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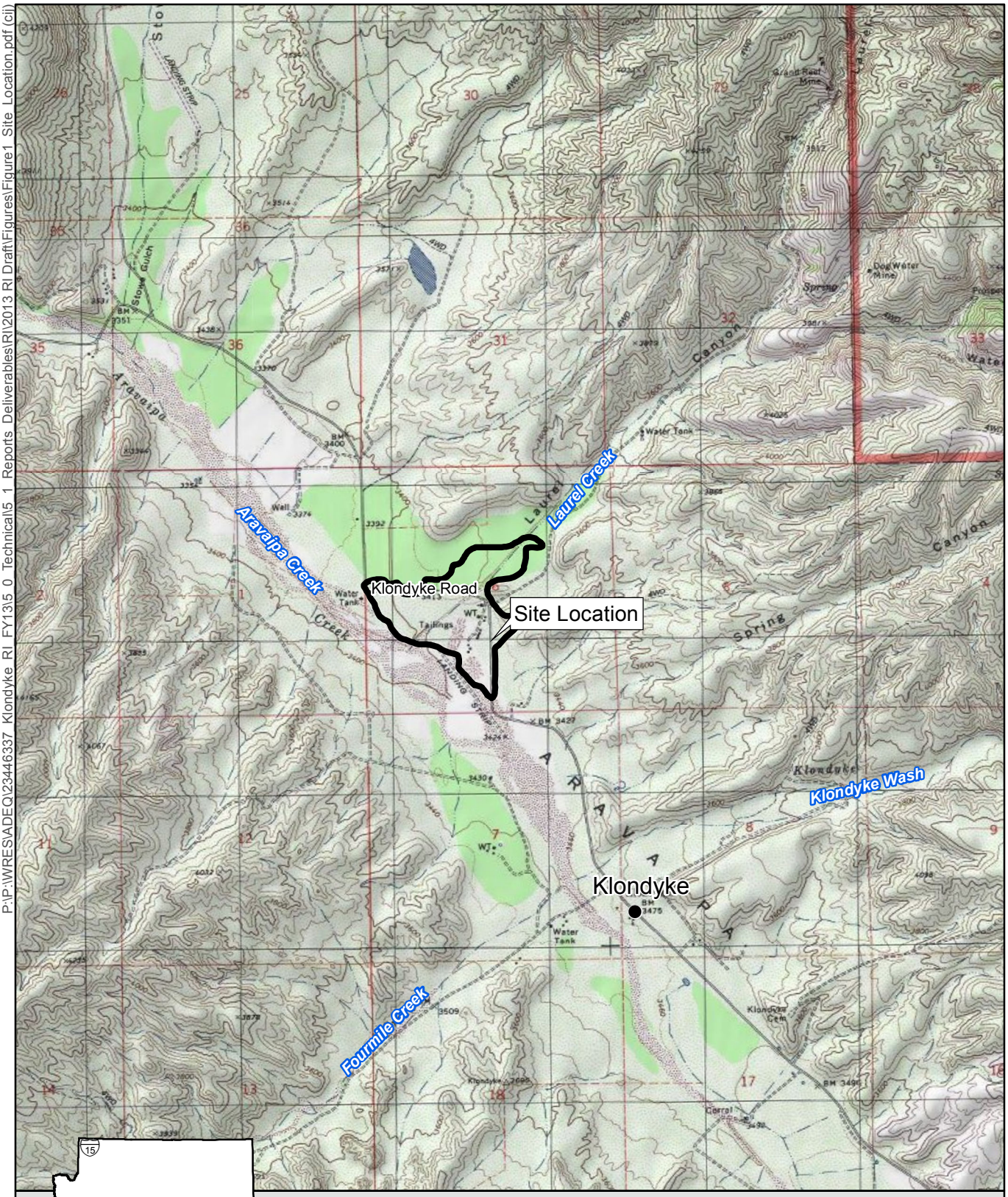

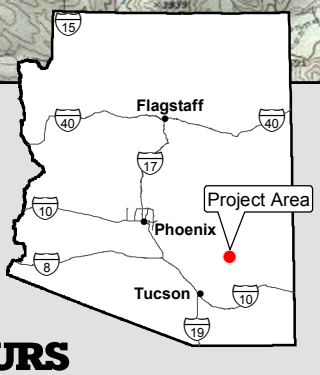

LEGEND

- Klondyke WQARF Site
- Granite Reef Mine
- Town of Klondyke

0 1,000 2,000 3,000 4,000
Scale in Feet

Source:
Base topographic data: Map created with USA Topo (tm) (c) 2002 National Geographic Holdings (www.topo.com)
Base Map: ALRIS 1997 - 2007

URS

Figure 1
Site Location

Klondyke Tailings WQARF Site

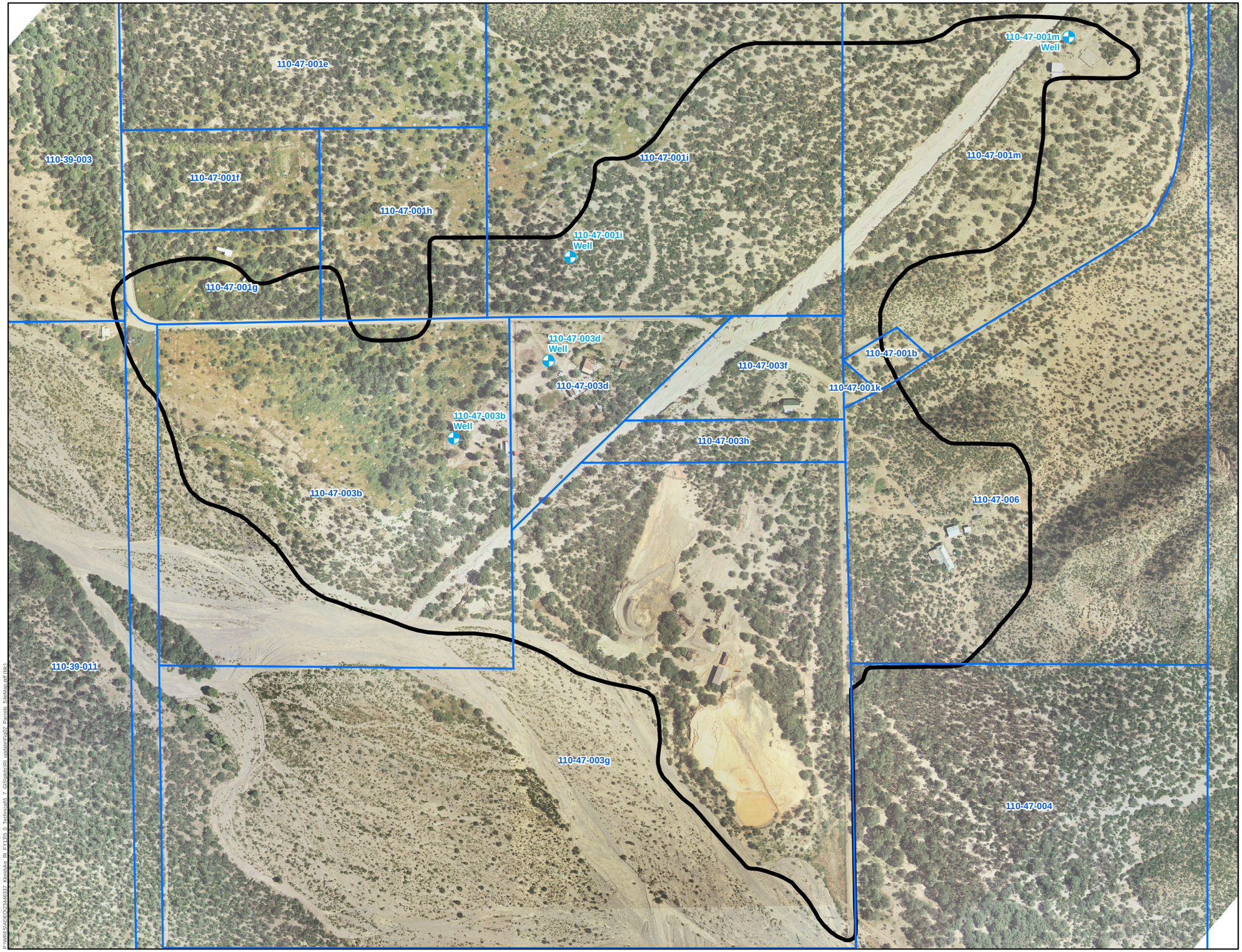

Figure 2
Site Map

Klondyke Tailings WQARF Site

Legend

Reference Features

- Klondyke WQARF Site
- 110-47-001 Parcels
- Domestic Well Location

0 100 200 400

Scale in Feet

Source: Topographical control provided by
A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane,
Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial
Mapping Inc., April 2006.

URS **Map Produced: June 2013**

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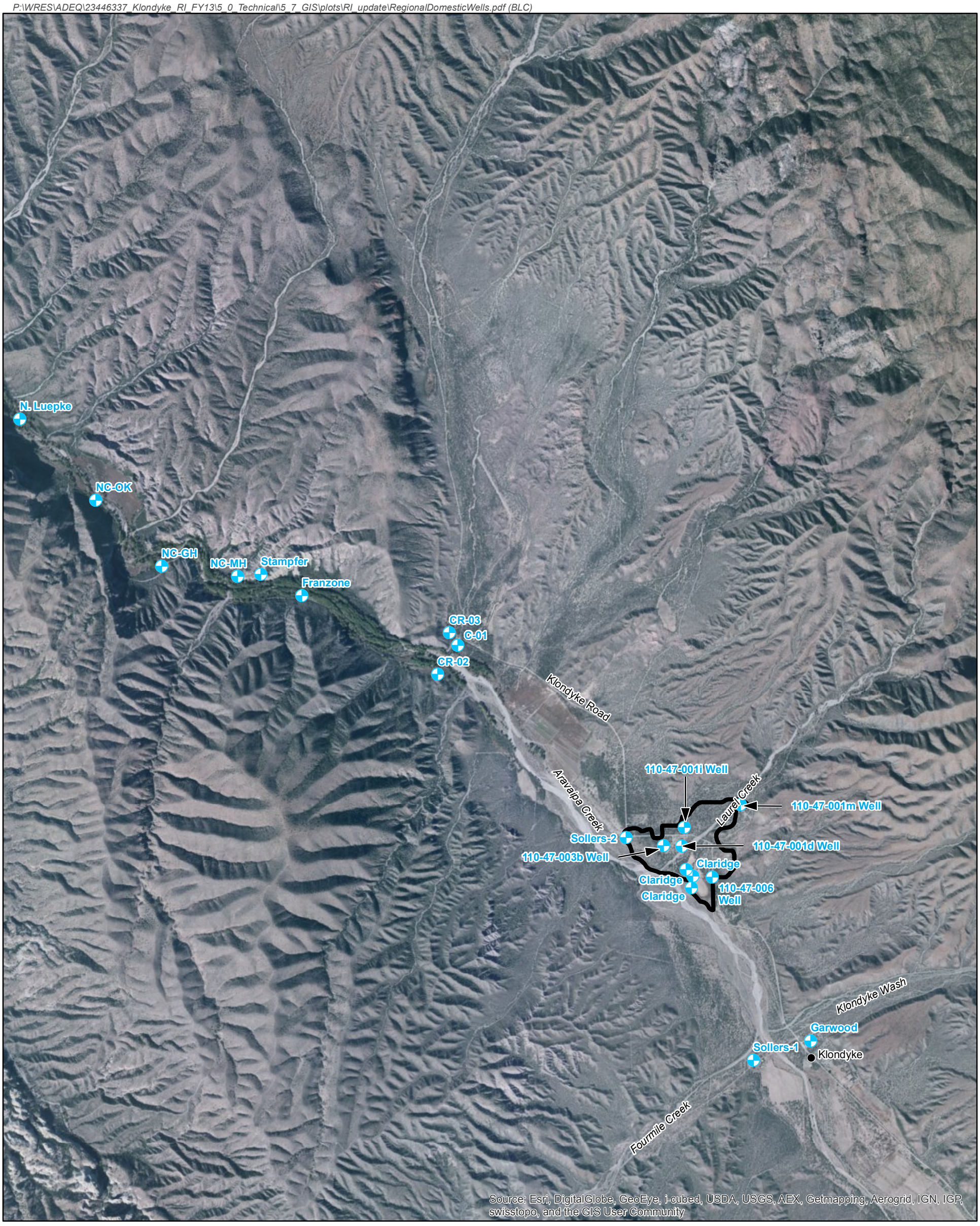


Legend

Ground Water Features

- Domestic Well

Reference Features

- Klondyke WQARF Site
- City/Town

0 1,000 2,000 3,000 4,000

Scale in Feet

Figure 3
Offsite Domestic Wells

Klondyke Tailings WQARF Site

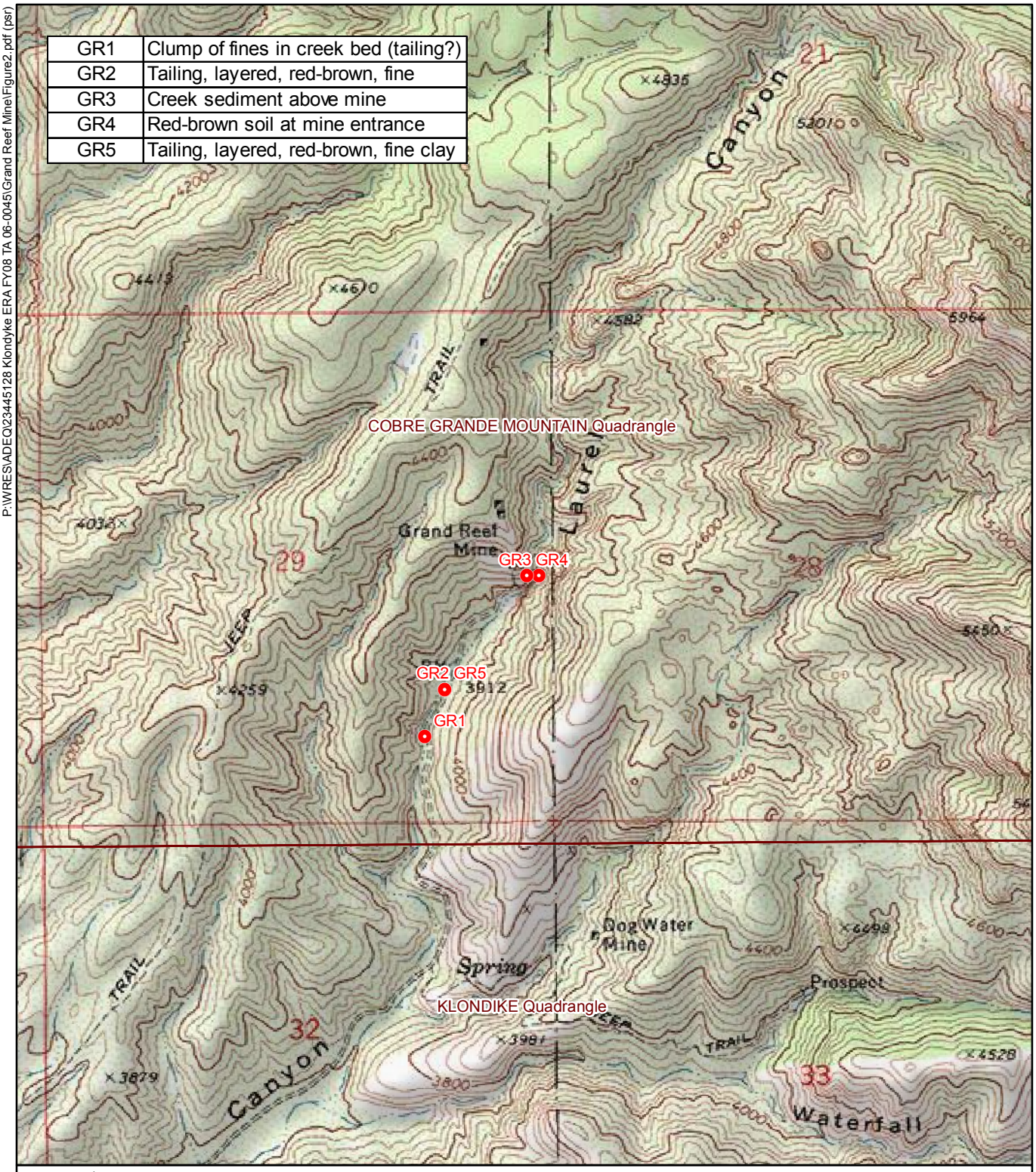
Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.

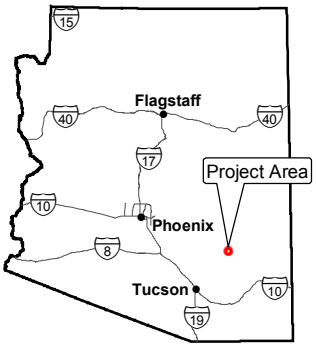
URS

Map Produced: May 2014

P:\WRES\ADEQ\23445128 Klondyke ERA FY08 TA 06-0045\Grand Reef Mine\Figure2.pdf (psr)

GR1	Clump of fines in creek bed (tailing?)
GR2	Tailing, layered, red-brown, fine
GR3	Creek sediment above mine
GR4	Red-brown soil at mine entrance
GR5	Tailing, layered, red-brown, fine clay





LEGEND

- Soil/Tailing Sample Location
- Quad Boundary

Source:
Base topographic data: Map created with TOPO!
(tm) (c) 2002 National Geographic Holdings (www.topo.com)
Base Map: ALRIS 1997 - 2005

Figure 4
Grand Reef Mine
Sample Locations
June 5, 2008

N

0 500 1,000
Feet

Figure 5
Lead in Surface Soil Samples

Klondyke Tailings WQARF Site

Legend

Lead Sampling Results

- < 400 mg/kg
- > 400 mg/kg

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 400
Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

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0 100 200 400 600

SCALE IN FEET

1"=200'

Legend

KB-1 ▲	Subsurface Soil Sample Locations and Number
KW-1 ⊕	Monitor Well Location and Number
□	Existing Water Well Location, Active
■	Existing Water Well Location, Inactive or Capped
◪	Existing Water Well Location, Open

Soil Boring and Monitor Well Location Map

Klondyke Tailings WQARF Site

Figure 6

URS

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Figure 7
Lead in Subsurface Soil Samples at a 6-Inch Depth

Klondyke Tailings WQARF Site

Legend

Lead Sampling Results

- < 400 mg/kg
- ≥ 400 mg/kg

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 400
Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

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Figure 8
Lead in Subsurface Soil Samples at a 12-Inch Depth

Klondyke Tailings WQARF Site

Legend

Lead Sampling Results

- < 400 mg/kg
- ≥ 400 mg/kg

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 400
Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

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Figure 9
Lead in Subsurface Soil Samples at a 24-Inch Depth

Klondyke Tailings WQARF Site

Legend

Lead Sampling Results

- < 400 mg/kg
- ≥ 400 mg/kg

Reference Features

- Klondyke WQARF Site
- Sampling Grid

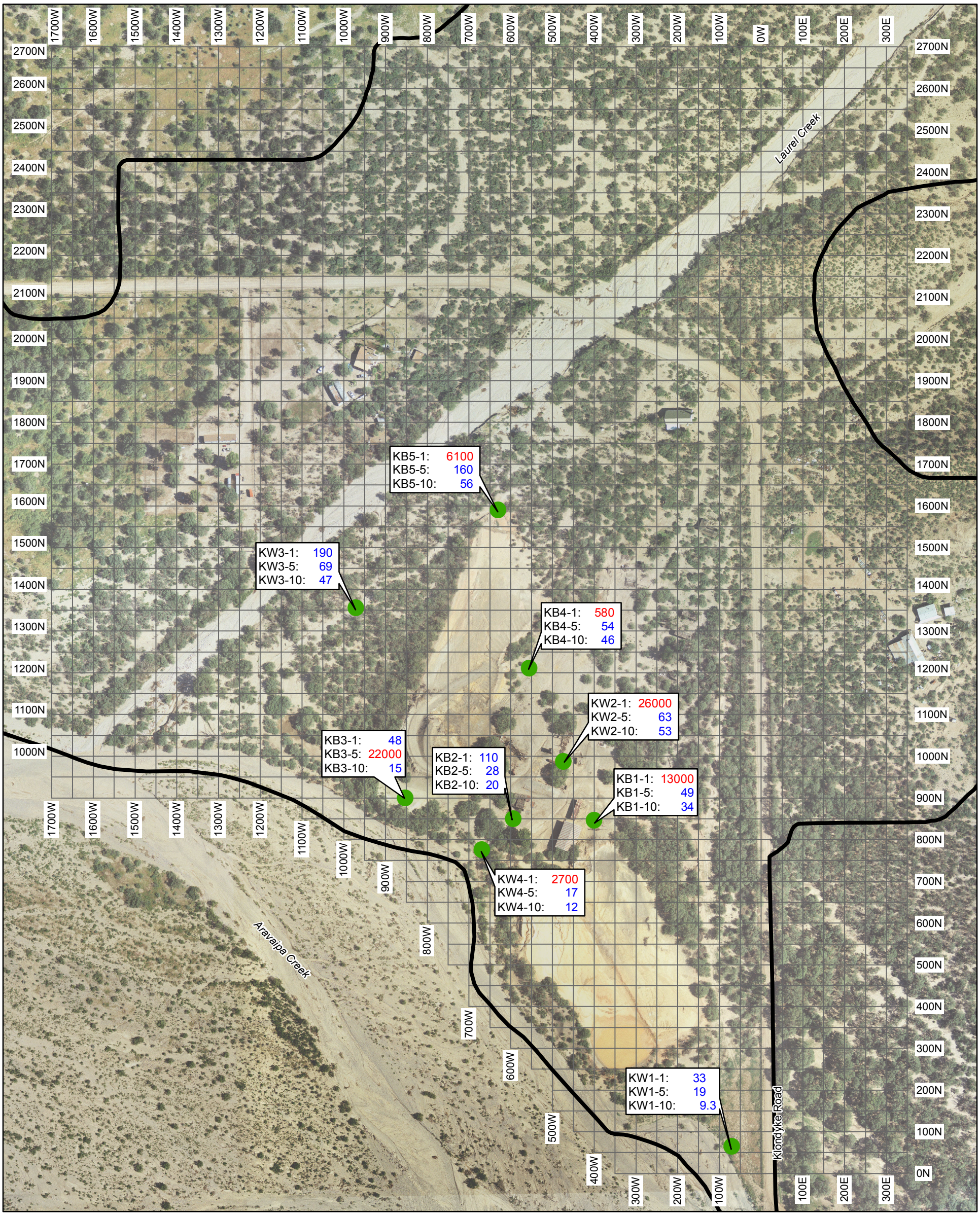
0 100 200 400
Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

P:\IRRESADE\G23446337_Klondyke_RI_FY13\5.0_Technical\5.1_Reports_Deliverables\RI\2013 RI Draft\Figures\Update03042013\Fig09_LeadInSoil_Depth24_new.pdf(s)



Legend

Lead Sampling Results

Multiple Depth Sample Locations

KB1-1:	13000	sampled at 1 foot
KB1-5:	49	sampled at 5 feet
KB1-10:	34	sampled at 10 feet

Results in milligrams per kilogram

Reference Features

Klondyke WQARF Site

Sampling Grid

0 50 100 200 300 400

Scale in Feet

Figure 10
Lead in Subsurface Soil Samples at 1-, 5-, and 10-Foot Depths

Klondyke Tailings WQARF Site

Source: Topographical control provided by A TEAM Professional Assoc., Inc. Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29. Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

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Map Produced: March 2013

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Figure 11
Regression Analysis of Lead Concentrations in Soil
6010B vs EDXRF

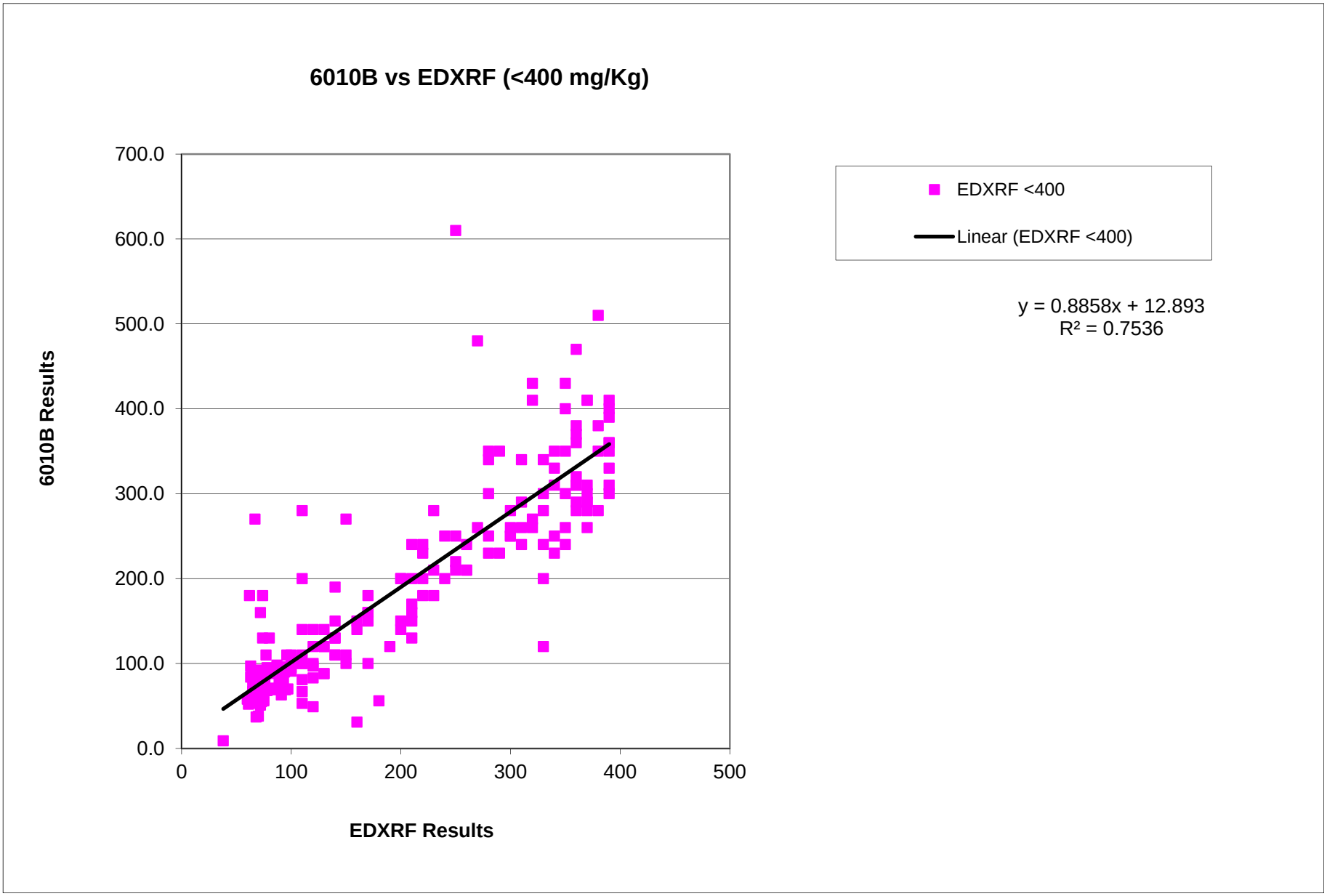


Figure 11
Regression Analysis of Lead Concentrations in Soil
6010B vs EDXRF

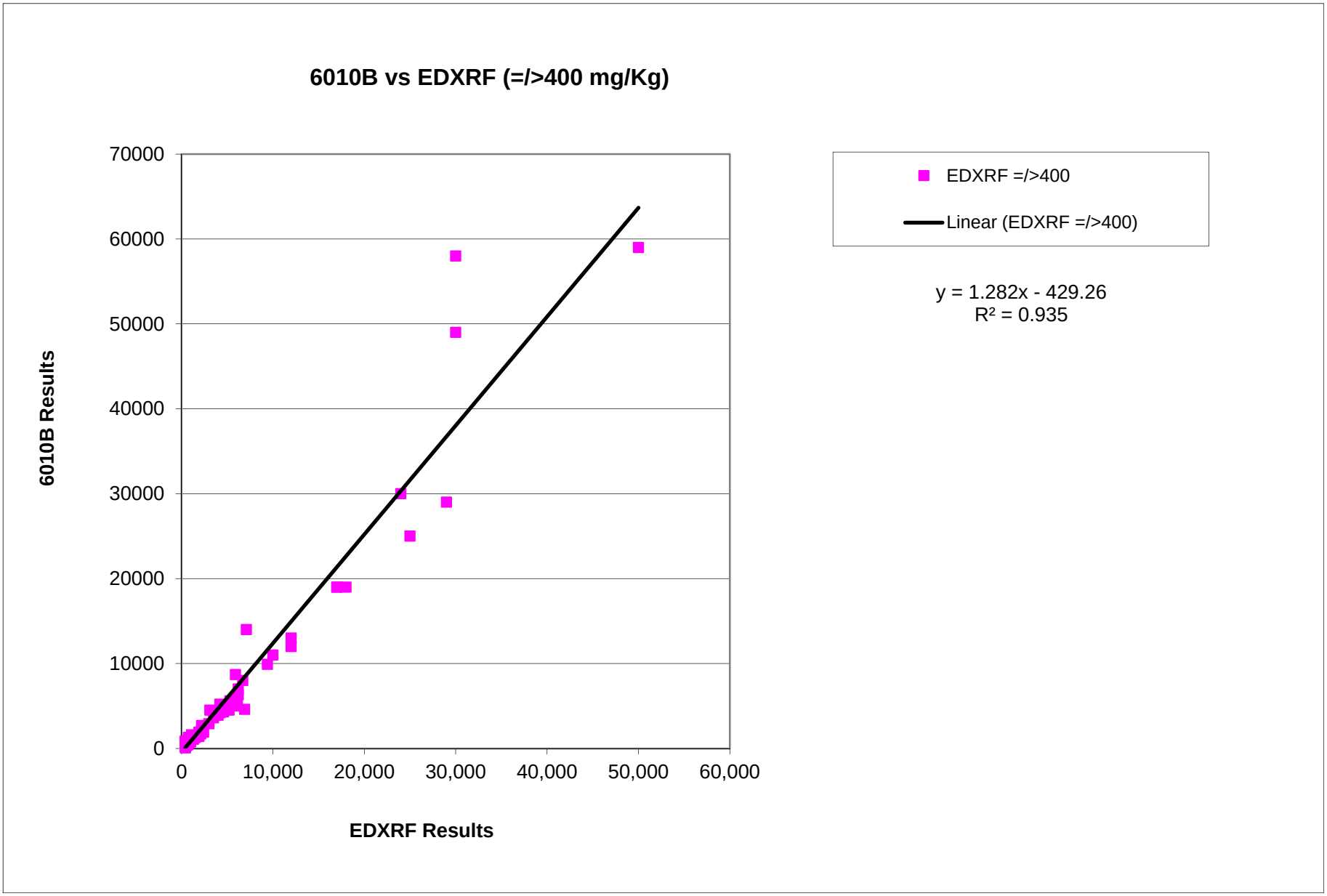


Figure 11
Regression Analysis of Lead Concentrations in Soil
6010B vs EDXRF

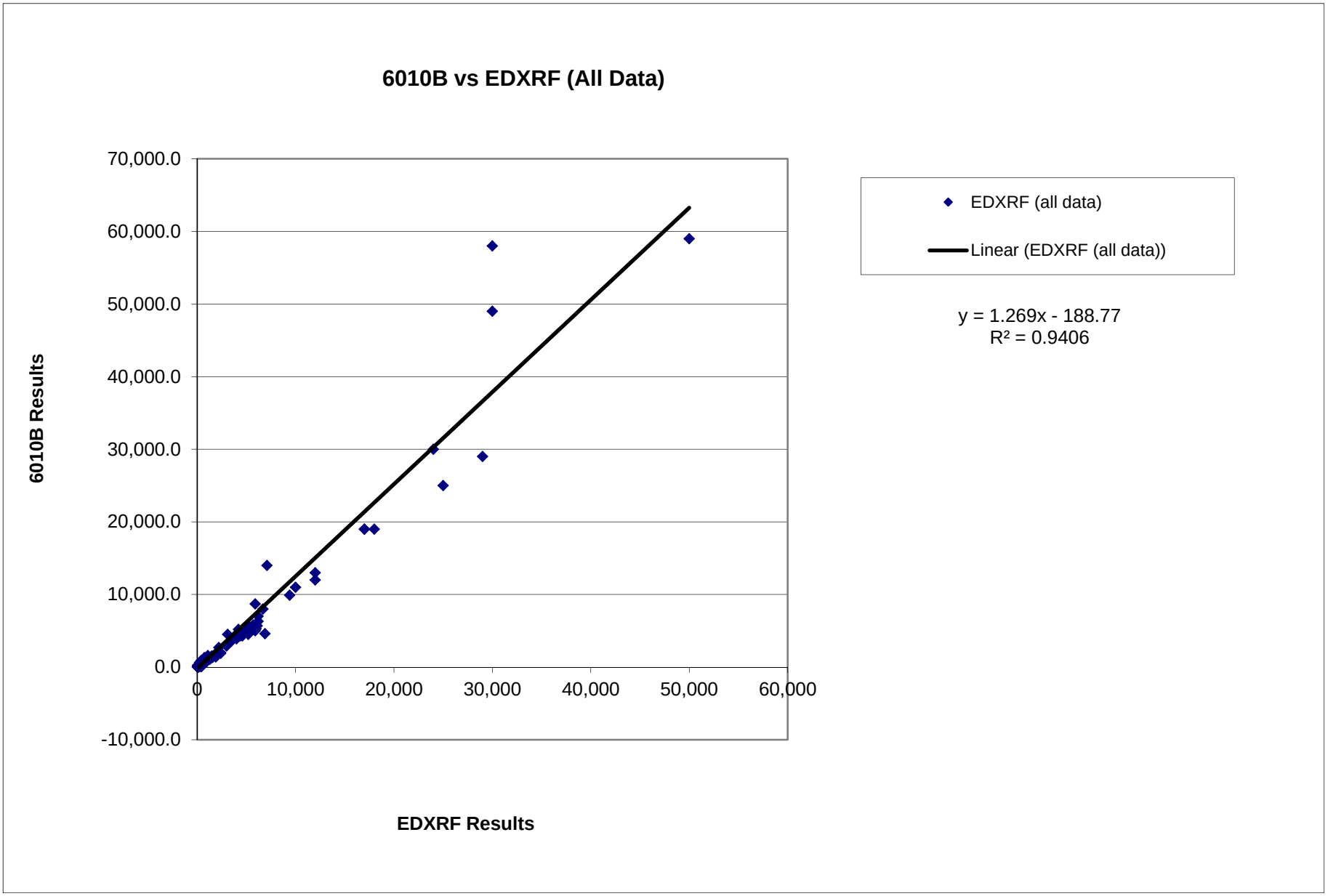


Figure 12
Regression Analysis of Manganese Concentrations in Soil
6010B vs EDXRF

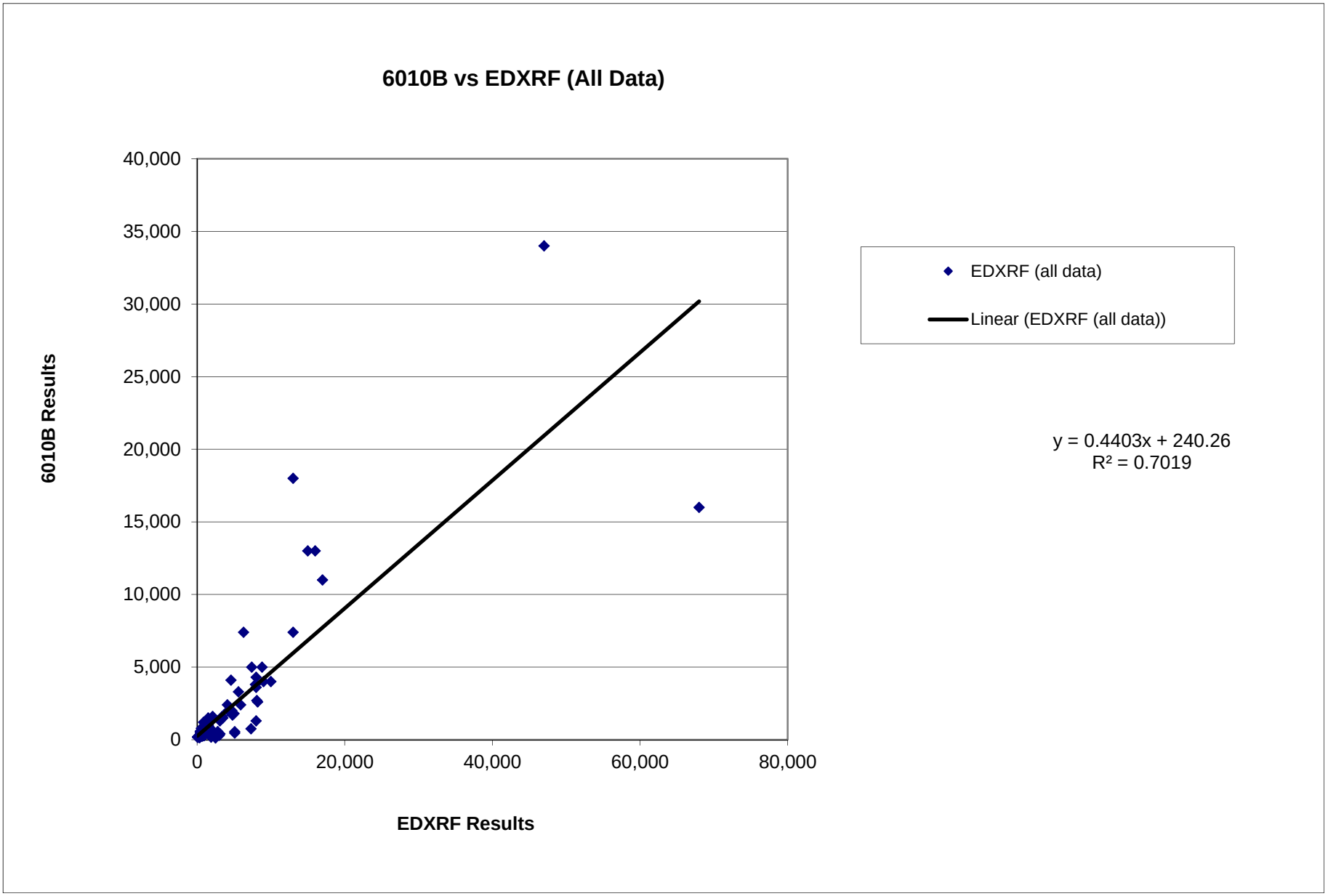


Figure 12
Regression Analysis of Manganese Concentrations in Soil
6010B vs EDXRF

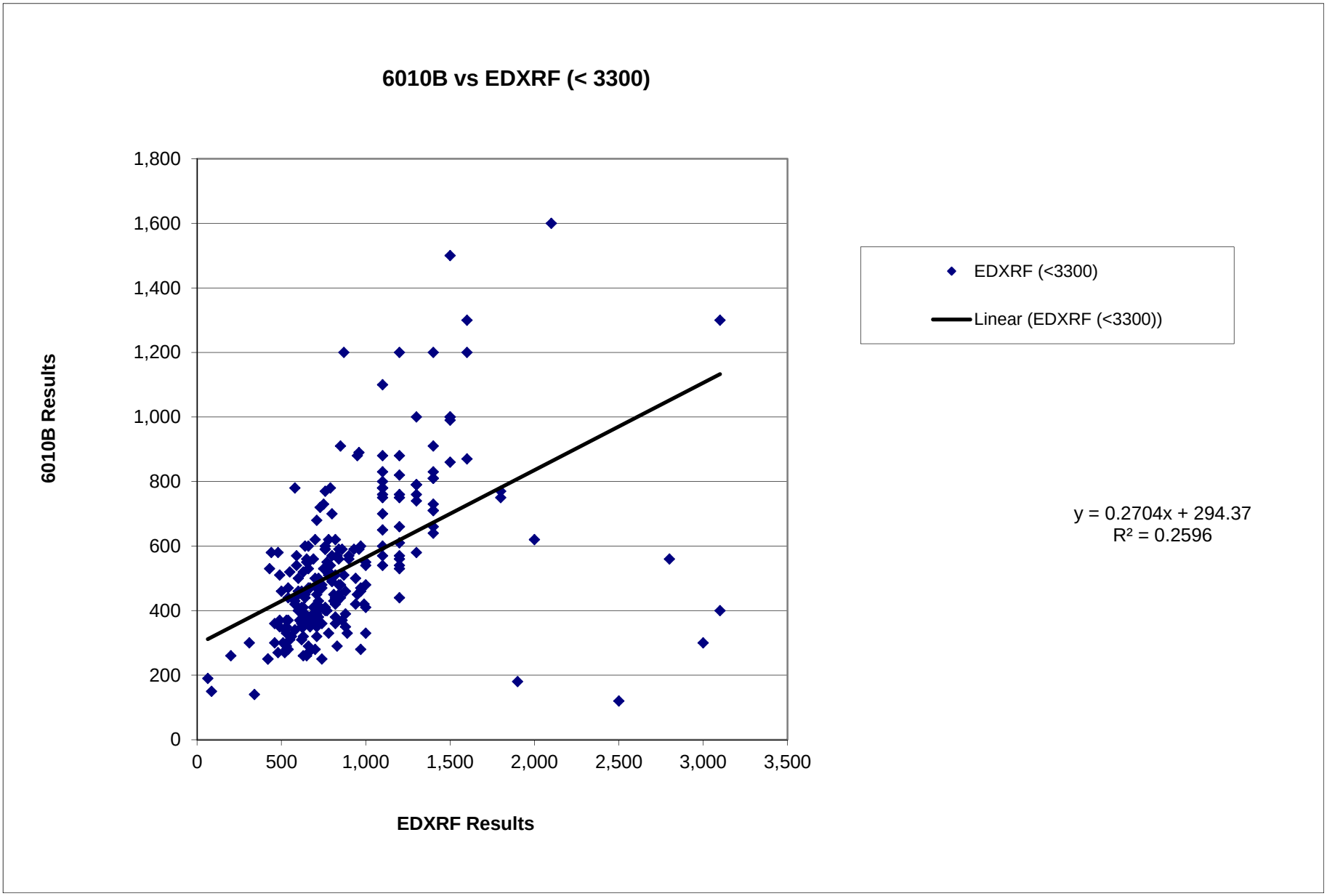


Figure 13
Regression Analysis of Cadmium Concentrations in Soil
6010B vs EDXRF

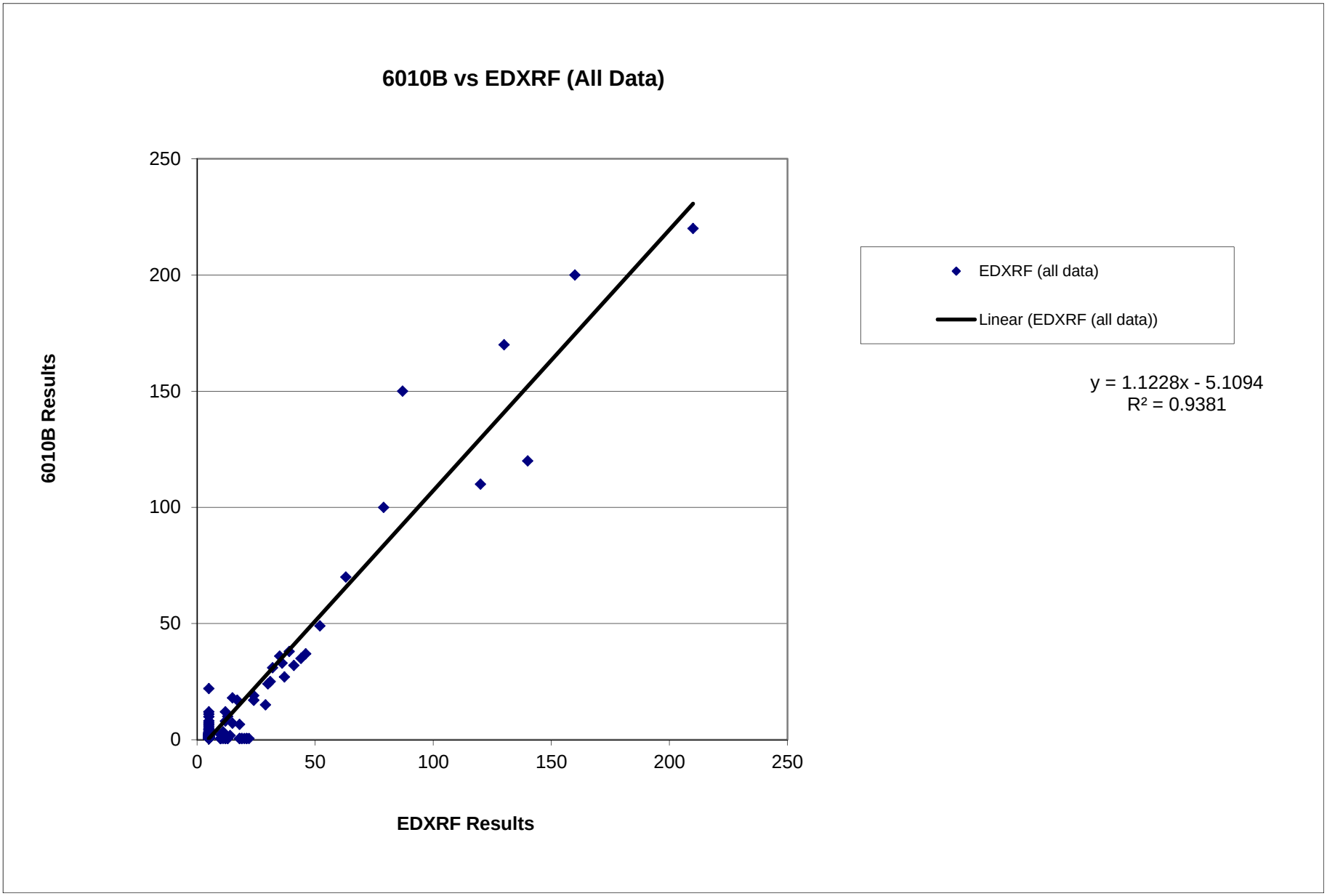
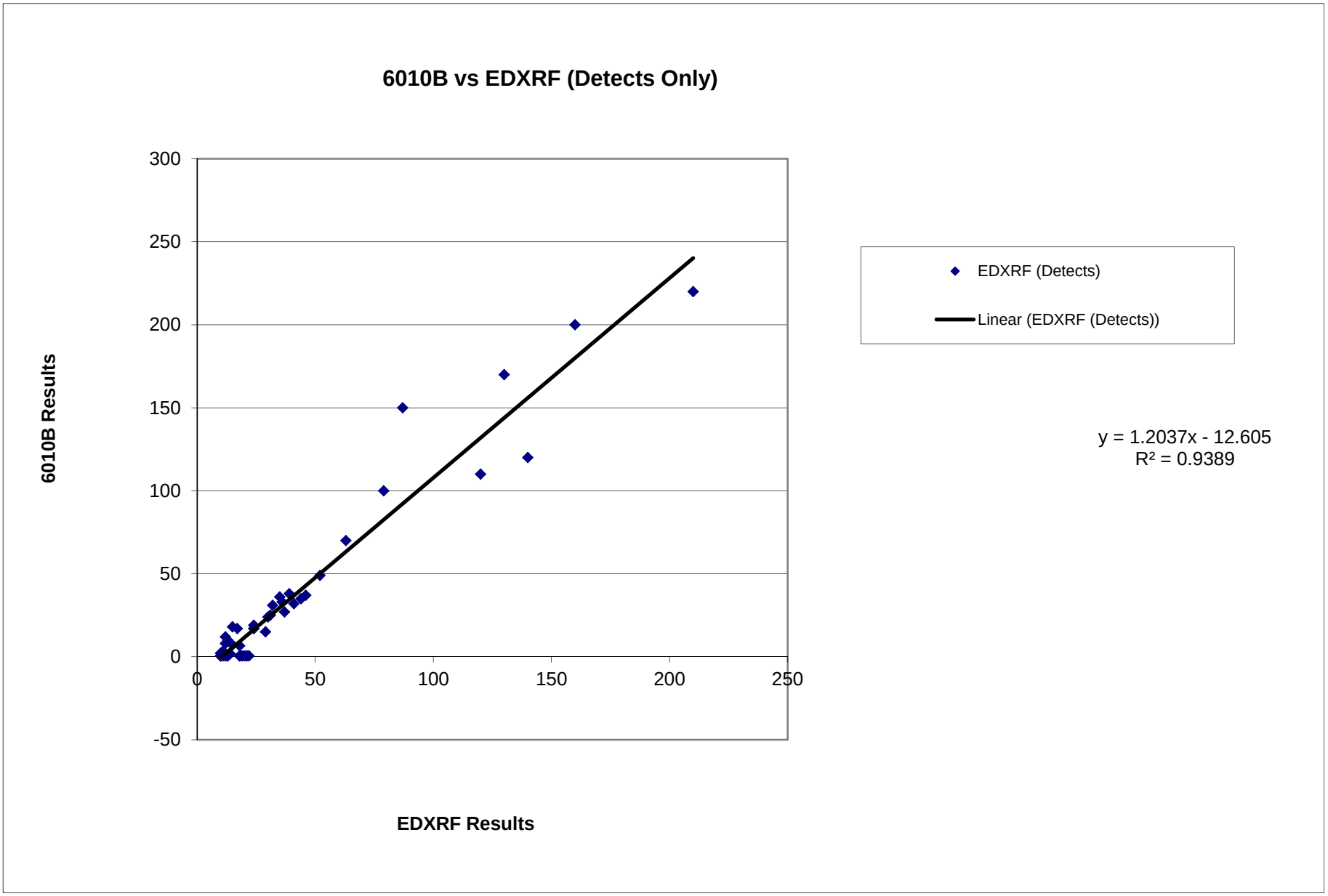


Figure 13
Regression Analysis of Cadmium Concentrations in Soil
6010B vs EDXRF



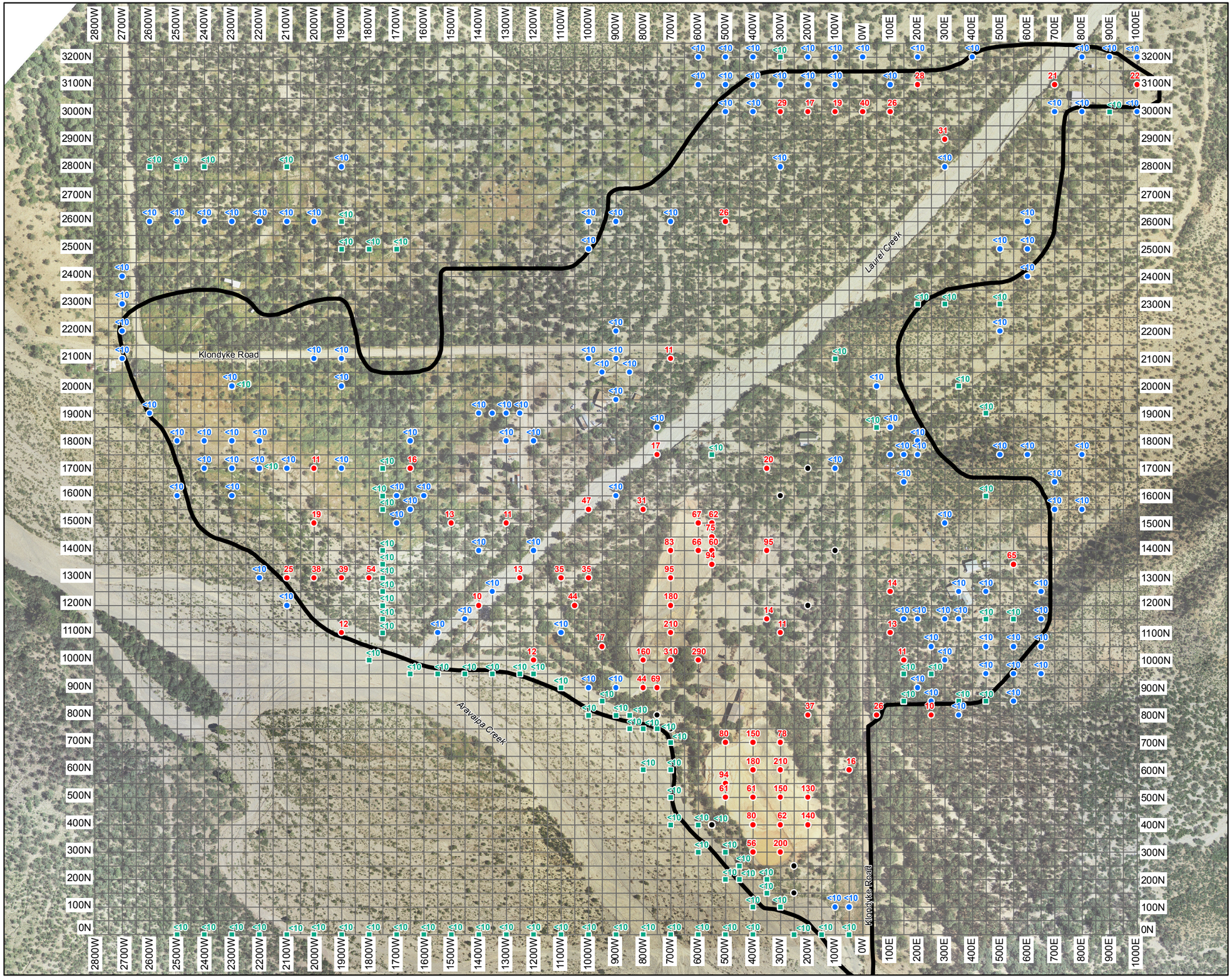


Figure 14
Arsenic (EDXRF & Method 6010) in Surface Soil Samples

Klondyke Tailings WQARF Site

Legend

Arsenic Sampling Results

- <10 mg/kg (Method 6010)
- ≥10 mg/kg (Method 6010)
- No Value
- <10 mg/kg (EDXRF)

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 400
Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

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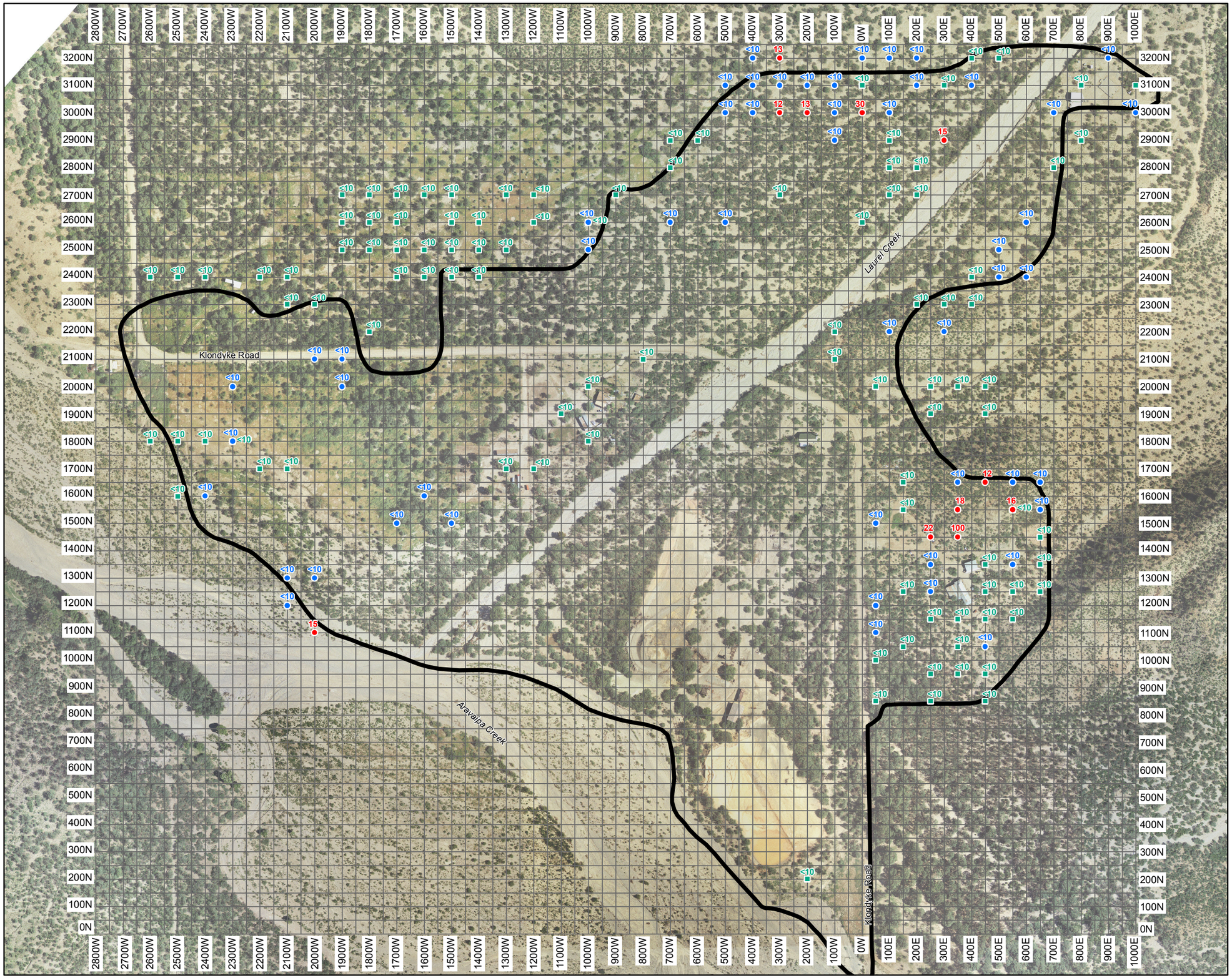

Figure 15
Arsenic (EDXRF & Method 6010) in Subsurface Soil Samples at a 6-Inch Depth

Klondyke Tailings WQARF Site

Legend

Arsenic Sampling Results

- <10 mg/kg (Method 6010)
- ≥10 mg/kg (Method 6010)
- No Value
- <10 mg/kg (EDXRF)

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 400
Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

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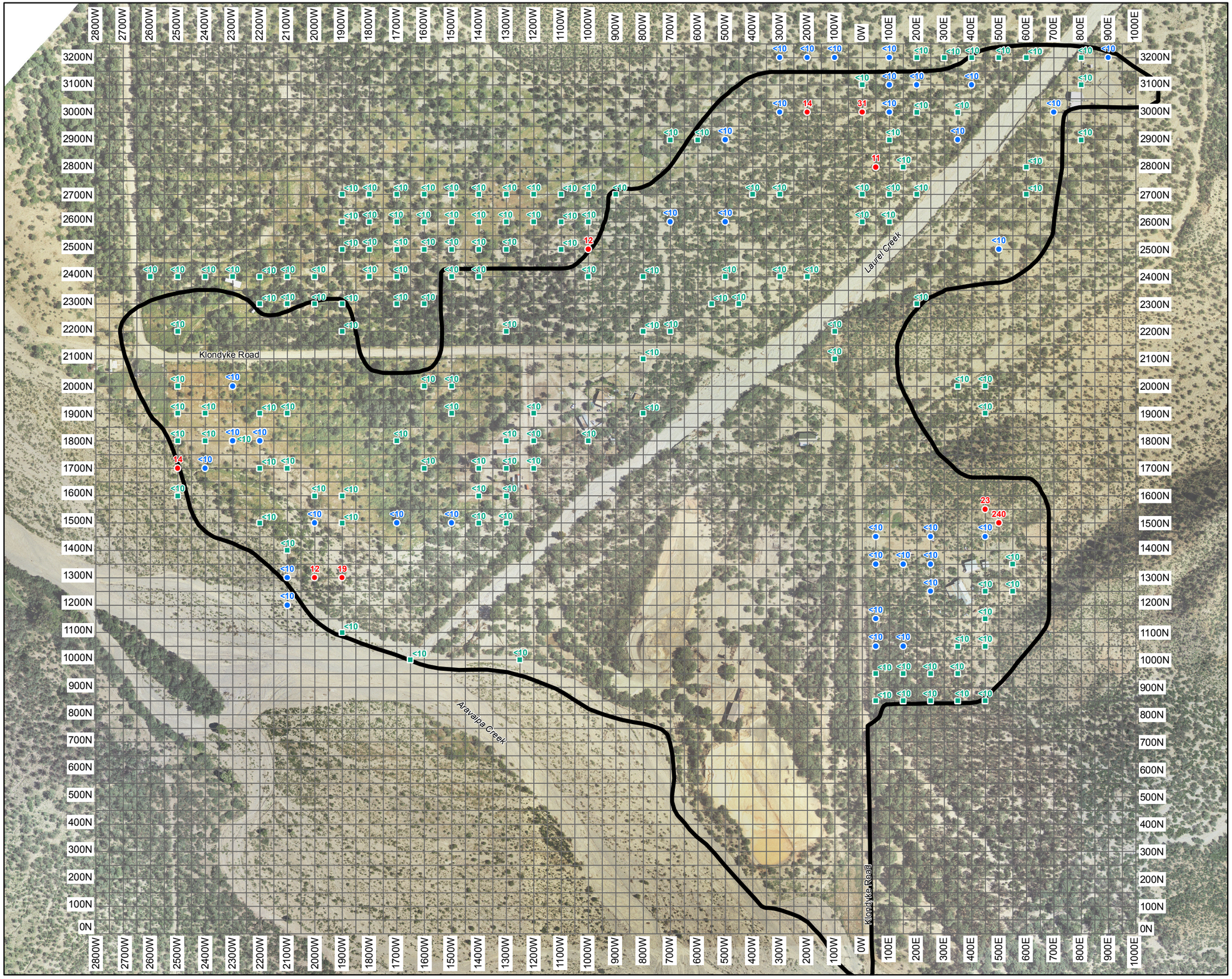

Figure 16
Arsenic (EDXRF & Method 6010) in Subsurface Soil Samples at a 12-Inch Depth

Klondyke Tailings WQARF Site

Legend

Aresenic Sampling Results

- <10 mg/kg (Method 6010)
- ≥10 mg/kg (Method 6010)
- No Value
- <10 mg/kg (EDXRF)

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 400

Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

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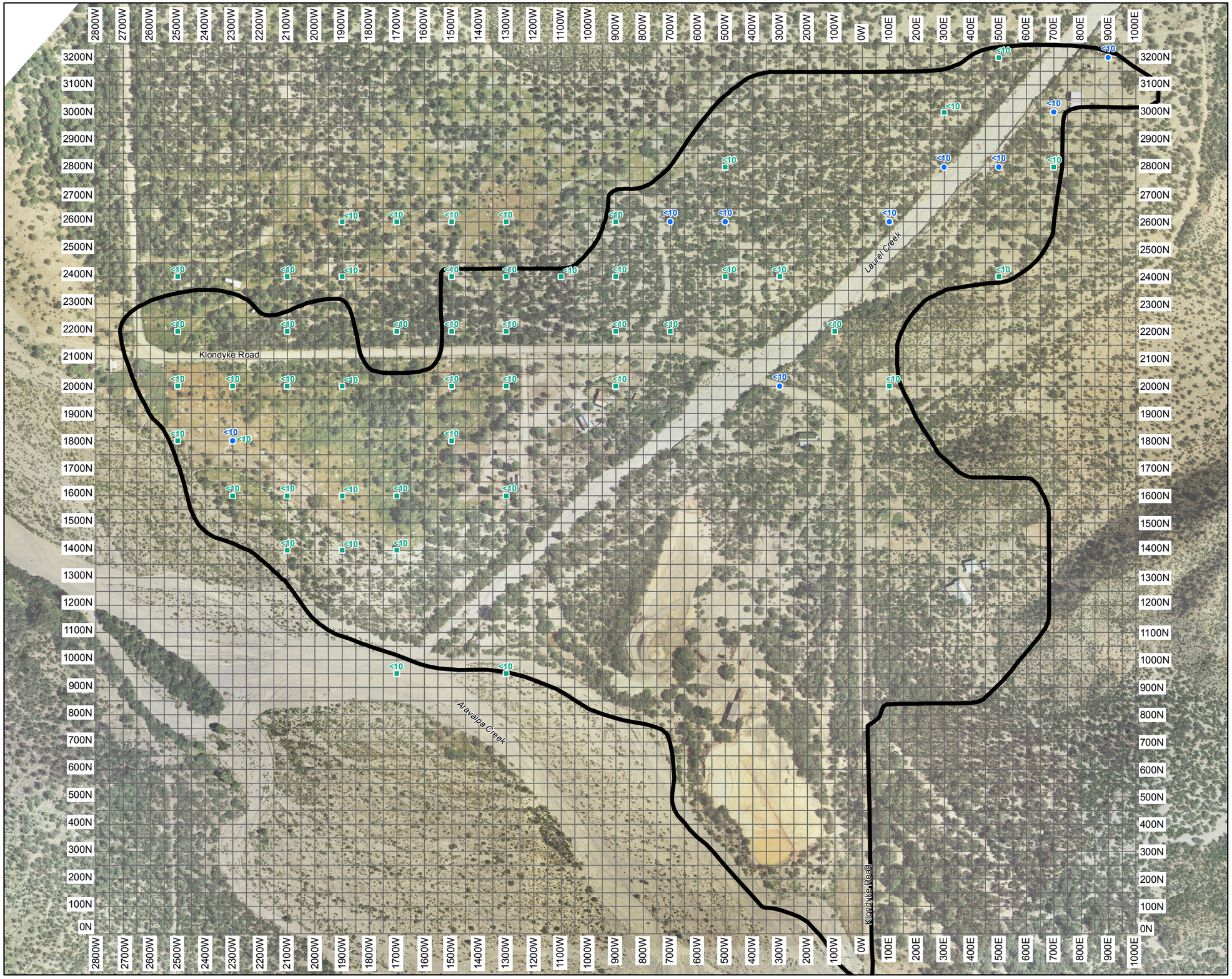

Figure 17
Arsenic (EDXRF & Method 6010) in Subsurface Soil Samples at a 24-Inch Depth

Klondyke Tailings WQARF Site

Legend

Arsenic Sampling Results

- <10 mg/kg (Method 6010)
- ≥10 mg/kg (Method 6010)
- No Value
- <10 mg/kg (EDXRF)

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 400
Scale in Feet

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.
Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

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Legend

Surface Water Features

- Surface Water Sample Location

Reference Features

- Klondyke WQARF Site
- City/Town

0 1,000 2,000 3,000 4,000

Scale in Feet

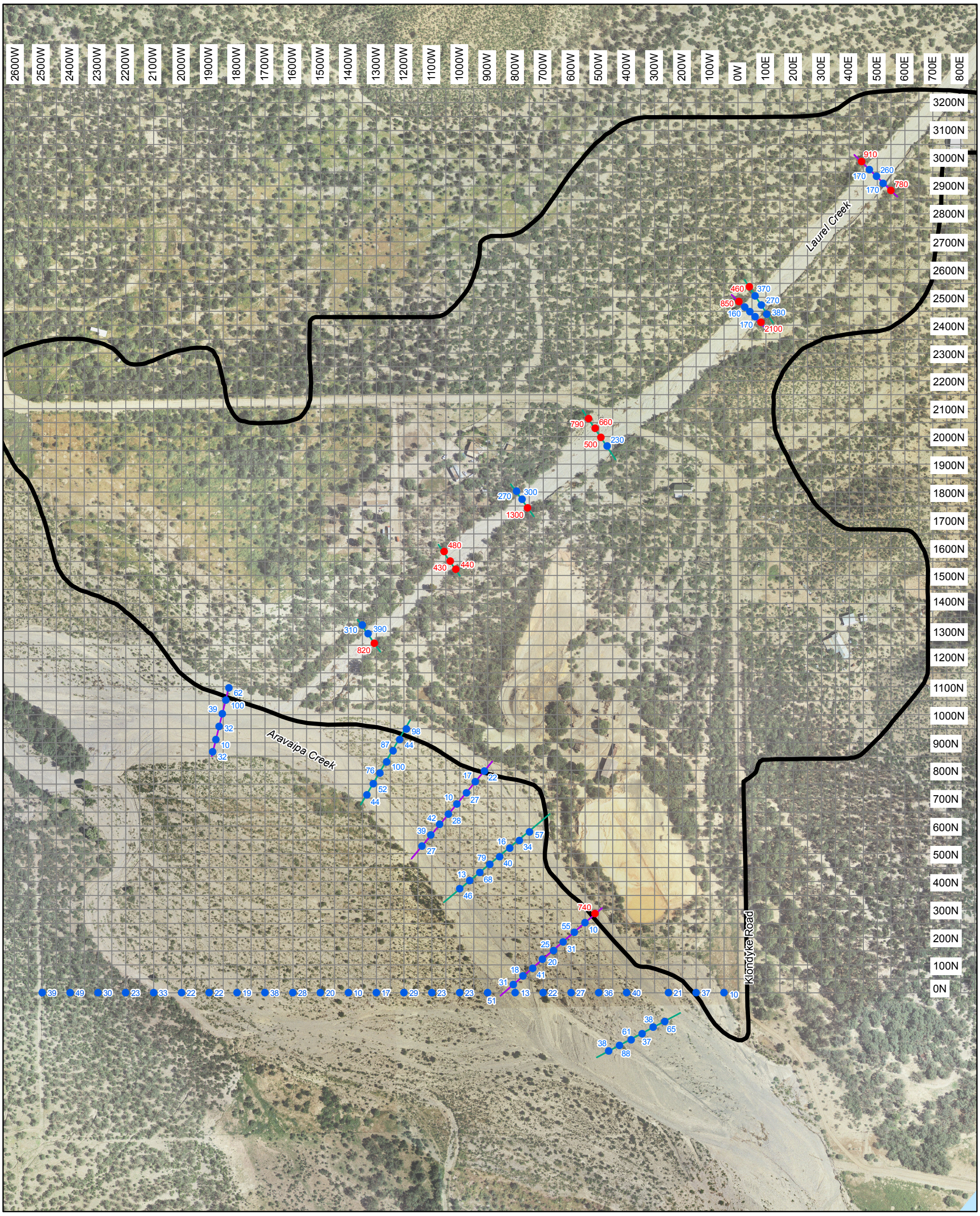
Figure 18
Surface Water Sampling

Klondyke Tailings WQARF Site

Source: Topographical control provided by A TEAM Professional Assoc., Inc.
Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29.

URS

Map Produced: June 2013



Legend

Lead Sampling Results

- < 400 mg/kg
- ≥ 400 mg/kg

Flood Status

- Prior to 2006 Flooding
- Following 2006 Flooding

Reference Features

- Klondyke WQARF Site
- Sampling Grid

0 100 200 300 400

Scale in Feet

Figure 19
Lead in Stream Sediment Samples

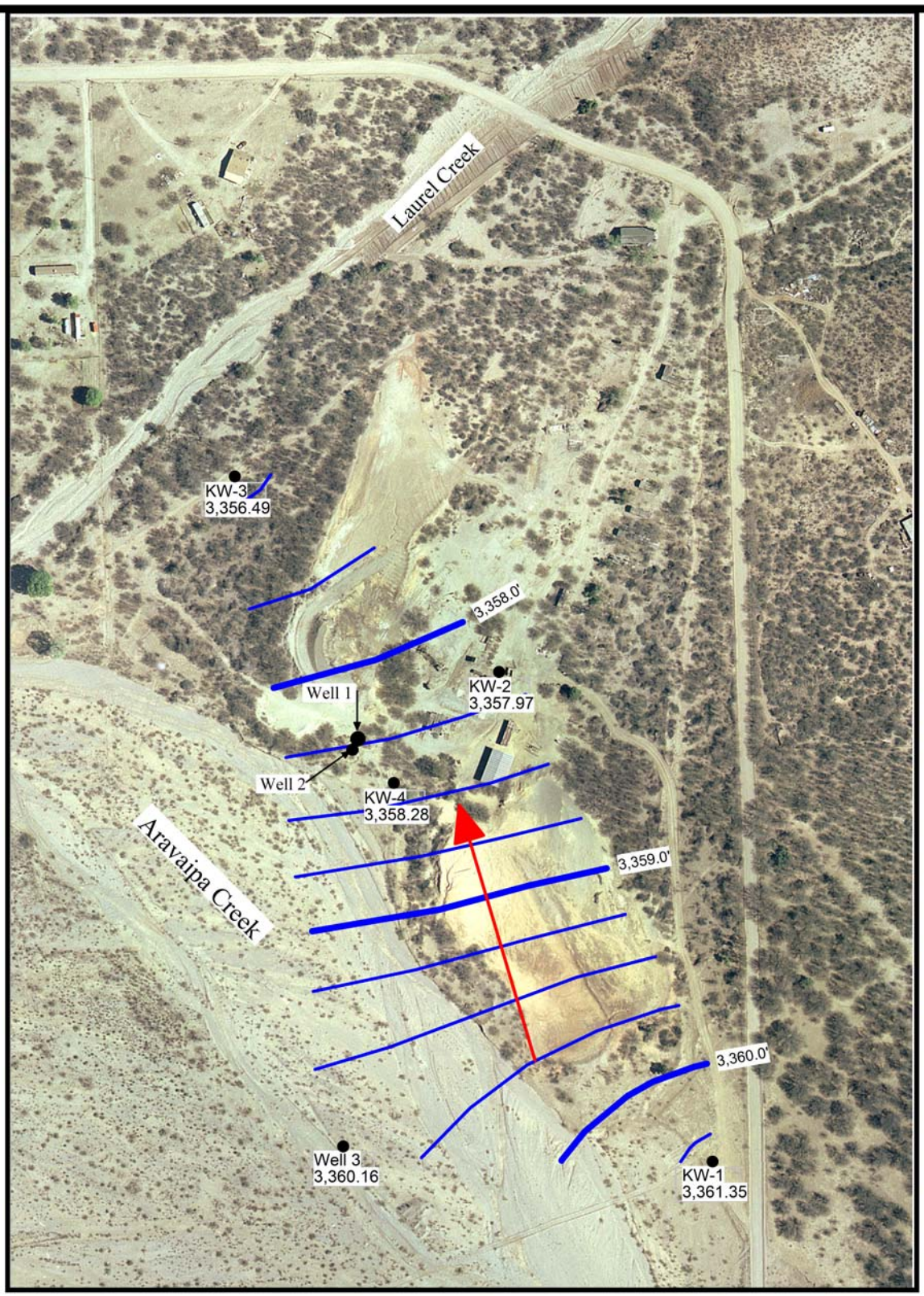
Klondyke Tailings WQARF Site

Source: Topographical control provided by A TEAM Professional Assoc., Inc. Horizontal datum is NAD83 Arizona State Plane, Central Zone, Vertical datum is based on NAVD29. Aerial Photography provided by Kenney Aerial Mapping Inc., April 2006.

URS

Map Produced: March 2013

P:\WRES\ADEQ\23446337_Klondyke_RI_FY13\5_0_Technical\5_1_Reports_Deliverables\RI\2013 RI Draft\Figures\Fig05_LeadInStreamSedimentSamples.pdf(cij)



Groundwater Elevation Contour

Direction of Groundwater Flow

Well Location

KW-1
3,361.35
Groundwater elevation amsl (feet)

0 100 200

SCALE (Feet)

N

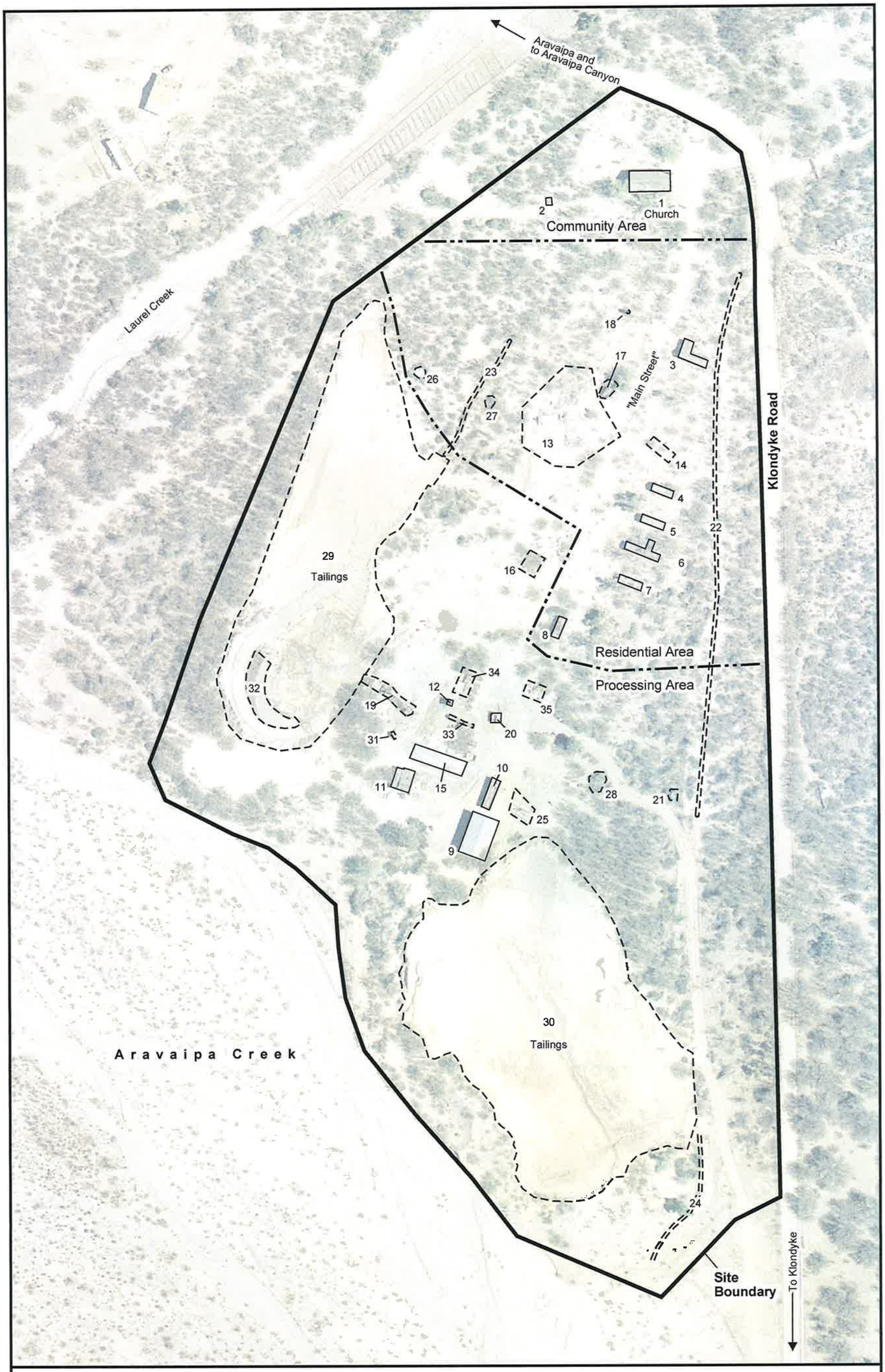
Groundwater Elevation Contour Map, February 21, 2013

Klondyke Tailings WQARF Site

23446337

Figure 20

URS



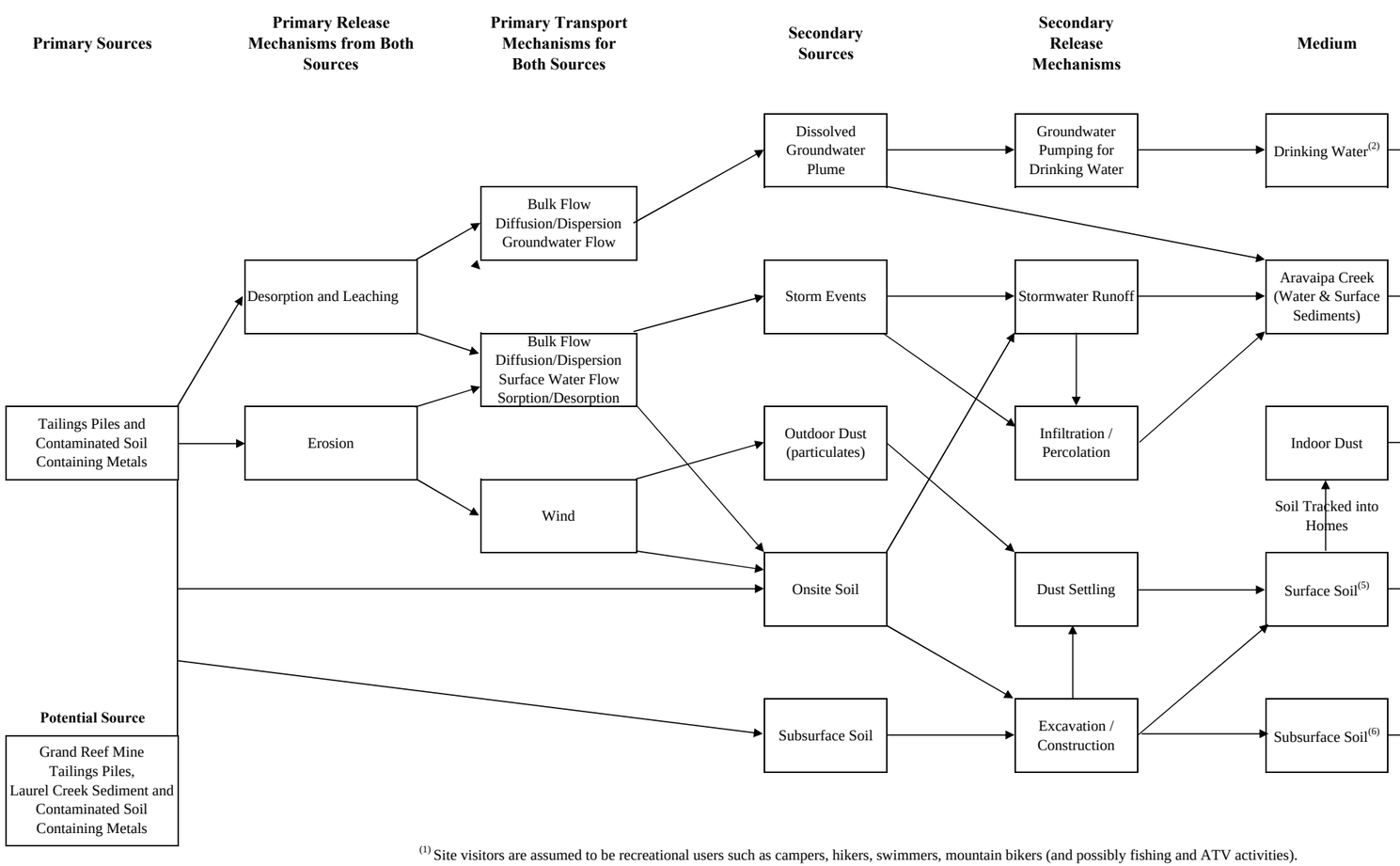
Map of Athletic Mining Company Mill Site, AZ BB:3:37(ASM)
Figure 21

N

= Feature Number (refer to Table 3)
Building
Structure or Object

0 100 200
Feet
1:1,800

Figure 22
Conceptual Site Model
Klondyke Tailings WQARF Site



	Receptor				
	Human			Biota	
Exposure Routes	Area Residents	Site Visitors(1)	Construction Workers	Terrestrial	Aquatic
Drinking Water(2)					
Ingestion				●	●
Inhalation					
Dermal Contact				●	●
Aravaipa Creek (Water & Surface Sediments)					
Ingestion	●(3)	●(3)	(4)	●	●
Inhalation	●(3)	●(3)	(4)	●	●
Dermal Contact	●(3)	●(3)	(4)	●	●
Indoor Dust					
Ingestion	●			●	
Inhalation				●	
Dermal Contact	●			●	
Surface Soil(5)					
Ingestion	●	●	●	●	●
Inhalation	●	●	●		
Dermal Contact	●	●	●	●	●
Subsurface Soil(6)					
Ingestion	●	●	●		
Inhalation	●	●	●		
Dermal Contact	●	●	●		

●	Pathway is potentially complete and significant
	Pathway is negligible or incomplete

(1) Site visitors are assumed to be recreational users such as campers, hikers, swimmers, mountain bikers (and possibly fishing and ATV activities).
Source: Public Health Assessment, Date 1999
(2) Pathways for drinking water are incomplete, because drinking water has not been impacted at the site
(3) Pathways for surface water are incomplete, because surface water has not been impacted at the site. Ingestion, dermal, and inhalation of dry surface sediments (0-3 inches bgs) (water in the creeks is only present intermittently) are considered to be potentially complete and significant pathways.
(4) Construction worker exposure to surface sediments is considered to be negligible because construction work will not occur in a creek. Infrequent (if any) incidental exposure to surface sediments that might occur during construction activities is considered to be negligible. Construction worker exposure to subsurface sediments is considered to be incomplete because construction workers will not perform intrusive activities in a creek.
(5) Surface soil is soil that was sampled at a depth of 0-3 inches bgs
(6) Subsurface soil is soil that was sampled at depths ranging from 6 inches to 10 feet bgs. It was assumed that residents and site visitors could be exposed to subsurface soil brought to the surface during excavation activities