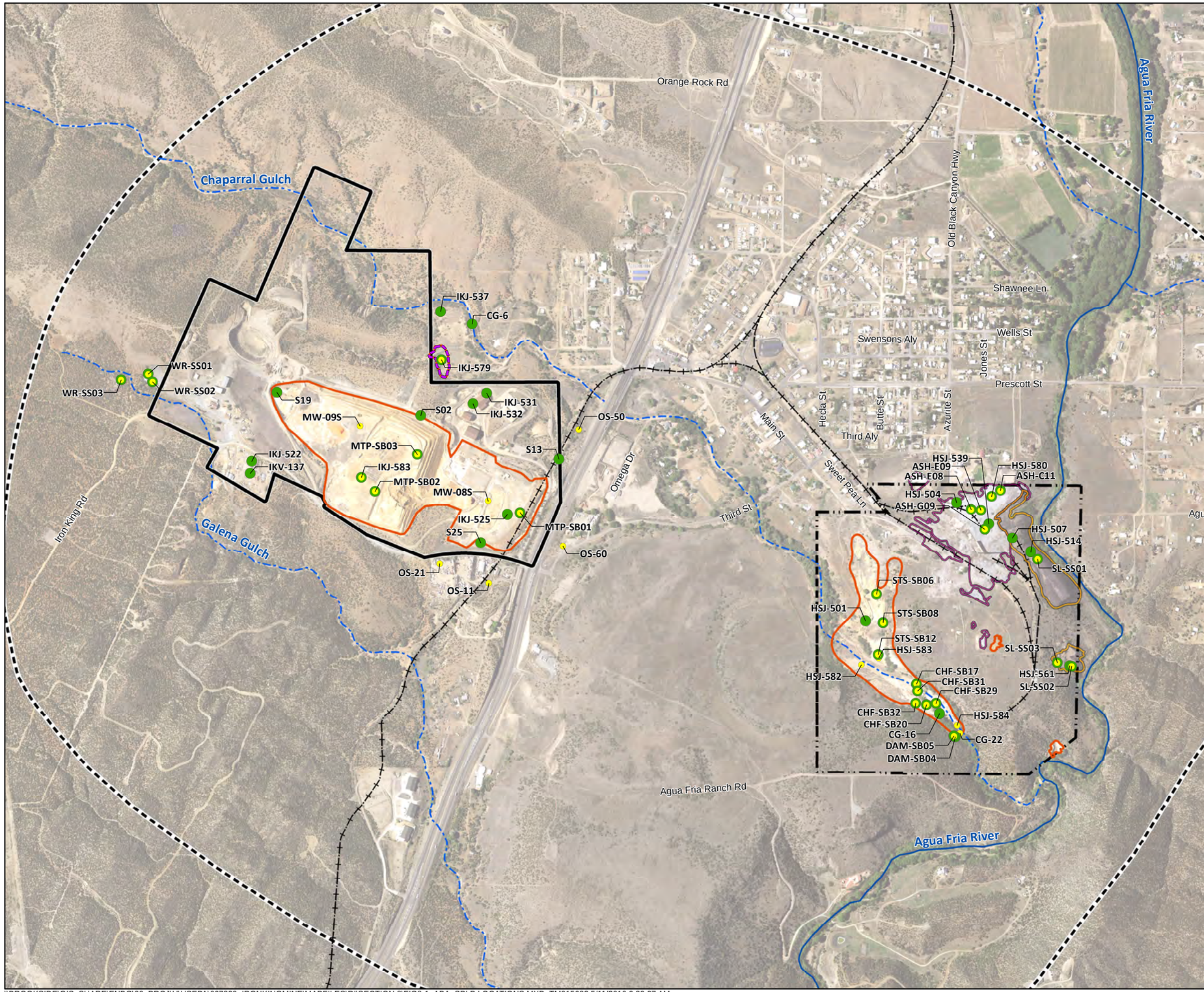
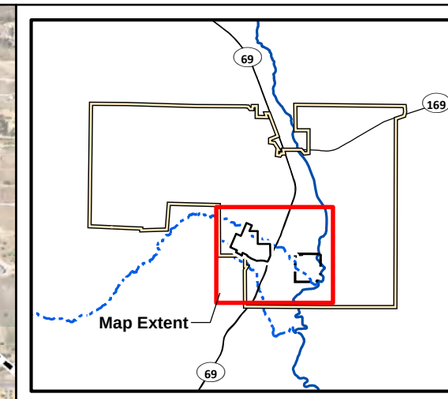




LEGEND

Sample Location by Analysis Type

- Acid-Base Accounting (ABA)
- Synthetic Precipitation Leaching Procedure (SPLP)
- Historic Rail Line
- River
- Intermittent Drainage
- Former Small Tailings Pile
- Slag Pile
- Tailings
- Dross Pile
- Former Iron King Mine Property
- Former Humboldt Smelter Property
- Area of Potential Site Impact
- Dewey-Humboldt Town Boundary

N

0 1,000 2,000

Scale in Feet

Note:
Image Source: USDA, 2015.

Figure 8-1
Acid-Base Accounting and Synthetic Precipitation Leaching Procedure Sample Locations
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona

\\BROOKSIDE\GIS_SHARE\ENBG\00_PROJ\U\USEPA\667309_IRONKINGMINE\MAPFILES\RI\SECTION 8\FIG8-1_ABA_SPLP LOCATIONS.MXD TM015632 5/11/2016 9:39:07 AM

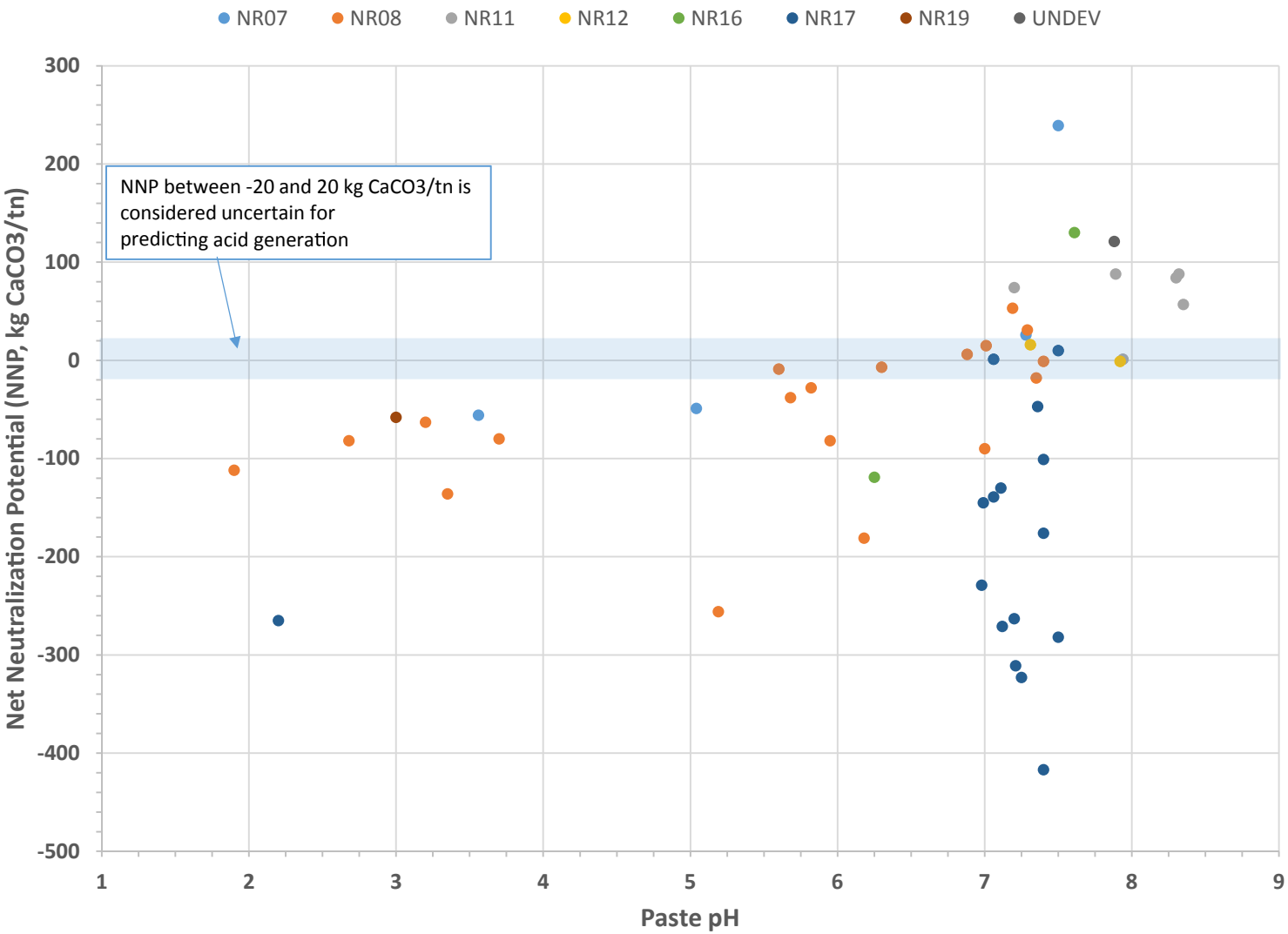
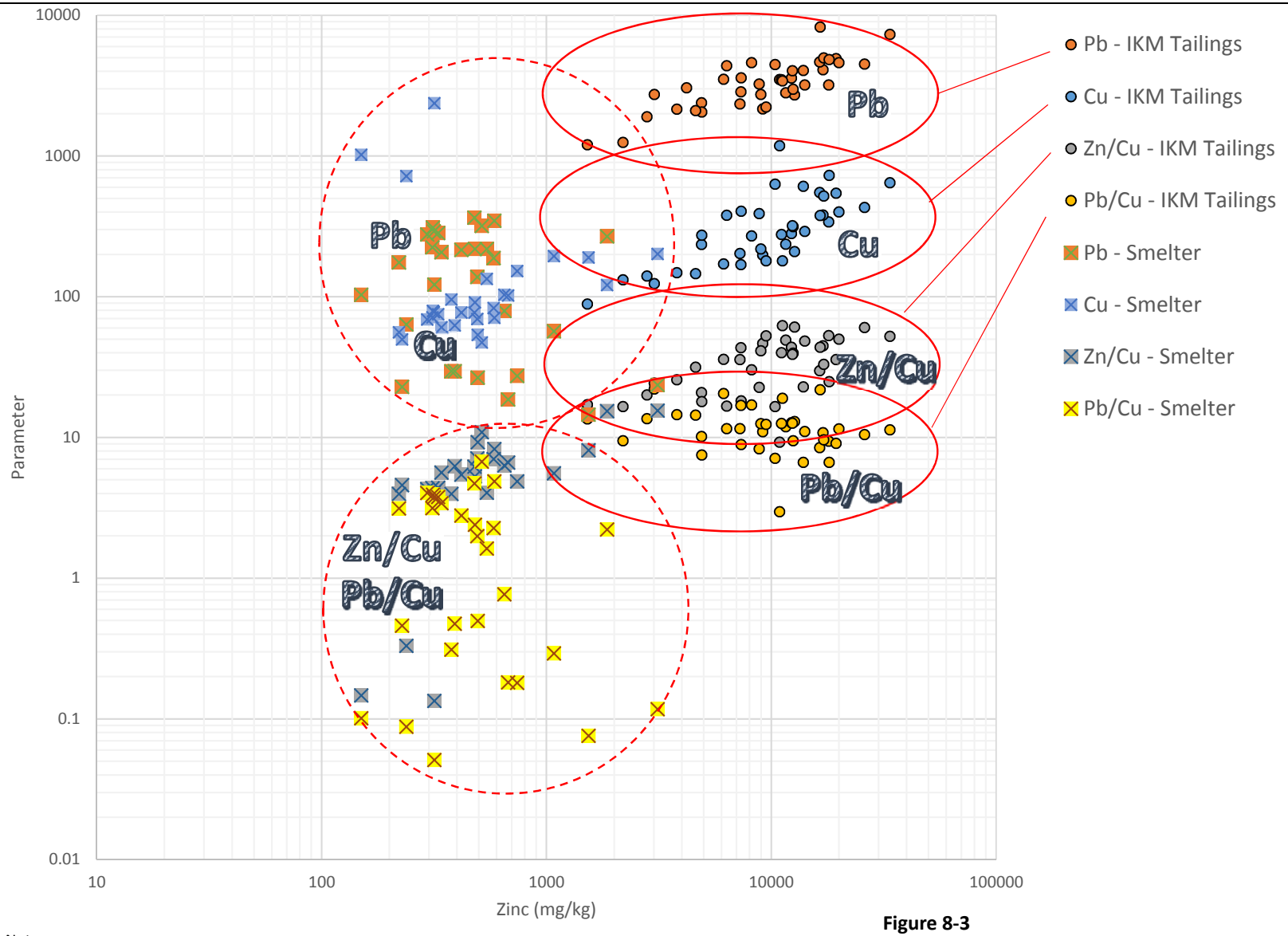


Figure 8-2

Net Neutralizing Potential versus Paste pH

Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona

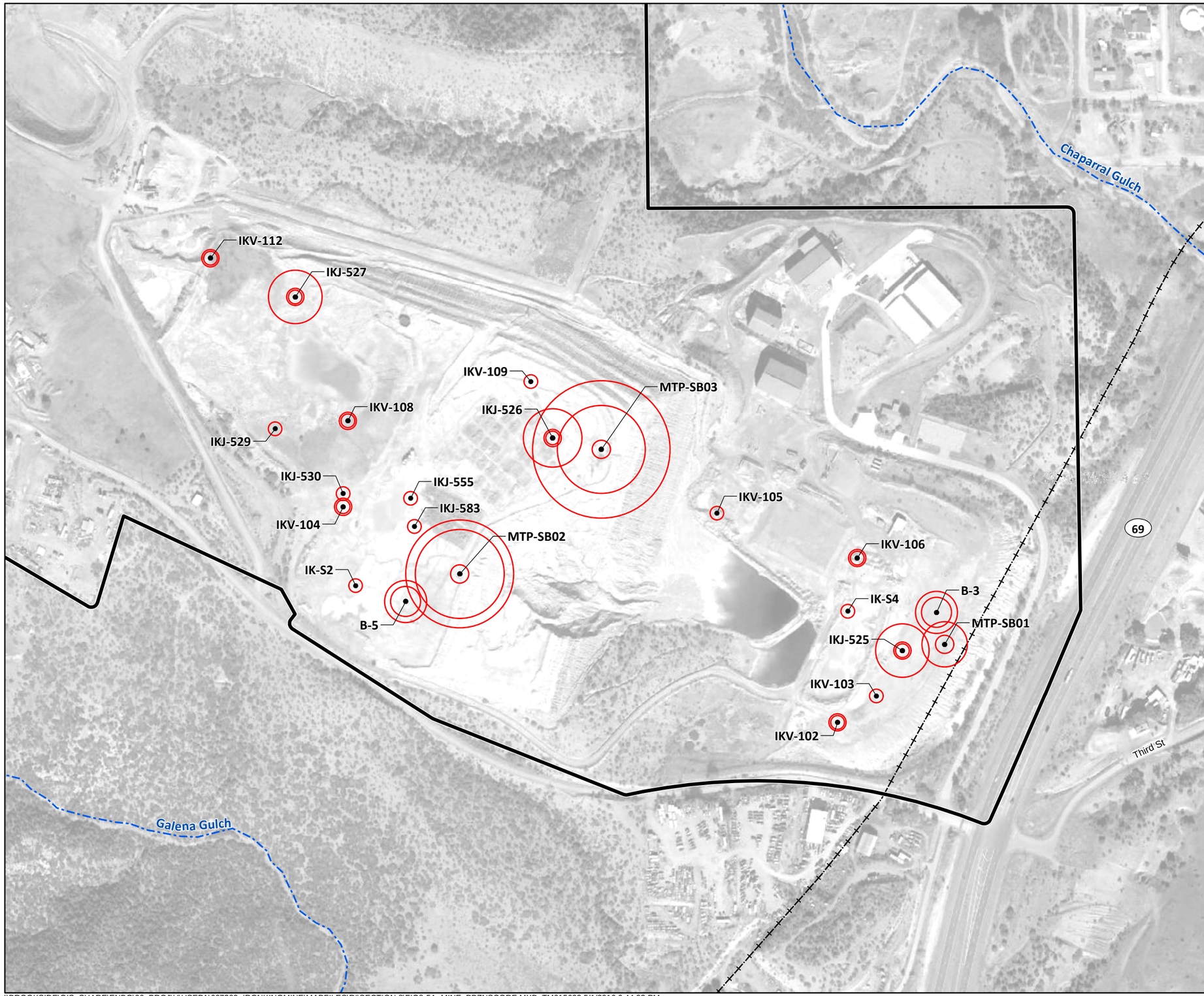


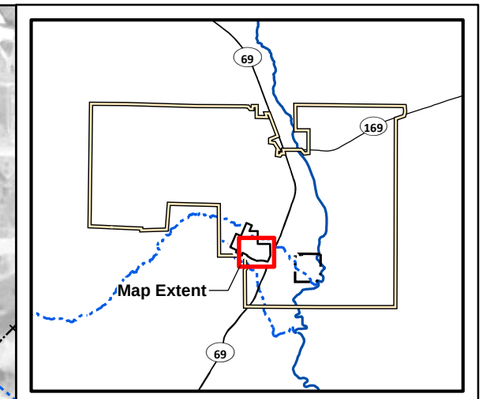
Notes:
IKM = former Iron King Mine
Smelter = former Humboldt Smelter
Cu = copper
Pb = lead
Zn = Zinc

Figure 8-3
Lead, Copper, and Zinc Data Analysis for Iron King Mine Tailings and Humboldt Smelter Tailings (Undisturbed)
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona

Notes:
HS = former Humboldt Smelter
IKM = former Iron King Mine
Cu = copper
Pb = lead
Zn = Zinc

Figure 8-4
Lead, Copper, and Zinc Data Analysis for Iron King Mine Tailings and Humboldt Smelter Tailings (Reworked)
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona





LEGEND

- Soil Sample Location

Soil Sample Depth (feet bgs)[a]

0 to 1 feet bgs

106 feet bgs

Soil Sample Score[b]

Score	Lead (mg/kg)	Zinc (mg/kg)
1	>1000	>1000
2	>900	>900
3	>800	>800
4	>700	>700
5	>600	>600
6	>500	>500
7	>0	>0
NS	--	--

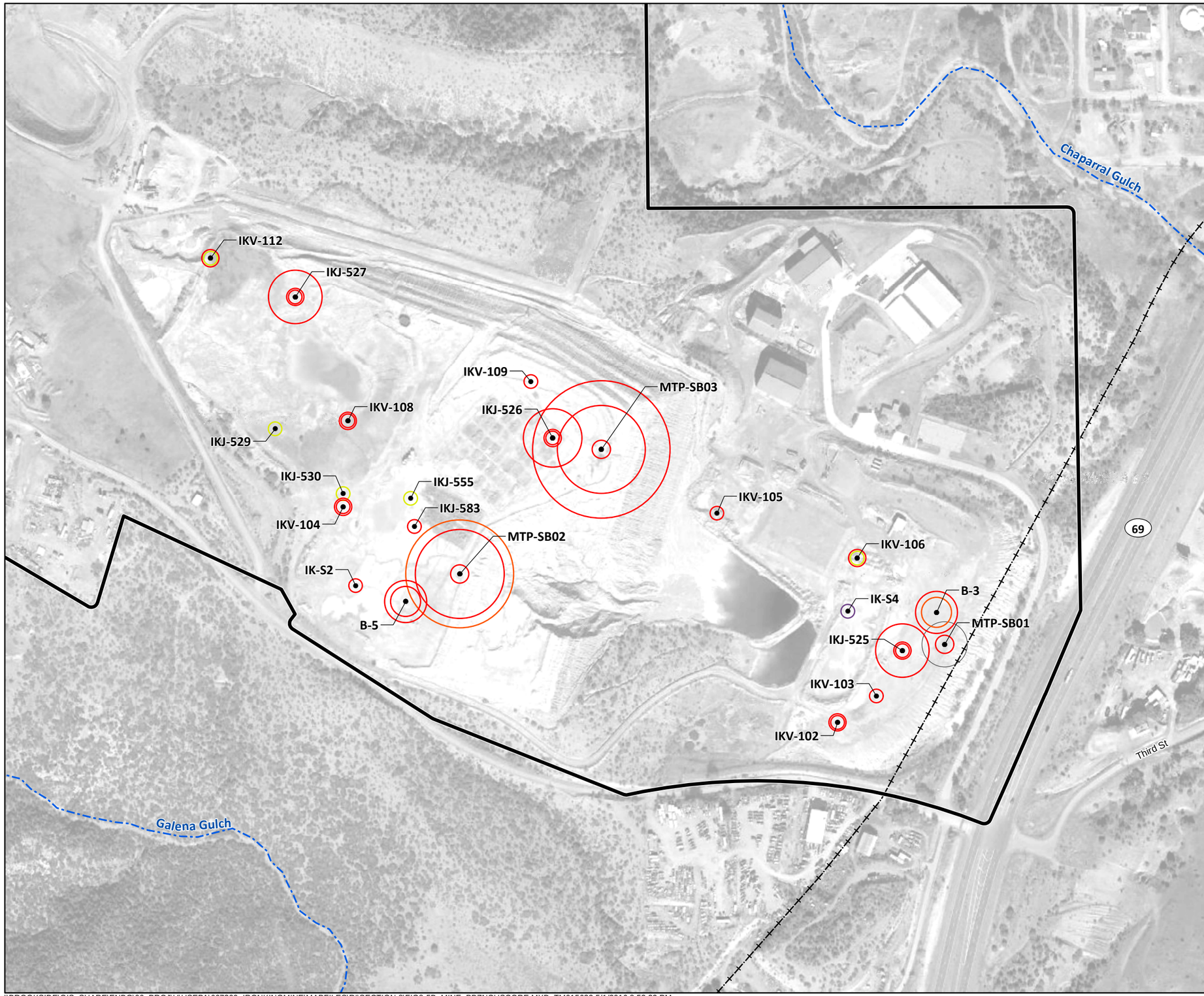
Historic Rail Line
River
Intermittent Drainage
Former Iron King Mine Property
Former Humboldt Smelter Property
Dewey-Humboldt Town Boundary

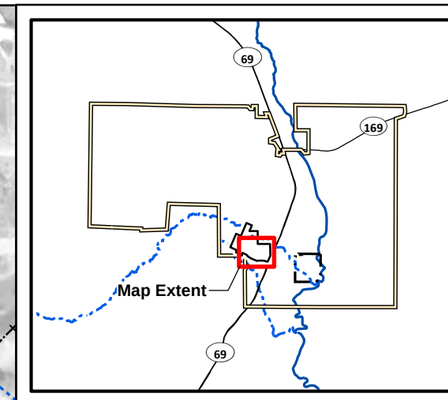
0 300 600
Scale in Feet
N

[a]Proportional symbols represent 1-foot sample intervals between 0 and 106 feet bgs. Each symbol represents a separate sample.
[b]Samples in Figures 8-5A and 8-6A are assigned a score of 1 to 7 using the lead and zinc sample concentrations. All samples in this figure are assigned a score of 1.

Notes:
feet bgs = feet below ground surface
Image Source: Google Earth™; Image date November 6, 2015. Accessed February 2, 2016.

Figure 8-5A
Iron King Mine Tailings Signatures, Lead and Zinc Concentration Scores
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona





LEGEND

- Soil Sample Location

Soil Sample Depth (feet bgs)[a]

0 to 1 feet bgs

106 feet bgs

Soil Sample Score[b]

Score	Lead (mg/kg)	Zinc (mg/kg)	Zinc/Copper Ratio	Lead/Copper Ratio
1	>1000	>1000	>20	>6
2	>900	>900	>18	>5.5
3	>800	>800	>16	>5
4	>700	>700	>14	>4.5
5	>600	>600	>12	>4
6	>500	>500	>10	>3.5
7	>0	>0	>0	>0
NS	--	--	--	--

- Historic Rail Line
- River
- Intermittent Drainage
- Former Iron King Mine Property
- Former Humboldt Smelter Property
- Dewey-Humboldt Town Boundary

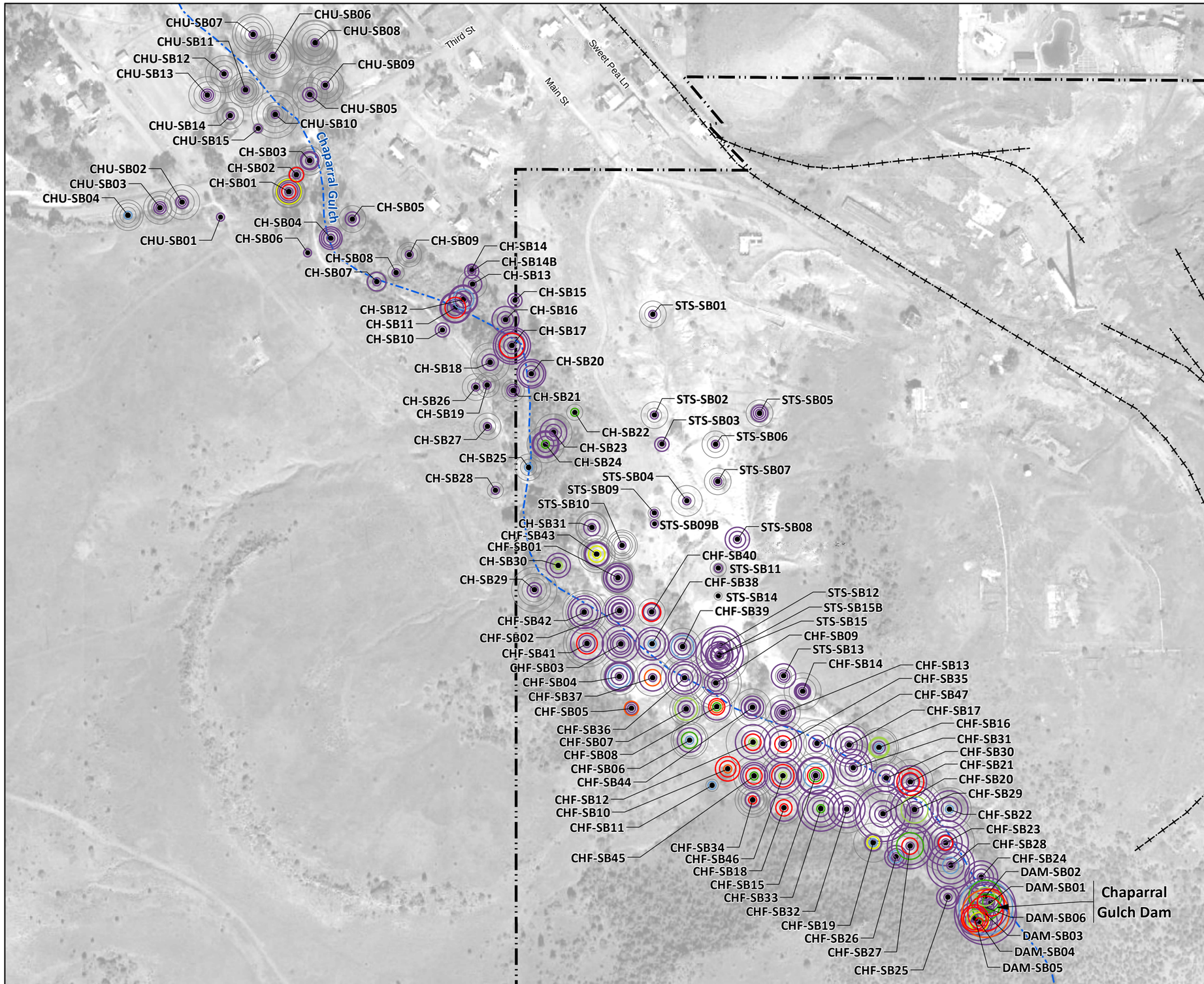
0 300 600
Scale in Feet

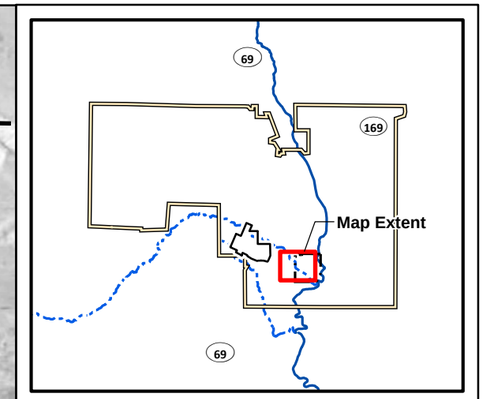
N

[a]Proportional symbols represent 1-foot sample intervals between 0 and 106 feet bgs. Each symbol represents a separate sample.
[b]Samples in Figures 8-5B and 8-6B are assigned a score of 1 to 7 using the lead, zinc, and copper sample concentrations. The only scores used in this figure are 1, 2, 3, 7 and NS. NS indicates that no score is assigned. One sample in this figure, MTP-SB01 at 27.5 feet bgs, is shown with a score of NS. Copper was not detected in this sample and therefore no score is assigned.

Notes:
feet bgs = feet below ground surface
Image Source: Google Earth™; Image date November 6, 2015. Accessed February 2, 2016.

Figure 8-5B
Iron King Mine Tailings, Lead and Zinc Concentration and Ratio Scores
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona





LEGEND

- Soil Sampling Location

Sample Depth (feet bgs)[a]

0 to 1 | 8 to 9 | 16 to 17 | 26 to 27

Soil Sample Score[b]

Score	Lead (mg/kg)	Zinc (mg/kg)
1	>1000	>1000
2	>900	>900
3	>800	>800
4	>700	>700
5	>600	>600
6	>500	>500
7	>0	>0
NS	--	--

- Historic Rail Line
- River
- Intermittent Drainage
- Former Iron King Mine Property
- Former Humboldt Smelter Property
- Dewey-Humboldt Town Boundary

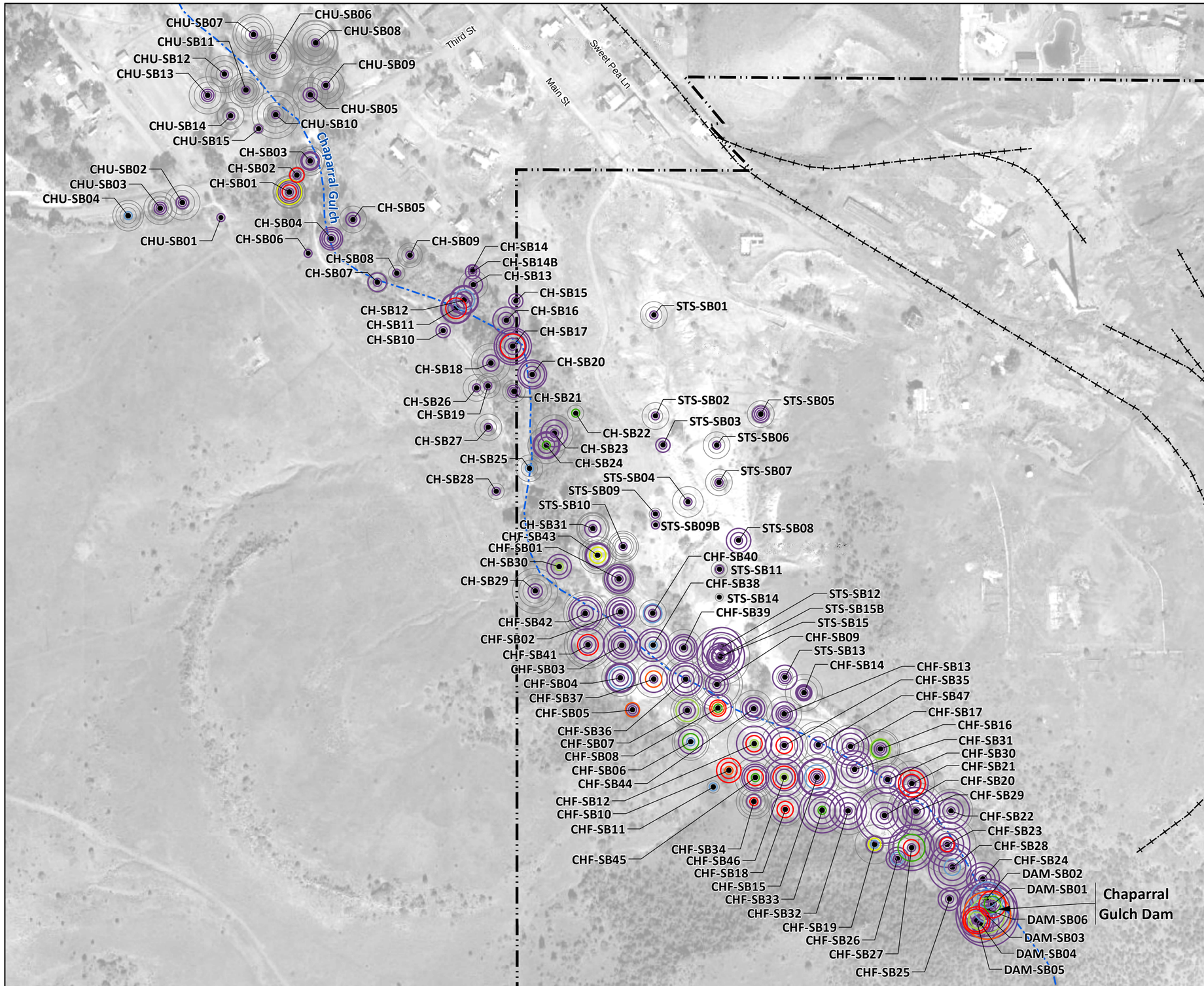
0 300 600
Scale in Feet

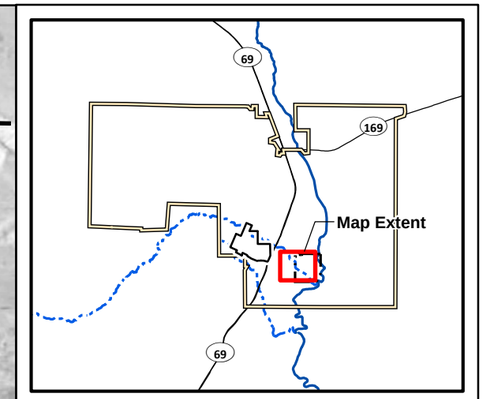
N

[a]Proportional symbols represent 1-foot sample intervals between 0 and 27 feet bgs. Each symbol represents a separate sample and is color coded according to the sample score.
[b]Samples characterized as recent materials are assigned a score of 1 to 7 using the lead and zinc sample concentrations. NS indicates no score is assigned. Scores are only assigned for samples characterized as recent material and with detections of lead and zinc.

Notes:
feet bgs = feet below ground surface
Image Source: Google Earth™; Image date November 6, 2015. Accessed February 2, 2016.

Figure 8-6A
Chaparral Gulch Materials and Signatures, Lead and Zinc Concentration Scores, Recent Materials (Tailings and Channel Deposits)
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona





LEGEND

- Soil Sampling Location

Sample Depth (feet bgs)[a]

0 to 1 · 8 to 9 · 16 to 17 · 26 to 27

Soil Sample Score[b]

Score	Lead (mg/kg)	Zinc (mg/kg)	Zinc/Copper Ratio	Lead/Copper Ratio
1	>1000	>1000	>20	>6
2	>900	>900	>18	>5.5
3	>800	>800	>16	>5
4	>700	>700	>14	>4.5
5	>600	>600	>12	>4
6	>500	>500	>10	>3.5
7	>0	>0	>0	>0
NS	--	--	--	--

- Historic Rail Line
- River
- Intermittent Drainage
- Former Iron King Mine Property
- Former Humboldt Smelter Property
- Dewey-Humboldt Town Boundary

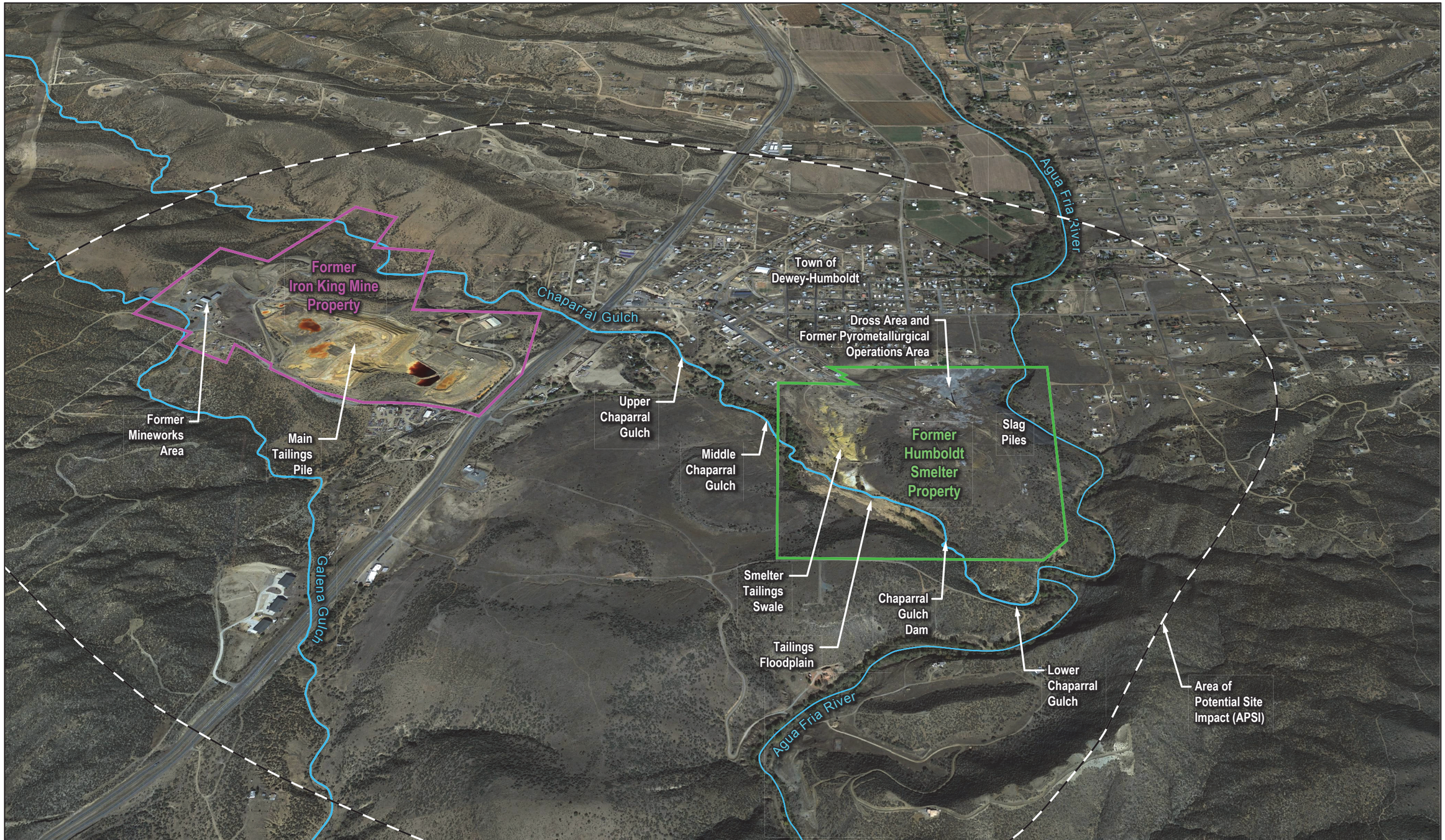
0 300 600
Scale in Feet

N

[a]Proportional symbols represent 1-foot sample intervals between 0 and 27 feet bgs. Each symbol represents a separate sample and is color coded according to the sample score.
[b]Samples characterized as recent materials are assigned a score of 1 to 7 using the lead, zinc, and copper sample concentrations. NS indicates no score is assigned. Scores are only assigned for samples characterized as recent material and with detections of lead, zinc and copper.

Notes:
feet bgs = feet below ground surface
Image Source: Google Earth™; Image date November 6, 2015. Accessed February 2, 2016.

Figure 8-6B
Chaparral Gulch Materials and Signatures, Lead and Zinc Concentration and Ratio Scores, Recent Materials (Tailings and Channel Deposits)
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona



LEGEND

- River or Intermittent Drainages
- Former Iron King Mine Property
- Former Humboldt Smelter Property
- Area of Potential Site Impact

Figure 8-7
Conceptual Site Model – Overview
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona

EN0419161124SCO iron_king_csm_overview_rev3.ai 4/16

LEGEND

- River or Intermittent Drainages
- Historic Rail Line
- Former Iron King Mine Property
- Former Humboldt Smelter Property
- Area of Potential Site Impact

Transport Mechanisms

- Erosion, historical operational discharges, or other releases to surface water
- Windblown particulates and aerial dispersion
- Historical spills along rail line
- Location of Cross Section A-A' (See Figure 8-9)
- Historical smelter stack emissions

Note:
Transport mechanisms not depicted on this diagram or the associated cross section include placement or dumping of waste or use of tailings, waste rock, or contaminated soil as construction fill or road base in surrounding areas.

Figure 8-8
Conceptual Site Model – Transport Mechanisms
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona

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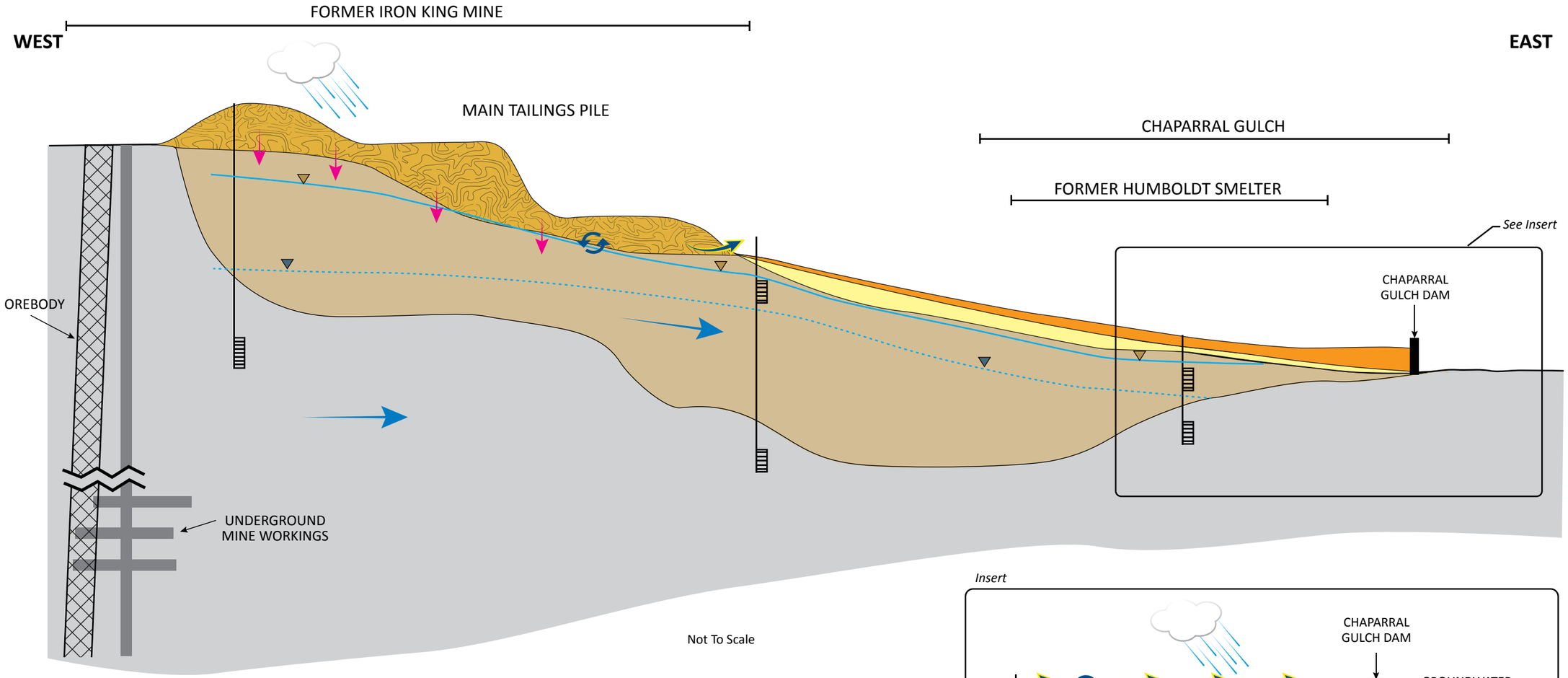

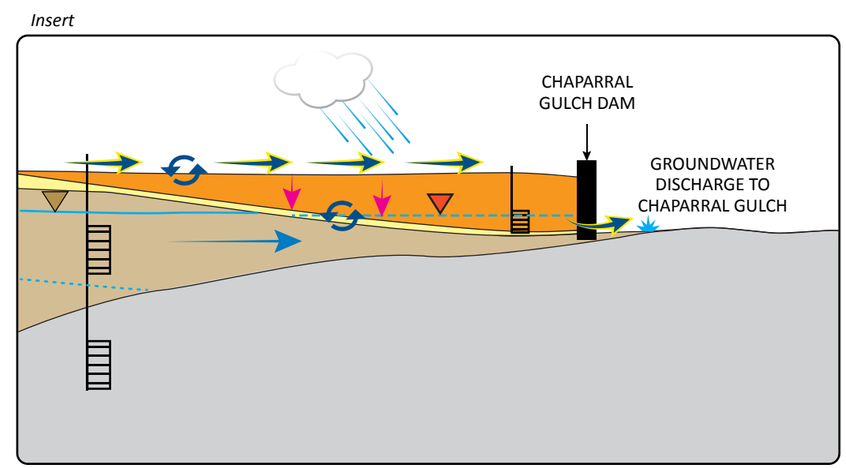

LEGEND

- Tailings
- Tailings and Tailings-Alluvium Mixtures
- Quarternary Alluvium
- Tertiary Hickey Formation
- Precambrian Bedrock
- Piezometric Surface (Tailings - Alluvium Mixture in Chaparral Gulch)
- Piezometric Surface (Hickey)
- Piezometric Surface (Precambrian)
- Regional groundwater flow direction
- Rainfall, percolation, generation of acid rock drainage (ARD), and leaching of metals
- Releases to surface water by erosion, runoff, and groundwater seepage
- Geochemical transformation by dissolution, precipitation, and adsorption reactions
- Well Screen

Figure 8-9
Conceptual Site Model Cross Section
Iron King Mine – Humboldt Smelter Superfund Site
Dewey-Humboldt, Yavapai County, Arizona