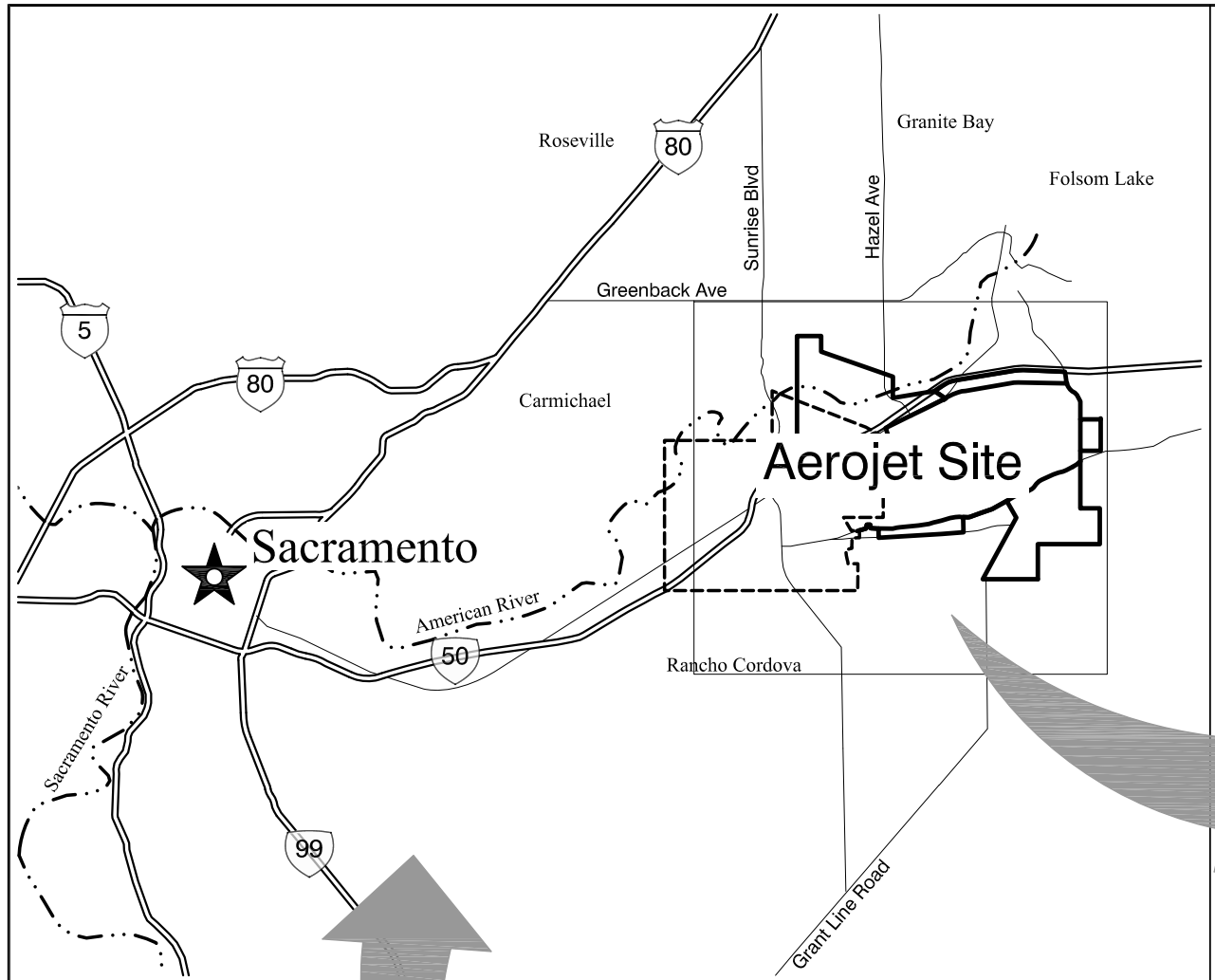
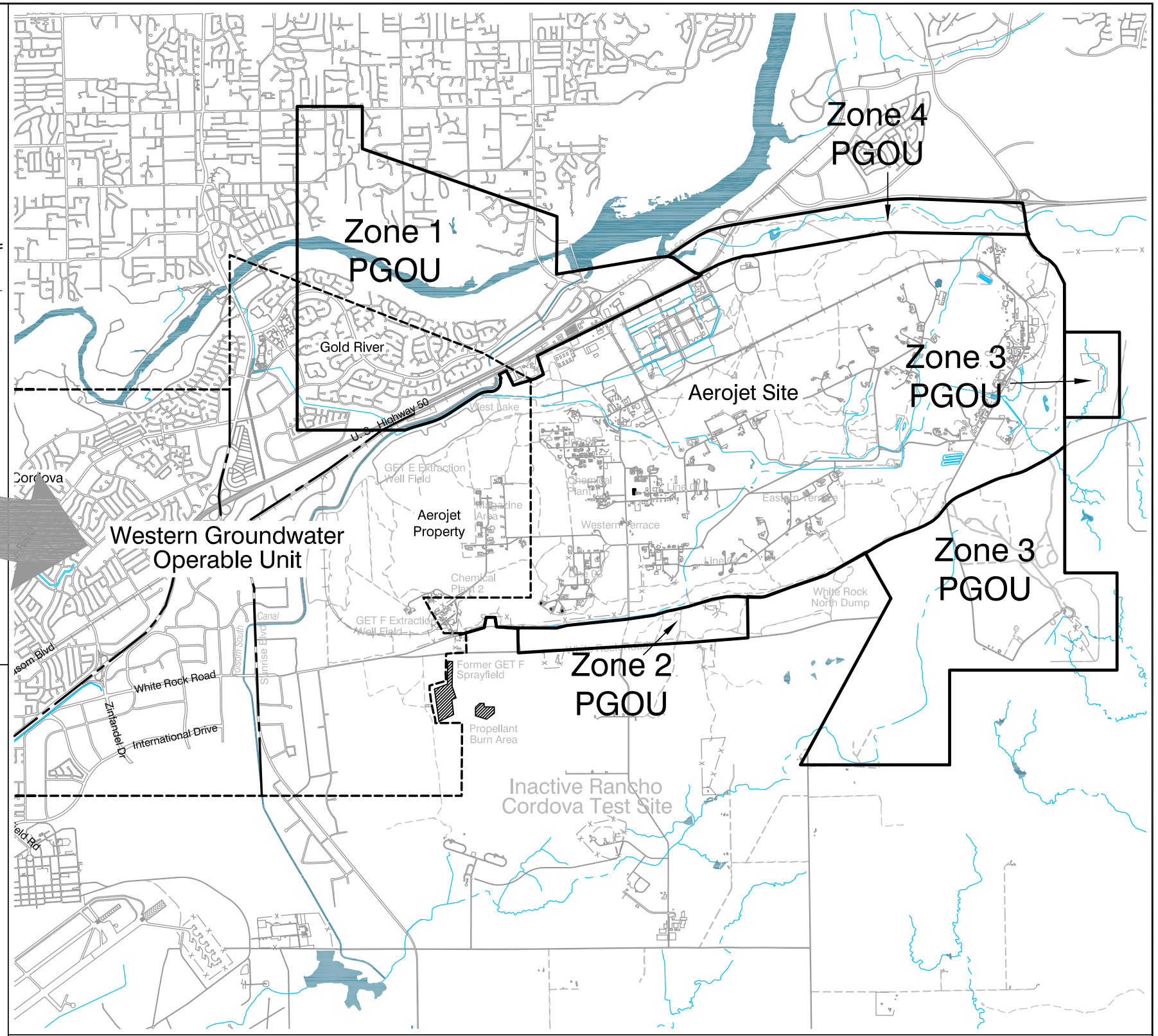




EXPLANATION

- Aerojet Property Boundary
- Perimeter Groundwater Oprable Units
- Western Groundwater Operable Unit Boundary

N

Scale: 1" = 5000'

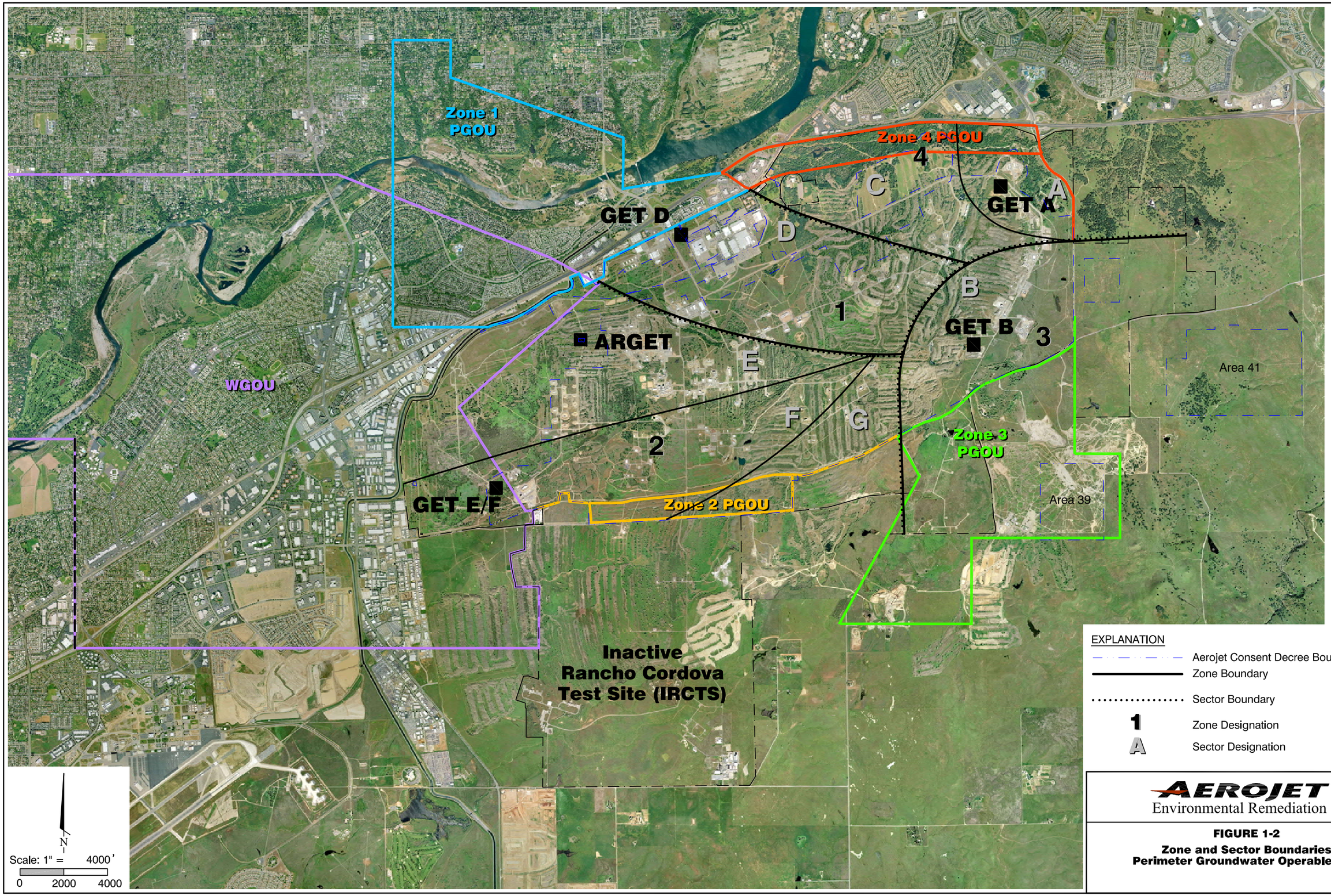
0 2500 5000

AEROJET
Environmental Remediation

FIGURE 1-1

Area Location Map
Perimeter Groundwater Operable Unit

2/2/05 ah SR10114457



AEROJET
Environmental Remediation

FIGURE 1-2
Zone and Sector Boundaries
Perimeter Groundwater Operable Unit

SR10129803 **FIGURE 1-2** 4/14/09 Herron, Al

Zone 1
PGOU

Zone 4
PGOU

Zone 3
PGOU

Zone 2
PGOU

Zone 3
PGOU

Aerojet Site

4360 4355 4365 4300 4301 4302 4620 4350 4340 4345 4580 1156

See 4900 Area Detail, Below Left

ARGET Extraction System

4330 4335 4325 4585 4370 4375 4380

4035 4220 4017 4001 4210 4320 4205 GET D 5025 5030 5020 5035 5105 5040

4500 4110 4105 4125 4100 4130 4120 4012 4013 GET A 4430

4535 4530 ARGET

4200 4425 4070 4435 4075

4600 4595 4590 Former GET E 5055

4550 4545 4540 4615 4610 4605

4145 GET E/F 4315 4007 4140 4555 4060-3

4304 4475 4011 4480 98 4095 4080 4085 4195 4215 4303 4405 4450 4455

4460 4465 4410 4575 4570 4565 4400

4225 4165 4230 4160 4235 4155 4240 4150 4245 4185 4250 4170 4255 4180 4260 4190 4270 4175 4265

Area 4900 Wells

A B C D E F G

1 2 3 4

EXPLANATION

- Extraction Well
- Recharge Well
- Water Supply Well
- Groundwater Treatment Facility
- GET Pipeline
- 1 Zone Designation
- A Sector Designation
- Zone Boundary
- Sector Boundary
- Perimeter Groundwater Operable Unit Boundary

N

Scale: 1" = 3000'

0 1500 3000

AEROJET
Environmental Remediation

FIGURE 1-3

Locations of Existing Interim Actions
Perimeter Groundwater Operable Units

5/13/05 ah SR10119690

PGOU Zone 1

PGOU Zone 4

PGOU Zone 3

PGOU Zone 2

GET A

GET B

GET D

ARGET

GET E/F

C32

D(e)

10D

11D

C29

LEGEND

- Superfund Boundary
- Aerojet Property Boundary
- PGOU Boundary
- Low to Medium Density Residential
- High Density Residential
- Commercial Mixed Use
- Office
- Community Resource Area
- Open Space, Parks & Parkways

N

Scale: 1" = 3200'

0 1600 3200

AEROJET
Environmental Remediation

FIGURE 1-4

Superfund Site Boundaries and Planned Land Use within the Perimeter Groundwater Operable Unit

2/9/05 ah SR10119102

California Regional Water Quality Control Board

Central Valley Region

Robert Schneider, Chair

Alan C. Lloyd Ph.D.
Secretary for Environmental Protection

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/~rwqcb5/home.html
11020 Sun Center Drive, Suite 200, Rancho Cordova 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4797

Arnold Schwarzenegger
Governor

RECEIVED

MAY 05 2005

AEROJET-GENERAL SACRAMENTO
ENVIRONMENTAL OPERATIONS

3 May 2005

Ms. Cindy Caulk
Program Coordinator
Aerojet-General Corporation
P. O. Box 13222
Sacramento, CA 95813-6000

RESULTS OF SAMPLES COLLECTED FROM ARDEN-CORDOVA WATER SERVICE WELLS, AEROJET-GENERAL CORPORATION

This letter presents the results of the sampling conducted by Regional Board staff on 13 April 2005. The results of the sampling are as follows:

Sample Location	Perchlorate (µg/l)	NDMA (µg/l)	TCE (µg/l)	PCE (µg/l)
ACWS 7 (1137)	0.87J	ND	ND	1.4
ACWS 12 (1141)	1.2J	ND	1.0	ND
ACWS 10 (1139)	1.7J	0.0015J	0.48J	ND
ACWS 20 (2065)	ND	0.0015J	0.52	ND
ACWS 21 (2066)	ND	0.00068J	ND	ND

The practical quantitation limit for perchlorate is 4 µg/l, 0.002 µg/l for NDMA, and 0.5 for TCE and PCE. ND stands for not detected above the quanitation limit. VOCs were analyzed for by EPA Method 524.2.

If you have any questions regarding this matter, please call me at (916) 464-4625.

ALEXANDER MACDONALD
Program Coordinator

cc: Mr. Charles Berrey, United States Environmental Protection Agency, San Francisco
Mr. Ed Cargile, Department of Toxic Substances Control, Sacramento
Mr. Brian Kinney, Department of Health Services, Office of Drinking Water, Sacramento
Mr. Dave Lancaster, Arden-Cordova Water Service, Sacramento

Fair Oaks Water District

Carmichael Water District

City of Folsom

City of Folsom

Sunrise Service Area

Sacramento County Water Maintenance District (Sunrise Service Area)

Southern California Water Company a.k.a. Arden Cordova Water System Franchise Area

California American Water Company

California American Water Company

2054 1932 1927 1858 1857 1859 1854 1856 1832 1855 1851 1853 1850 1852 1842 1022 1023 1095 1065 1042 1834 1250 1041 1224 1008 1020 1002 1021 1843 1155 1090 1433 1009 1027 1010 1008 1064 1035 1874 1835 1099 1821 1039 1016 1015 1100 1001 1025 926 925 1289 1004 1005 1096 1161 1019 1198 1032 1056 1054

EXPLANATION

- PGOU Boundary
- One Mile Radius from PGOU Boundary
- Partial Consent Decree Boundary
- Water Purveyor Service Area Boundary
- Public Water Supply Well
- Domestic Water Supply Well
- Destroyed Water Supply Well
- Area Included in WGOU Private Well Survey

Wells on this map that are not destroyed are abandoned or inactive.

N

Scale: 1" = 4500'

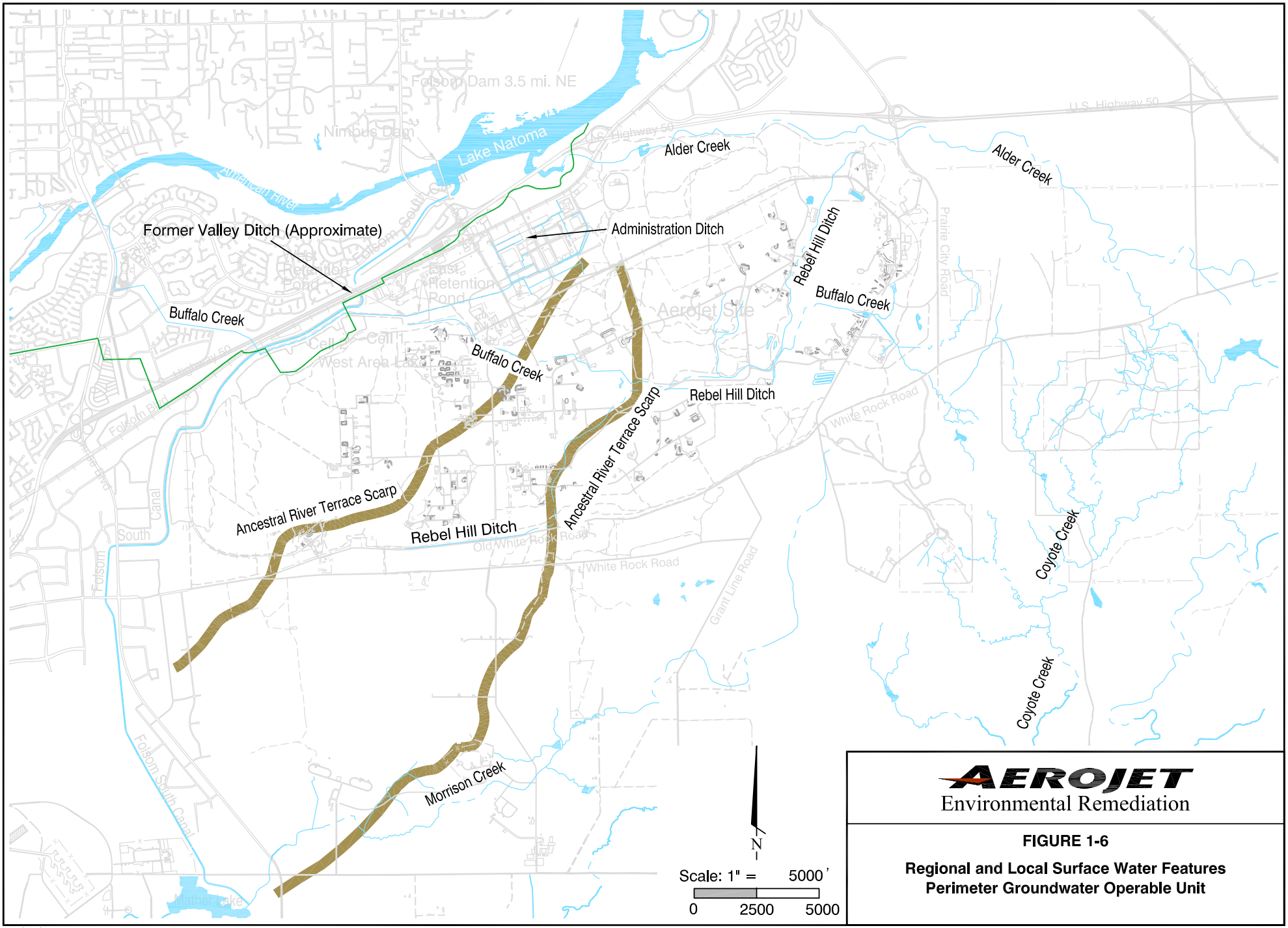
0 2250 4500

AEROJET
Environmental Remediation

FIGURE 1-5B

Inactive, Abandoned or Destroyed Water Supply Well Locations Perimeter Groundwater Operable Unit

7/25/05 ah SR10119966



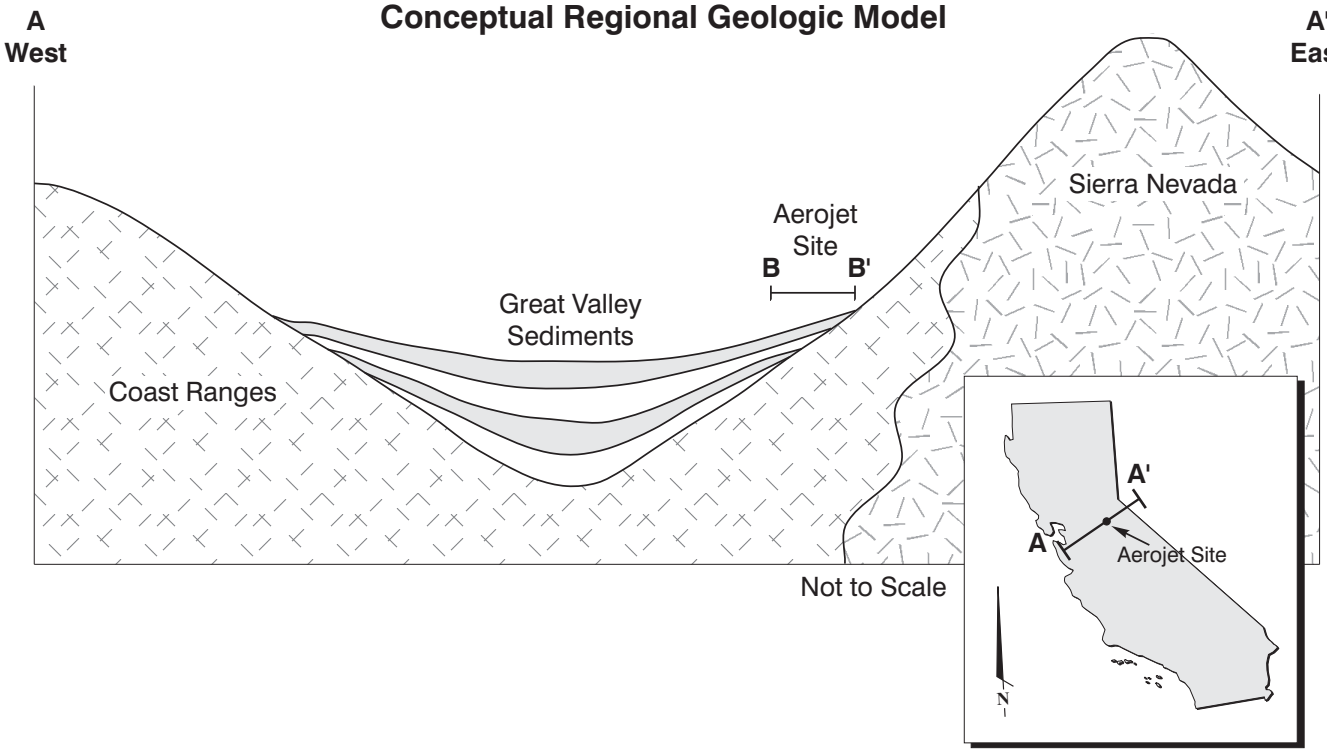
AEROJET
Environmental Remediation

FIGURE 1-6

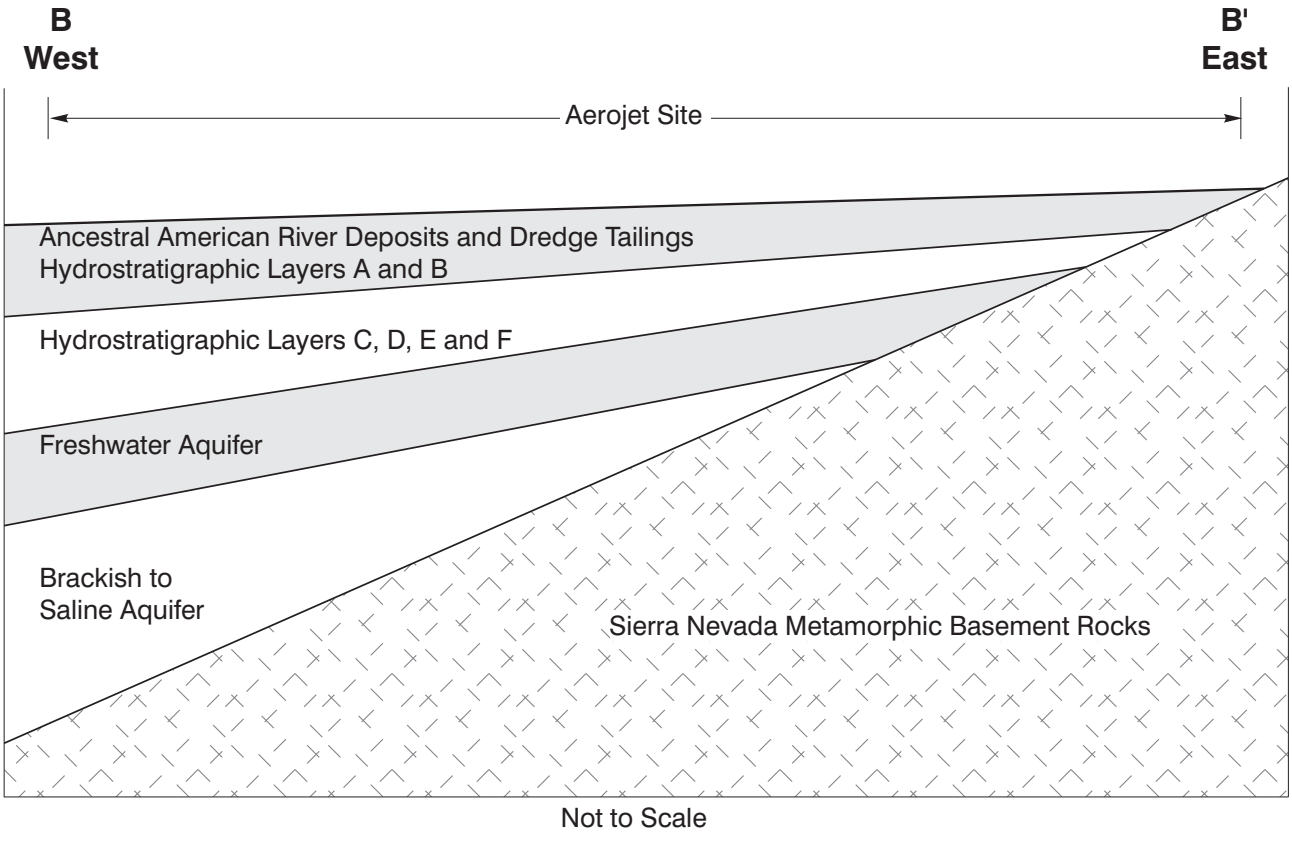
Regional and Local Surface Water Features
Perimeter Groundwater Operable Unit

2/2/05 ah SR1014460

Conceptual Regional Geologic Model



Conceptual Regional Hydrogeologic Model



AEROJET
Environmental Remediation

FIGURE 1-7
Conceptual Regional Geologic and Hydrogeologic Models
Perimeter Groundwater Operable Unit

3/19/04 ah SR10114462

A
SW

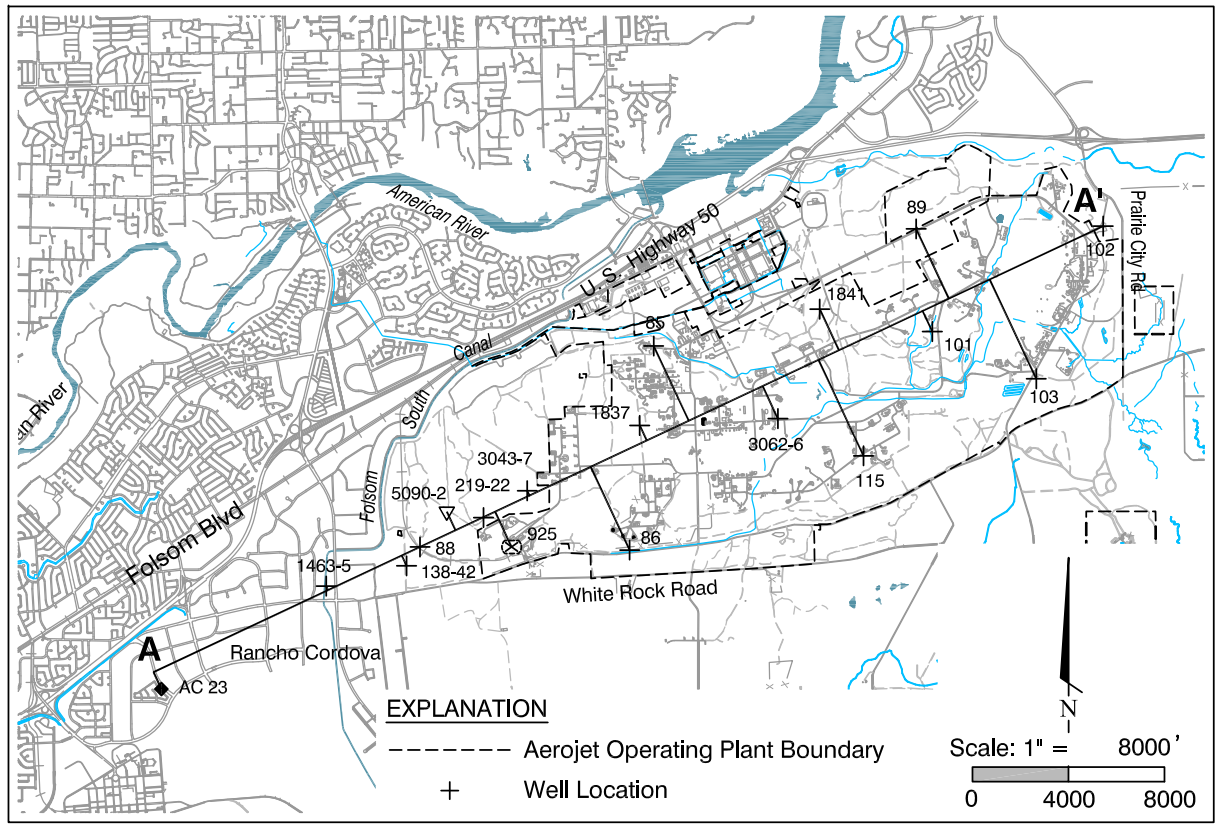
A'
NE

AC23 1463-5 138-42 88 5090-2 219-22 925 3043 86 1837 85 3062-6 115 1841 101 89 103 102

Elevation (Feet MSL)

500 0 -500 -1000 -1500 -2000

Qf/Rd
TQl/Qf
Tm
Tvs
Ti
Kc
Jml
?



EXPLANATION

- Qf/Rd — Undifferentiated Quaternary Fluvial Deposits/Recent Dredge Tailings
- TQl/Qf — Tertiary-Quaternary Laguna Formation Undifferentiated Quaternary Flucial Deposits
- Tm — Tertiary Mehrten Formation
- Tvs — Tertiary Valley Springs Formation
- Ti — Tertiary Ione Formation
- Kc — Cretaceous Chico Formation
- Jml — Jurassic Basement Rock
- Formation Contact (Dashed Where Inferred)

Source: Modified from Scoping Report (Aerojet General, 1989)

Scale: 1" = 800'
0 400 800
N

AEROJET
Environmental Remediation

FIGURE 1-8

Site-Wide Geologic Cross Section
Perimeter Groundwater Operable Unit

2/8/05 ah SR10114463

488	3152	4150	4230
493	3155	4155	4235
1550	3156	4160	4240
1553	3166	4165	4250
3090	3189	4170	4255
3099	3193	4175	4260
3100	3198	4180	4265
3104	3199	4185	4270
3129	3239	4190	
3137	3269	4205	
3151	3315	4225	

Zone 1 PGOU

Western Groundwater Operable Unit

EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Western Groundwater Operable Unit
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

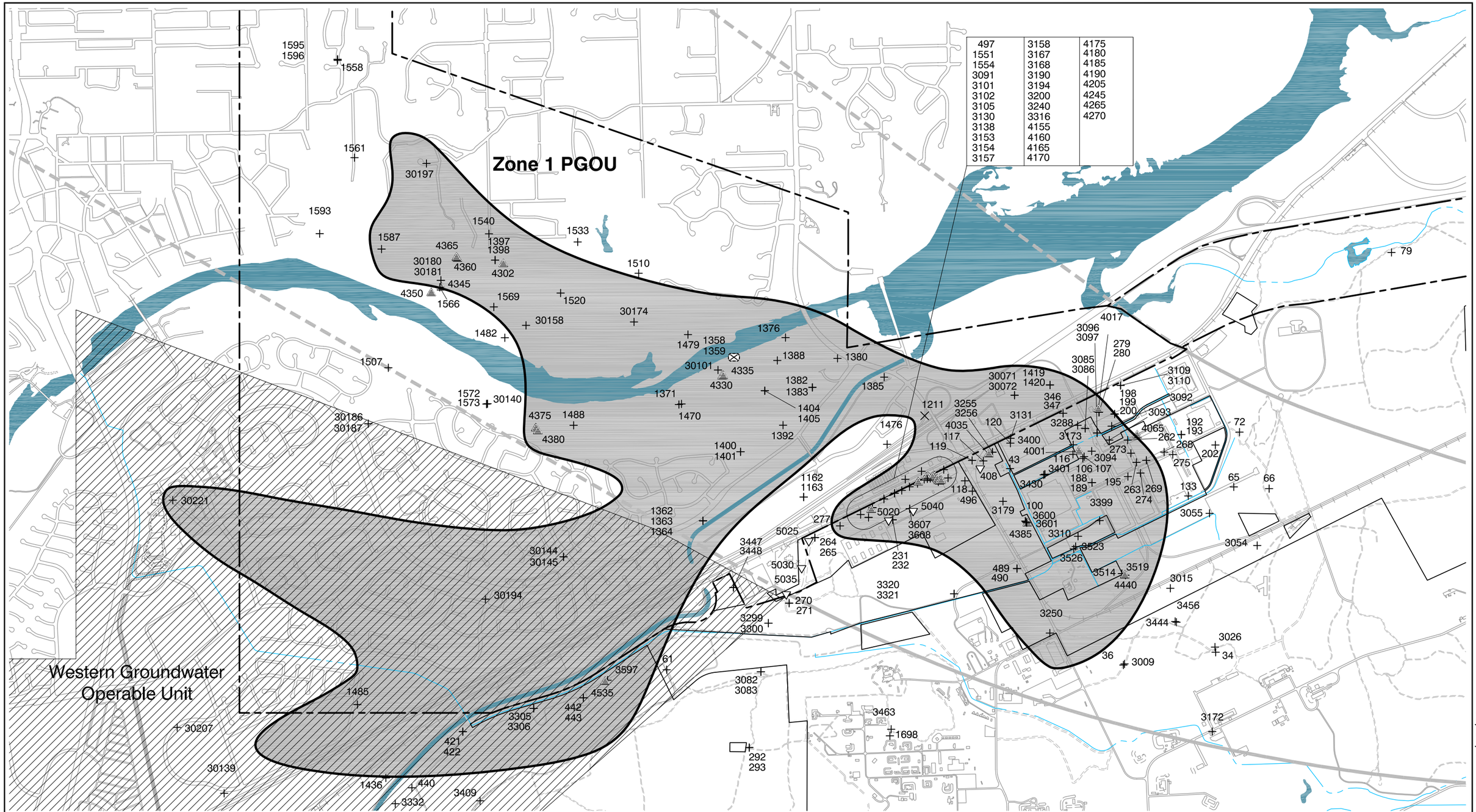
Scale: 1" = 1600'

0 800 1600

AEROJET
Environmental Remediation

FIGURE 1-9
Layer C
Composite Maximum Extent of Contamination
Zone 1 PGOU

SR10129806 FIGURE 1-9 4/16/09 Herron, Al



EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Western Groundwater Operable Unit
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

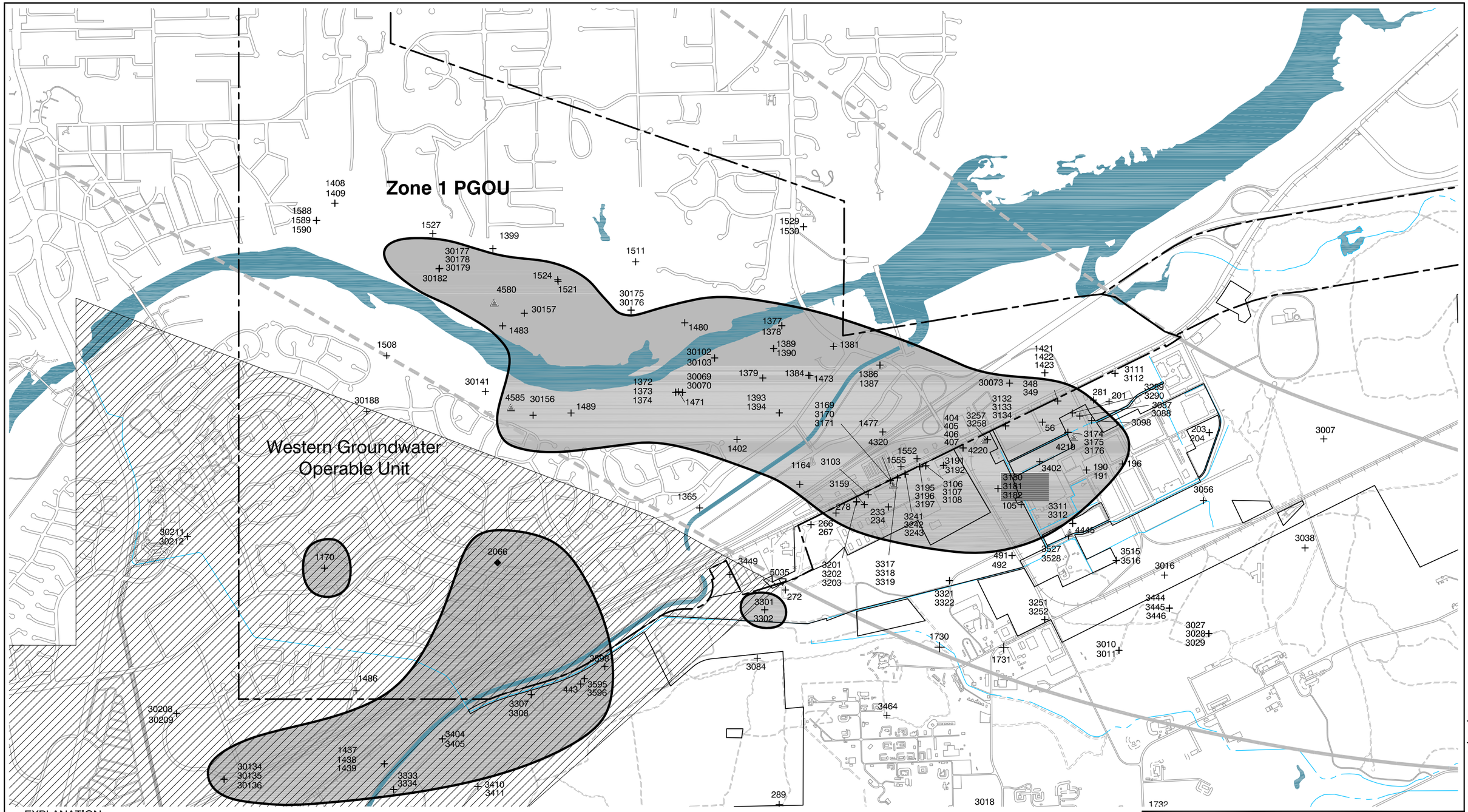
Scale: 1" = 1600'

0 800 1600

AEROJET
Environmental Remediation

FIGURE 1-10
Layer D
Composite Maximum Extent of Contamination
Zone 1 PGOU

SR10129808 FIGURE 1-10 4/16/09 Herron, Al



EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Western Groundwater Operable Unit
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

Scale: 1" = 1600'

0 800 1600

AEROJET
Environmental Remediation

FIGURE 1-11

Layer E
Composite Maximum Extent of Contamination
Zone 1 PGOU

SR10129809 FIGURE 1-11 4/16/09 Herron, Al

Zone 1 PGOU

Western Groundwater
Operable Unit

1474
3135
3136
108
3089
3291
194
205
3177
3178
3259
197
3183
3184
3313
3314
296
2066
1171
3303
3253
3254
3030
1729
3003
3004
3012
85
3599
3309
3465
3021
3066
1734

EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Western Groundwater Operable Unit
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

Scale: 1" = 1600 '

0 800 1600

AEROJET
Environmental Remediation

FIGURE 1-12
Layer F
Composite Maximum Extent of Contamination
Zone 1 PGOU

SR10129810 **FIGURE 1-12** 4/16/09 Herron, Al

Western Groundwater Operable Unit

GET E Extraction Wells

Zone 2 PGOU

To GET F

Line 01

Line 03

Line 04

Sites 8G & 9G

Former Open Burn Facility

Hogout Area

Former White Rock North Dump

Former White Rock South Dump

GET B South (Ehnizs Property)

Teichert Sand and Gravel Quarry

Former Municipal Landfill

IRCTS

Circular Feature

Area Addressed by IRCTS

Old White Rock Road

White Rock Road

Nimbus Rd.

STSW-142A

STSW-143A

EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Area Addressed by IRCTS, WGOU or WRND
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

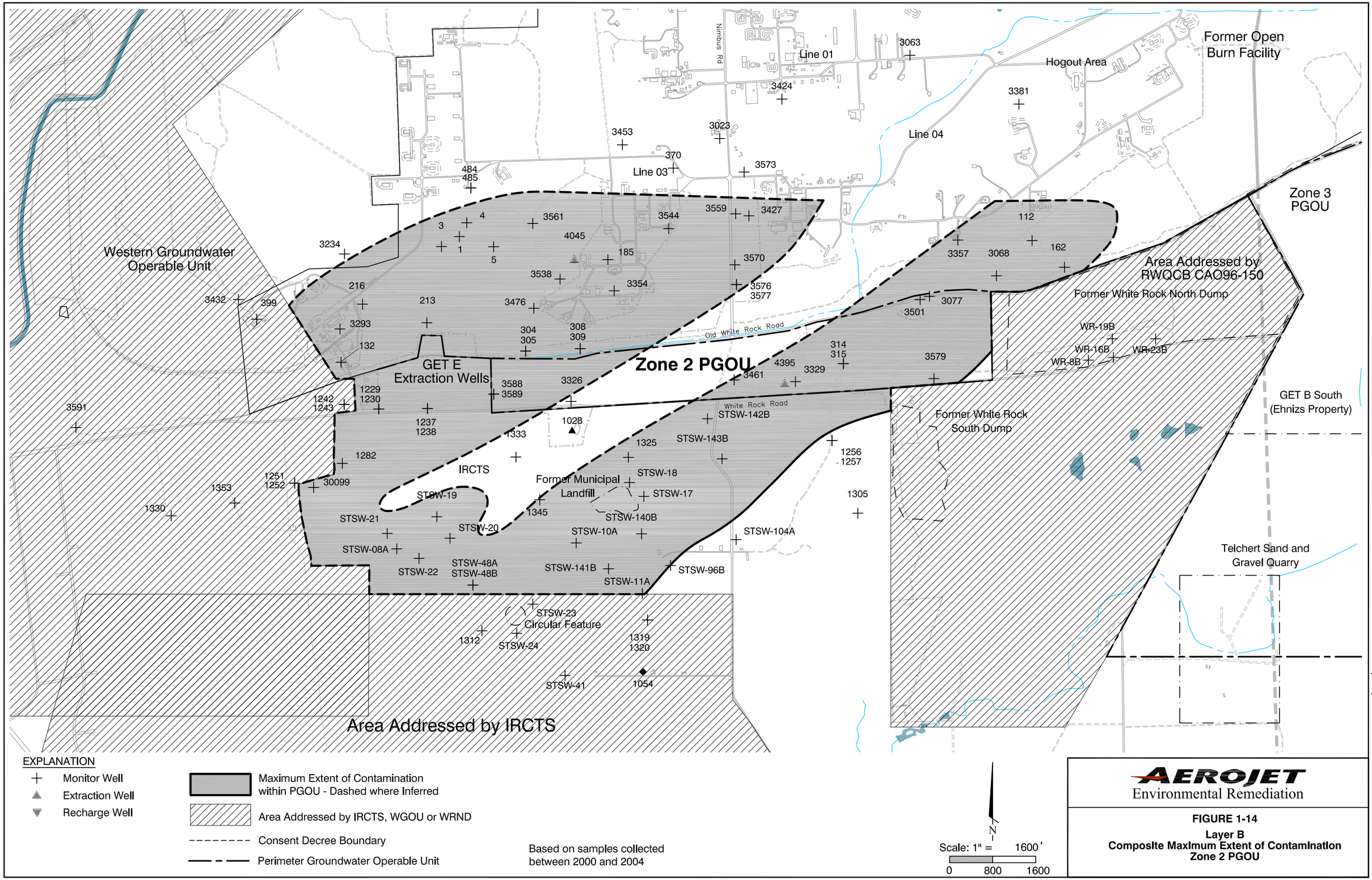
Scale: 1" = 1600 '

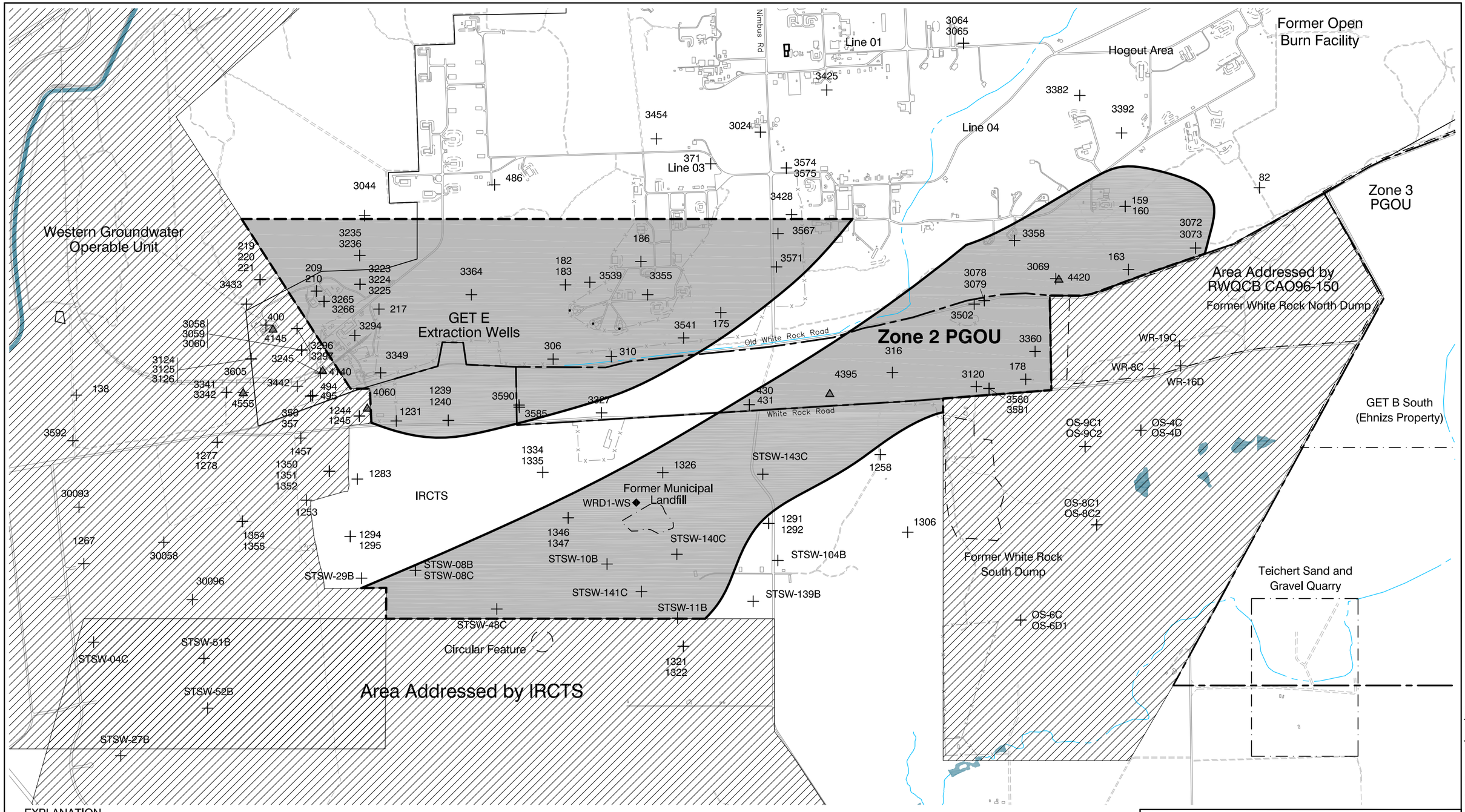
0 800 1600

AEROJET
Environmental Remediation

FIGURE 1-13
Layer A
Composite Maximum Extent of Contamination
Zone 2 PGOU

SR10129811 FIGURE 1-13 4/16/09 Herron, Al

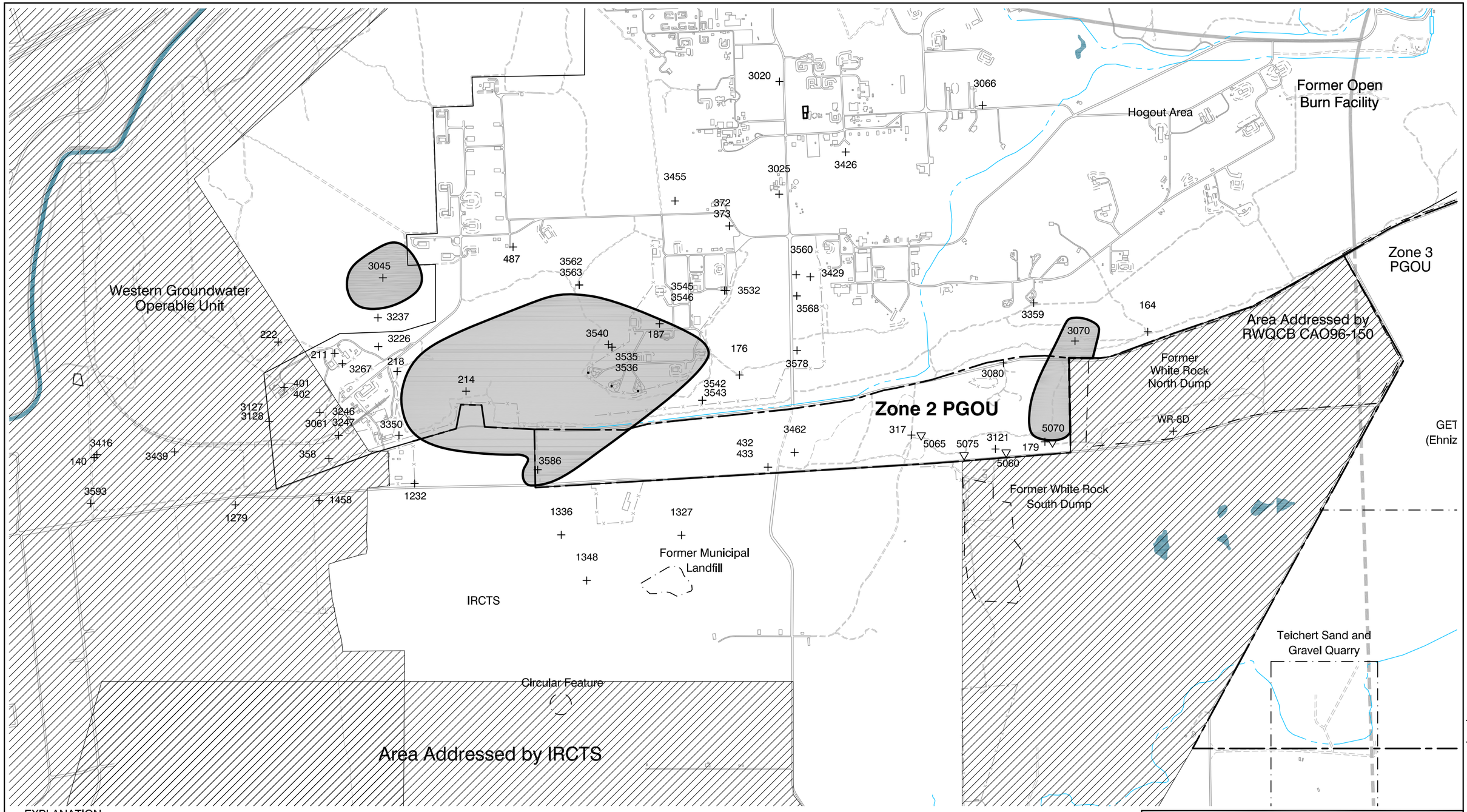

Nimbus Rd
Line 01
Line 03
Line 04
Hogout Area
Former Open Burn Facility
Zone 3 PGOU
Western Groundwater Operable Unit
Zone 2 PGOU
Area Addressed by RWQCB CAO96-150
Former White Rock North Dump
WR-19B
WR-16B
WR-23B
WR-8B
Old White Rock Road
White Rock Road
GET E Extraction Wells
IRCTS
Former Municipal Landfill
Former White Rock South Dump
GET B South (Ehnizs Property)
Teichert Sand and Gravel Quarry
STSW-23 Circular Feature
Area Addressed by IRCTS
EXPLANATION
Monitor Well
Extraction Well
Recharge Well
Maximum Extent of Contamination within PGOU - Dashed where Inferred
Area Addressed by IRCTS, WGOU or WRND
Consent Decree Boundary
Perimeter Groundwater Operable Unit
Based on samples collected between 2000 and 2004
Scale: 1" = 1600 '
0 800 1600
AEROJET
Environmental Remediation
FIGURE 1-14
Layer B
Composite Maximum Extent of Contamination
Zone 2 PGOU
SR10129812 FIGURE 1-14 4/16/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 1-15
Layer C
Composite Maximum Extent of Contamination
Zone 2 PGOU

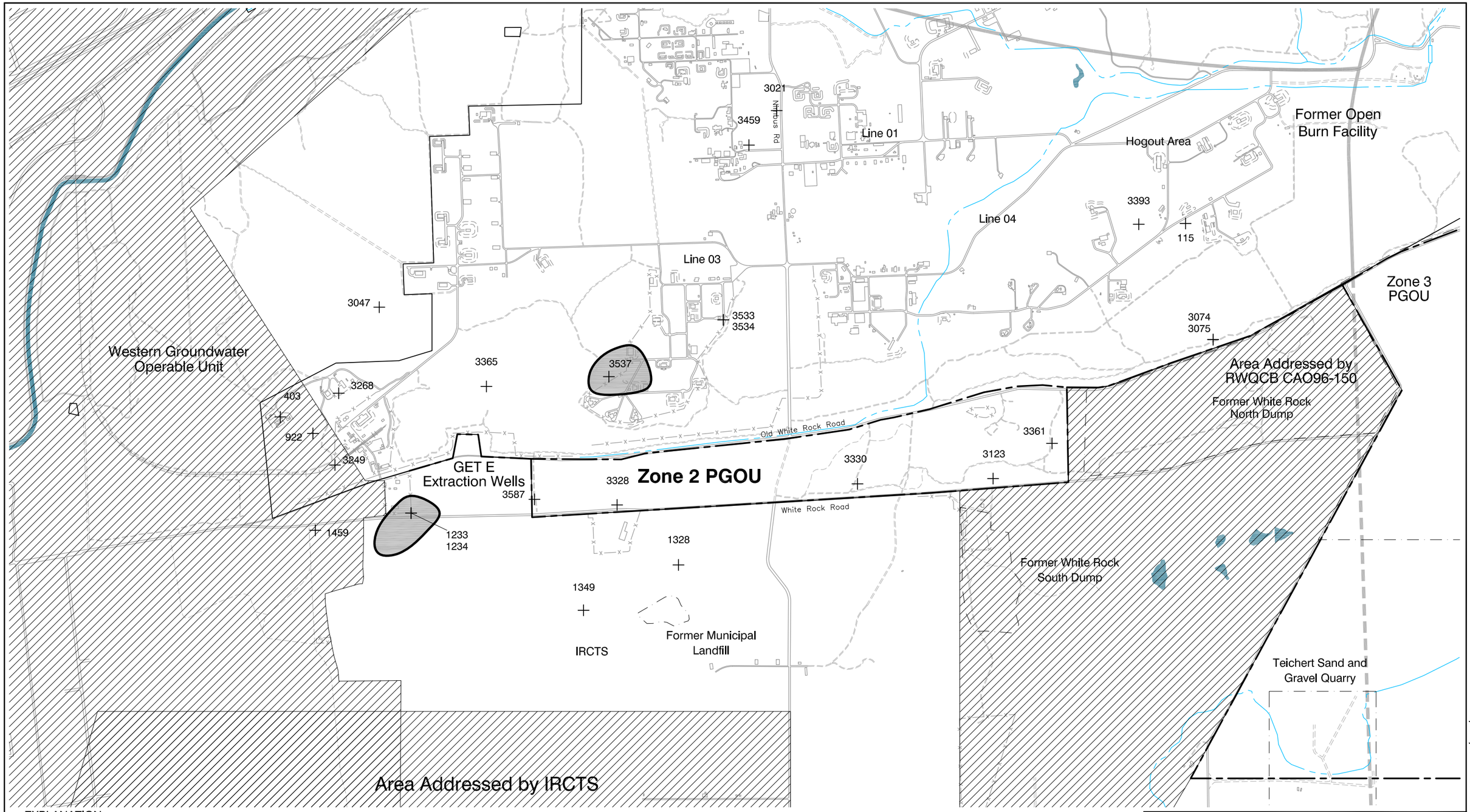
SR10129813 FIGURE 1-15 4/16/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 1-16
Layer D
Composite Maximum Extent of Contamination
Zone 2 PGOU

SR10129814 FIGURE 1-16 4/16/09 Herron, Al



EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Area Addressed by IRCTS, WGOU or WRND
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

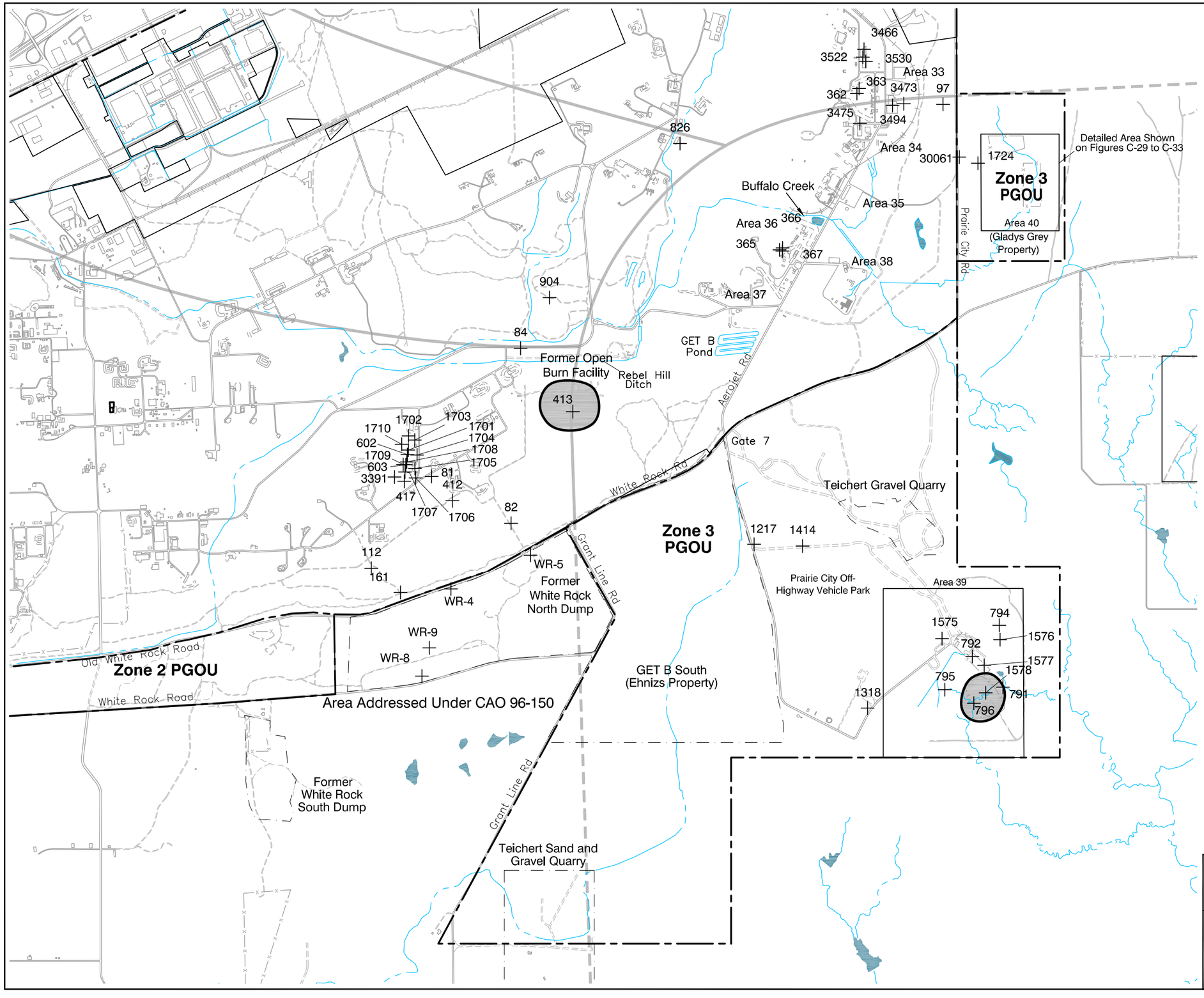
Scale: 1" = 1600 '

0 800 1600

AEROJET
Environmental Remediation

FIGURE 1-17
Layer E
Composite Maximum Extent of Contamination
Zone 2 PGOU

SR10129815 **FIGURE 1-17** 4/16/09 Herron, Al



EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

Scale: 1" = 2000'

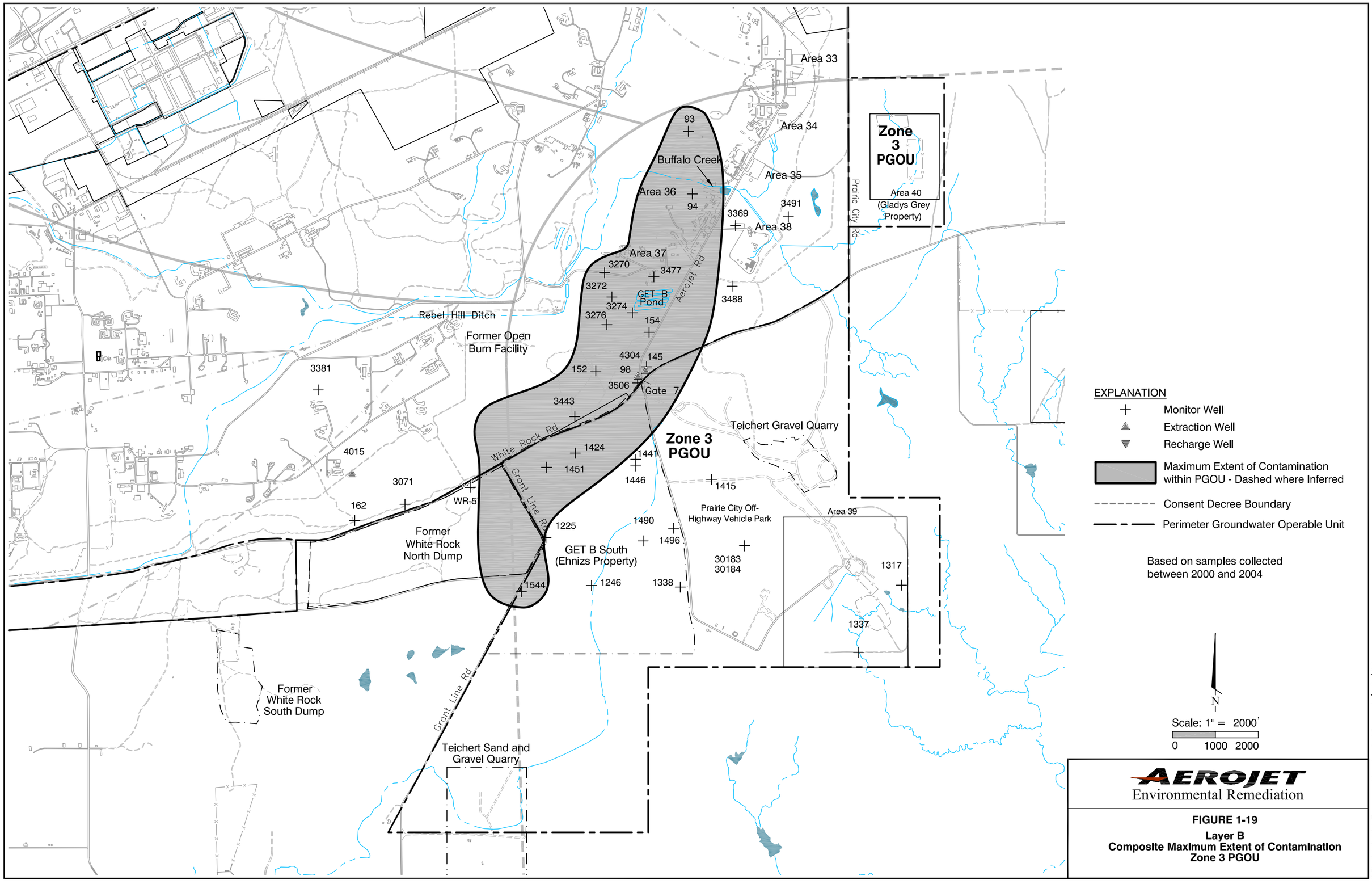
0 1000 2000

AEROJET
Environmental Remediation

FIGURE 1-18

Layer A
Composite Maximum Extent of Contamination
Zone 3 PGOU

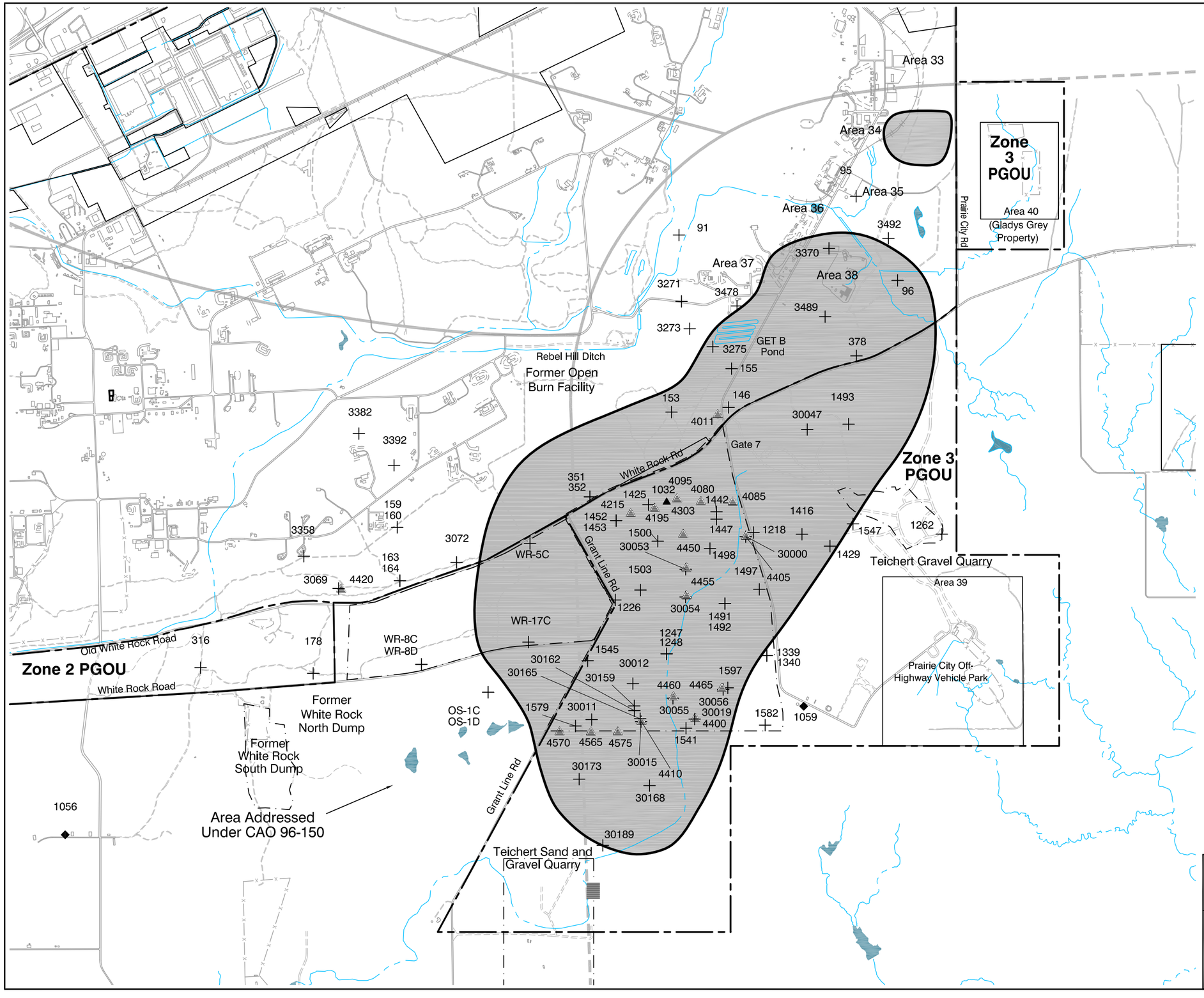
SR10129816 FIGURE 1-18 4/16/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 1-19
Layer B
Composite Maximum Extent of Contamination
Zone 3 PGOU

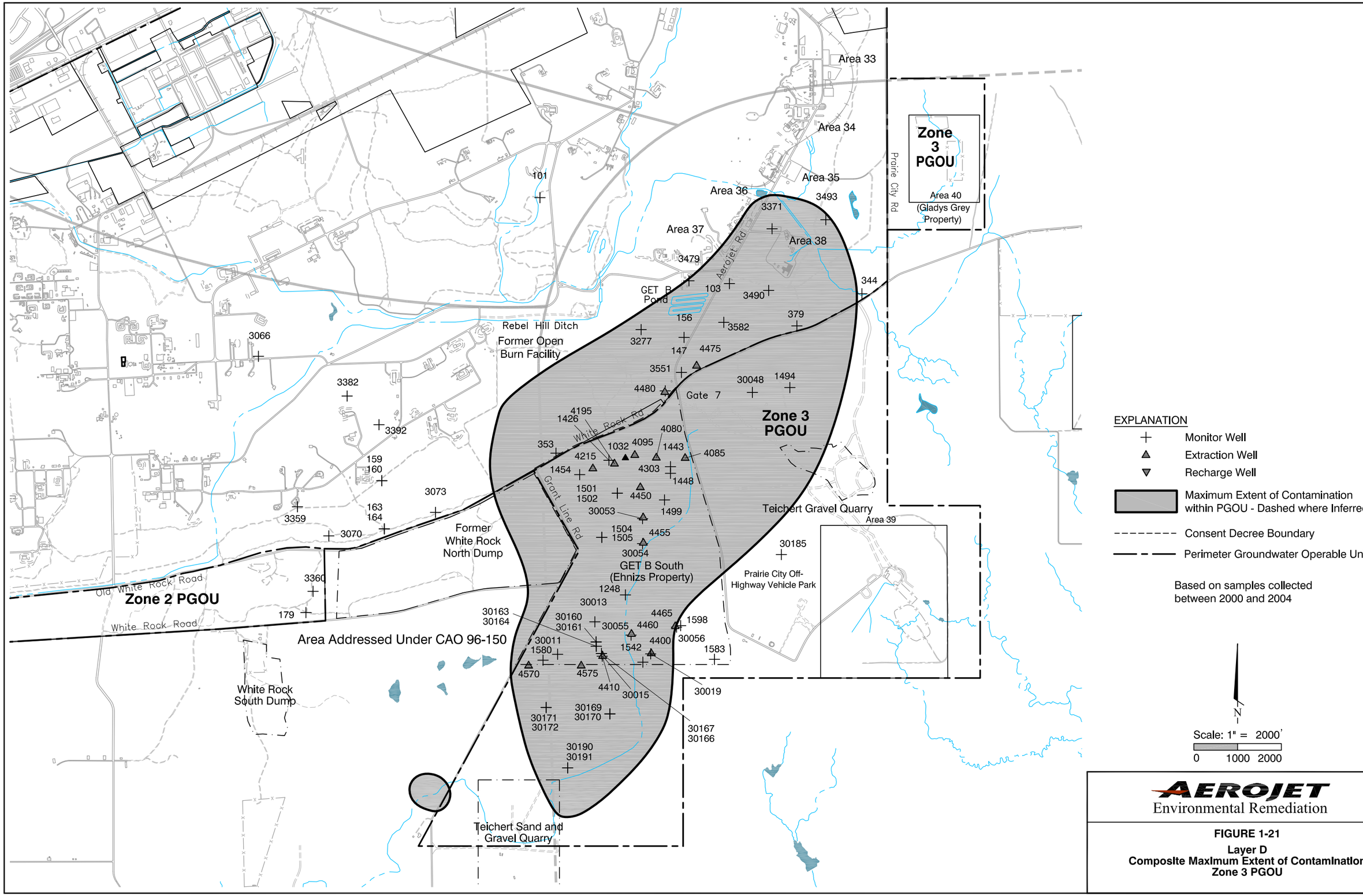
SR10129817 **FIGURE 1-19** 4/16/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 1-20
Layer C
Composite Maximum Extent of Contamination
Zone 3 PGOU

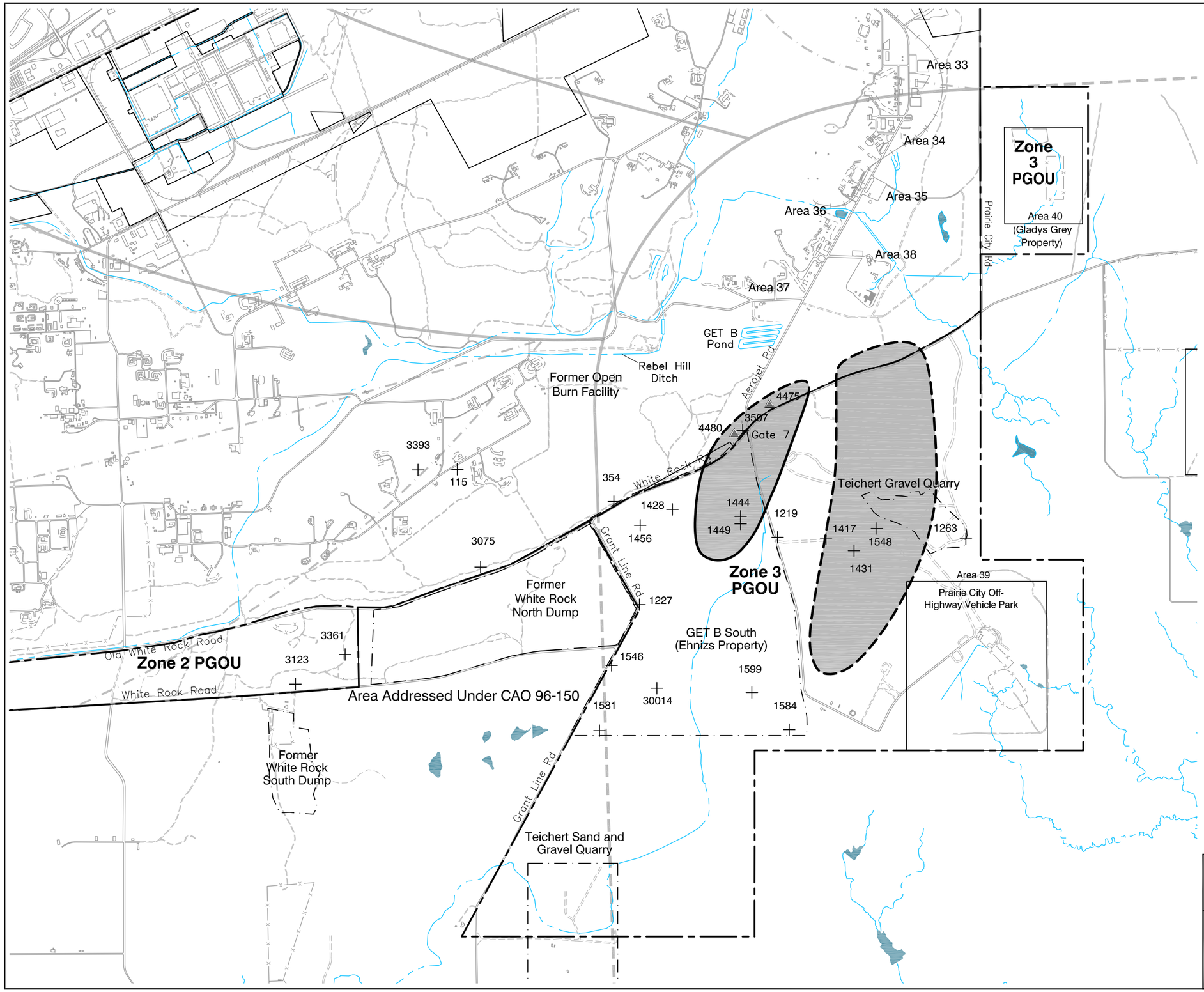
SR10129818 **FIGURE 1-20** 4/16/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 1-21
Layer D
Composite Maximum Extent of Contamination
Zone 3 PGOU

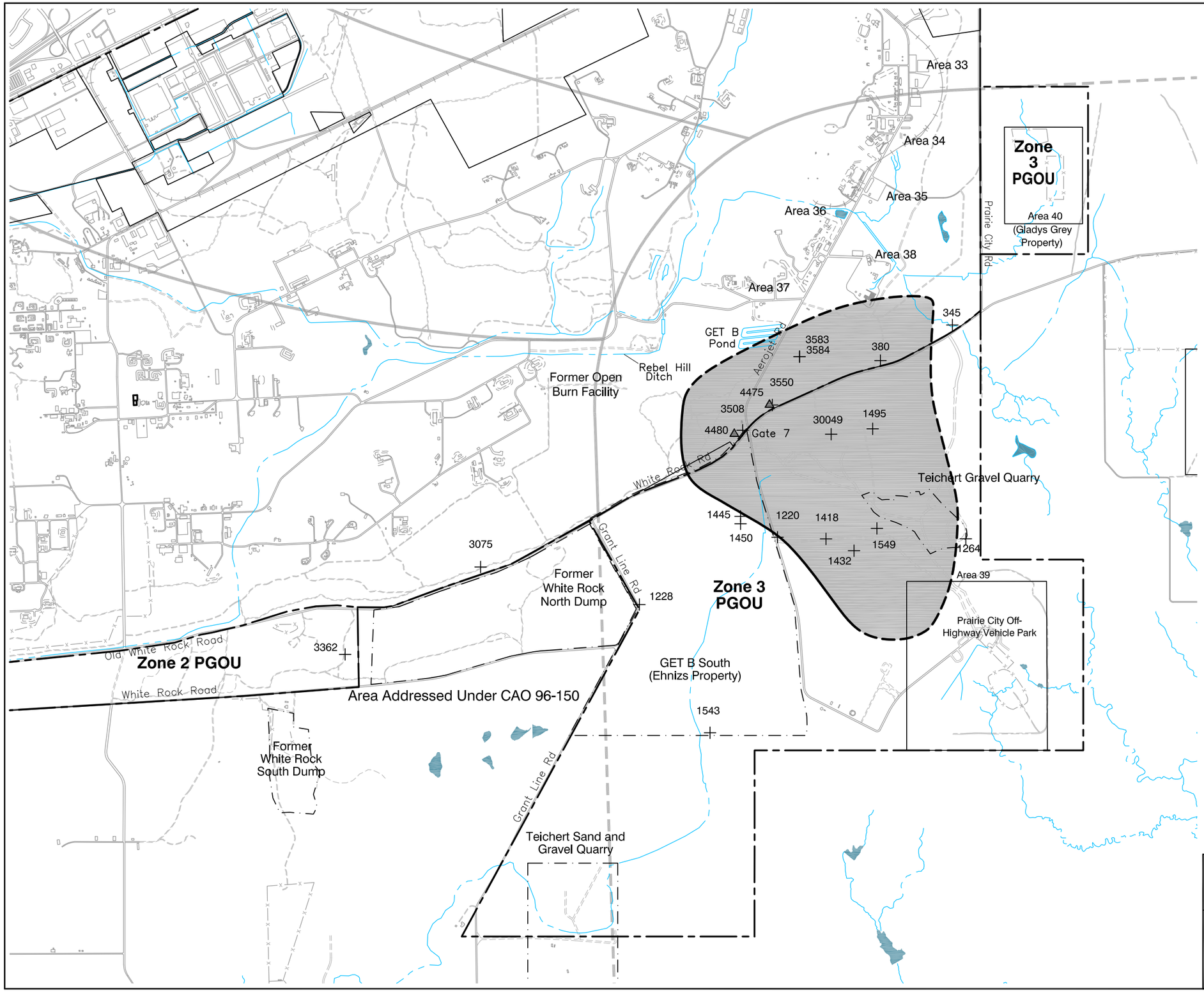
SR10129819 **FIGURE 1-21** 4/16/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 1-22
Layer E
Composite Maximum Extent of Contamination
Zone 3 PGOU

SR10129820 FIGURE 1-22 4/16/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 1-23
Layer F
Composite Maximum Extent of Contamination
Zone 3 PGOU

SR10129821 **FIGURE 1-23** 4/16/09 Herron, Al

Zone 4 PGOU

Alder Creek

Aerojet Lake

3497

3394

3216

3388

3412
3413

3186

90

3418

Landfill

Area 30

Area 21

3377

3385

3284

3187

377

Former GET A Pond

3260

Sector A

Area 31

3185

77

Area 46

Sector C

Area 32

Zone 1

Sector D

Zone 3
Sector B

EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

Scale: 1" = 1000'

0 500 1000

AEROJET
Environmental Remediation

FIGURE 1-24
Dredged Layer
Composite Maximum Extent of Contamination
Zone 4 PGOU

SR10129822 **FIGURE 1-24** 4/16/09 Herron, Al

Zone 4 PGOU

EXPLANATION

- Monitor Well
- Extraction Well
- Recharge Well
- Maximum Extent of Contamination within PGOU - Dashed where Inferred
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

Based on samples collected between 2000 and 2004

N

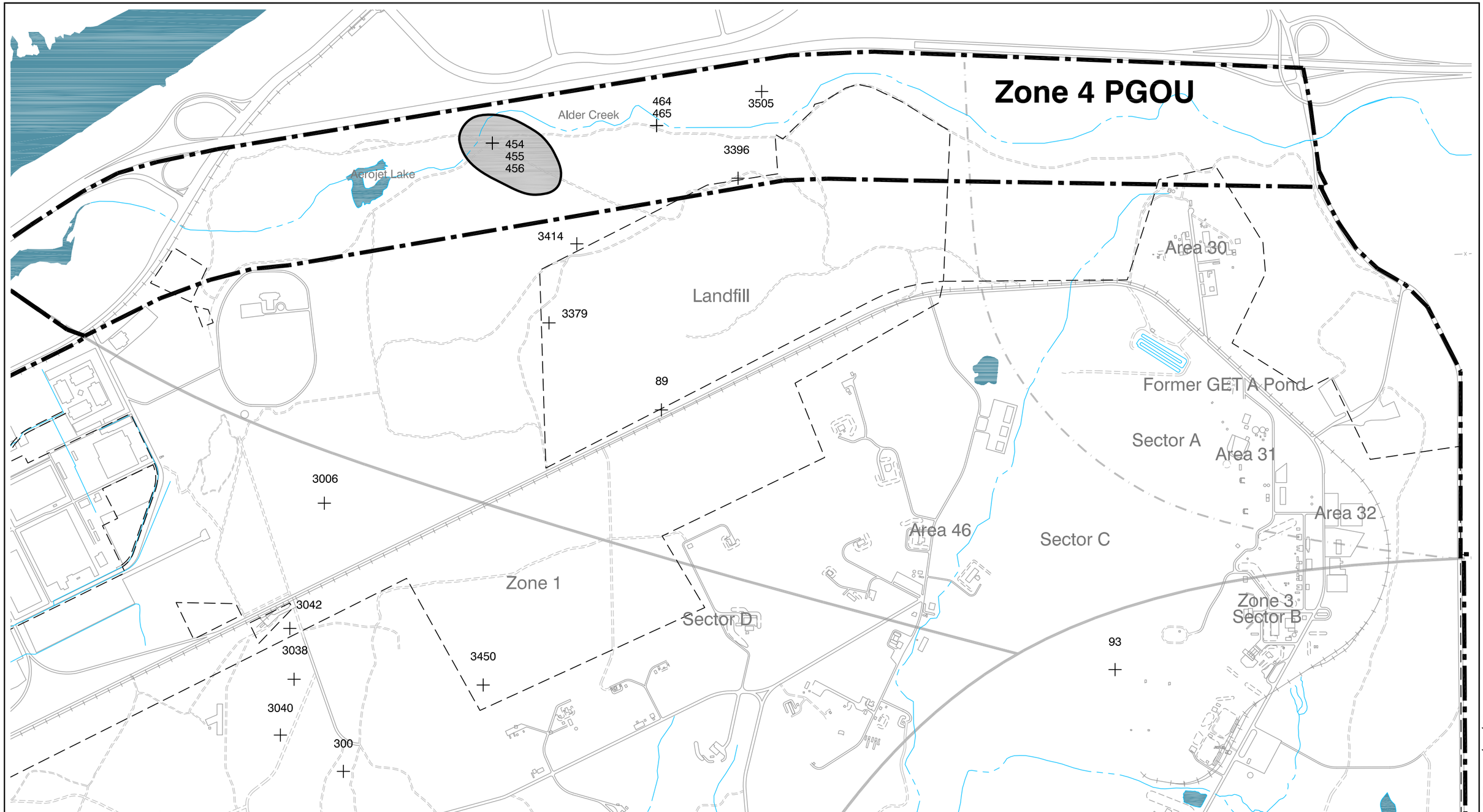
Scale: 1" = 1000'

0 500 1000

AEROJET
Environmental Remediation

FIGURE 1-25
Layer A
Composite Maximum Extent of Contamination
Zone 4 PGOU

SR10129823 FIGURE 1-25 4/16/09 Herron, Al



EXPLANATION

KEY TO WELL SYMBOLS

103 — Well Identification

<0.0075 — NDMA Concentration in µg/L

Well Type Location

NS = Not Sampled

Consent Decree Boundary

Perimeter Groundwater Operable Unit

Maximum Extent of Contamination within PGOU - Dashed where Inferred

Based on samples collected between 2000 and 2004

Scale: 1" = 1000'

0 500 1000

AEROJET
Environmental Remediation

FIGURE 1-26

Layer B
Composite Maximum Extent of Contamination
Zone 4 PGOU

FIGURE 1-26 4/16/09 Herron, Al

SR10129824

Source Medium	Release Mechanism	Secondary Source	Secondary Release Mechanism	Exposure Medium	Exposure Route	Human					Ecological																			
											Birds			Mammals						Plants				Invertebrates			Amphibians, Reptiles & Fish			
						Onsite Resident	Hypothetical Offsite Resident	Onsite Comm/Ind Worker	Site Visitor/ Recreator [d]	Onsite Construction Worker	Raptors	Songbirds, Quails & relatives	Water Fowl	Large Herbivores	Carnivores	Piscivores	Bats	Small Mammals	Wetland Plants	Trees	Shrubs	Grasses	Soil Dwelling Invertebrates	Herbaceous Insects	Aquatic Invertebrates	Snakes & Lizards	Turtles	Frogs & Toads	Fish
Sumps and USTs	Spills or Releases	Sediment [a]	Dust	Air	Ingestion	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Dermal Contact	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
			Infiltration/ Percolation	Perched/ Regional Groundwater	See Exposure Routes for Treated and Untreated Groundwater Described Below																									
Drums and ASTs			Runoff	Surface Water and Sediment [a]	Ingestion	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Dermal Contact	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
				Fish/Shellfish / Aquatic Food Chain	Ingestion	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Ponds					Ingestion	C	I	C	I	C	C	C	I	C	C	N	I	C	I	I	I	I	C (1)	N	I	Q	Q	Q	I
					Dermal Contact	C	I	C	I	C	C	C	I	C	C	N	I	C	C (1)	C (1)	C (1)	C (1)	C (1)	N	I	N	N	N	I
Septic Tanks	Infiltration/ Percolation	Soil	Dust	Air	Inhalation	C	N	C	I	C	N	N	N	N	N	N	N	N	N	N	N	N	I	N	I	N	N	N	I
			Infiltration/ Percolation	Perched/ Regional Groundwater	See Exposure Routes for Treated and Untreated Groundwater Described Below																									
			Runoff	Surface Water and Sediment [a]	Ingestion	I	I	I	I	I	C	C	C	C	C	C	C	C	I	I	I	I	I	I	C (1)	N	N	N	C (1)
					Inhalation	I	I	I	I	I	N	N	N	N	N	N	N	N	I	I	I	I	I	I	I	N	N	N	I
					Dermal Contact	I	I	I	I	I	N	N	N	N	N	N	N	N	C (1)	I	I	I	I	I	C (1)	N	N	N	C (1)
				Fish/Shellfish/ Aquatic Food Chain	Ingestion	I	I	I	I	I	N	I	C	I	C	C	I	I	I	I	I	I	I	I	C (1)	N	Q	Q	C (1)
			Volatile Emissions (soil vapor)	Soil Vapor	Inhalation (Indoor)	C	I	C	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation (Outdoor Air)	C	N	C	I	C	Q	N	I	N	Q	N	N	Q	N	N	N	N	Q	N	I	Q	N	Q	I
			Plant Uptake Soil Invertebrate Uptake	Garden Produce [b] / Terrestrial Food Chain	Ingestion	I	I	I	I	I	C	C	N	C	C	I	C	C	I	I	I	I	C (1)	C (1)	I	Q	N	Q	I

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Environmental Remediation

FIGURE 1-27, Page 1 of 2
Site-Wide Conceptual Model for the Perimeter Groundwater Operable Unit

Source Medium	Release Mechanism	Secondary Source	Secondary Release Mechanism	Exposure Medium	Exposure Route	Human					Ecological																			
											Birds			Mammals					Plants				Invertebrates			Amphibians, Reptiles & Fish			
						Onsite Resident	Hypothetical Offsite Resident	Onsite Comm/Ind Worker	Site Visitor/ Recreator [d]	Onsite Construction Worker	Raptors	Songbirds, Quails & relatives	Water Fowl	Large Herbivores	Carnivores	Piscivores	Bats	Small Mammals	Wetland Plants	Trees	Shrubs	Grasses	Soil Dwelling Invertebrates	Herbaceous Insects	Aquatic Invertebrates	Snakes & Lizards	Turtles	Frogs & Toads	Fish
Drums and Tanks, Ponds, Deluge Water, Waste Disposal Facilities	Spills/Leaks, Infiltration/ Percolation	Untreated Groundwater	Potable and Non-potable Use		Ingestion	I	C	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation	I	C	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Dermal Contact	I	C	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
			Short Term Excavation	Water in Trench [c]	Ingestion	I	I	I	I	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation	I	I	I	I	Q	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Dermal Contact	I	I	I	I	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
			Volatile Emissions	Soil Vapor	Inhalation (Indoor)	I	C	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation (Outdoor)	N	N	N	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
			Plant Uptake	Garden Produce [b] / Terrestrial Food Chain (Ecological)	Ingestion	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
			Discharge to Surface Water	Surface Water and Sediment	Ingestion	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	C (1)	N	N	N	C (1)
					Inhalation	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	N	N	N	I
					Dermal Contact	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	C (1)	N	N	N	C (1)
				Fish / Shellfish	Ingestion	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	C (1)	N	Q	Q	C (1)
		Treated Groundwater	Direct Reuse (Potable or Non-potable)	Groundwater	Ingestion	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Dermal Contact	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
			Recharge (Potable or Non-potable)	Groundwater	Ingestion	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Dermal Contact	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
				Short Term Excavation	Ingestion	I	I	I	I	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation	I	I	I	I	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Dermal Contact	I	I	I	I	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
				Volatile Emissions	Inhalation (Indoor)	N	N	I	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
					Inhalation (Outdoor)	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
				Plant Uptake	Ingestion	N	N	I	N	N	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
				Discharge to Surface Water	Ingestion	N	N	I	N	N	C	C	C	C	C	C	C	C	C	I	I	I	I	I	I	C (1)	Q	Q	Q	C (1)
					Inhalation	N	N	I	N	N	N	N	N	N	N	N	N	N	N	I	I	I	I	I	I	I	N	N	N	I
					Dermal Contact	N	N	I	N	N	N	N	C	N	N	C	N	N	C (1)	I	I	I	I	I	I	C (1)	N	N	N	C (1)
			Surface Water Discharge	Surface Water and Sediment	Ingestion	N	N	I	N	N	C	C	C	C	C	C	C	C	I	I	I	I	I	I	C (1)	N	N	N	C (1)
					Inhalation	N	N	I	N	N	N	N	N	N	N	N	N	N	I	I	I	I	I	I	I	N	N	N	I
					Dermal Contact	N	N	I	N	N	N	N	C	N	N	C	N	N	C (1)	I	I	I	I	I	I	C (1)	N	N	N	C (1)
				Fish/Shellfish / Aquatic Food Chain	Ingestion	N	N	I	N	N	N	C	C	I	C	C	C	I	I	I	I	I	I	I	I	C (1)	N	Q	Q	C (1)

Notes:

a No sediment was identified in the potential source sites within Areas 20, 21 and 49. Samples collected within ditches has been characterized as surface soil samples because they are 1) exposes (i.e., not covered by water); 2) dry (unsaturated); 3) sufficiently fine-grained such that they may become airborne; and 4) during site grading they will be mixed in with shallow soil.

b Projected residential redevelopment at Aerojet is not likely to include land-intensive pathways, such as in situ gardening. The naturally occurring soil at Aeroject is not ideally suited for this type of activity. Significant land preparation activities (i.e., addition of topsoil and nutrients) would be required prior to growing fruits or vegetables.

c Although construction workers may briefly intercept the shallow water table only in some OUs; however, construction activities in saturated trench conditions are generally avoided and dewatering is performed to avoid work in a wet and slippery trench. Dermal exposures to contaminants in trench water would be incomplete as steady state absorption and penetration of the skin is unlikely, given short exposure times.

d Since a residential and/or commercial/industrial soil exposure will be evaluated for all the source sites, there is no need to quantify a separate recreational exposure. Exposures to fish on the Aerojet property are highly unlikely, and are dependent upon the presence of edible species that are of large enough size to be filleted.

e Recreational exposure will be evaluated on a site-specific basis; if a residential and/or commercial/industrial soil exposure has already been evaluated, there is no need to quantify a separate recreational exposure to soil unless the property may be transferred solely for recreational use. Exposures to fish on the Aerojet property are highly unlikely, and are dependent upon the presence of edible species that are of large enough size to be filleted.

ASTs	Above-ground Storage Tank	N	Negligible or insignificant (though hypothetically potentially complete) pathway that will not be evaluated
C	Complete exposure pathway evaluated quantitatively	Q	Qualitative (not quantitative) evaluation planned for this potentially complete exposure pathway
Comm/Ind	Commercial/Industrial	USTs	Underground Storage Tank
I	Incomplete exposure pathway	C (1)	Exposure route is potentially complete but is not explicitly evaluated; it is part of direct contact exposure pathway that is evaluated quantitatively.

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FIGURE 1-27, Page 2 of 2
Site-Wide Conceptual Model for the Perimeter Groundwater Operable Unit

2/8/05 ah SR10119170

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS
No Action	None	Not Applicable	No action. Existing Interim Actions would be shut down.	Required for consideration by NCP.
No Further Action	Various	Various	No further action taken. Operation of existing Interim Actions would continue.Existing Interim Actions include several remedial technologies and proces options. See Section 3.	Potentially applicable.
Institutional Controls	Proprietary Controls	Land purchase	Purchase of land above contaminated groundwater to prevent use. Land purchase may also be required offsite to construct offsite facilities.	Potentially applicable.
		Deed restrictions	Proprietary controls that are legally enforceable against subsequent owners.	Potentially applicable. Restrictions (equivalent to restrictions applied to "Carve-out Lands") will be created for recharge of groundwater via wells or impoundments.
		Deed notices	Non-enforceable informational document filed in public land records alerting anyone searching records to important information about property.	Potentially applicable.
		Easements	Property right conveyed by a landowner to another party which gives the second party rights with regard to the land of the first party.	Potentially applicable in conjunction with other groundwater response actions.
		Covenants	Promise by one landowner to another made in connection with conveyance of property. Promise to refrain from using property in a certain manner.	Potentially applicable in conjunction with other groundwater response actions.
	Governmental Contols	Land use restrictions	Land use restrictions issued to restrict property use. Potential restrictions include drilling new wells.	Potentially applicable.
		Groundwater use restrictions	If groundwater is contaminated, restrictions could include water or well use restrictions such as limitations on the drilling of new wells, and the California Dept of Health Services (DHS) program of monitoring and oversight of public water systems.	Potentially applicable. Once contaminated groundwater is restored, restrictions can be removed.
		Advisories	Publicly -issued warnings that provide notice to potential users of groundwater of some existing or impending risk associated with its use.	Potentially applicable in conjunction with other groundwater response actions.
Monitoring	Monitoring	Groundwater monitoring	Short- and long-term monitoring of groundwater to evaluate contaminant levels, migration, and attenuation.	Potentially applicable.
Domestic Wellhead Treatment	Wellhead Treatment	Home carbon treatment unit	Placement of treatment processes such as granular activated carbon on individual wells to remove contaminants.	Potentially applicable. Granulated activated carbon would remove only VOC's.
Monitored Natural Attenuation	Monitoring/Verification	Groundwater monitoring	Contaminants are allowed to naturally attenuate via biodegradation, dispersion, dilution and adsorption. Long-term monitoring is necessary to evaluate changes in concentration and plume size. Contingent action may be required.	Potentially applicable for Area 39 and areas beyond containment. May be implemented in conjunction with other actions (i.e., onsite containment).

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

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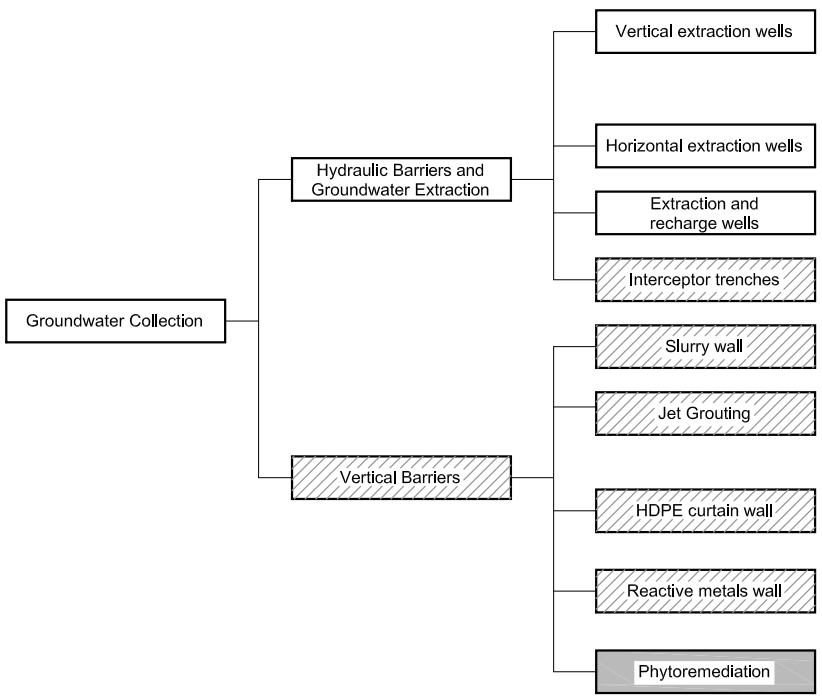
Environmental Remediation

FIGURE 2-1

Technical Implementability Screening of Groundwater Remedlatlon Technologles and Process Optlons
Sheet 1 of 5

2/9/05 ah SR10119104



DESCRIPTION	SCREENING COMMENTS
New vertical extraction wells are installed and the groundwater is pumped to physically remove contaminants from the saturated zone. A hydraulic barrier is established that prevents contaminant migration.	Potentially applicable. Requires groundwater treatment.
Horizontal wells are installed and the groundwater is pumped to physically remove contaminants from the saturated zone. A hydraulic barrier is established that prevents contaminant migration.	Potentially applicable. Requires groundwater treatment.
Wells are installed and groundwater is pumped to establish a hydraulic barrier. Uncontaminated water is recharged to create a hydraulic barrier and increase flow to extraction wells.	Potentially applicable. Requires groundwater treatment.
Perforated pipe in trenches backfilled with media more porous than surrounding media to collect groundwater.	Not feasible in most areas because of depth to groundwater, vertical depth of chemicals, and difficulty of constructing long trench.
Trench around areas of contamination is filled with a soil or cement bentonite slurry.	Not feasible in most areas because of depth to groundwater, vertical depth of chemicals, and difficulty of constructing long trench.
Grout mixture is injected using a drill rod into pore spaces of soil at very high pressures and velocities to form a column. Adjacent or overlapping grout columns are used to form an impermeable barrier.	Difficult to ensure continuity between columns and to install at depths greater than 150 feet. Not feasible in most PGOU areas because of depth to groundwater, vertical depth of chemicals and different soil types/densities.
High density polyethylene curtain is constructed in a trench around areas of contamination and backfilled.	Not feasible in most areas because of depth to groundwater, vertical depth of chemicals, and difficulty of constructing long trench.
Reactive metals (e.g. iron filings for some VOCs) placed in saturated zone of a trench and groundwater is treated as it flows through reactive media. Frequently reactive media placed in the "gate" section of a "funnel and gate" system.	Not feasible in most areas because of depth to groundwater, vertical depth of chemicals, and difficulty of constructing long trench.
Vegetation (e.g. trees or grasses) is used to accelerate the biodegradation of contaminants in and around rhizosphere.	Not feasible in most areas because of depth to groundwater.

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

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FIGURE 2-1

Technical Implementability Screening of Groundwater Remediation Technologies and Process Options
Sheet 2 of 5

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS
			the biodegradation of contaminants in and around rhizosphere.	
In Situ Treatment	Stripping	Air sparging	Air is injected into the groundwater via well injection points or within a sparge trench. Volatile chemicals are stripped from the water and soil into the soil vapor and extracted from the subsurface.	Not feasible in most areas because of depth to groundwater and difficulty of collecting vapors in large developed area. Only applicable for VOCs.
		In-well aeration/stripping	Air-lift pumping in a well with two screened intervals results in recirculation of groundwater through the aquifer and well. in addition, air-bubble stripping within the well removes VOCs from the groundwater. A low vacuum head is used to extract vapors to the surface for treatment.	Potentially applicable for VOCs removal only. Vapor-phase VOCs may require treatment.
	Chemical Treatment	In-well oxidation		Potentially applicable for VOCs removal only.
	Biological Treatment	Enhanced biological reduction	Nutrients and a carbon source are introduced to groundwater in areas where COCs are present to stimulate indigenous microbes to break down the COCs.	Potentially applicable for perchlorate and VOCs. Pilot testing currently being conducted for VOCs and perchlorate removal.

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

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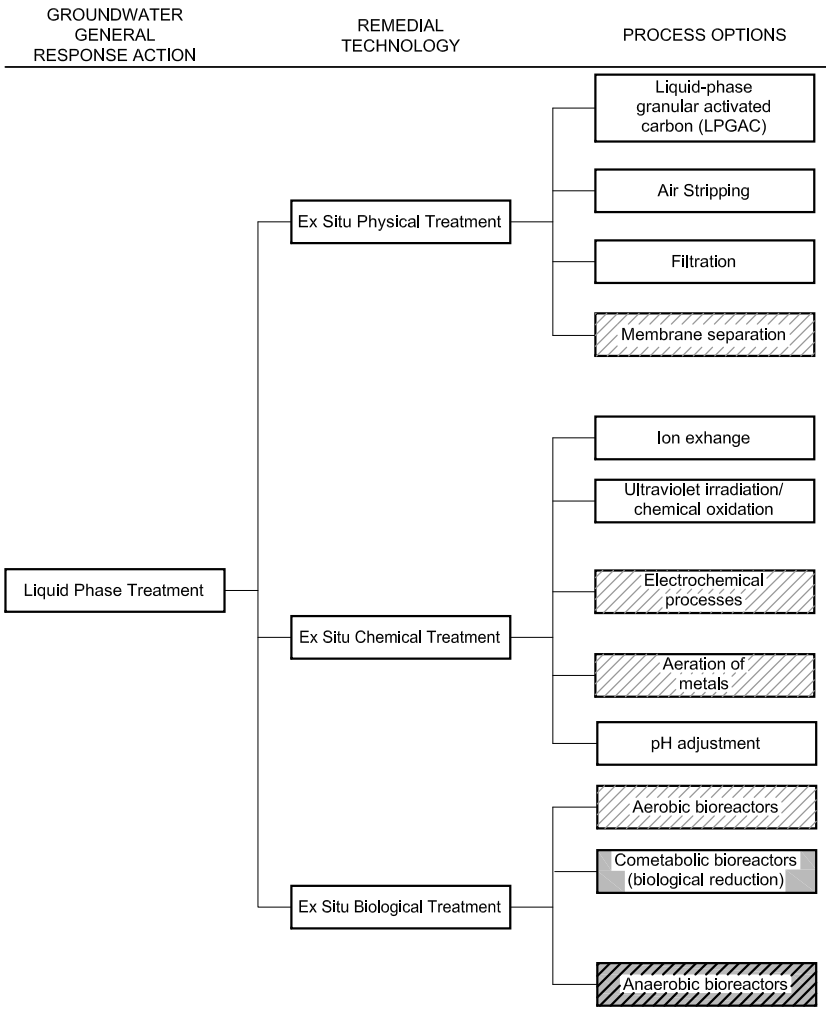
Environmental Remediation

FIGURE 2-1

Technical Implementability Screening of Groundwater Remediation Technologies and Process Options
Sheet 3 of 5



DESCRIPTION	SCREENING COMMENTS
Contaminated water is passed through adsorbent media, such as granular activated carbon and the contaminant is sorbed onto the media. The adsorbent is replaced and/or regenerated on a regular basis.	Potentially applicable. Process can be applied for municipal water supply wellhead treatment as well as at a groundwater treatment facility.
Large volumes of air are forced through water in a packed column or by diffused bubble aeration to promote transfer of non-polar VOCs to the air phase. Includes warm water stripping variations.	Potentially applicable for VOC removal only. Air stripping releases VOCs that, depending on ARAR's, may require vapor-phase treatment. Currently used at GETs A, B, D, E/F and ARGET.
Water treated via ex-situ chemical or biological processes is passed through single or multi media filters to remove particulate matter prior to management of treated groundwater.	Potentially applicable.
Contaminated water is passed through semi-permeable membranes which separate contaminants from water based on molecular size, shape, and ionic characteristics. Can be used for volume reduction. Techniques include reverse osmosis, ultrafiltration, nanofiltration, and electrodialysis.	Not feasible because of the large flow rate of reject or concentrate streams generated. Also some contaminant concentrations too low for treatment.
Contaminated water is passed through a resin bed capable of exchanging the ions in solution with ions on the resin. The loaded resin is then either disposed or regenerated and reused.	Potentially applicable for perchlorate and nitrate removal. Currently used to remove perchlorate from GET D and GET B groundwater.
Ultraviolet light is used to promote the oxidation of 1,4-dioxane, NDMA and VOCs, and for disinfection. Hydrogen peroxide may be needed for 1,4-dioxane and VOC oxidation.	Potentially applicable for 1,4-dioxane, NDMA, and VOC removal as well as a disinfection process. Currently used at GETs A, B, E/F and ARGET to remove NDMA, VOCs, and 1,4 dioxane.
Electrochemical treatment changes the oxidation state of ions in solution to a preferred and treatable state through the application of an electrical current. Generally used to precipitate heavy metals, oxidize trace organics, and coagulate colloids.	Not applicable for chemicals of concern.
Aeration promotes chemical oxidation and the formation of insoluble hydroxides.	Not applicable for chemicals of concern.
Acid or caustic is added upstream of another process option to enhance the performance of the process option or added downstream of a process option to adjust the pH.	Potentially applicable. Currently used at several Interim Actions.
Organics are biologically assimilated and transformed by aerobic microorganisms in Fixed Bed Reactors or Fluidized Bed Reactors.	Limited effectiveness for chlorinated VOCs.
Chlorinated VOCs are degraded by enzymes produced by aerobic microorganisms during oxidation of a primary substrate. Water contaminated with perchlorate is amended with organic substrate such as ethanol and nutrients and passed upflow through a fluidized bed reactor. Perchlorate is reduced biologically.	Potentially applicable. Currently used to remove perchlorate from Aerojet GET E and F groundwater.
Organics and perchlorate are biologically assimilated and transformed by anaerobic microorganisms. Nutrient such as brewers yeast required. Additional treatment may be required to reduce organic concentration prior to disposition of treated water.	Difficult to implement. Not widely used. Low reaction rates result in longer startup and treatment times. Sensitive to changes in influent flows and concentrations. Polishing of effluent stream may be required.

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

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Environmental Remediation

FIGURE 2-1

Technical Implementability Screening of Groundwater Remediation Technologies and Process Options
Sheet 4 of 5

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS
Vapor-Phase Treatment for Air Stripping Offgas	Ex Situ Physical/Chemical/ Treatment	Direct discharge	The air stream is discharged directly to the atmosphere without treatment.	Potentially applicable. Depends on concentration of the contaminants, flow rate, regulatory agency acceptance, and public acceptance.
		Vapor-phase granular activated carbon (VPGAC)	A VOC-contaminated air stream is passed through adsorbent media, such as granular activated carbon. The carbon is replaced and/or regenerated on a regular basis.	Potentially applicable. Water vapor in the gas stream will adversely affect VOC adsorption. Thermal pretreatment to remove water vapor may be required.
		Catalytic oxidation	Vapor-phase VOCs are destroyed by heating the air stream and passing it through a combustion unit in contact with a catalyst bed. The catalyst enhances the thermal oxidation (600 to 900 degrees F) of contaminants to water vapor, carbon dioxide, and hydrochloric acid.	Potentially applicable. The hydrochloric acid by-product in the offgas may require treatment with a scrubber before releasing to the atmosphere.
		Thermal oxidation	VOC-contaminants in an air stream are oxidized by high temperatures (1000 to 1800 degrees F). Combustion by-products may include hydrochloric acid and nitrogen oxides.	Potentially applicable. The hydrochloric acid by-product in the offgas may require treatment with a scrubber. Partial or incomplete combustion of chlorinated chemicals can result in production of chlorine gas and other by-products.
Disposition of Treated Groundwater	Management/Reuse of Treated Groundwater	Direct potable water supply	Treated water is delivered or sold to neighboring and regional water purveyors, directly to a point of use in a water distribution system, with wellhead treatment, or through a surface water treatment facility.	Potentially applicable. Treated groundwater may require DHS evaluation of use for direct potable water supply in accordance with DHS Policy Memo 97-005.
		Indirect potable water supply	Treated groundwater would be discharged to surface water. Surface water would be treated at the point of use by a responsible water utility.	Potentially applicable.
		Non-potable water reuse	Treated water is reused as irrigation water.	Potentially applicable.
		Streamflow augmentation	Treated groundwater is discharged to surface ditches, storm sewer, or a surface water body.	Potentially applicable.
		Groundwater recharge	Treated groundwater is recharged into the local aquifer.	Potentially applicable.
		Deep well injection	Treated groundwater is injected into a deep aquifer.	Not feasible because the permeability of the deep units is not great enough.

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

AEROJET
Environmental Remediation

FIGURE 2-1

Technical Implementability Screening of Groundwater Remediation Technologies and Process Options
Sheet 5 of 5

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
No Action	None	Not Applicable	Does not achieve all remedial action objectives.	May be implemented at sites with regulatory agency acceptance.	No cost.	None.
No Further Action	Various	Various	See Effectiveness Evaluation	Implementable.	No capital and moderate O&M costs.	None.
Institutional Controls	Proprietary Controls	Land purchase	This process option focuses on limitation of direct exposure to source areas. Not appropriate for groundwater action, except as need to site any groundwater remediation facilities.	May be difficult to implement offsite. Purchase must be negotiated with current land owners.	High capital cost.	Screened out based on effectiveness and cost.
		Deed restrictions	Long term effectiveness depends on continued future implementation.	Potentially implementable.	Low costs.	None.
		Deed notices	Long term effectiveness depends on continued future implementation.	Potentially implementable.	Low costs.	None.
		Easements	Long term effectiveness depends on continued future implementation.	Implementability will depend upon activity to be undertaken under easement and ease of negotiation with landowner/governmental agency.	Moderate capital costs depending on extent of easements required. Low O&M costs.	None.
		Covenants	Long term effectiveness depends on continued future implementation.	Potentially implementable.	Low costs.	None.
	Governmental Controls	Land use restrictions	This process option focuses on limitation of direct exposure to source areas. Not appropriate for groundwater action, except as needed to site any groundwater remediation facilities.	May be difficult to implement offsite. Must be negotiated with land owner.	Uncertain. Costs depend on scope of land use restrictions.	None.
		Groundwater use restrictions	Long term effectiveness depends on continued future implementation.	Potentially implementable.	Low costs.	None.
		Advisories	Long term effectiveness depends on continued future implementation.	Potentially implementable.	Low costs.	None.
Monitoring	Monitoring	Groundwater monitoring	Effective at verifying presence of and tracking contaminants in groundwater and verifying attenuation. Does not remediate contamination.	Potentially implementable.	Low to moderate capital cost, low O&M cost.	None.
Domestic Wellhead Treatment	Wellhead Treatment	Home Carbon Treatment Unit	Highly effective at preventing direct exposure to contamination. Long-term effectiveness depends upon routine replacement of carbon units.	Potentially implementable.	Low capital cost, low (O&M) cost.	None.

EXPLANATION

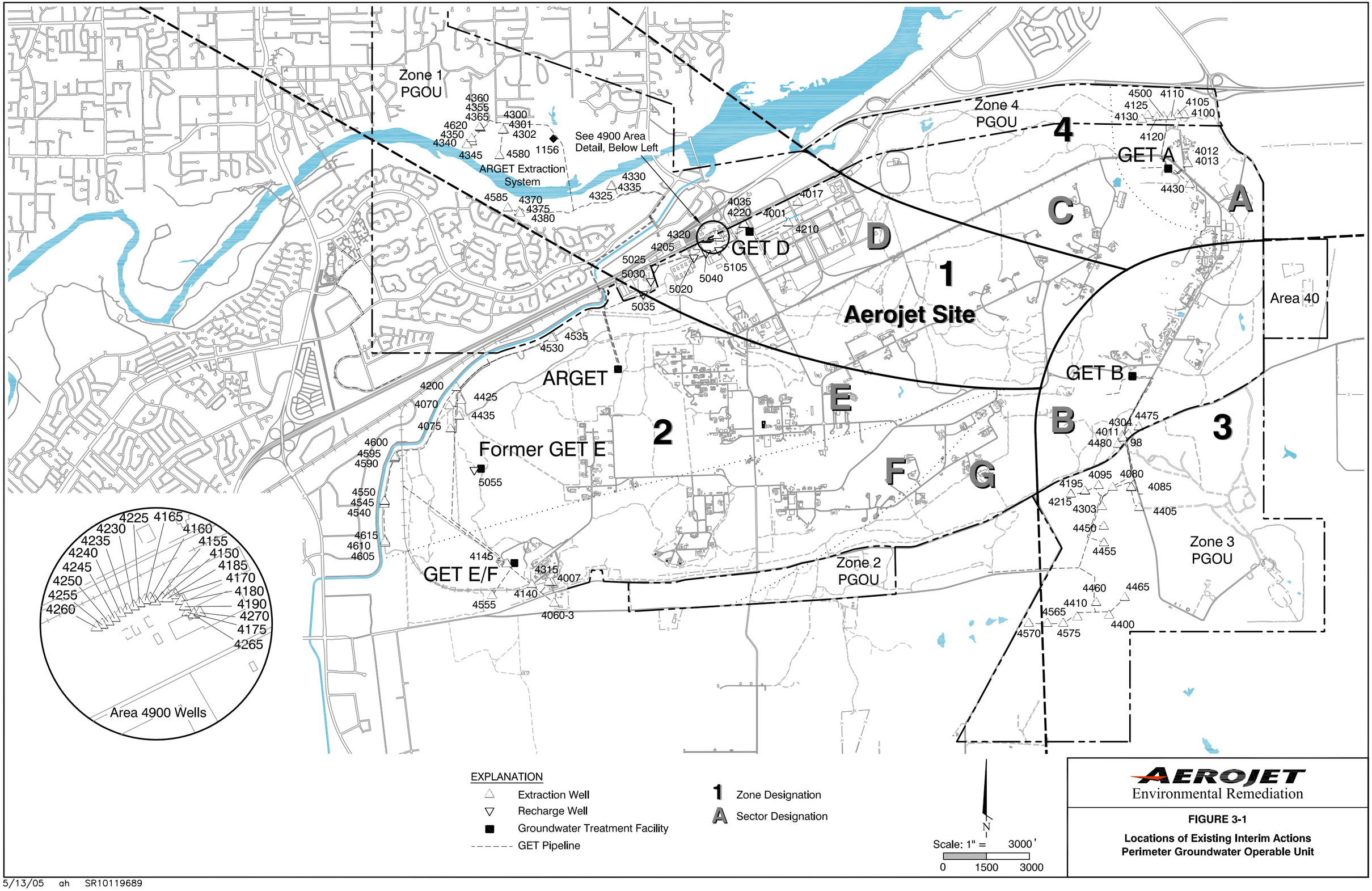
- Potentially effective, implementable, and cost-effective Technology or Process Option.
- Technology and/or Process Option screened out on the basis of effectiveness, implementability, and/or costs.
- Process Option considered innovative.
- Heavy box indicates Representative Technology or Process Option.

AEROJET
Environmental Remediation

FIGURE 2-2

Evaluation of Groundwater Remediation Technologies and Process Options
Sheet 1 of 4

2/9/05 ah SR10119105

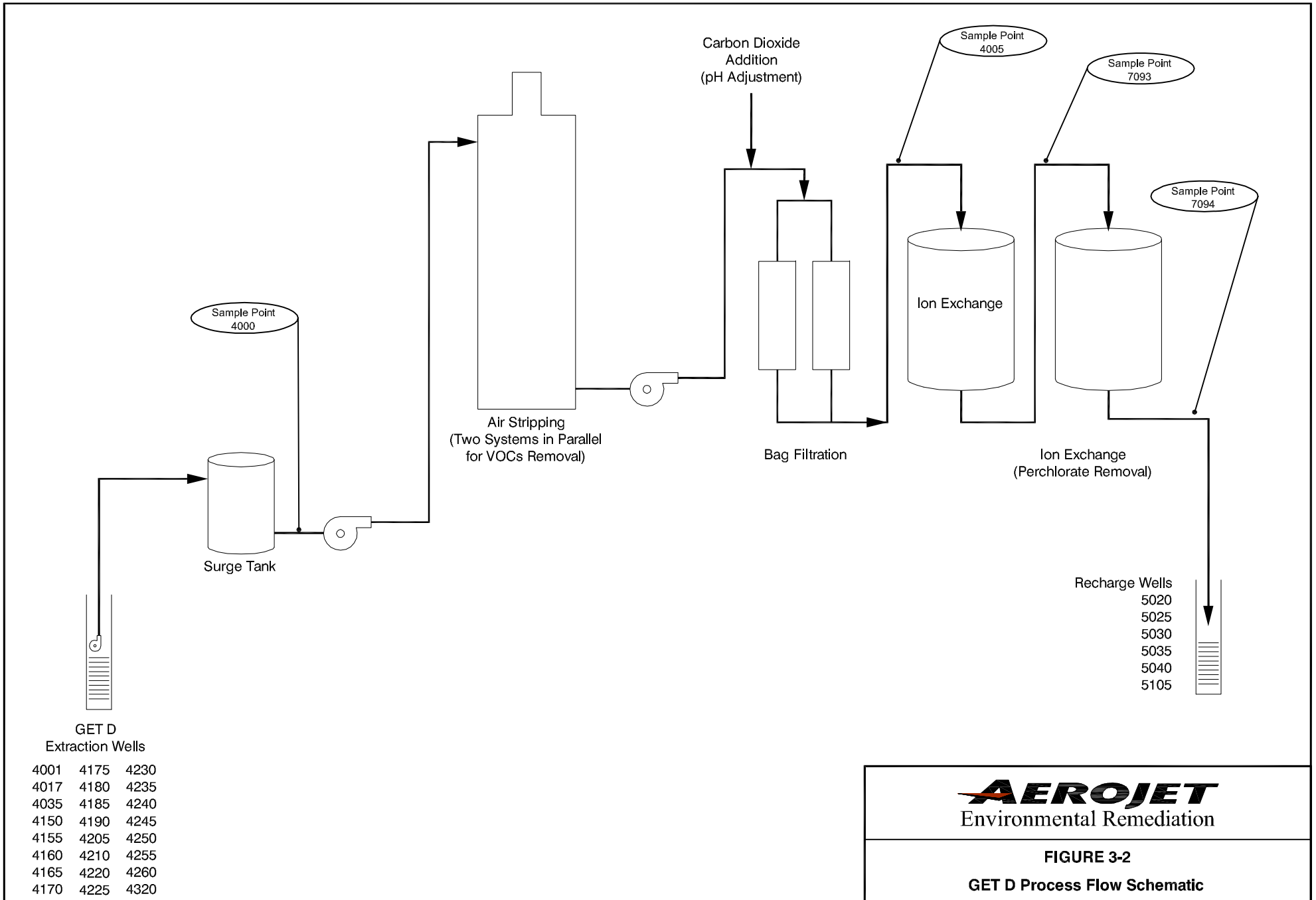


AEROJET
Environmental Remediation

FIGURE 3-1

Locations of Existing Interim Actions
Perimeter Groundwater Operable Unit

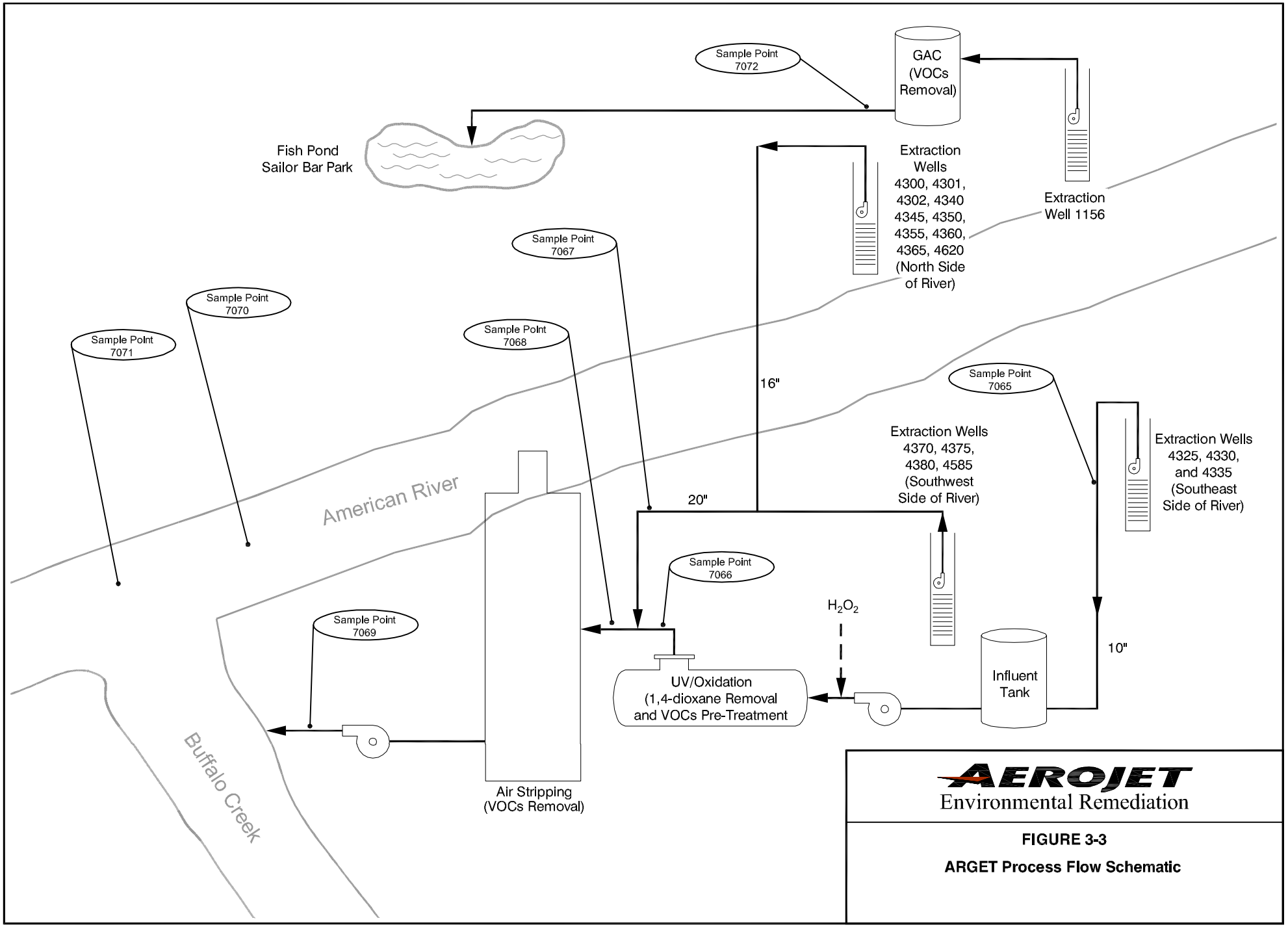
5/13/05 ah SR10119689



AEROJET
Environmental Remediation

FIGURE 3-2

GET D Process Flow Schematic

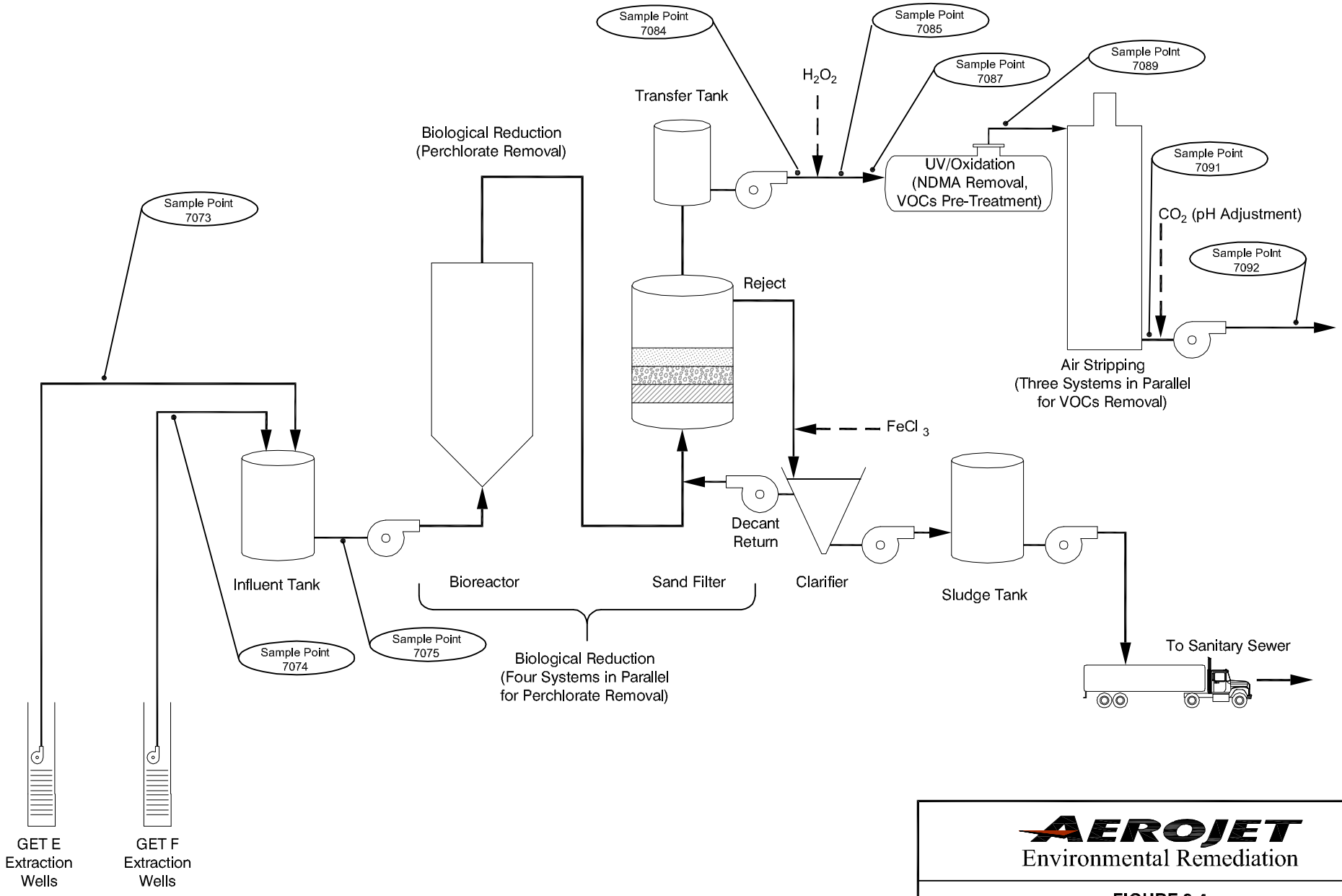


AEROJET
Environmental Remediation

FIGURE 3-3

ARGET Process Flow Schematic

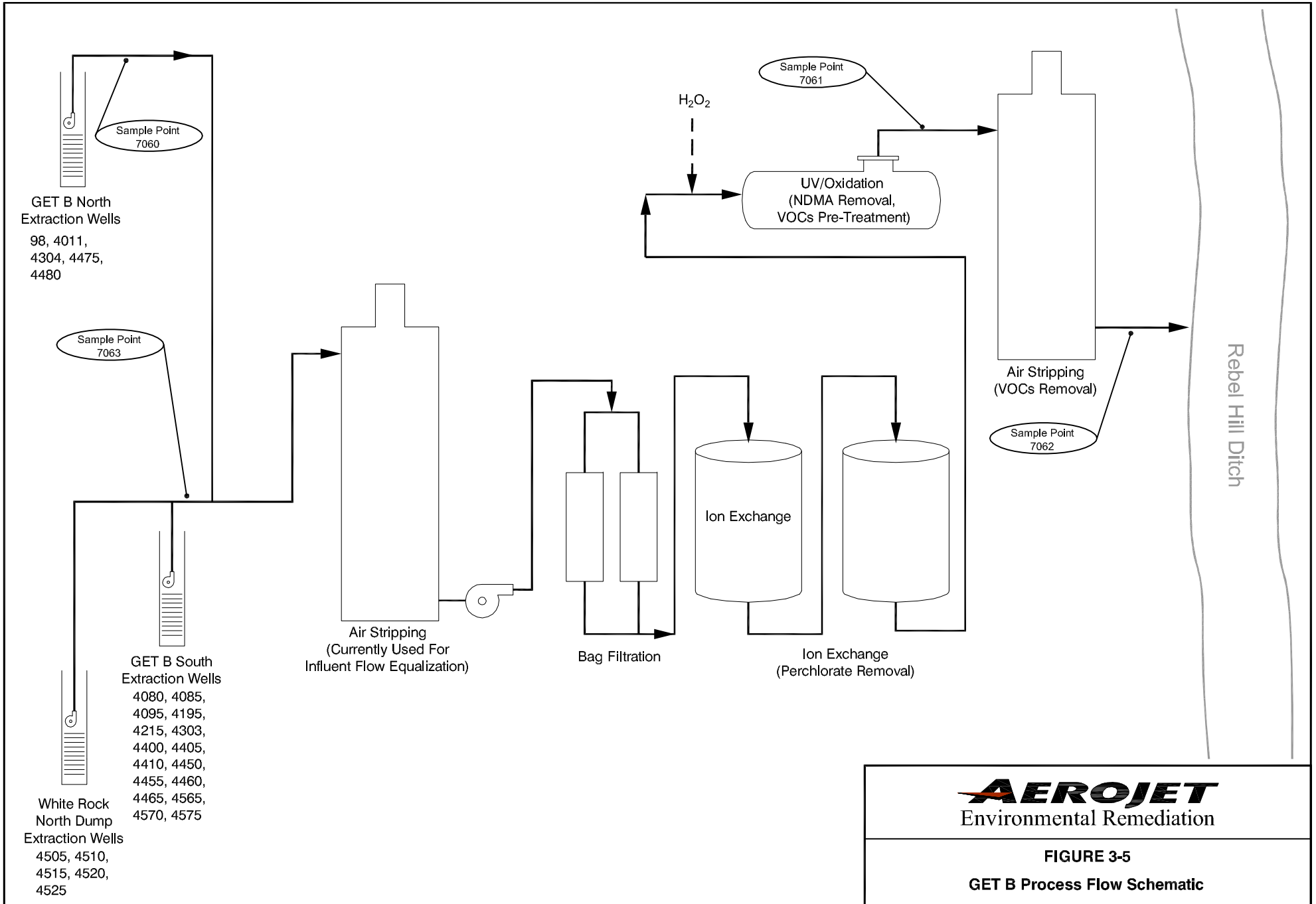
2/9/05 fr/ah SR10119108



AEROJET
Environmental Remediation

FIGURE 3-4

GET E/F Process Flow Schematic

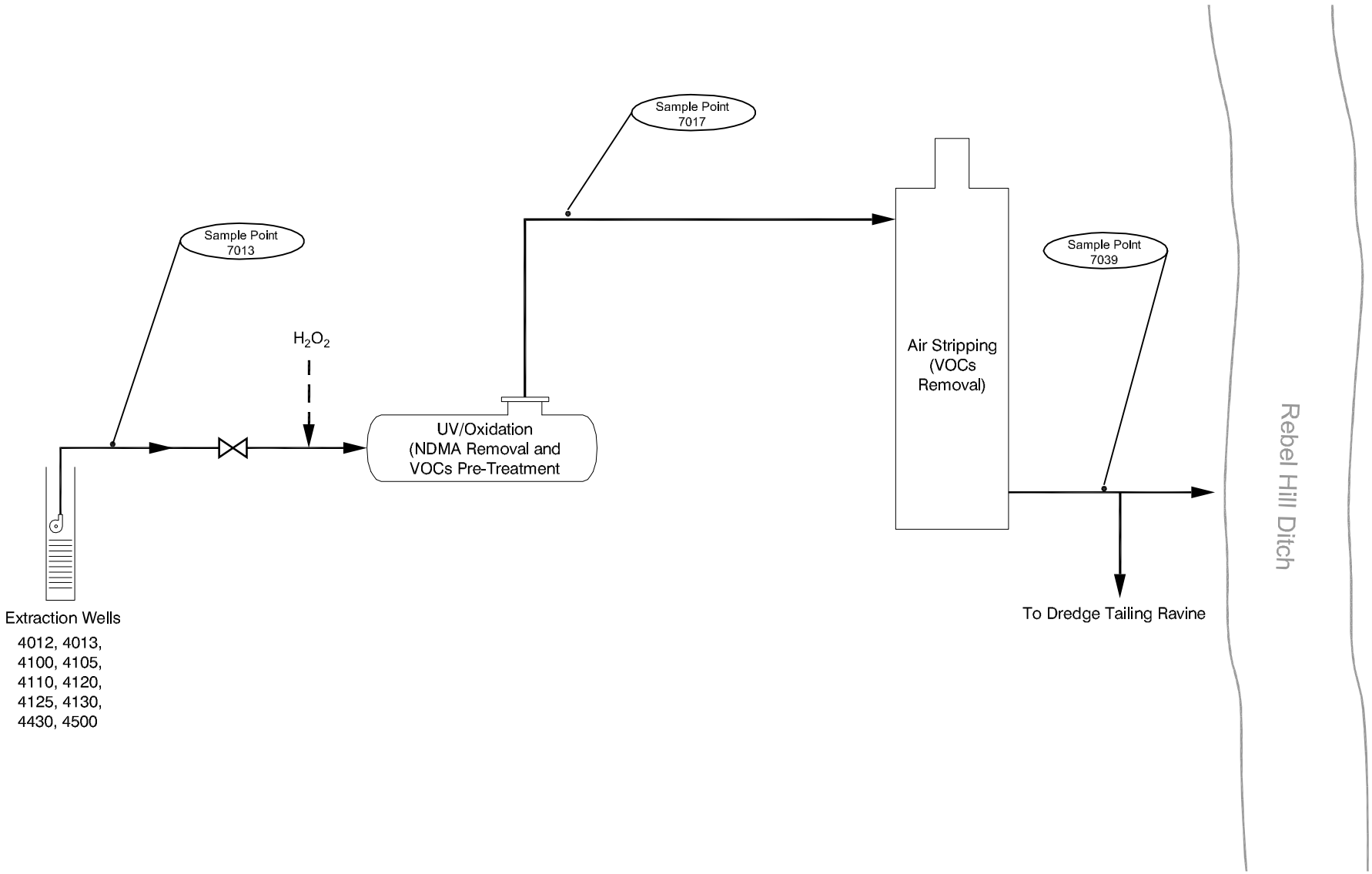


AEROJET
Environmental Remediation

FIGURE 3-5

GET B Process Flow Schematic

2/9/05 fr/ah SR10119110

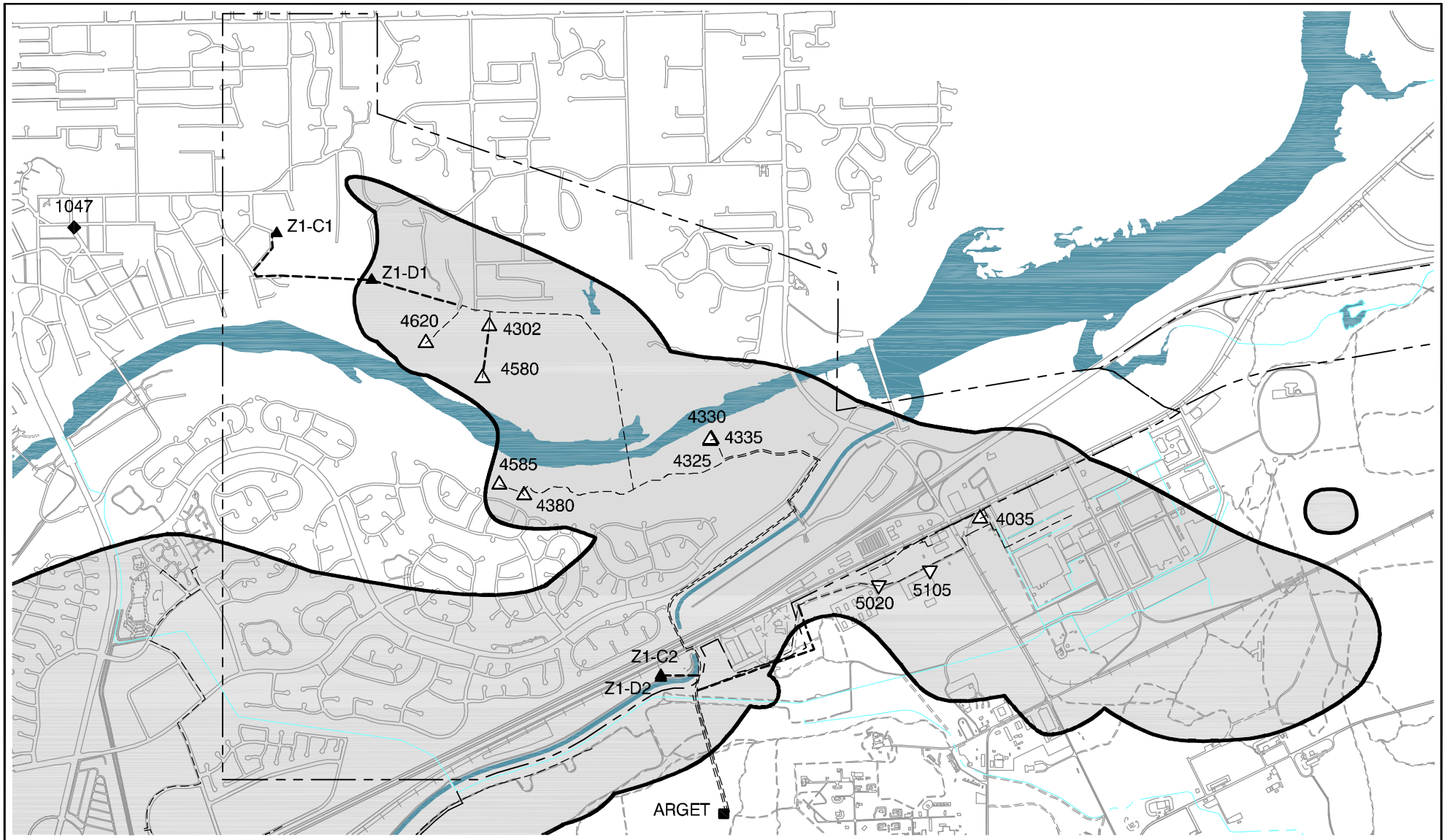


AEROJET
Environmental Remediation

FIGURE 3-6

GET A Process Flow Schematic

2/9/05 fr/ah SR10119111



EXPLANATION

- Existing Extraction Well
- Existing Recharge Well Proposed for Conversion to Extraction Well
- Proposed Extraction Well
- Groundwater Treatment Facility
- Maximum Extents of Chemicals in Zone 1
- PGOU Zone Boundary
- GET Pipeline
- Proposed Pipeline

Based on samples collected between 2000 and 2004

N

Scale: 1" = 2400'

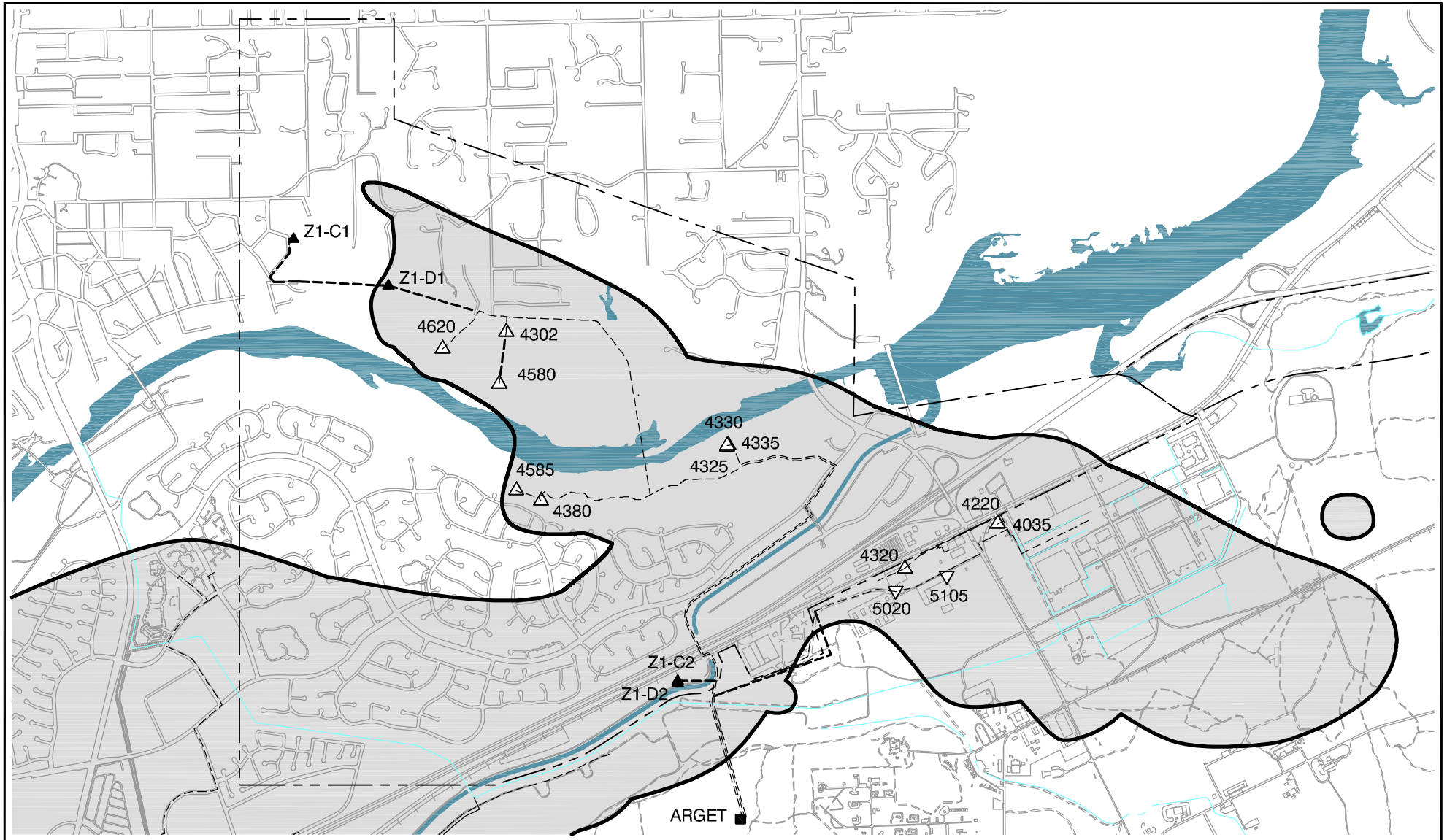
0 1200 2400

AEROJET
Environmental Remediation

FIGURE 4-1

Alternative Z1-2
Contain and Remediate Zone 1 Groundwater

SR10129825 **FIGURE 4-1** 6/15/09 Gram, Bob



EXPLANATION

- △ Existing Extraction Well
- ▽ Existing Recharge Well Proposed for Conversion to Extraction Well
- ▲ Proposed Extraction Well
- ■ Groundwater Treatment Facility
- Maximum Extents of Chemicals in Zone 1
- PGOU Zone Boundary
- GET Pipeline
- Proposed Pipeline

Based on samples collected between 2000 and 2004

N

Scale: 1" = 2400'

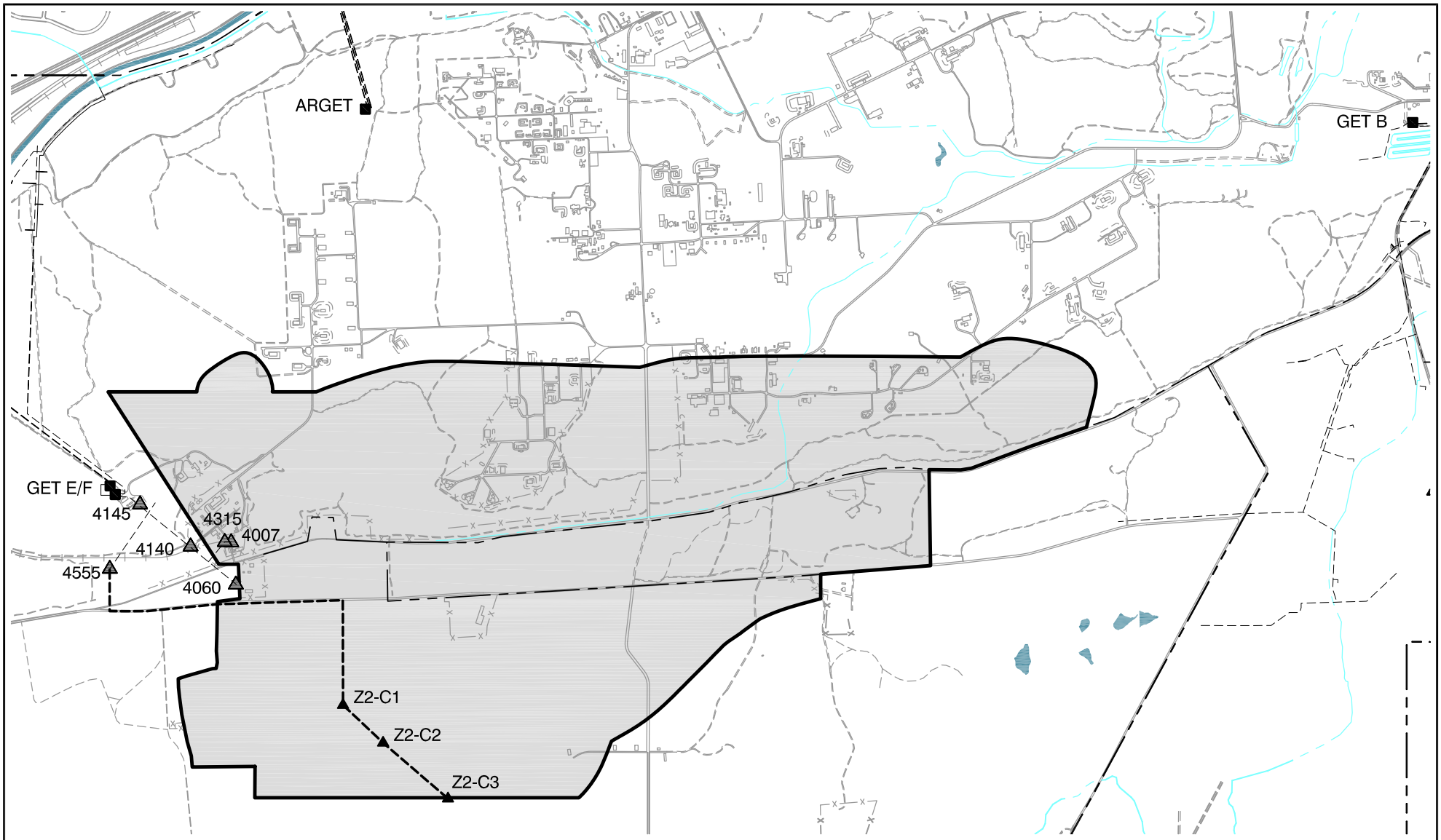
0 1200 2400

AEROJET
Environmental Remediation

FIGURE 4-2

Alternative Z1-3
Contain, Remediate and Remove Additional Mass from Zone 1 Groundwater

SR10129826 **FIGURE 4-2** 6/15/09 Gram, Bob ----

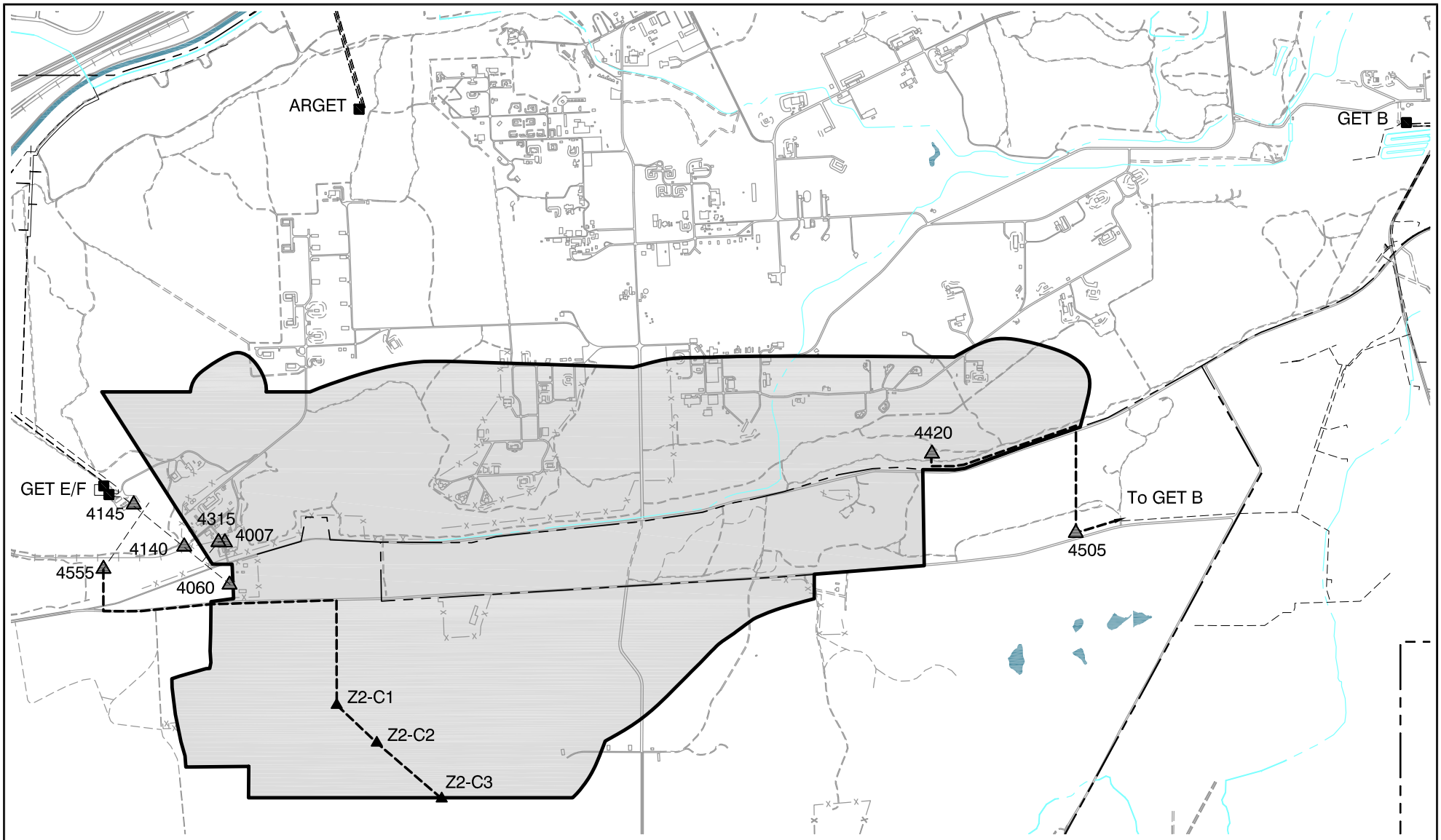


AEROJET
Environmental Remediation

FIGURE 4-3

Alternative Z2-2
Contain and Remediate Zone 2 Groundwater

SR10129827 **FIGURE 4-3** 4/16/09 Herron, Al

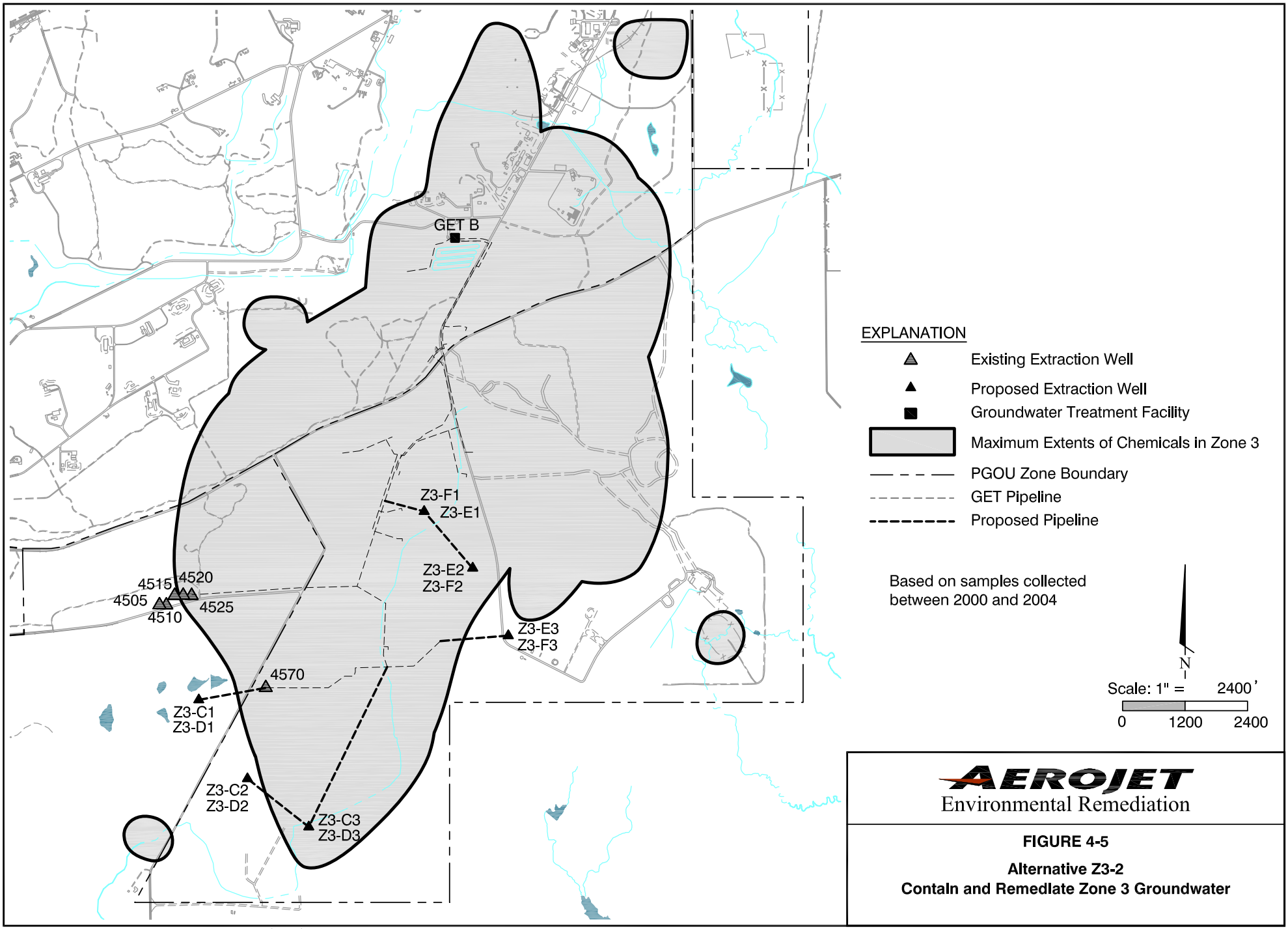


AEROJET
Environmental Remediation

FIGURE 4-4

Alternative Z2-3
Contain, Remediate and Remove Additional Mass from Zone 2 Groundwater

SR10129828 **FIGURE 4-4** 4/16/09 Herron, Al

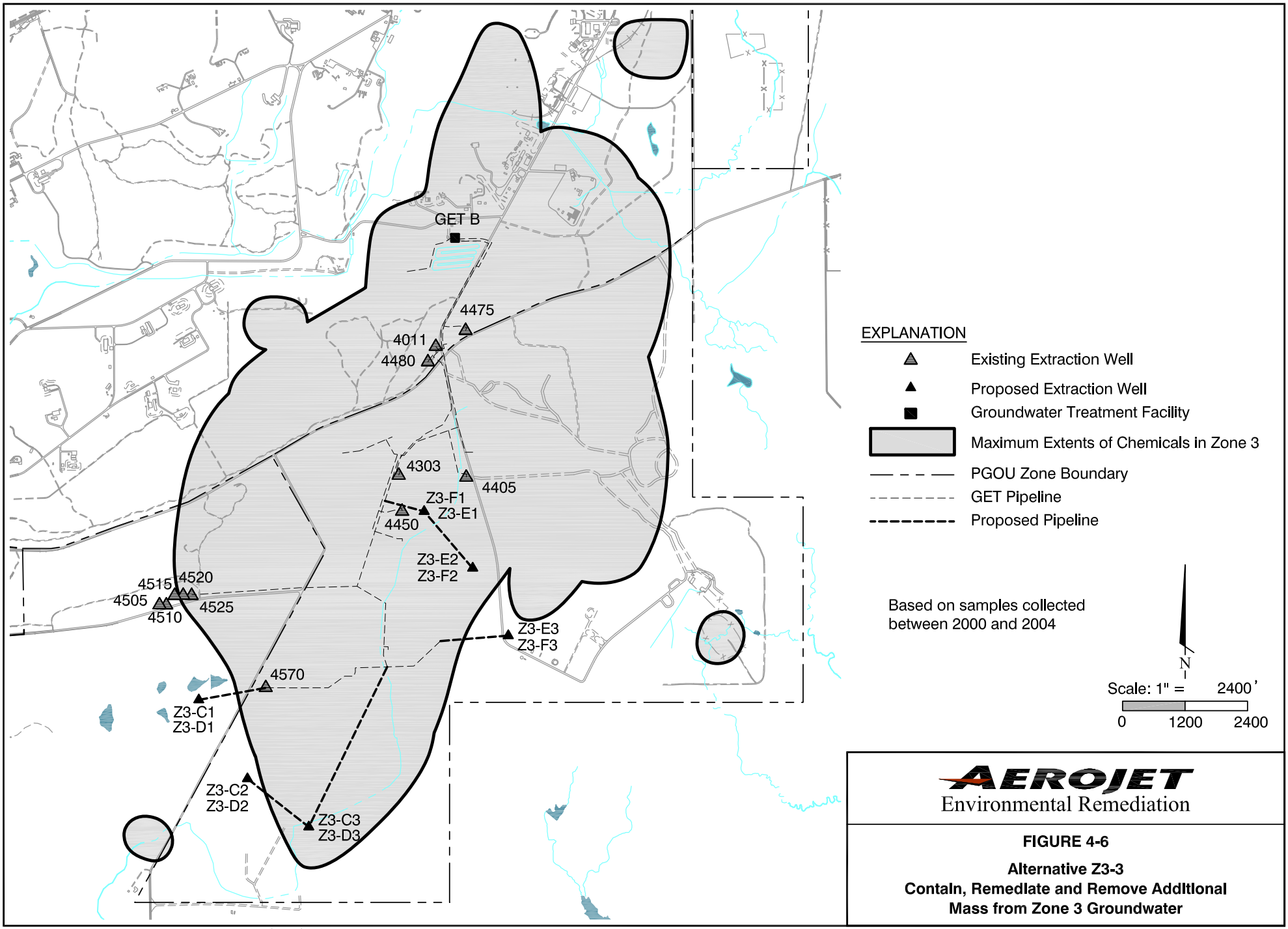


AEROJET
Environmental Remediation

FIGURE 4-5

Alternative Z3-2
Contain and Remediate Zone 3 Groundwater

SR10129829 **FIGURE 4-5** 4/16/09 Herron, Al

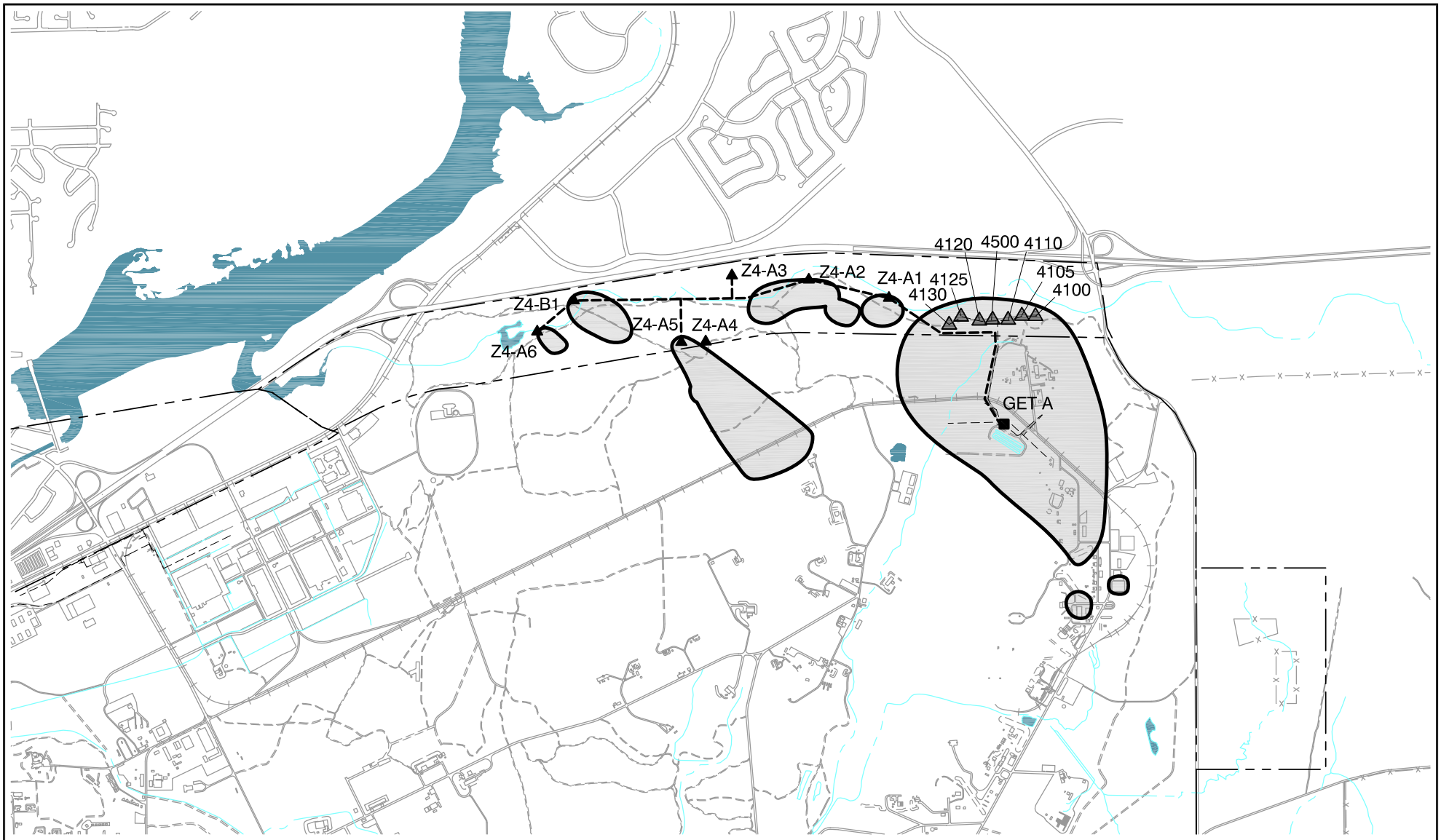


AEROJET
Environmental Remediation

FIGURE 4-6

Alternative Z3-3
Contain, Remediate and Remove Additional Mass from Zone 3 Groundwater

SR10129830 **FIGURE 4-6** 4/16/09 Herron, Al

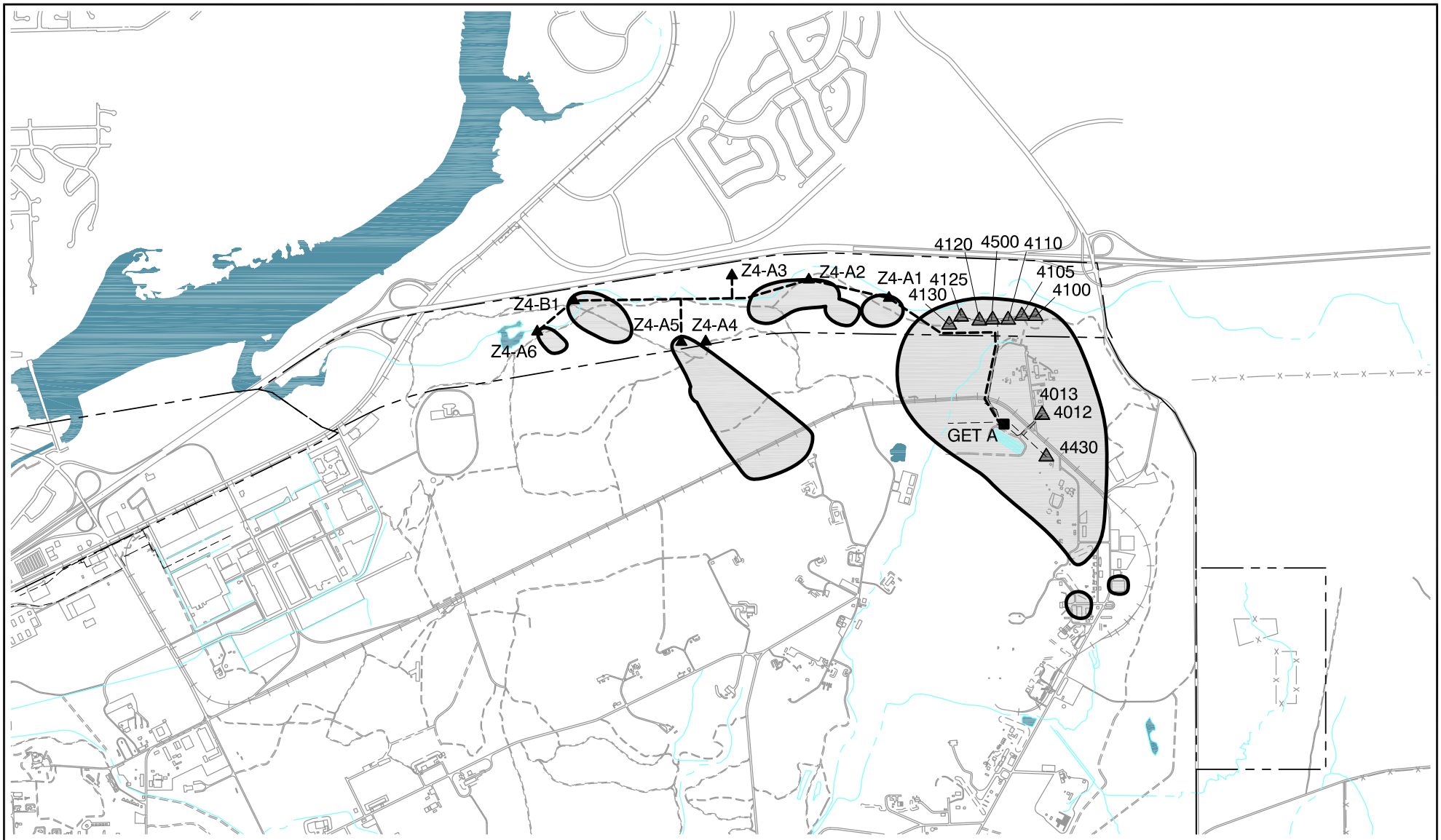


AEROJET
Environmental Remediation

FIGURE 4-7

Alternative Z4-2
Contain and Remediate Zone 4 Groundwater

SR10129831 **FIGURE 4-7** 4/20/09 Herron, Al



EXPLANATION

- Existing Extraction Well
- Proposed Extraction Well
- Groundwater Treatment Facility
- Maximum Extents of Chemicals in Zone 4
- PGOU Zone Boundary
- GET Pipeline
- Proposed Pipeline

Based on samples collected between 2000 and 2004

N

Scale: 1" = 2400'

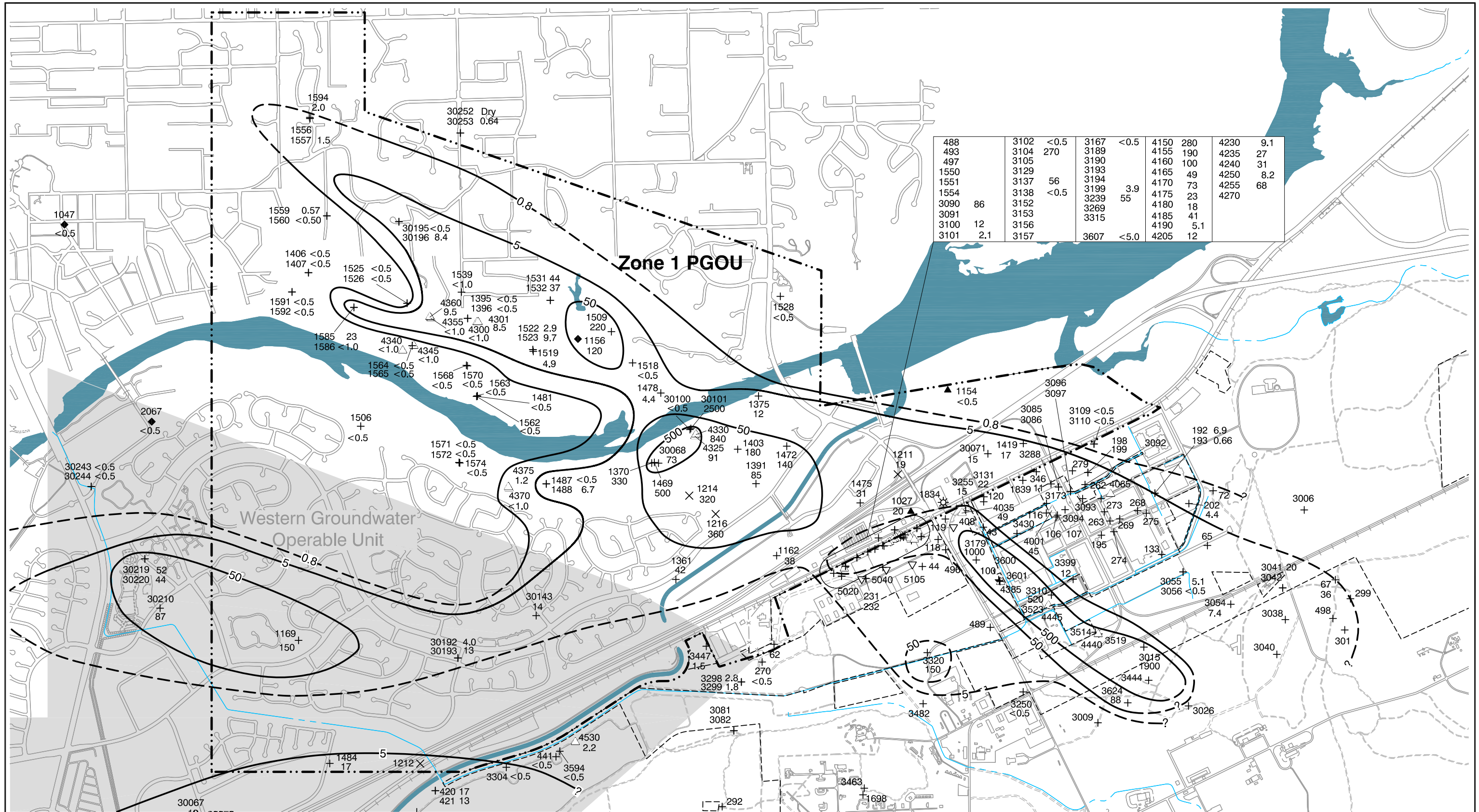
0 1200 2400

AEROJET
Environmental Remediation

FIGURE 4-8

Alternative Z4-3
Contain, Remediate and Remove Additional Mass from Zone 4 Groundwater

SR10129832 **FIGURE 4-8** 4/20/09 Herron, Al



EXPLANATION

KEY TO WELL SYMBOLS

- 103 — Well Identification
- \+ — Well Type and Location
- 54 — Chemical Concentration in µg/l
  If Blank, No Sample During Time Period
  J - Estimated Concentration

WELL TYPES

- \+ Monitor Well
- △ Extraction Well
- ▽ Recharge Well
- ◆ Water Supply Well
- × State-Owned Well

- 5 — Chemical Concentration Contour (µg/l)
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit

N

Scale: 1" = 1600'

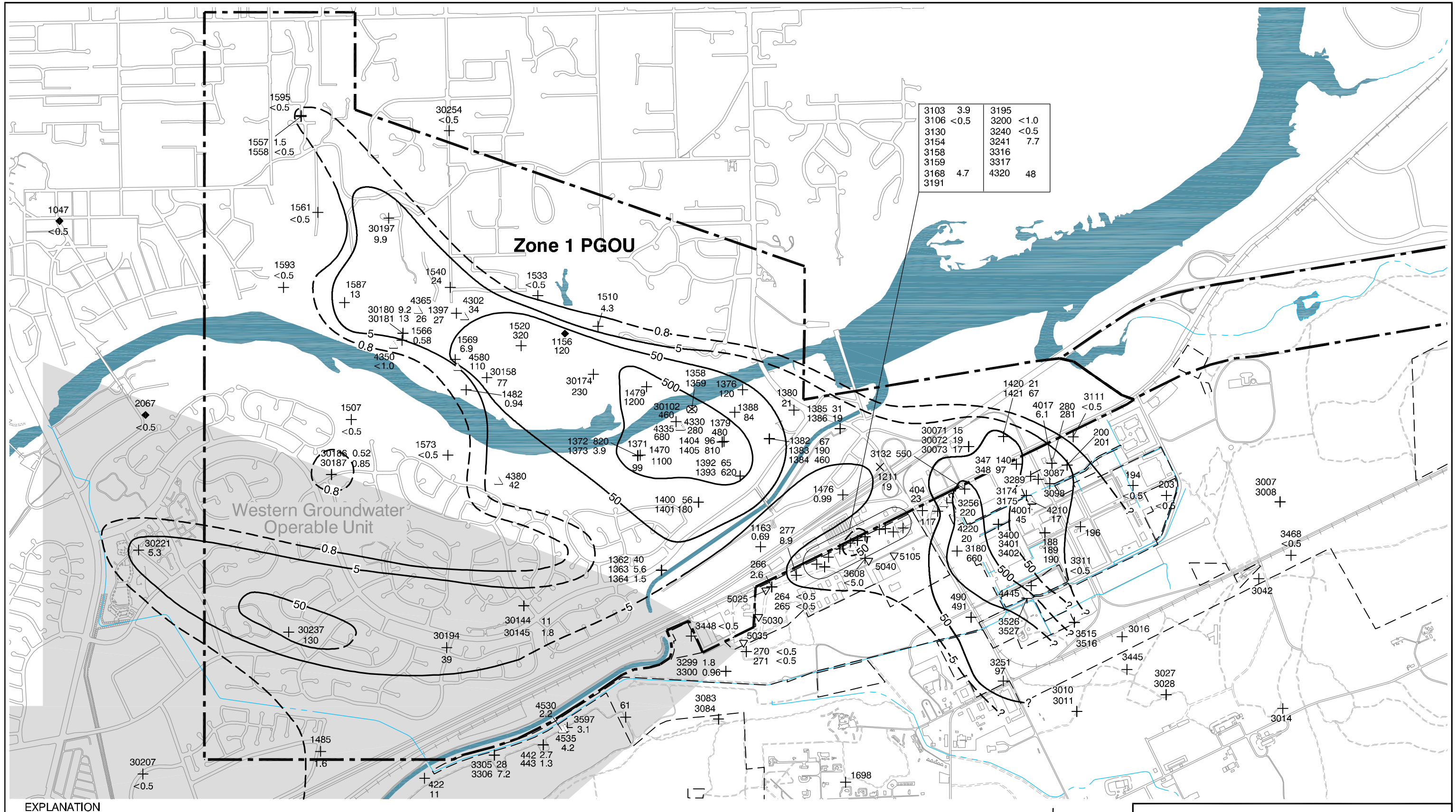
0 800 1600

AEROJET
Environmental Remediation

FIGURE 7-1

Layer C
TCE Iso-Concentration Contours 2000 - 2004
Zone 1 PGOU

1/31/05 ah SR10118962



EXPLANATION

KEY TO WELL SYMBOLS

103 — Well Identification

\+ — Well Type and Location

54 — Chemical Concentration in µg/l
If Blank, No Sample During Time Period
J - Estimated Concentration

WELL TYPES

\+ Monitor Well
Extraction Well
Recharge Well
Water Supply Well
Domestic Well
State-Owned Well
Destroyed Well

5 Chemical Concentration Contour (µg/l)

Consent Decree Boundary

Perimeter Groundwater Operable Unit

N

Scale: 1" = 1600'

0 800 1600

AEROJET
Environmental Remediation

FIGURE 7-2

Layer D
TCE Iso-Concentration Contours, 2000 -2004
Zone 1 PGOU

2/9/05 ah SR10118963

Zone 1 PGOU

Western Groundwater Operable Unit

EXPLANATION

KEY TO WELL SYMBOLS

103 — Well Identification

\+ — Well Type and Location

54 — Chemical Concentration in µg/l
If Blank, No Sample During Time Period
J - Estimated Concentration

WELL TYPES

\+ Monitor Well

Extraction Well

Recharge Well

◆ Water Supply Well

5 — Chemical isoconcentration contour in µg/L, dashed where inferred, queried where uncertain.

Consent Decree Boundary

Perimeter Groundwater Operable Unit

N

Scale: 1" = 1600'

0 800 1600

AEROJET
Environmental Remediation

FIGURE 7-3

Layer E
TCE Iso-Concentration Contours 2000-2004
Zone 1 PGOU

1/31/05 ah SR10118964

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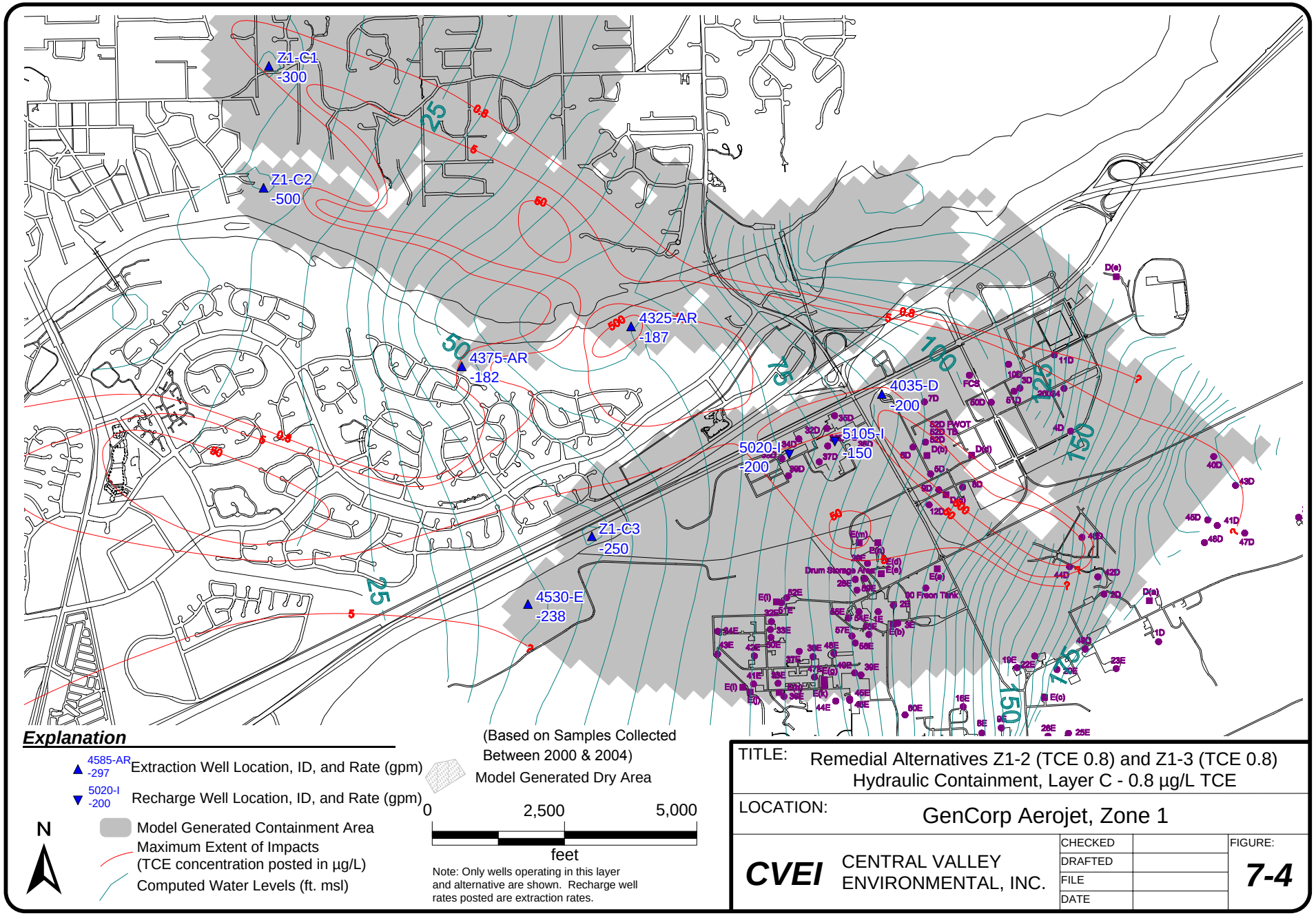

Explanation

- ▲ 4585-AR -297 — Extraction Well Location, ID, and Rate (gpm)
- ▼ 5020-I -200 — Recharge Well Location, ID, and Rate (gpm)
- Model Generated Containment Area
- Maximum Extent of Impacts (TCE concentration posted in µg/L)
- Computed Water Levels (ft. msl)
- (Based on Samples Collected Between 2000 & 2004) Model Generated Dry Area

N

0 2,500 5,000
feet

Note: Only wells operating in this layer and alternative are shown. Recharge well rates posted are extraction rates.

TITLE:	Remedial Alternatives Z1-2 (TCE 0.8) and Z1-3 (TCE 0.8) Hydraulic Containment, Layer C - 0.8 µg/L TCE
LOCATION:	GenCorp Aerojet, Zone 1

CVEI CENTRAL VALLEY ENVIRONMENTAL, INC.

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DATE		

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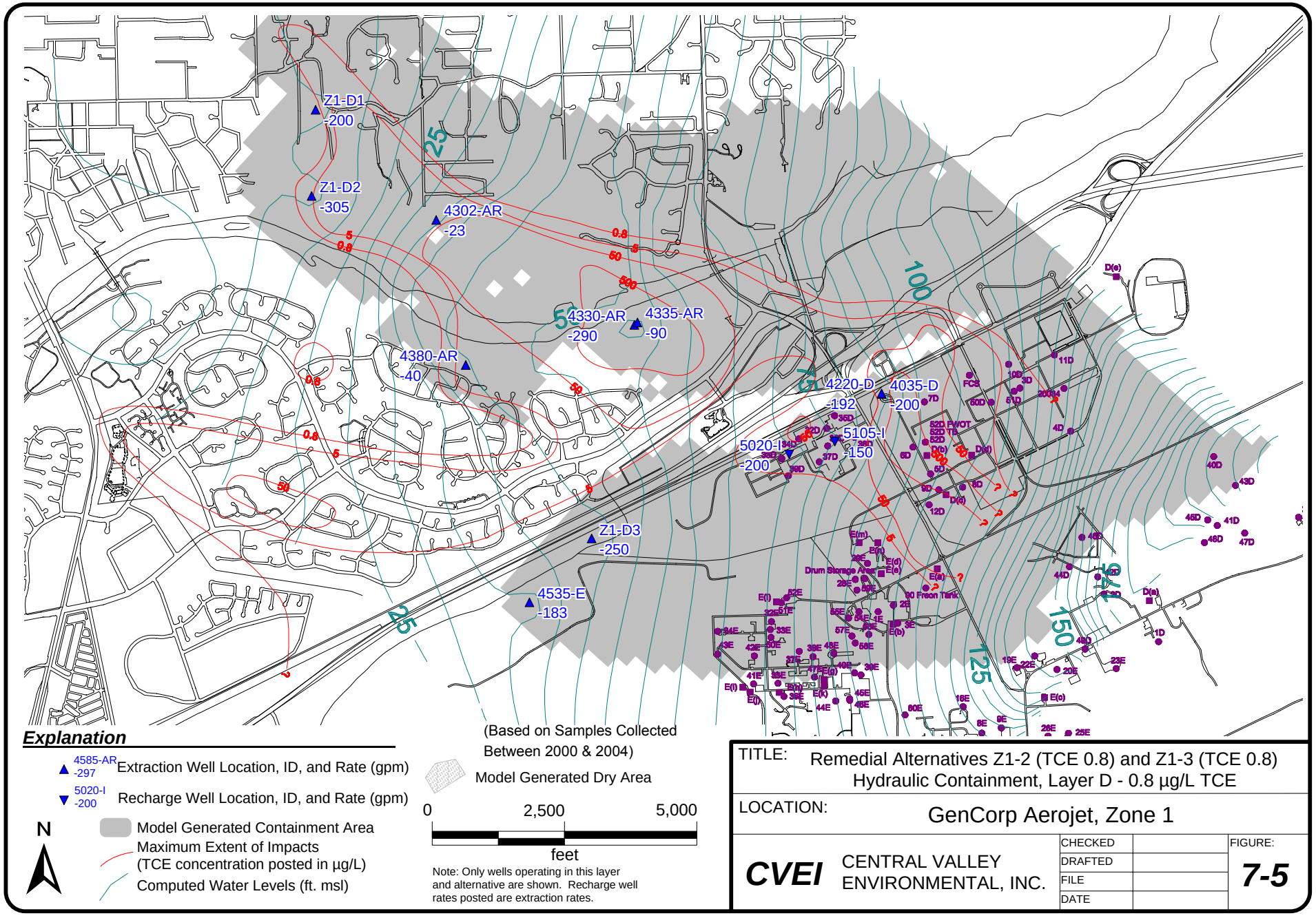

Explanation

- ▲ 4585-AR -297 — Extraction Well Location, ID, and Rate (gpm)
- ▼ 5020-I -200 — Recharge Well Location, ID, and Rate (gpm)
- Model Generated Containment Area
- Maximum Extent of Impacts (TCE concentration posted in µg/L)
- Computed Water Levels (ft. msl)

(Based on Samples Collected Between 2000 & 2004)

Model Generated Dry Area

N

0 2,500 5,000

feet

Note: Only wells operating in this layer and alternative are shown. Recharge well rates posted are extraction rates.

TITLE: Remedial Alternatives Z1-2 (TCE 0.8) and Z1-3 (TCE 0.8) Hydraulic Containment, Layer D - 0.8 µg/L TCE

LOCATION: GenCorp Aerojet, Zone 1

CVEI CENTRAL VALLEY ENVIRONMENTAL, INC.

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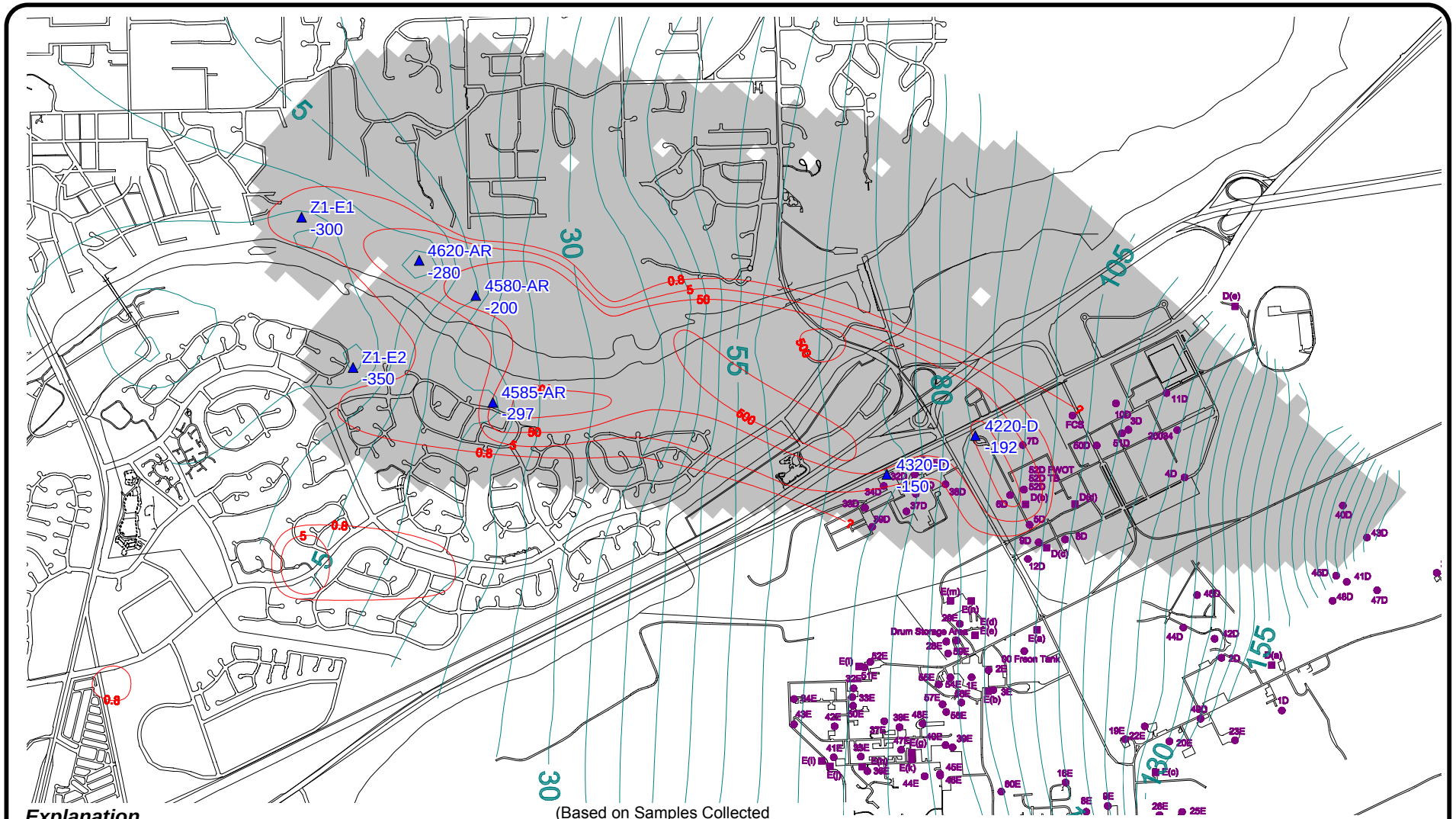
DATE		

C:\AEROJET\ZONE 1\GIS\Alt1-3b.WOR



Explanation

- ▲ 4585-AR -297 — Extraction Well Location, ID, and Rate (gpm)
- ▼ 5020-I -200 — Recharge Well Location, ID, and Rate (gpm)
- Model Generated Containment Area
- Maximum Extent of Impacts (TCE concentration posted in µg/L)
- Computed Water Levels (ft. msl)
- Model Generated Dry Area (Based on Samples Collected Between 2000 & 2004)

N

0 2,500 5,000 feet

Note: Only wells operating in this layer and alternative are shown. Recharge well rates posted are extraction rates.

TITLE:	Remedial Alternatives Z1-2 (TCE 0.8) and Z1-3 (TCE 0.8) Hydraulic Containment, Layer E - 0.8 µg/L TCE
LOCATION:	GenCorp Aerojet, Zone 1

CVEI CENTRAL VALLEY ENVIRONMENTAL, INC.

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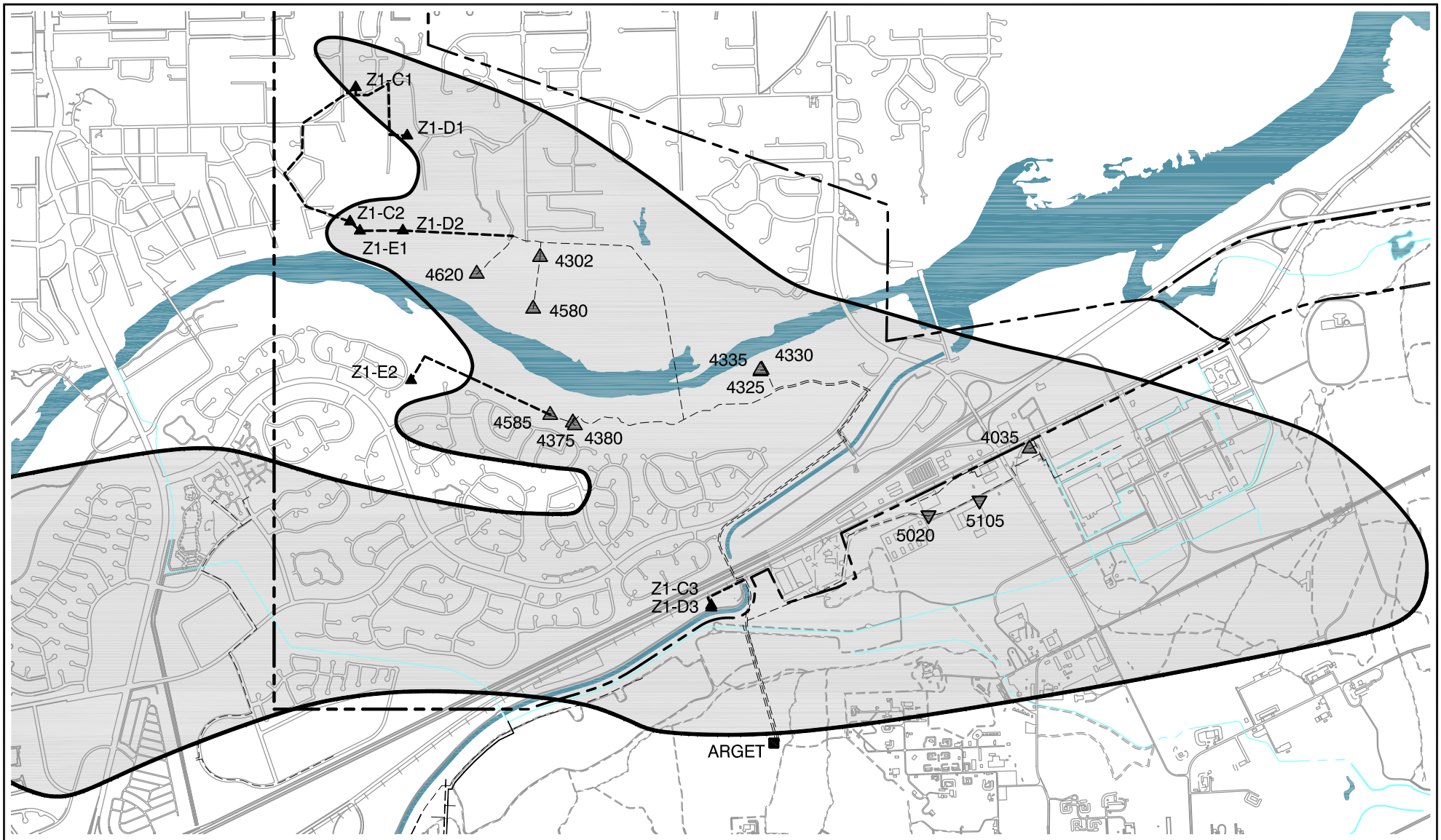
DRAFTED		**7-6**
FILE		
DATE		



EXPLANATION

- Existing Extraction Well
- Proposed Extraction Well
- Groundwater Treatment Facility
- Maximum Extents of Chemicals in Zone 1
- PGOU Zone Boundary
- GET Pipeline
- Proposed Pipeline

Based on samples collected between 2000 and 2004

N

Scale: 1" = 2400'

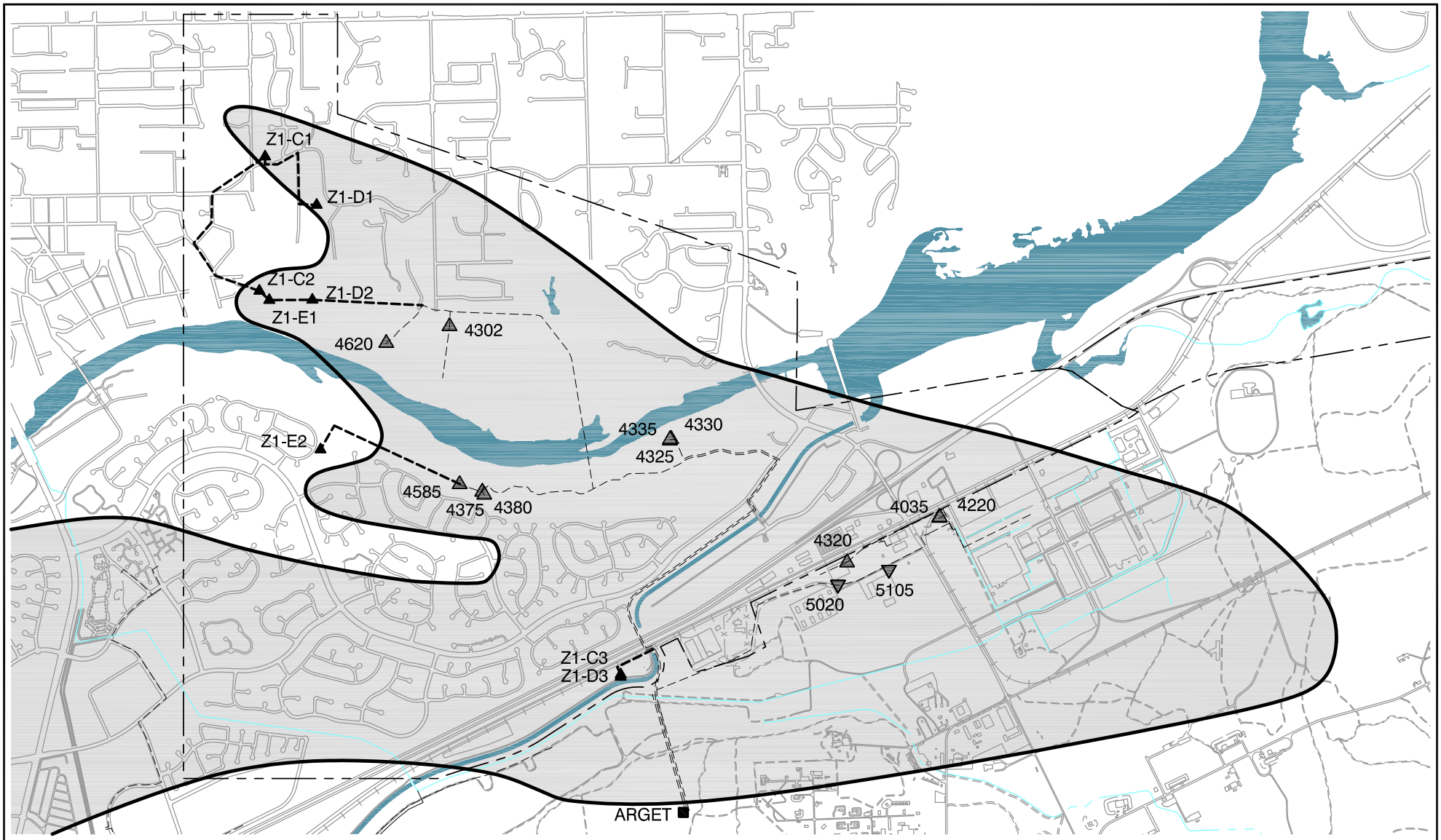
0 1200 2400

AEROJET
Environmental Remediation

FIGURE 7-7

Alternative Z1-2 (TCE 0.8)
Contain and Remediate Zone 1 Groundwater

SR10129833 **FIGURE 7-7** 4/20/09 Herron, Al

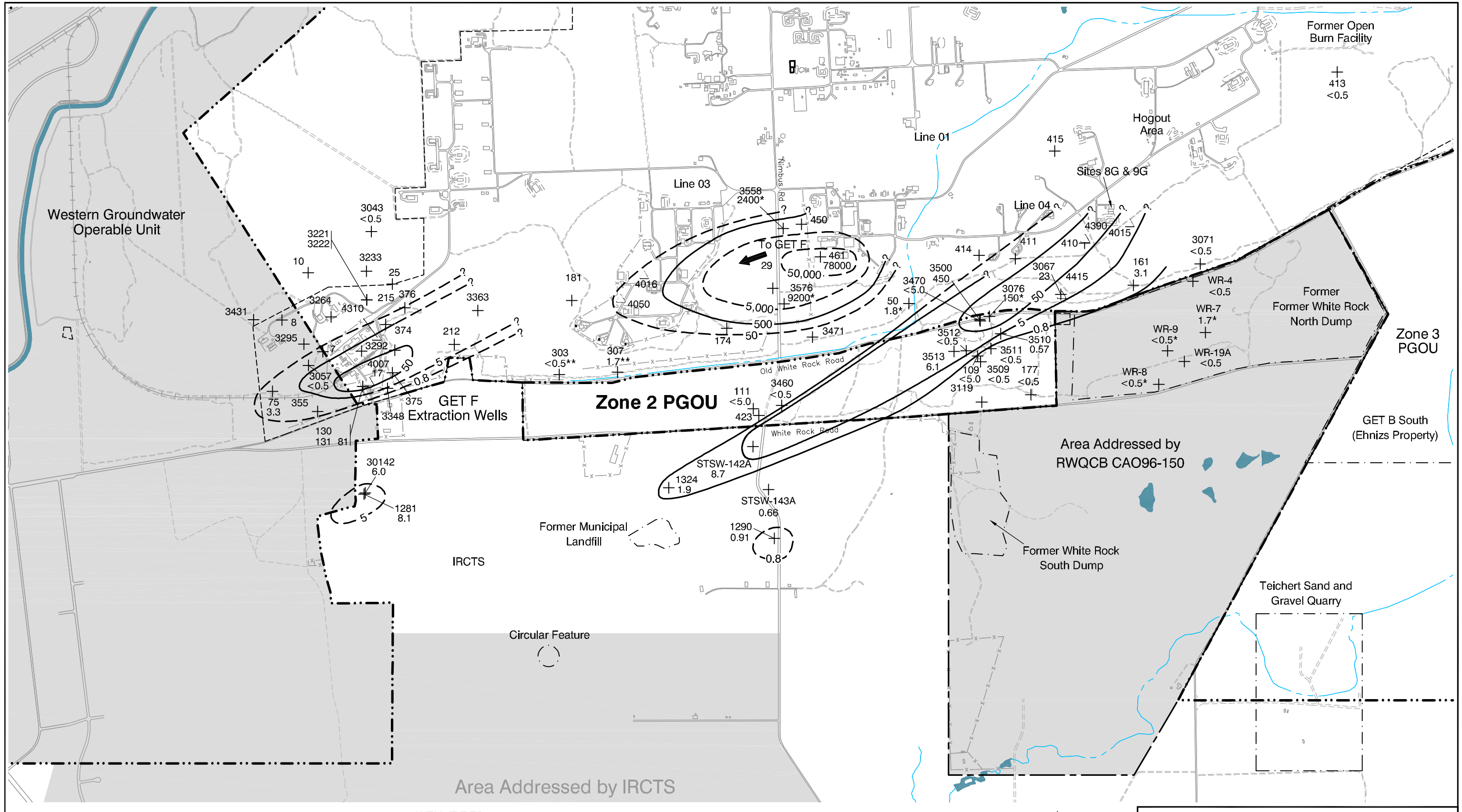


AEROJET
Environmental Remediation

FIGURE 7-8

Alternative Z1-3 (TCE 0.8) Contain and Remove Additional Mass from Zone 1 Groundwater

SR10129800 **FIGURE 7-8** 4/14/09 Herron, Al



EXPLANATION

KEY TO WELL SYMBOLS

Well Identification — 161 260 — TCE Concentration in Groundwater, µg/L
No Value = Not Sampled
Well Type and Location

Asterisk (*) Indicates Data Collected Prior to Sampling Period
Double Asterisk (**) Indicates Data Collected After RI Sampling Period

WELL TYPES

- Monitor Well
- Extraction Well
- State-owned Well
- Water Supply Well
- Domestic Well
- Destroyed Well

- 5 — Iso-concentration Contour in µg/L
- Consent Decree Boundary
- Groundwater Operable Unit Boundary
- Areas Addressed by Other Agreements

N

Scale: 1" = 1600'

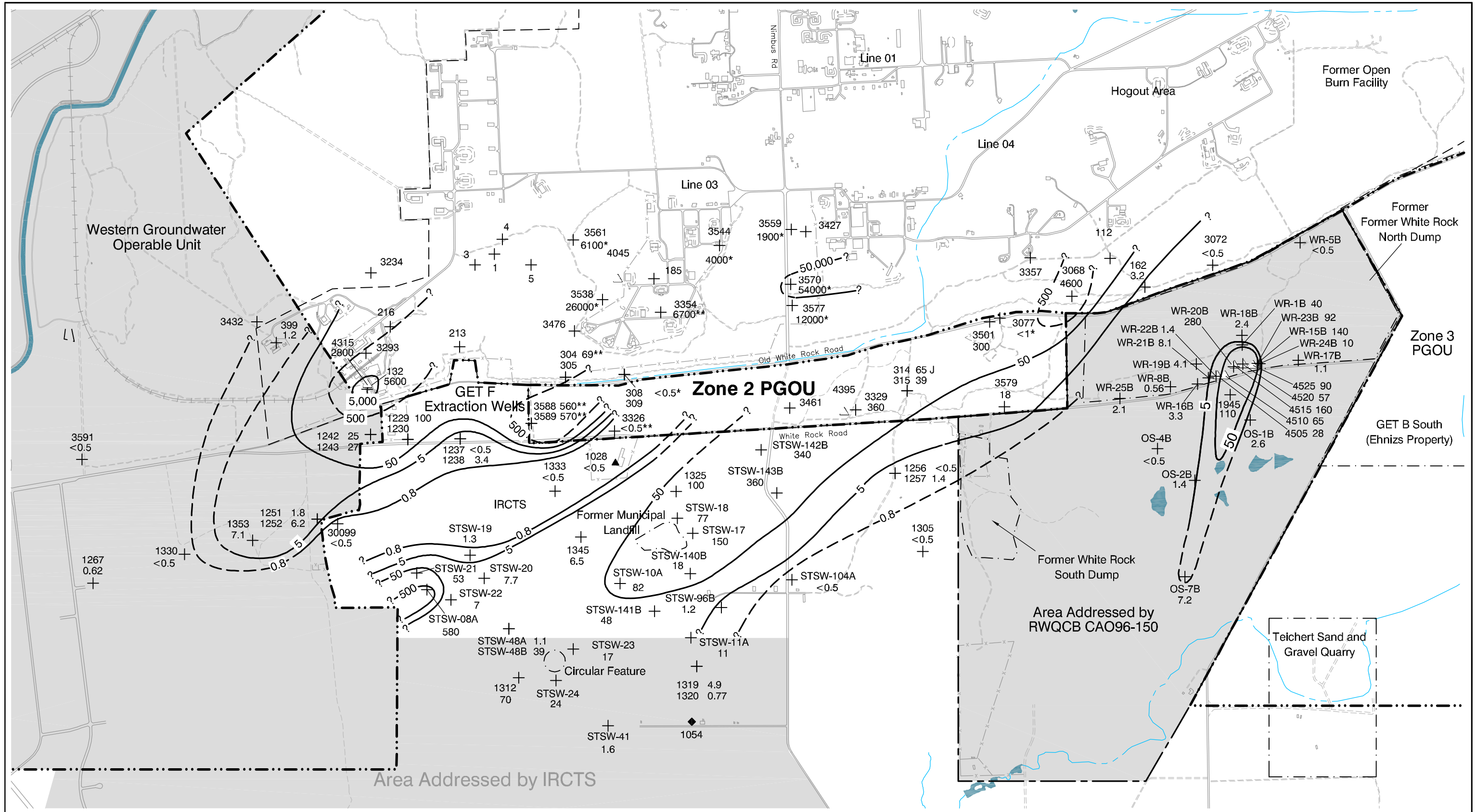
0 800 1600

AEROJET
Environmental Remediation

FIGURE 7-9

Layer A
TCE Iso-Concentration Contours, 2000 - 2004
Zone 2 PGOU

2/9/05 ah SR10118965



EXPLANATION

KEY TO WELL SYMBOLS

Well Identification —— 161 260 —— TCE Concentration in Groundwater, µg/L
No Value = Not Sampled
Well Type and Location

Asterisk (*) Indicates Data Collected Prior to Sampling Period
Double Asterisk (**) Indicates Data Collected After RI Sampling Period

WELL TYPES

- Monitor Well
- Extraction Well
- State-owned Well
- Water Supply Well
- Domestic Well
- Destroyed Well

- 5 — Chemical Concentration Contour (µg/L), Dashed Where Inferred
- Consent Decree Boundary
- Perimeter Groundwater Operable Unit
- Areas Addressed by Other Agreements

N

Scale: 1" = 1600'

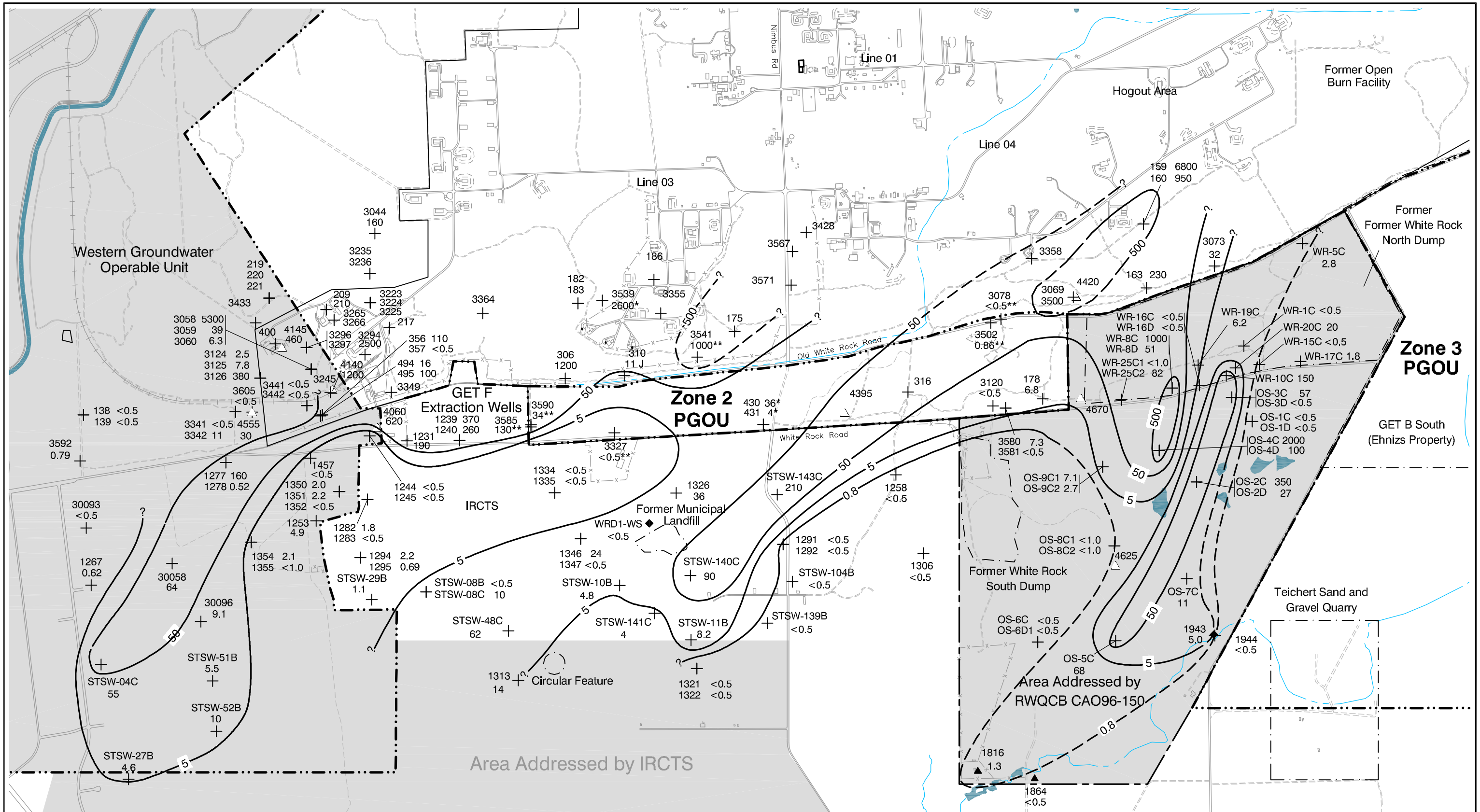
0 800 1600

AEROJET
Environmental Remediation

FIGURE 7-10

Layer B
TCE Iso-Concentration Contours 2000-2004
Zone 2 PGOU

2/9/05 ah SR10118966



EXPLANATION

KEY TO WELL SYMBOLS

Well Identification —— 161 260 —— TCE Concentration in Groundwater, µg/L
No Value = Not Sampled
Well Type and Location

Asterisk (*) Indicates Data Collected Prior to Sampling Period
Double Asterisk (**) Indicates Data Collected After RI Sampling Period

WELL TYPES

- Monitor Well
- Extraction Well
- State-owned Well
- Water Supply Well
- Domestic Well
- Destroyed Well

—5— Chemical Concentration Contour (µg/L), Dashed Where Inferred
Consent Decree Boundary
Perimeter Groundwater Operable Unit
Areas Addressed by Other Agreements

N

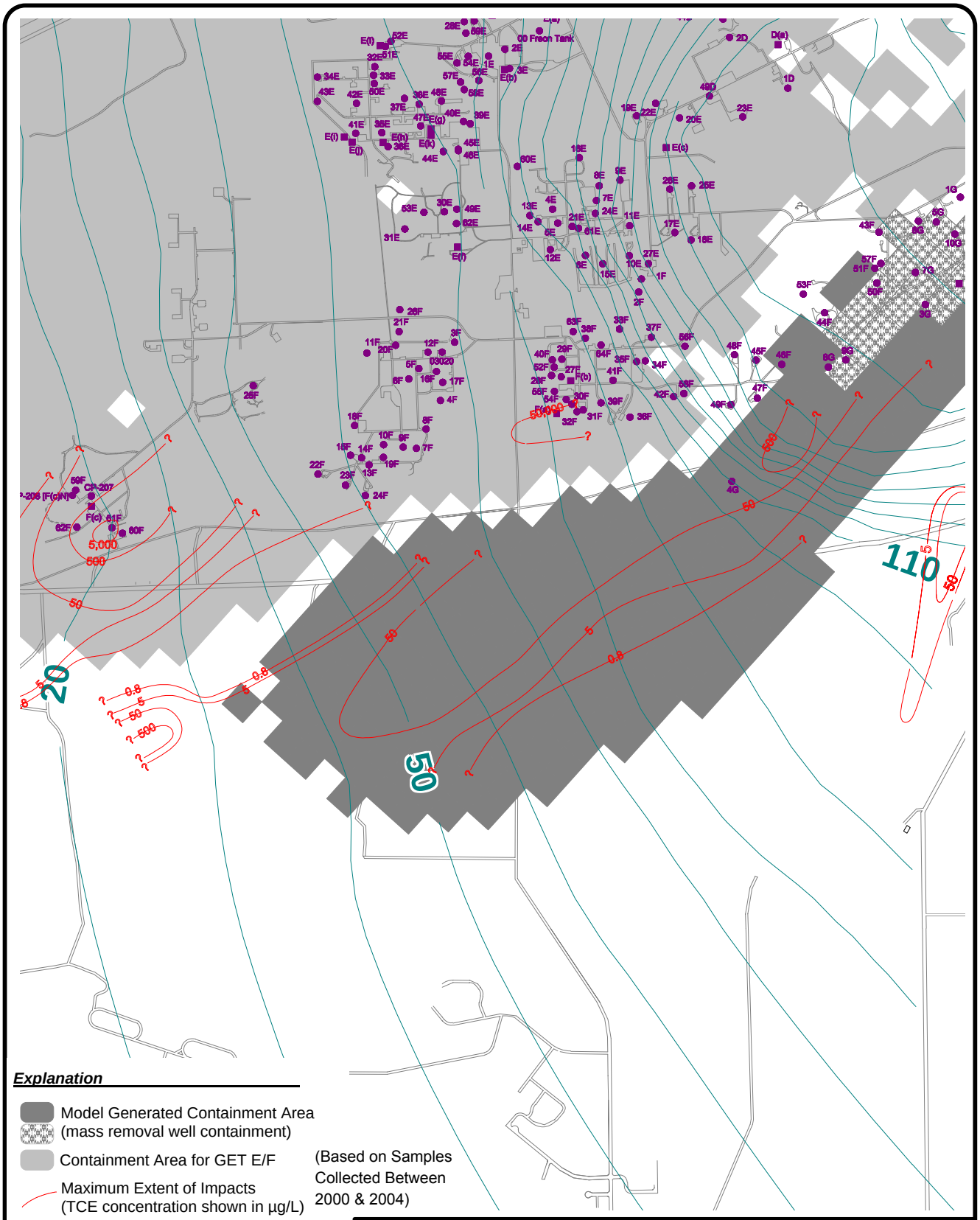
Scale: 1" = 1600'
0 800 1600

AEROJET
Environmental Remediation

FIGURE 7-11

Layer C
TCE Iso-Concentration Contours 2000-2004
Zone 2 PGOU

2/9/05 ah SR10118967



Explanation

- Model Generated Containment Area (mass removal well containment)
- Containment Area for GET E/F
- Maximum Extent of Impacts (TCE concentration shown in µg/L)
- Computed Water Levels (ft. msl)

Note: Containment in Layer B is due to downward migration to Layer C extraction wells.

(Based on Samples Collected Between 2000 & 2004)

N

0 2,500 5,000

feet

TITLE: Remedial Alternatives Z2-2 (TCE 0.8) and Z2-3 (TCE 0.8) Hydraulic Containment, Layer B - 0.8 µg/L TCE

LOCATION: GenCorp Aerojet, Zone 2

CVEI CENTRAL VALLEY ENVIRONMENTAL, INC.

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DATE	

FIGURE: **7-12**

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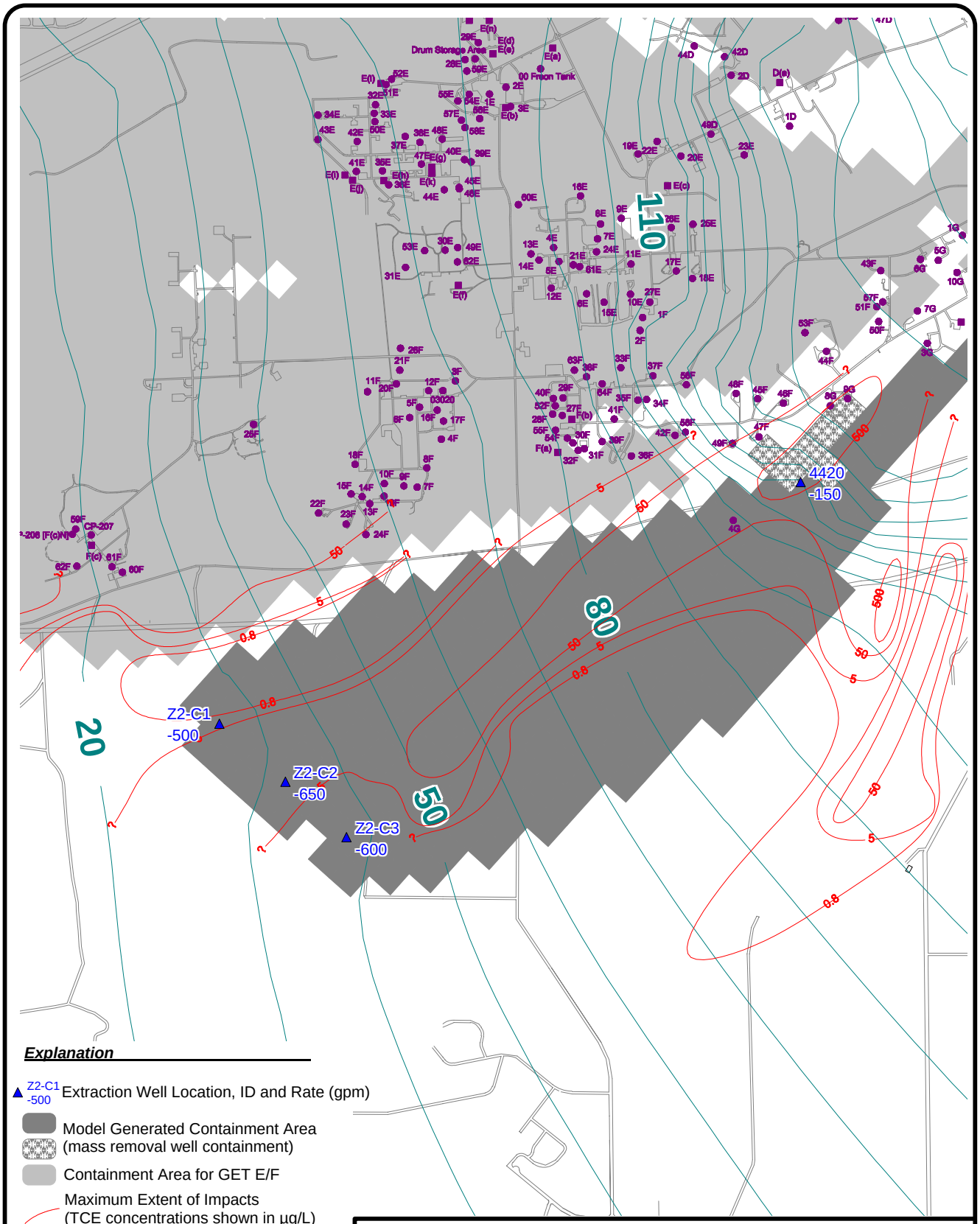


Explanation

- Z2-C1 -500 — Extraction Well Location, ID and Rate (gpm)
- Model Generated Containment Area (mass removal well containment)
- Containment Area for GET E/F
- Maximum Extent of Impacts (TCE concentrations shown in µg/L)
- Computed Water Levels (ft. msl) (Based on Samples Collected Between 2000 & 2004)

N

0 — 2,500 — 5,000 feet

TITLE: Remedial Alternatives Z2-2 (TCE 0.8) and Z2-3 (TCE 0.8) Hydraulic Containment, Layer C - 0.8 µg/L TCE

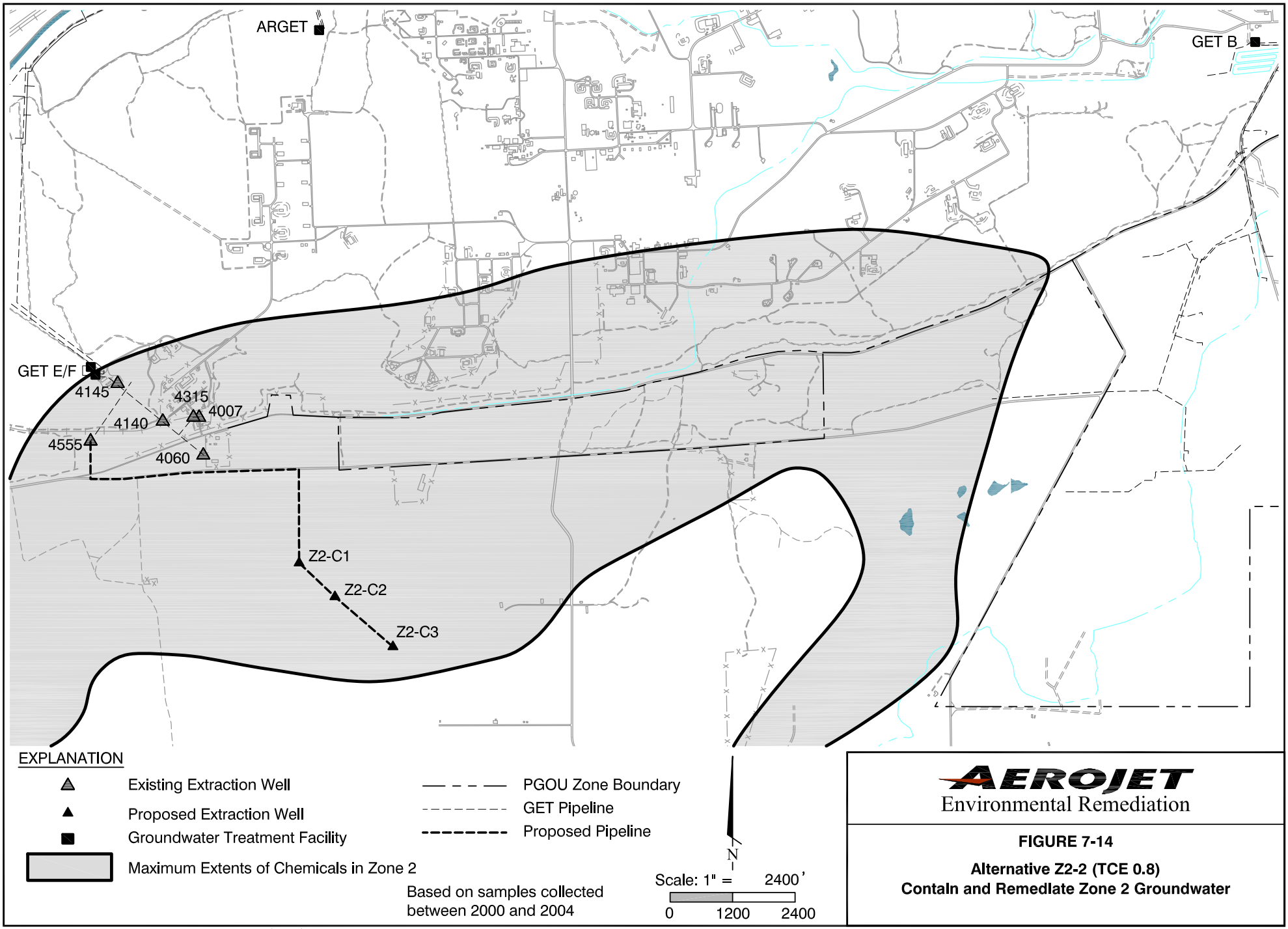
LOCATION: GenCorp Aerojet, Zone 2

CVEI CENTRAL VALLEY ENVIRONMENTAL, INC.

CHECKED	
DRAFTED	
FILE	
DATE	

FIGURE: 7-13

C:\AEROJET\ZONE 2\GIS\Z2-Alt3b.WOR

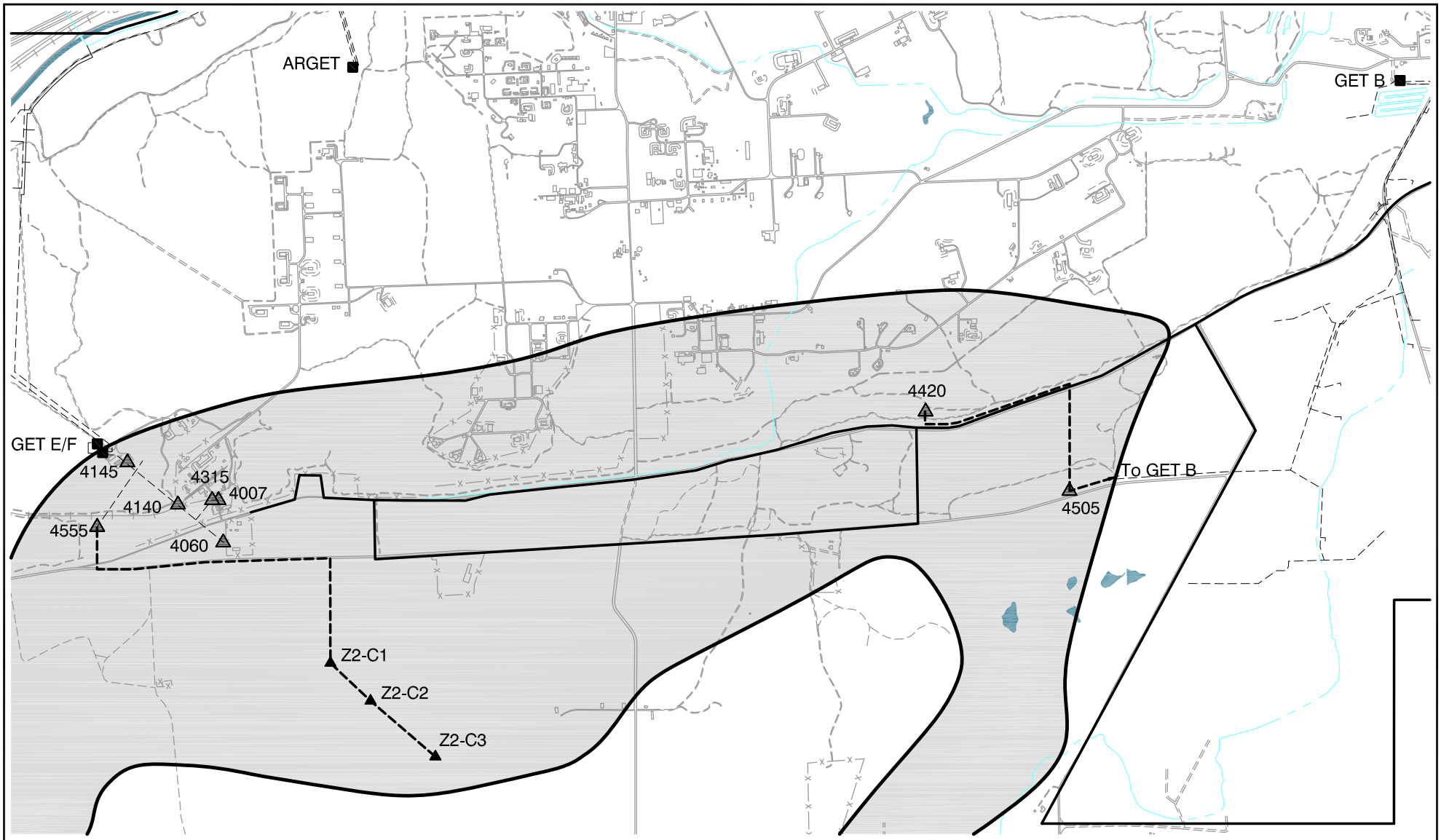


AEROJET
Environmental Remediation

FIGURE 7-14

Alternative Z2-2 (TCE 0.8)
Contain and Remediate Zone 2 Groundwater

SR10129801 **FIGURE 7-14** 4/14/09 Herron, Al



AEROJET
Environmental Remediation

FIGURE 7-15

Alternative Z2-3 (TCE 0.8)
Contain, Remediate and Remove Additional Mass from Zone 2 Groundwater

SR10129802 **FIGURE 7-15** 4/14/09 Herron, Al