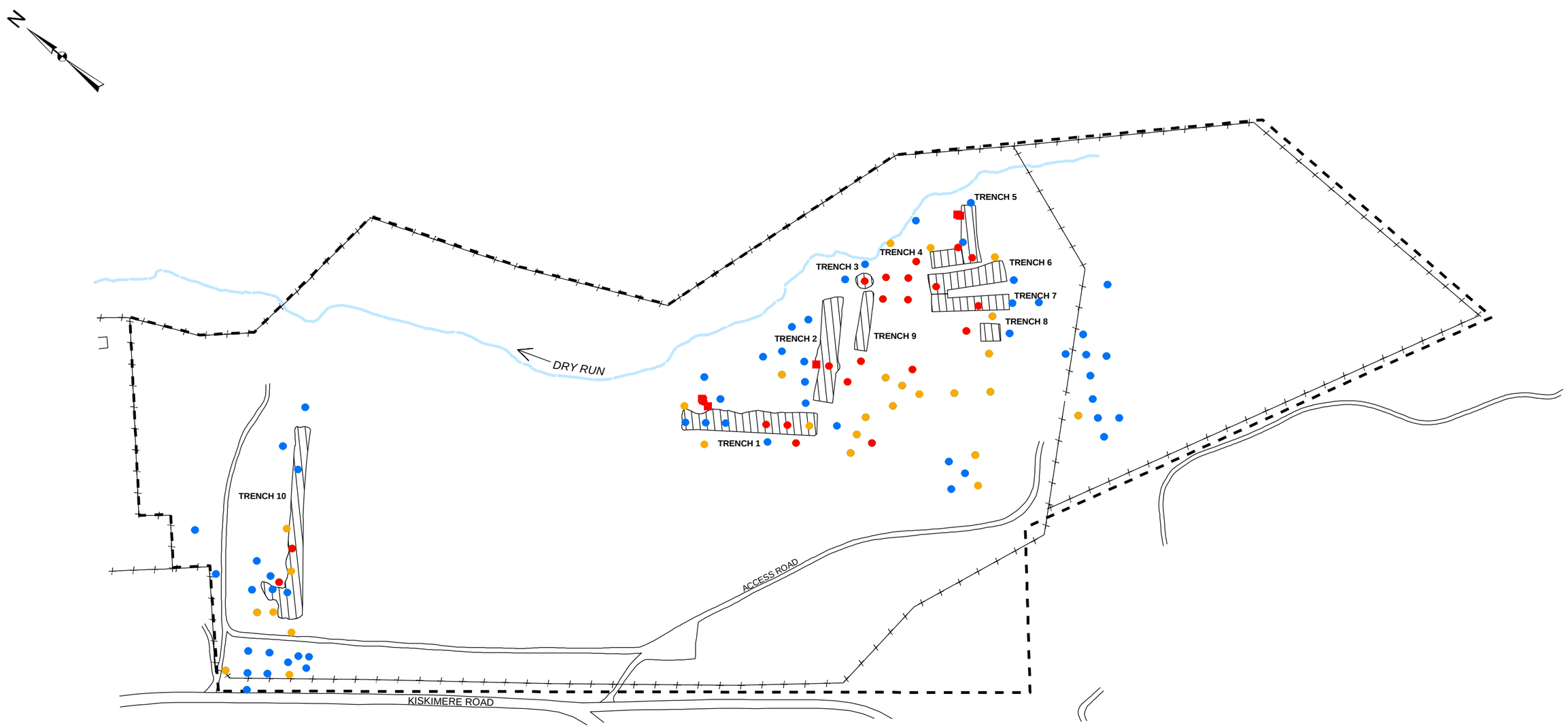
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.280 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.280 - 2.560 pCi/g)
- Radionuclide Detected Above Twice Background (>2.560 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 234 IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-36

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U234_24.mxd Date: 05/24/04



Legend

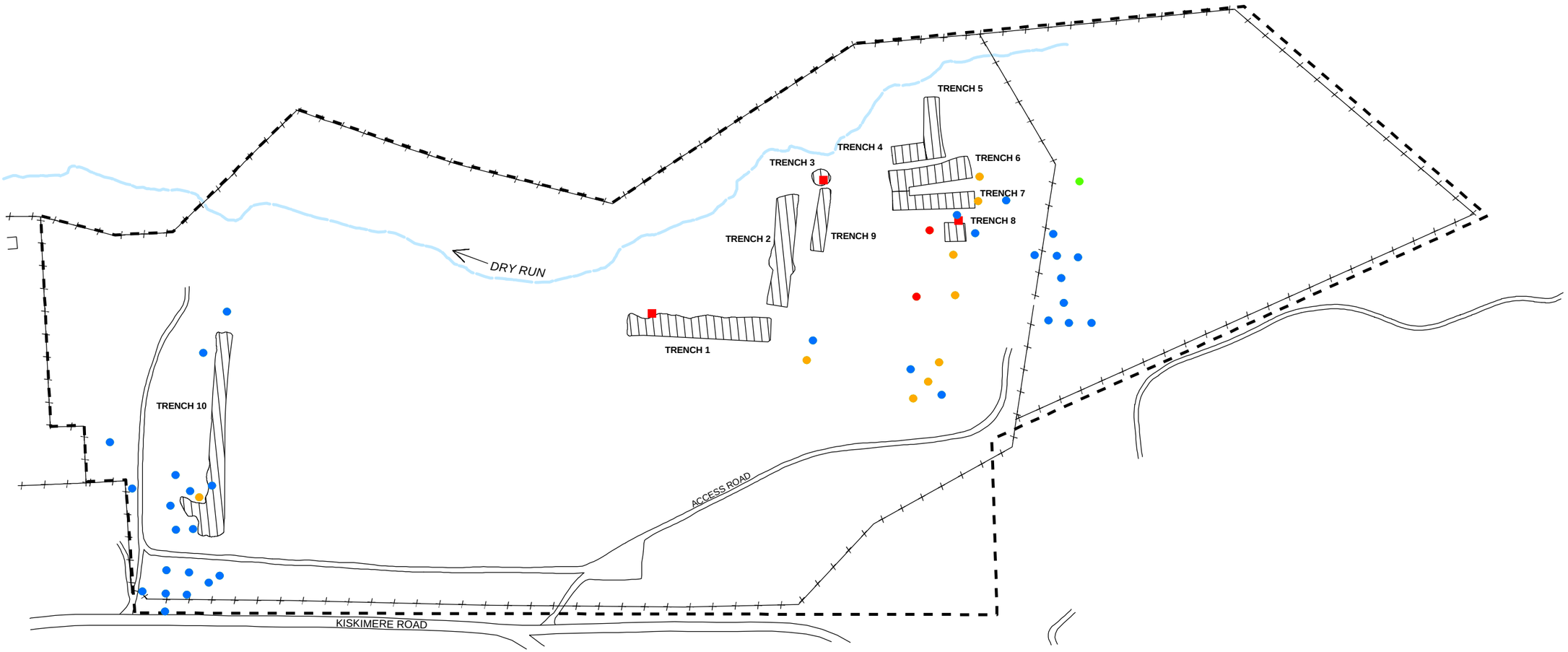
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.280 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.280 - 2.560 pCi/g)
- Radionuclide Detected Above Twice Background (>2.560 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 234 IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-37

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U234_410.mxd
05/24/04



Legend

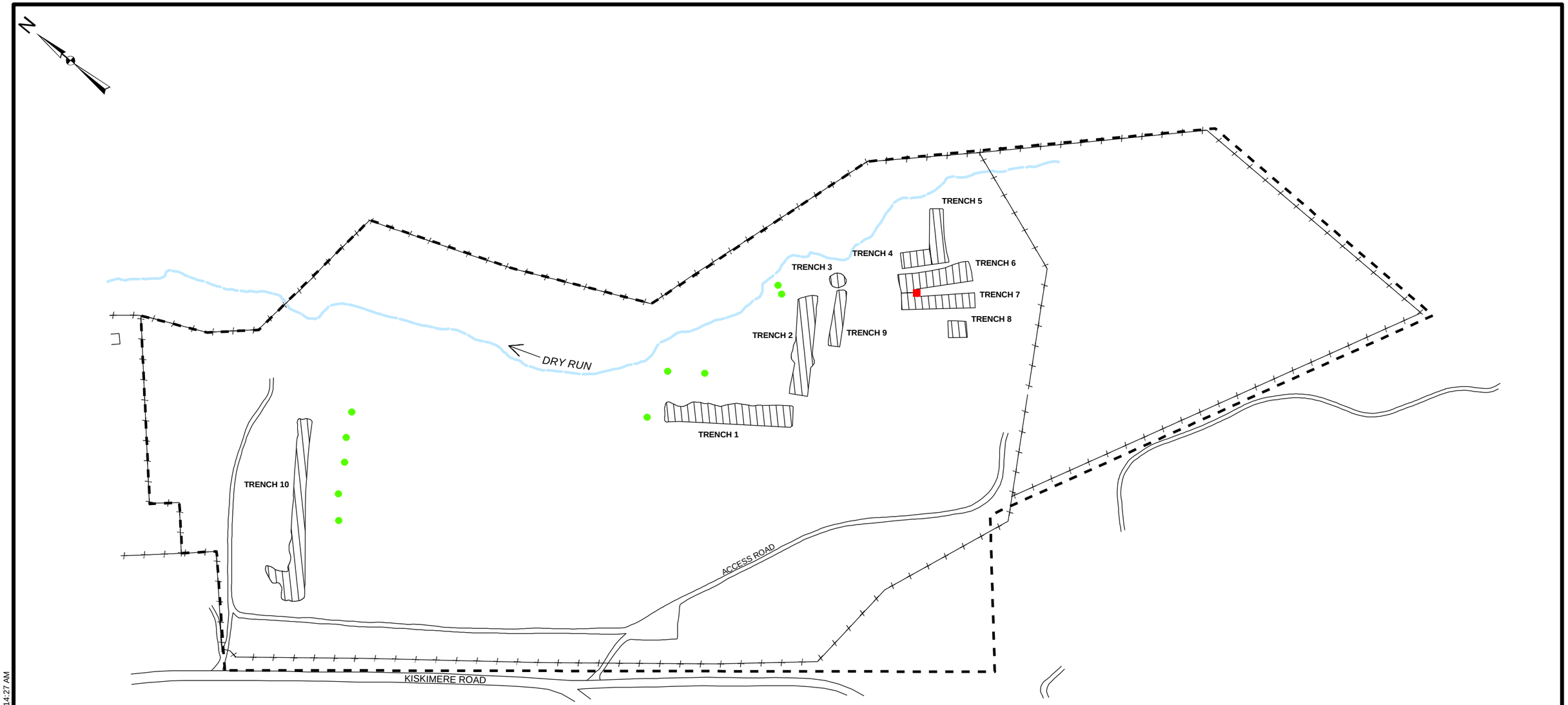
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.280 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.280 - 2.560 pCi/g)
- Radionuclide Detected Above Twice Background (>2.560 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 105 210 420 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 234 IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-38

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U234_1014.mxd
05/24/04



Legend

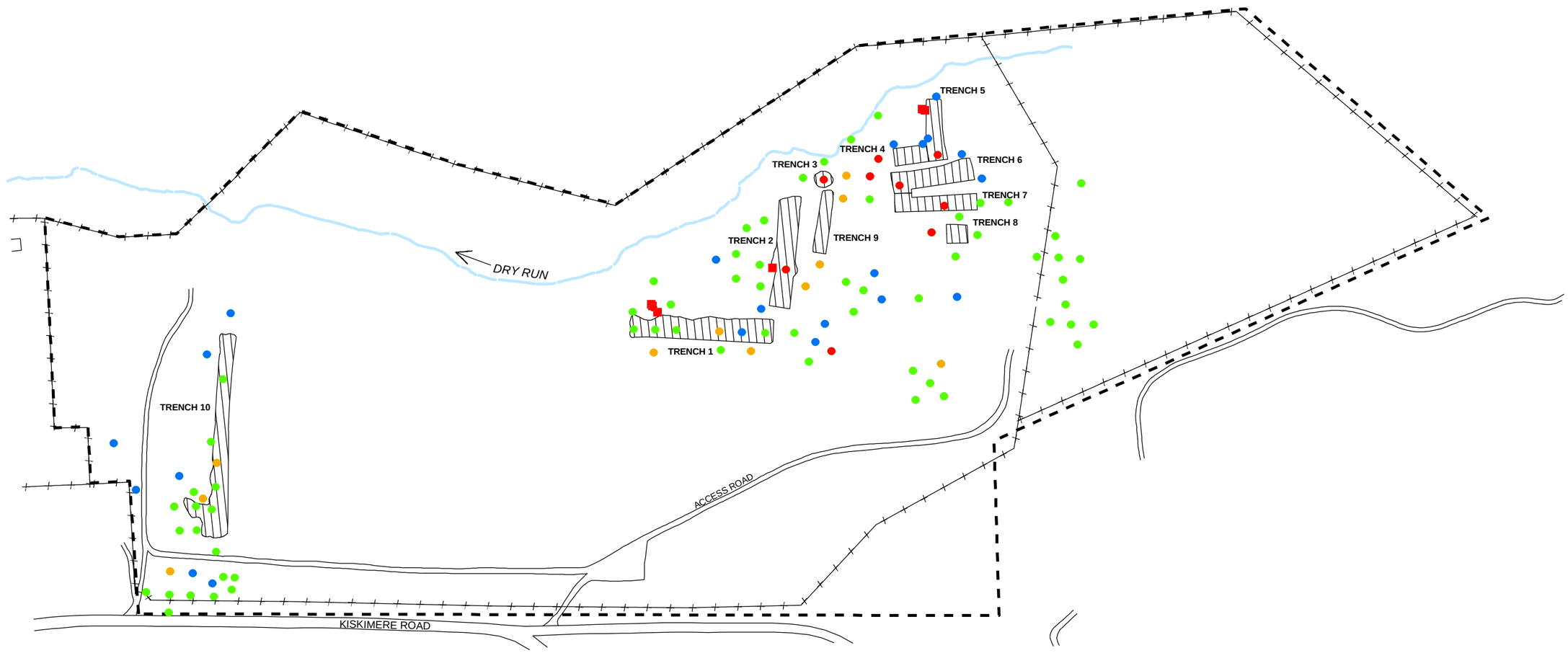
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (0.269 pCi/g)
- Radionuclide Detected Between Background and Twice Background (0.269 - 0.538 pCi/g)
- Radionuclide Detected Above Twice Background (>0.538 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 235 (ALPHA) IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-39

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U235_24.mxd Date: 05/24/04 10:14:27 AM



Legend

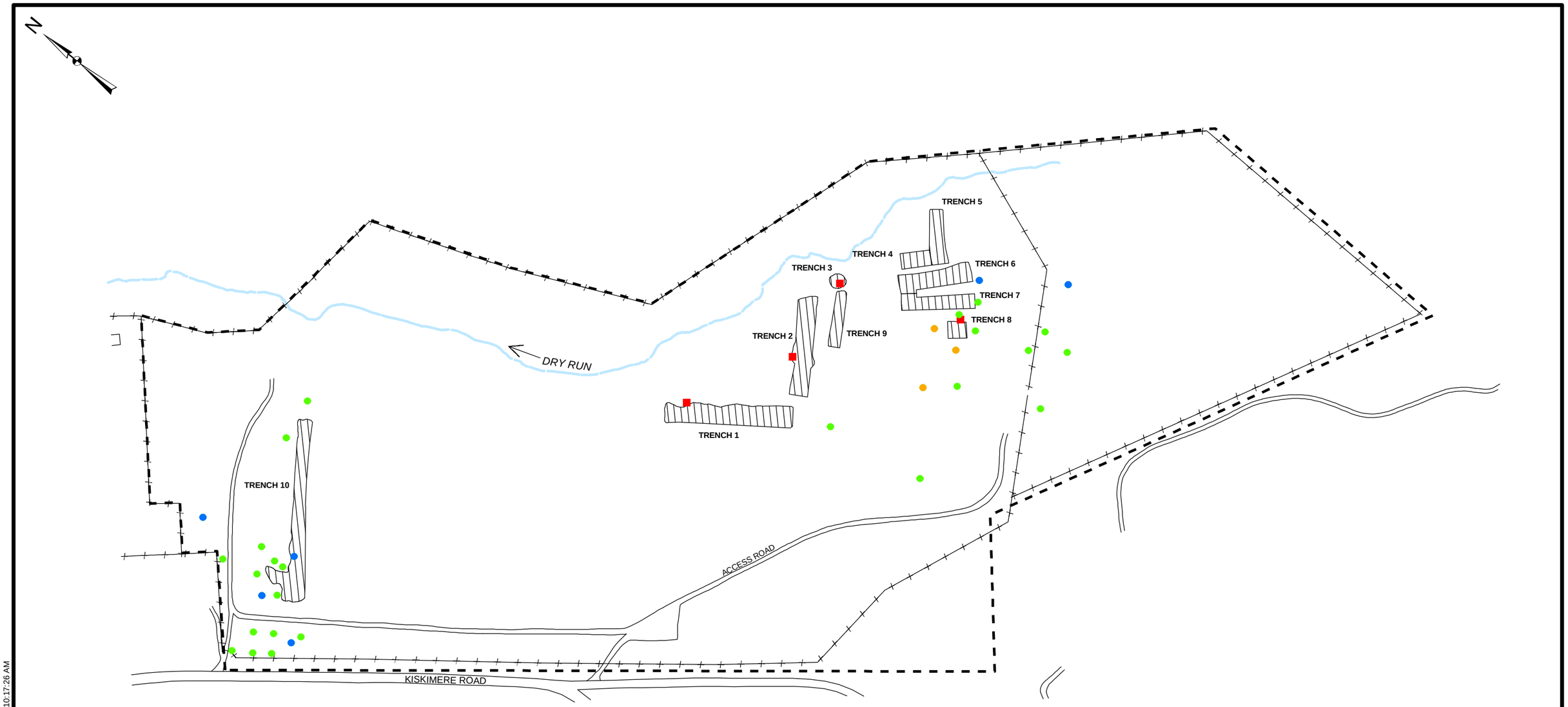
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (0.269 pCi/g)
- Radionuclide Detected Between Background and Twice Background (0.269 - 0.538 pCi/g)
- Radionuclide Detected Above Twice Background (>0.538 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 235 (ALPHA) IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-40

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U235_410.mxd Date: 05/24/04 10:13:30 AM



Legend

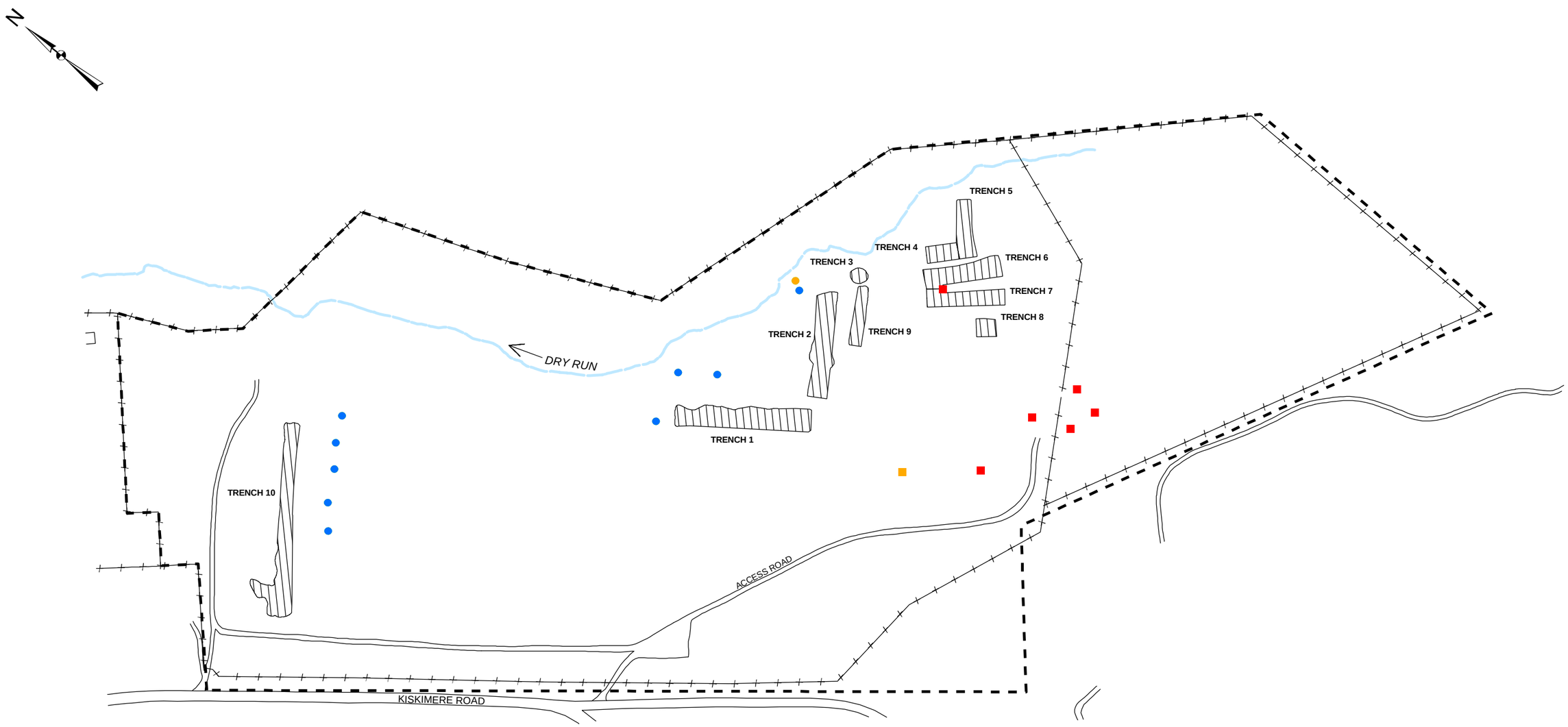
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (0.269 pCi/g)
- Radionuclide Detected Between Background and Twice Background (0.269 - 0.538 pCi/g)
- Radionuclide Detected Above Twice Background (>0.538 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 235 (ALPHA) IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-41

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U235_1014.mxd Date: 05/24/04 10:17:26 AM



Legend

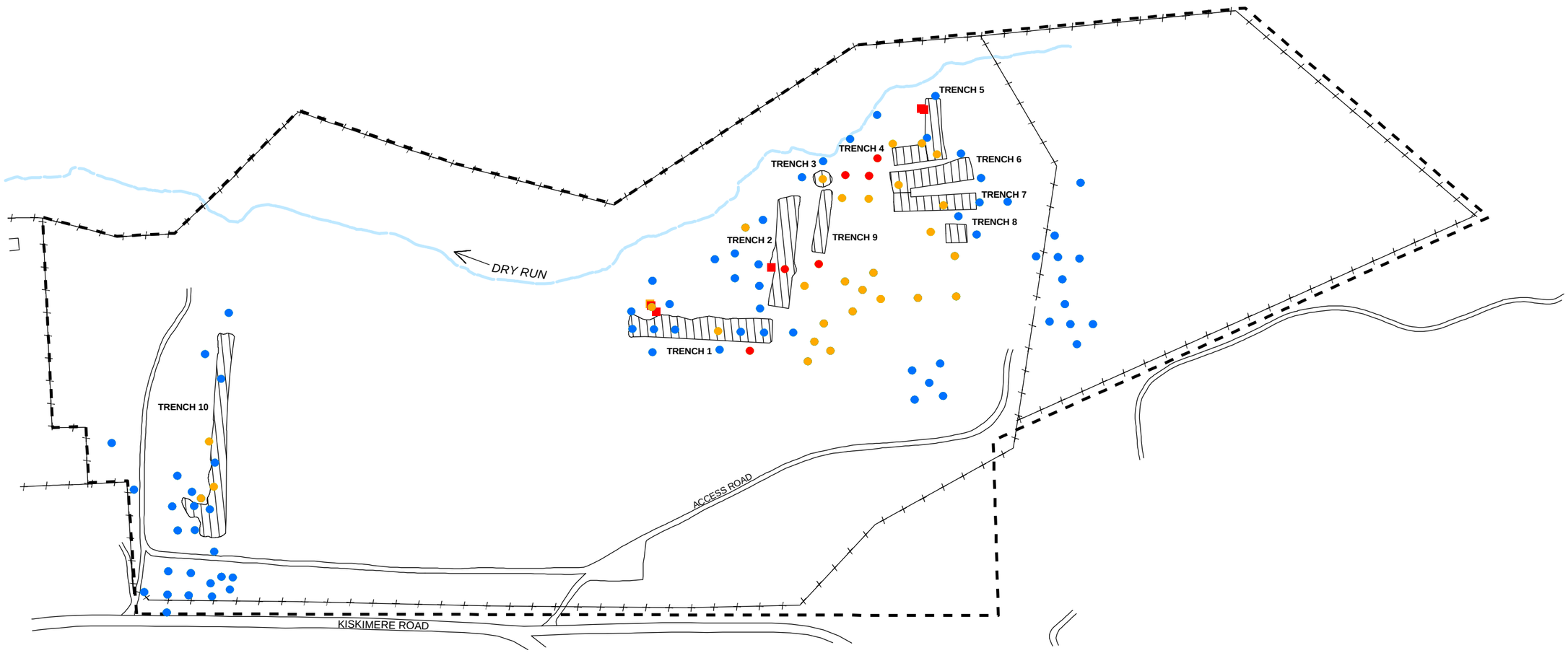
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.410 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.410 - 2.820 pCi/g)
- Radionuclide Detected Above Twice Background (>2.82 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 238 IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-42

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U238_24.mxd
05/25/04



Legend

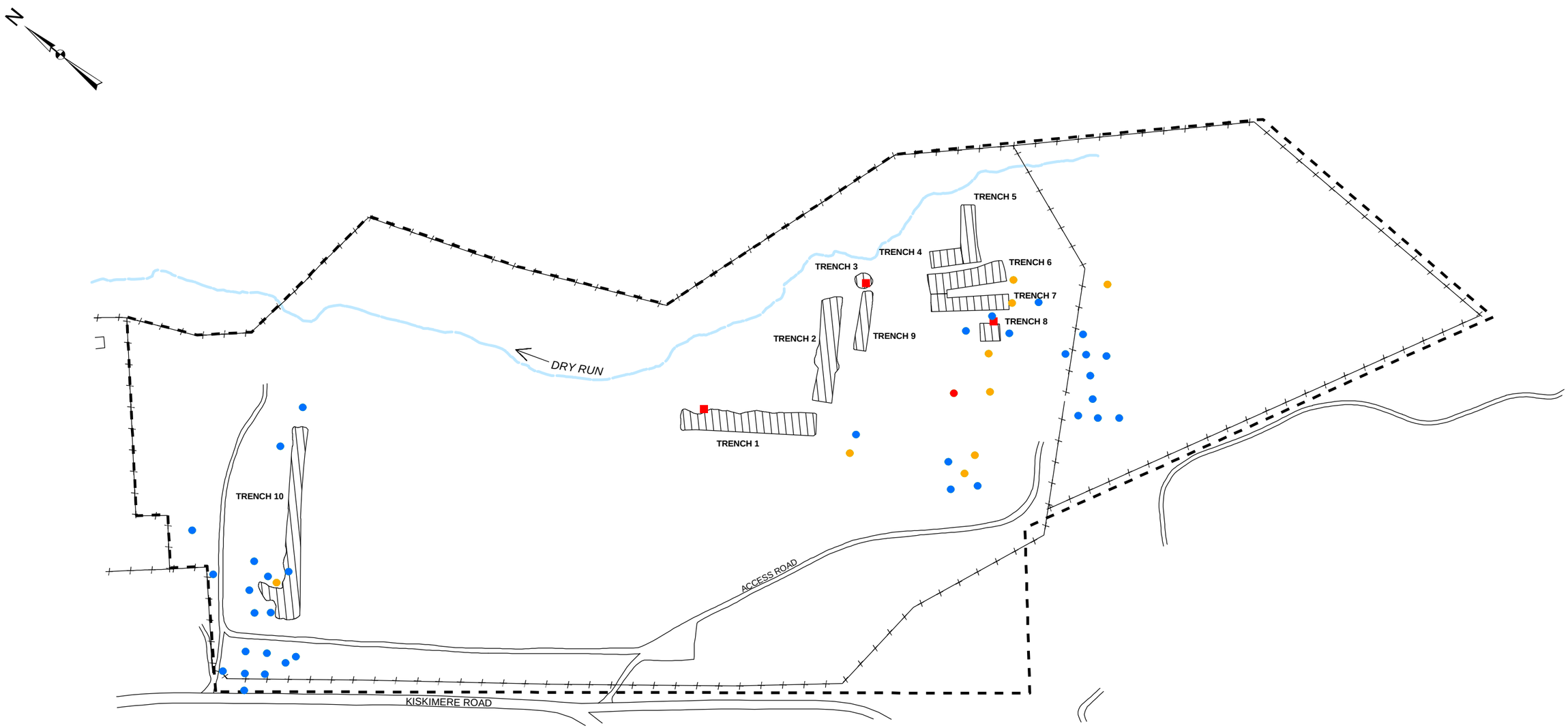
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.410 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.410 - 2.820 pCi/g)
- Radionuclide Detected Above Twice Background (>2.82 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 238 IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-43

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U238_410.mxd
05/25/04



Legend

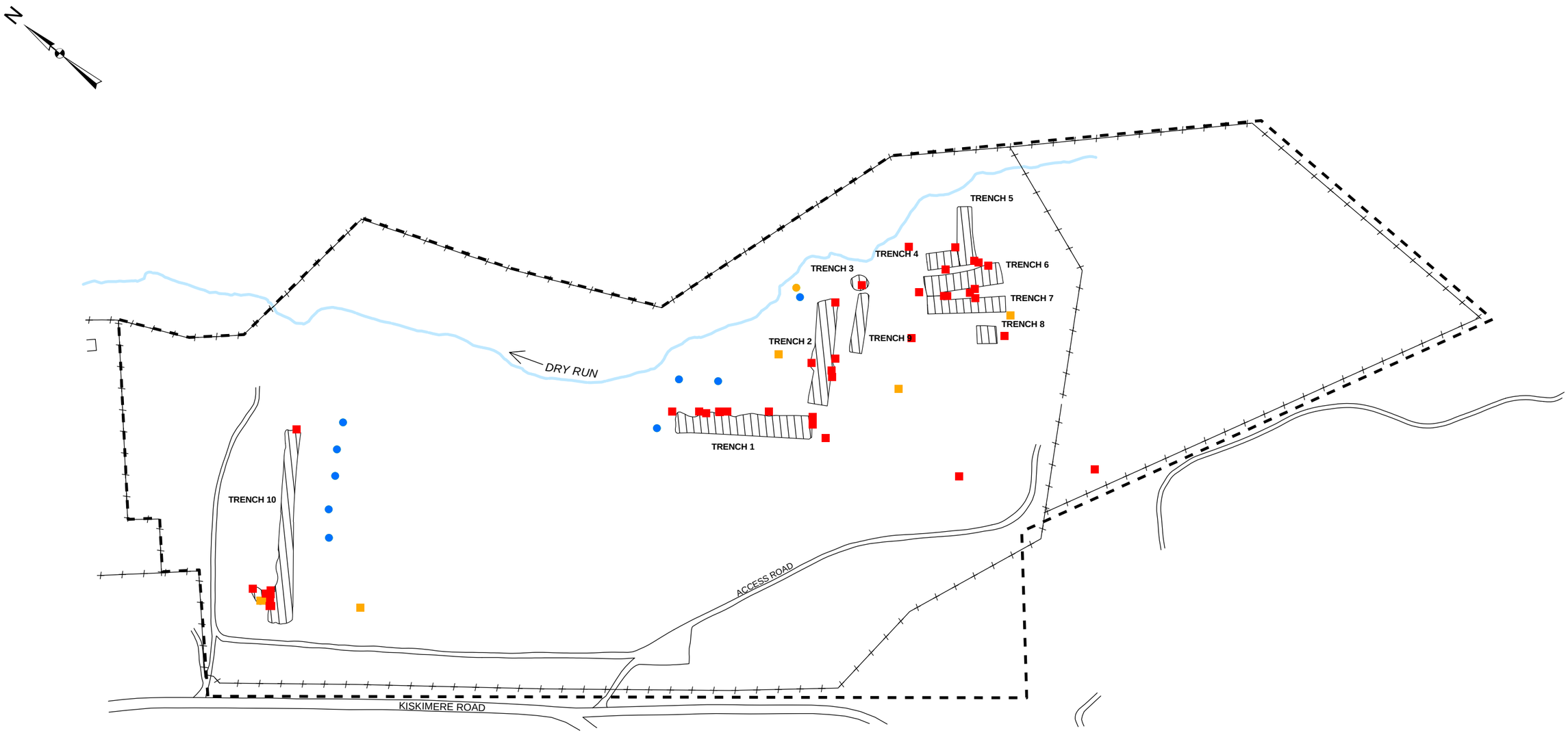
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.410 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.410 - 2.820 pCi/g)
- Radionuclide Detected Above Twice Background (>2.82 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 238 IN SUBSURFACE SOILS (>10 - 24' BGS)

FIGURE 4-44

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_U238_1024.mxd
05/25/04



Legend

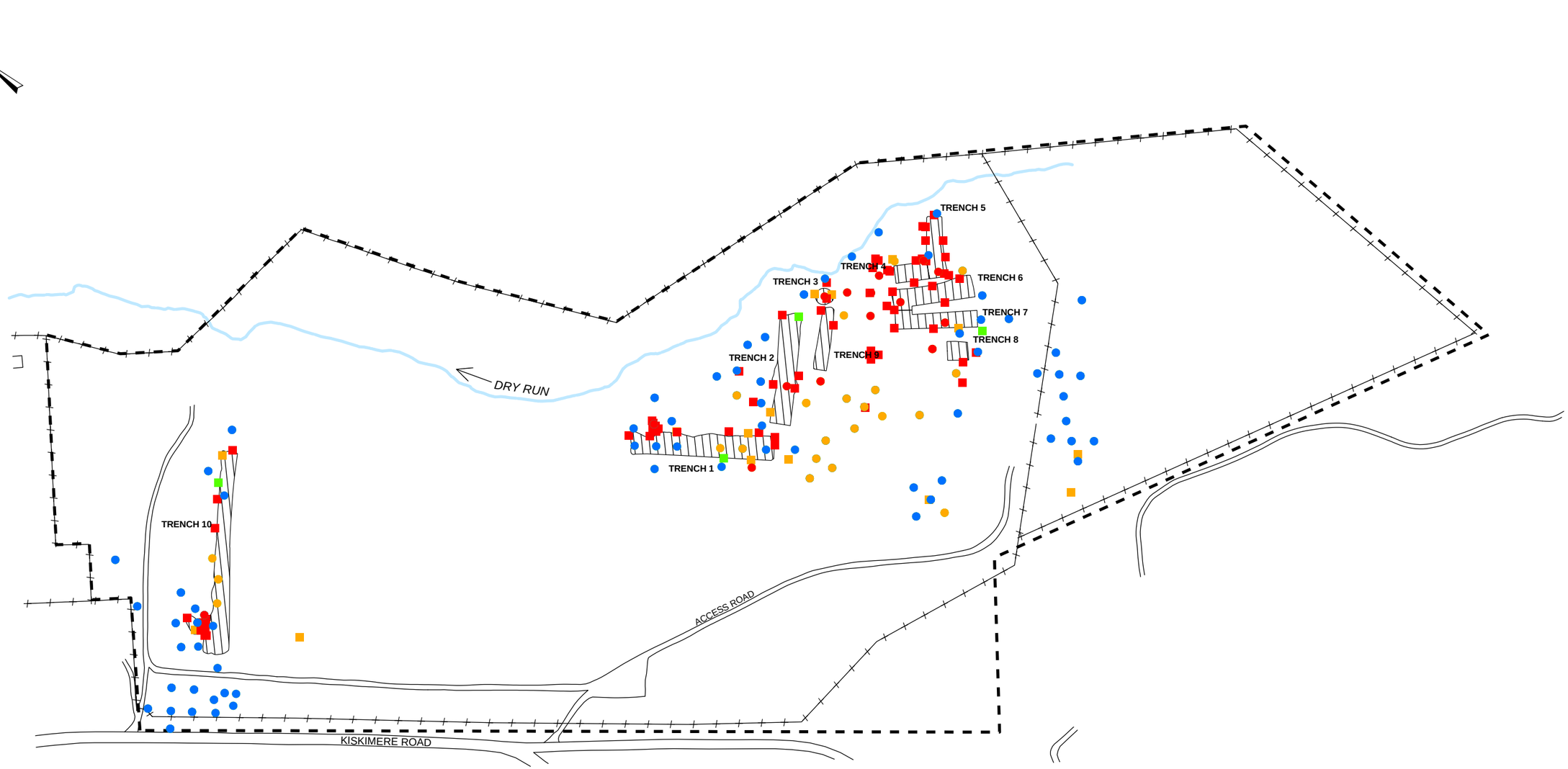
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.960 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.960 - 5.920 pCi/g)
- Radionuclide Detected Above Twice Background (>5.920 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL URANIUM AND TOTAL ISOTOPIC URANIUM
IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-45

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_TOTU_0.54B.mxd
05/24/04



Legend

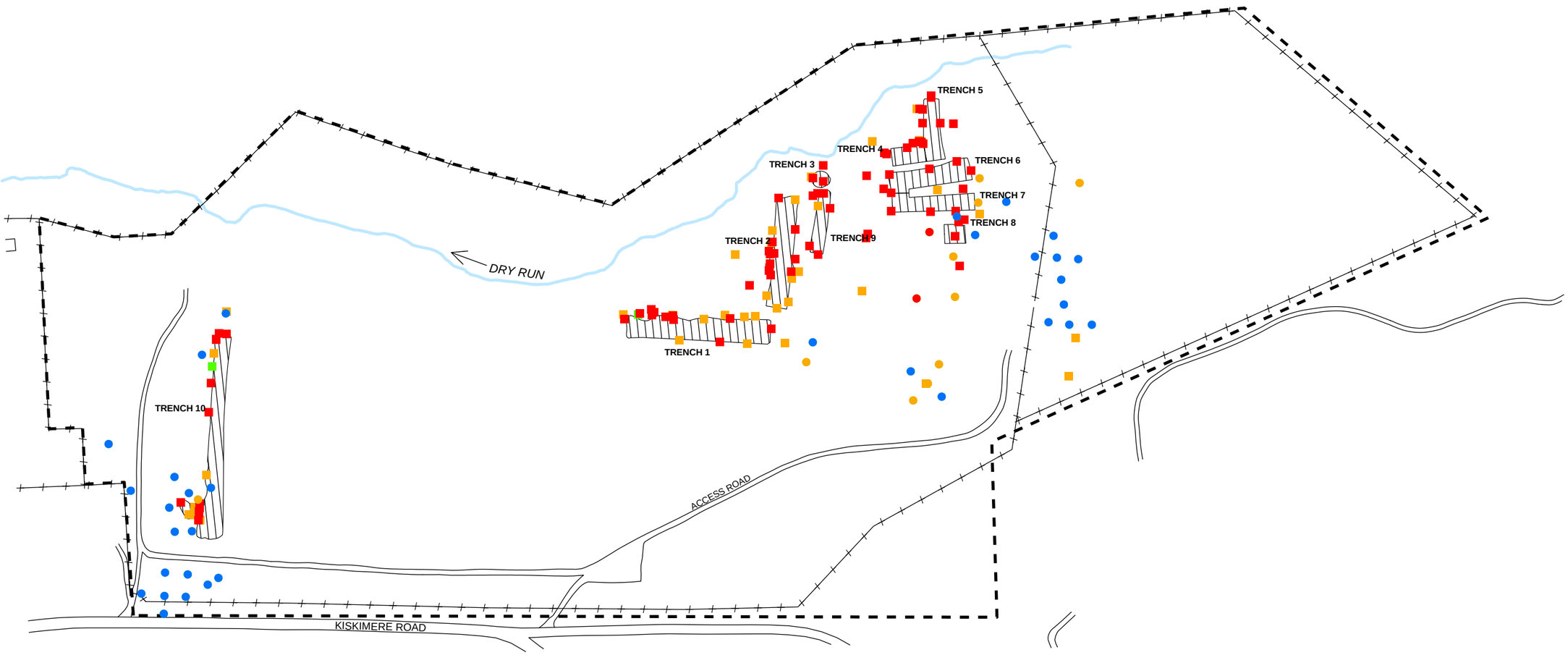
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.960 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.960 - 5.920 pCi/g)
- Radionuclide Detected Above Twice Background (>5.920 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL URANIUM AND TOTAL ISOTOPIC URANIUM
IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-46

N:\111171431.00000\GIS\ArcMap\RI_Figures\sub_TOTU_410B.mxd
05/24/04



Legend

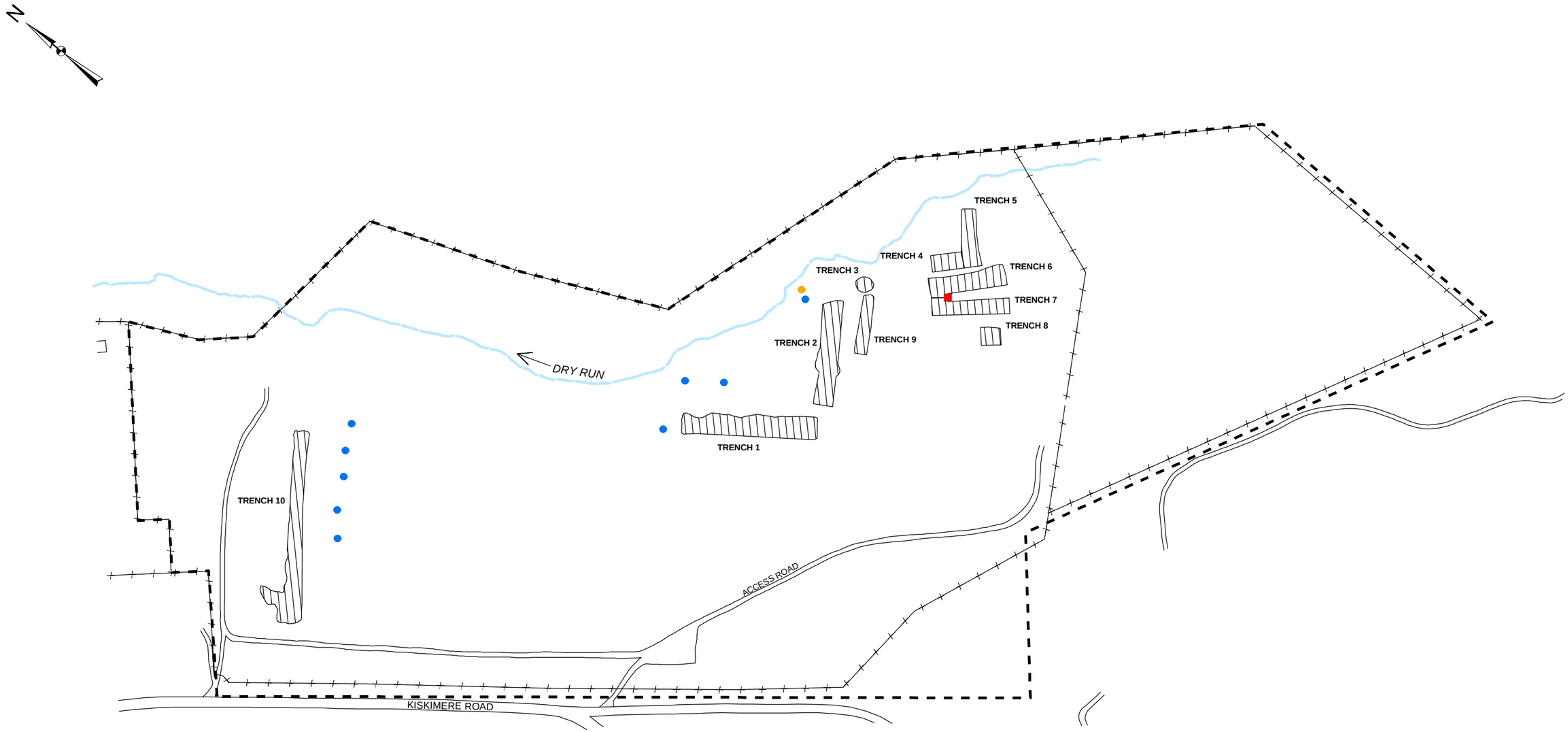
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.960 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.960 - 5.920 pCi/g)
- Radionuclide Detected Above Twice Background (>5.920 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL URANIUM AND TOTAL ISOTOPIC URANIUM
IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-47

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_TOTU_1014B.mxd
05/24/04



Legend

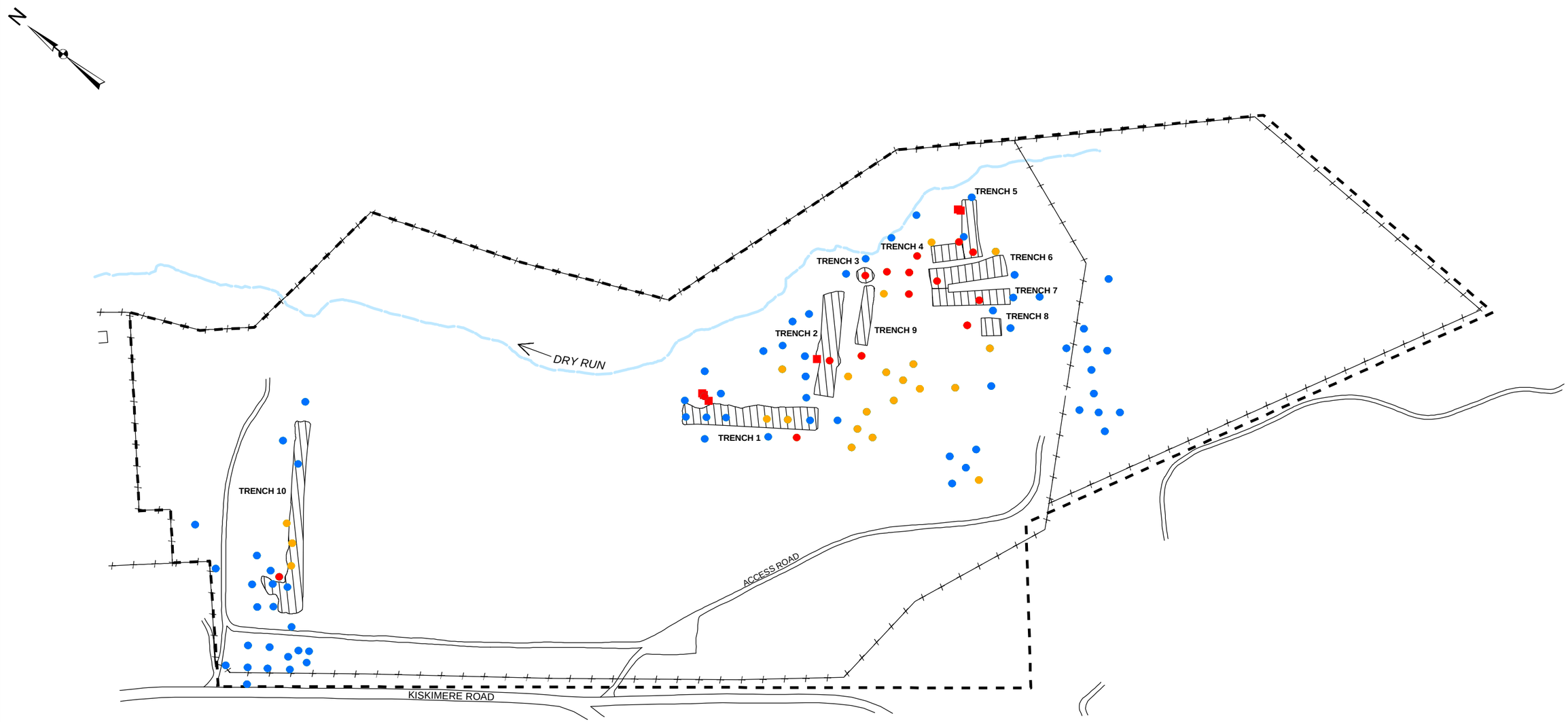
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.960 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.960 - 5.920 pCi/g)
- Radionuclide Detected Above Twice Background (>5.920 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL ISOTOPIC URANIUM IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-48

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_ISOU_0.54.mxd
05/24/04



Legend

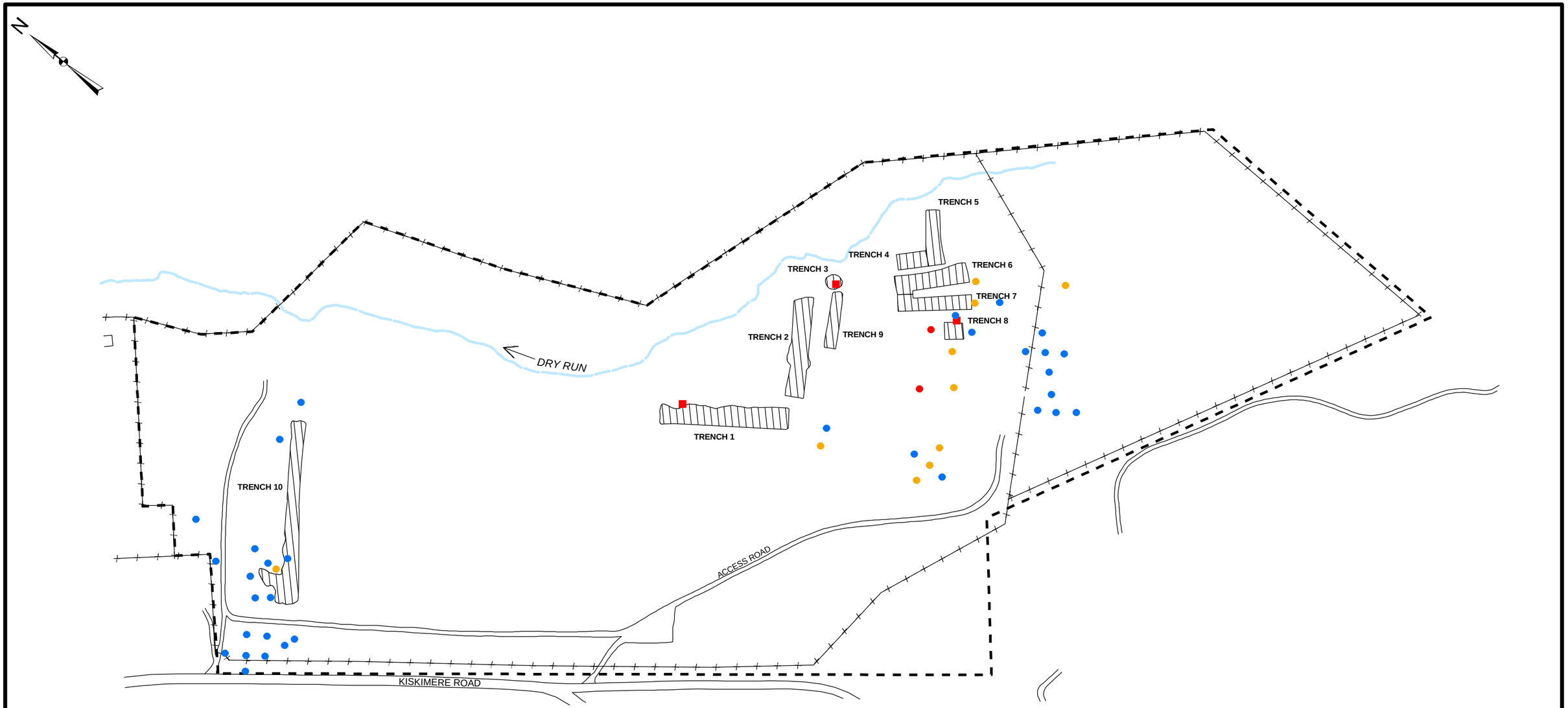
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.960 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.960 - 5.920 pCi/g)
- Radionuclide Detected Above Twice Background (>5.920 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL ISOTOPIC URANIUM IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-49

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_ISOU_410.mxd
05/24/04



Legend

- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (2.960 pCi/g)
- Radionuclide Detected Between Background and Twice Background (2.960 - 5.920 pCi/g)
- Radionuclide Detected Above Twice Background (>5.920 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

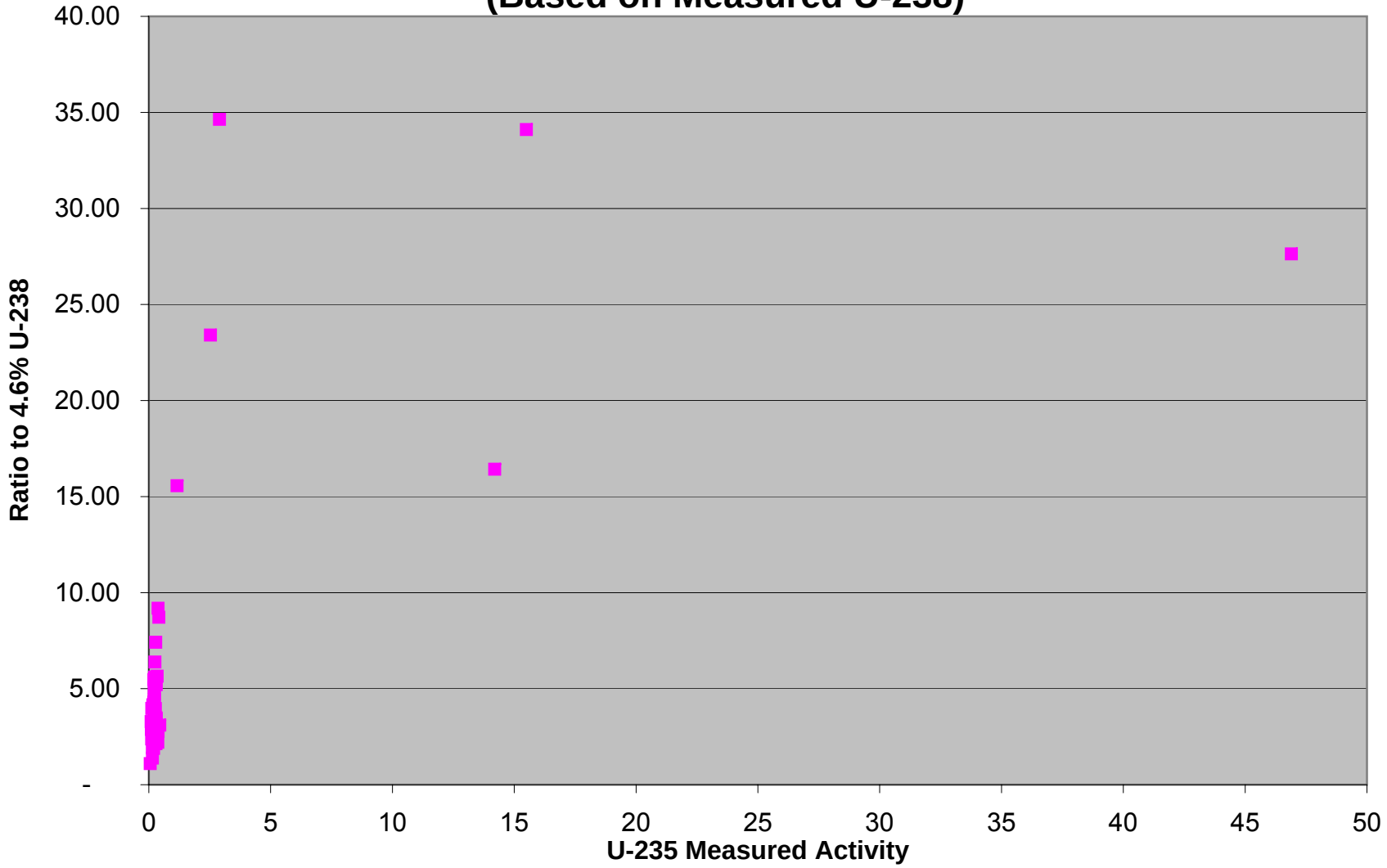
0 100 200 400 Feet

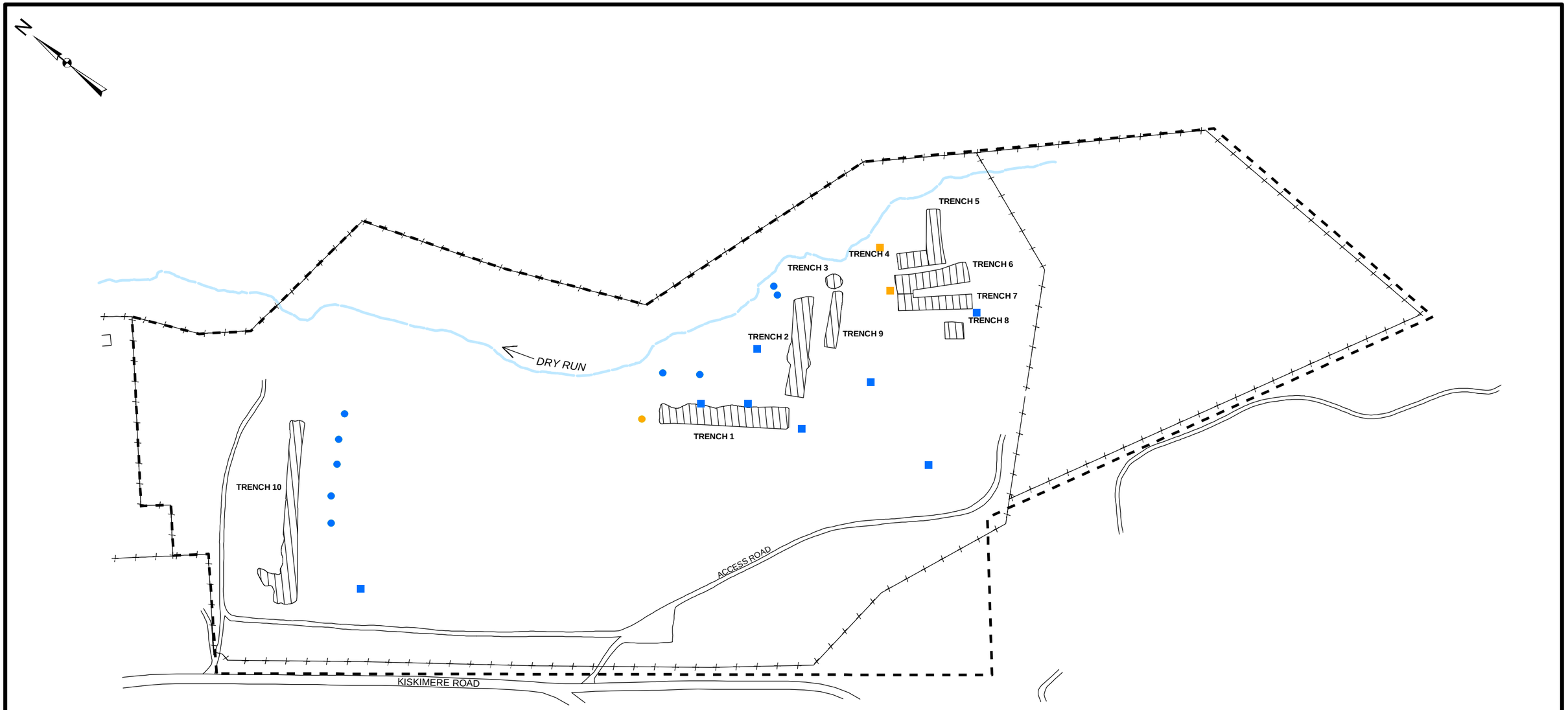
SHALLOW LAND DISPOSAL AREA
TOTAL ISOTOPIC URANIUM IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-50

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_ISOU_1014.mxd
05/24/04

FIGURE 4-51
U-235 Activity Ratio to Natural Uranium in Subsurface Soils
(Based on Measured U-238)





Legend

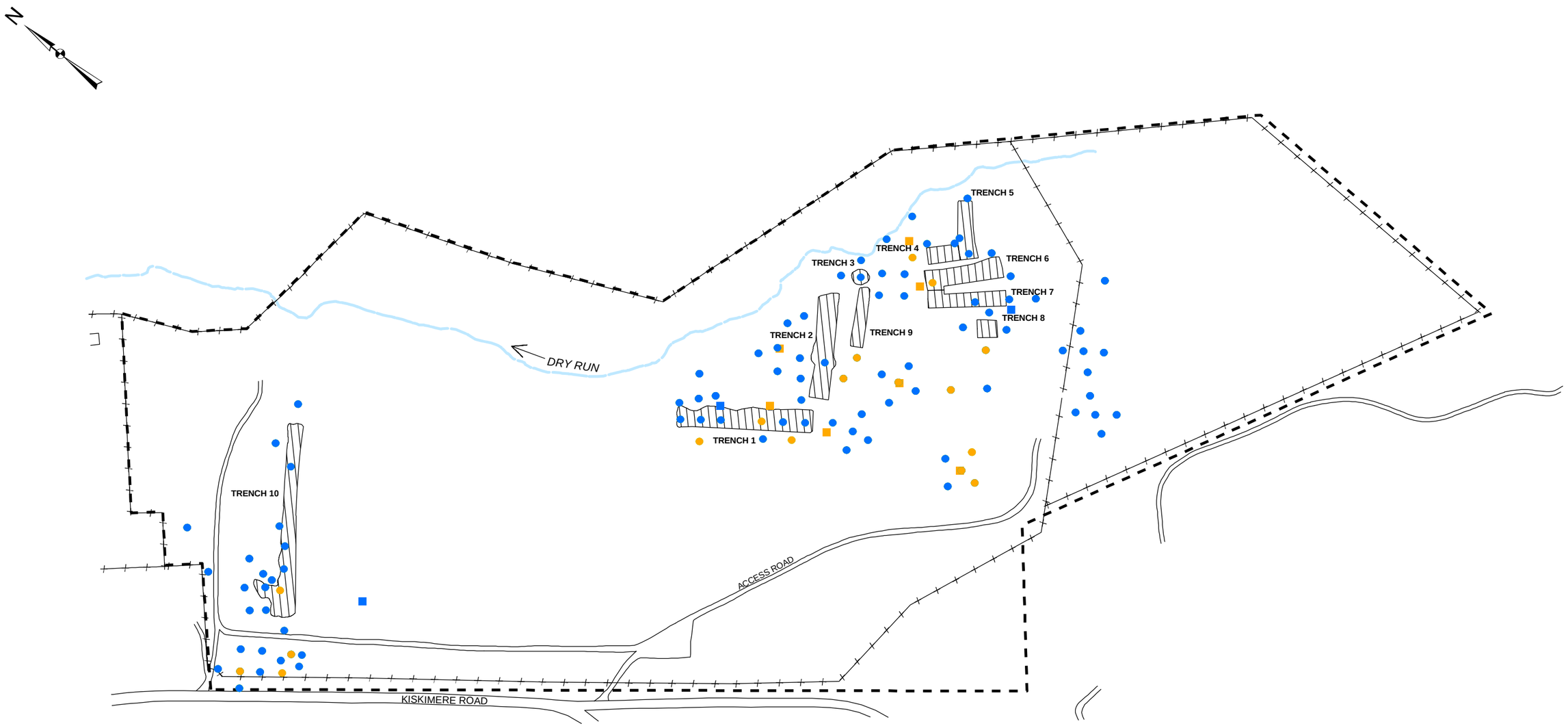
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.770 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.770 - 3.54 pCi/g)
- Radionuclide Detected Above Twice Background (>3.540 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
THORIUM 232 IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-52

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_TH232_24.mxd
05/25/04



Legend

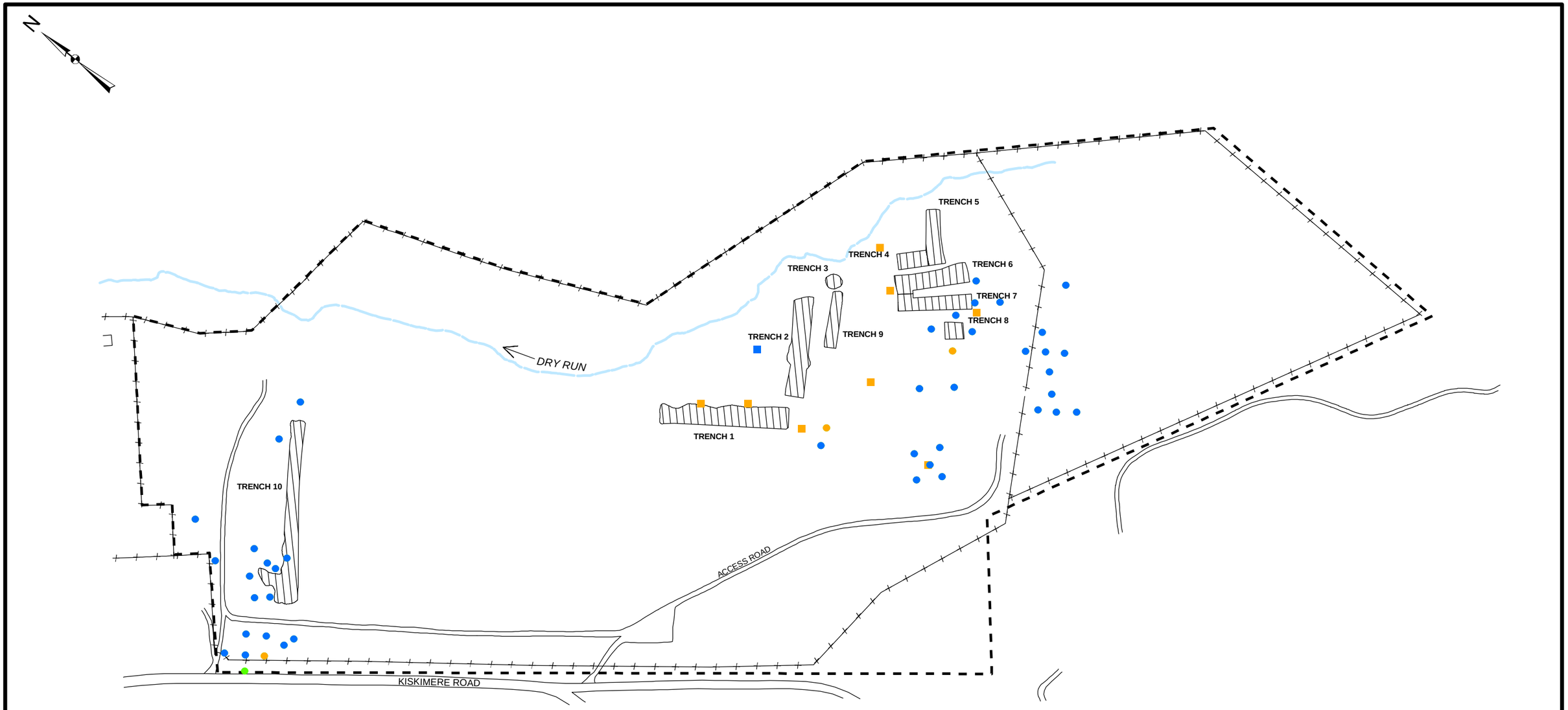
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.770 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.770 - 3.54 pCi/g)
- Radionuclide Detected Above Twice Background (>3.540 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
THORIUM 232 IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-53

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_TH232_410.mxd
05/25/04



Legend

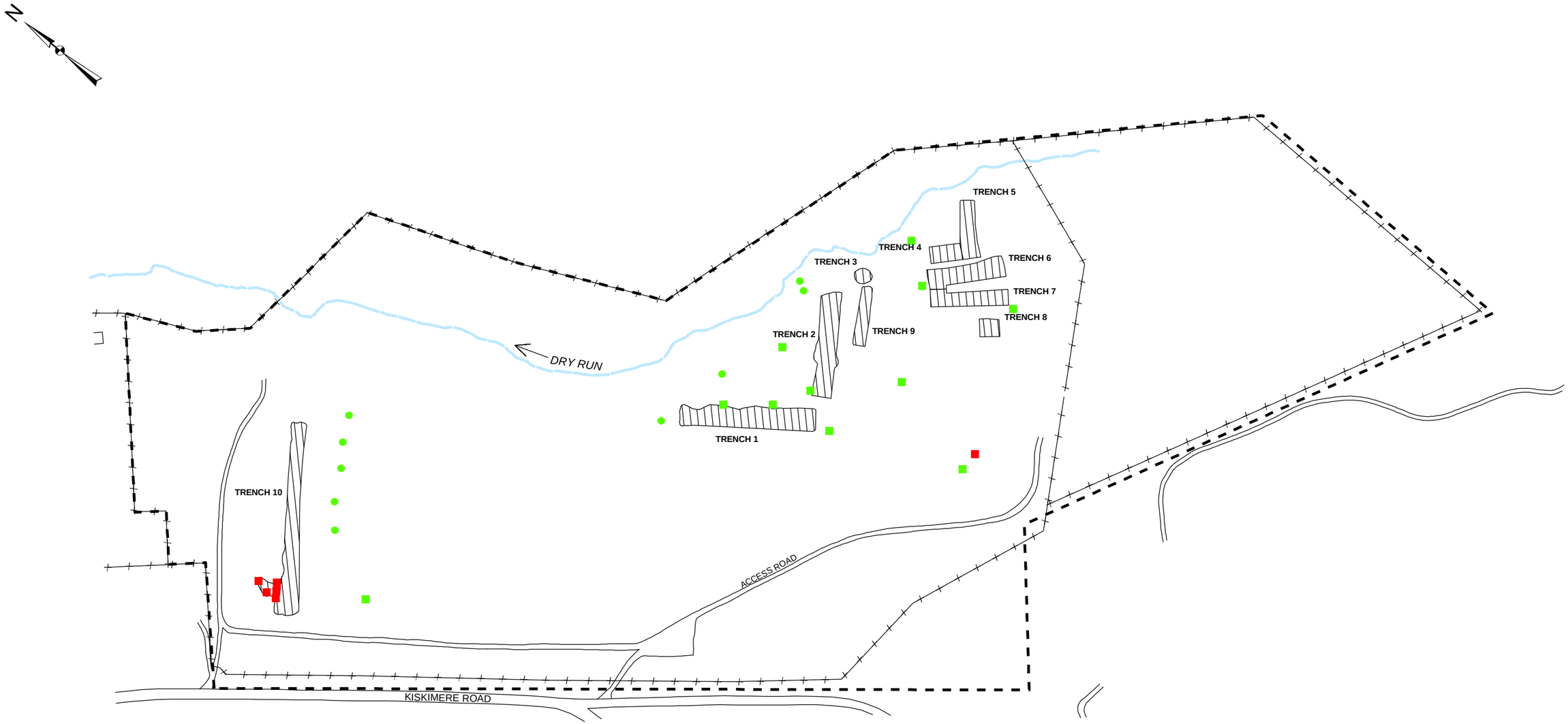
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.770 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.770 - 3.54 pCi/g)
- Radionuclide Detected Above Twice Background (>3.540 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
THORIUM 232 IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-54

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_TH232_1019.mxd
05/25/04



Legend

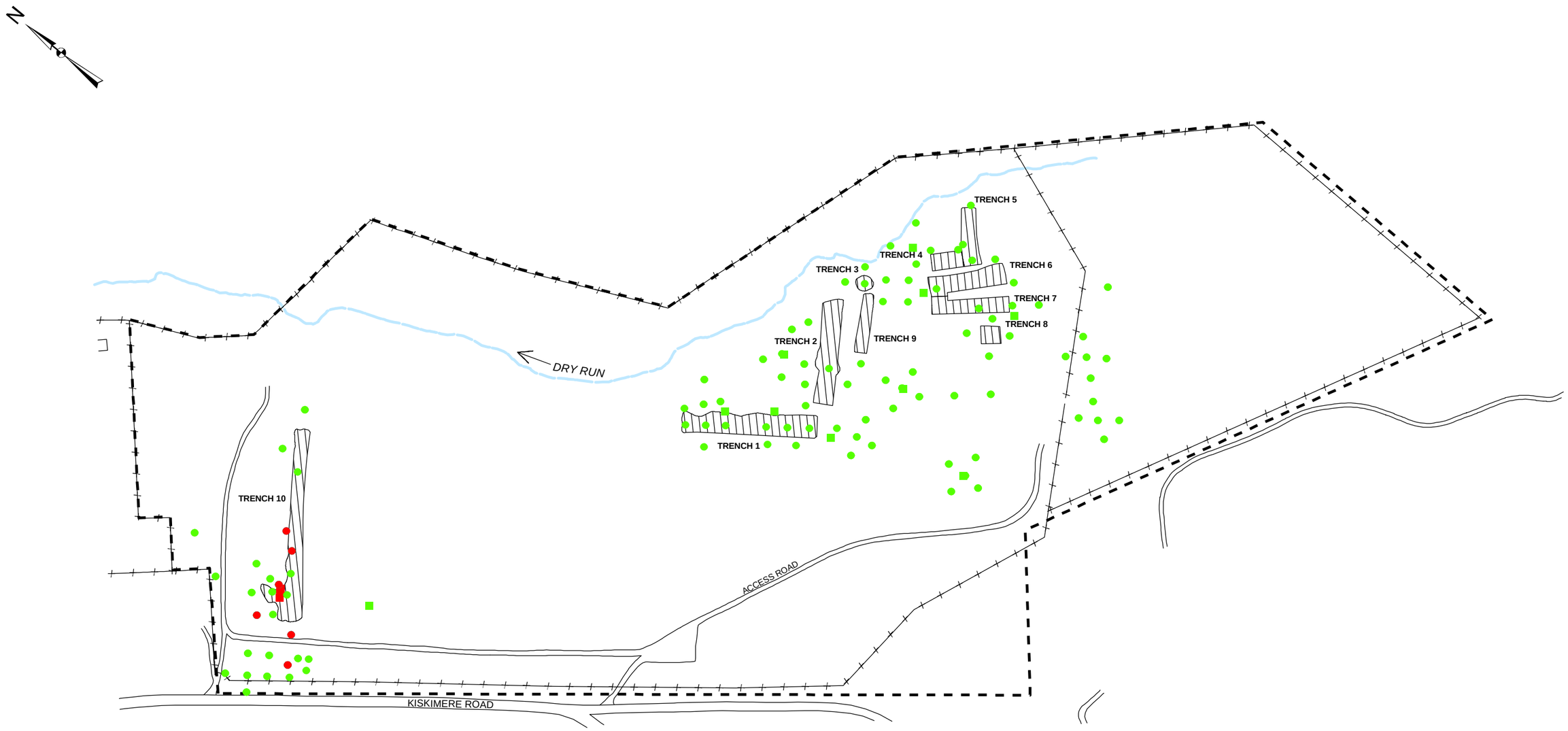
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
AMERICIUM 241 IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-55

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_AM241_24.mxd
05/25/04



Legend

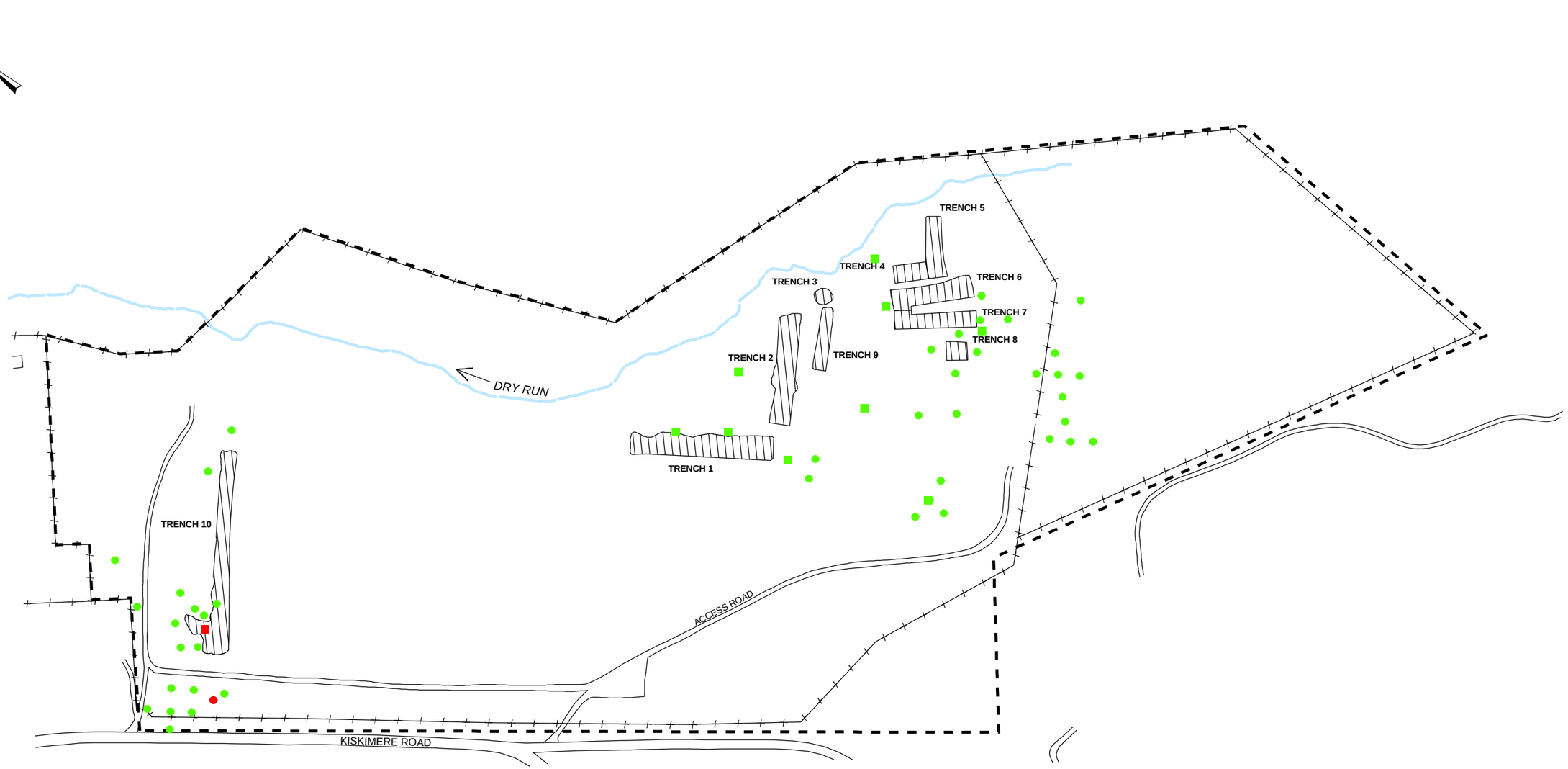
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 105 210 420 Feet

SHALLOW LAND DISPOSAL AREA
AMERICIUM 241 IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-56

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_AM241_410.mxd
05/25/04



Legend

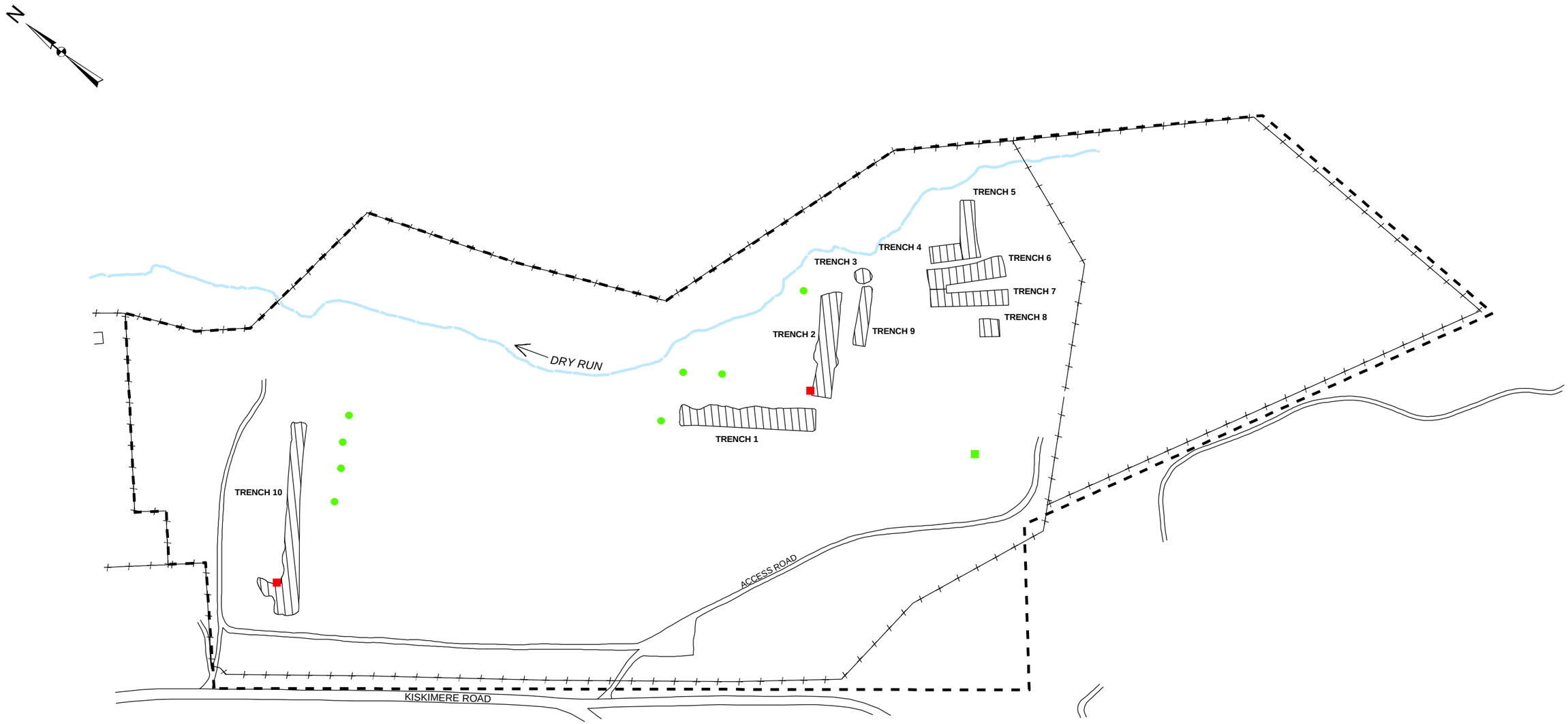
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
AMERICIUM 241 IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-57

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_AM241_1018.mxd
05/25/04



Legend

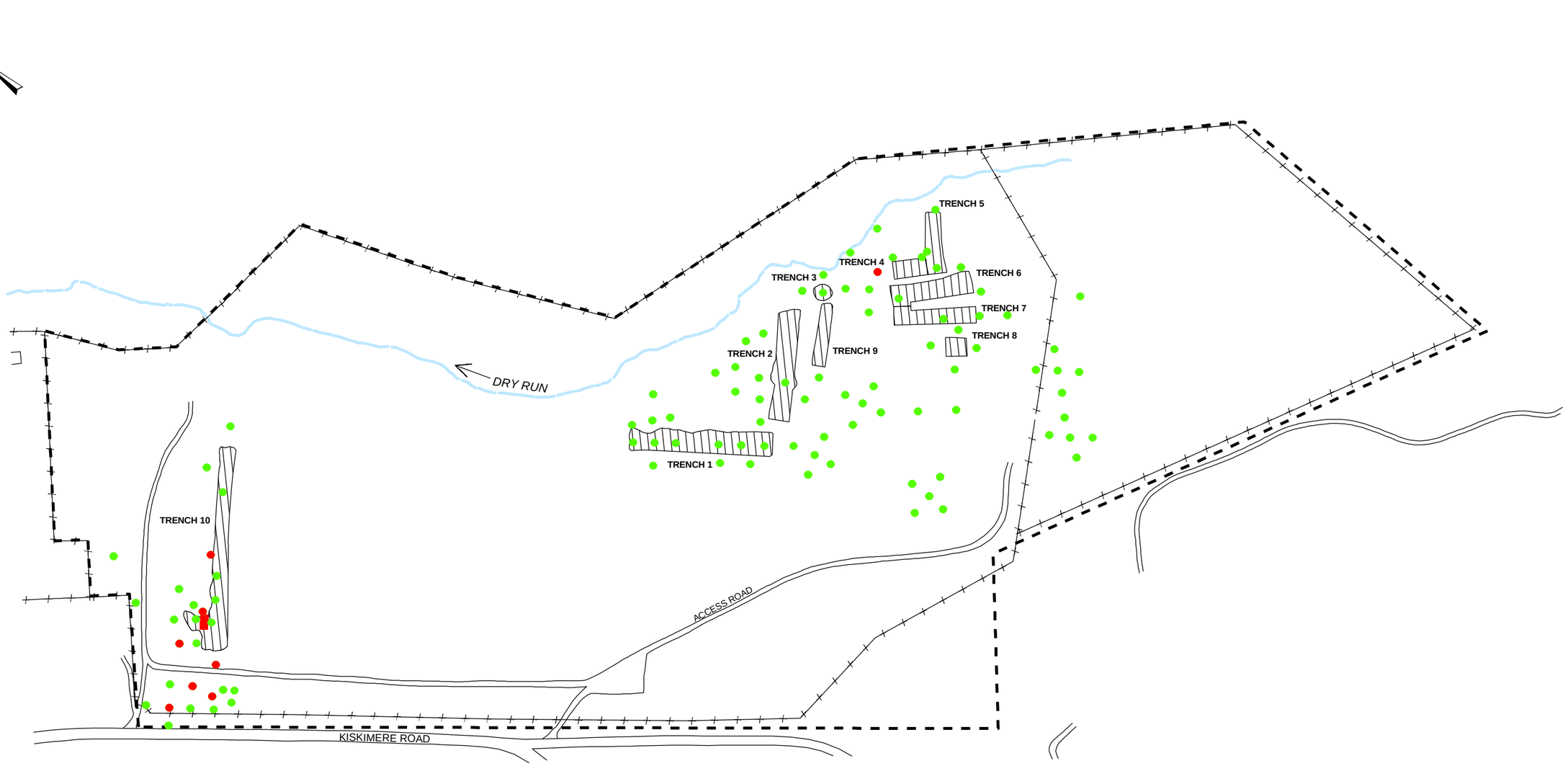
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 239 IN SUBSURFACE SOILS (> 0.5 - 4' BGS)

FIGURE 4-58

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_PU239_24.mxd
05/25/04



Legend

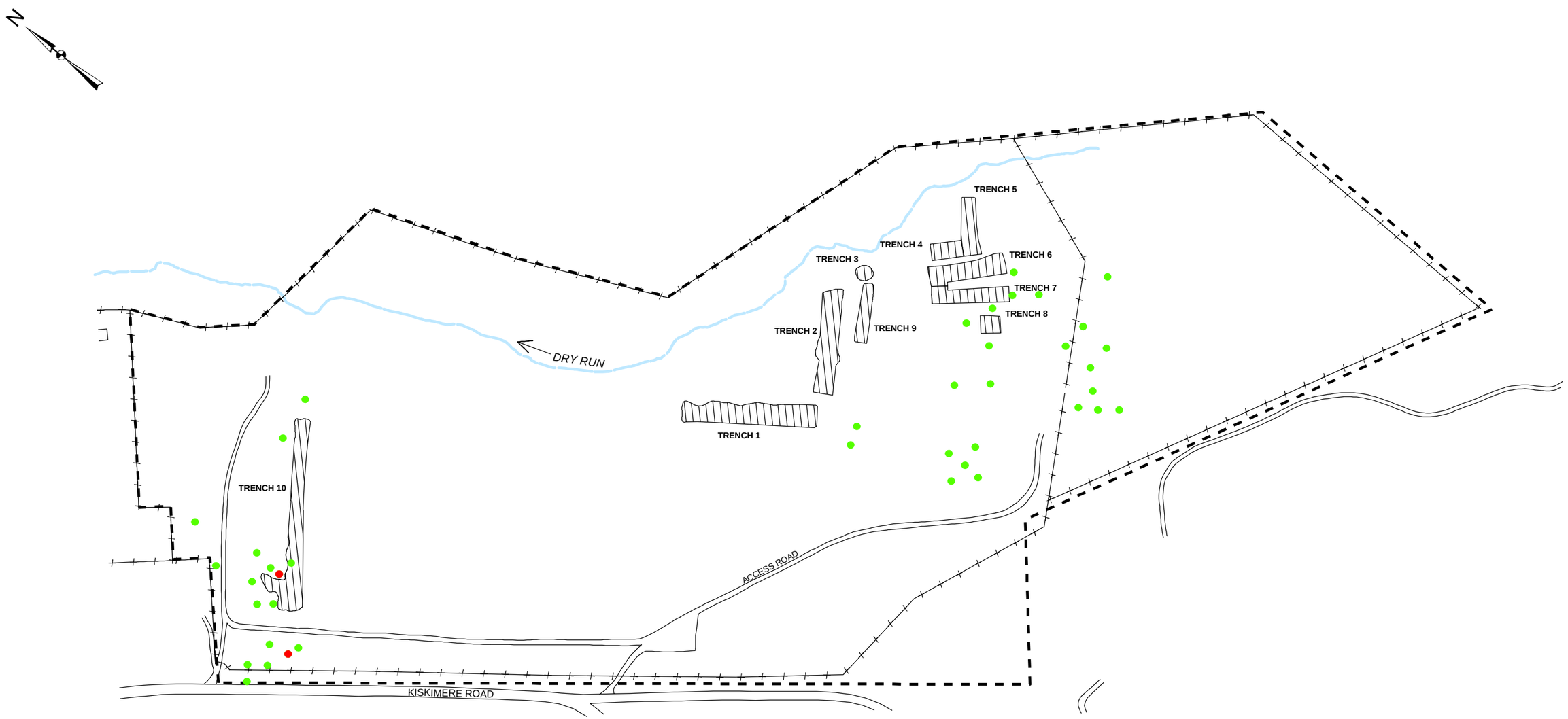
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 239 IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-59

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_PU239-240_410.mxd
05/25/04



Legend

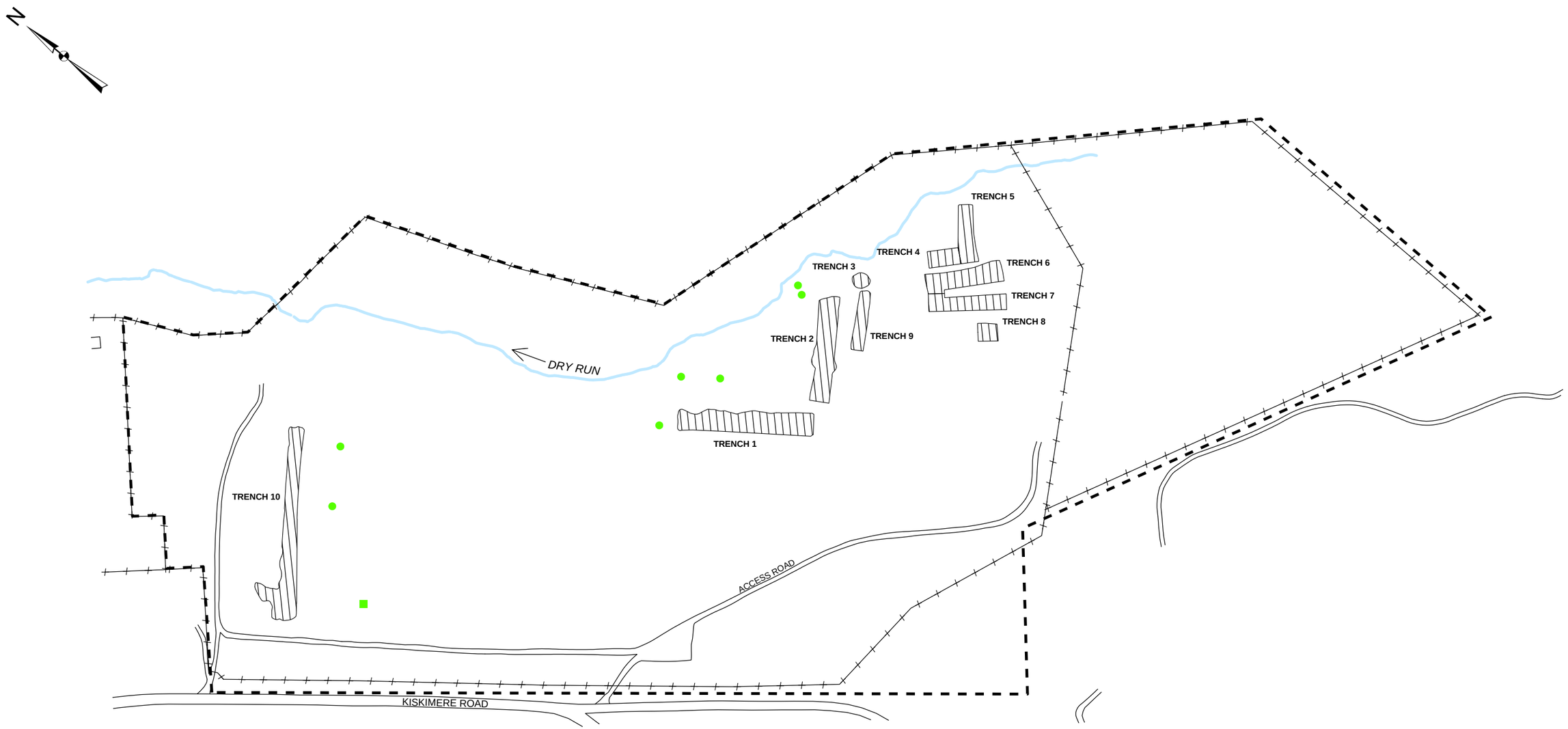
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 239 IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-60

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_PU239-240_1014.mxd
05/25/04



Legend

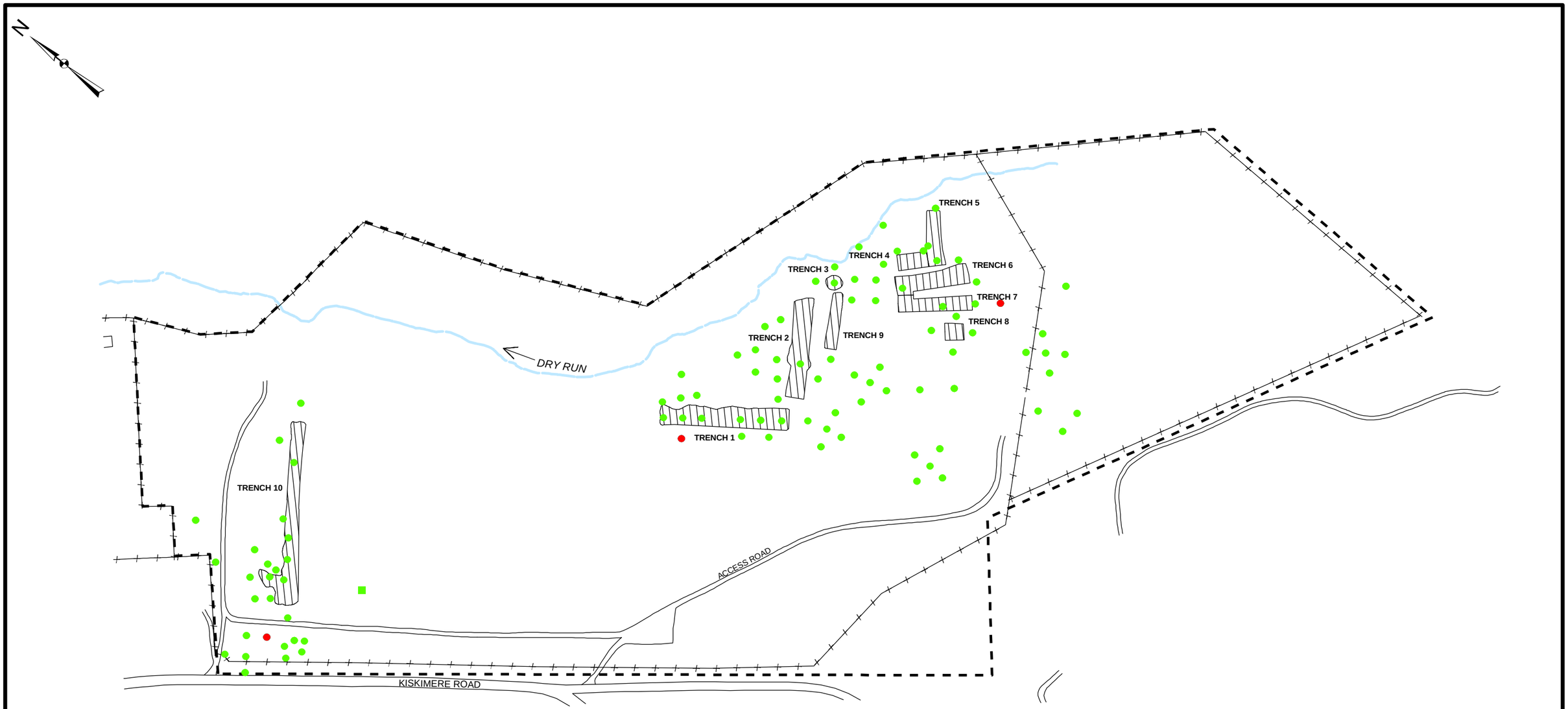
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 241 IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-61

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_PU241_24.mxd
05/24/04



Legend

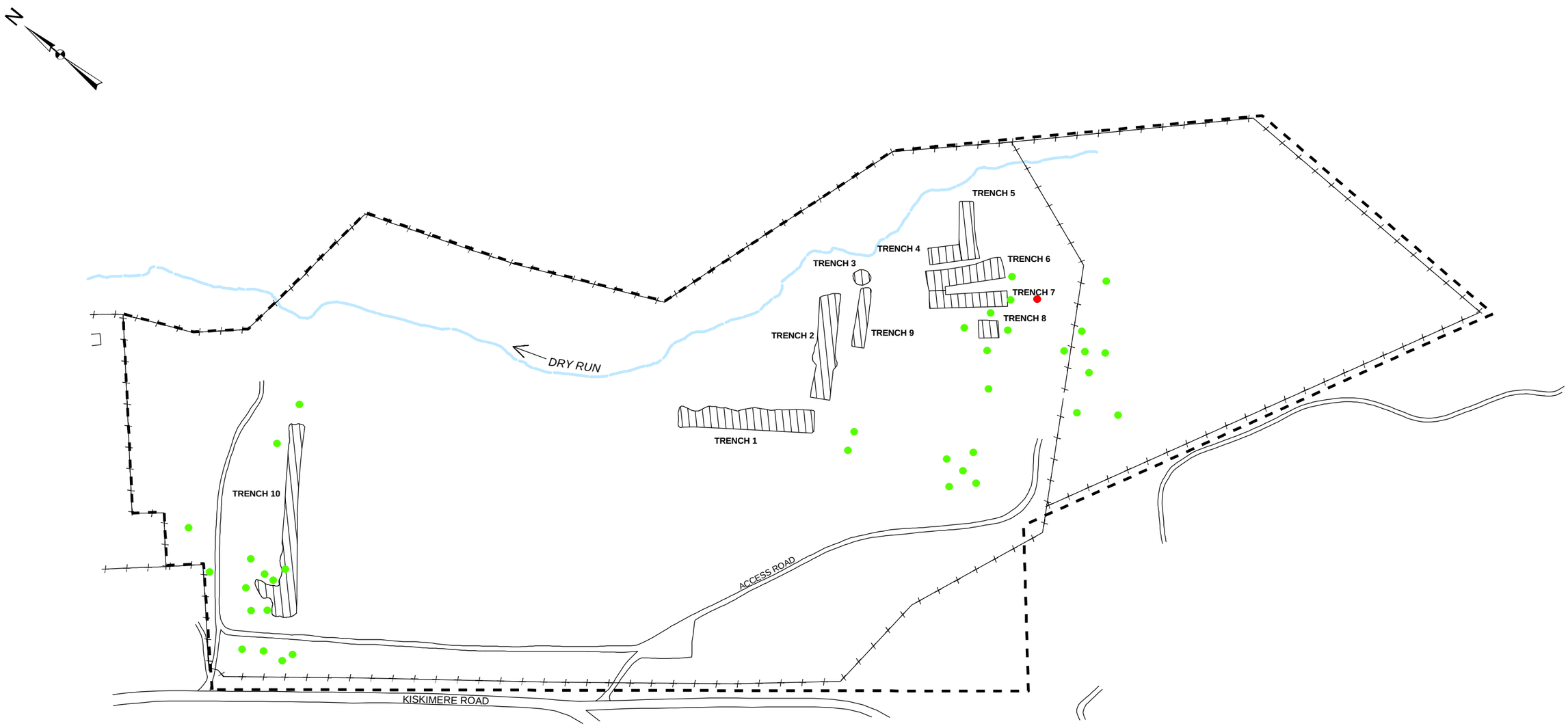
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 241 IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-62

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_PU241_410.mxd
05/25/04



Legend

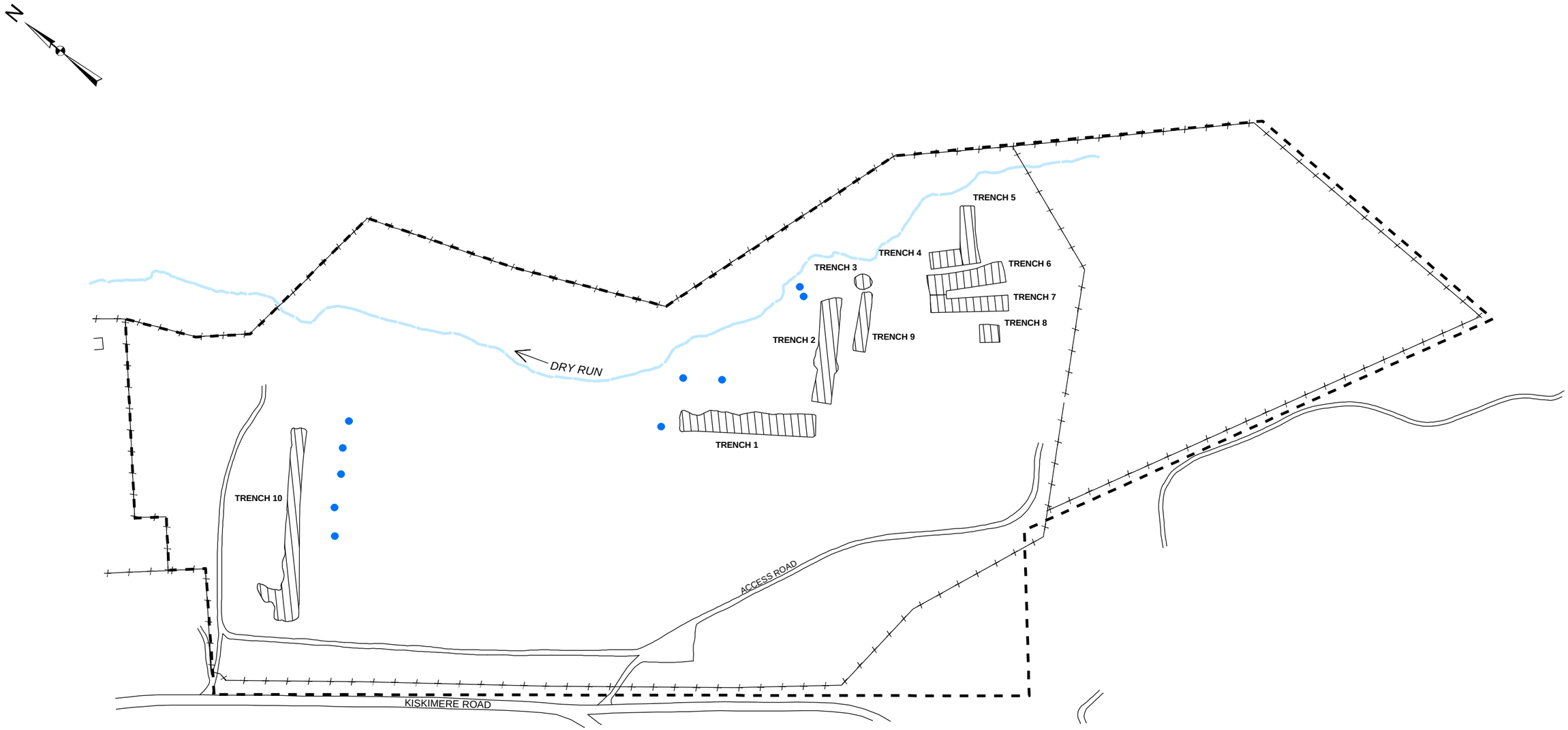
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Above Background (>0.000 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 241 IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-63

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_PU241_1014.mxd
05/25/04



Legend

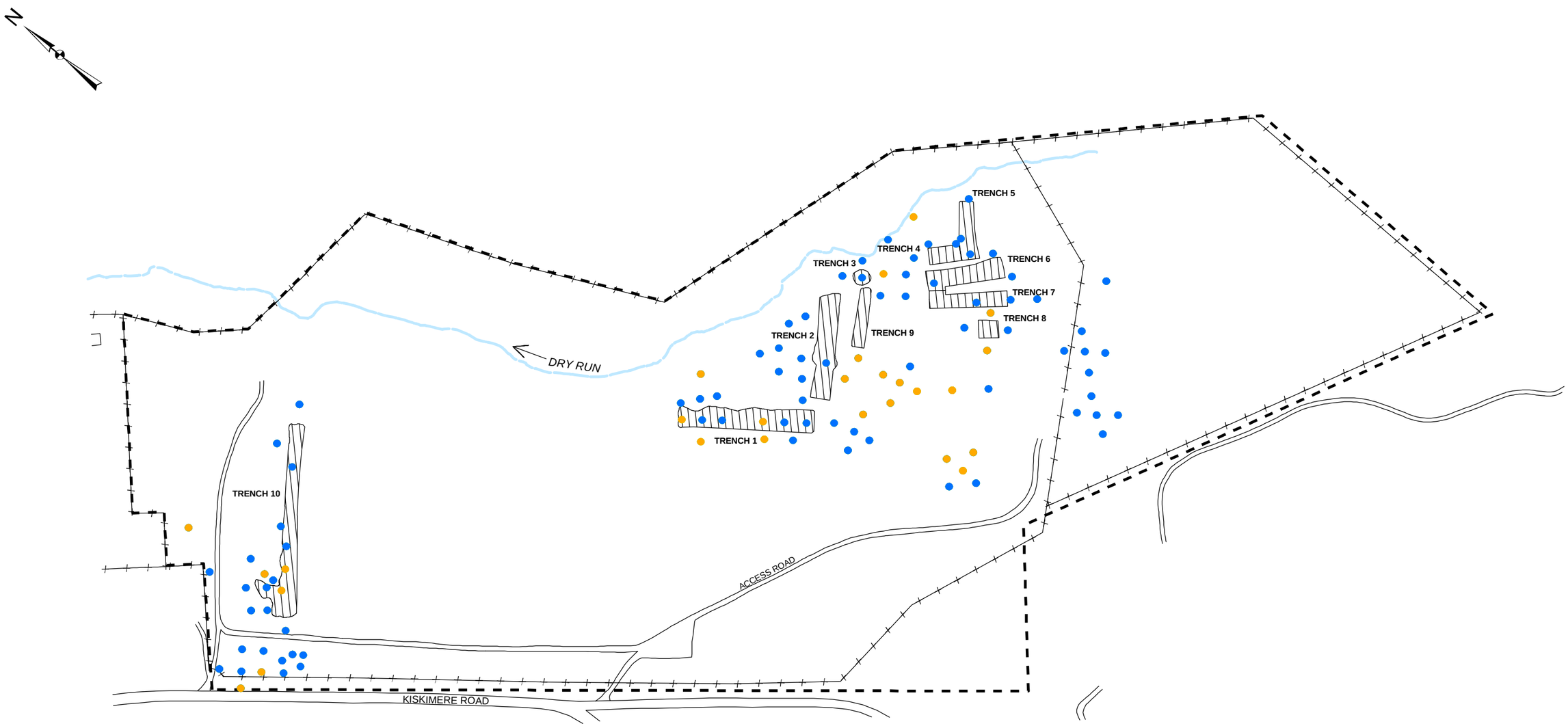
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.66 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.66 - 3.32 pCi/g)
- Radionuclide Detected Above Twice Background (>3.32 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RADIUM 228 IN SUBSURFACE SOILS (>0.5 - 4' BGS)

FIGURE 4-64

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_RD228_24.mxd Date: 05/24/04 1:18:15 PM



Legend

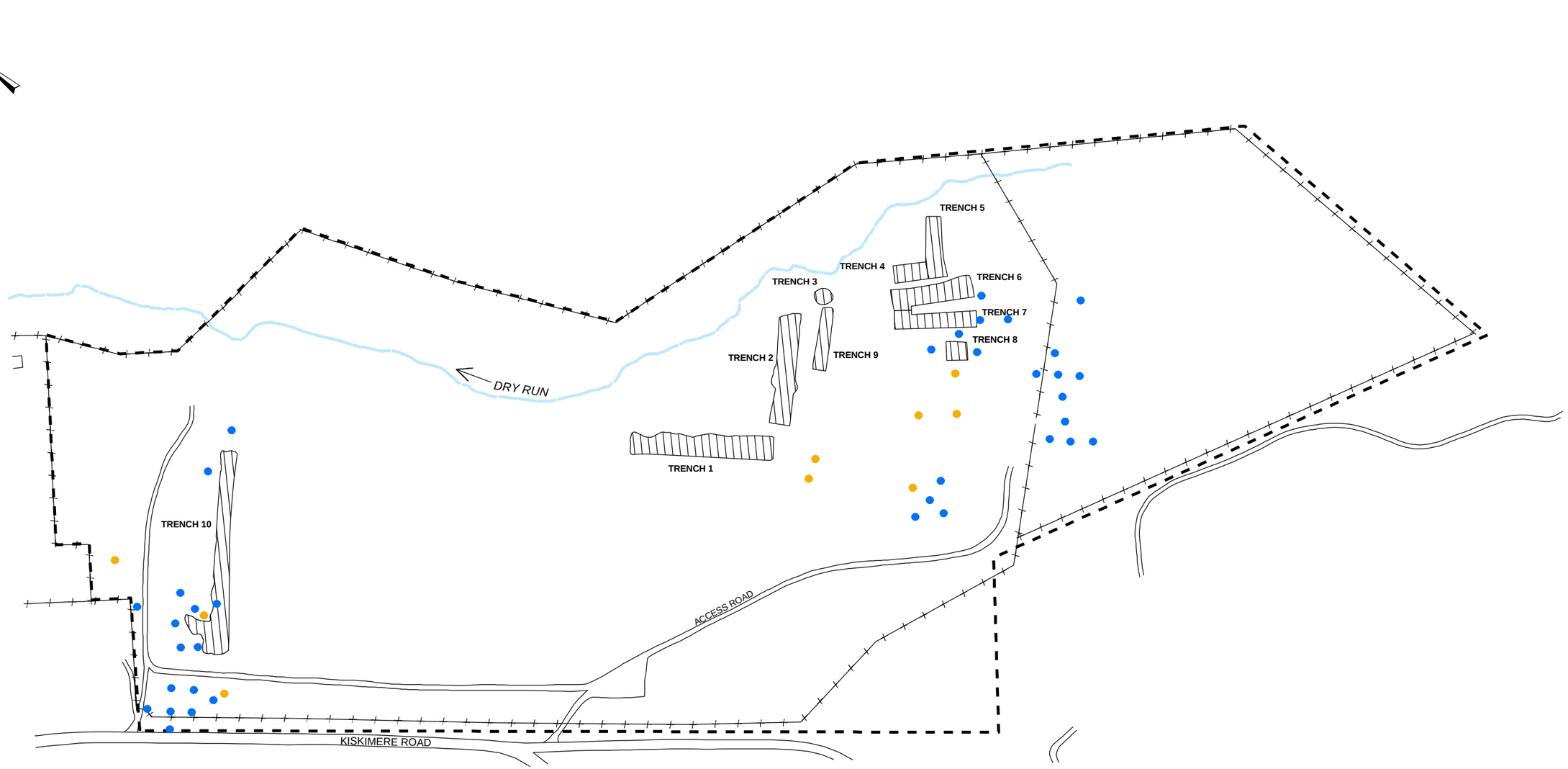
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.66 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.66 - 3.32 pCi/g)
- Radionuclide Detected Above Twice Background (>3.32 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RADIUM 228 IN SUBSURFACE SOILS (4 - 10' BGS)

FIGURE 4-65

N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_RD228_410.mxd Date: 05/24/04 1:21:07 PM



Legend

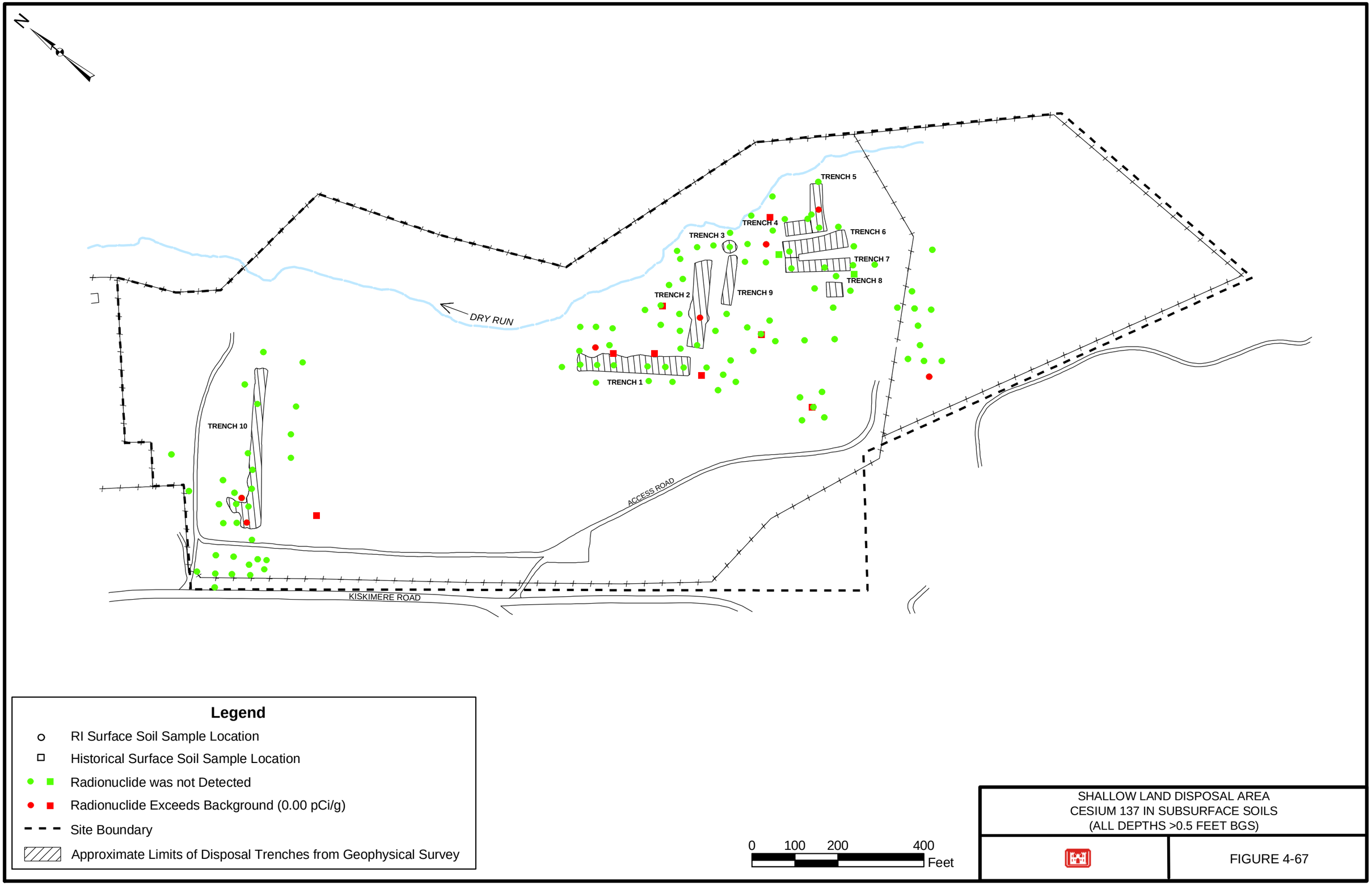
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.66 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.66 - 3.32 pCi/g)
- Radionuclide Detected Above Twice Background (>3.32 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RADIUM 228 IN SUBSURFACE SOILS (>10' BGS)

FIGURE 4-66

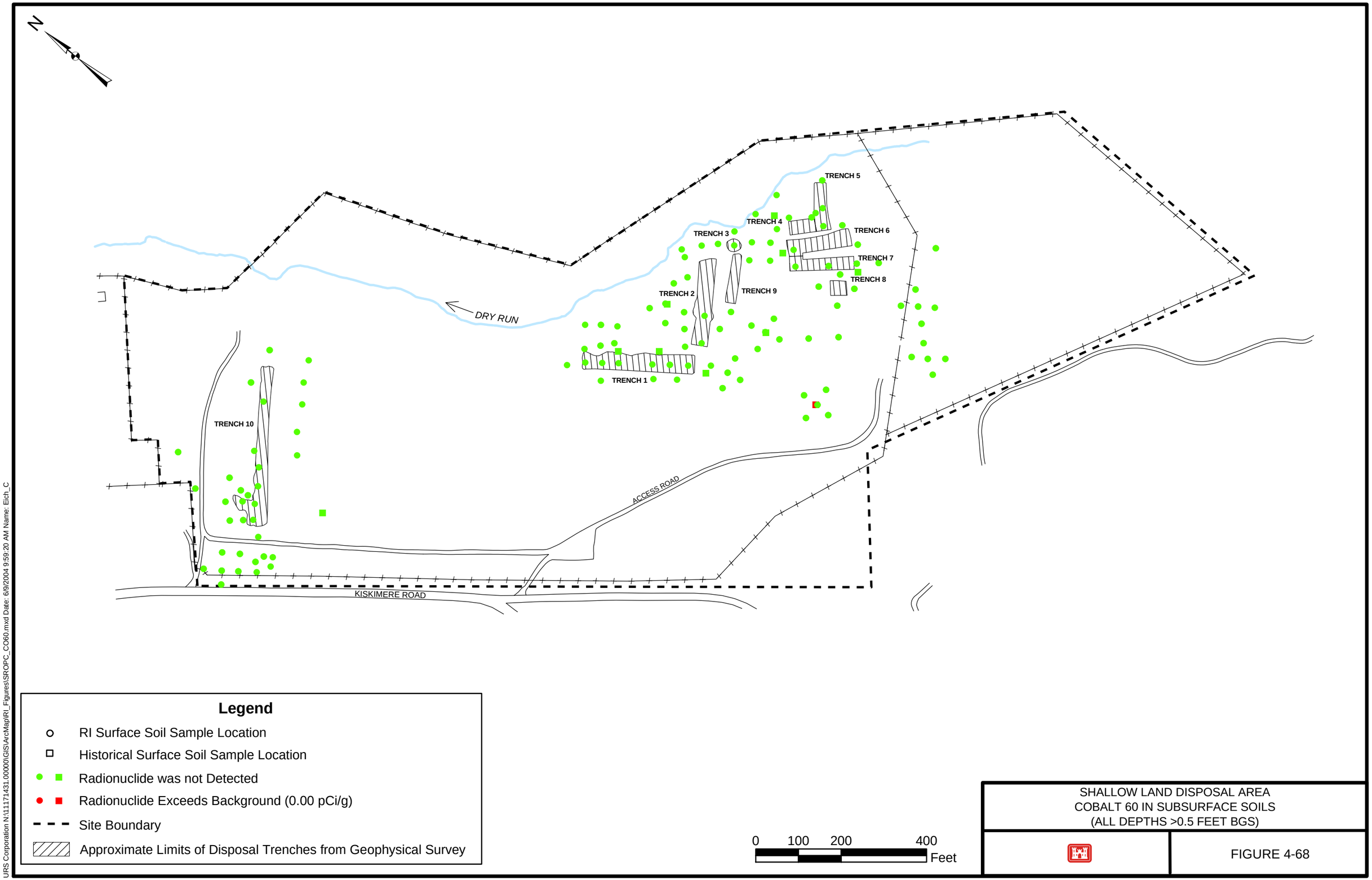
N:\11171431.00000\GIS\ArcMap\RI_Figures\sub_RD228_1014.mxd Date: 05/24/04 1:24:25 PM



SHALLOW LAND DISPOSAL AREA
CESIUM 137 IN SUBSURFACE SOILS
(ALL DEPTHS >0.5 FEET BGS)

FIGURE 4-67

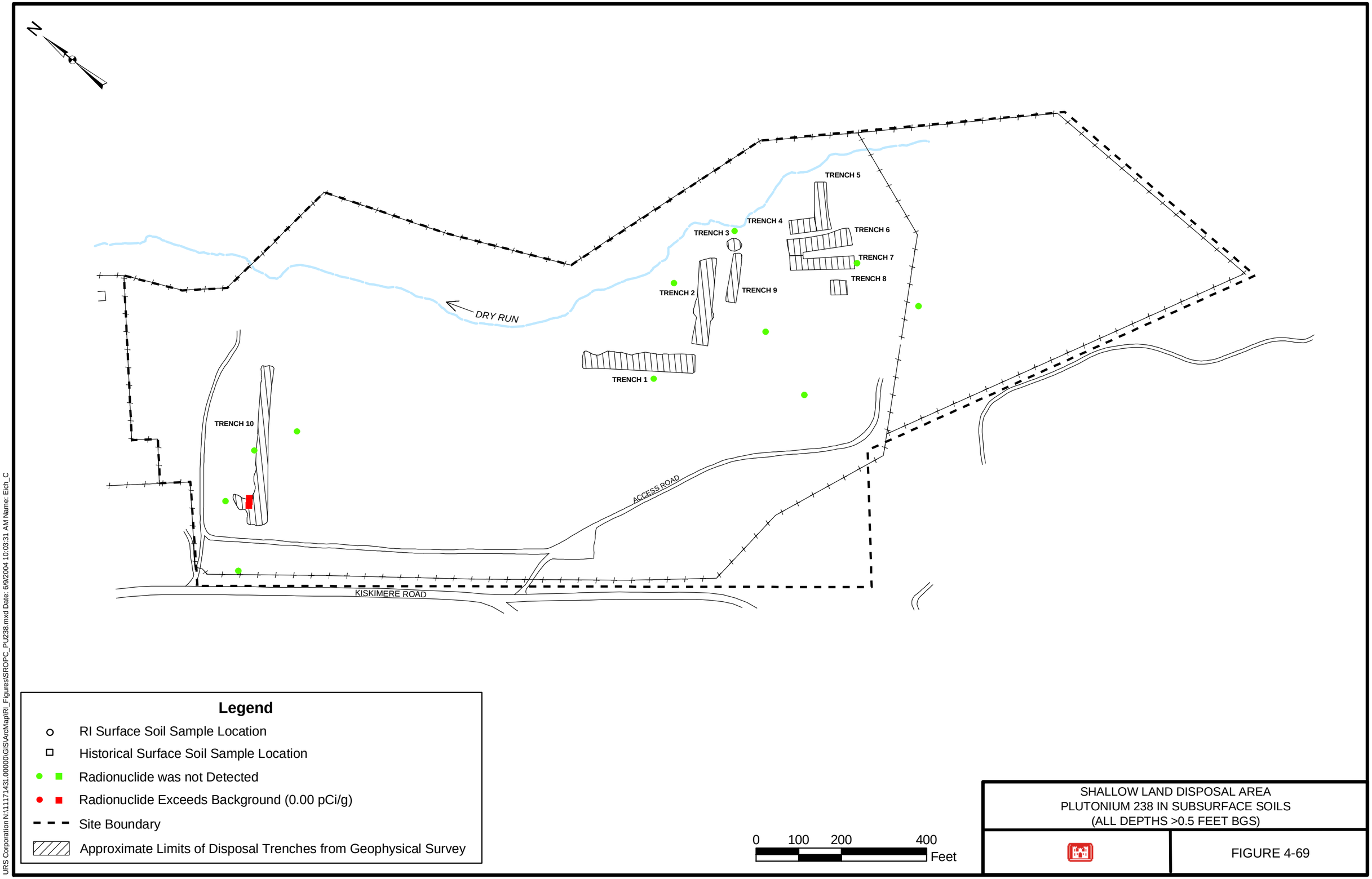
URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\SROPC_CS137.mxd Date: 6/9/2004 10:02:24 AM Name: Eich_C



SHALLOW LAND DISPOSAL AREA
COBALT 60 IN SUBSURFACE SOILS
(ALL DEPTHS >0.5 FEET BGS)

FIGURE 4-68

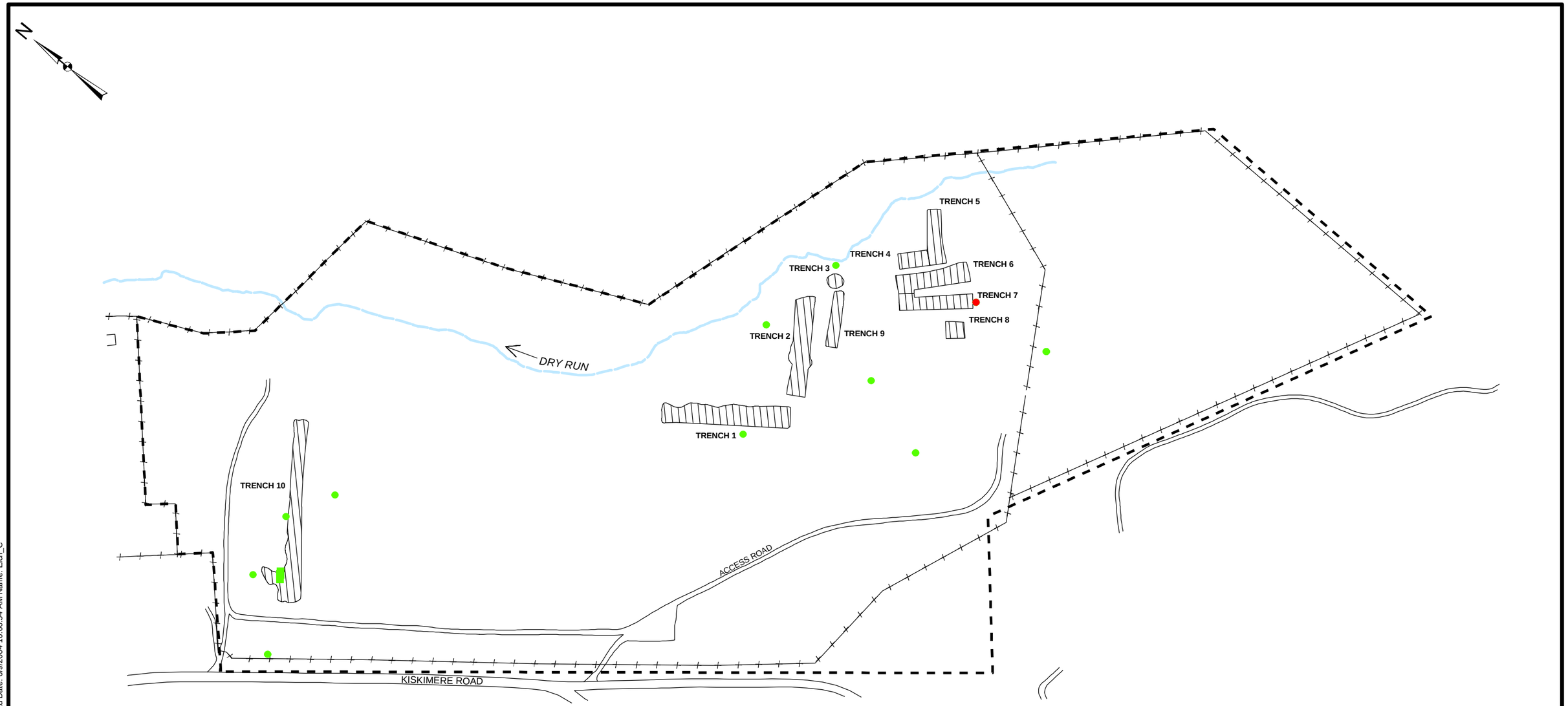
URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\SROPC_CO60.mxd Date: 6/9/2004 9:59:20 AM Name: Eich_C



SHALLOW LAND DISPOSAL AREA
PLUTONIUM 238 IN SUBSURFACE SOILS
(ALL DEPTHS >0.5 FEET BGS)

FIGURE 4-69

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\SROPC_PU238.mxd Date: 6/9/2004 10:03:31 AM Name: Eich_C



Legend

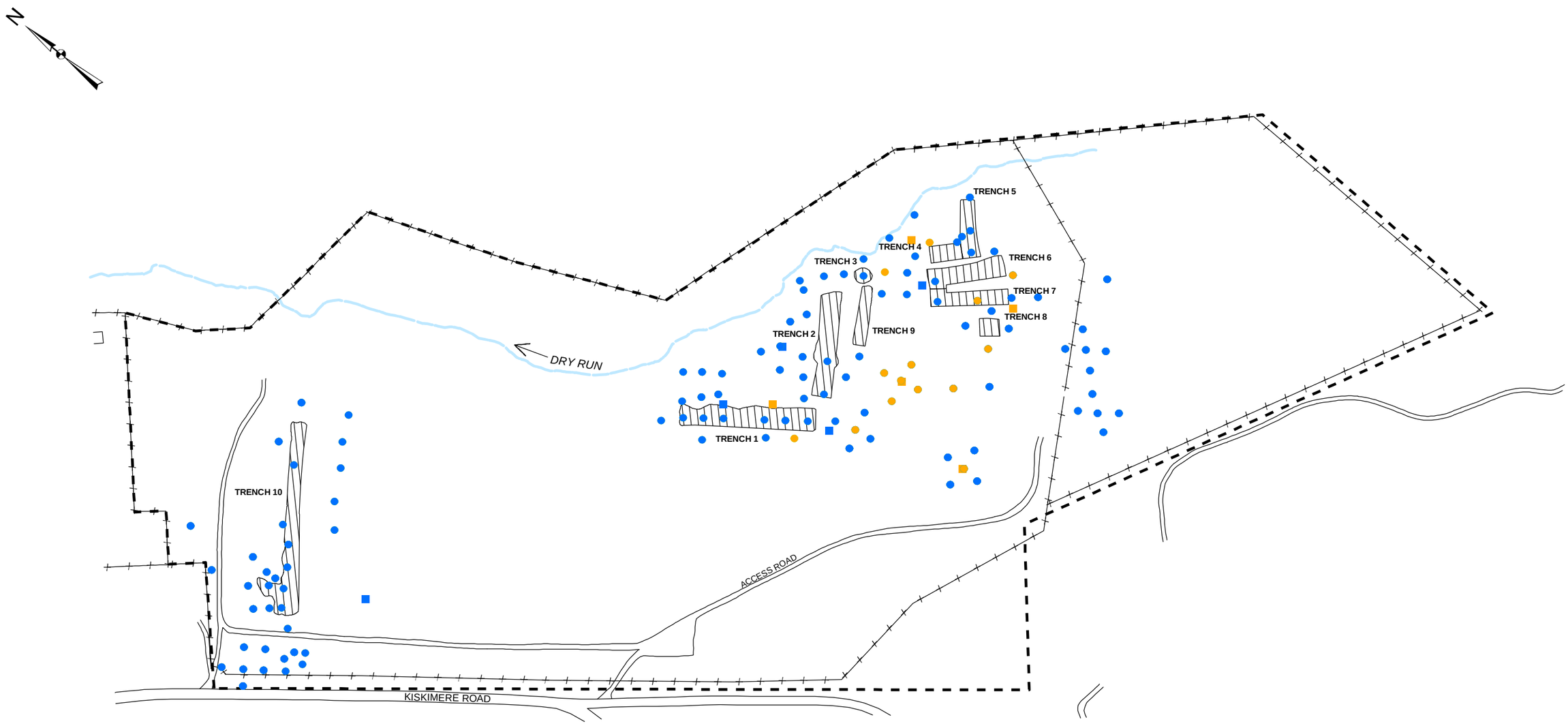
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Exceeds Background (0.00 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
PLUTONIUM 242 IN SUBSURFACE SOILS
(ALL DEPTHS >0.5 FEET BGS)

FIGURE 4-70

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\SROPC_PU242.mxd Date: 6/9/2004 10:06:54 AM Name: Eich_C



Legend

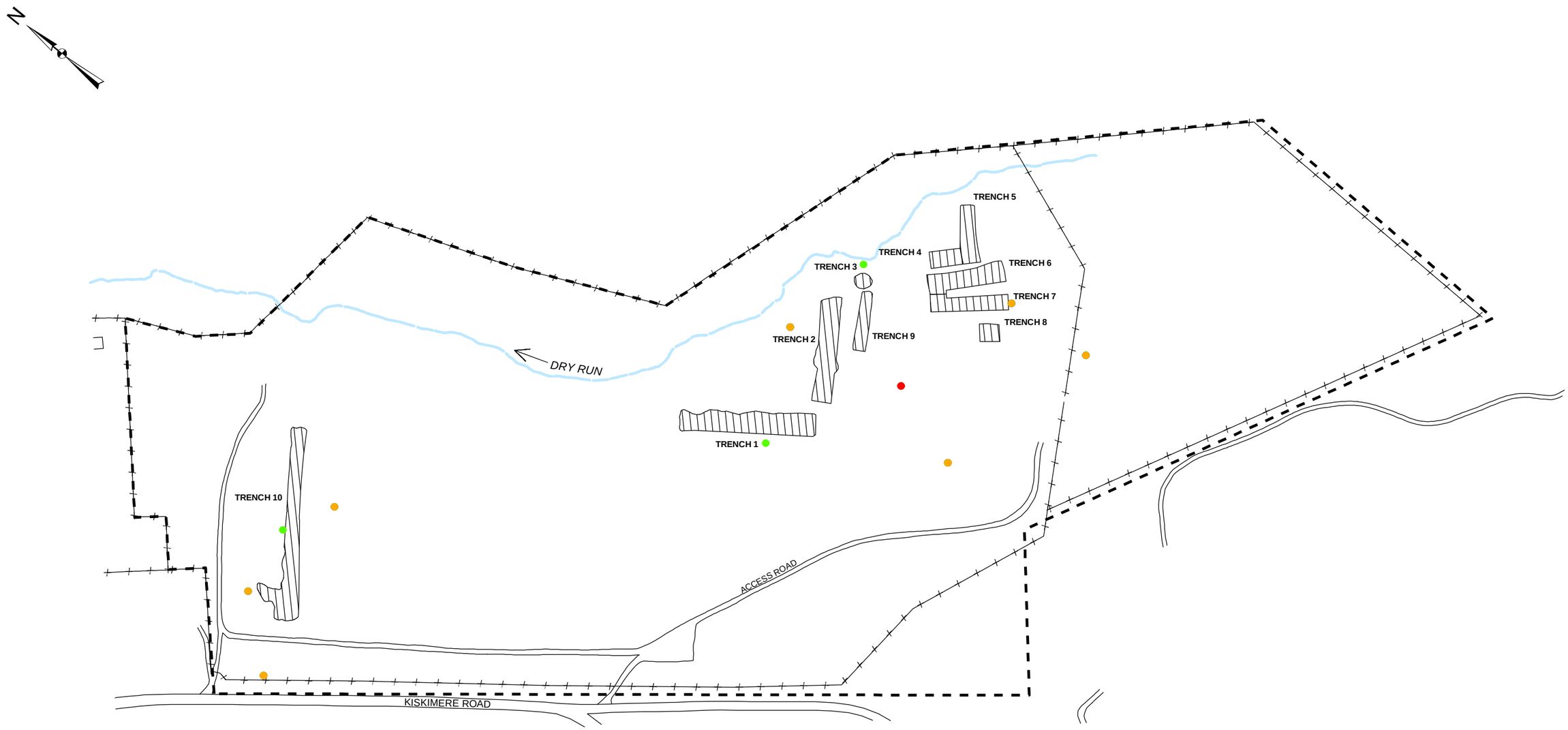
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.32 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.32 - 2.64 pCi/g)
- Radionuclide Detected Above Twice Background (>2.64 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RADIUM 226 IN SUBSURFACE SOILS
(ALL DEPTHS >0.5 FEET BGS)

FIGURE 4-71

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\SROPC_RD226.mxd Date: 6/9/2004 10:11:21 AM Name: Elch_C



Legend

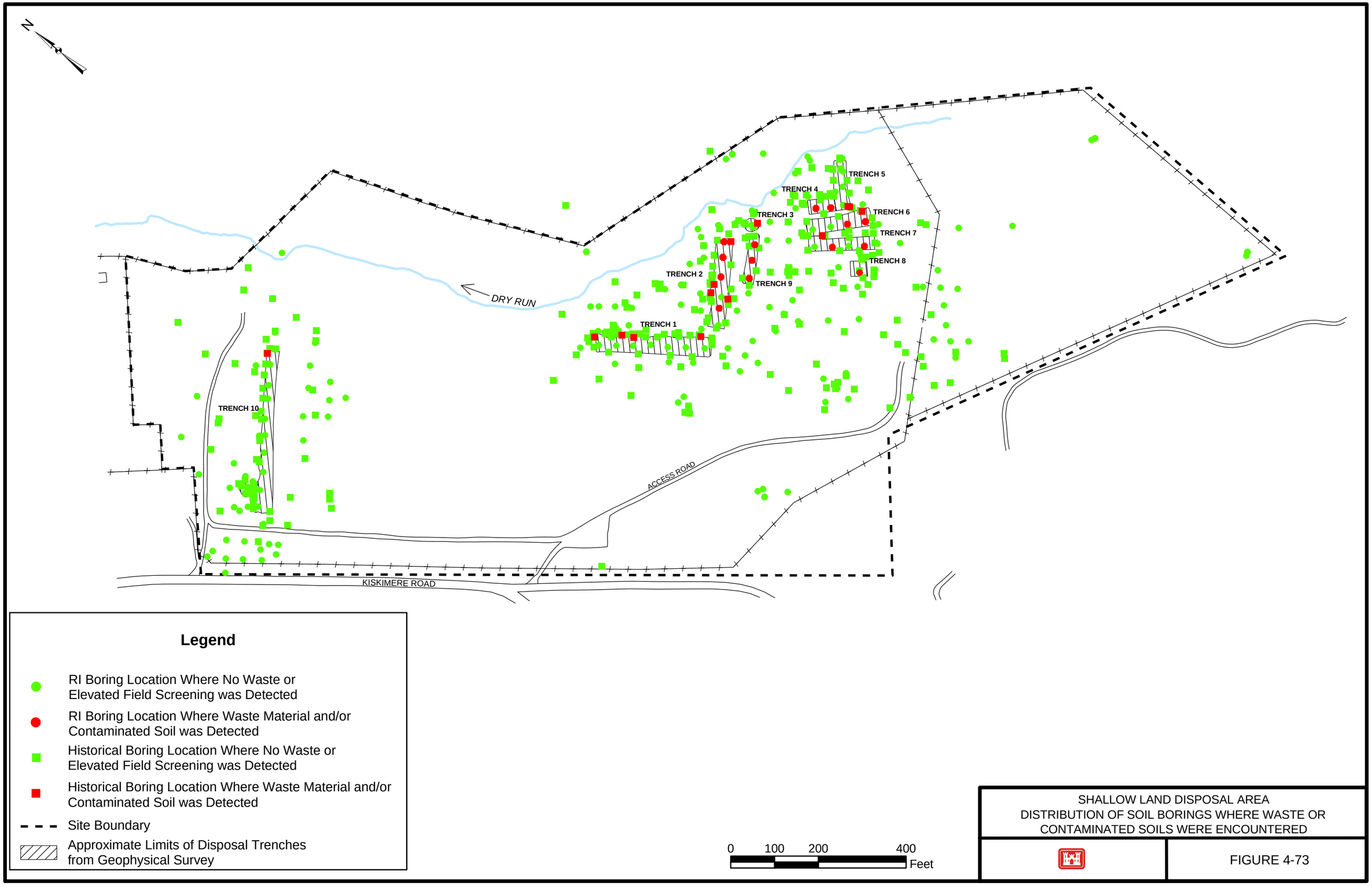
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below Background (1.155 pCi/g)
- Radionuclide Detected Between Background and Twice Background (1.155 - 2.310 pCi/g)
- Radionuclide Detected Above Twice Background (>2.310 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
THORIUM 230 IN SUBSURFACE SOILS
(ALL DEPTHS >0.5 FEET BGS)

FIGURE 4-72

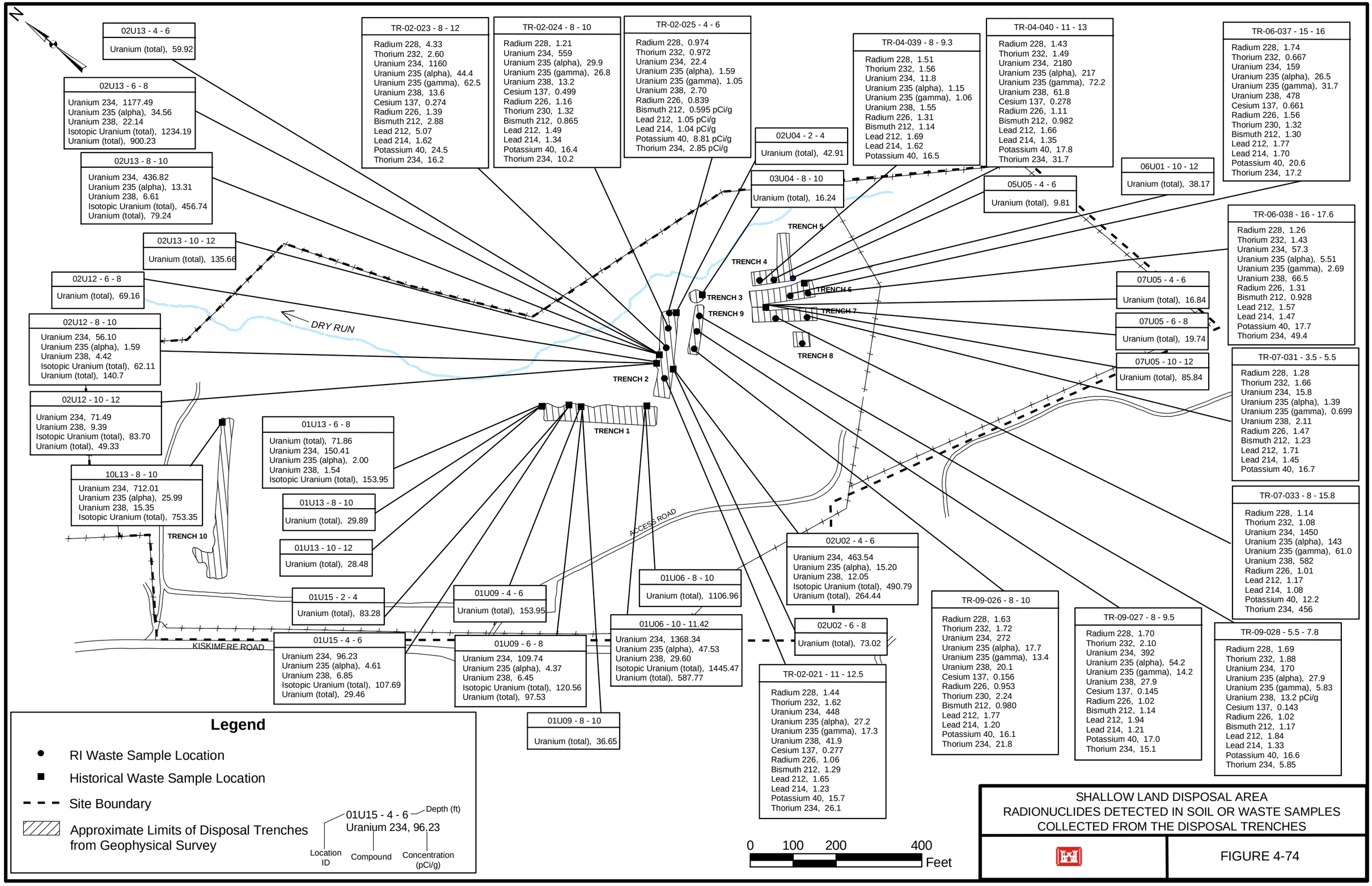
URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\SROPC_TH230.mxd Date: 6/9/2004 10:14:29 AM Name: Eich_C



SHALLOW LAND DISPOSAL AREA
DISTRIBUTION OF SOIL BORINGS WHERE WASTE OR CONTAMINATED SOILS WERE ENCOUNTERED

FIGURE 4-73

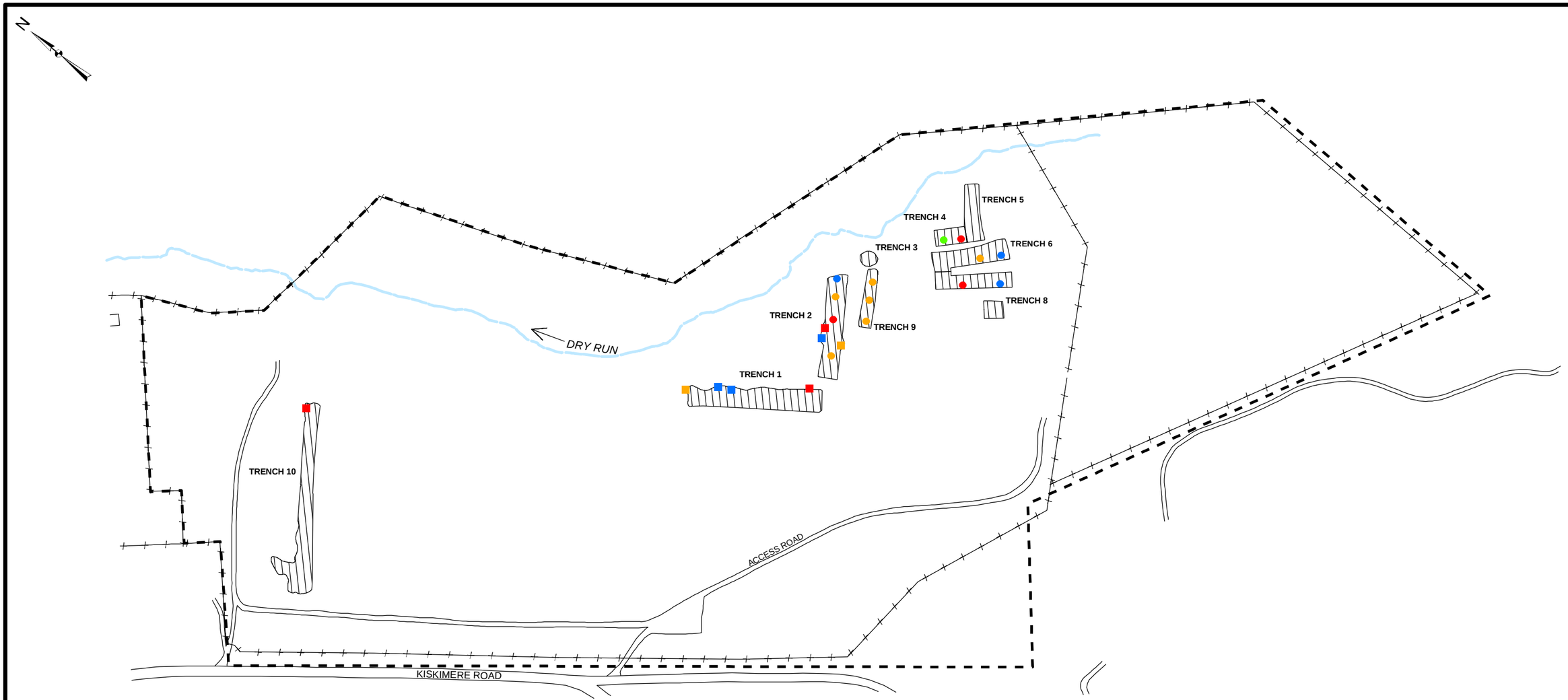
URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\TRENCH_BORINGS.mxd Date: 6/2/2004 11:35:07 AM Name: Eich_C



SHALLOW LAND DISPOSAL AREA
RADIONUCLIDES DETECTED IN SOIL OR WASTE SAMPLES COLLECTED FROM THE DISPOSAL TRENCHES

FIGURE 4-74

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WASTE_CE2.mxd Date: 6/2/2004 12:39:15 PM Name: Eich_C



Legend

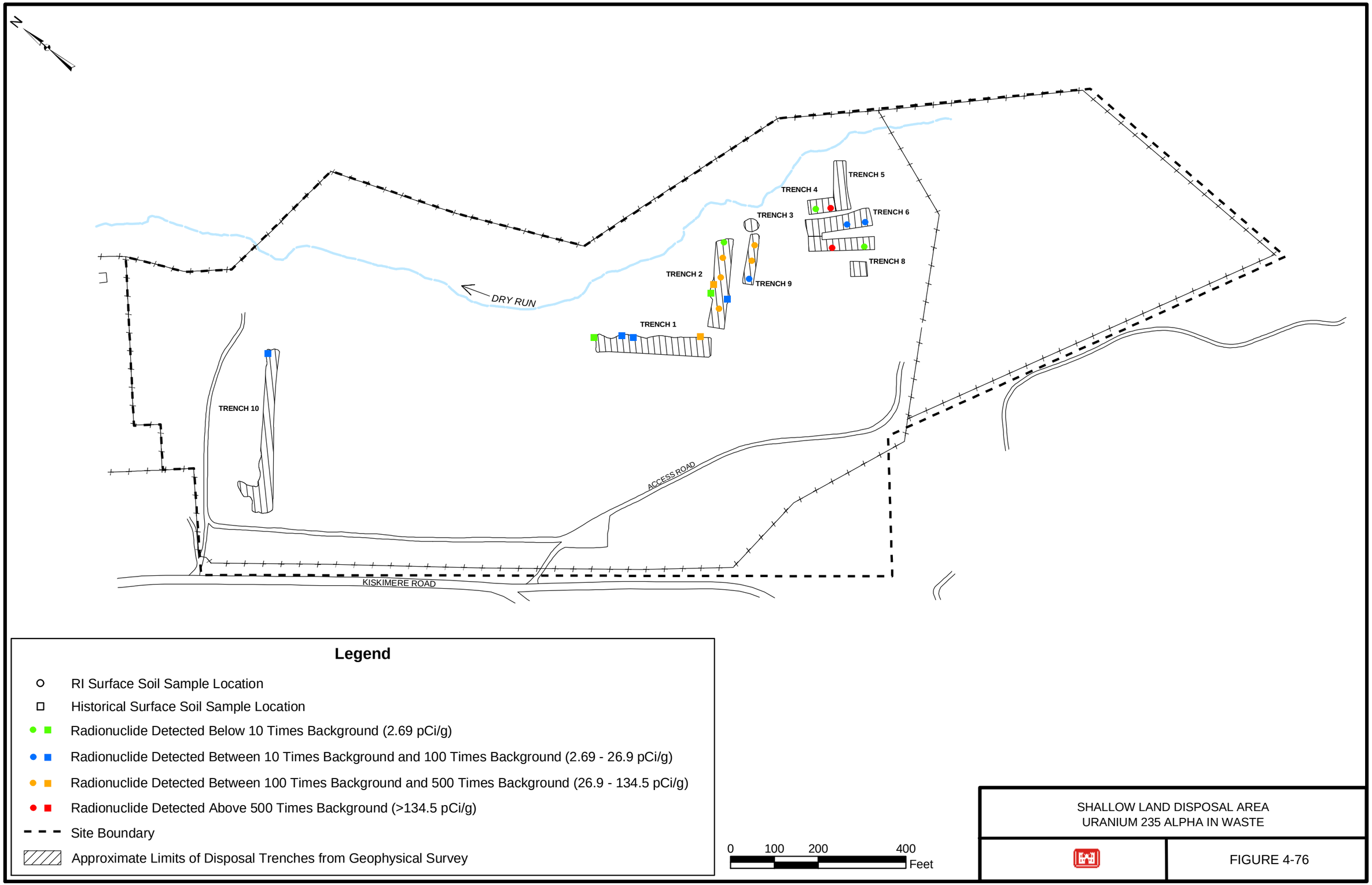
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide Detected Below 10 Times Background (12.8 pCi/g)
- Radionuclide Detected Between 10 Times Background and 100 Times Background (12.8 - 128 pCi/g)
- Radionuclide Detected Between 100 Times Background and 500 Times Background (128 - 640 pCi/g)
- Radionuclide Detected Above 500 Times Background (>640 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 234 IN WASTE

FIGURE 4-75

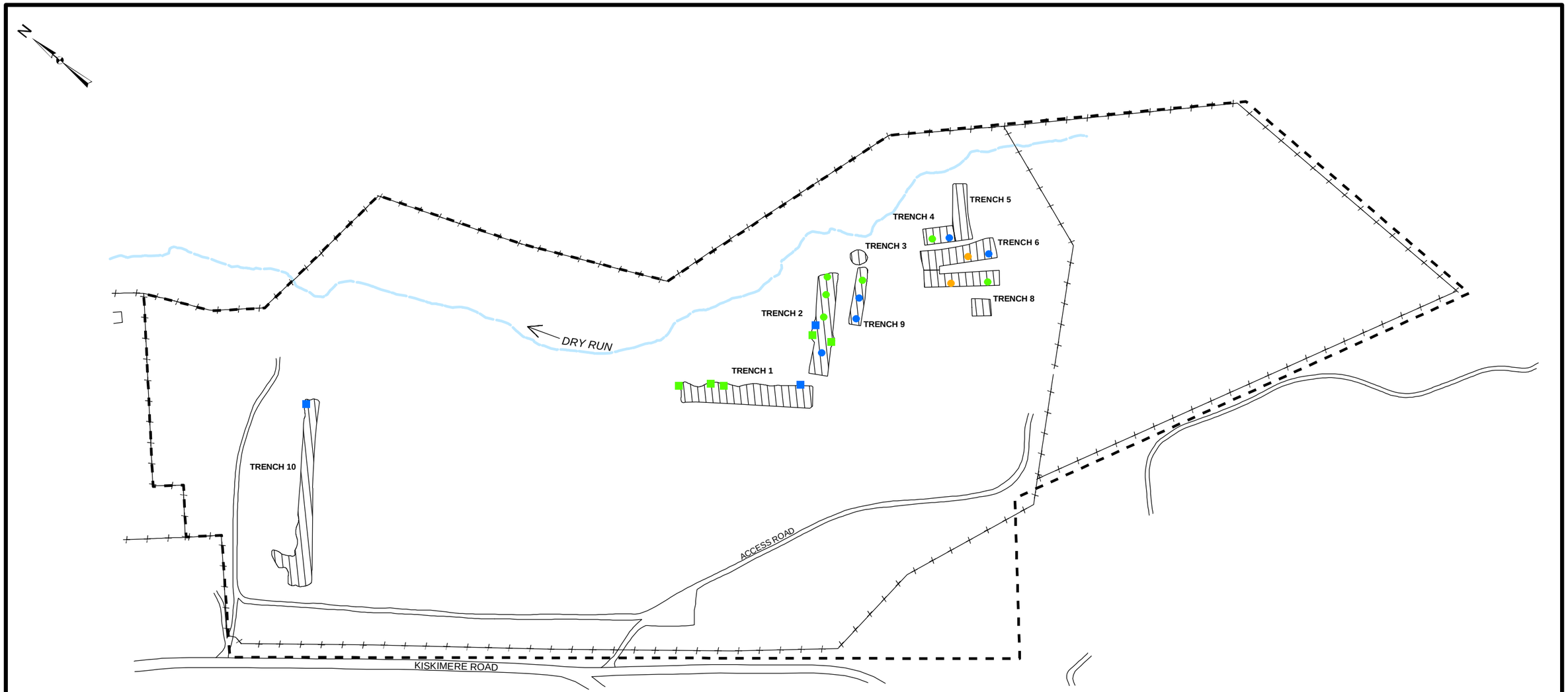
URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\waste_U234_CE.mxd Date: 6/10/2004 3:22:45 PM Name: Eich_C



SHALLOW LAND DISPOSAL AREA
URANIUM 235 ALPHA IN WASTE

FIGURE 4-76

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\waste_U235a_CE.mxd Date: 6/3/2004 11:19:42 AM Name: Eich_C



Legend

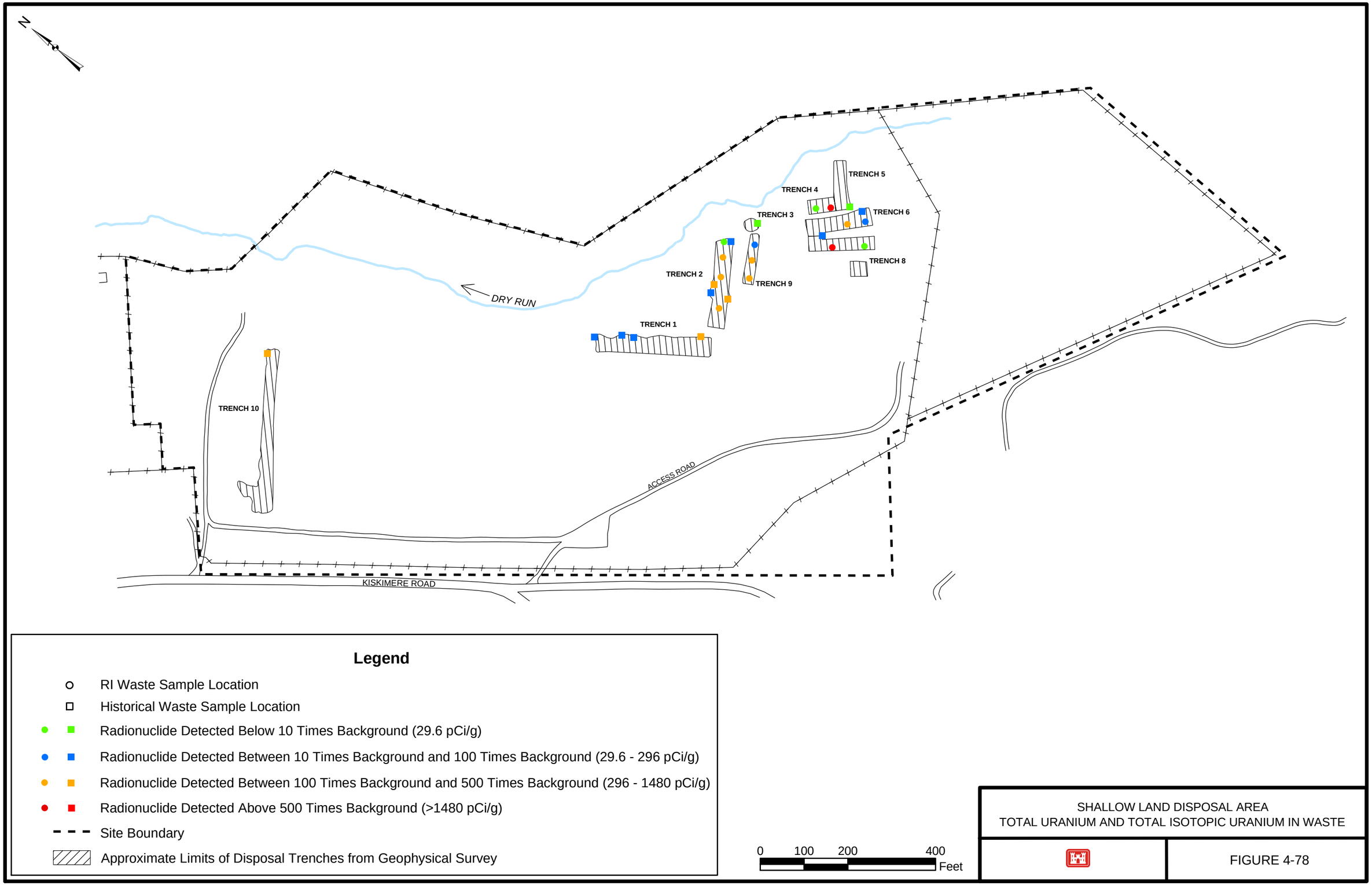
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide Detected Below 10 Times Background (14.1 pCi/g)
- Radionuclide Detected Between 10 Times Background and 100 Times Background (14.1 - 141 pCi/g)
- Radionuclide Detected Between 100 Times Background and 500 Times Background (141 - 705 pCi/g)
- Radionuclide Detected Above 500 Times Background (>705 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 238 IN WASTE

FIGURE 4-77

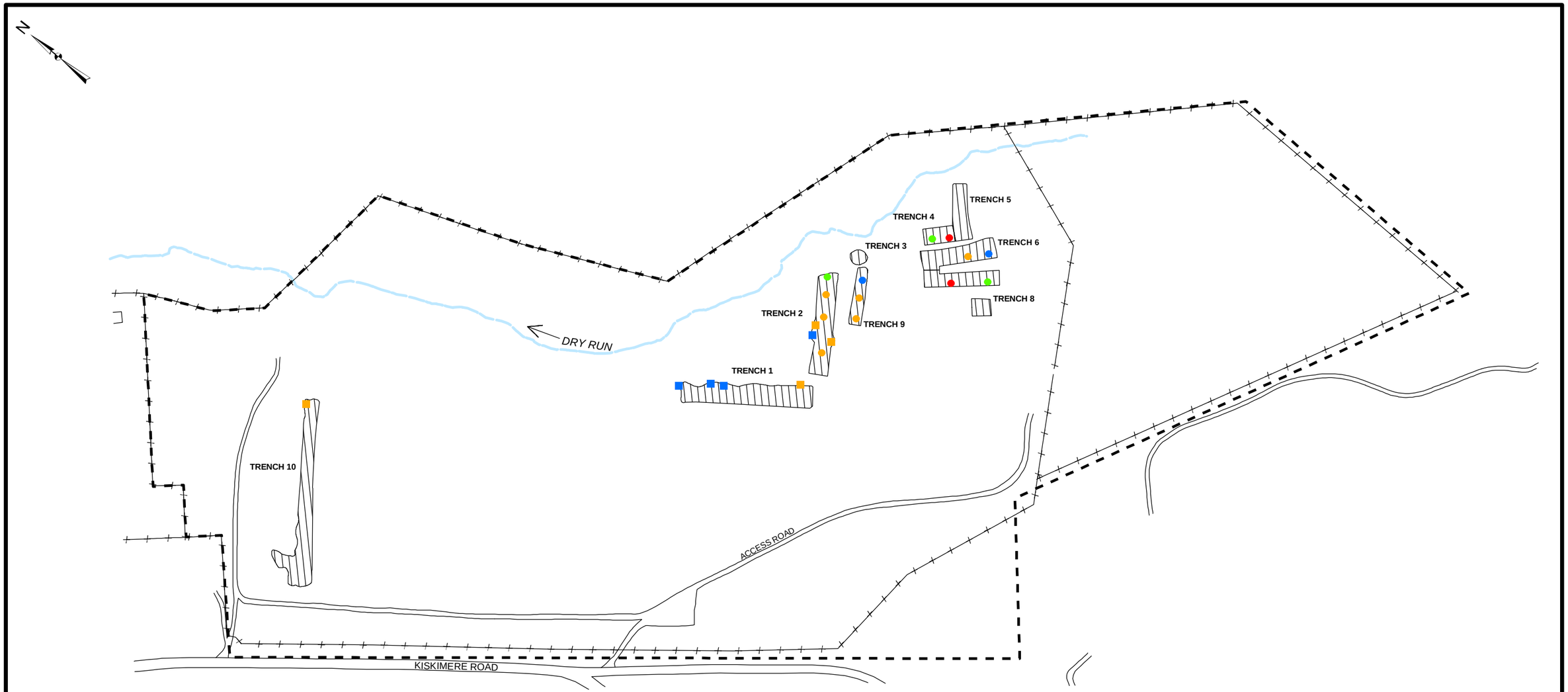
URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\waste_U238_CE.mxd Date: 6/3/2004 11:29:08 AM Name: Eich_C



SHALLOW LAND DISPOSAL AREA
TOTAL URANIUM AND TOTAL ISOTOPIC URANIUM IN WASTE

FIGURE 4-78

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\waste_Utot_JC.mxd Date: 6/3/2004 11:37:15 AM Name: Eich_C



Legend

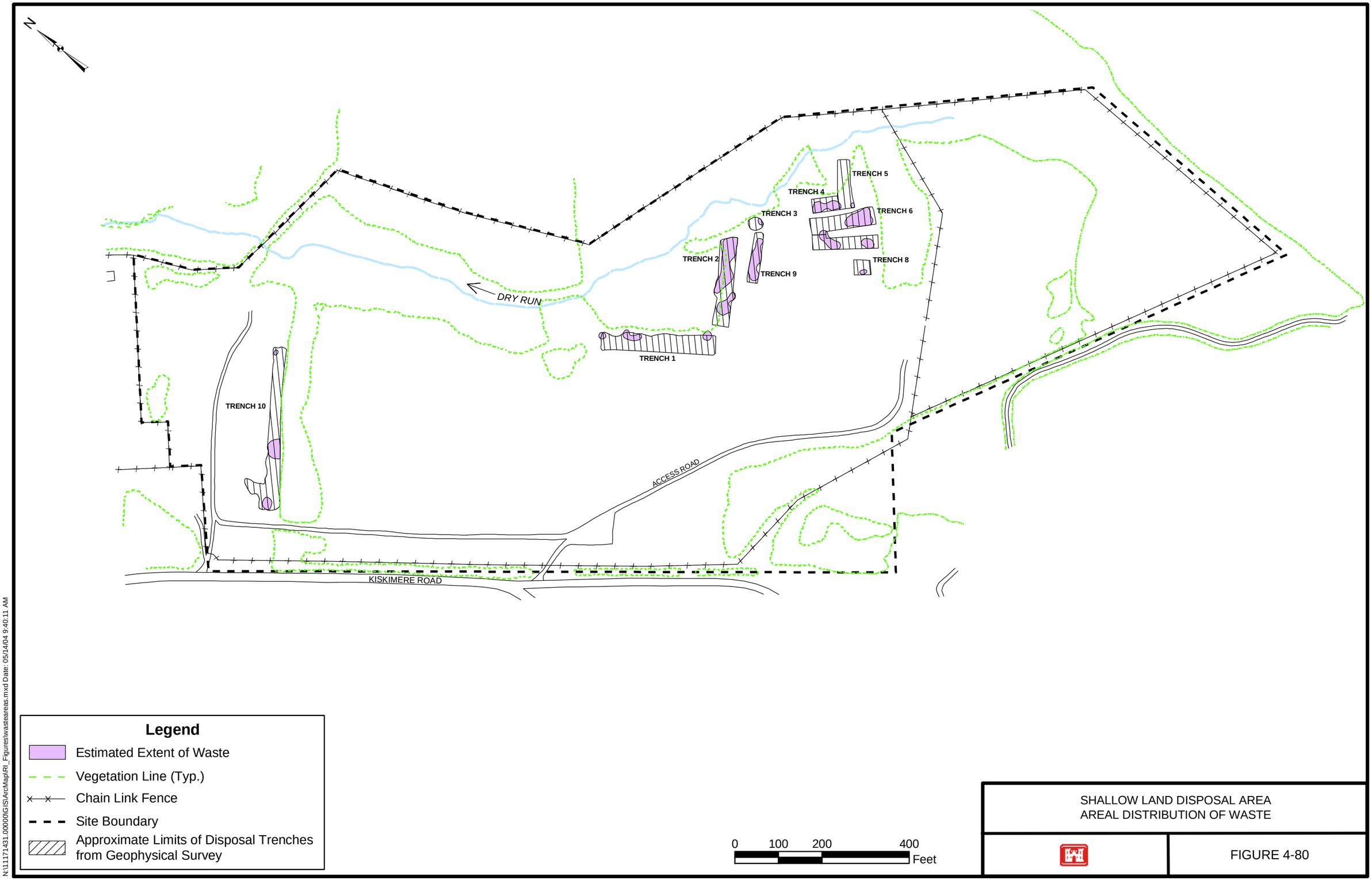
- RI Surface Soil Sample Location
- Historical Surface Soil Sample Location
- Radionuclide Detected Below 10 Times Background (29.6 pCi/g)
- Radionuclide Detected Between 10 Times Background and 100 Times Background (29.6 - 296 pCi/g)
- Radionuclide Detected Between 100 Times Background and 500 Times Background (296 - 1480 pCi/g)
- Radionuclide Detected Above 500 Times Background (>1480 pCi/g)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
TOTAL ISOTOPIC URANIUM IN WASTE

FIGURE 4-79

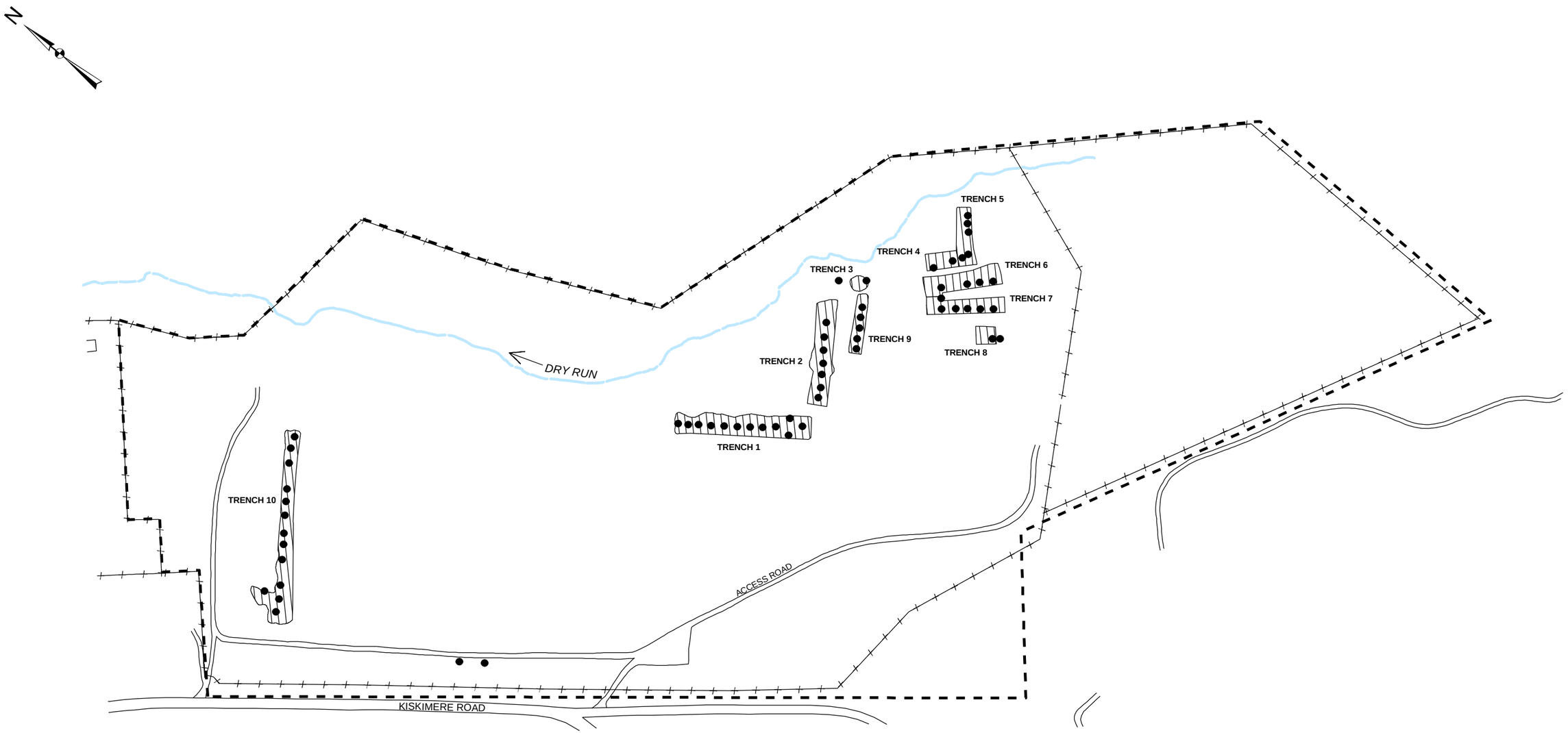
URS Corporation N:\11171431.00000GIS\ArcMap\RI_Figures\waste_isoU_CE.mxd Date: 6/3/2004 11:52:00 AM Name: Eich_C



SHALLOW LAND DISPOSAL AREA
AREAL DISTRIBUTION OF WASTE

FIGURE 4-80

N:\11171431.00000\GIS\ArcMap\RI_Figures\wasteareas.mxd Date: 05/14/04 9:40:11 AM



Legend

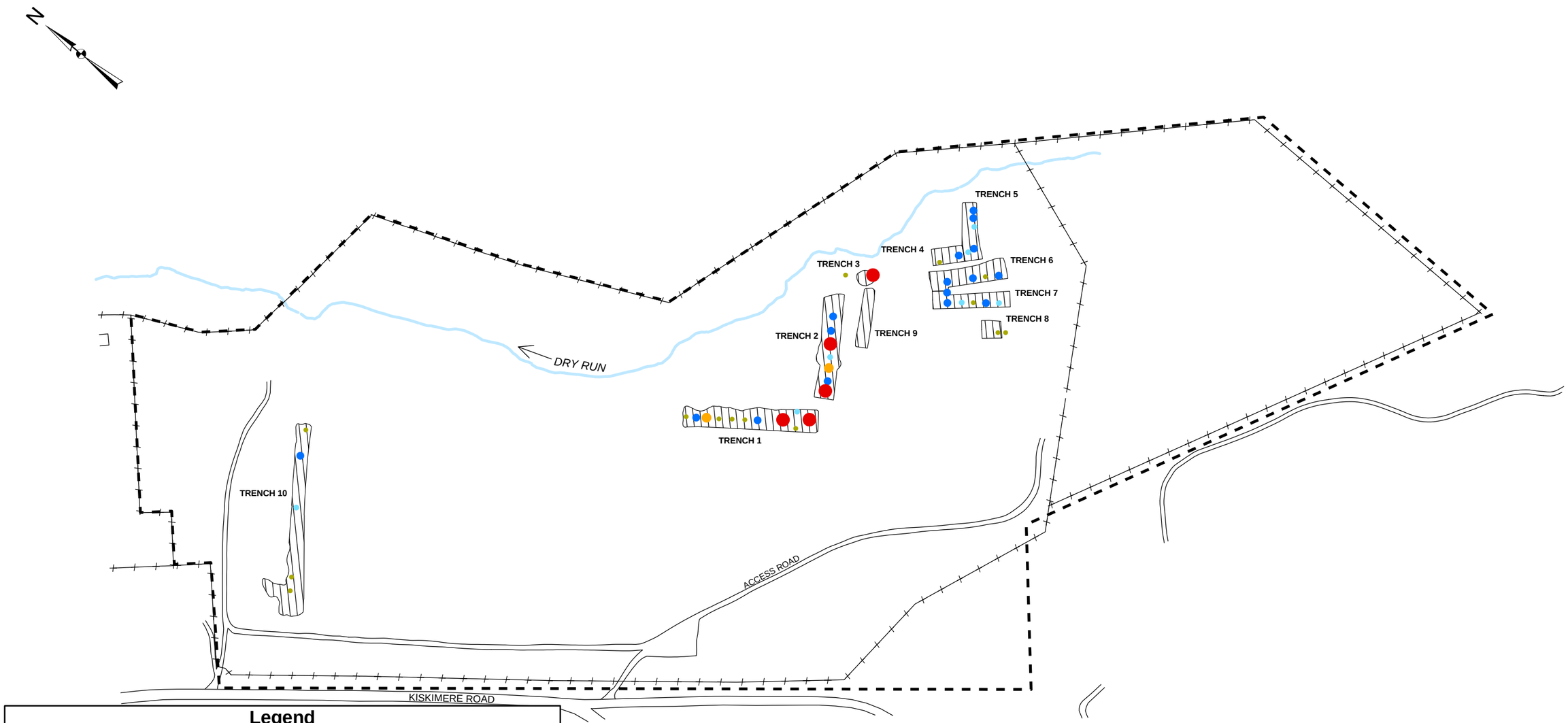
- Site Boundary
- SLDA Disposal Trenches

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
RI LEACHATE SAMPLE LOCATIONS

FIGURE 4-81

N:\11171431.00000\GIS\ArcMap\RI_Figures\LEACHATE_CE.mxd Date: 06/3/04 3:20:45 PM



Legend

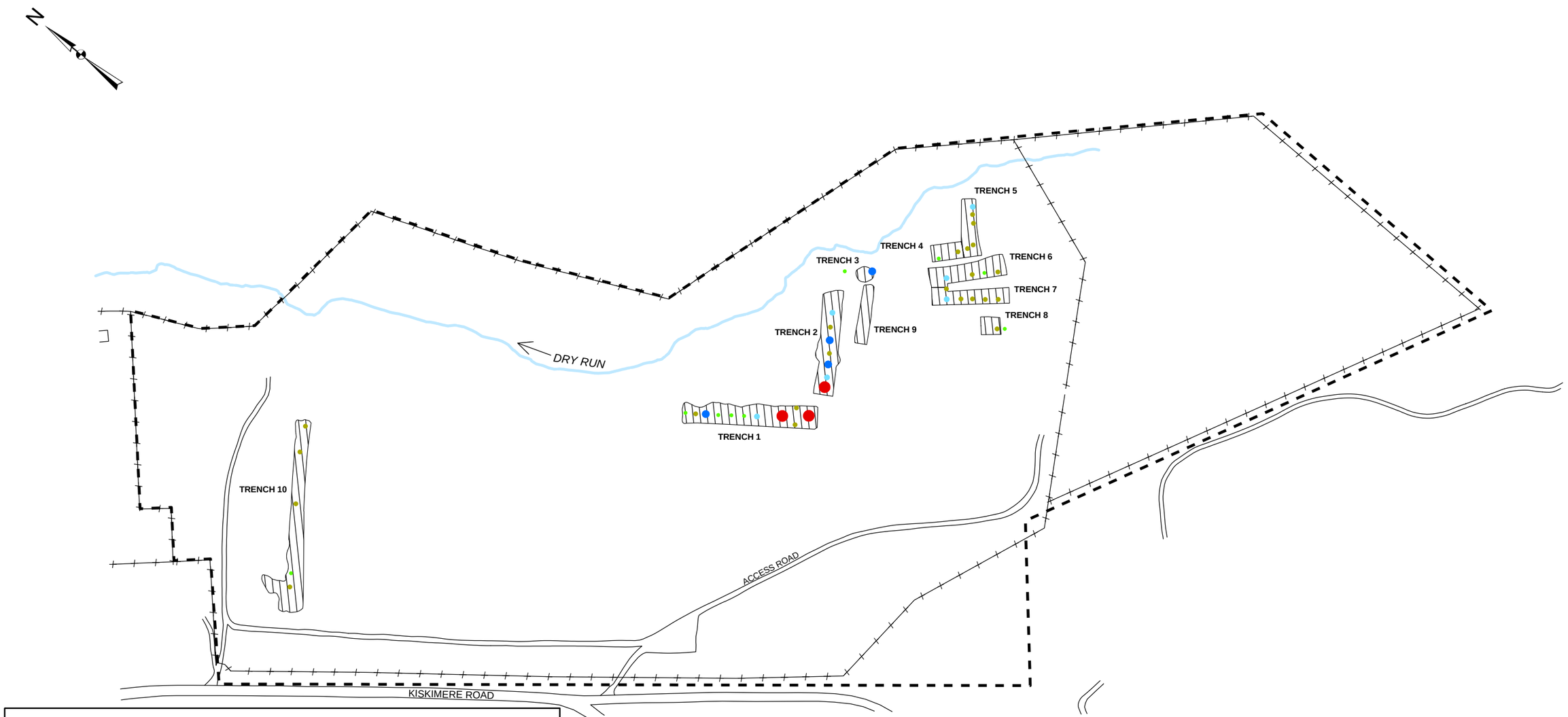
- RI Leachate Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below 30 pCi/L
- Radionuclide Detected Between 30 - 100 pCi/L
- Radionuclide Detected Between 100 - 1000 pCi/L
- Radionuclide Detected Between 1000 - 2000 pCi/L
- Radionuclide Detected Between 2000 - 4000 pCi/L
- Radionuclide Detected at > 4000 pCi/L
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 234 IN LEACHATE (12/03)

FIGURE 4-82

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WL_U234_CE.mxd Date: 6/10/2004 3:41:38 PM Name: Eich_C



Legend

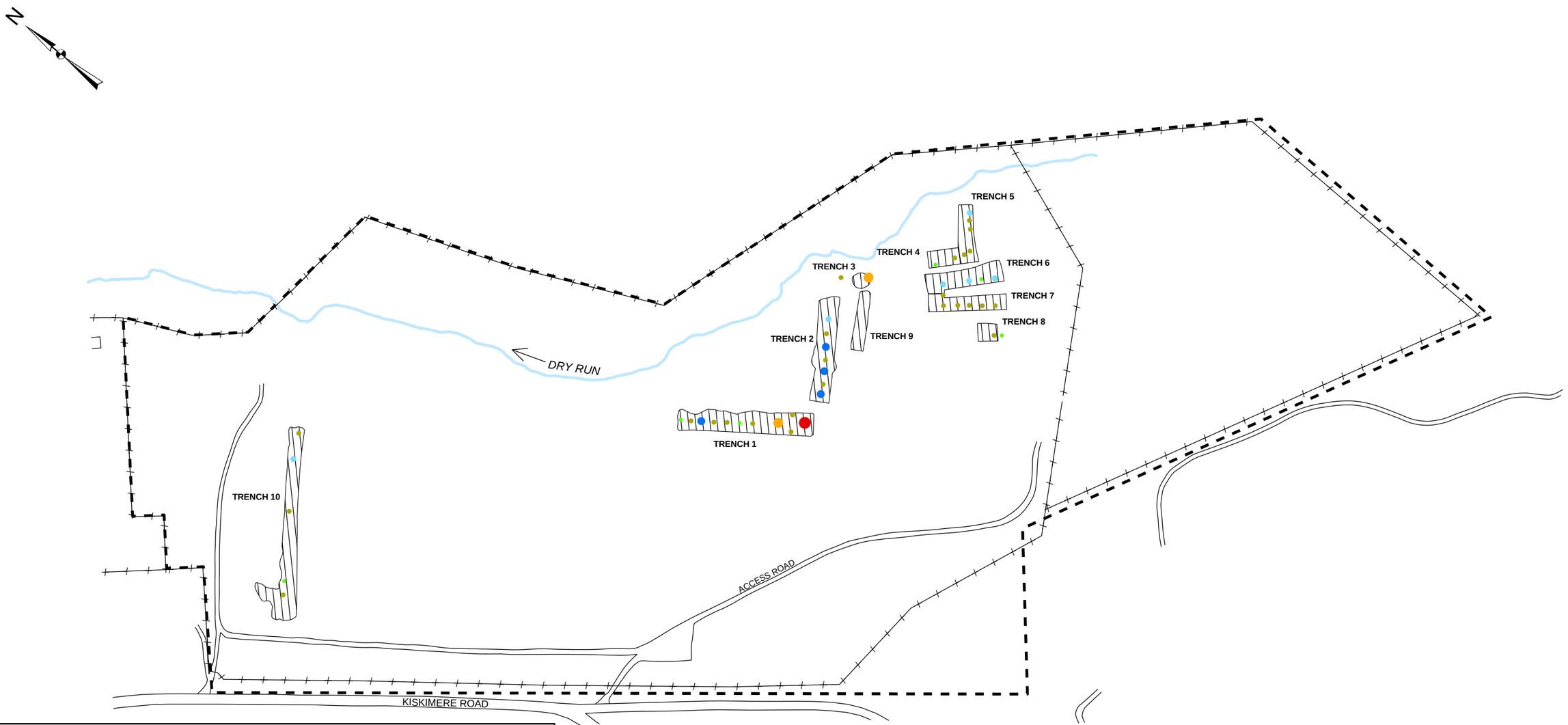
- RI Leachate Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below 30 pCi/L
- Radionuclide Detected Between 30 - 100 pCi/L
- Radionuclide Detected Between 100 - 500 pCi/L
- Radionuclide Detected Between 500 - 1000 pCi/L
- Radionuclide Detected at > 1000 pCi/L
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 235 ALPHA IN LEACHATE (12/03)

FIGURE 4-83

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WL_U235a_CE.mxd Date: 6/9/2004 1:12:18 PM Name: Eich_C



Legend

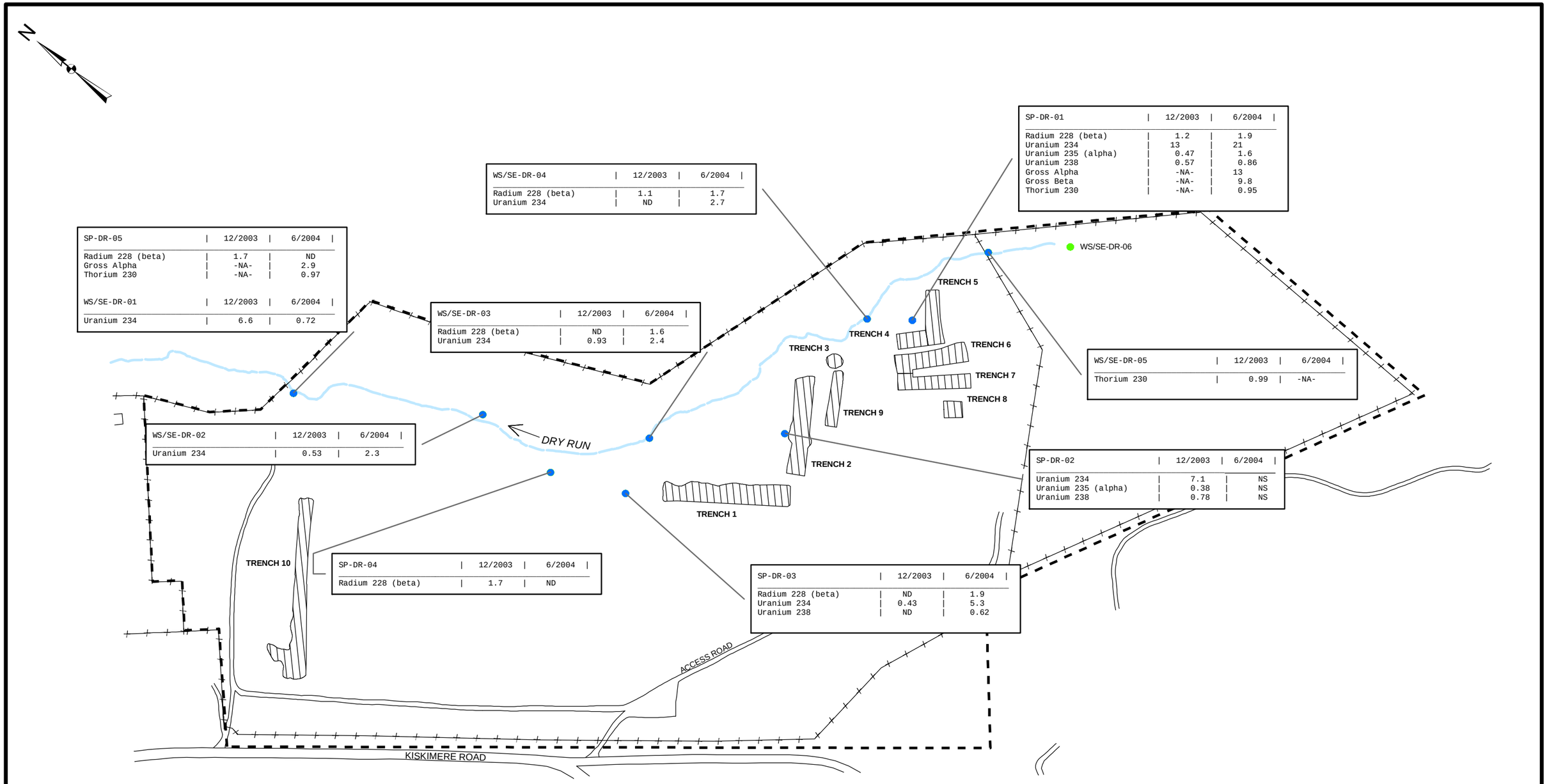
- RI Leachate Sample Location
- Radionuclide was not Detected
- Radionuclide Detected Below 30 pCi/L
- Radionuclide Detected Between 30 - 100 pCi/L
- Radionuclide Detected Between 100 - 500 pCi/L
- Radionuclide Detected Between 500 - 1000 pCi/L
- Radionuclide Detected at > 1000 pCi/L
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
URANIUM 238 IN LEACHATE (12/03)

FIGURE 4-84

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WL_U238_CE.mxd Date: 6/9/2004 1:13:42 PM Name: Eich_C



Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

NA- Not Analyzed
ND- Not Detected
NS- Not Sampled

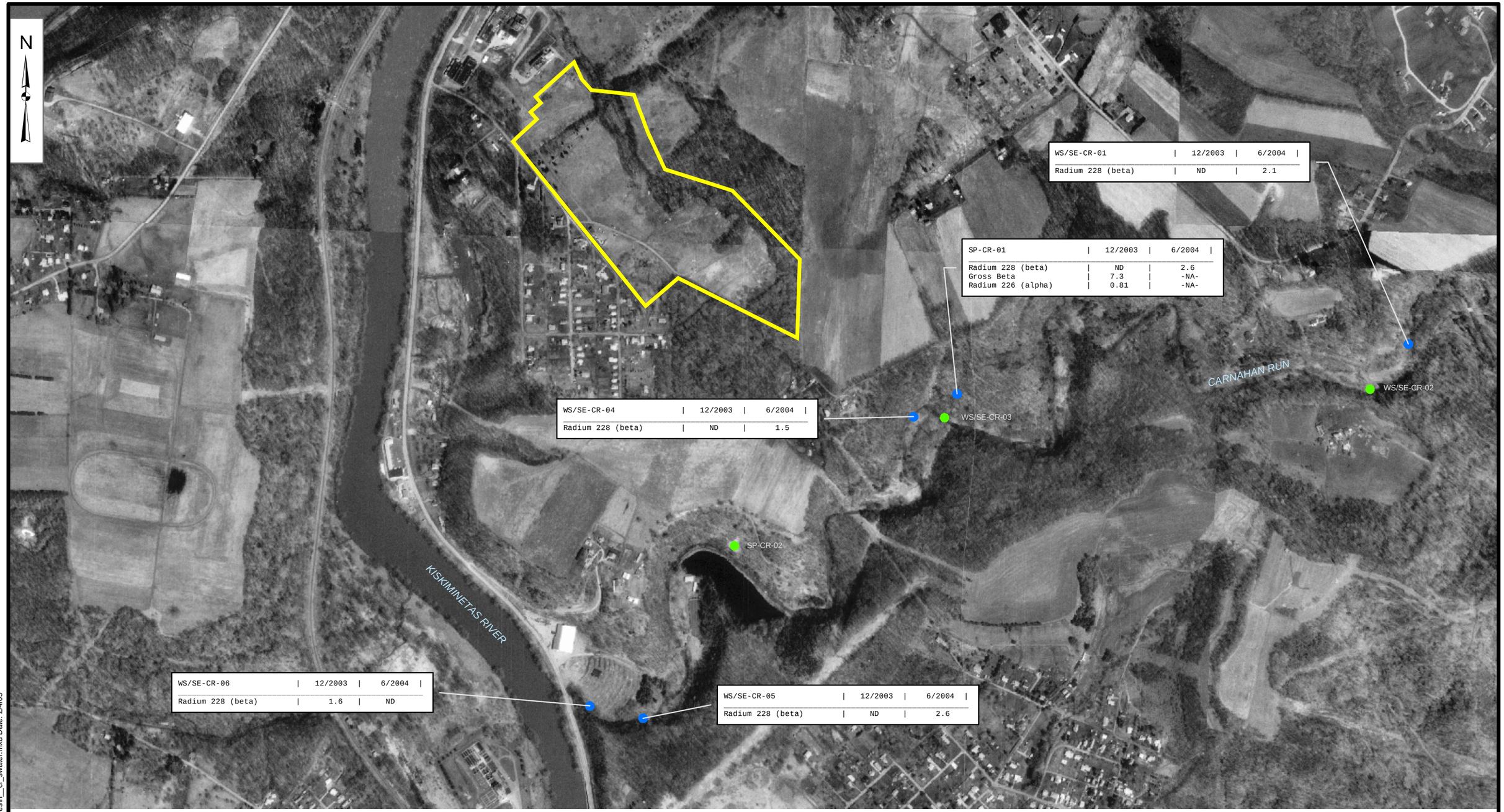
Notes:
1. Only detected radionuclides are shown. Gamma spectroscopy data are not shown for AM-241, U-235, Ra-228, and Ra-226 since isotope specific analyses were completed.
2. All results reported in pCi/L.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
SUMMARY OF DETECTIONS IN SURFACE WATER AND GROUNDWATER SEEPS (DRY RUN RI SAMPLING)

FIGURE 4-85

N:\11171431.00000\GIS\ArcMap\RI_Figures\ri_surfacewater.mxd Date: 2/4/05



Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Site Boundary

NA- Not Analyzed

ND- Not Detected

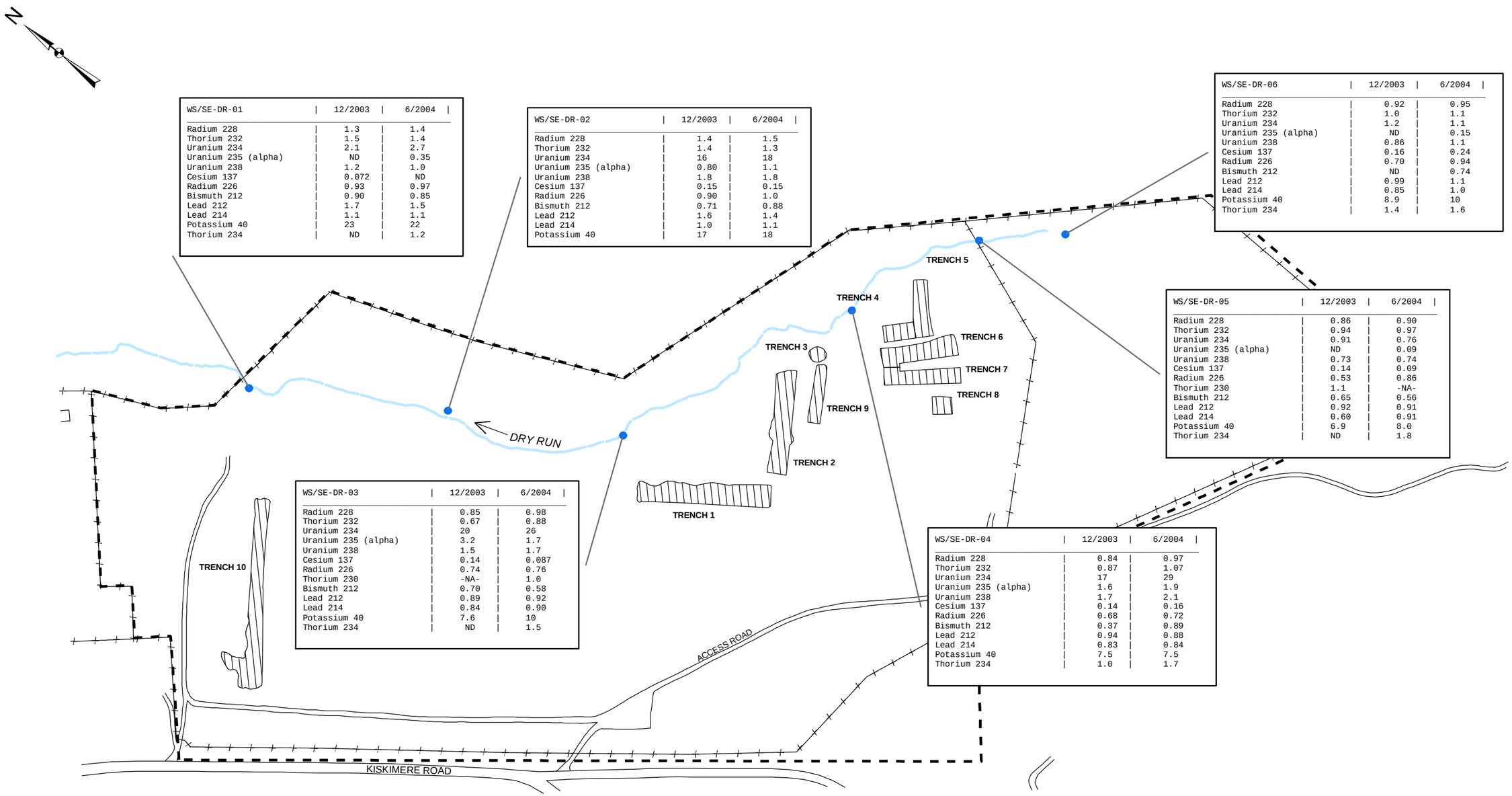
Notes:
1. Only detected radionuclides are shown. Gamma spectroscopy data are not shown for AM-241, U-235, Ra-228, and Ra-226 since isotope specific analyses were completed.
2. All results reported in pCi/L.

0 360 720 1,440 Feet

SHALLOW LAND DISPOSAL AREA
SUMMARY OF DETECTIONS IN SURFACE WATER AND MINE OUTFALL (CARNAHAN RUN RI SAMPLING)

FIGURE 4-86

N:\11171431.00000\GIS\ArcMap\RI_Figures\ri__cr_swater.mxd Date: 2/4/05



WS/SE-DR-01	12/2003	6/2004
Radium 228	1.3	1.4
Thorium 232	1.5	1.4
Uranium 234	2.1	2.7
Uranium 235 (alpha)	ND	0.35
Uranium 238	1.2	1.0
Cesium 137	0.072	ND
Radium 226	0.93	0.97
Bismuth 212	0.90	0.85
Lead 212	1.7	1.5
Lead 214	1.1	1.1
Potassium 40	23	22
Thorium 234	ND	1.2

WS/SE-DR-02	12/2003	6/2004
Radium 228	1.4	1.5
Thorium 232	1.4	1.3
Uranium 234	16	18
Uranium 235 (alpha)	0.80	1.1
Uranium 238	1.8	1.8
Cesium 137	0.15	0.15
Radium 226	0.90	1.0
Bismuth 212	0.71	0.88
Lead 212	1.6	1.4
Lead 214	1.0	1.1
Potassium 40	17	18

WS/SE-DR-06	12/2003	6/2004
Radium 228	0.92	0.95
Thorium 232	1.0	1.1
Uranium 234	1.2	1.1
Uranium 235 (alpha)	ND	0.15
Uranium 238	0.86	1.1
Cesium 137	0.16	0.24
Radium 226	0.70	0.94
Bismuth 212	ND	0.74
Lead 212	0.99	1.1
Lead 214	0.85	1.0
Potassium 40	8.9	10
Thorium 234	1.4	1.6

WS/SE-DR-05	12/2003	6/2004
Radium 228	0.86	0.90
Thorium 232	0.94	0.97
Uranium 234	0.91	0.76
Uranium 235 (alpha)	ND	0.09
Uranium 238	0.73	0.74
Cesium 137	0.14	0.09
Radium 226	0.53	0.86
Thorium 230	1.1	-NA-
Bismuth 212	0.65	0.56
Lead 212	0.92	0.91
Lead 214	0.60	0.91
Potassium 40	6.9	8.0
Thorium 234	ND	1.8

WS/SE-DR-03	12/2003	6/2004
Radium 228	0.85	0.98
Thorium 232	0.67	0.88
Uranium 234	20	26
Uranium 235 (alpha)	3.2	1.7
Uranium 238	1.5	1.7
Cesium 137	0.14	0.087
Radium 226	0.74	0.76
Thorium 230	-NA-	1.0
Bismuth 212	0.70	0.58
Lead 212	0.89	0.92
Lead 214	0.84	0.90
Potassium 40	7.6	10
Thorium 234	ND	1.5

WS/SE-DR-04	12/2003	6/2004
Radium 228	0.84	0.97
Thorium 232	0.87	1.07
Uranium 234	17	29
Uranium 235 (alpha)	1.6	1.9
Uranium 238	1.7	2.1
Cesium 137	0.14	0.16
Radium 226	0.68	0.72
Bismuth 212	0.37	0.89
Lead 212	0.94	0.88
Lead 214	0.83	0.84
Potassium 40	7.5	7.5
Thorium 234	1.0	1.7

Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

NA- Not Analyzed

ND- Not Detected

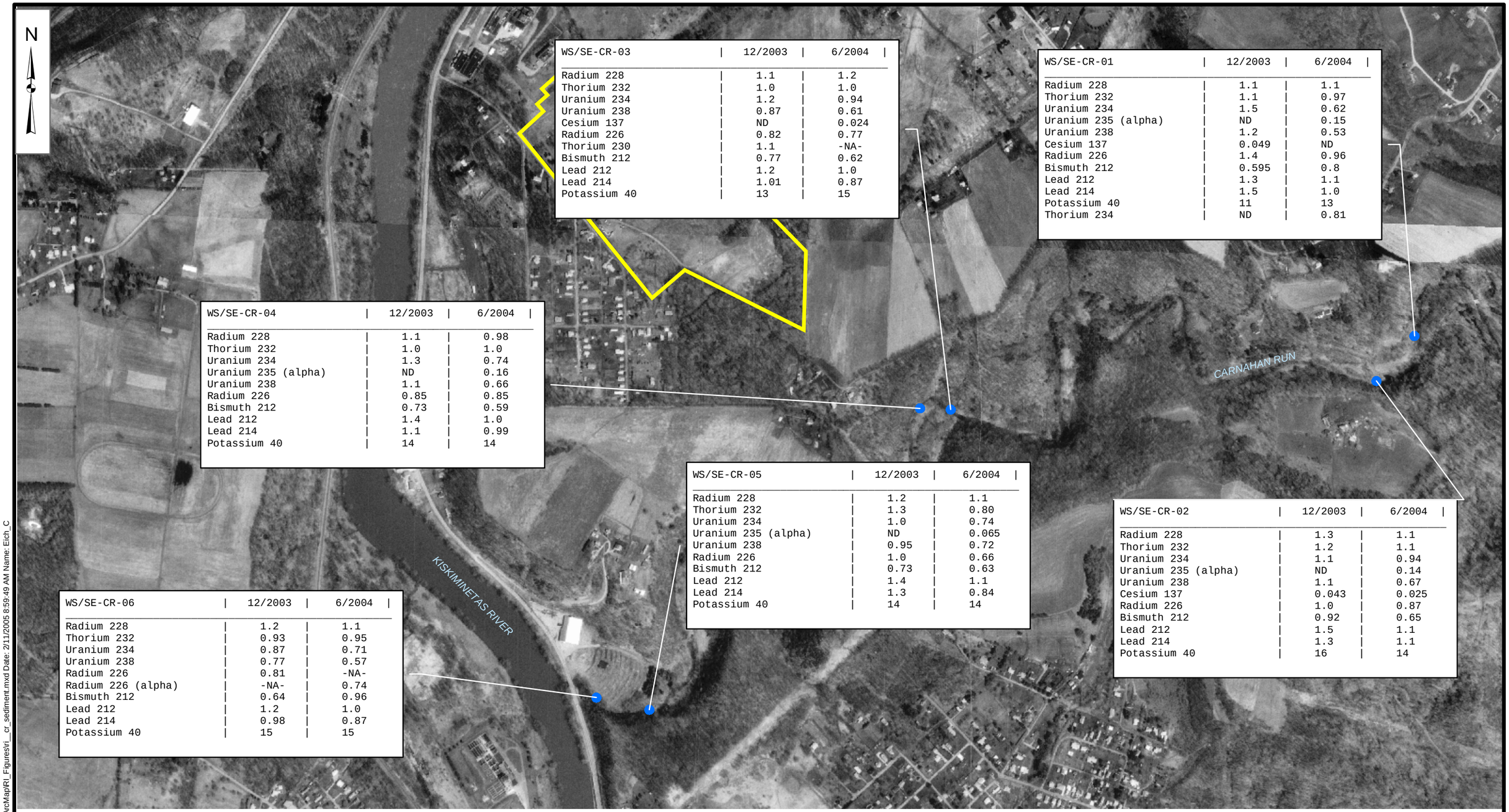
Notes:
1. Only detected radionuclides are shown. U-235 gamma spectroscopy data are not shown since U-235 activity was based on alpha spectroscopy.
2. All results reported in pCi/g.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
SUMMARY OF DETECTIONS IN SEDIMENT (DRY RUN RI SAMPLING)

FIGURE 4-87

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\ri_sediment.mxd Date: 2/11/2005 8:58:43 AM Name: Eich_C



WS/SE-CR-03	12/2003	6/2004
Radium 228	1.1	1.2
Thorium 232	1.0	1.0
Uranium 234	1.2	0.94
Uranium 238	0.87	0.61
Cesium 137	ND	0.024
Radium 226	0.82	0.77
Thorium 230	1.1	-NA-
Bismuth 212	0.77	0.62
Lead 212	1.2	1.0
Lead 214	1.01	0.87
Potassium 40	13	15

WS/SE-CR-01	12/2003	6/2004
Radium 228	1.1	1.1
Thorium 232	1.1	0.97
Uranium 234	1.5	0.62
Uranium 235 (alpha)	ND	0.15
Uranium 238	1.2	0.53
Cesium 137	0.049	ND
Radium 226	1.4	0.96
Bismuth 212	0.595	0.8
Lead 212	1.3	1.1
Lead 214	1.5	1.0
Potassium 40	11	13
Thorium 234	ND	0.81

WS/SE-CR-04	12/2003	6/2004
Radium 228	1.1	0.98
Thorium 232	1.0	1.0
Uranium 234	1.3	0.74
Uranium 235 (alpha)	ND	0.16
Uranium 238	1.1	0.66
Radium 226	0.85	0.85
Bismuth 212	0.73	0.59
Lead 212	1.4	1.0
Lead 214	1.1	0.99
Potassium 40	14	14

WS/SE-CR-05	12/2003	6/2004
Radium 228	1.2	1.1
Thorium 232	1.3	0.80
Uranium 234	1.0	0.74
Uranium 235 (alpha)	ND	0.065
Uranium 238	0.95	0.72
Radium 226	1.0	0.66
Bismuth 212	0.73	0.63
Lead 212	1.4	1.1
Lead 214	1.3	0.84
Potassium 40	14	14

WS/SE-CR-02	12/2003	6/2004
Radium 228	1.3	1.1
Thorium 232	1.2	1.1
Uranium 234	1.1	0.94
Uranium 235 (alpha)	ND	0.14
Uranium 238	1.1	0.67
Cesium 137	0.043	0.025
Radium 226	1.0	0.87
Bismuth 212	0.92	0.65
Lead 212	1.5	1.1
Lead 214	1.3	1.1
Potassium 40	16	14

WS/SE-CR-06	12/2003	6/2004
Radium 228	1.2	1.1
Thorium 232	0.93	0.95
Uranium 234	0.87	0.71
Uranium 238	0.77	0.57
Radium 226	0.81	-NA-
Radium 226 (alpha)	-NA-	0.74
Bismuth 212	0.64	0.96
Lead 212	1.2	1.0
Lead 214	0.98	0.87
Potassium 40	15	15

Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Site Boundary

NA- Not Analyzed

ND- Not Detected

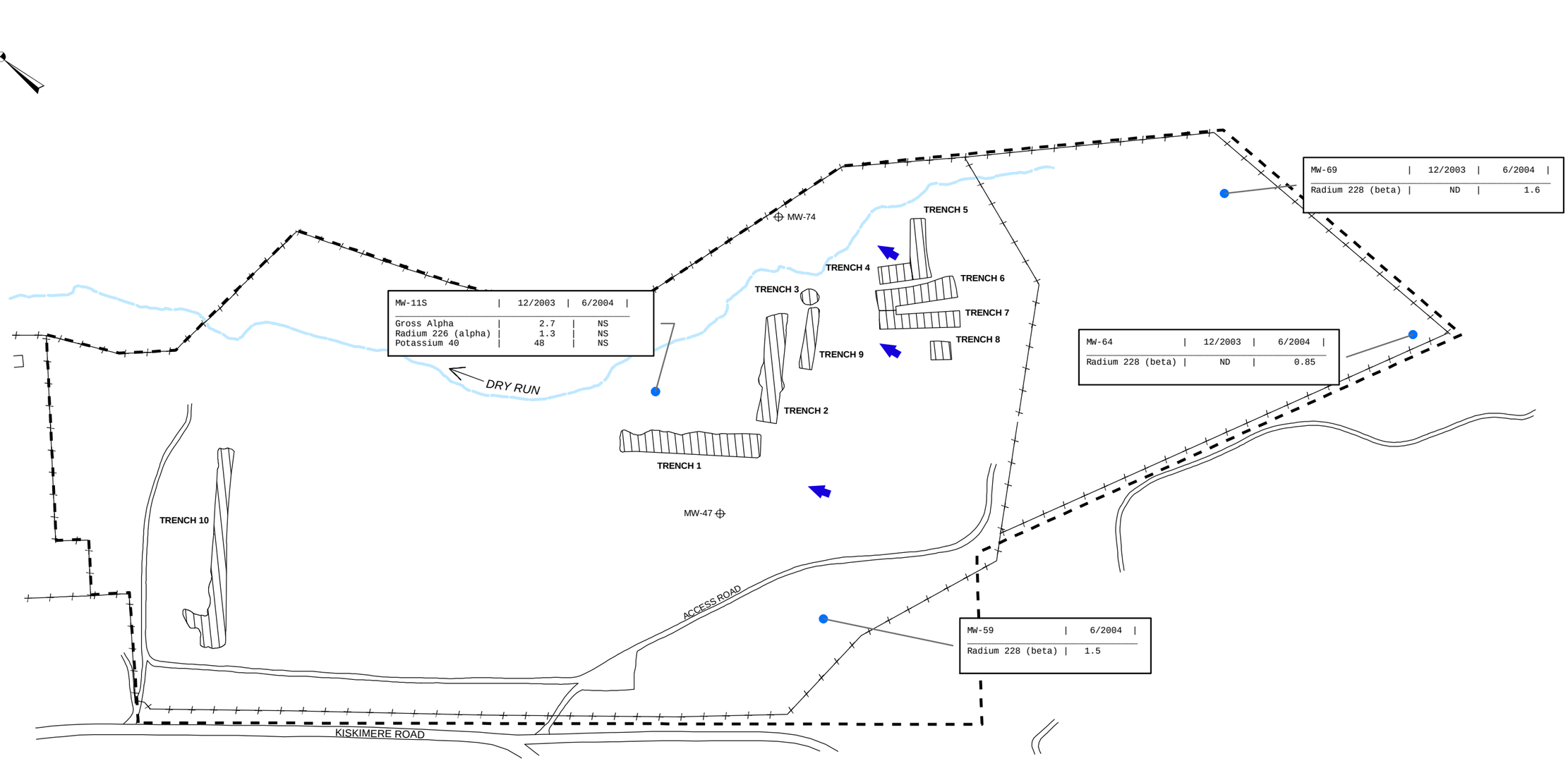
Notes:
1. Only detected radionuclides are shown. U-235 gamma spectroscopy data are not shown since U-235 activity was based on alpha spectroscopy.
2. All results reported in pCi/g.

0 375 750 1,500 Feet

SHALLOW LAND DISPOSAL AREA
SUMMARY OF DETECTIONS IN SEDIMENT
(CARNAHAN RUN RI SAMPLING)

FIGURE 4-88

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\ri__cr_sediment.mxd Date: 2/11/2005 8:59:49 AM Name: Eich_C



Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Monitoring Well Not Sampled
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction

NA- Not Analyzed

ND- Not Detected

NS- Not Sampled

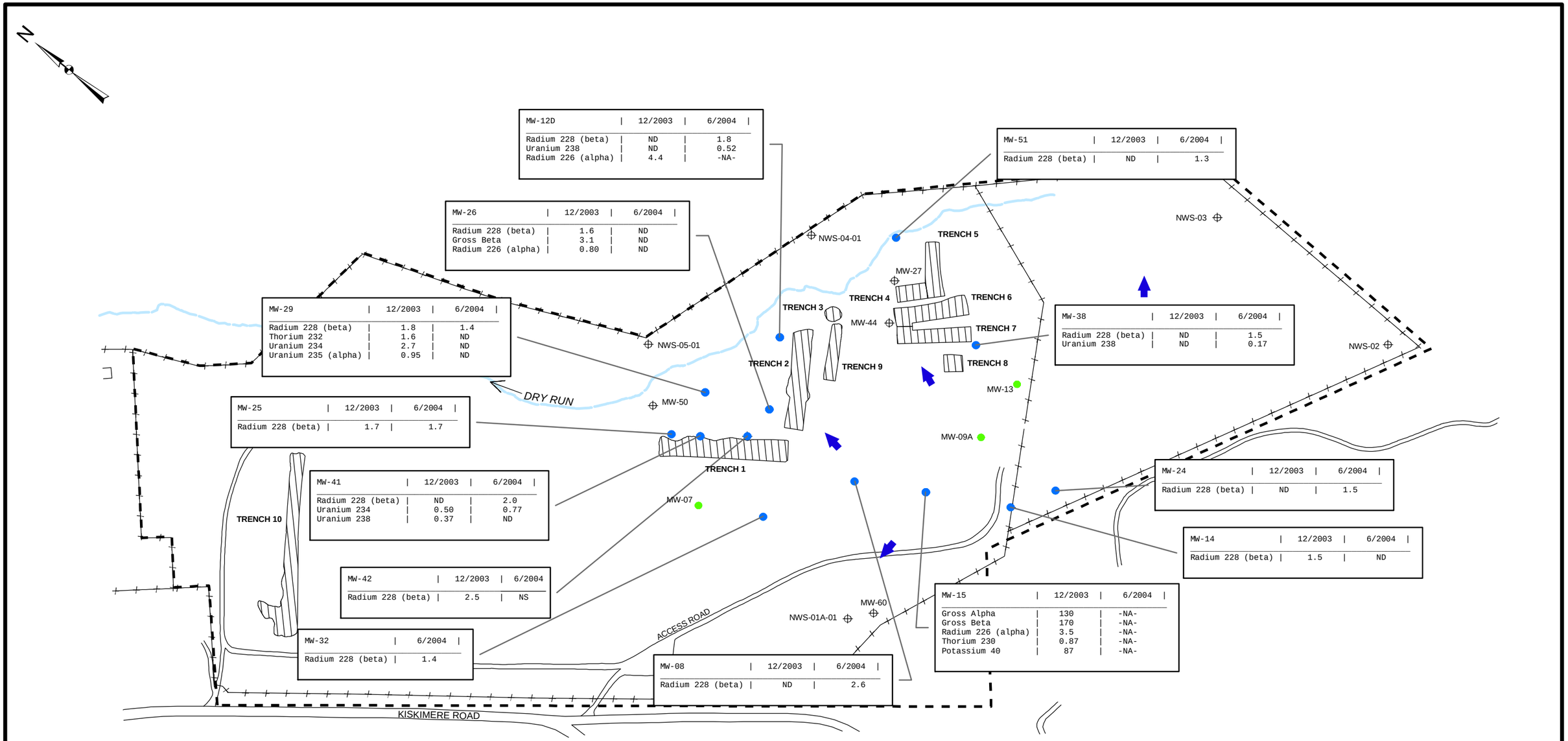
Notes:
1. Only detected radionuclides are shown. Gamma spectroscopy data are not shown for AM-241, U-235, Ra-228, and Ra-226 since isotope specific analyses were completed.
2. All results reported in pCi/L.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ANALYTICAL RESULTS
(OVERBURDEN ZONE RI SAMPLING)

FIGURE 4-89

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WGRES_SS.mxd Date: 2/11/2005 9:01:29 AM Name: Eich_C



Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Monitoring Well Not Sampled
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction

NA- Not Analyzed

ND- Not Detected

NS- Not Sampled

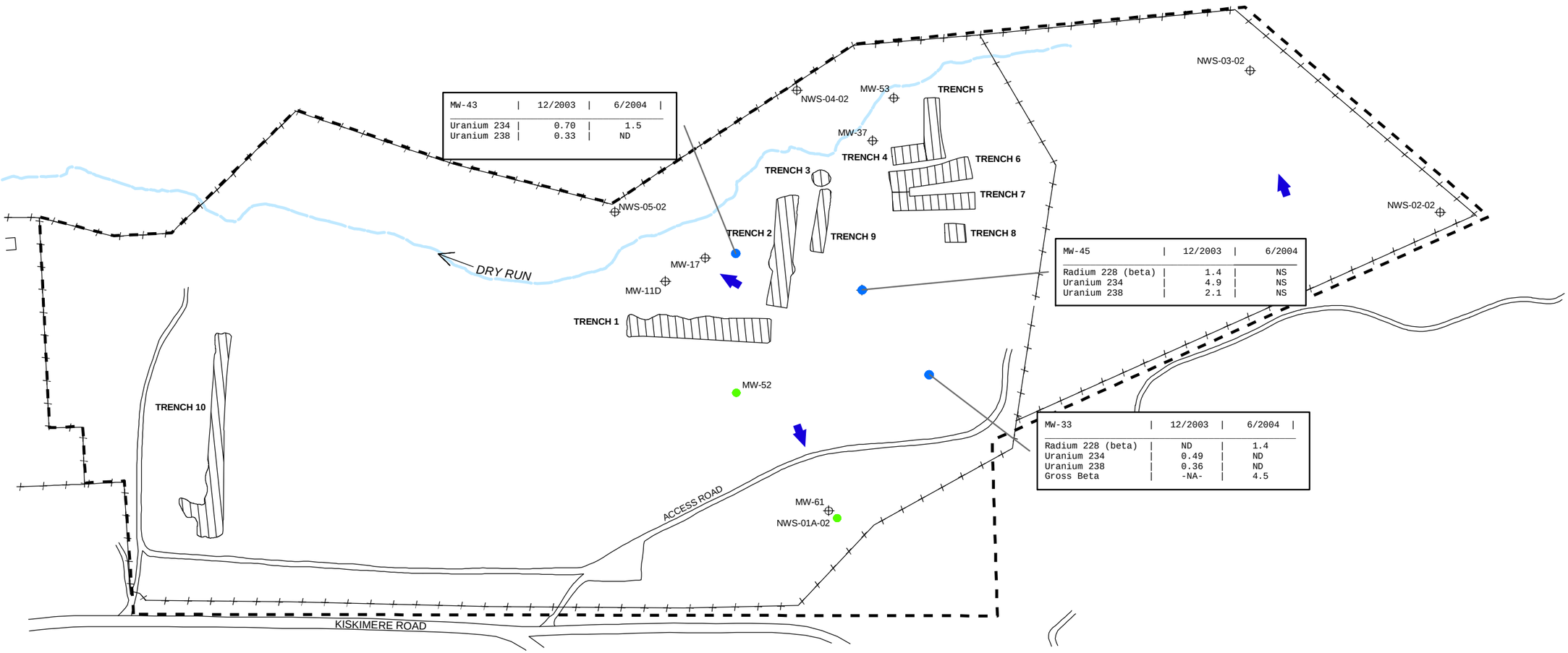
Notes:
1. Only detected radionuclides are shown. Gamma spectroscopy data are not shown for AM-241, U-235, Ra-228, and Ra-226 since isotope specific analyses were completed.
2. All results reported in pCi/L.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ANALYTICAL RESULTS
(FIRST SHALLOW BEDROCK ZONE RI SAMPLING)

FIGURE 4-90

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WGRES_1S.mxd Date: 2/11/2005 9:02:05 AM Name: Eich_C



Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Monitoring Well Not Sampled
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction

NA- Not Analyzed

ND- Not Detected

NS- Not Sampled

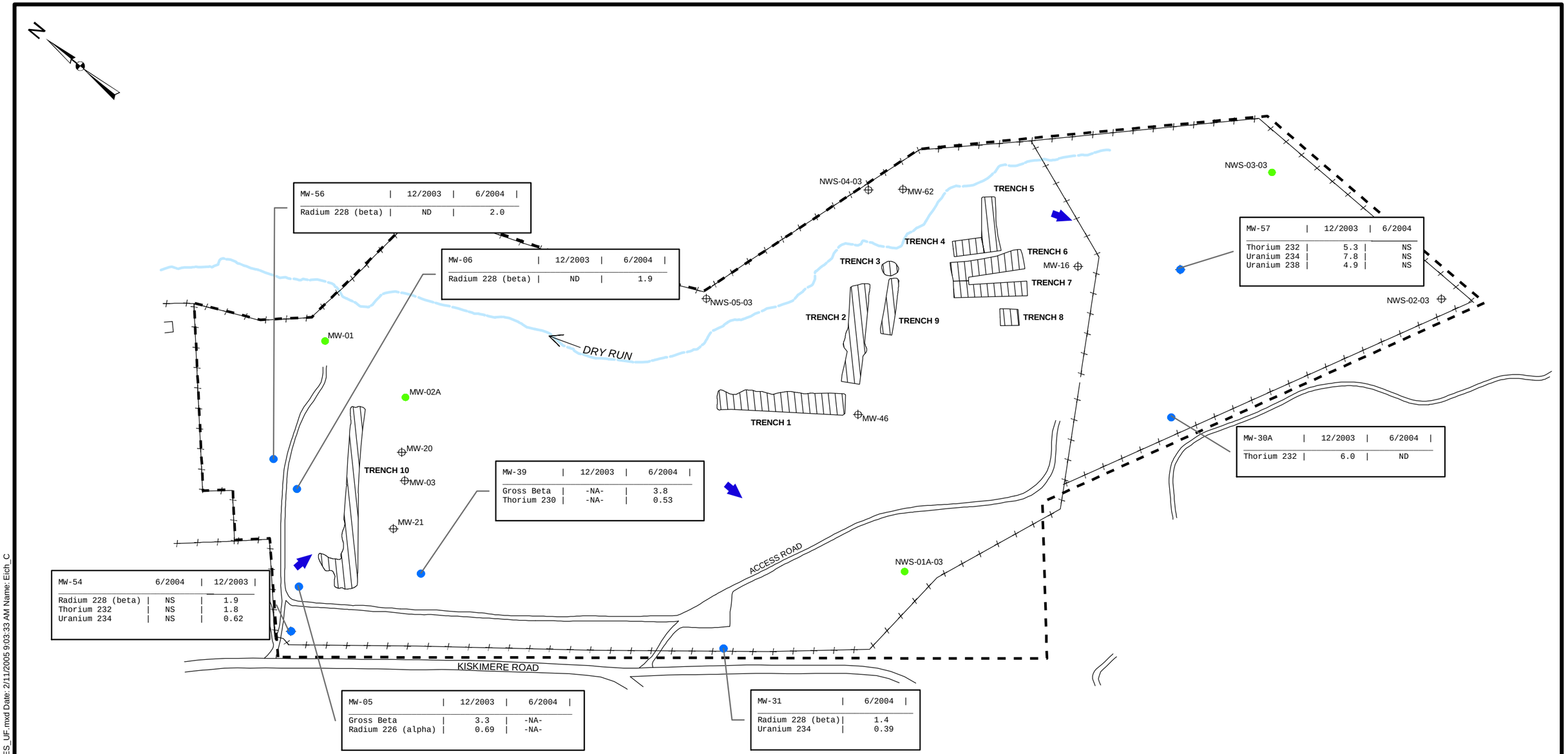
Notes:
1. Only detected radionuclides are shown. Gamma spectroscopy data are not shown for AM-241, U-235, Ra-228, and Ra-226 since isotope specific analyses were completed.
2. All results reported in pCi/L.

0 105 210 420 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ANALYTICAL RESULTS
(SECOND SHALLOW BEDROCK ZONE RI SAMPLING)

FIGURE 4-91

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WGRES_2S.mxd Date: 2/11/2005 9:02:49 AM Name: Eich_C



Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Monitoring Well Not Sampled
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction

NA- Not Analyzed

ND- Not Detected

NS- Not Sampled

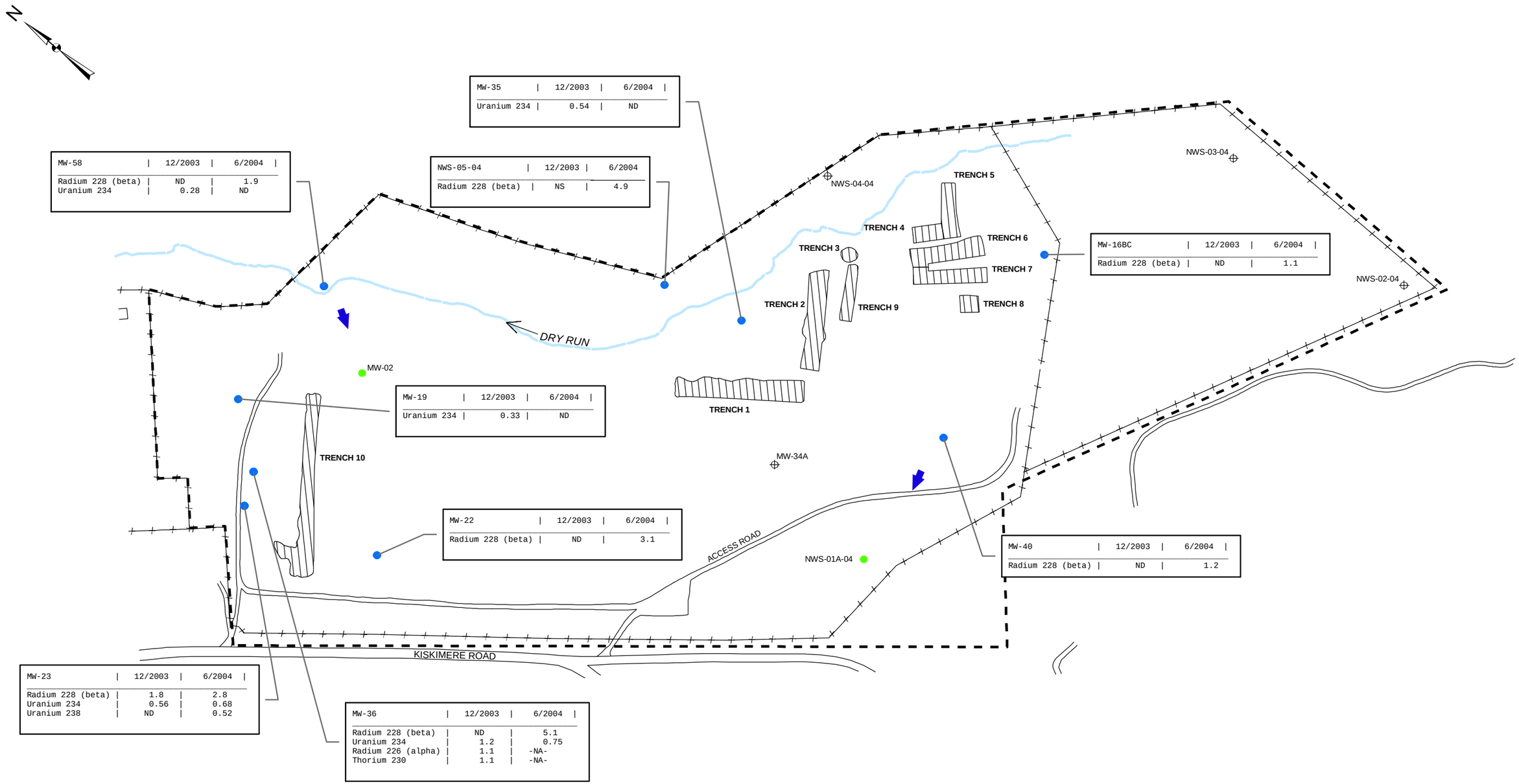
Notes:
1. Only detected radionuclides are shown. Gamma spectroscopy data are not shown for AM-241, U-235, Ra-228, and Ra-226 since isotope specific analyses were completed.
2. All results reported in pCi/L.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ANALYTICAL RESULTS
(UPPER FREEPORT FORMATION RI SAMPLING)

FIGURE 4-92

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WGRES_UF.mxd Date: 2/11/2005 9:03:33 AM Name: Eich_C



Legend

- Radionuclide was Not Detected
- Radionuclide Detected
- Monitoring Well Not Sampled
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction

NA- Not Analyzed

ND- Not Detected

NS- Not Sampled

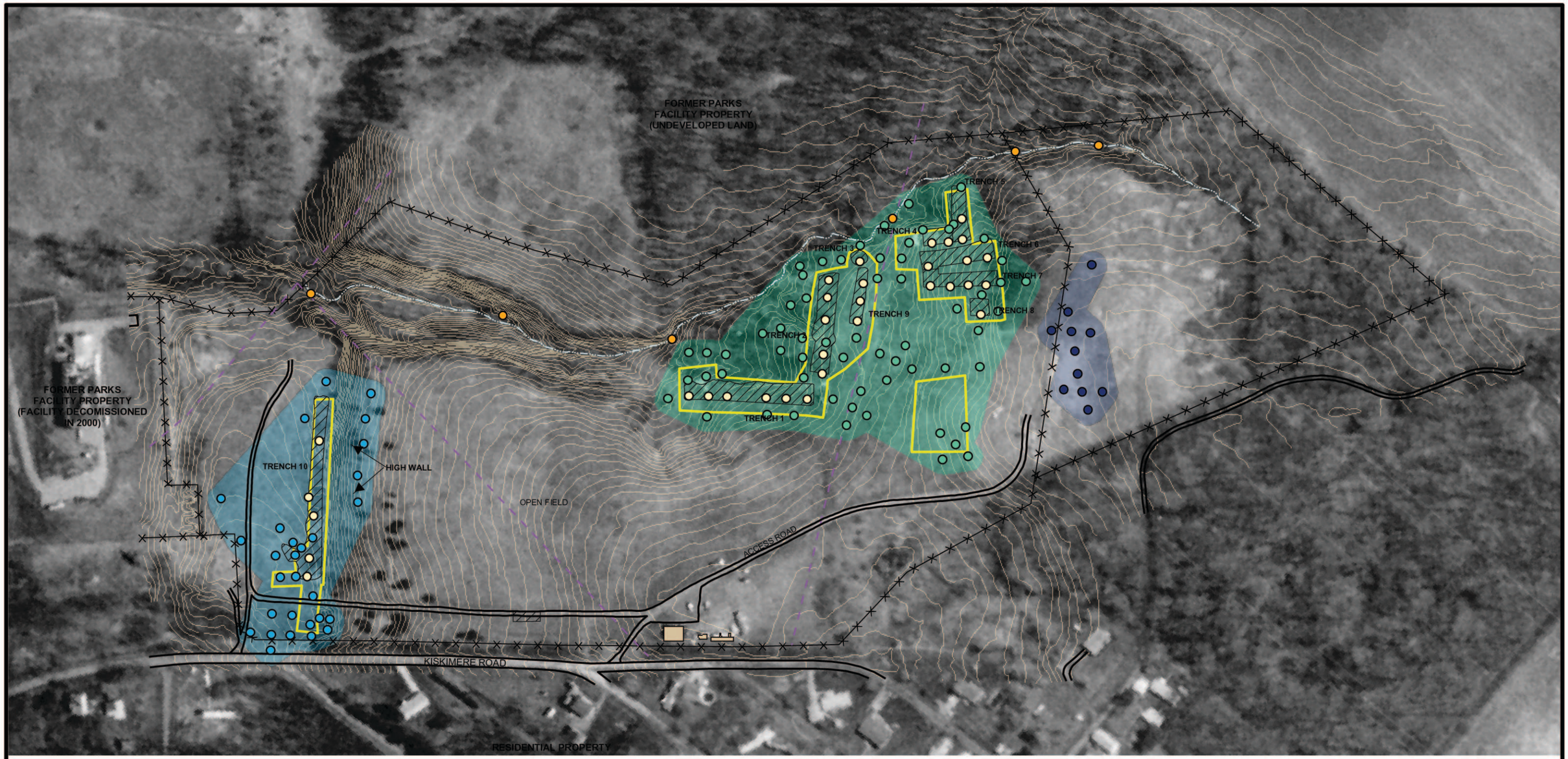
Notes:
1. Only detected radionuclides are shown. Gamma spectroscopy data are not shown for AM-241, U-235, Ra-228, and Ra-226 since isotope specific analyses were completed.
2. All results reported in pCi/L.

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ANALYTICAL RESULTS
(DEEP BEDROCK ZONE RI SAMPLING)

FIGURE 4-93

URS Corporation N:\11171431.00000\GIS\ArcMap\RI_Figures\WGRES_DB.mxd Date: 2/11/2005 9:04:18 AM Name: Eich_C



Legend

- Roads
- Buried Gas Line
- Chain Link Fence
- Trench Sampling Locations
- Dry Run Sampling Locations
- Dry Run
- Preliminary MARSSIM Class 1 Survey Units
- Buildings
- EU 1
- EU 2
- EU 3
- Trenches

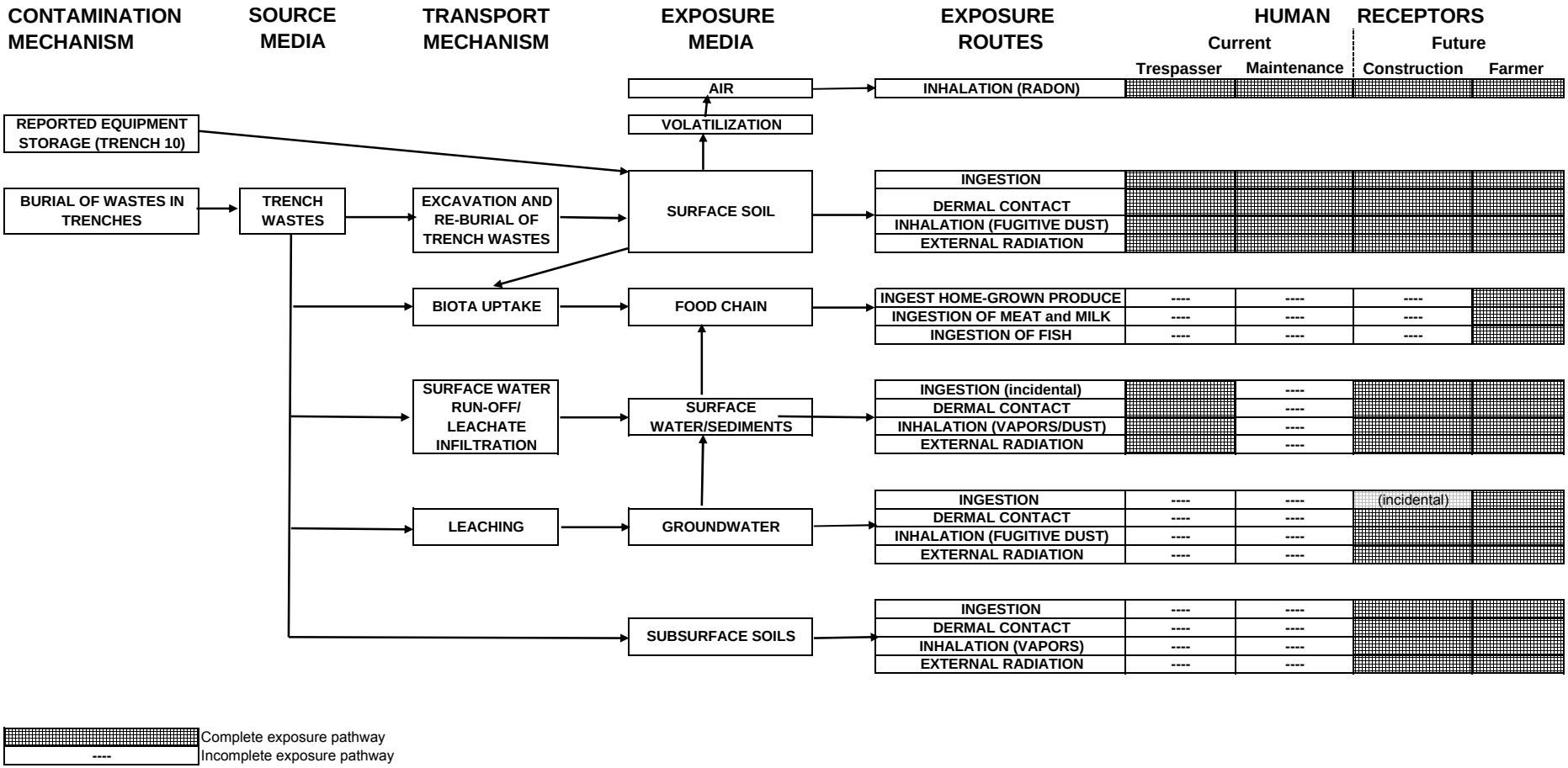
N

0 100 200 400 Feet

IDENTIFICATION OF THE EXPOSURE UNITS
FOR THE BASELINE RISK ASSESSMENT

FIGURE 6-1

FIGURE 6-2
PRELIMINARY GRAPHIC CONCEPTUAL SITE MODEL ~ PATHWAYS FOR HUMAN EXPOSURE AT SLDA



LRB Draft 5/9/03

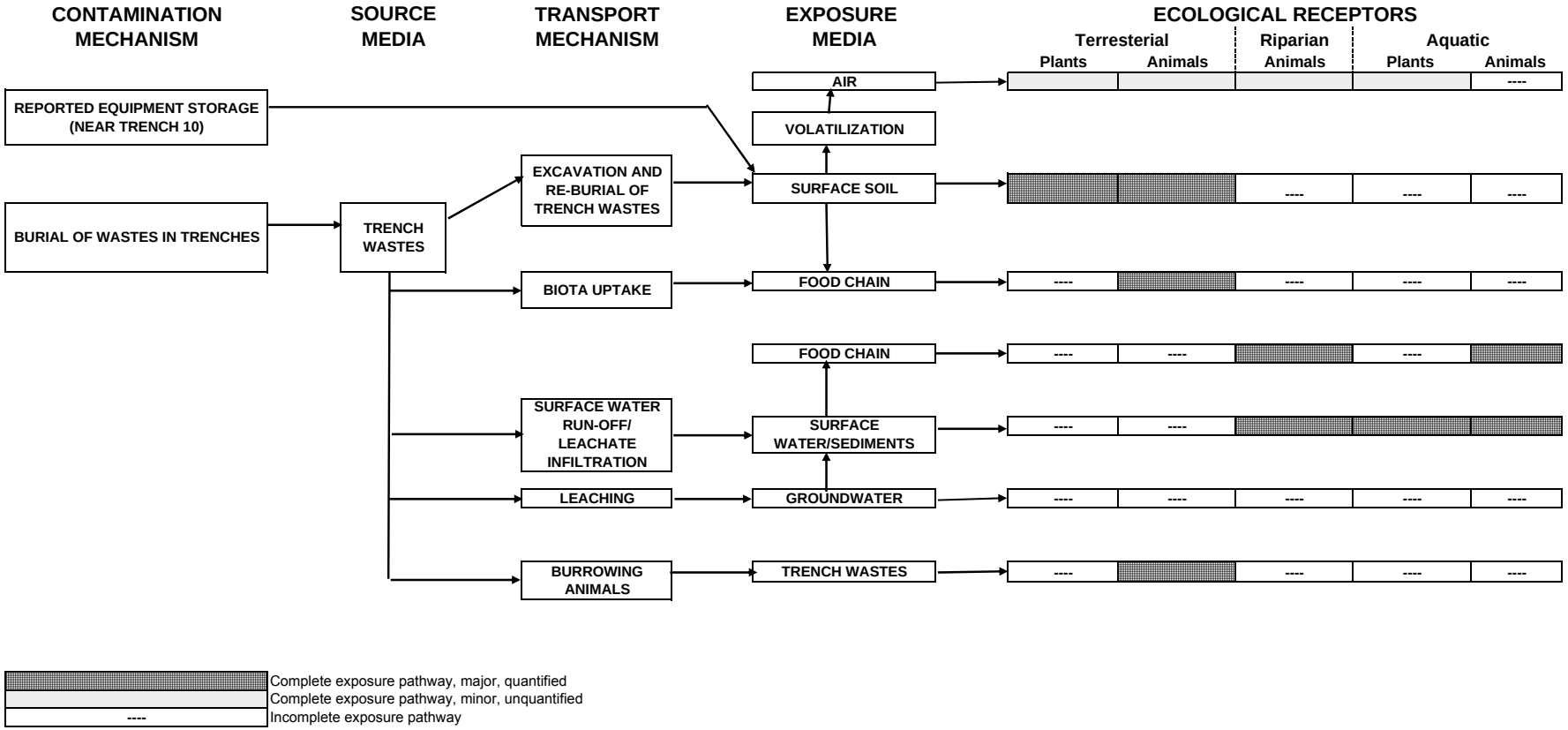



FIGURE 7-1
DRAFT CONCEPTUAL SITE MODEL ~ GENERAL SCREENING PATHWAYS FOR ECOLOGICAL EXPOSURE AT SLDA