NOTICE

All drawings located at the end of the document.

50541

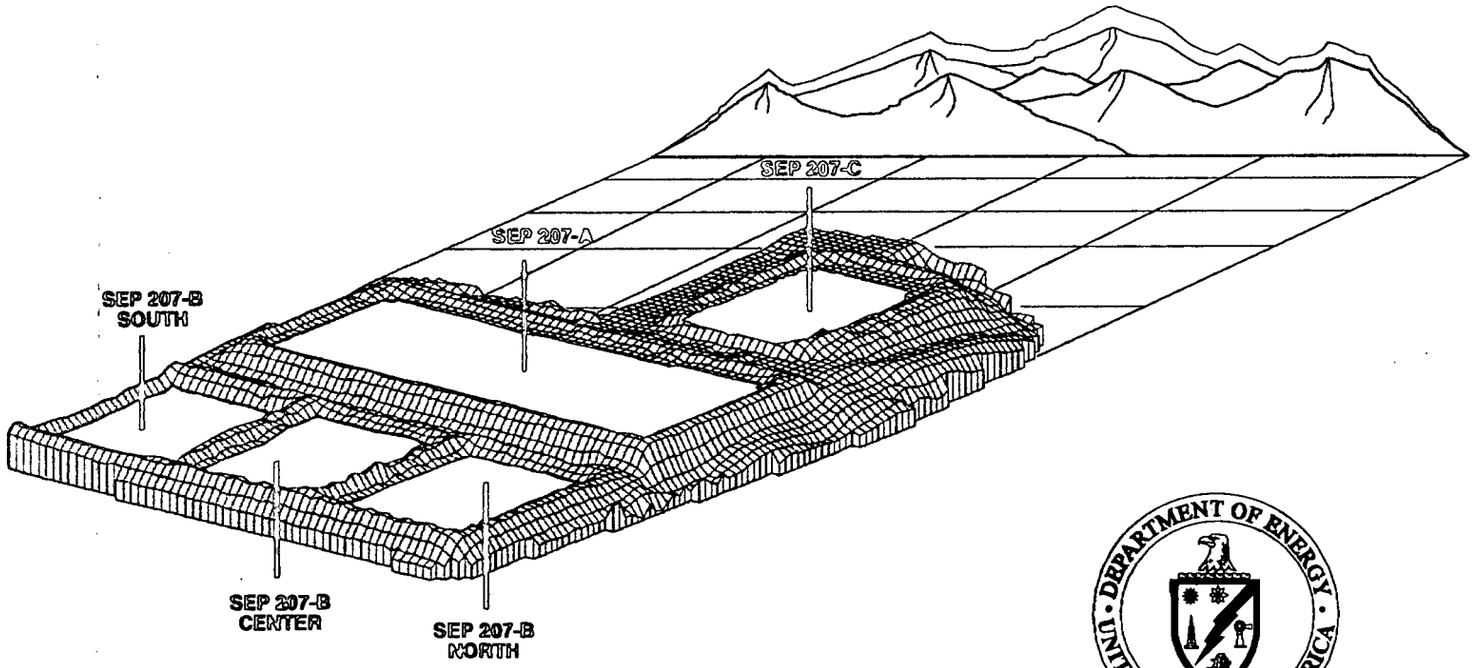
OU4 Solar Evaporation Ponds Interim Measure/Interim Remedial Action Environmental Assessment Decision Document

U.S. Department of Energy
Rocky Flats Environmental Technology Site
Golden, Colorado

February 1995

Revision: Proposed

Part II
Volume 2 - Figures



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OU4 Solar Evaporation Ponds
Interim Measure/Interim Remedial Action
Environmental Assessment
Decision Document

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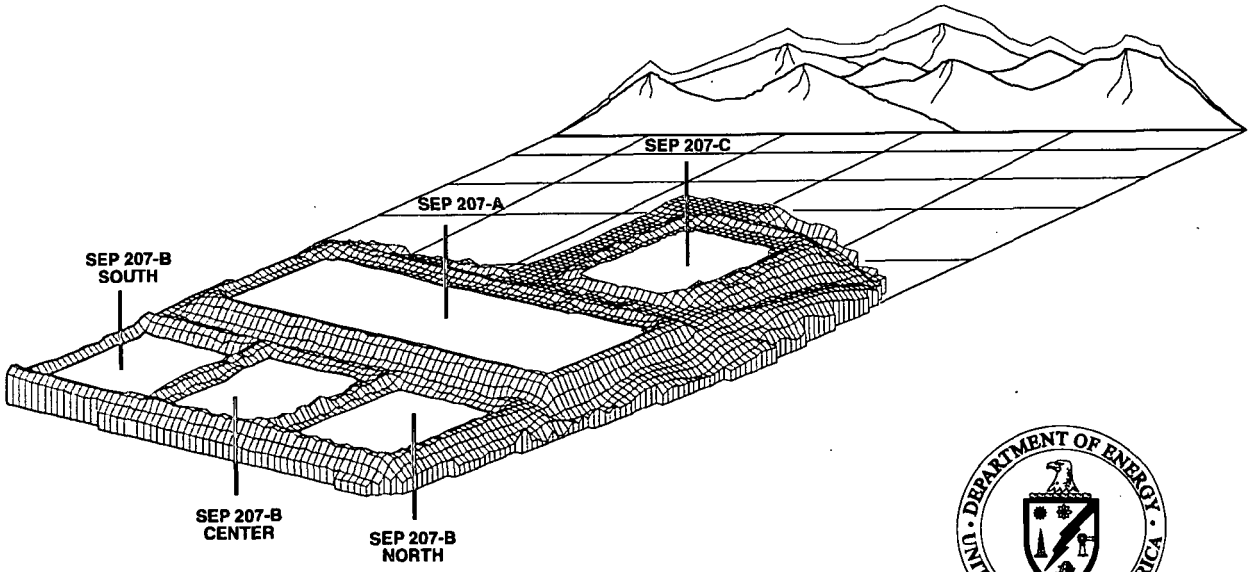

DOCUMENT ORGANIZATION

Operable Unit 4 Solar Evaporation Pond
Interim Measure/Interim Remedial Action -
Environmental Assessment Decision Document

Part I	-	Executive Summary and Introduction
Part II	-	Operable Unit 4 Phase I RCRA Facility Investigation/Remedial Investigation Report
		Volume 1 - Sections 1 through 8 (Figures for Section 3 are in Volume 2)
		Volume 2 - Section 3 Figures
		Volume 3 - Appendices A through G
		Volume 4 - Appendices H through L
		Volume 5 - Appendices M through O
		Volume 6 - Appendices P through Q
		Volume 7 - Appendices R through V
		Volume 8 - Appendices W through AA
Part III	-	Interim Measure/Interim Remedial Action Design Analysis
Part IV	-	Recommended Interim Measure/Interim Remedial Action Alternative
Part V	-	Post-Closure Monitoring and Assessment Plan

SOLAR EVAPORATION PONDS
OU4 IM/IRA ENVIRONMENTAL ASSESSMENT DECISION DOCUMENT

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II.3.5-23	Geophysical Line 5	II.3-555
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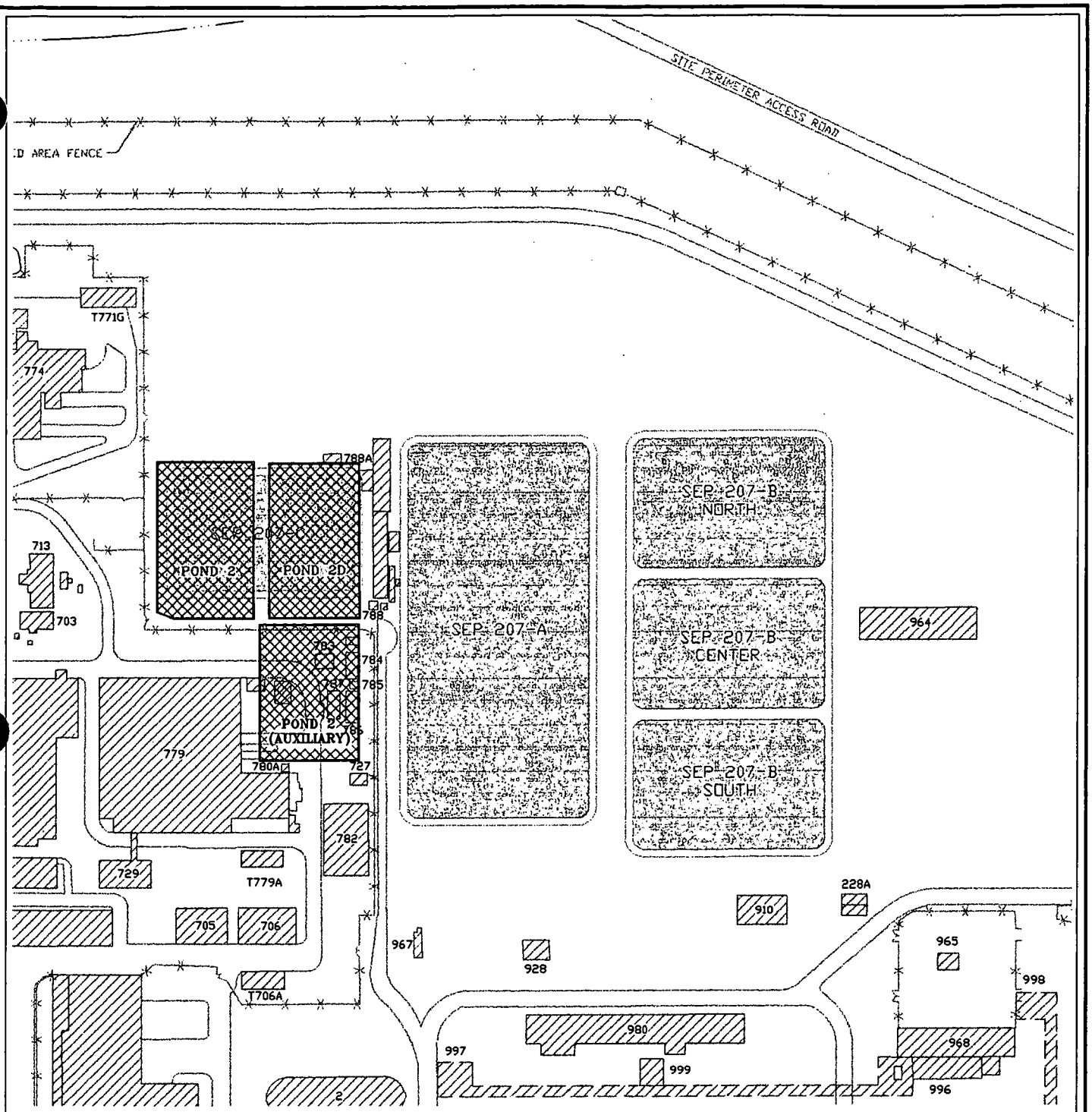
II.3.5-25	Geophysical Line 7	II.3-557



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Pond (SEP)
- Approximate Locations of Original Ponds

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GOLDEN, COLORADO

Figure II.3.1-2

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Approximate Locations of Original Ponds

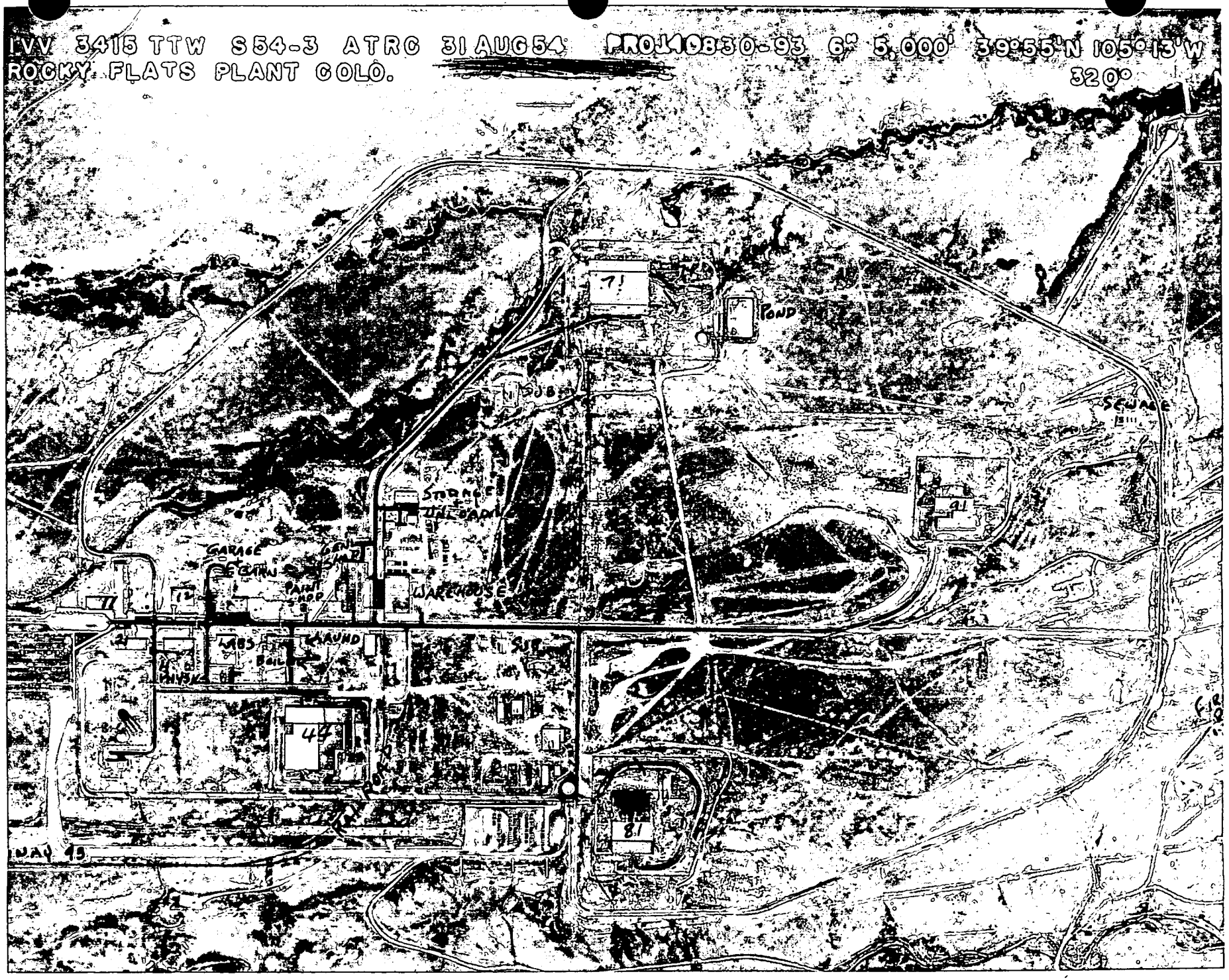


Figure II.3.1-3
August 1954 Photograph
Showing Original Pond 2

Figure II.3.1-4

September 1956 Photograph
Showing Original Pond 2

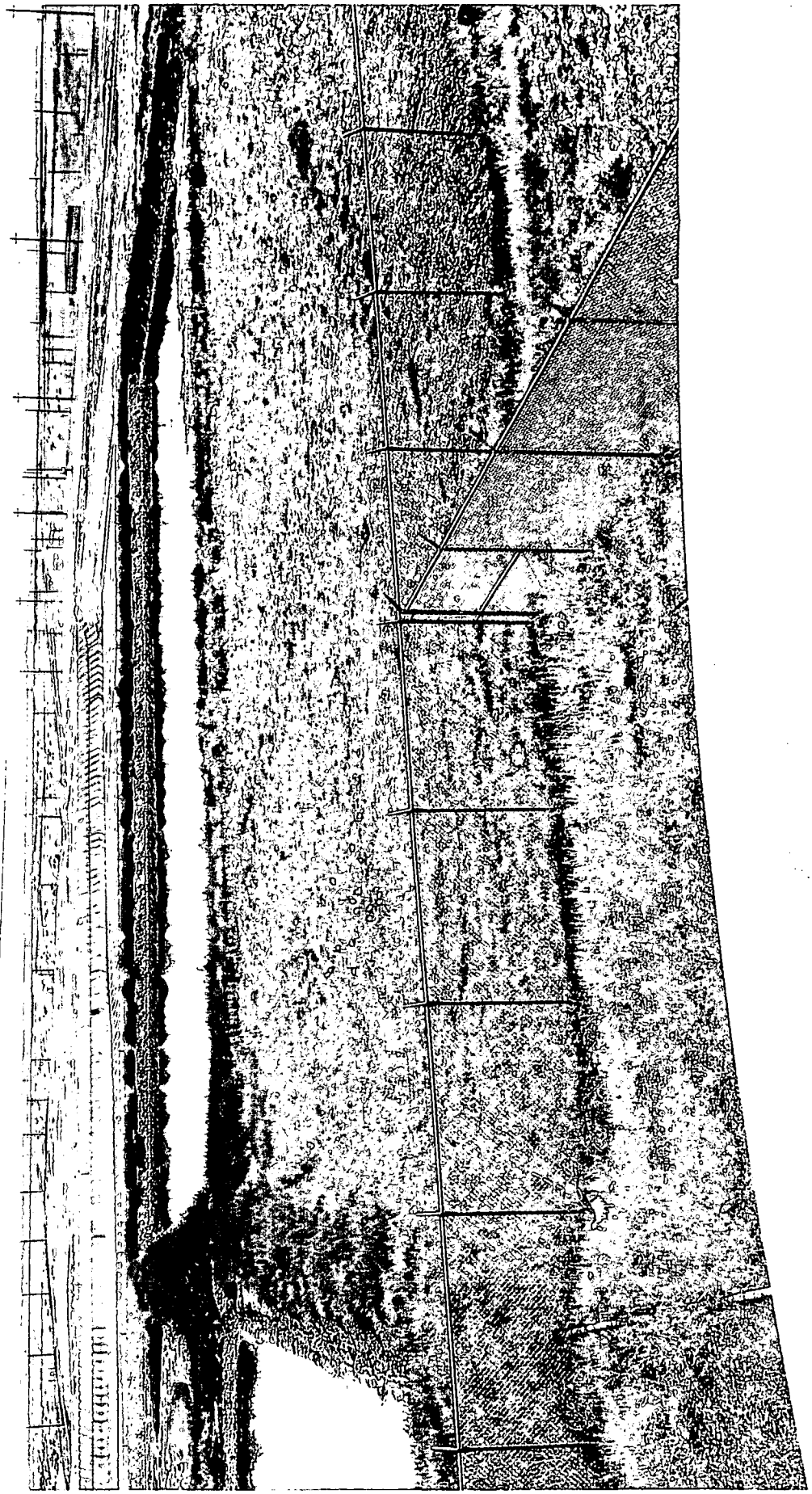


Figure II.3.1-5

September 1958 Photograph
Showing Pond 2-Auxiliary

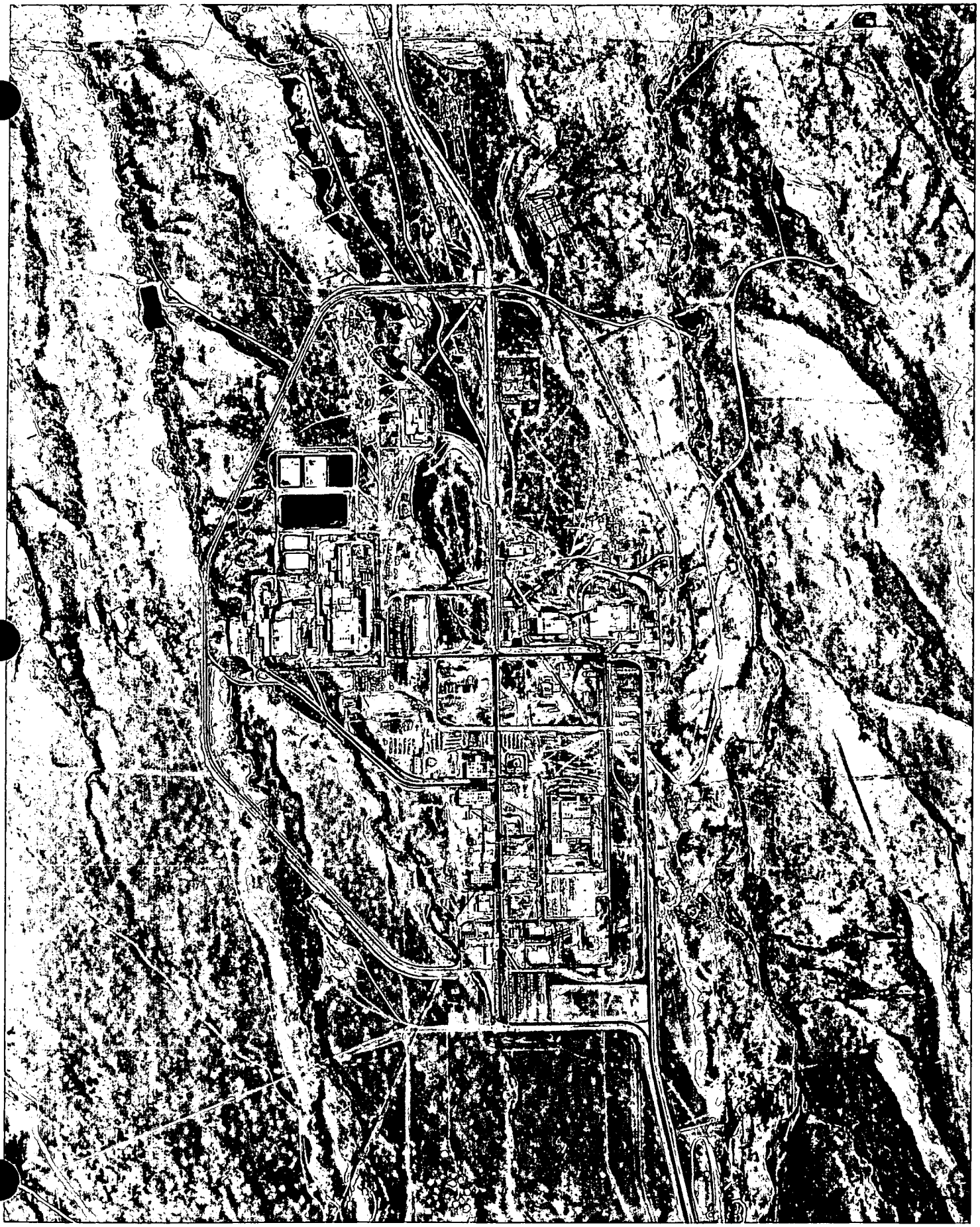


Figure II.3.1-6

July 1966 Photograph
Showing Ponds 2A and 2B in Operation

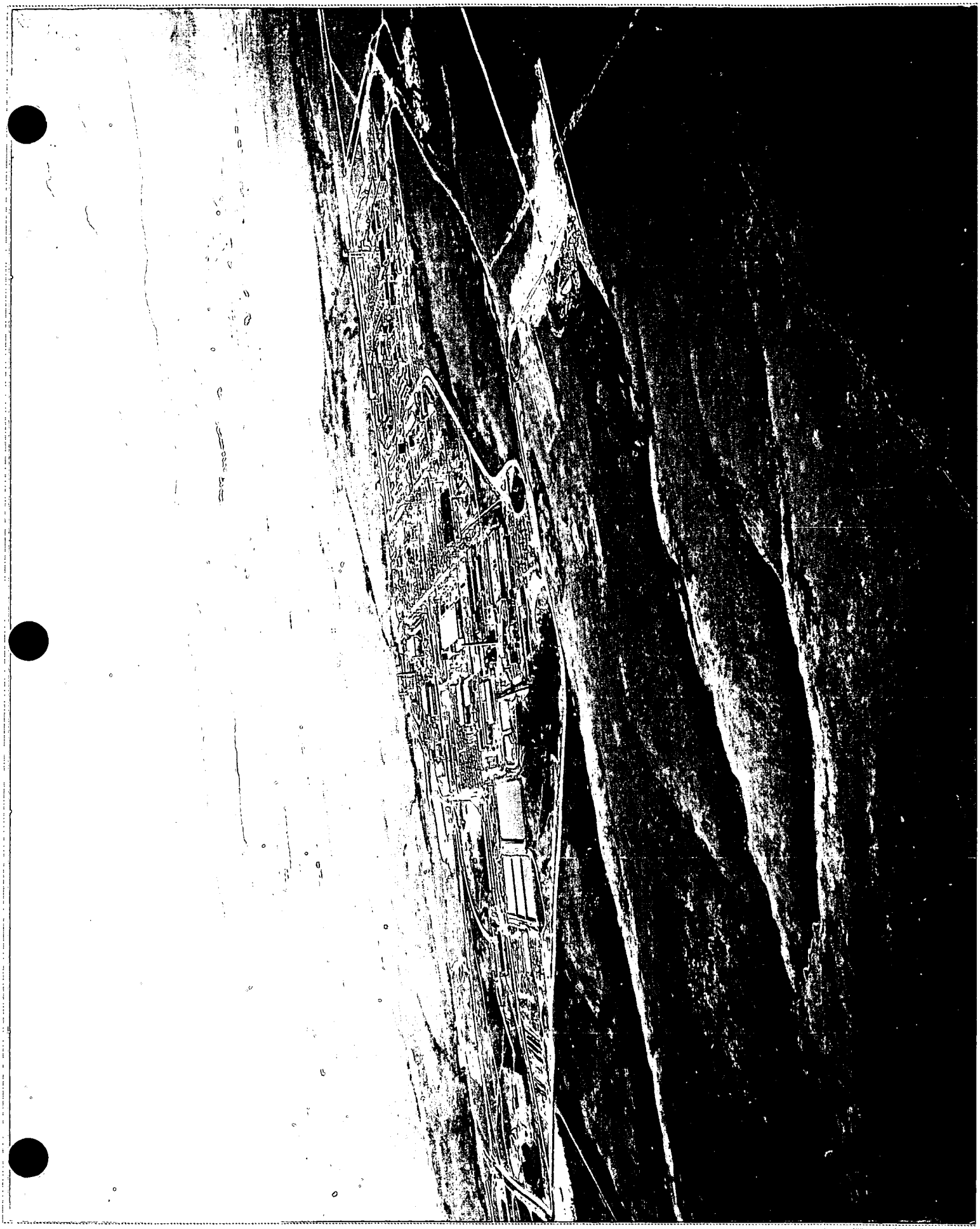


Figure II.3.1-7

June 1969 Photograph
Showing Ponds 2A and 2B Prior to Re-Gradin

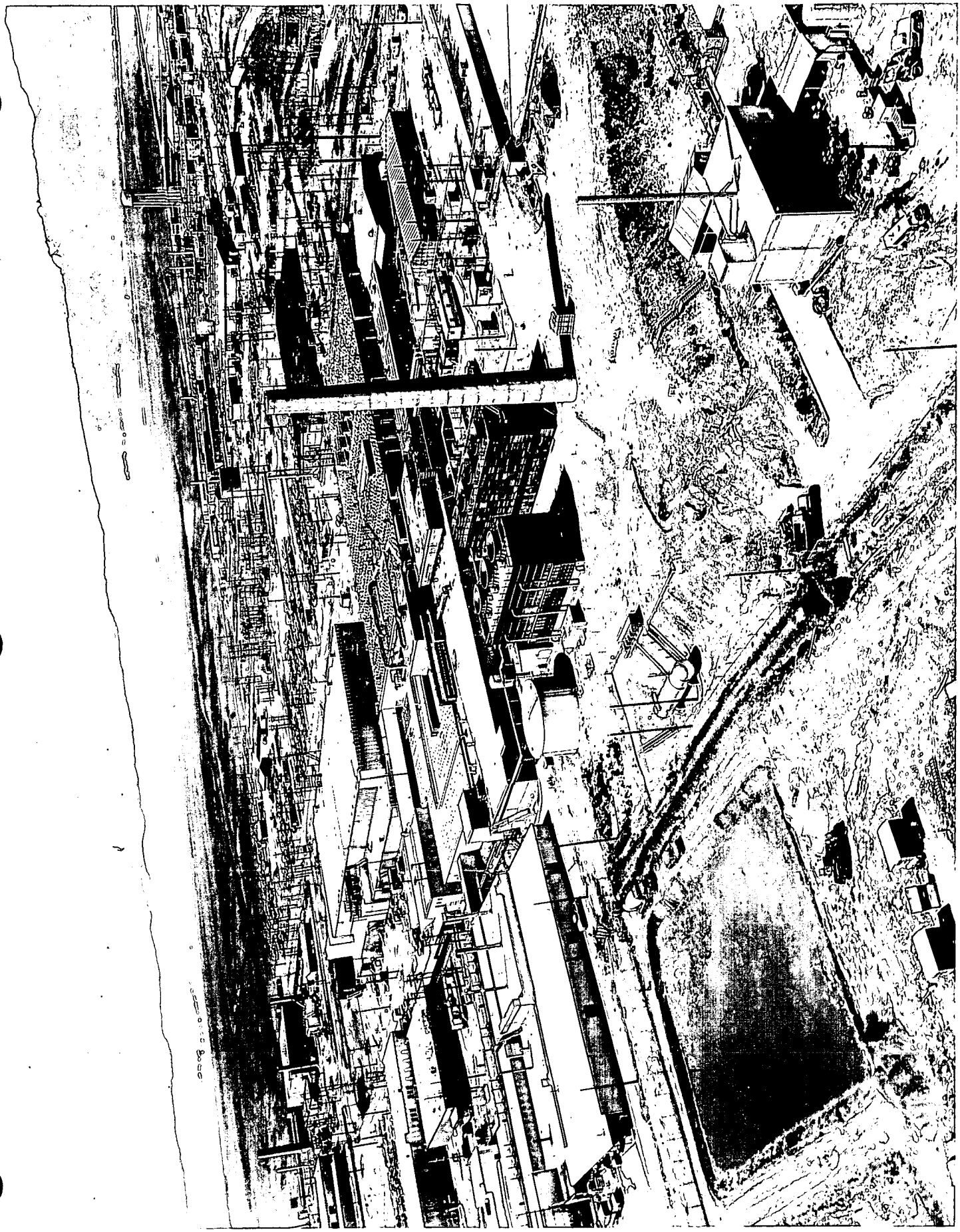


Figure II.3.1-8

July 1969 Photograph
Showing Re-Grading of Ponds 2A and 2B

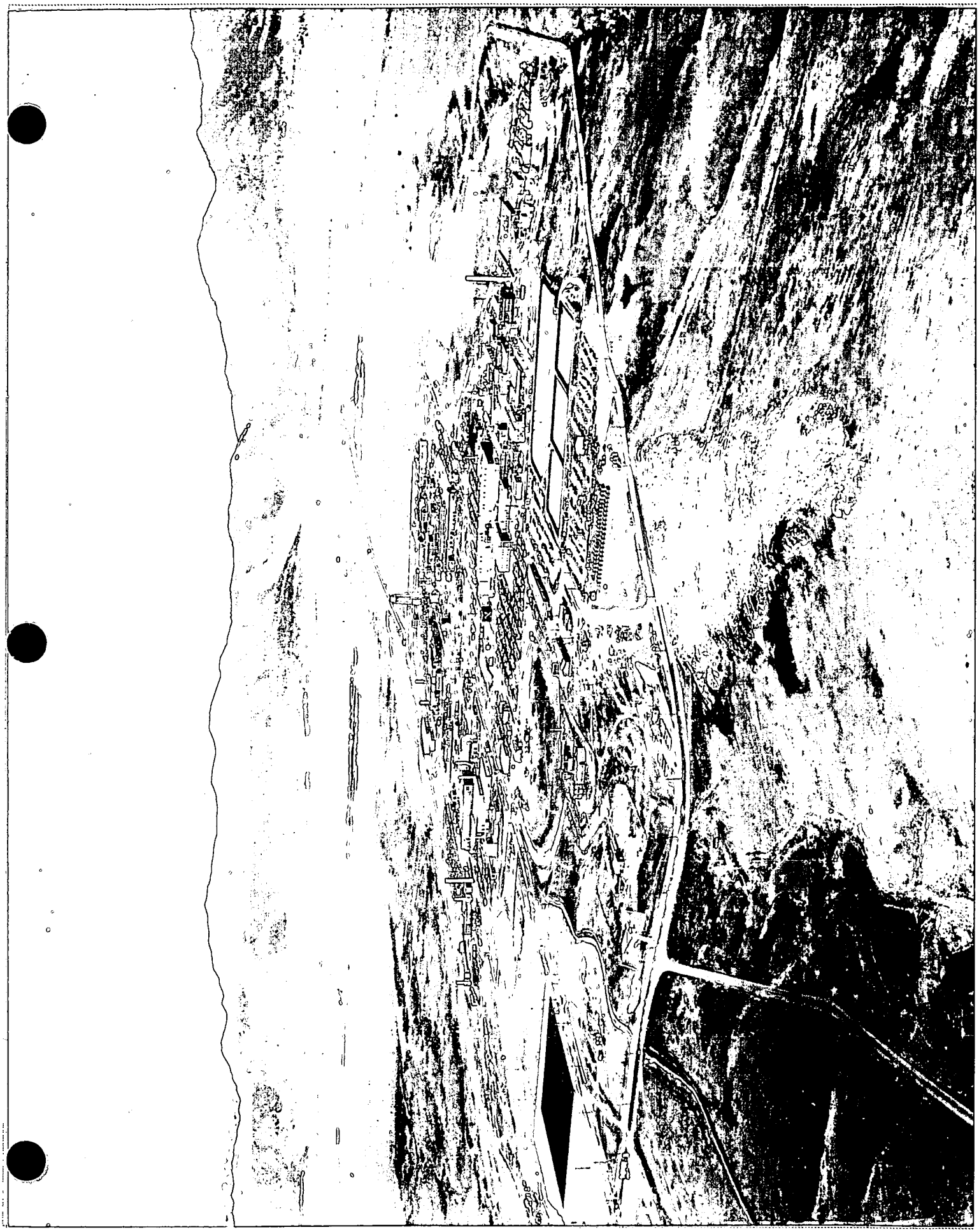
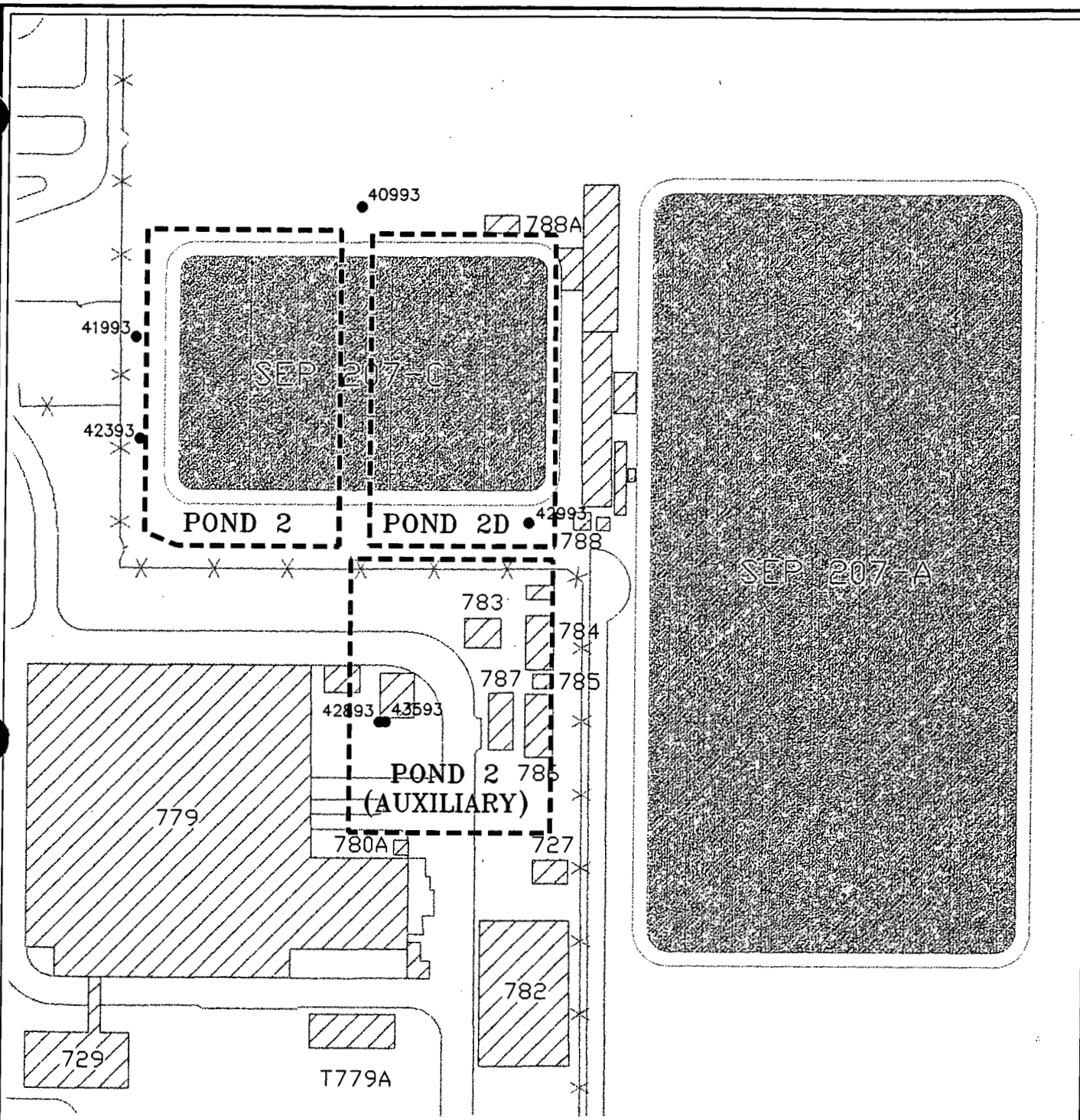


Figure II.3.1-9

May 1970 Photograph
Showing Ponds 2A and 2B after Re-Grading



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Pond (SEP)
- Approximate Boundary of Original Ponds
- 40993 Borehole Location and Identification

50 0 50 100 150 FEET

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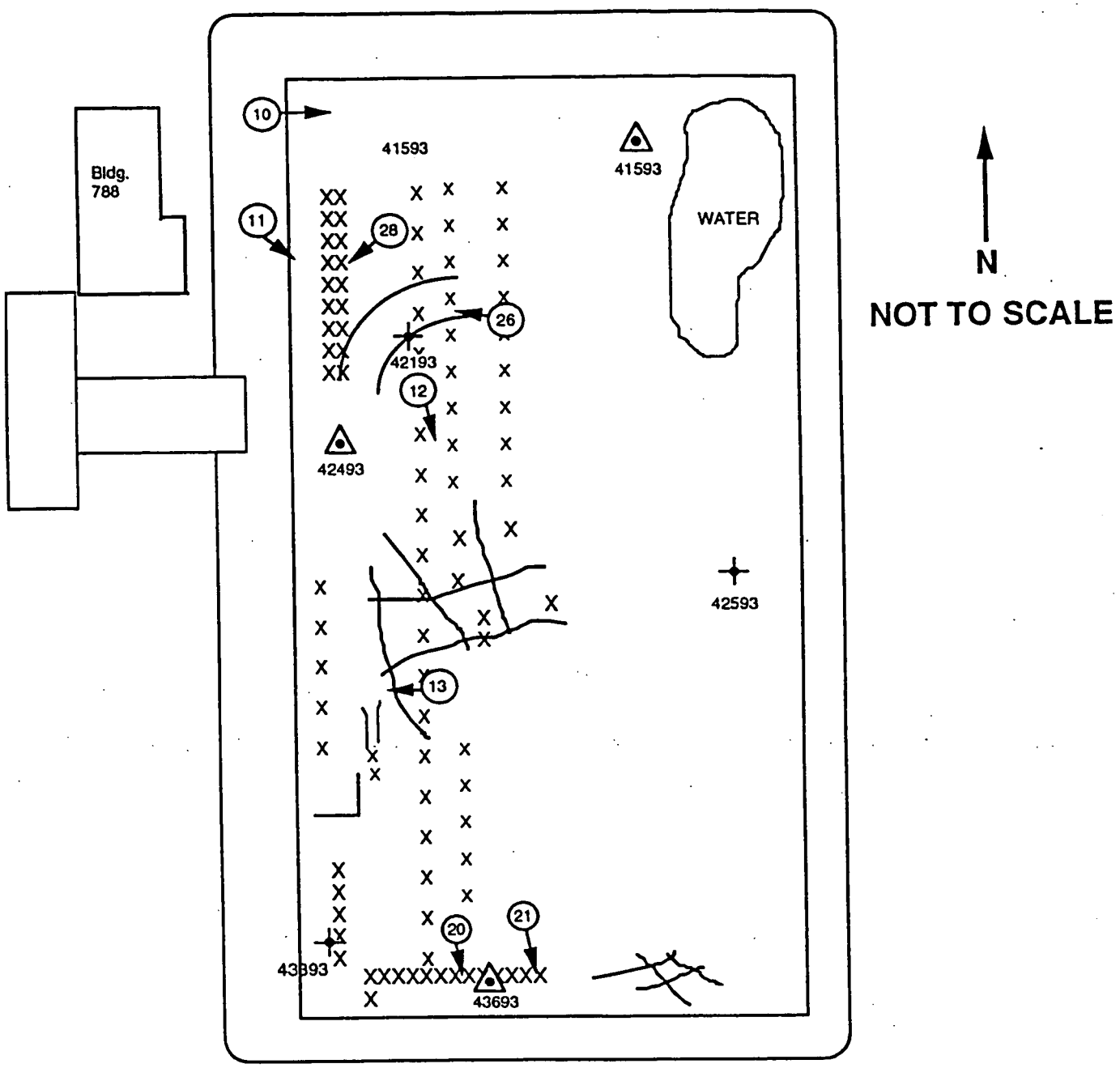
Figure II.3.1-15

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Locations of Boreholes Investigating
Original Ponds Area



12 = Camera Vantage Point and Exposure Number

X = Mud Crack or Bubbling

= Distinct Individual Crack

43693 = Proposed Vadose Zone Borehole Location

43393 = Proposed Borehole Location

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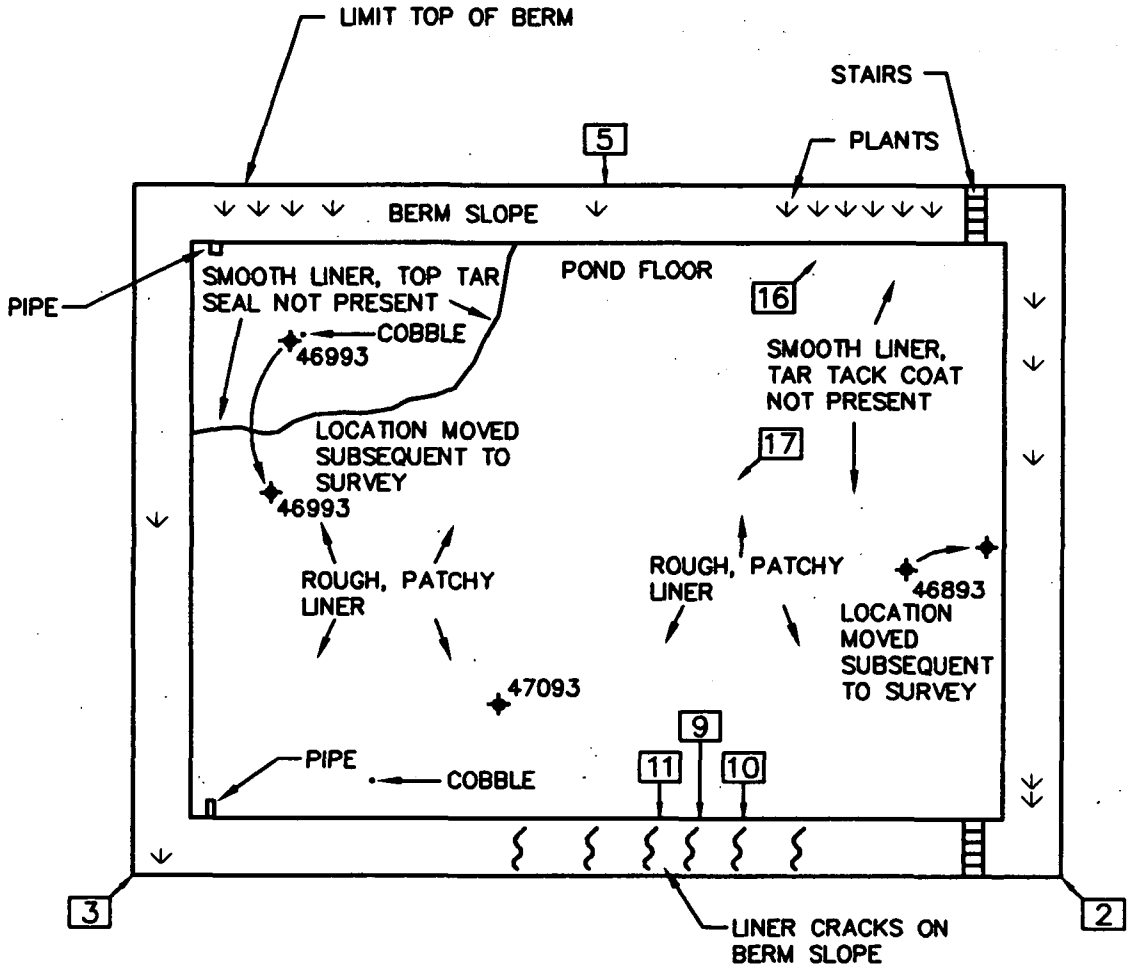
Figure II.3.1-16

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Sketch of SEP 207-A
Visual survey Results



Not To Scale
(Approximately 1"=50')

LEGEND

1 Camera Vantage Point and Photograph Number (EG&G Roll No. 45142)

47093 Approximate Borehole Location

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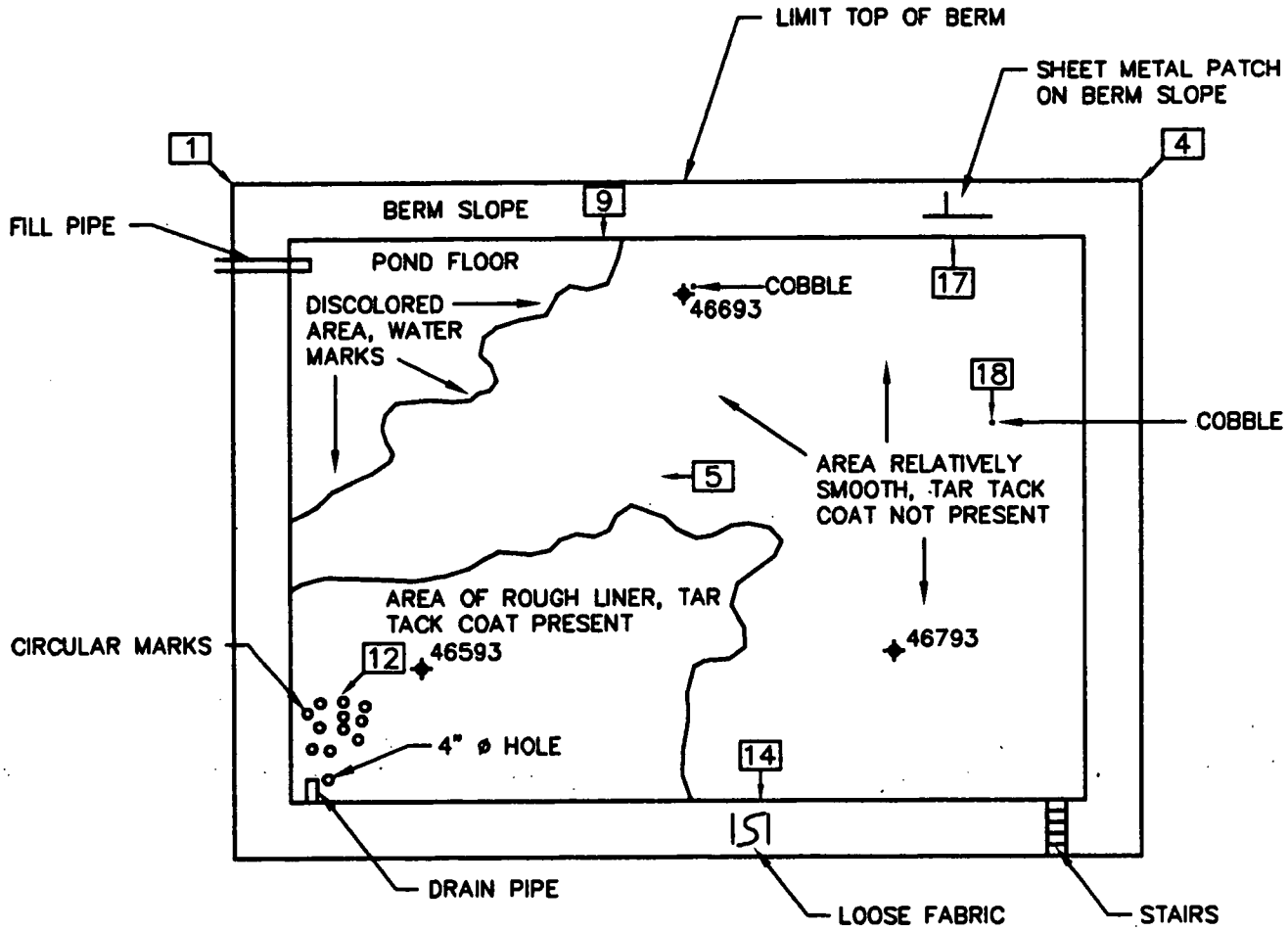
Figure II.3.1-17

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Sketch of SEP 207-B Center
Visual Survey Results



Not To Scale
(Approximately 1"=50')

LEGEND

1 Camera Vantage Point and Photograph Number (EG&G Roll No. 45142)

46793 Approximate Borehole Location

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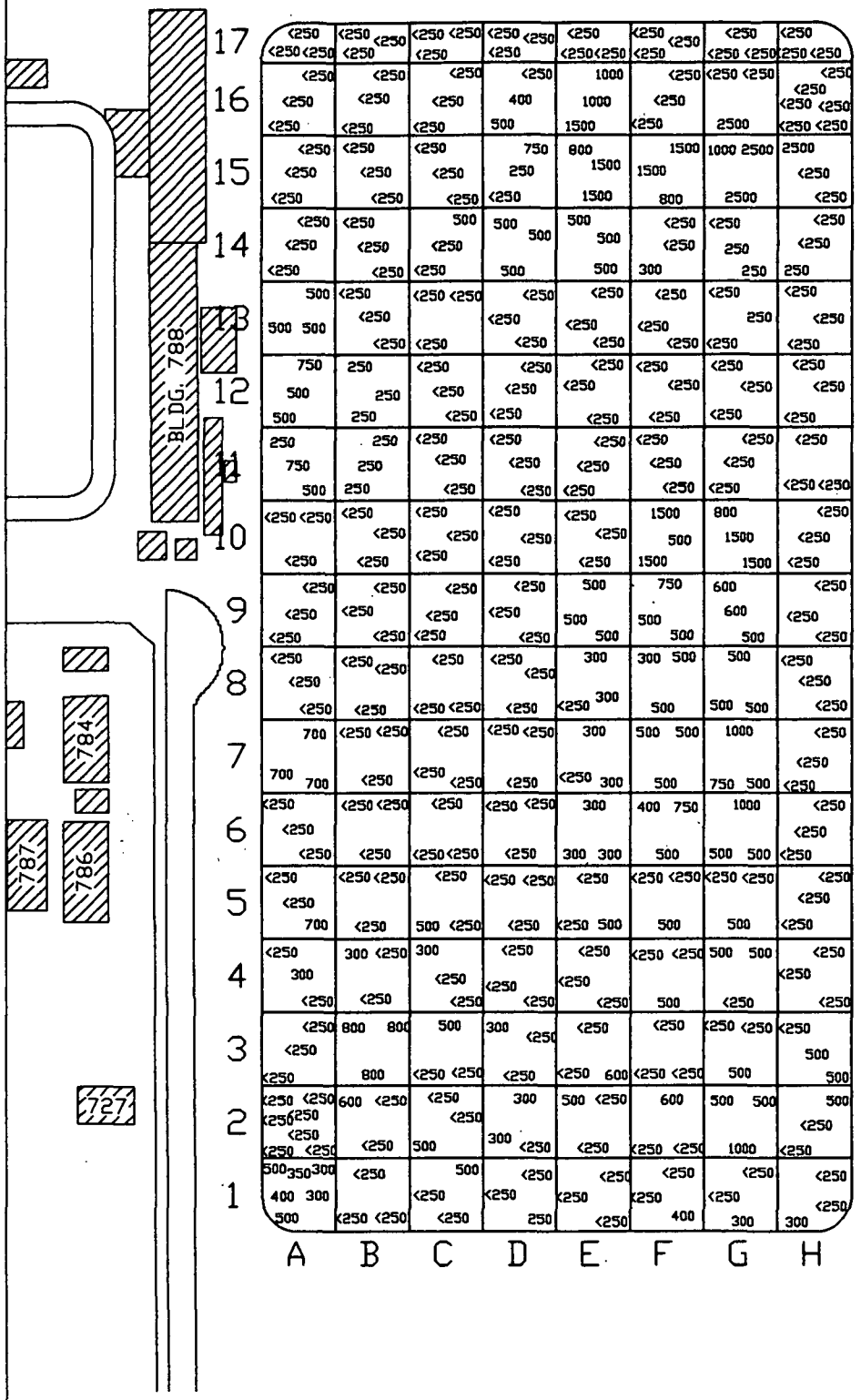
Figure II.3.1-18

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Sketch of SEP 207-B North Visual Survey Results



LEGEND

Paved Roads

Buildings

500 Radiological Reading

NOTES

1. SEP 207-A Survey was completed by E.G.&G.
2. Total Alpha Survey was conducted using Ludlum 12-1A Meter and Air Proportional Detector.
3. Instrument Readings <250 CPM are considered below Action Limits per RFP Standard Operating Procedures.

Approximate Scale: 1 Inch = 75 Feet

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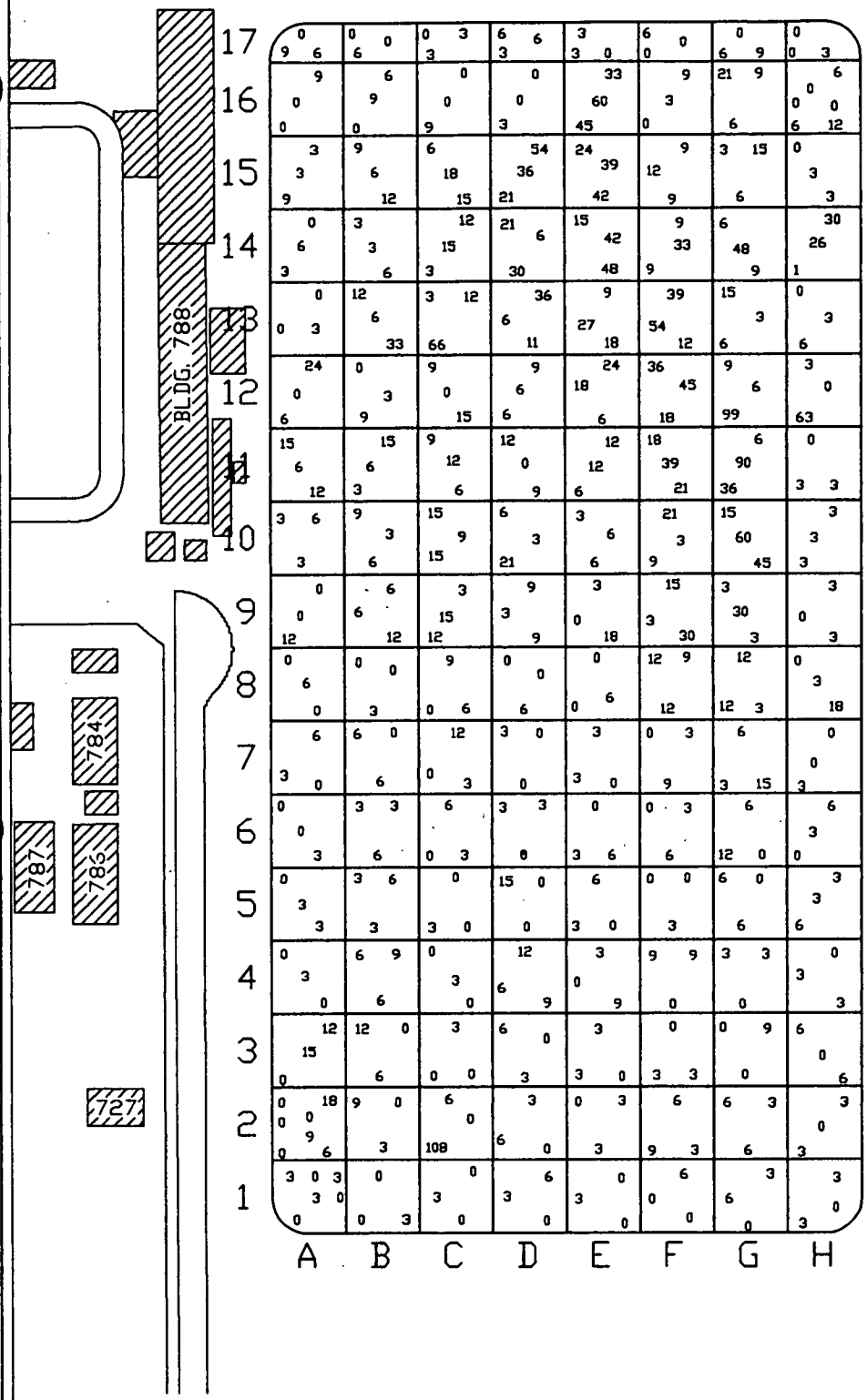
ROCKY FLATS PLANT
GOLDEN, COLORADO

Figure II.3.1-19

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-A Total Alpha Radiation
Survey Results



LEGEND

Paved Roads

Buildings

3 Radiological Reading

NOTES

1. SEP 207-A survey was completed by E.G.&G.

Approximate Scale: 1 inch = 75 Feet

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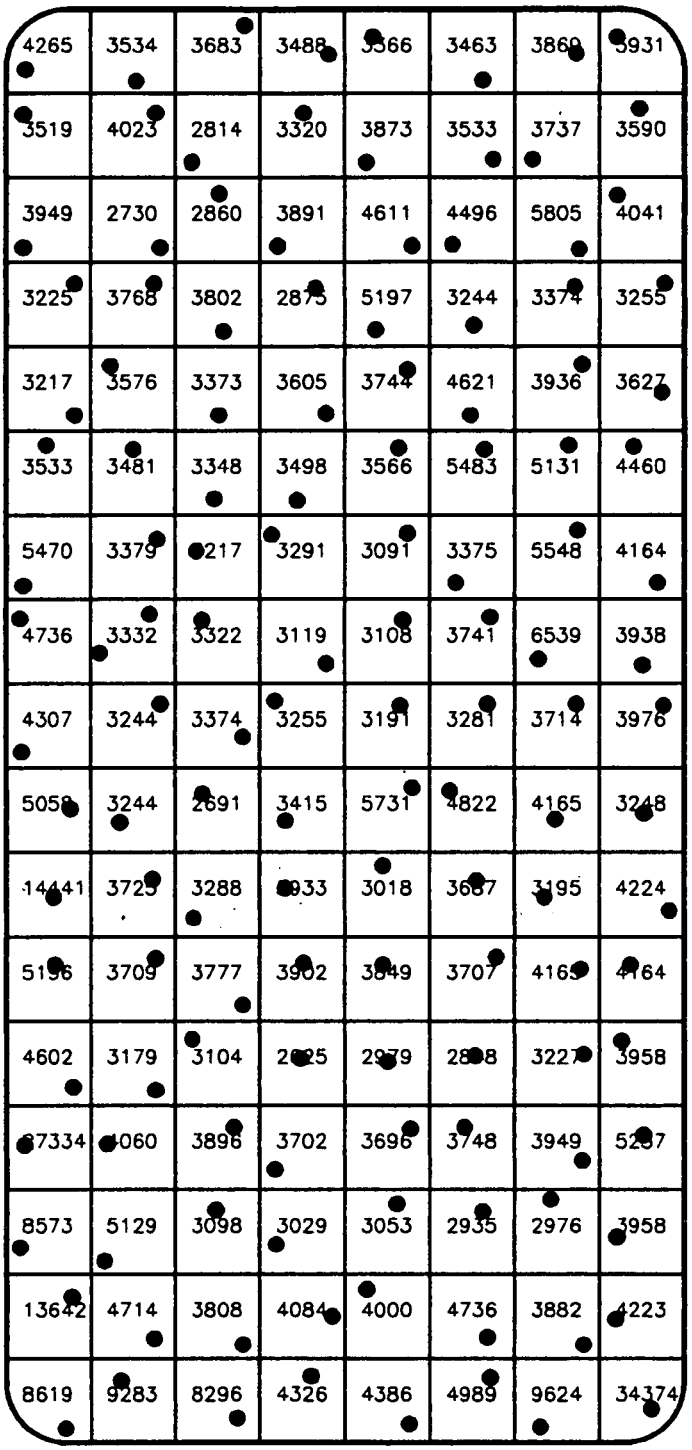
GOLDEN, COLORADO

Figure II.3.1-20

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-A Removable (Smear) Alpha Radiation Survey Results



LEGEND

5805 **FIDLER Reading In Counts Per Minute (cpm)**

● **Location Where FIDLER Reading Was Taken**

NOTES

1. **FIDLER Survey Conducted By E.G.&G.**
2. **Calculated Background = 3618 cpm.**

Approximate Scale: 1 Inch = 60 Feet

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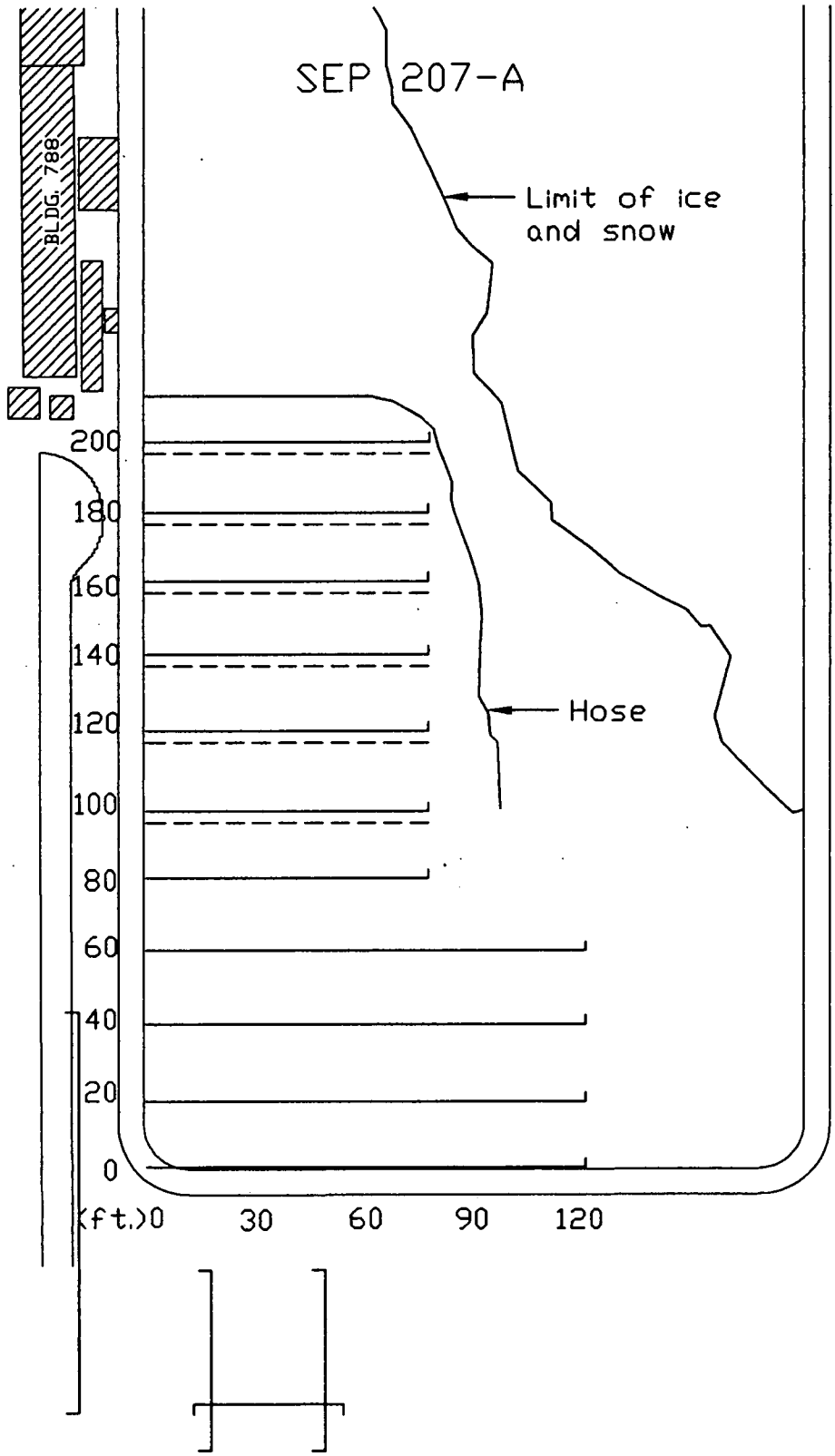
Figure II.3.1-21

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-A Gamma (FIDLER)
Radiation Survey Results



LEGEND

- Paved Roads
- Buildings
- 300 MHz GPR Line
- 900 MHz GPR Line
- Construction Yard Field Tests

NOTES

1. Survey Date: 12/92

Not To Scale

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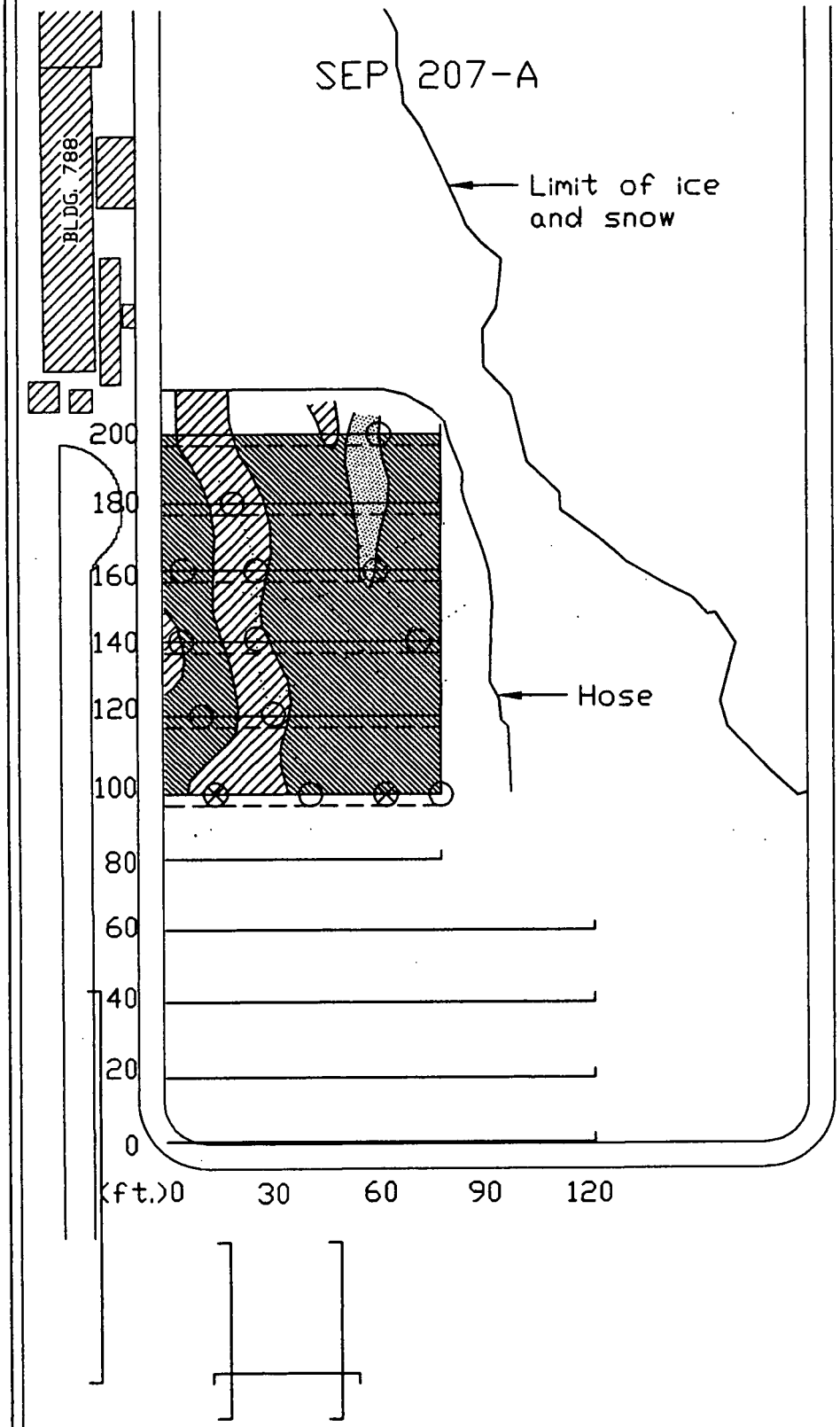
GOLDEN, COLORADO

Figure II.3.1-32

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
GPR Survey
SEP 207-A Area



LEGEND

- Paved Roads
- Buildings
- ZONE 1 Wide Space Layer Zone
- ZONE 2 Near Surface Multi-Layer Zone
- ZONE 3 Synclinal Zone
- Moisture Anomaly
- Possible Metal Object Anomaly
- 300 MHz GPR Line
- 900 MHz GPR Line
- Construction Yard Field Tests
- Location of Cracks in Liner from Visual Survey

NOTES

1. Survey Date: 12/92

Not To Scale

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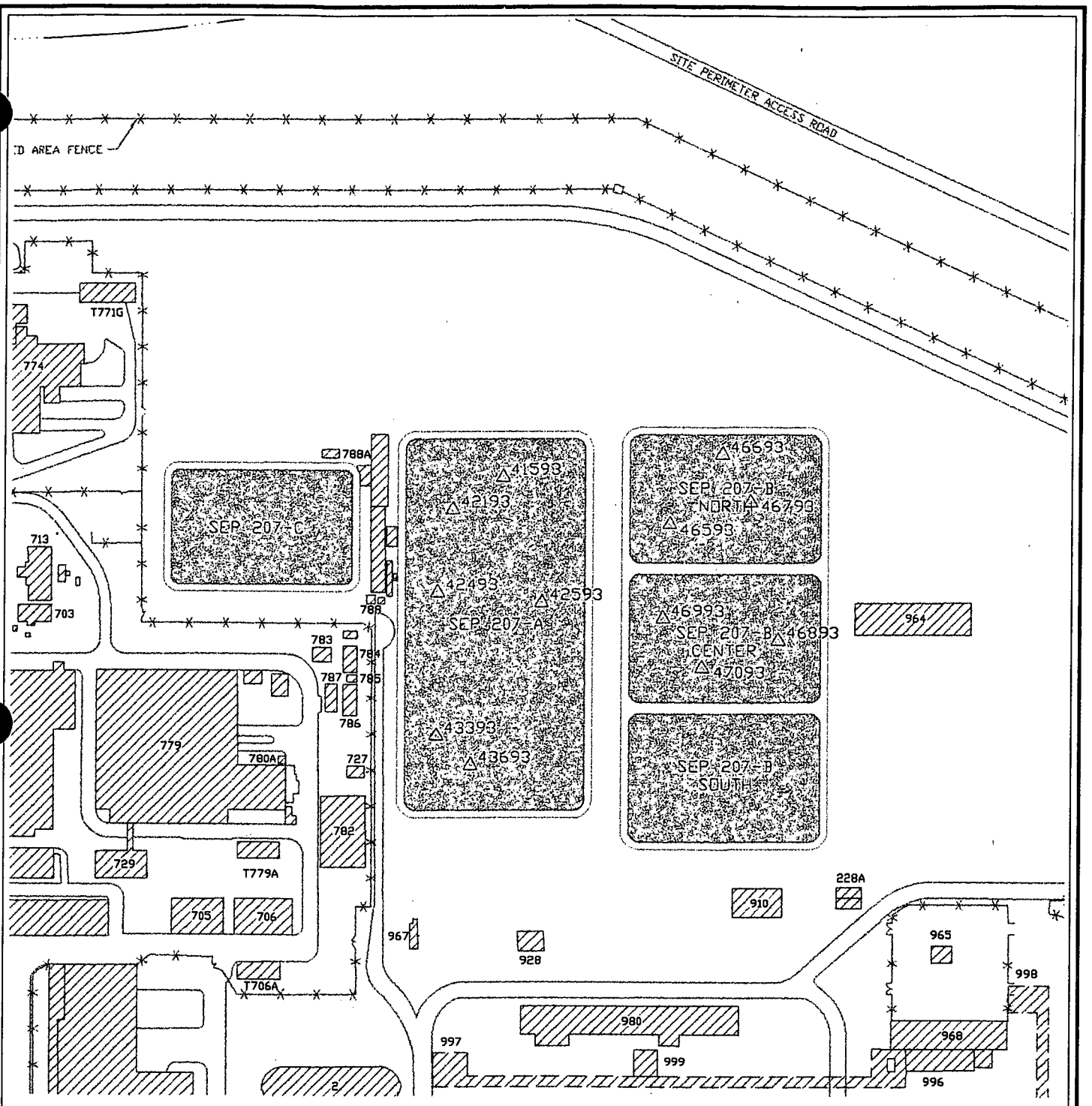
Figure II.3.1-35

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Interpreted GPR Data
SEP 207-A - 900 MHz Antenna



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △43393 Sampling Location and Identification

100 0 100 200 300 FEET

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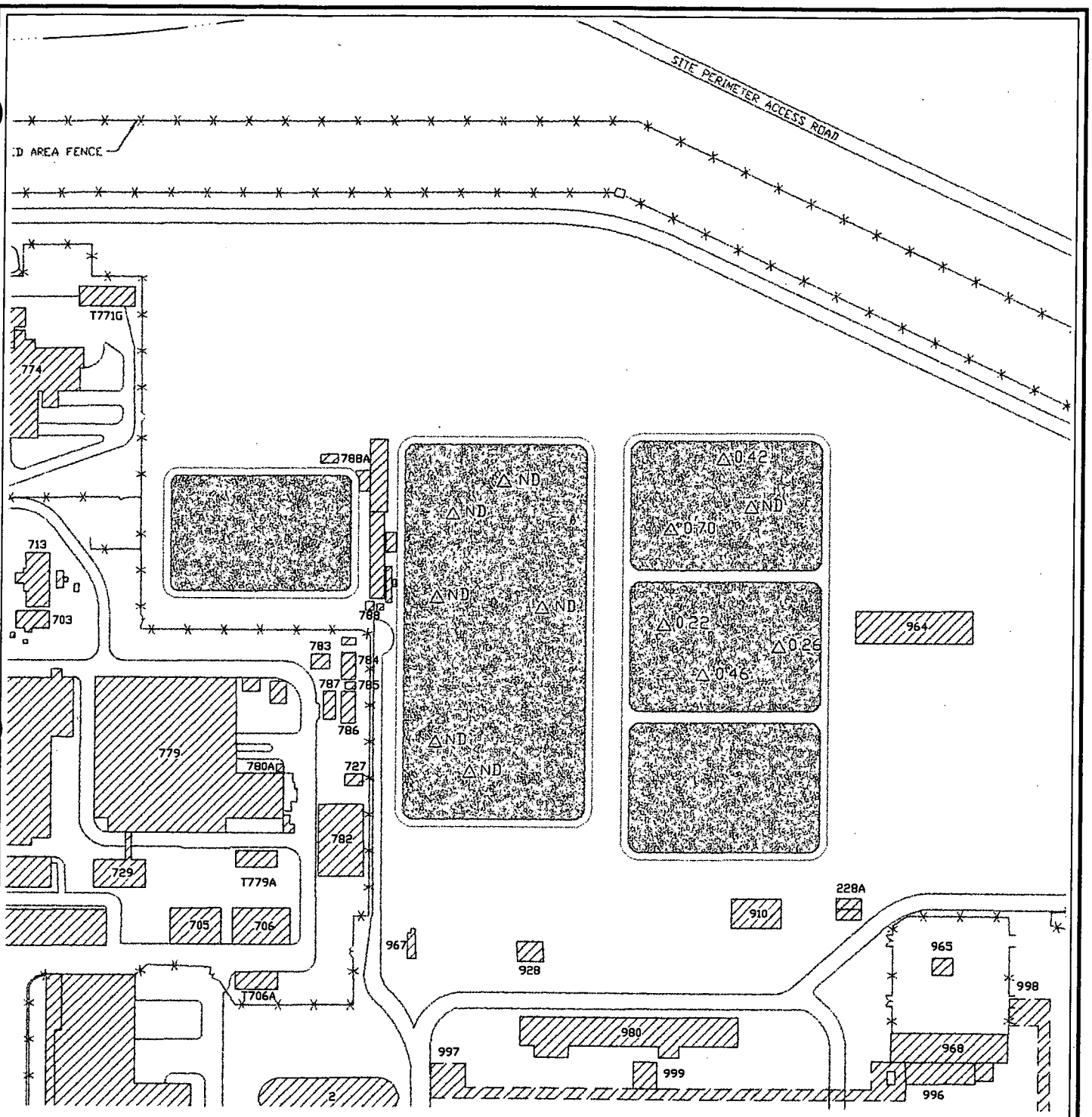
Figure II.3.1-36

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Existing Ponds Liner, Subgrade, And Subsurface Sampling Locations



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 0.70 Result in mg/kg
- ND Not detected

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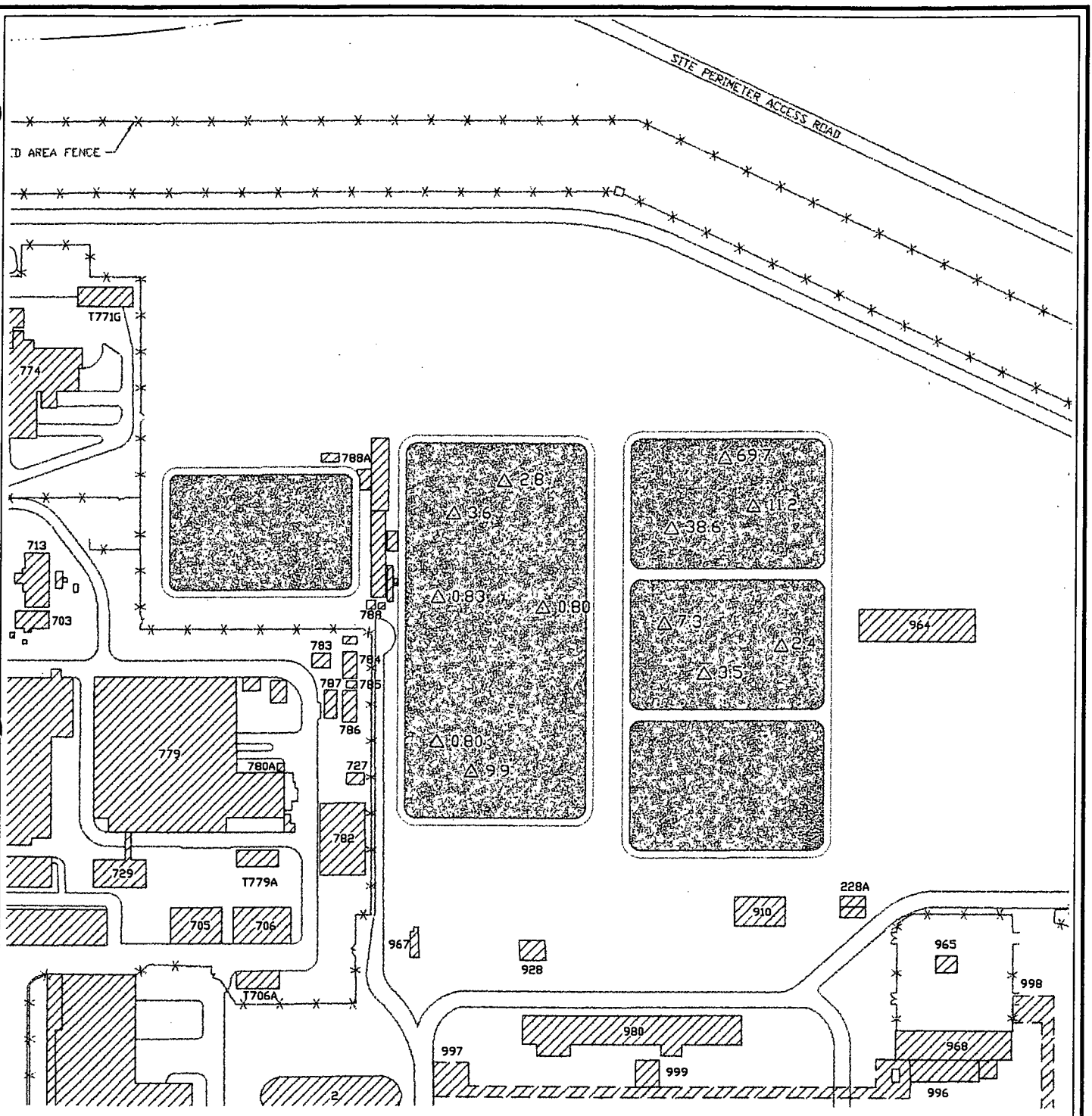
Figure II.3.1-37

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Beryllium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 0.80 Result in mg/kg

100 0 100 200 300 FEET

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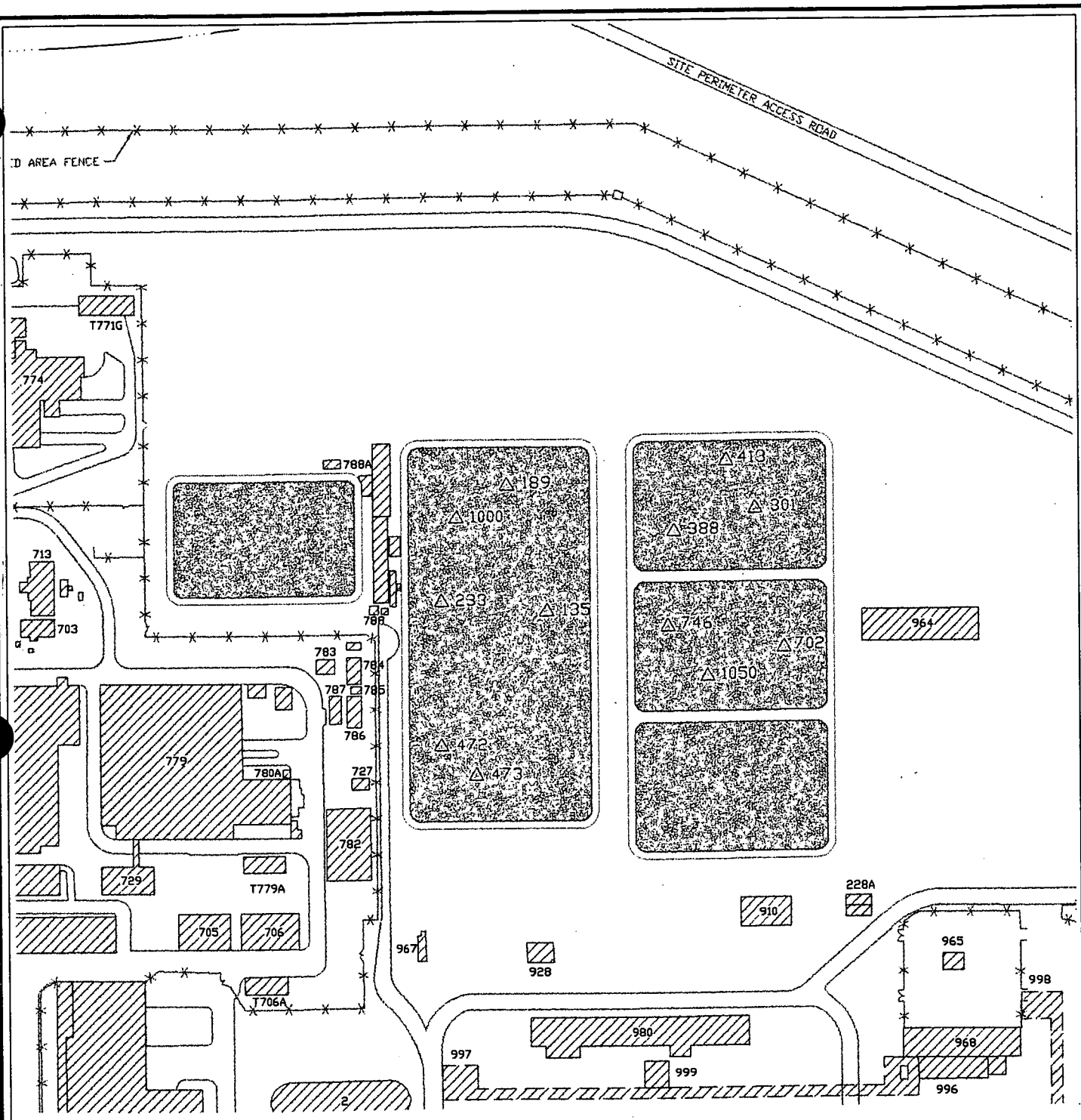
Figure II.3.1-38

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Cadmium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 472 Result in mg/kg

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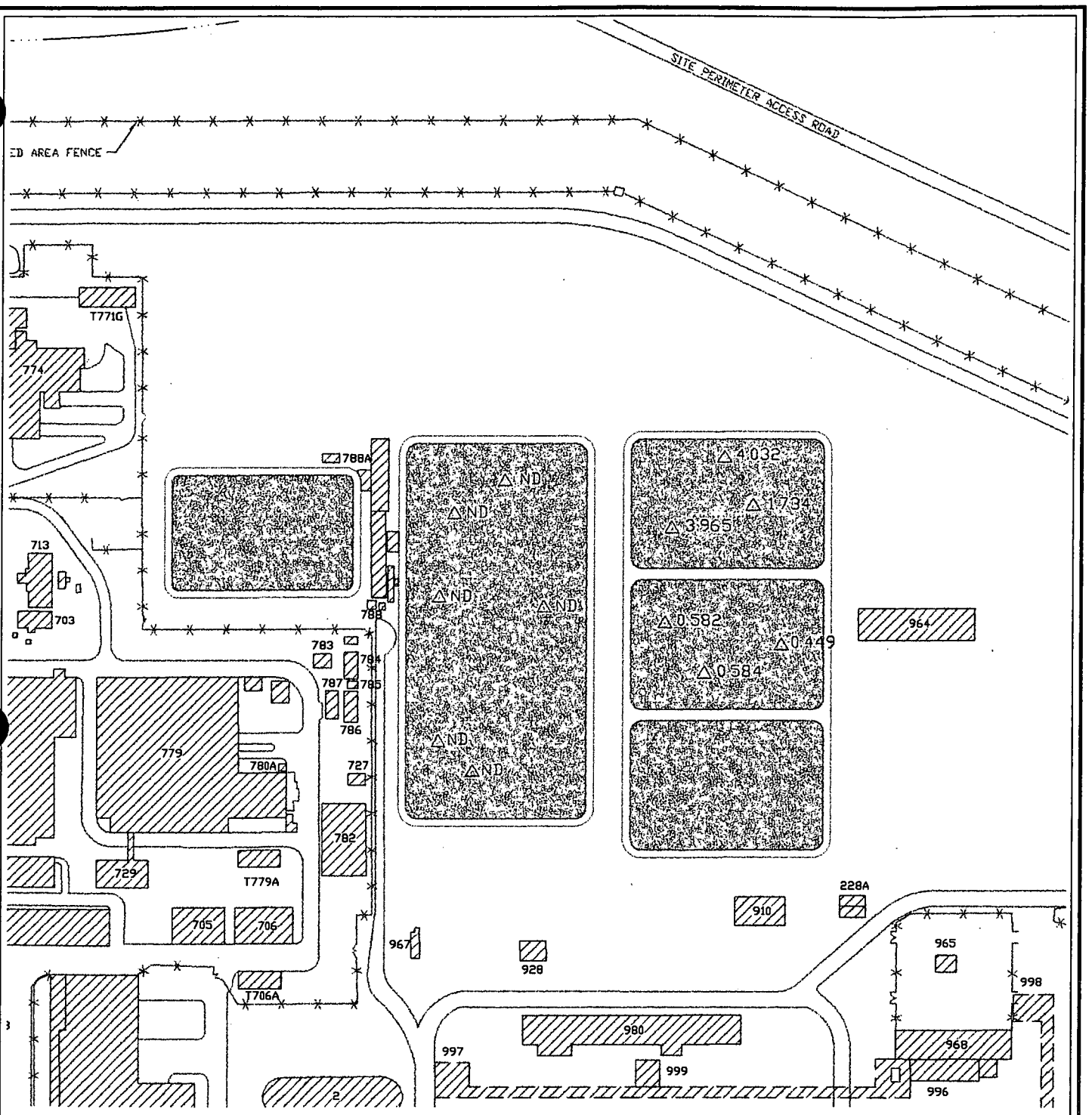
Figure II.3.1-39

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Sodium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 0.449 Result in pCi/g
- ND Not Detected

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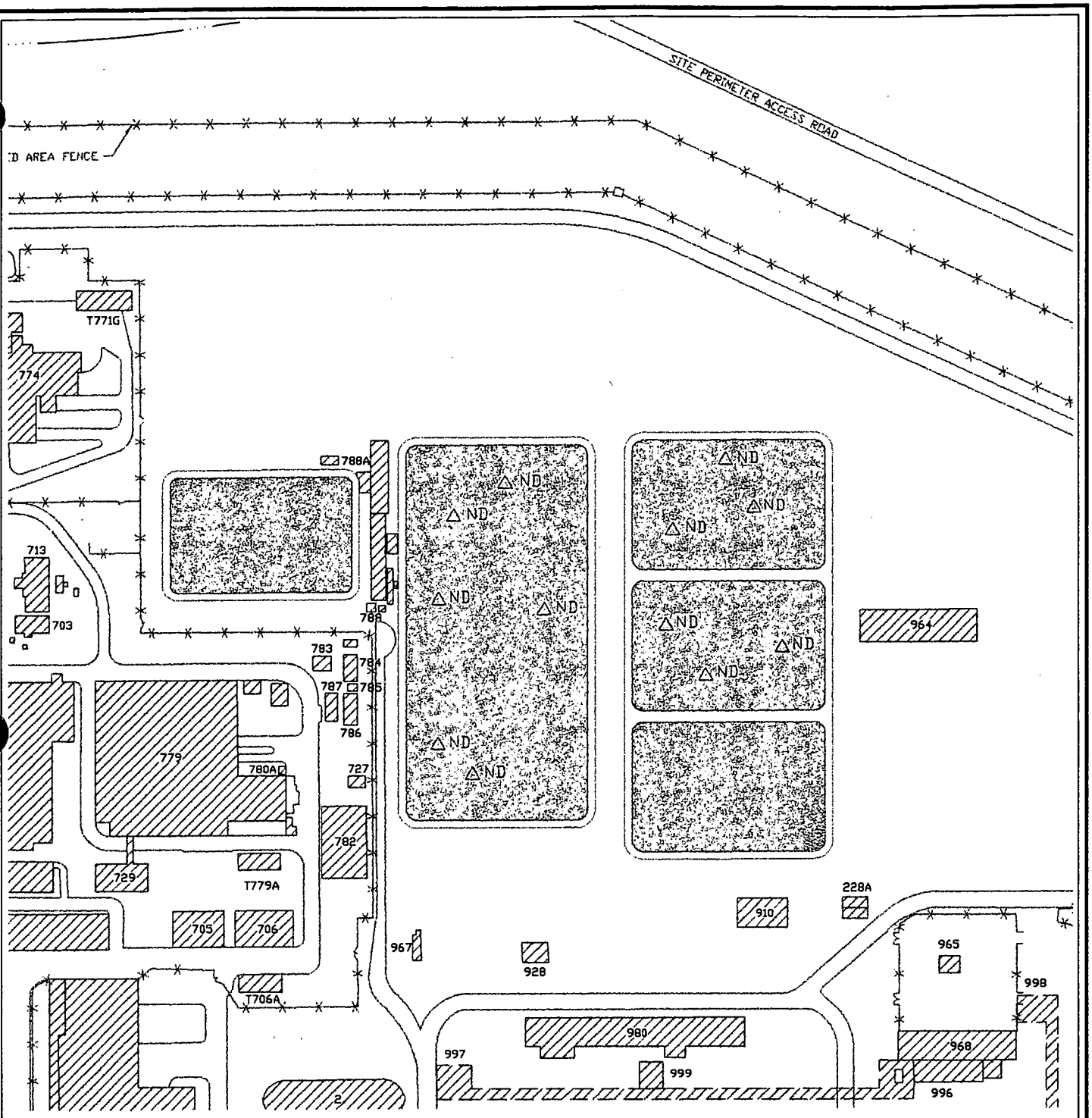
Figure II.3.1-40

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Americium 241



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- ND Not Detected

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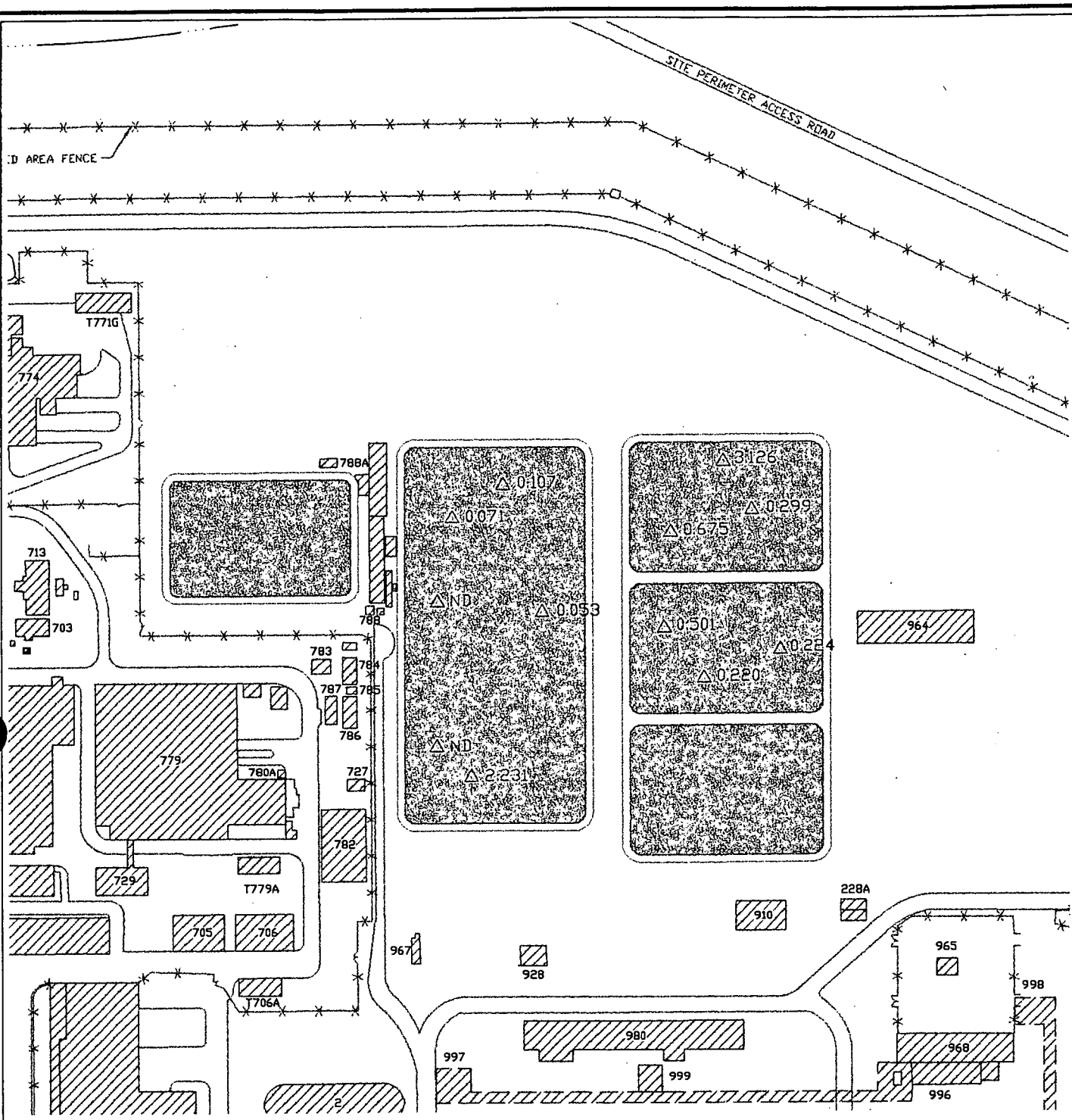
Figure II.3.1-41

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Cesium-134



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 2.231 Result in pCi/g
- ND Not Detected

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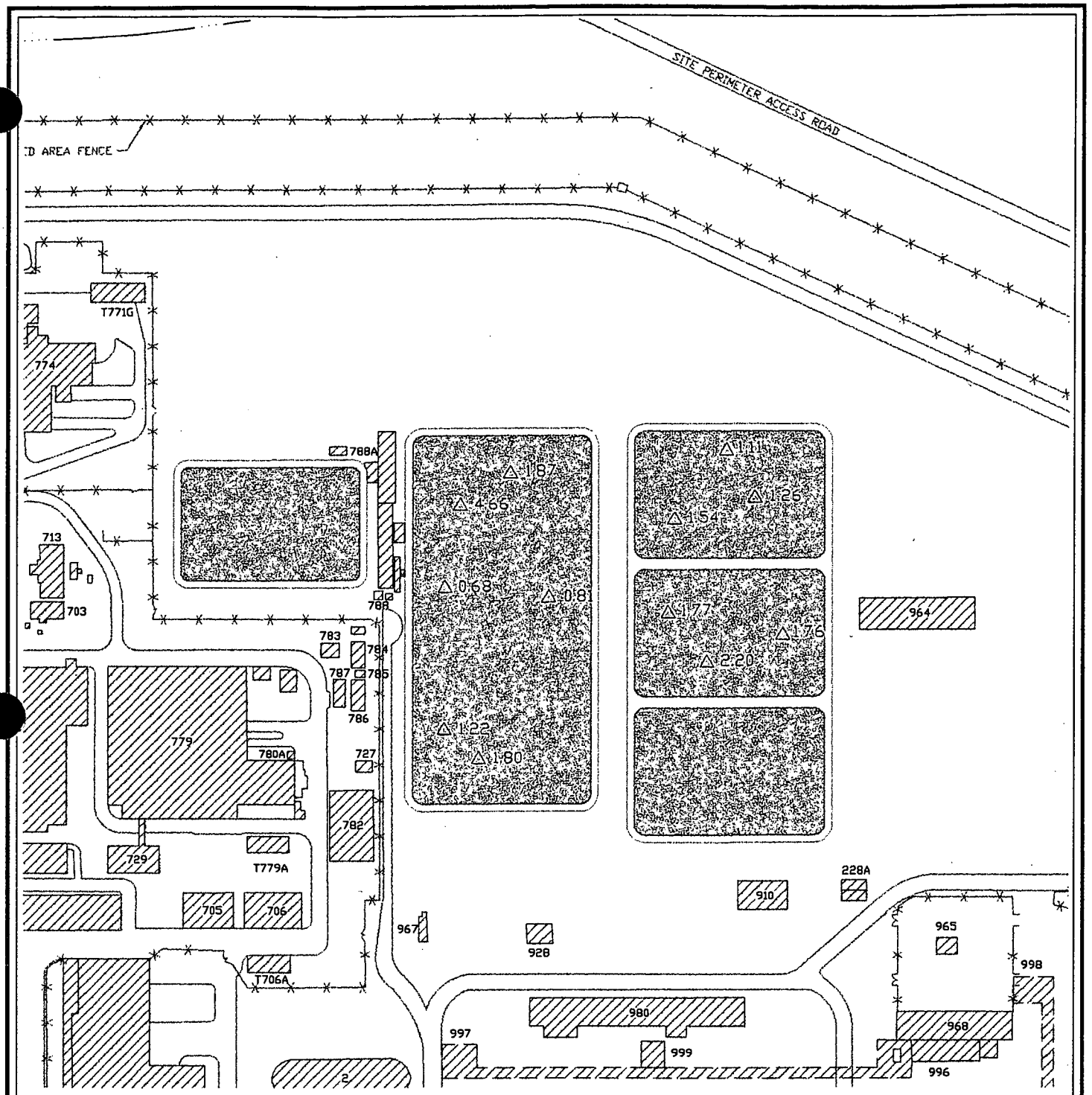
Figure II.3.1-42

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Plutonium 239/240



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 1.22 Result in pCi/g

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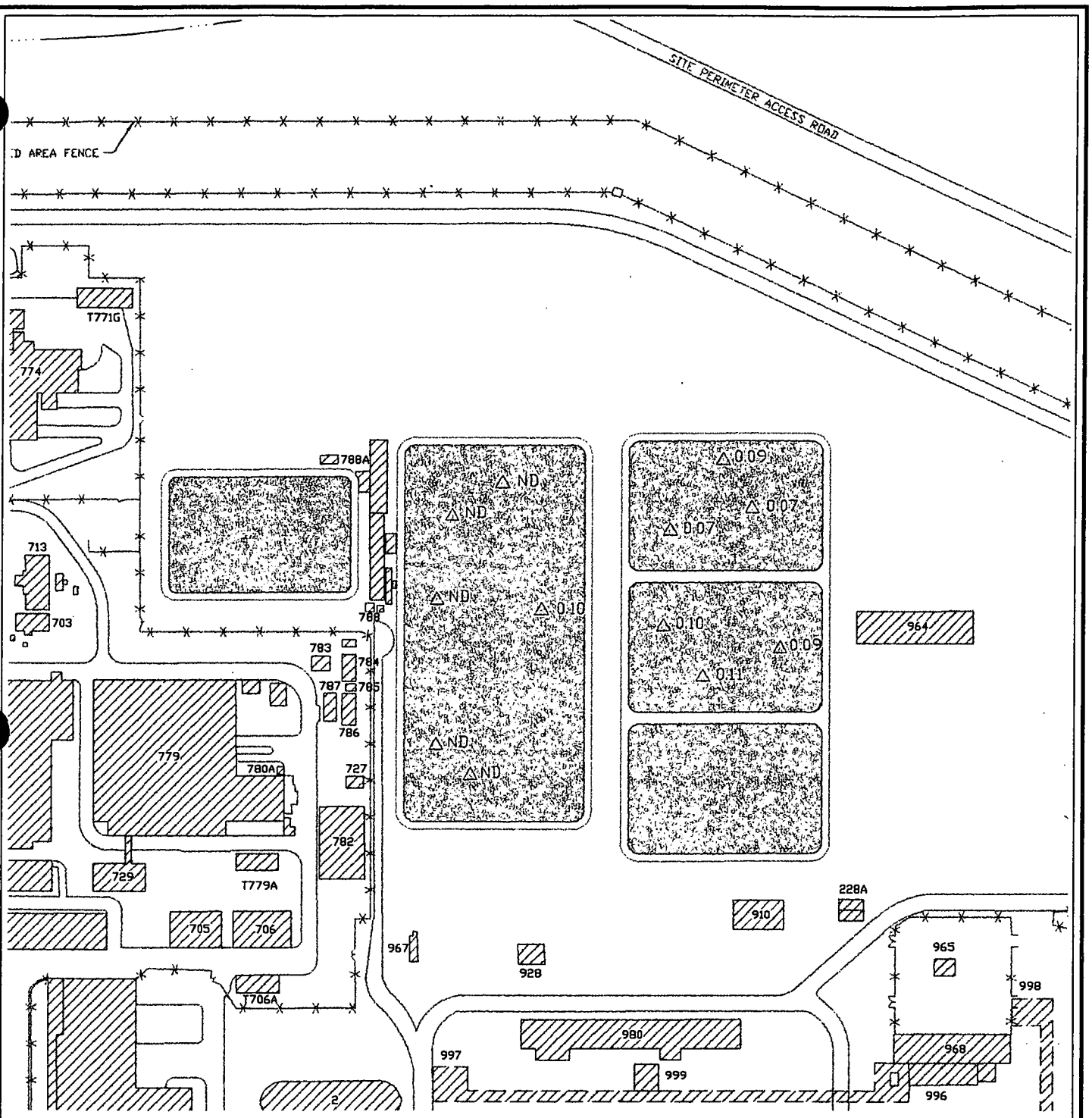
Figure II.3.1-43

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Uranium 233/234



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 0.70 Result in pCi/g
- ND Not Detected

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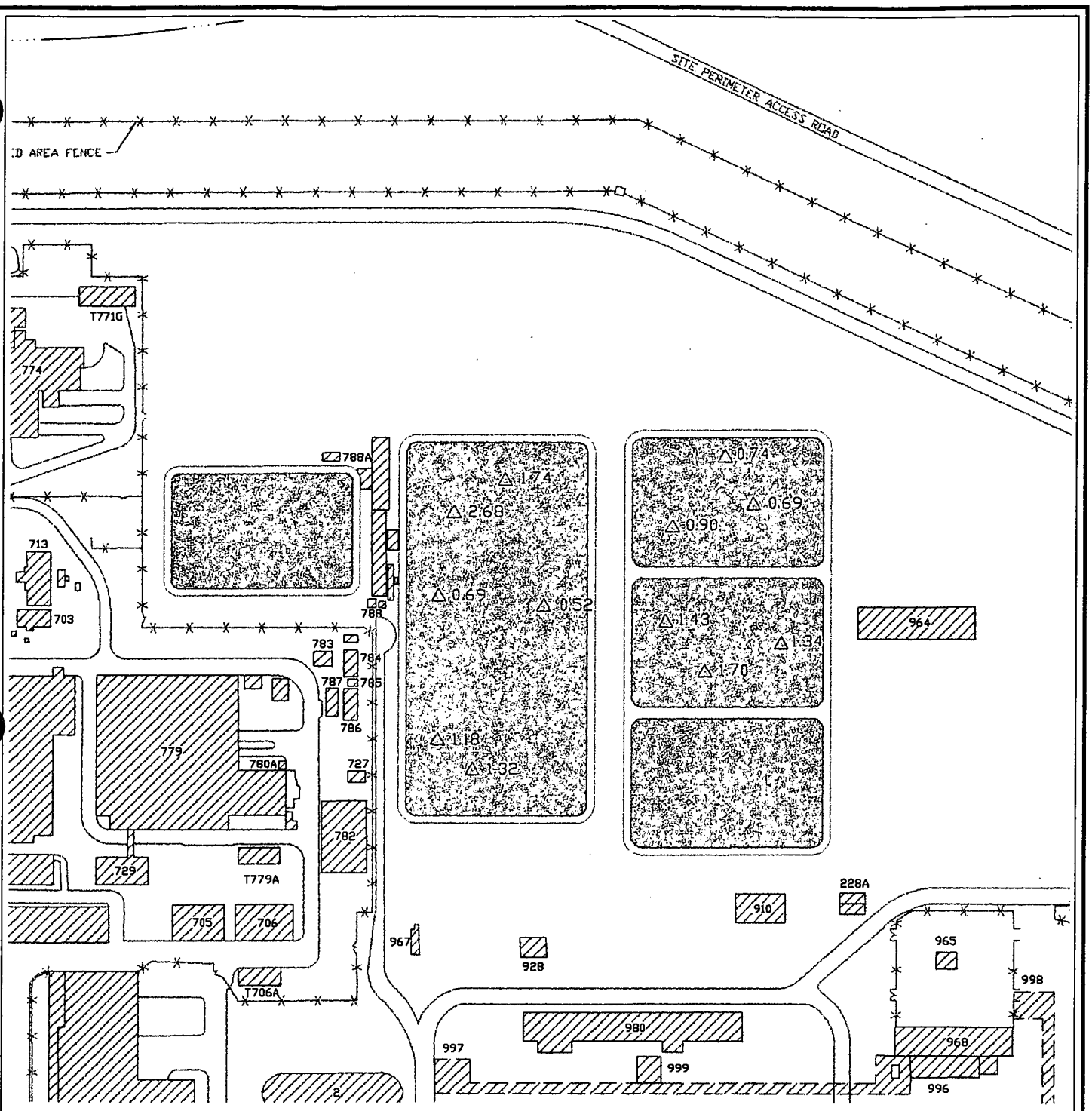
Figure II.3.1-44

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner Sampling Results
Uranium 235



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 1.18 Result in pCi/g

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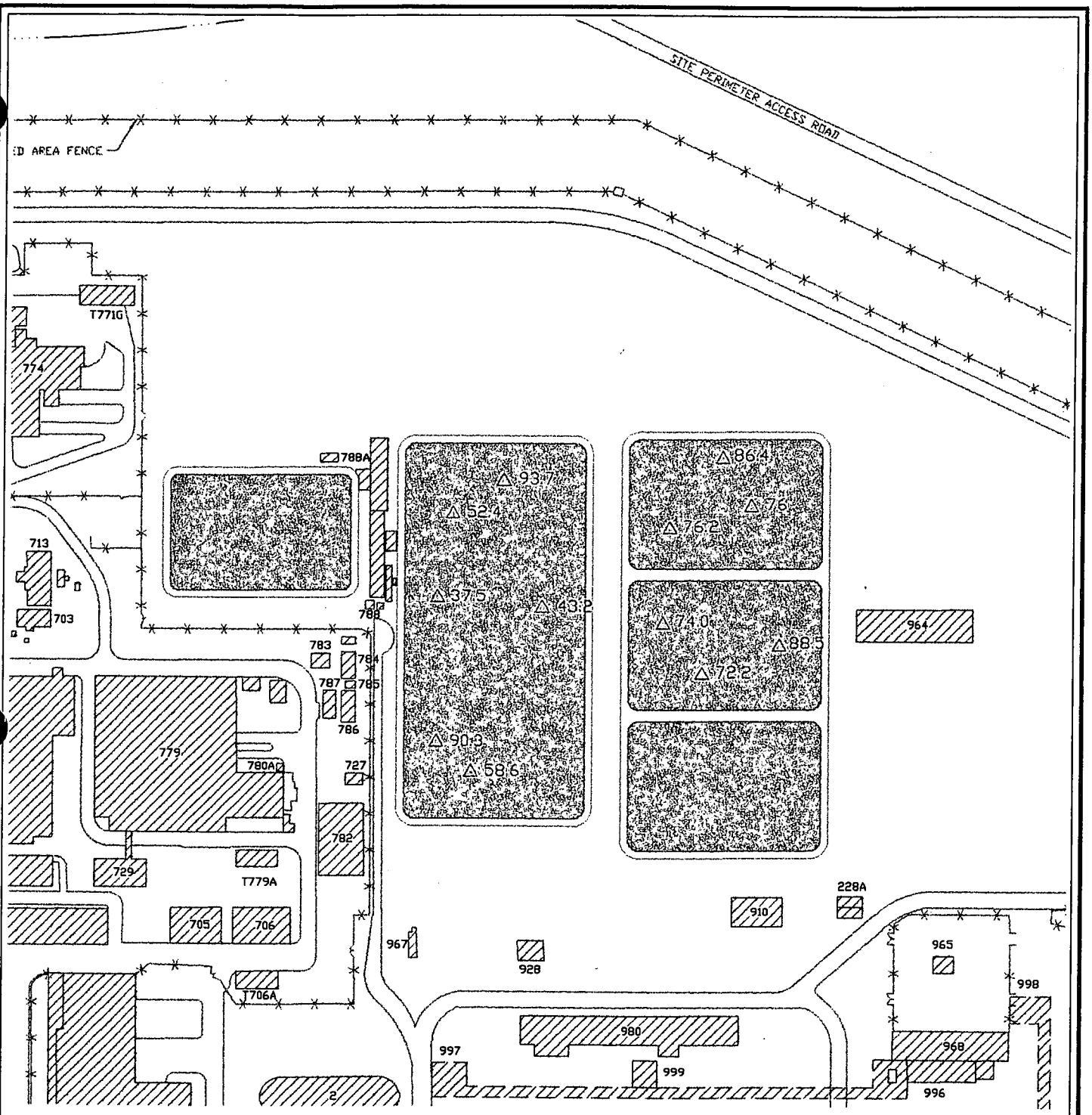
Figure II.3.1-45

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Liner
Uranium 238



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 58.6 Result in mg/kg

100 0 100 200 300 FEET

Note: Results in Red Exceed Background Level of 93.87 mg/kg

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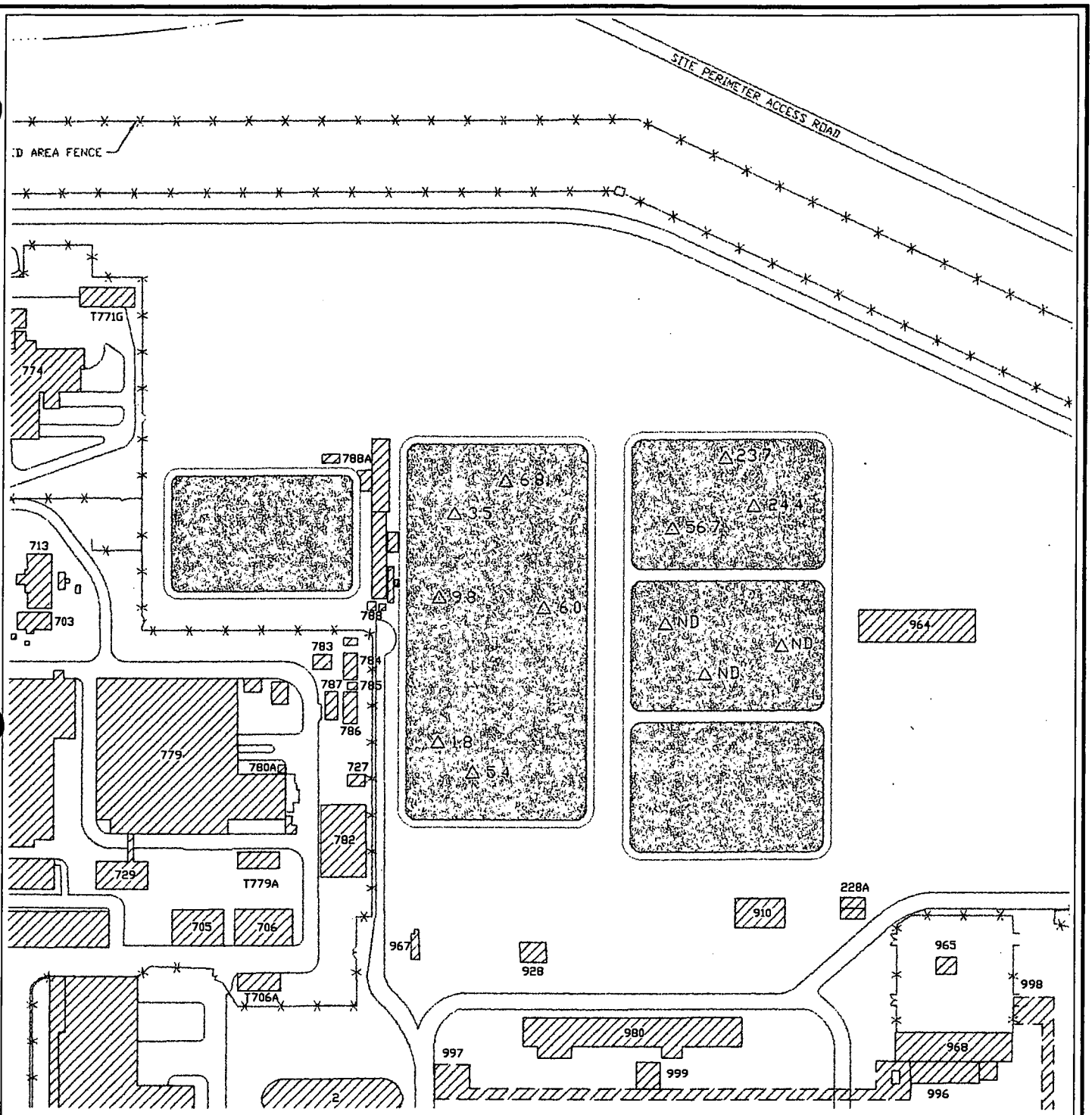
Figure II.3.1-46

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Barium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 6.0 Result in mg/kg
- ND Not Detected

Note: Results in Red Exceed Background Level of 2.3 mg/kg

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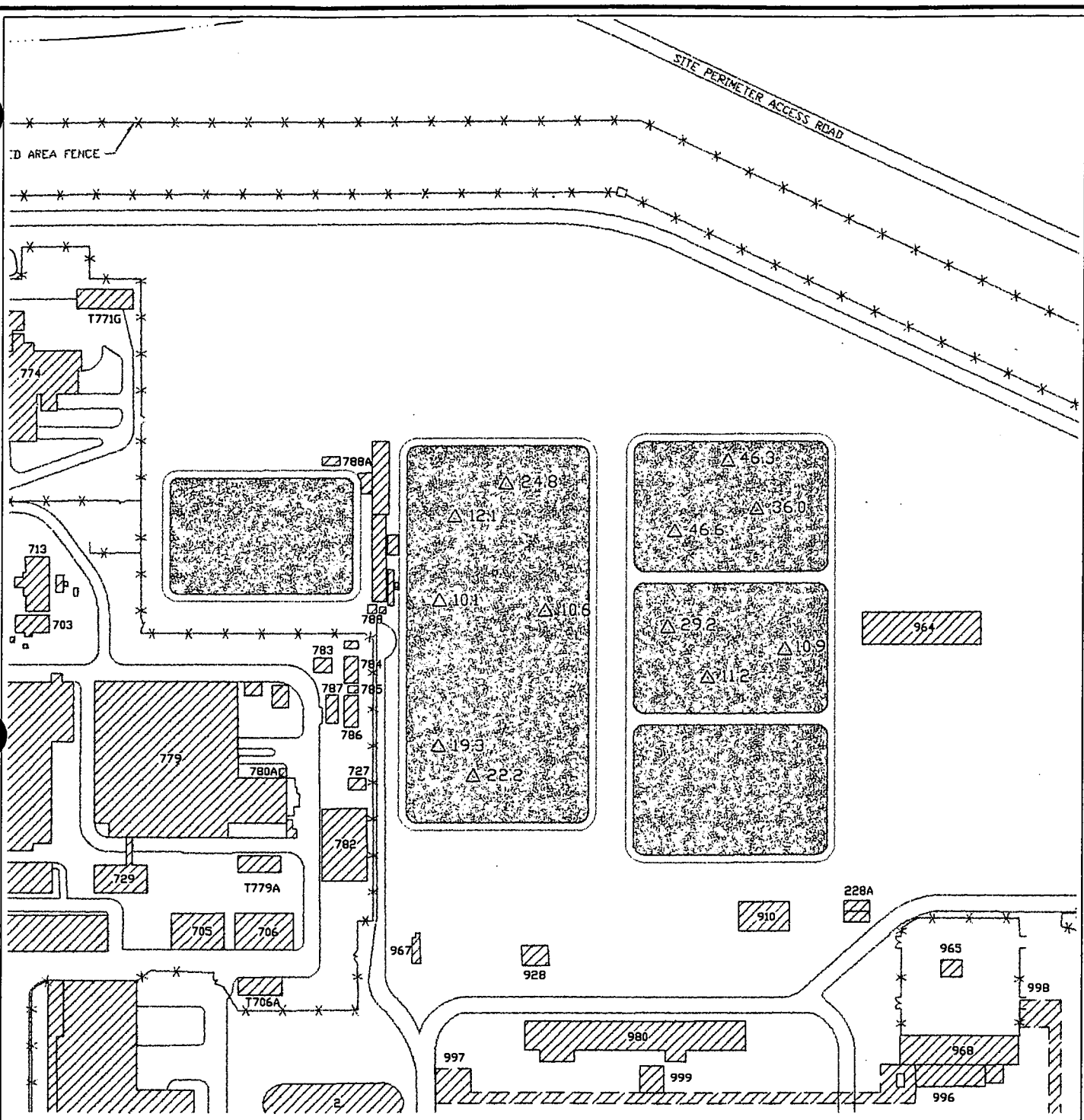
Figure II.3.1-47

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Cadmium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 36.0 Result in mg/kg

100 0 100 200 300 FEET

Note: Results in Red Exceed Background Level of 83.2 mg/kg

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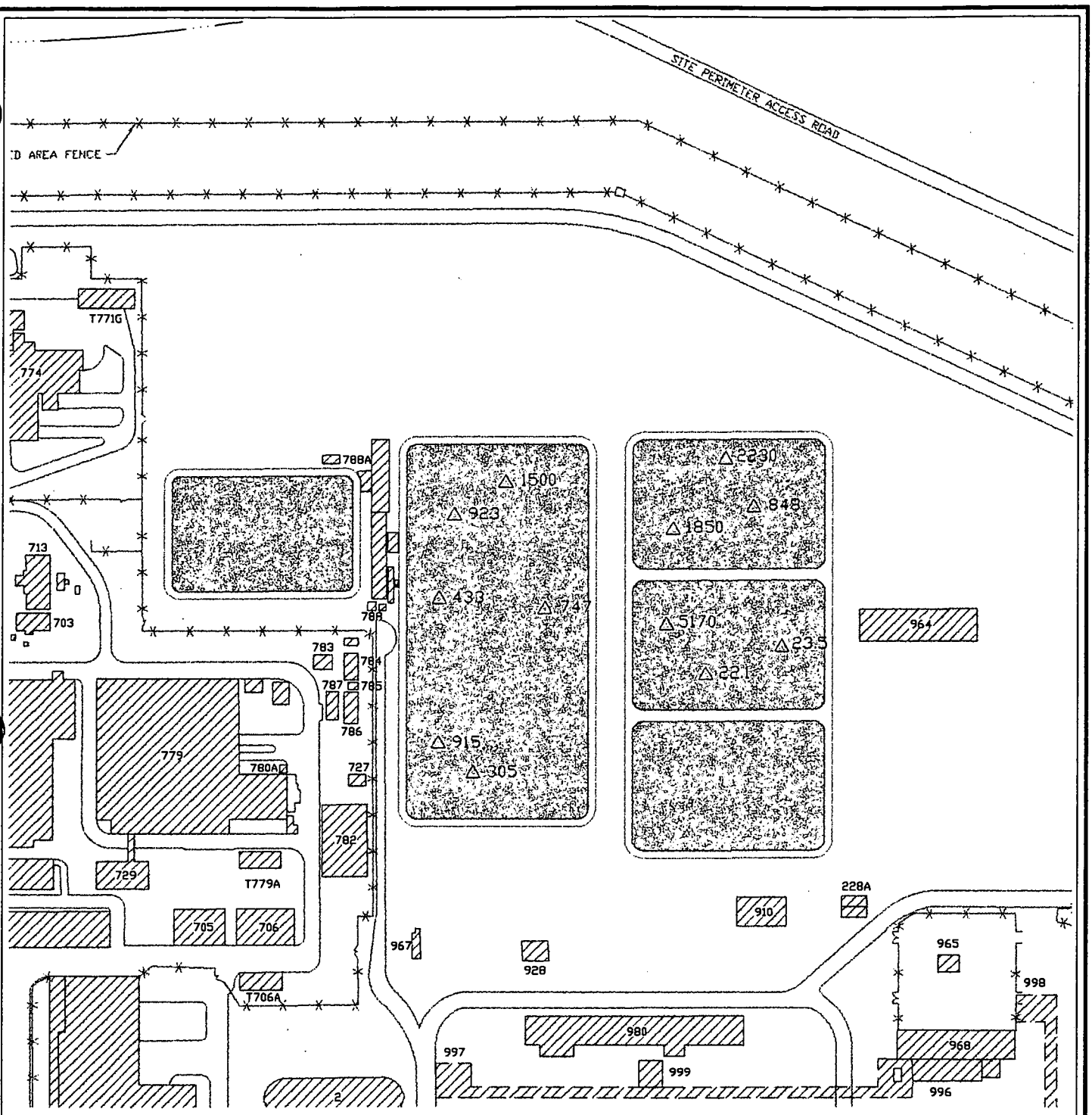
Figure II.3.1-48

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Lithium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 23.5 Result in mg/kg

Note: Results in Red Exceed Background Level of 7.1 mg/kg

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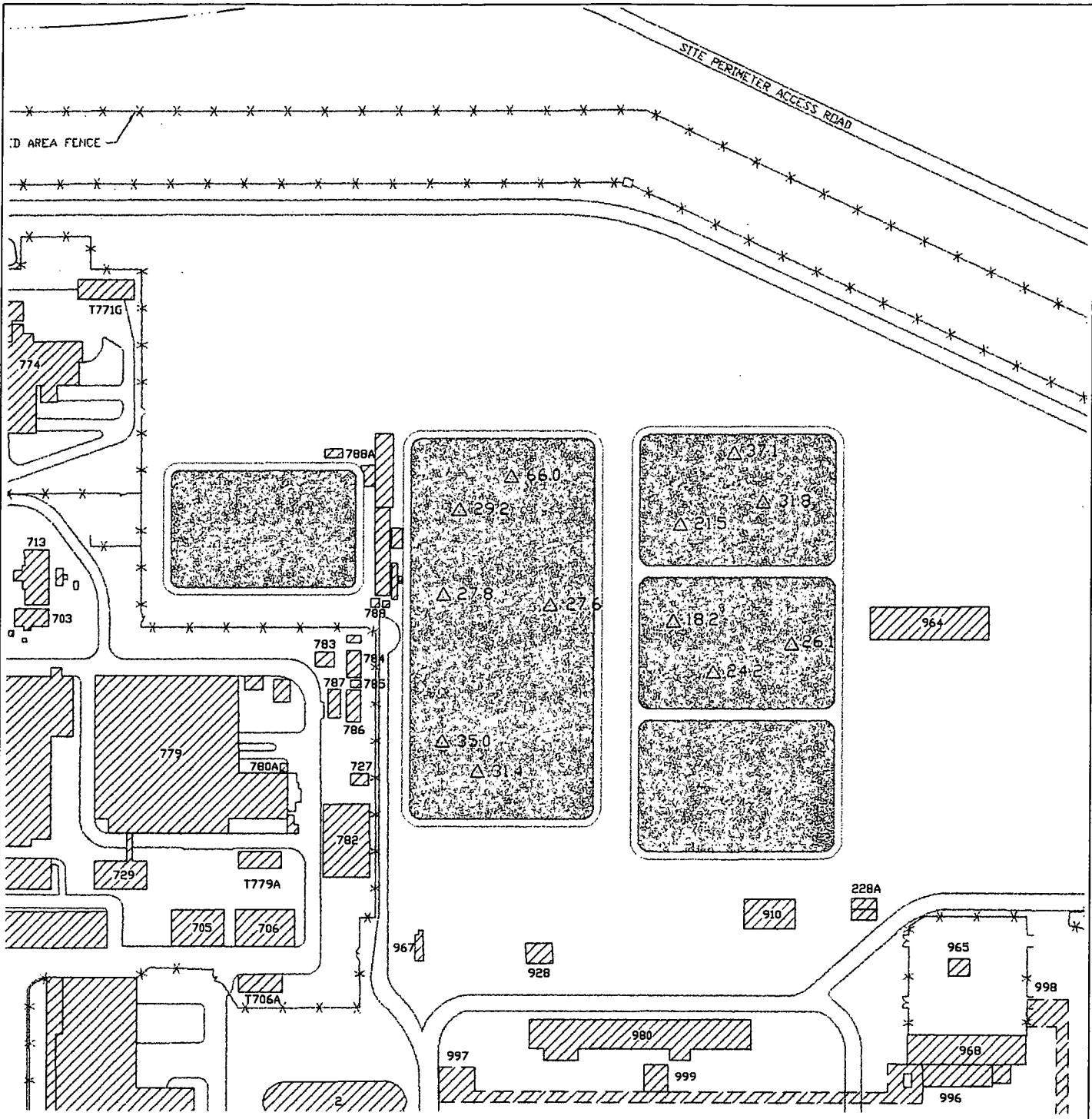
Figure II.3.1-49

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Nitrate/Nitrite



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 35.0 Result in mg/kg

Note: Results in Red Exceed Background Level of 23.64 mg/kg

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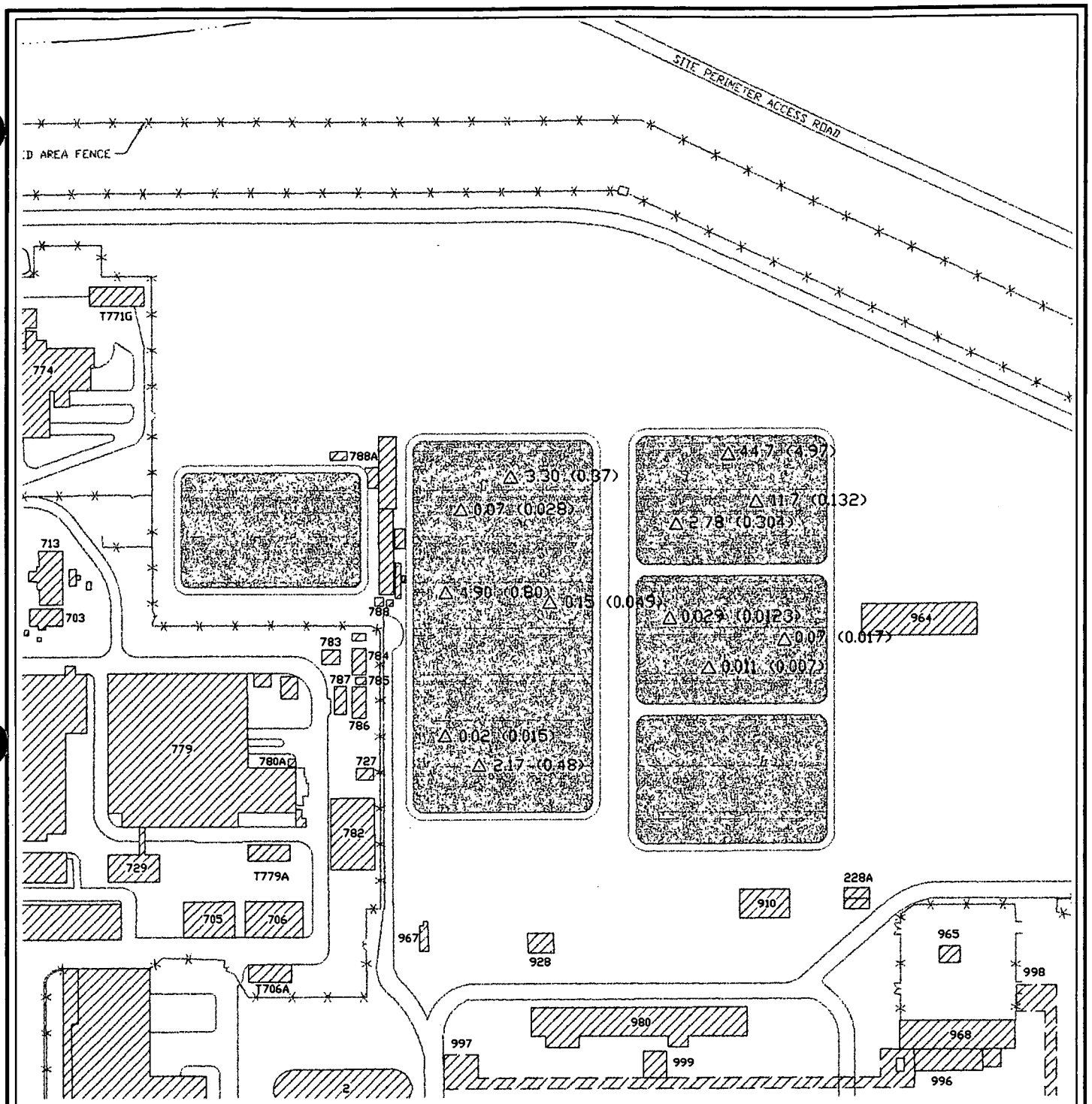
Figure II.3.1-50

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Zinc



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 2.78 Result in pCi/g
- (0.304) Counting Error

Note: Results in Red Exceed Background Level of 0.01 pCi/g

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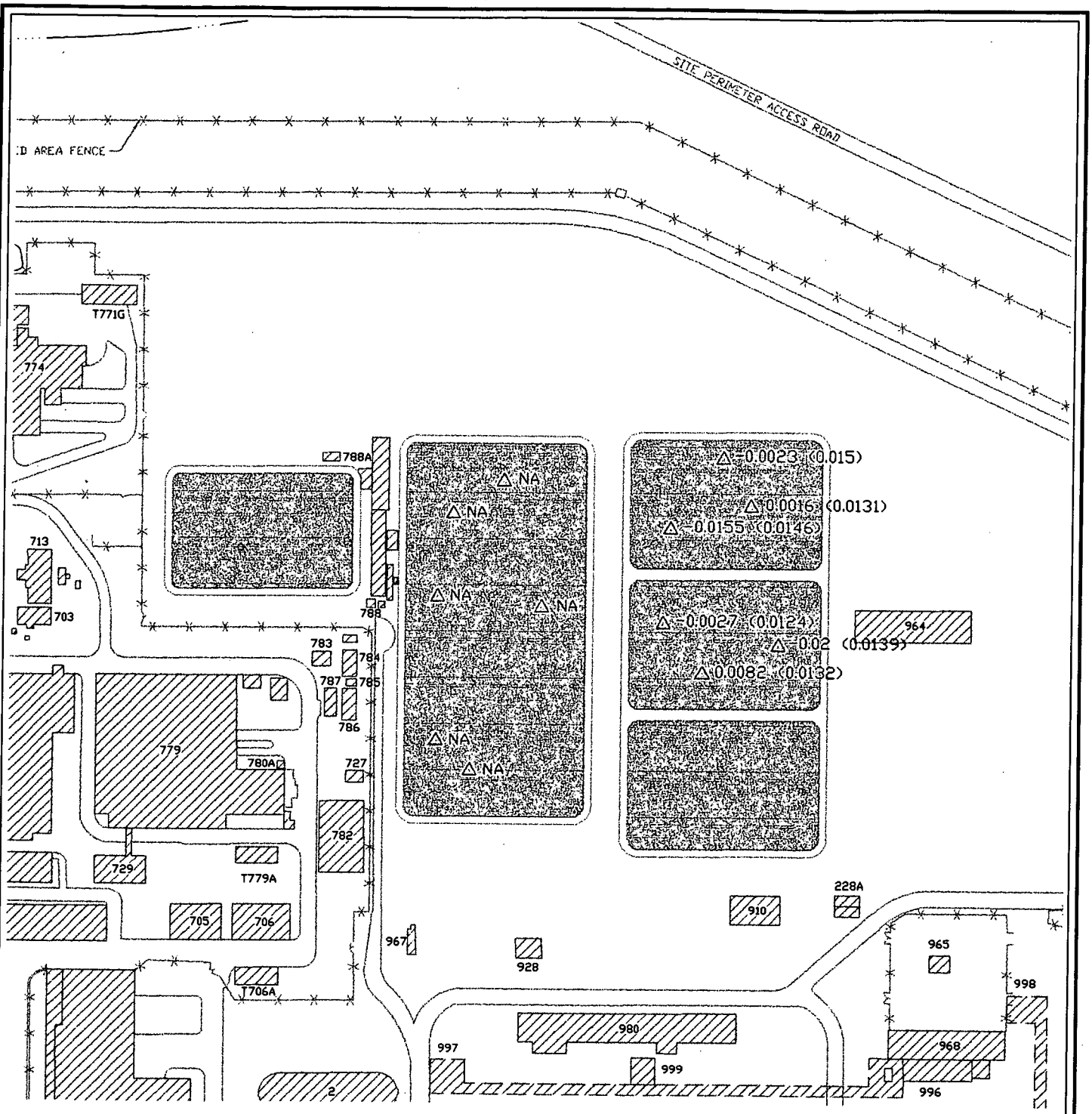
Figure II.3.1-51

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Americium 241



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- -0.0023 Result in pCi/g
- (0.015) Counting Error
- NA Not Analyzed

Note: Background Not Analyzed

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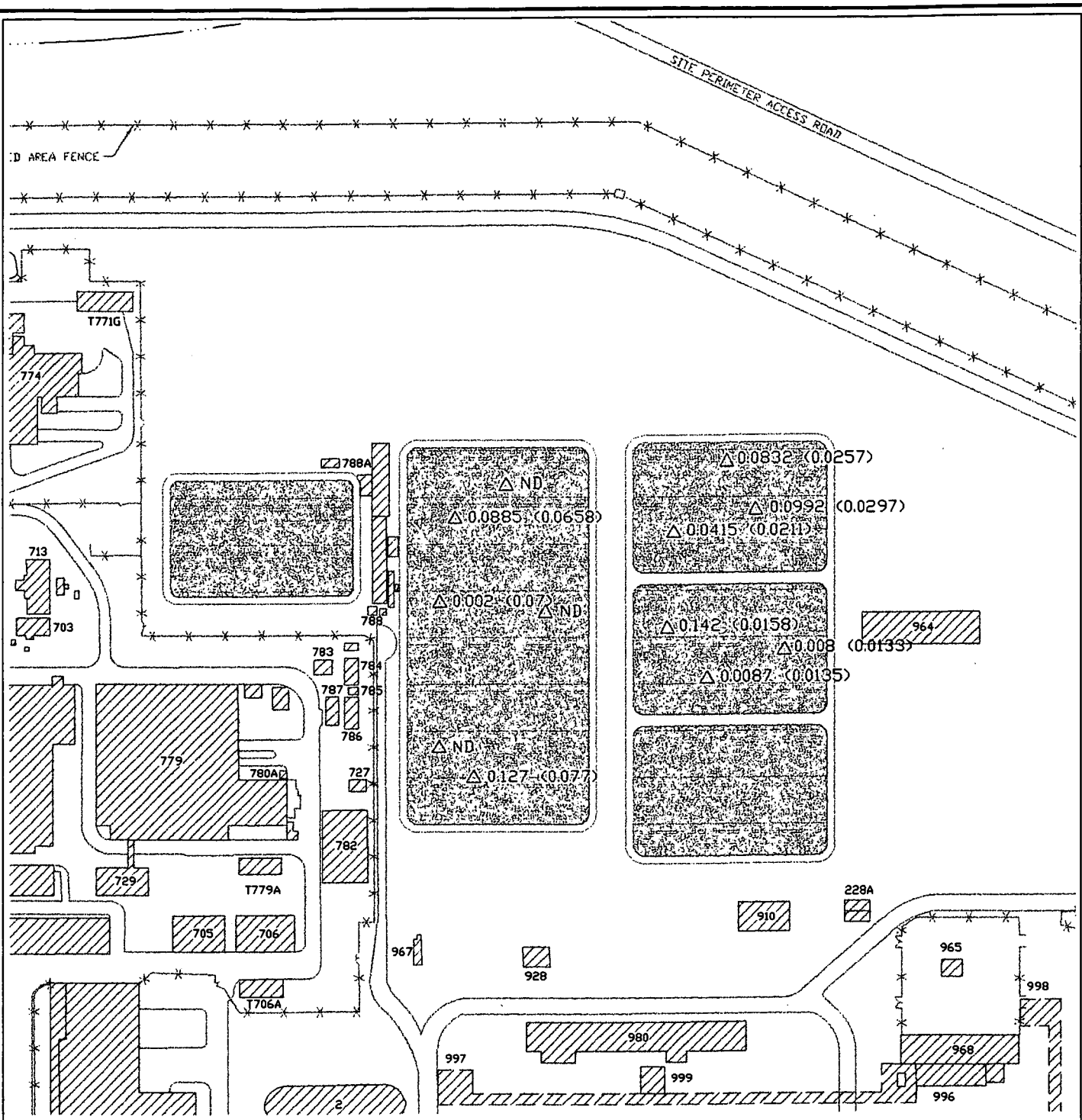
Figure II.3.1-52

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Cesium-134



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 0.008 Result in pCi/g
- (0.0133) Counting Error
- ND Not Detected

Note: Results in Red Exceed Background Level of 0.166 pCi/g

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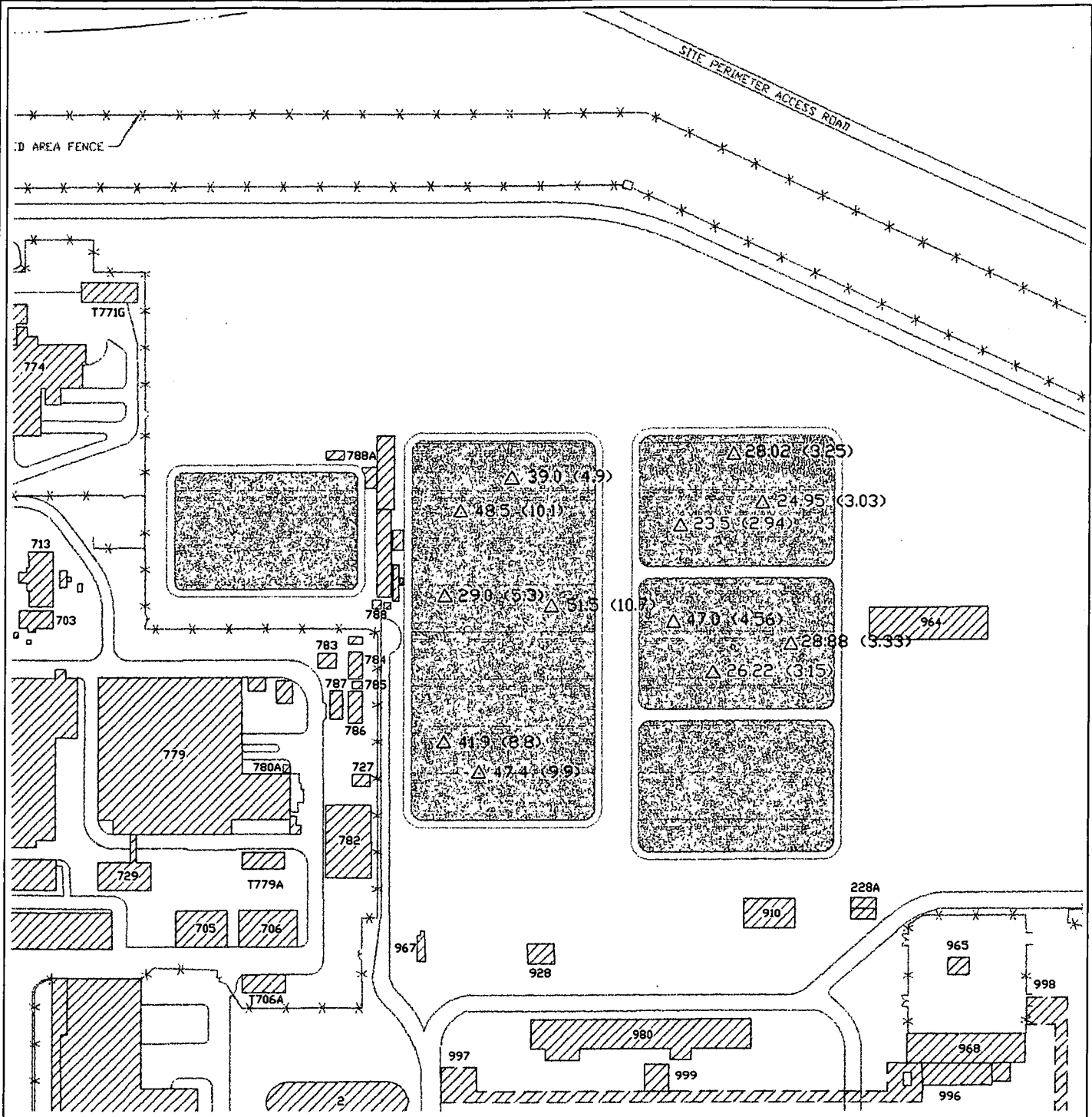
Figure II.3.1-53

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Cesium-137



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 28.02 Result in pCi/g
- (3.25) Counting Error

Note: Results in Red Exceed Background Level of 27.99 pCi/g

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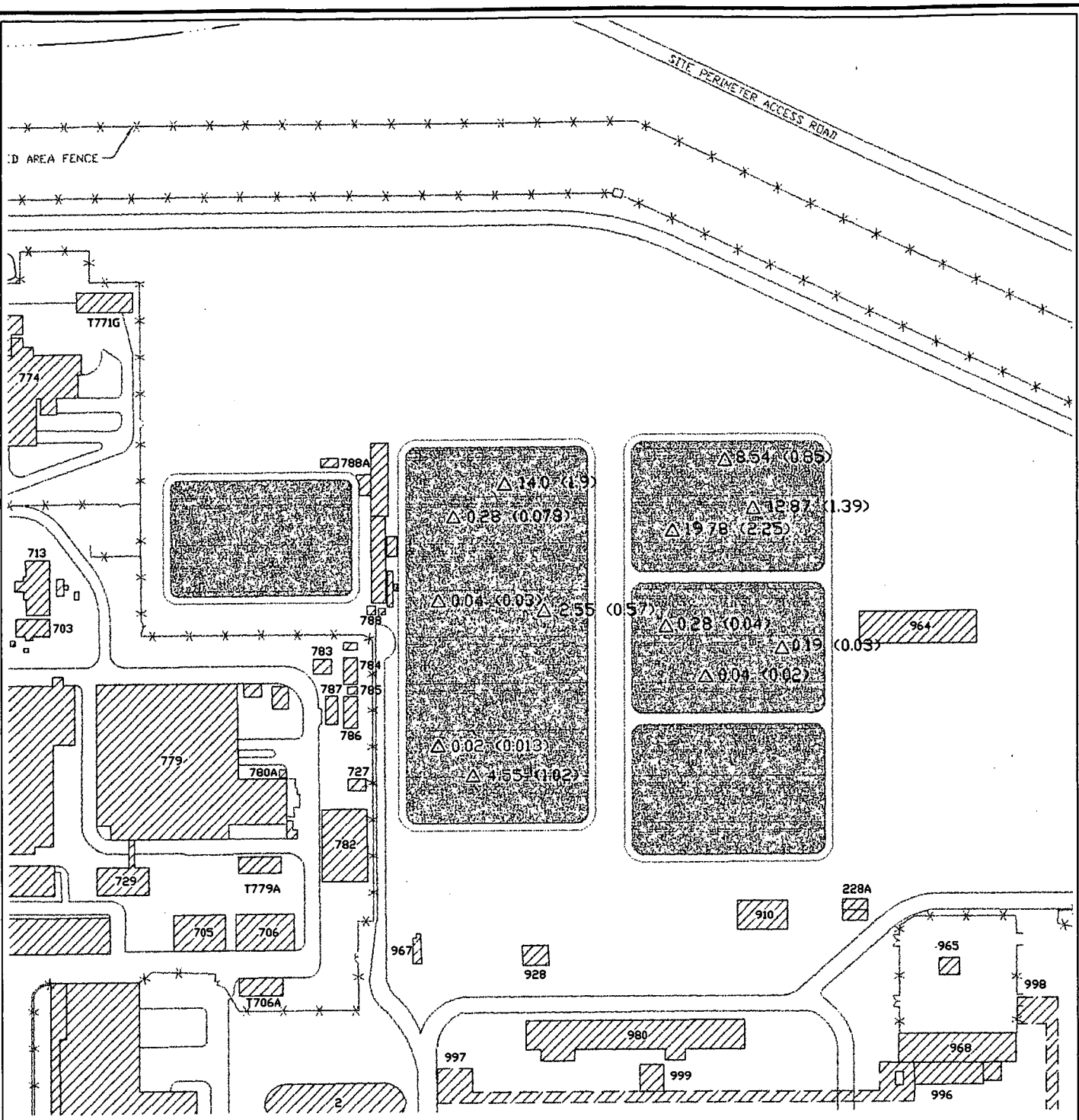
Figure II.3.1-54

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Gross Beta



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 19.78 Result in pCi/g
- (2.25) Detection Limit in pCi/g

Note: Results in Red Exceed Background Level of 0.02 pCi/g

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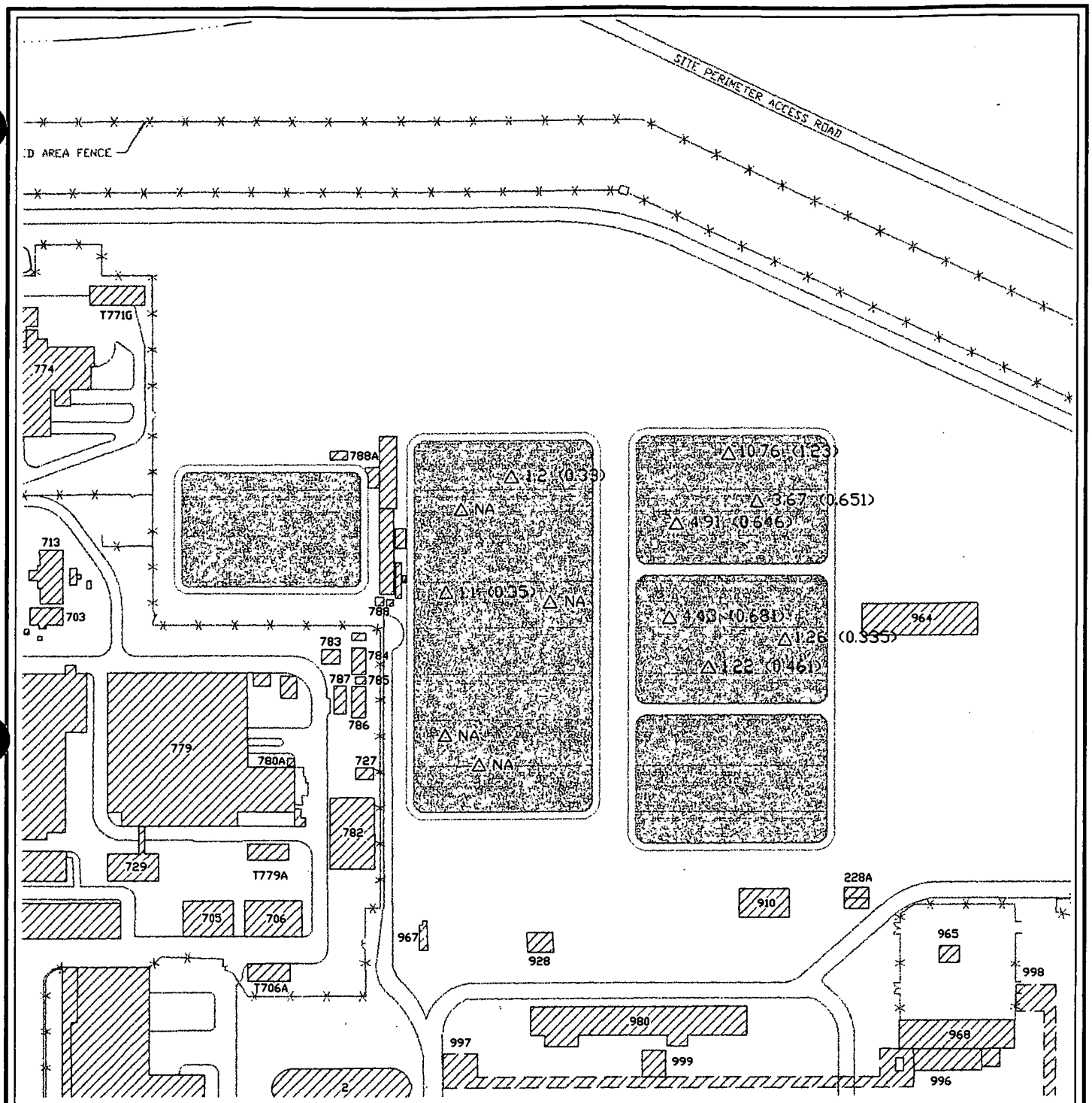
Figure II.3.1-55

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Plutonium 239/240



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 1.22 Result in pCi/g
- (0.461) Counting Error
- NA Not Analyzed

Note: Results in Red Exceed Background Level of 0.65 pCi/g

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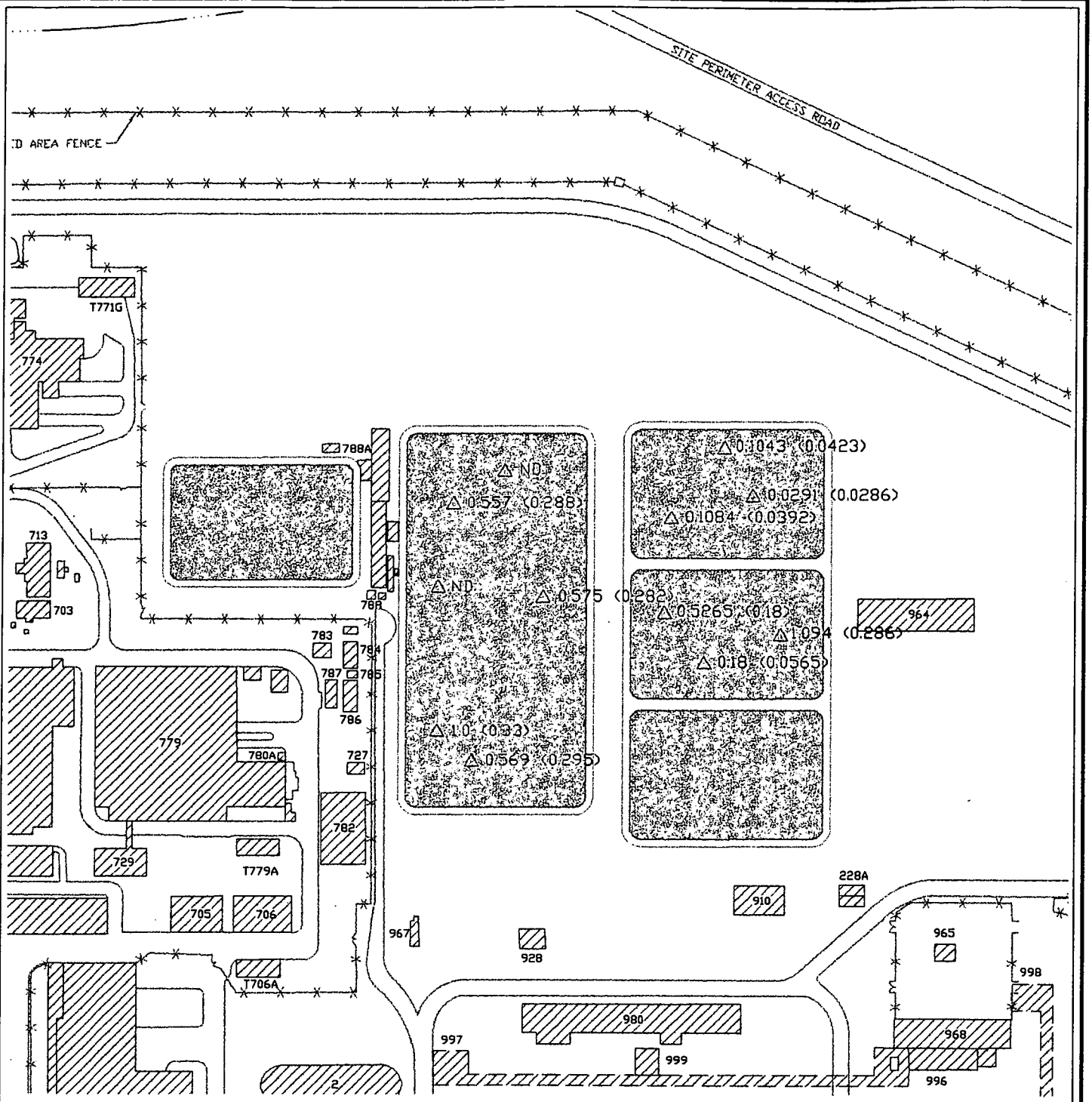
Figure II.3.1-56

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Radium 226



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 1.0 Result in pCi/g
- (0.33) Counting Error
- ND Not Detected

Note: Results in Red Exceed Background Level of 0.54 pCi/g

100 0 100 200 300 FEET

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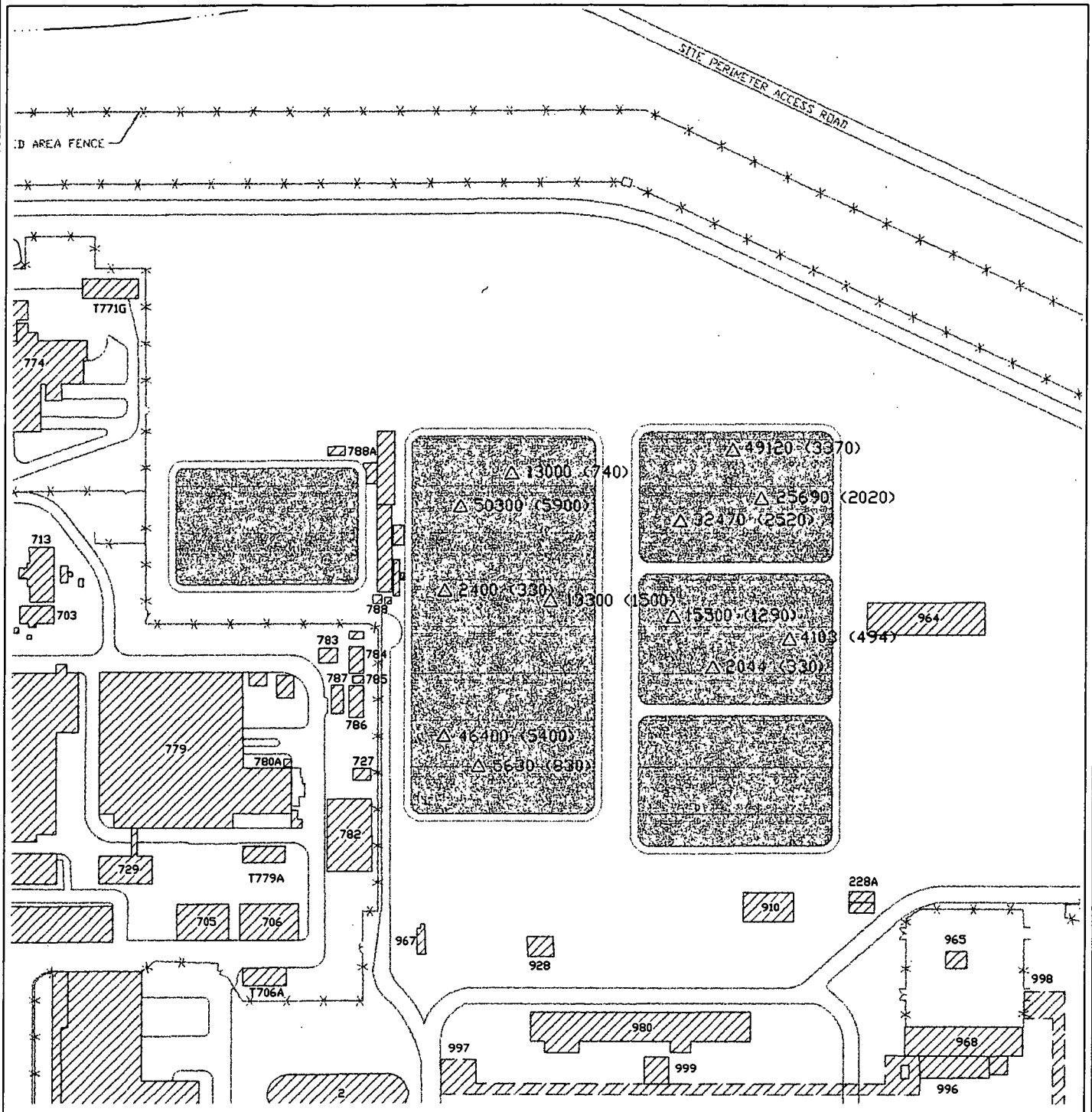
Figure II.3.1-57

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Strontium 89/90



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 2044 Result in pCi/l
- (330) Counting Error

Note: Results in Red Exceed Background Level of 212.2 pCi/l

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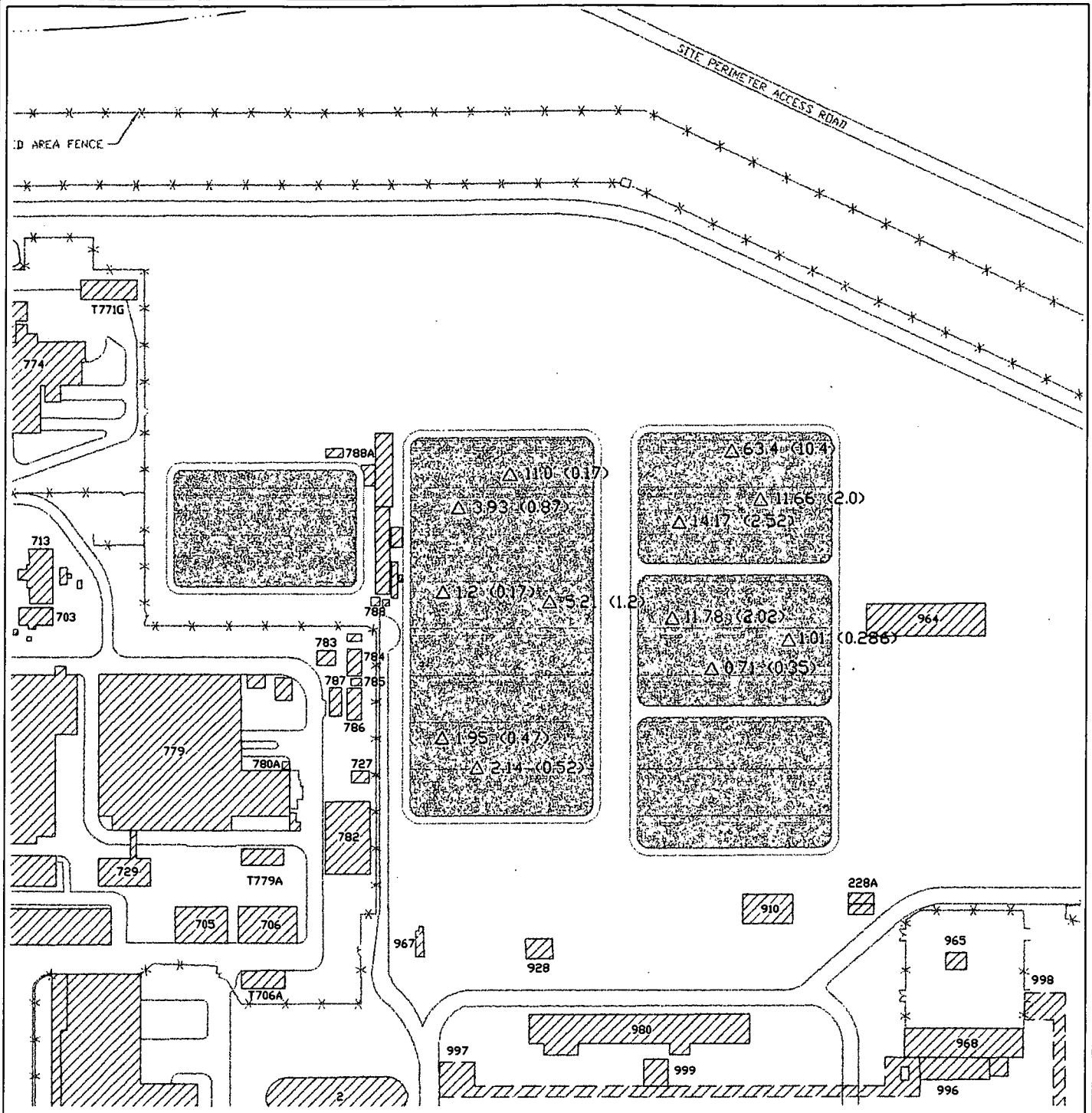
Figure II.3.1-58

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Tritium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 5.21 Result in pCi/g
- (1.2) Counting Error

Note: Results in Red Exceed Background Level of 0.53 pCi/g

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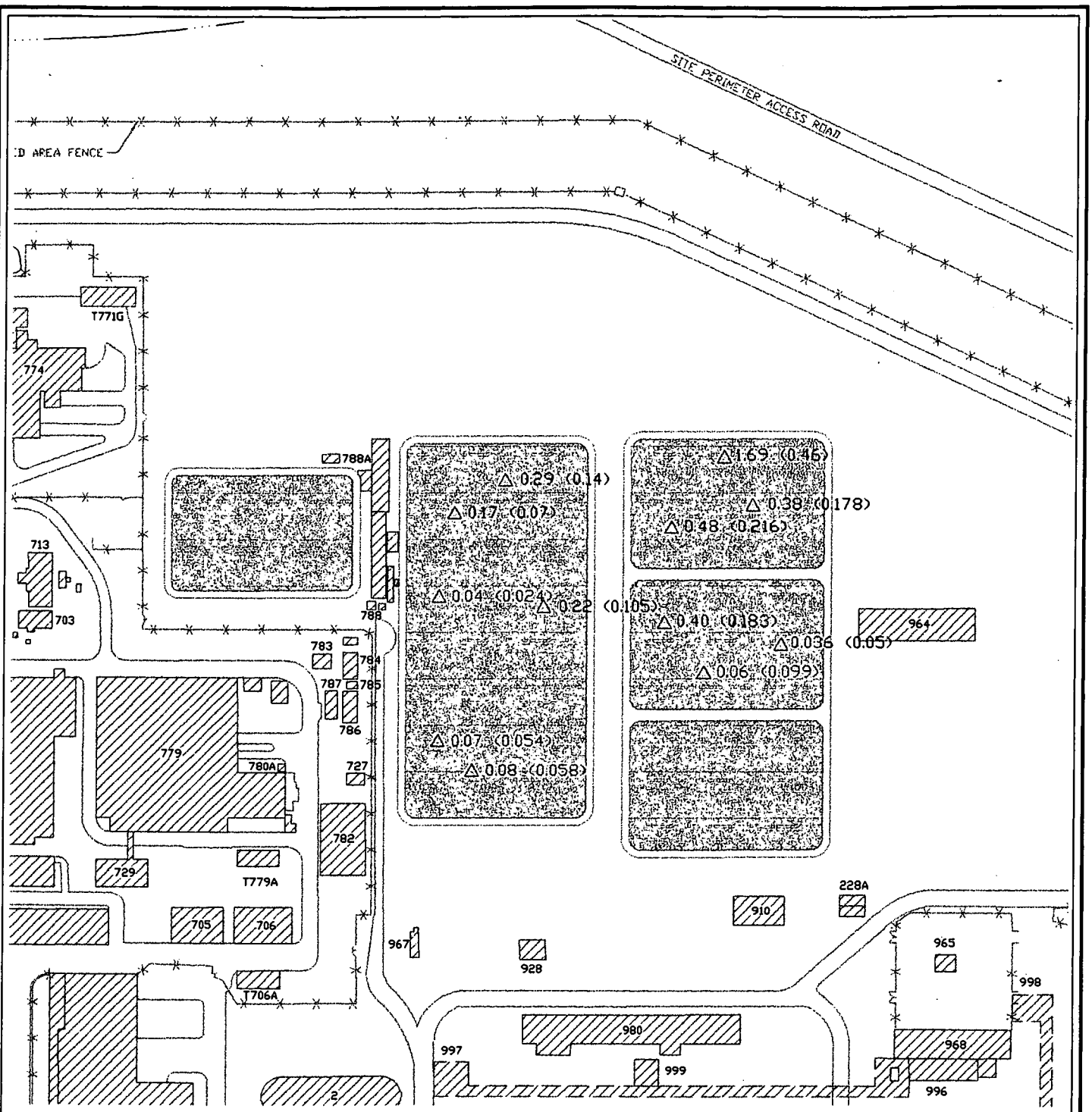
Figure II.3.1-59

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Uranium 233/234



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 0.48 Result in pCi/g
- (0.216) Counting Error

Note: Results in Red Exceed Background Level of 0.1 pCi/g

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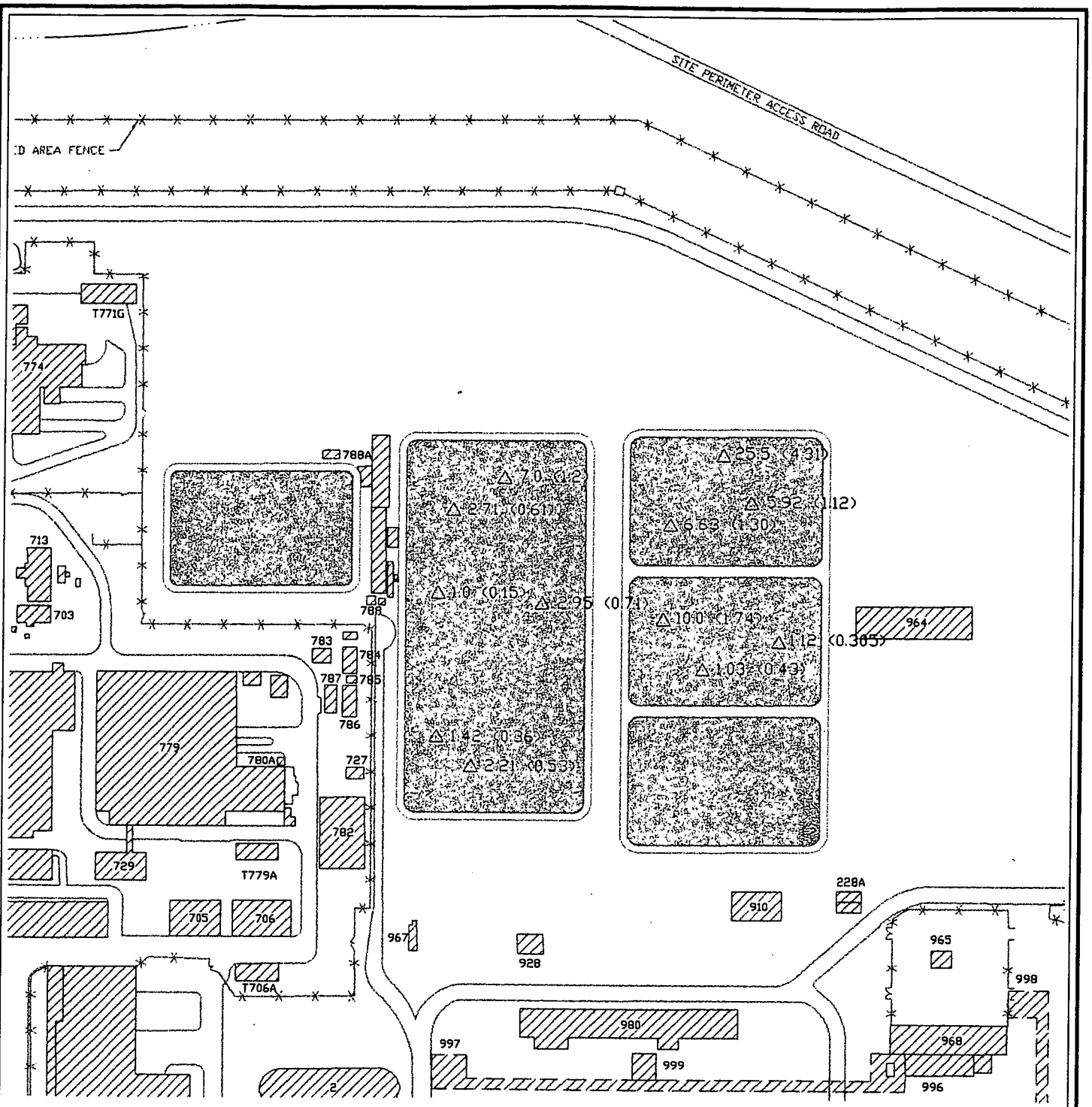
Figure II.3.1-60

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Uranium 235



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Sampling Location
- 6.63 Result in pCi/g
- (1.30) Counting Error

Note: Results in Red Exceed Background Level of 0.63 pCi/g

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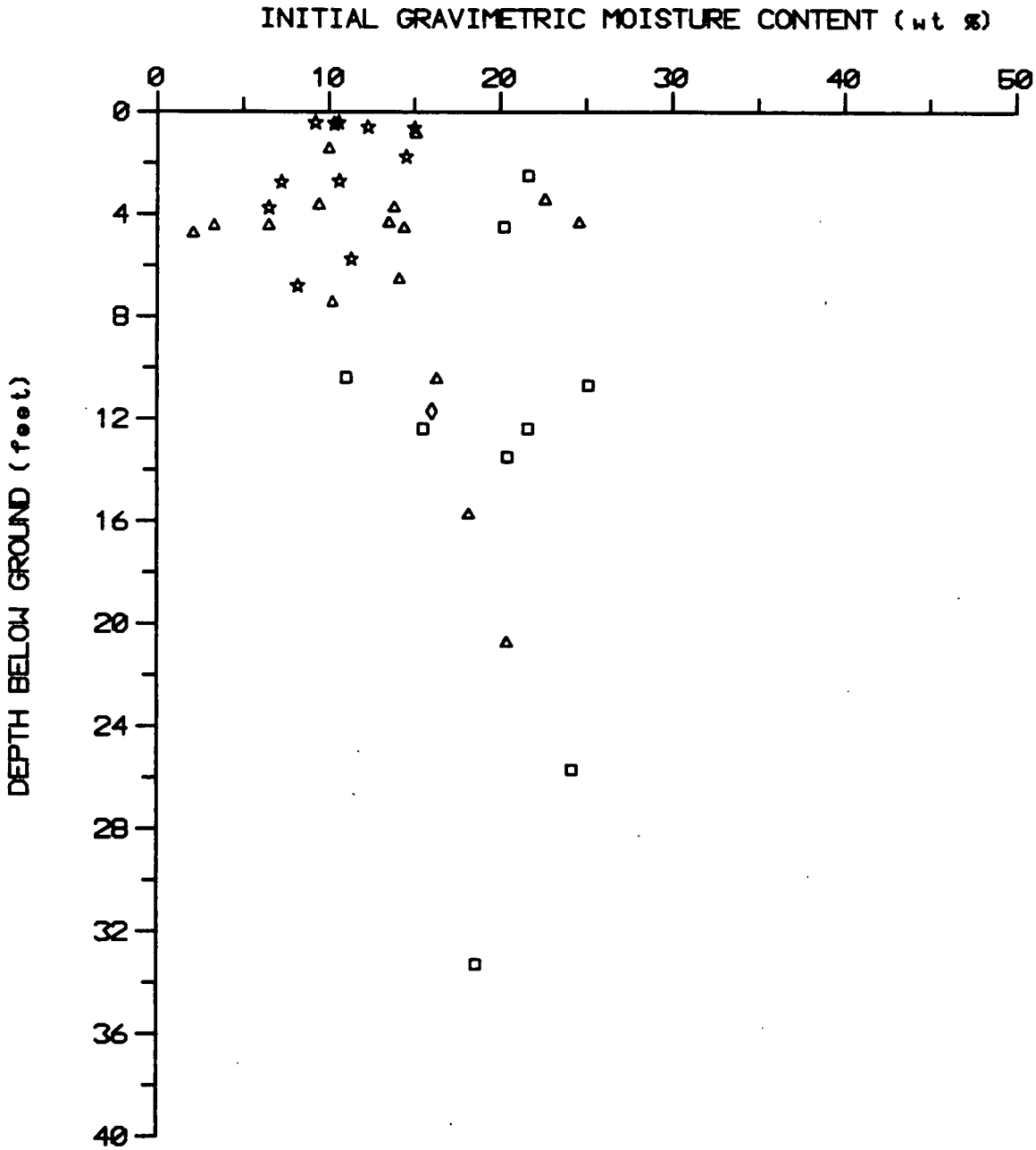
Figure II.3.1-61

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Existing Ponds Subgrade Sampling Results
Uranium 238



□ BEDROCK (SPRING '93)

△ ALLUVIUM (SPRING '93)

☆ ALLUVIUM (FALL '93)

◊ BEDROCK (FALL '93)

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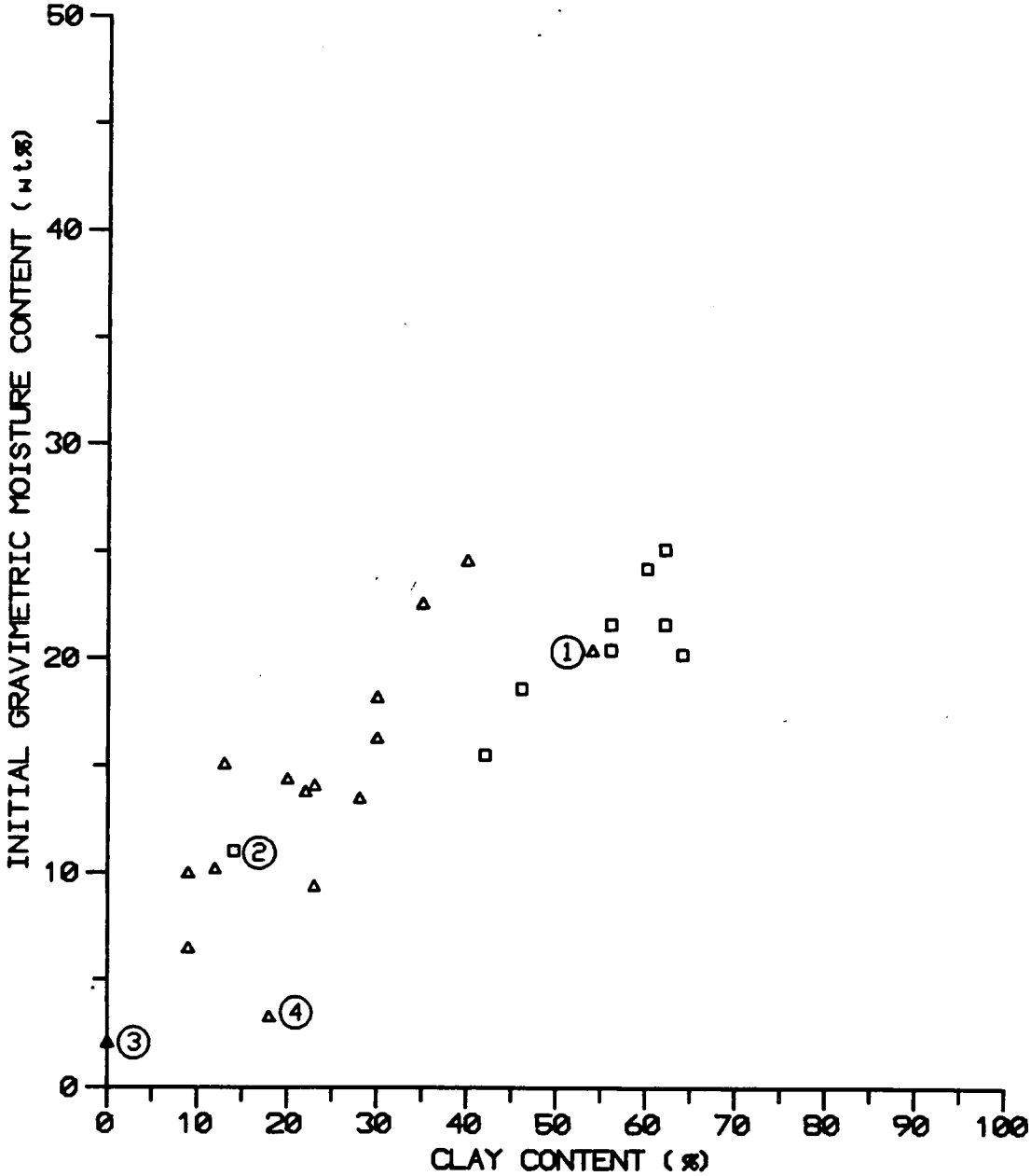
Figure II.3.3-2

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Initial Gravimetric Moisture Content versus Depth



		SAMPLE	BOREHOLE	USGS/WENTWORTH
□ BEDROCK	1	BH40401AE	40593	CH
△ ALLUVIUM	2	BH40609AE	40993	SANDSTONE
	3	BH40405AE	44393	SW
	4	BH40600AE	43193	GM

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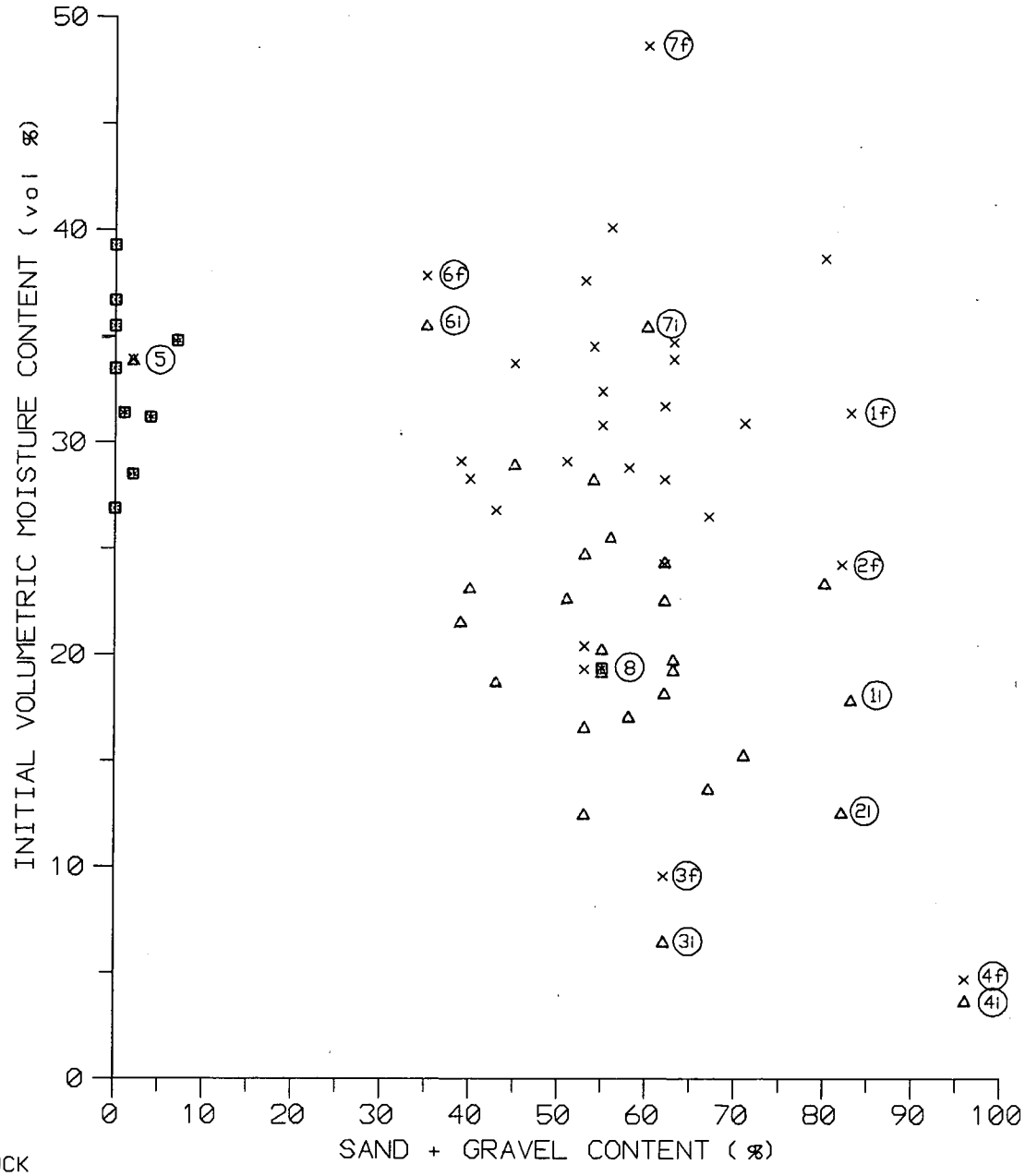
Figure II.3.3-3

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Initial Gravimetric Moisture Content versus Clay Content



□ BEDROCK
△ ALLUVIUM
* BEDROCK ADJUSTED MOISTURE CONTENT
× ALLUVIUM ADJUSTED MOISTURE CONTENT
i LABORATORY VOLUMETRIC MOISTURE CONTENT
f ADJUSTED VOLUMETRIC MOISTURE CONTENT

SAMPLE	BOREHOLE	USGS/BEDROCK
1 BH40612AE	43693	GC
2 BH40608AE	40993	GM
3 BH40600AE	43193	GM
4 BH40405AE	44393	SW
5 BH40401AE	40593	CH
6 BH40407AE	44093	CH
7 BH40611AE	42893	GC
8 BH40609AE	40993	SANDSTONE

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Figure II.3.3-4

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Volumetric Moisture Content versus Coarse Fraction

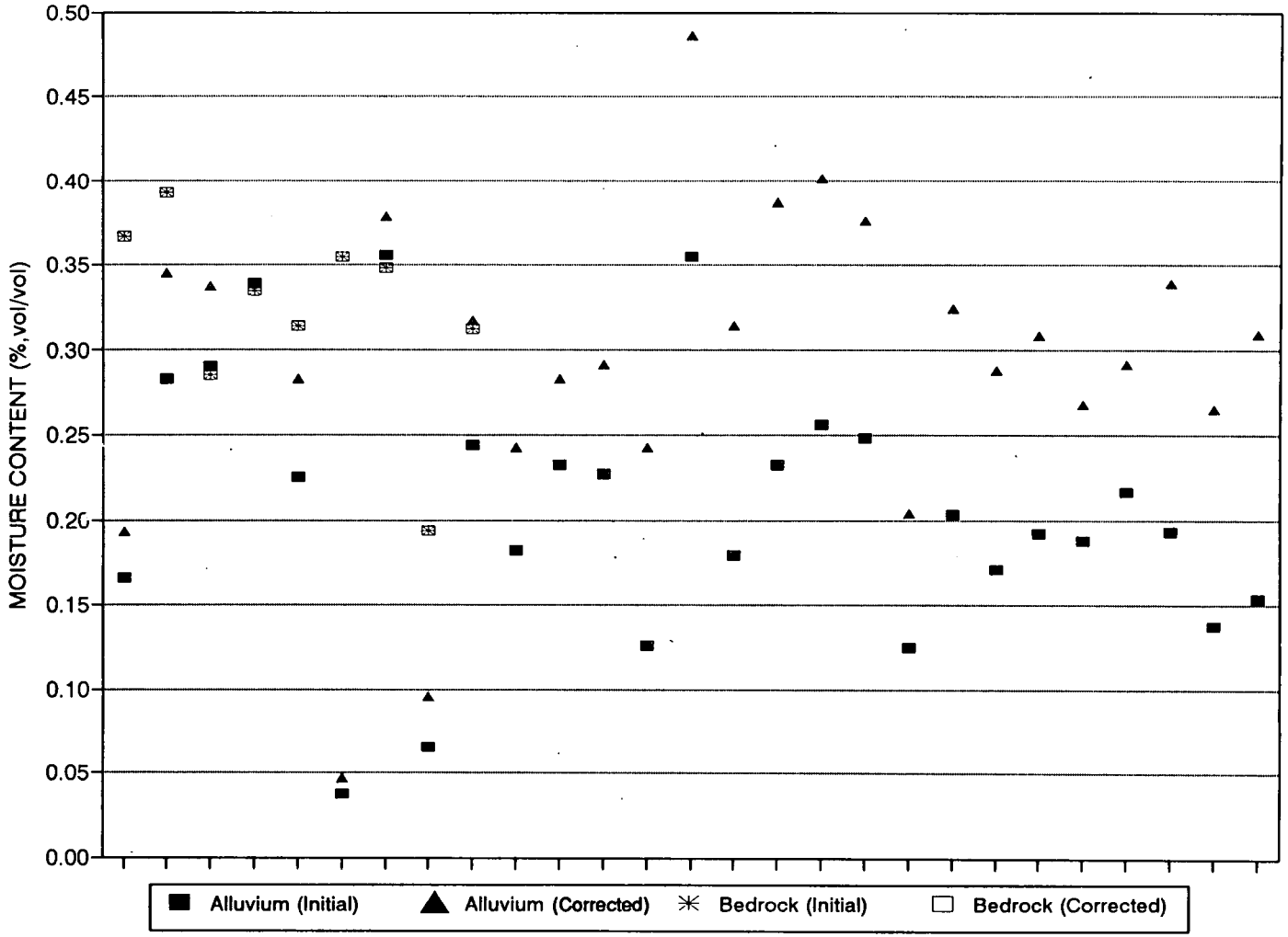

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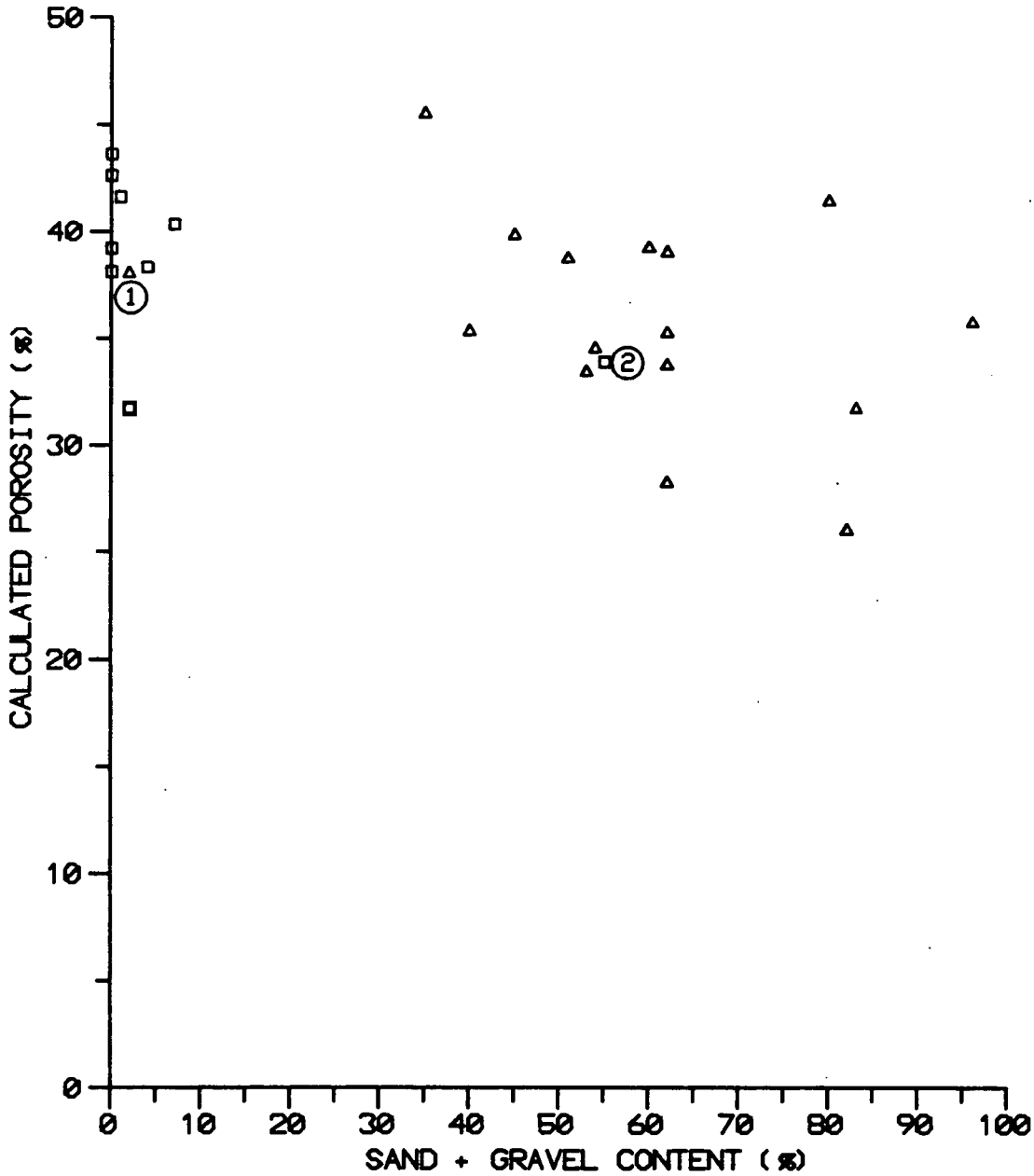
Figure II.3.3-5

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Correlation Between Initial and Corrected Moisture Contents

rf85x11h



		SAMPLE	BOREHOLE	USGS/WENTWORTH
□ BEDROCK	1	BH40401AE	40593	CH
△ ALLUVIUM	2	BH40609AE	40993	SANDSTONE

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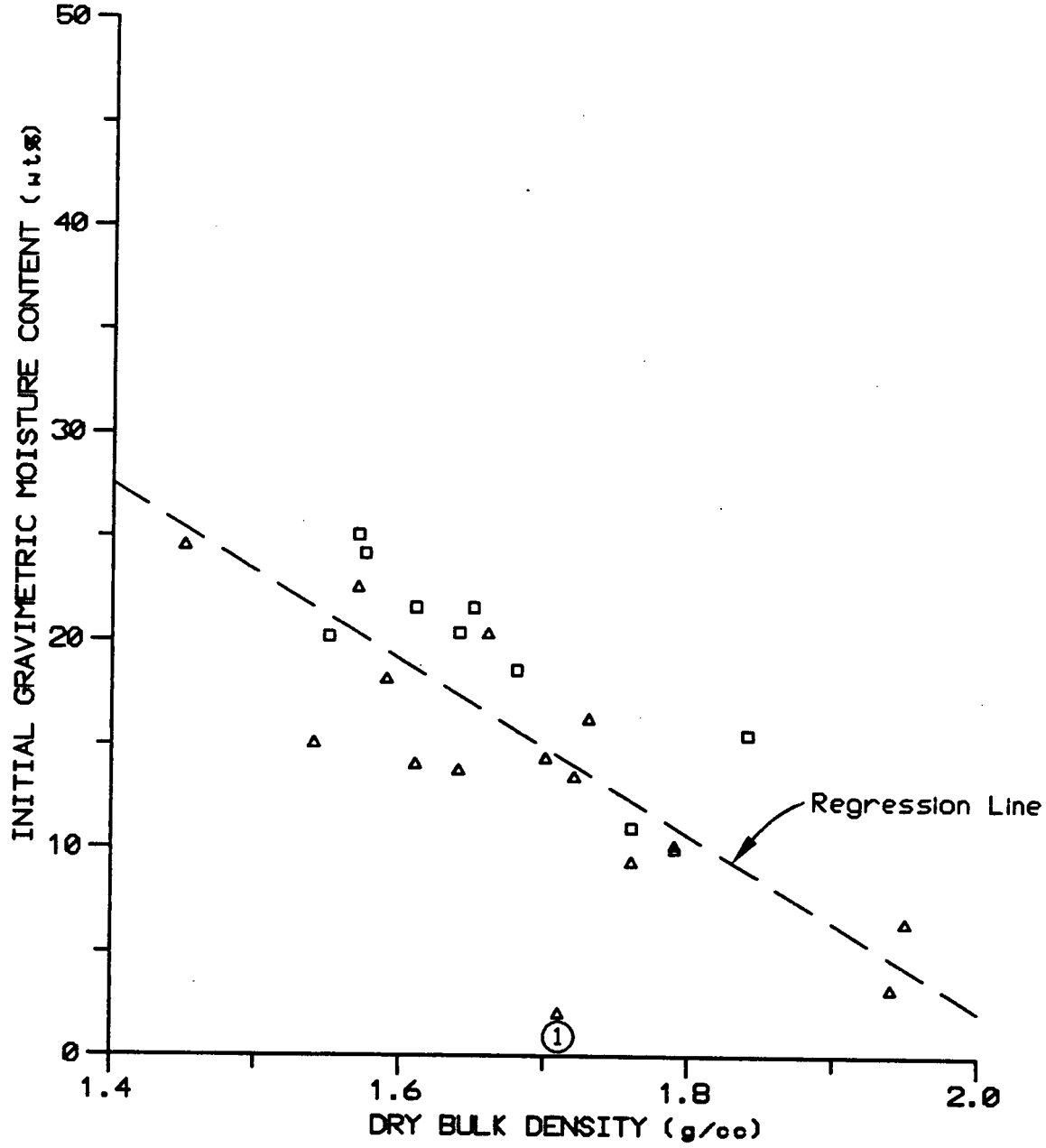
Figure II.3.3-6

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Calculated Porosity
versus Coarse Soil Particle Fraction



	SAMPLE	BOREHOLE	USGS
□ BEDROCK	1 BH40404AE	44393	SW
△ ALLUVIUM			

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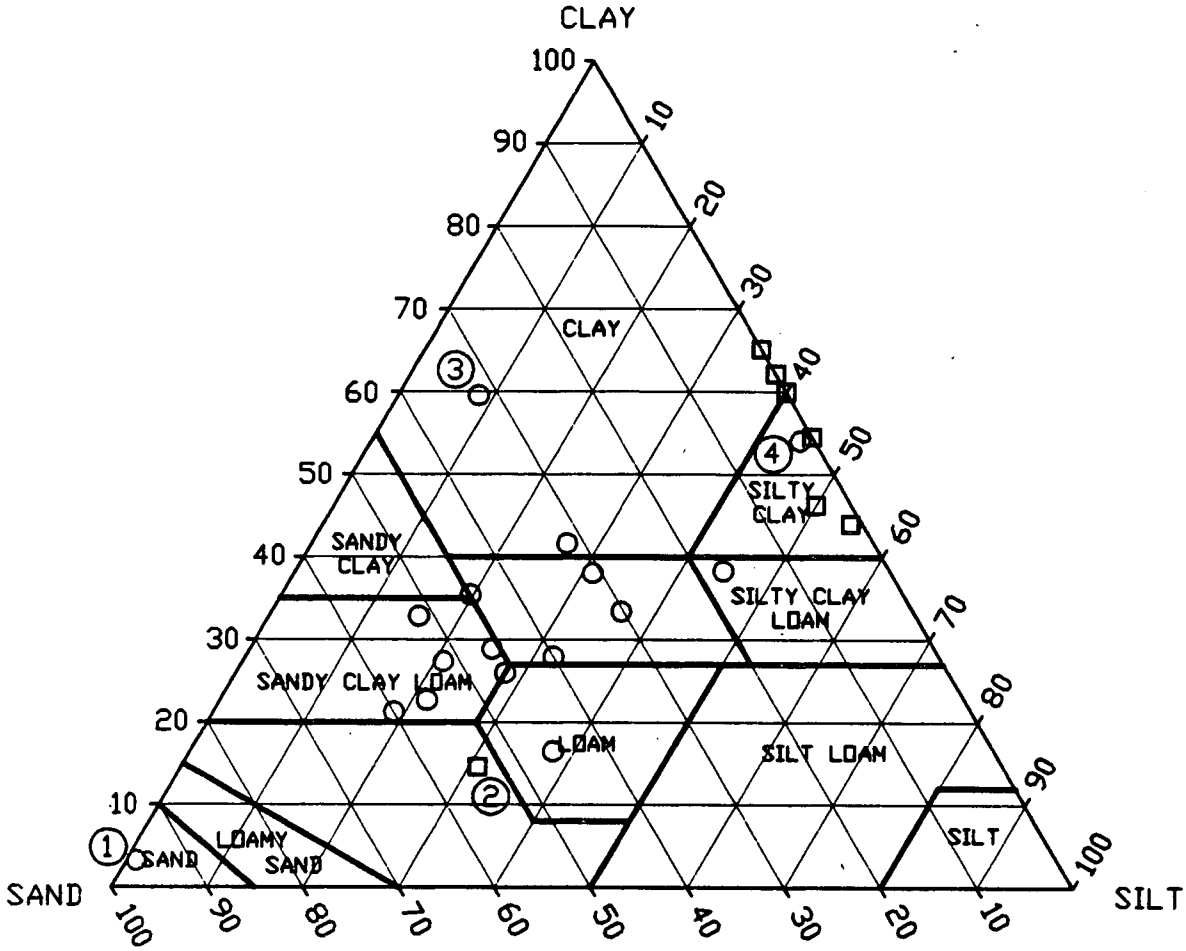
Figure II.3.3-7

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Initial Moisture Content versus Dry Bulk Density



□ BEDROCK SAMPLES

○ RFA SOILS SAMPLES

	SAMPLE	BOREHOLE	USGS/Wentworth
1	BH40405AE	44393	SW
2	BH40609AE	40993	Sandstone
3	BH40611AE	42893	GC
4	BH40401AE	40593	CH

Sand, Silt, and Clay in percent by weight (adjusted to 100% without gravel fraction)

Percentages reflect clay (below 0.002 mm), silt (0.002-0.05 mm), and sand (0.05-2.0 mm) in the basic soil textural classes

Source: Hillel (1982)

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Figure II.3.3-8

OU4 Phase I RFI/RI
Sand-Silt-Clay Textural Triangle (USDA Classification)

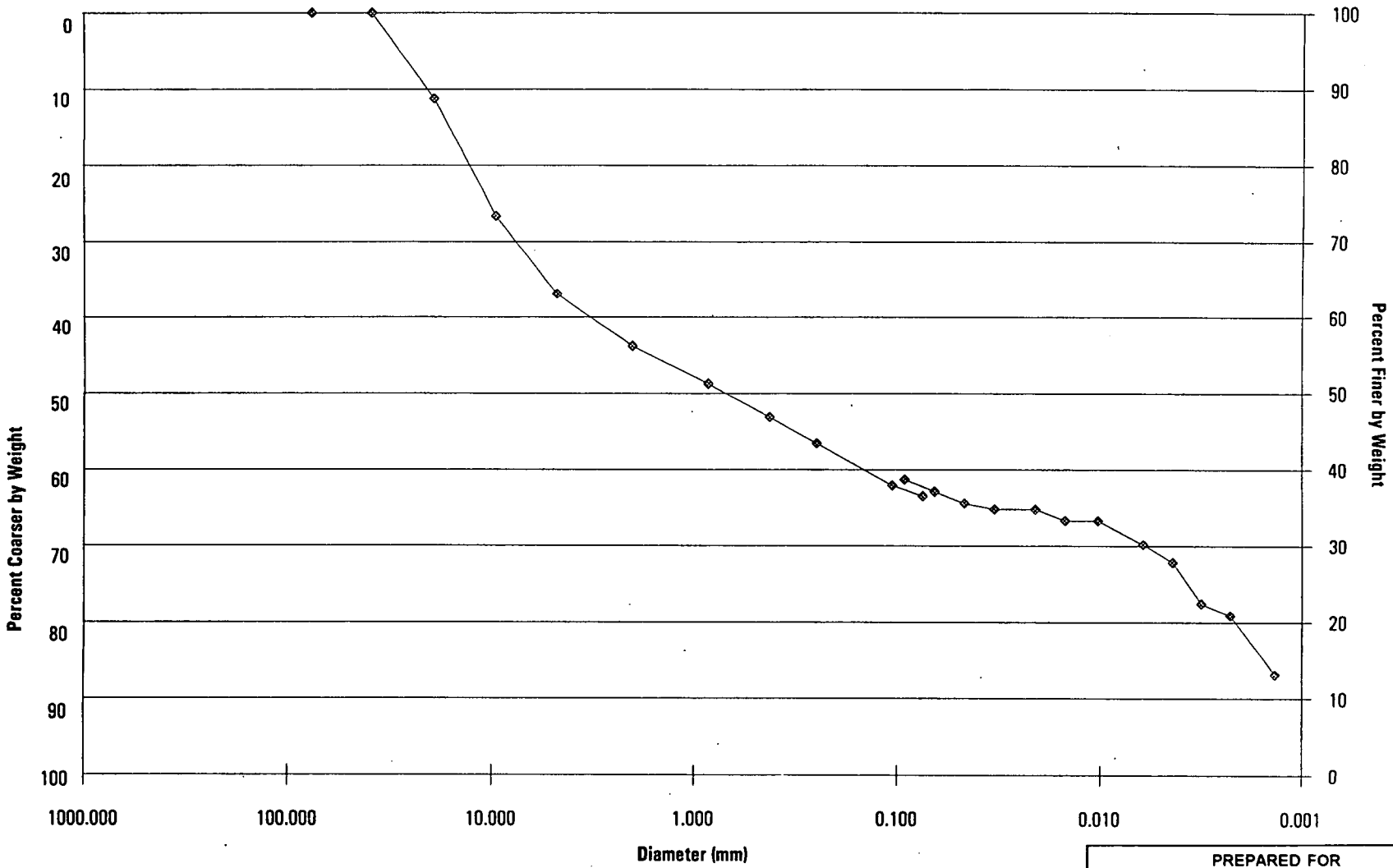

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Figure II.3.3-9

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Particle-Size Distribution,
Sample BH40600AE, Borehole 43193

rf85x11h

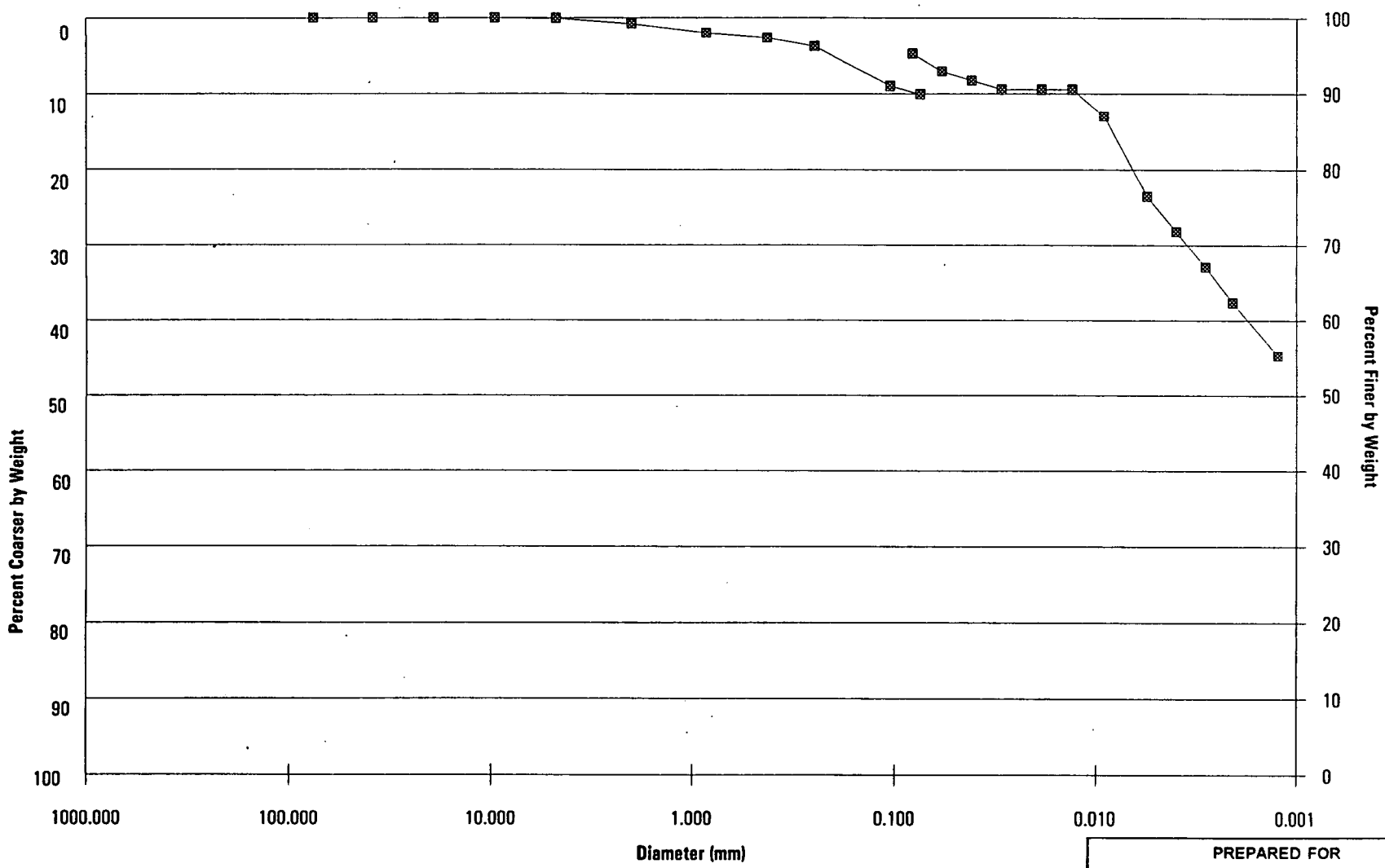

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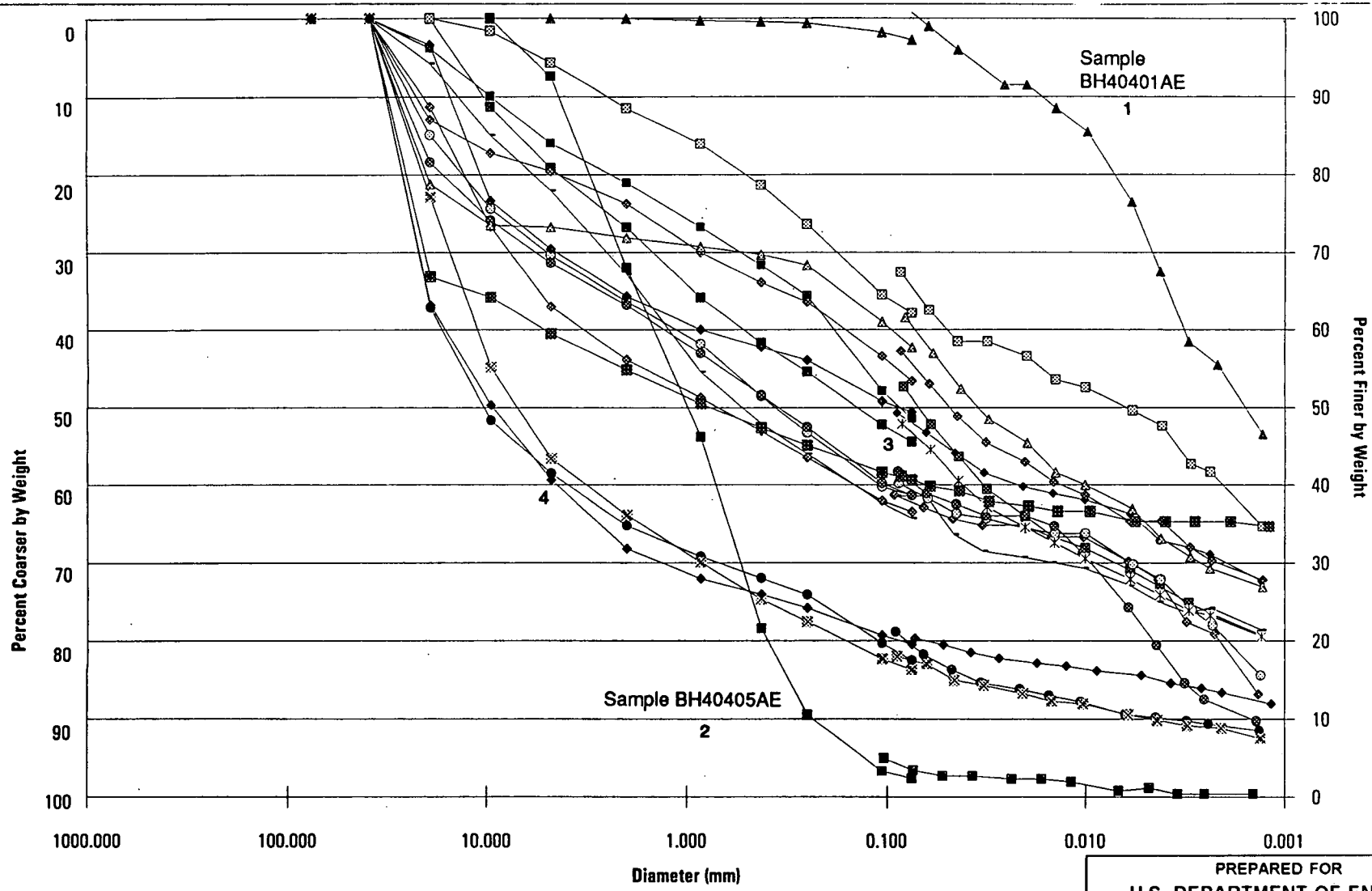
Figure II.3.3-10

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Particle-Size Distribution,
sample BH40405AE, Borehole 44393

rf85x11h



SAMPLE	BOREHOLE	USCS
BH40401AE	40593	CH
BH40405AE	44393	SW

GROUPS

1. Finer Grained RFA Soils
2. Coarser Grained RFA Soils
3. Majority of RFA Soils
4. Coarse Grain RFA Soils

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Figure II.3.3-11

OU4 Phase 1 RFI/RI
Composite Particle-Size Distribution Curves
Subsurface Soils

rf85x11h

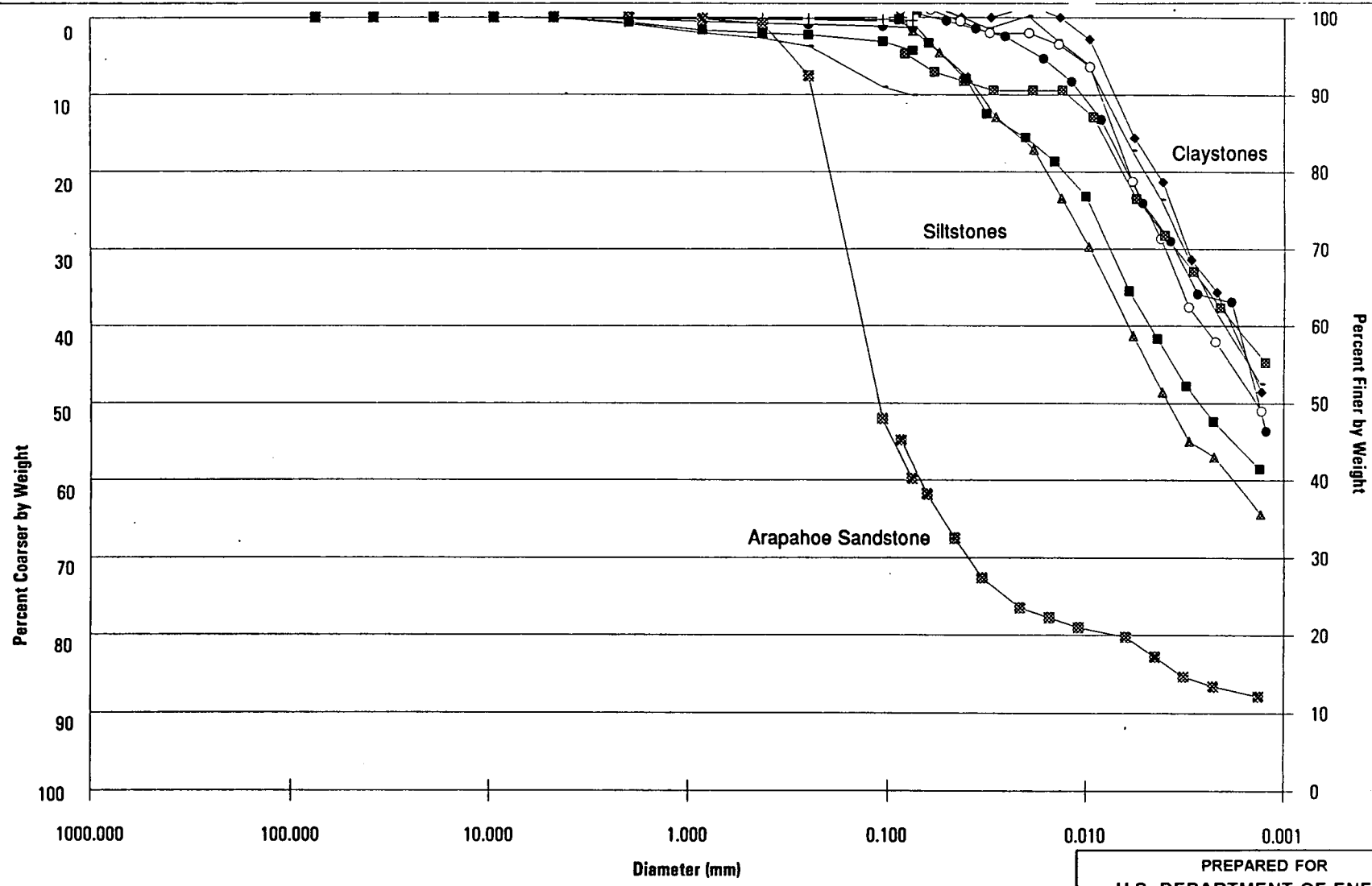

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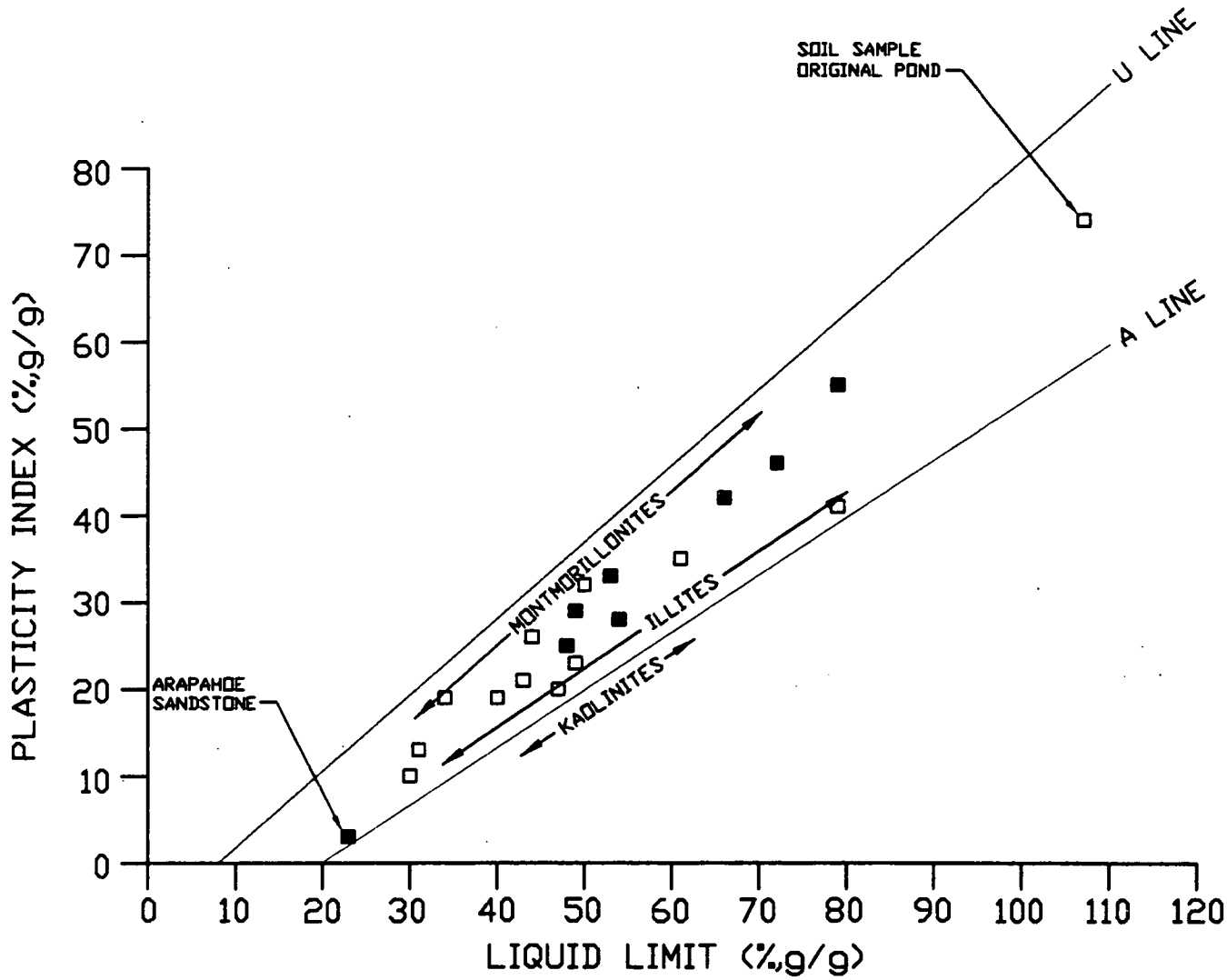
Figure II.3.3-12

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Composite Particle-Size Distribution Curves
Bedrock Lithologies

rf85x11h



LEGEND

- □ RFA SOILS
- ■ BEDROCK
- A LINE - SEPARATION BETWEEN CLAY AND SILTS
- U LINE - UPPER LIMIT LINE OF SOILS

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Figure II.3.3-13

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Soil and Bedrock Plasticity Classification

SOURCE: Holtz and Kovacs (1981)

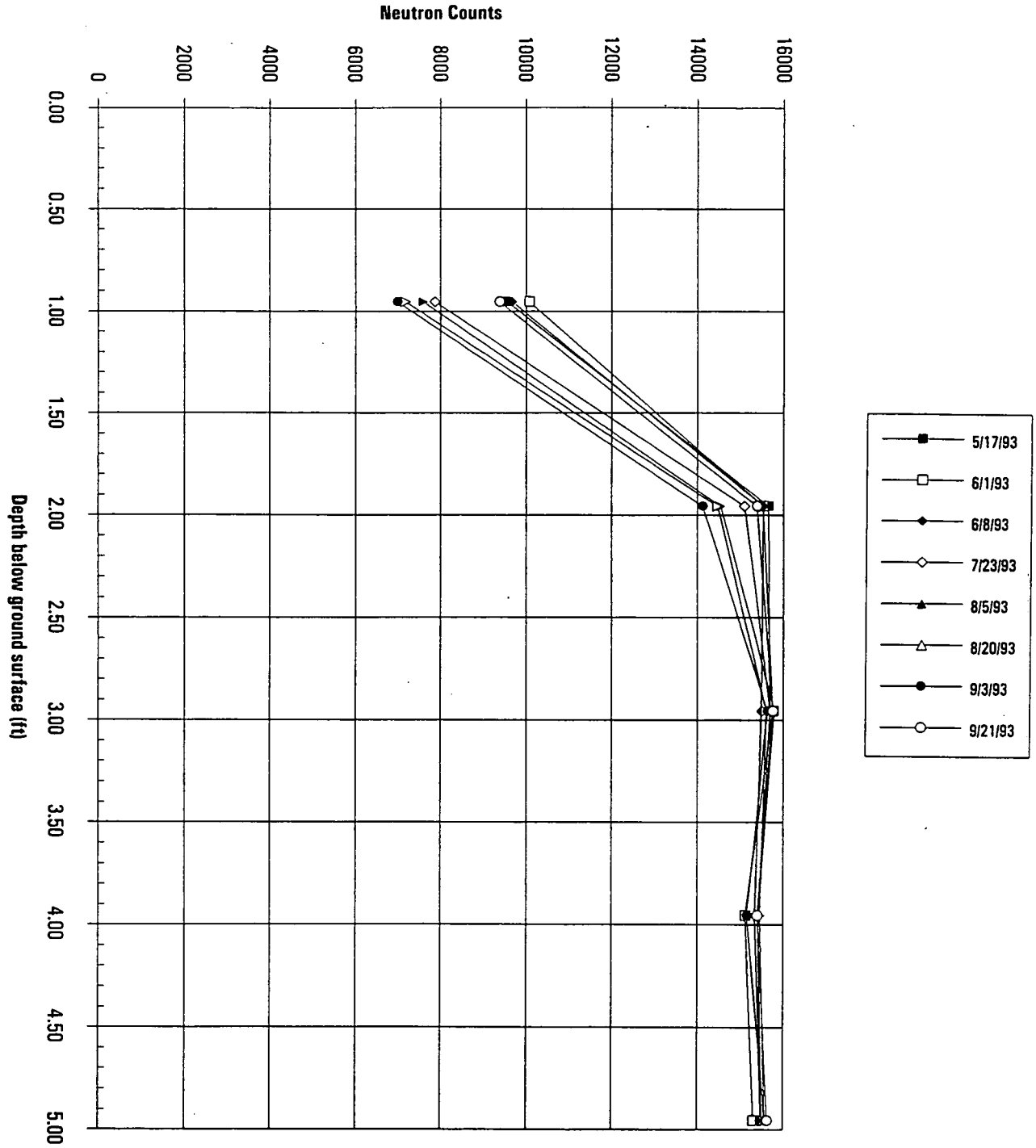

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Figure II.3.3-17

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 40293

rl85x11

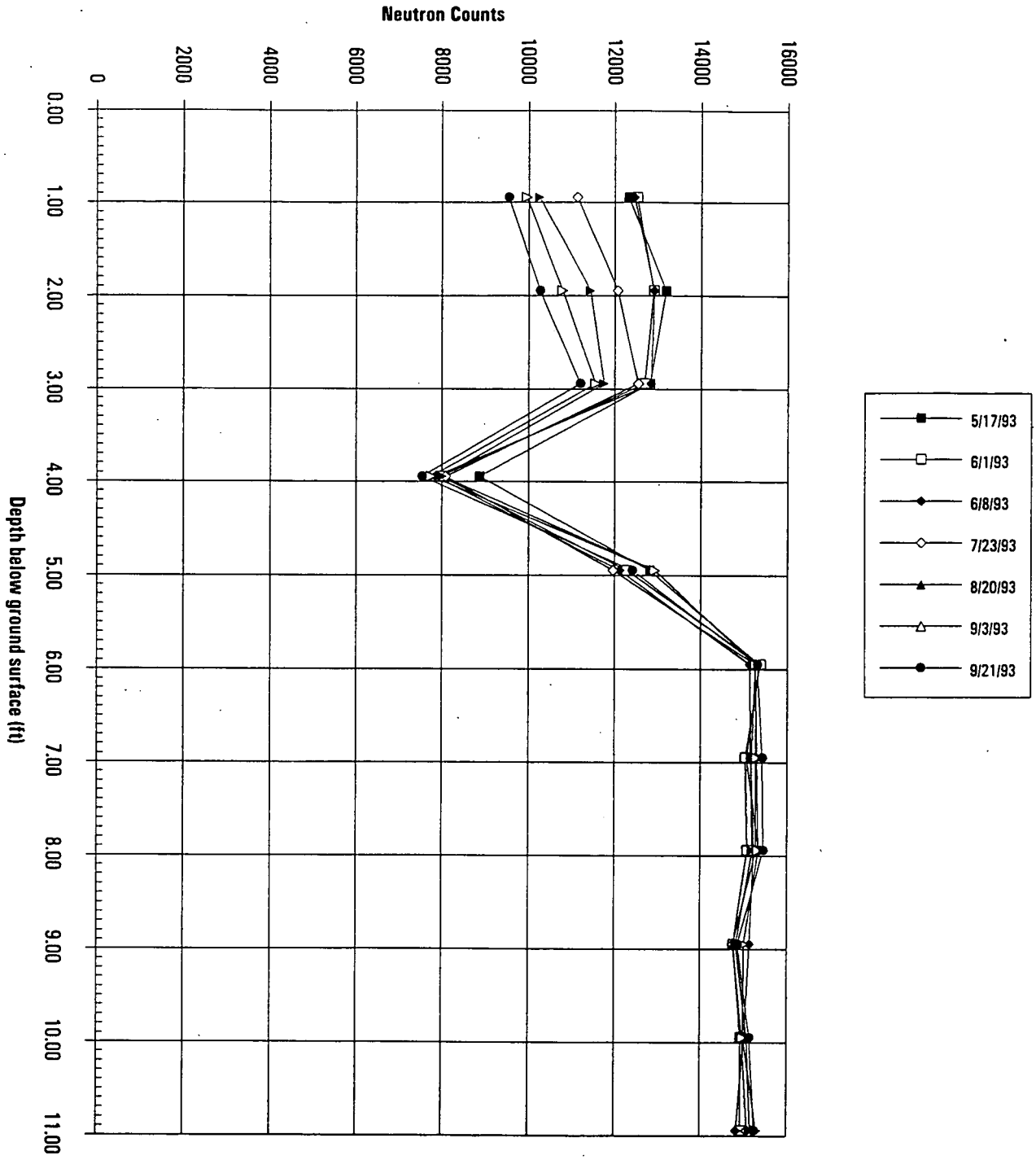

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Figure II.3.3-18

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 40393

rf85x11

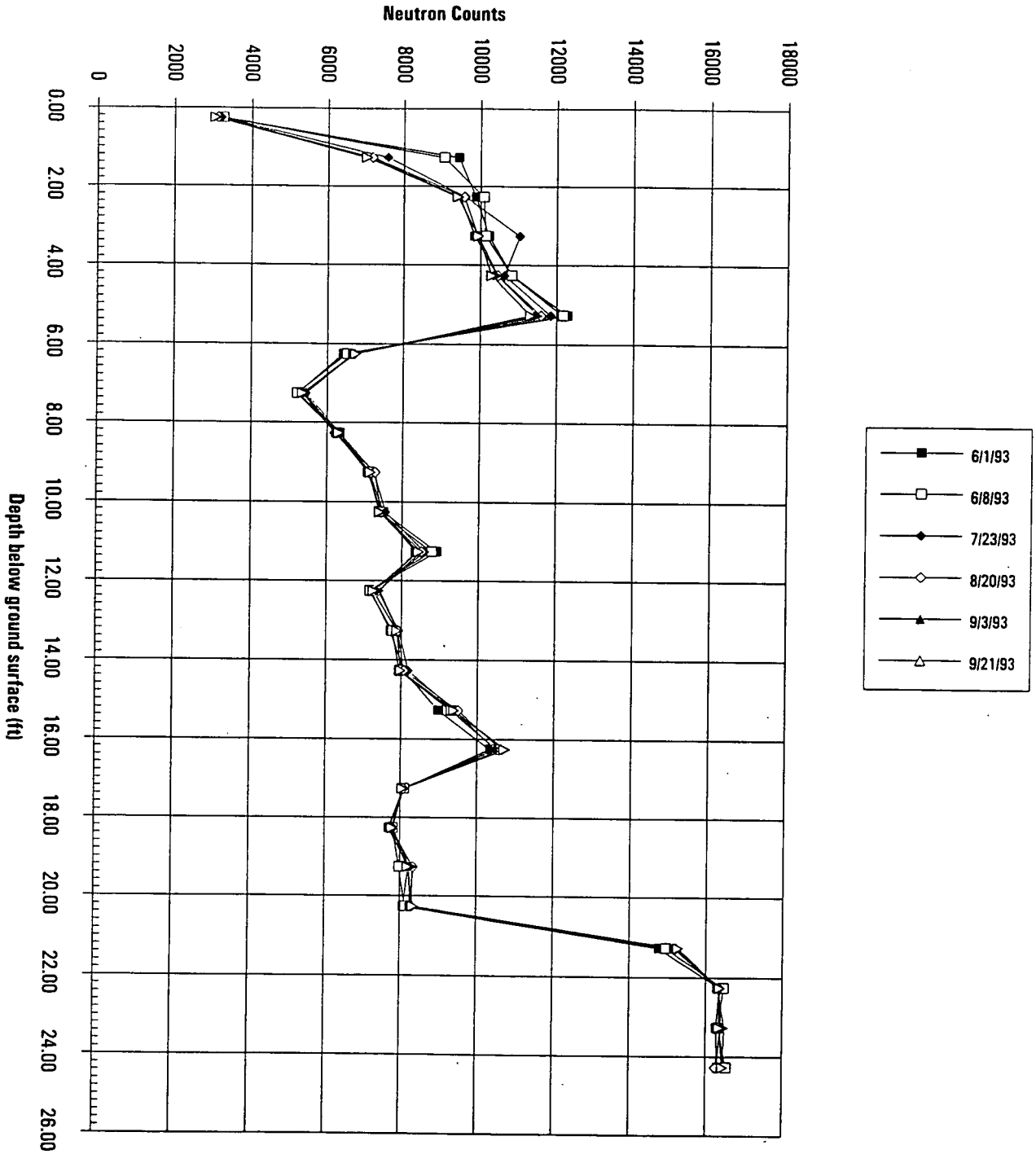

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Figure II.3.3-19

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 40593

rf85x11

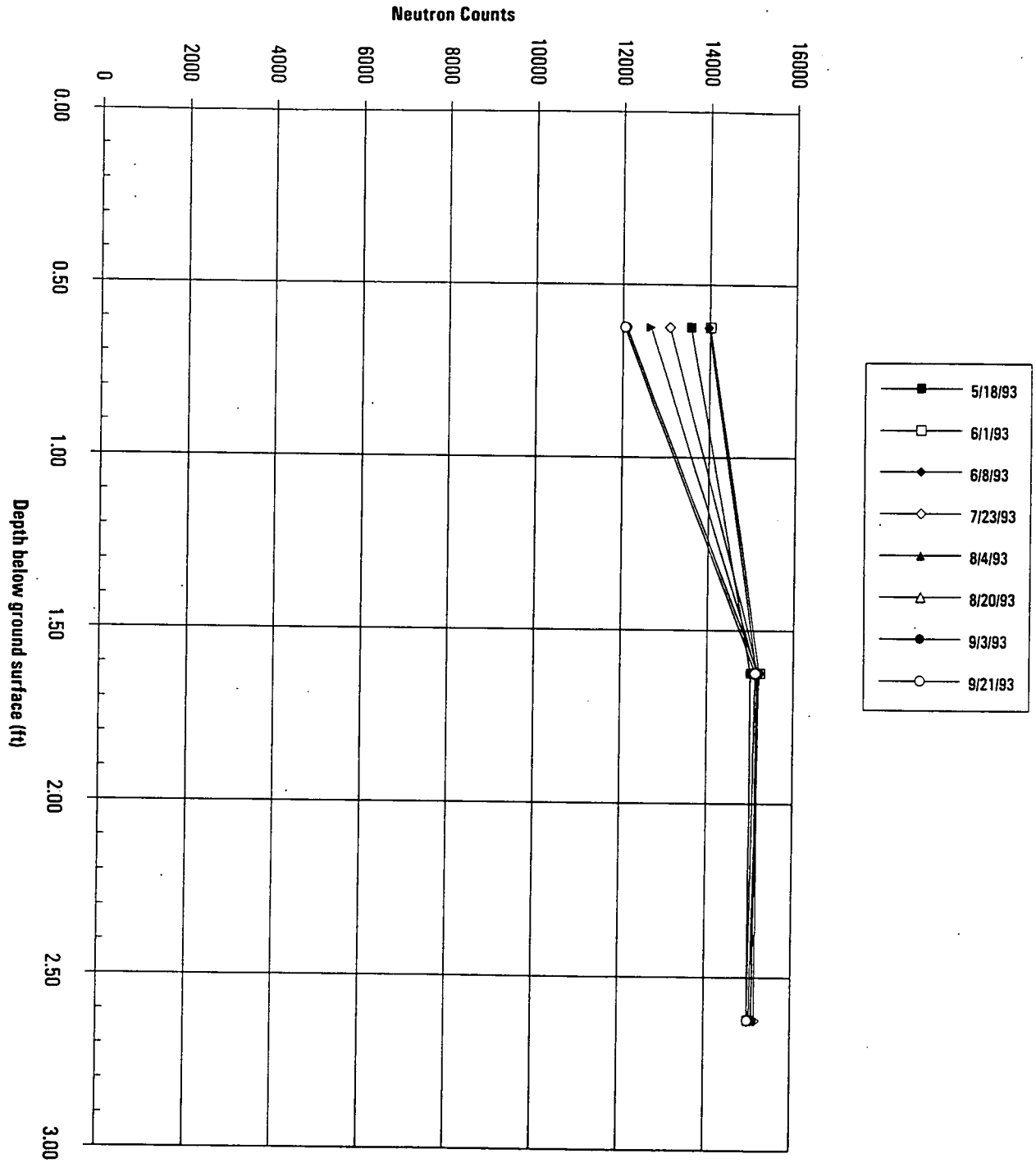

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Figure II.3.3-20

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 40693

rf85x11

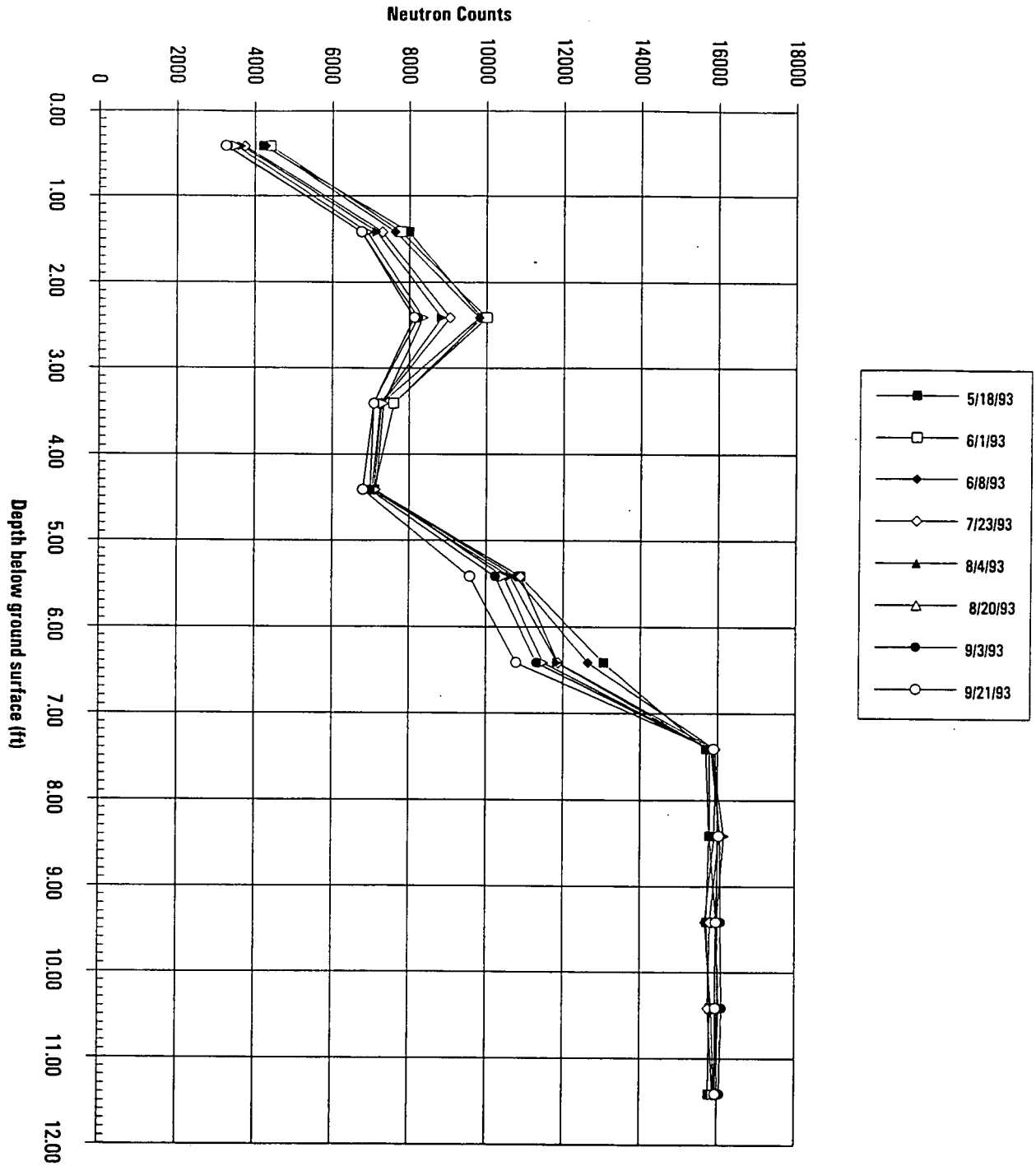

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Figure II.3.3-21

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 40793

rf85x11

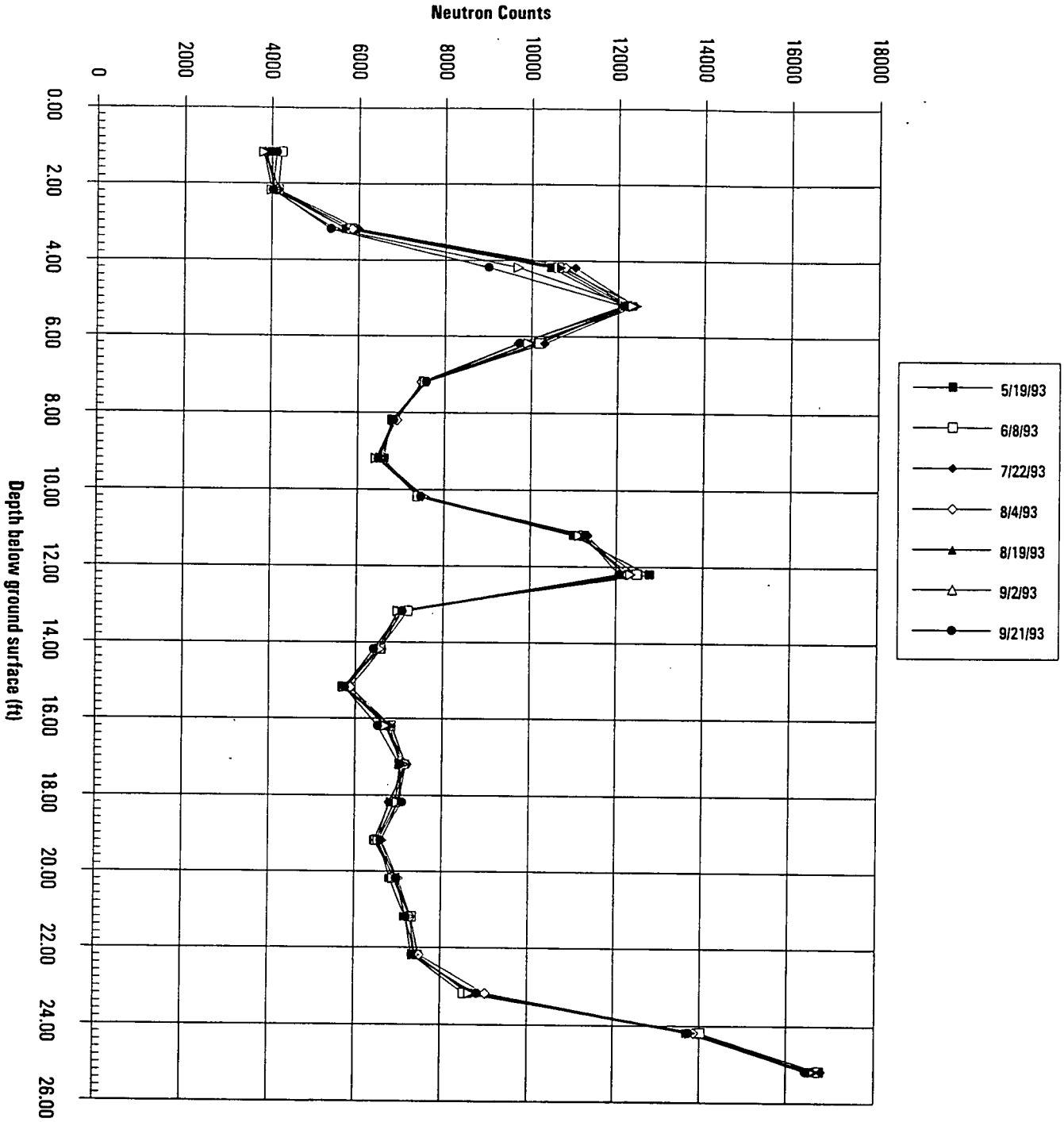

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Figure II.3.3-22

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 40993

rf85x11

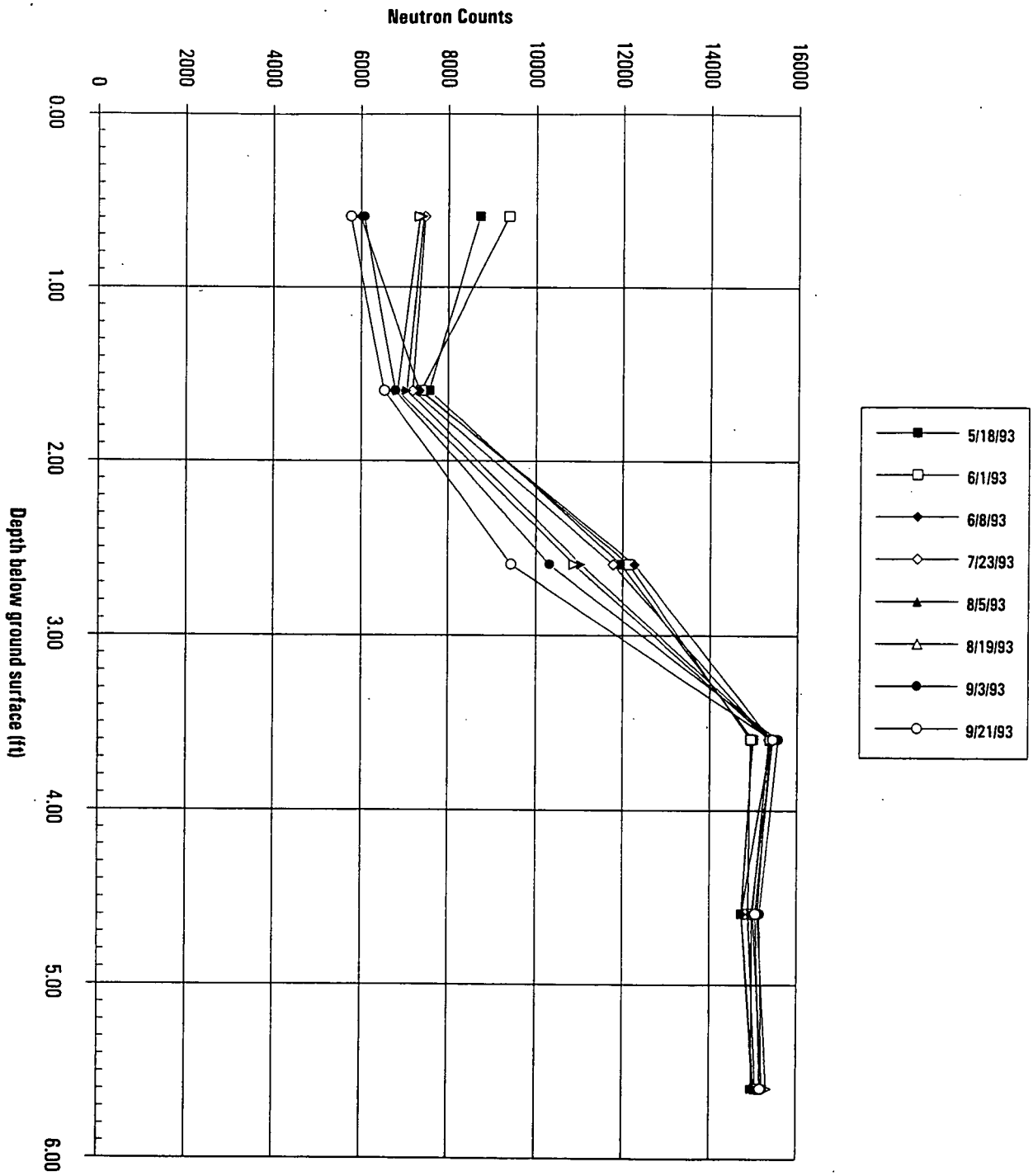

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Figure II.3.3-23

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 41293

rf85x11

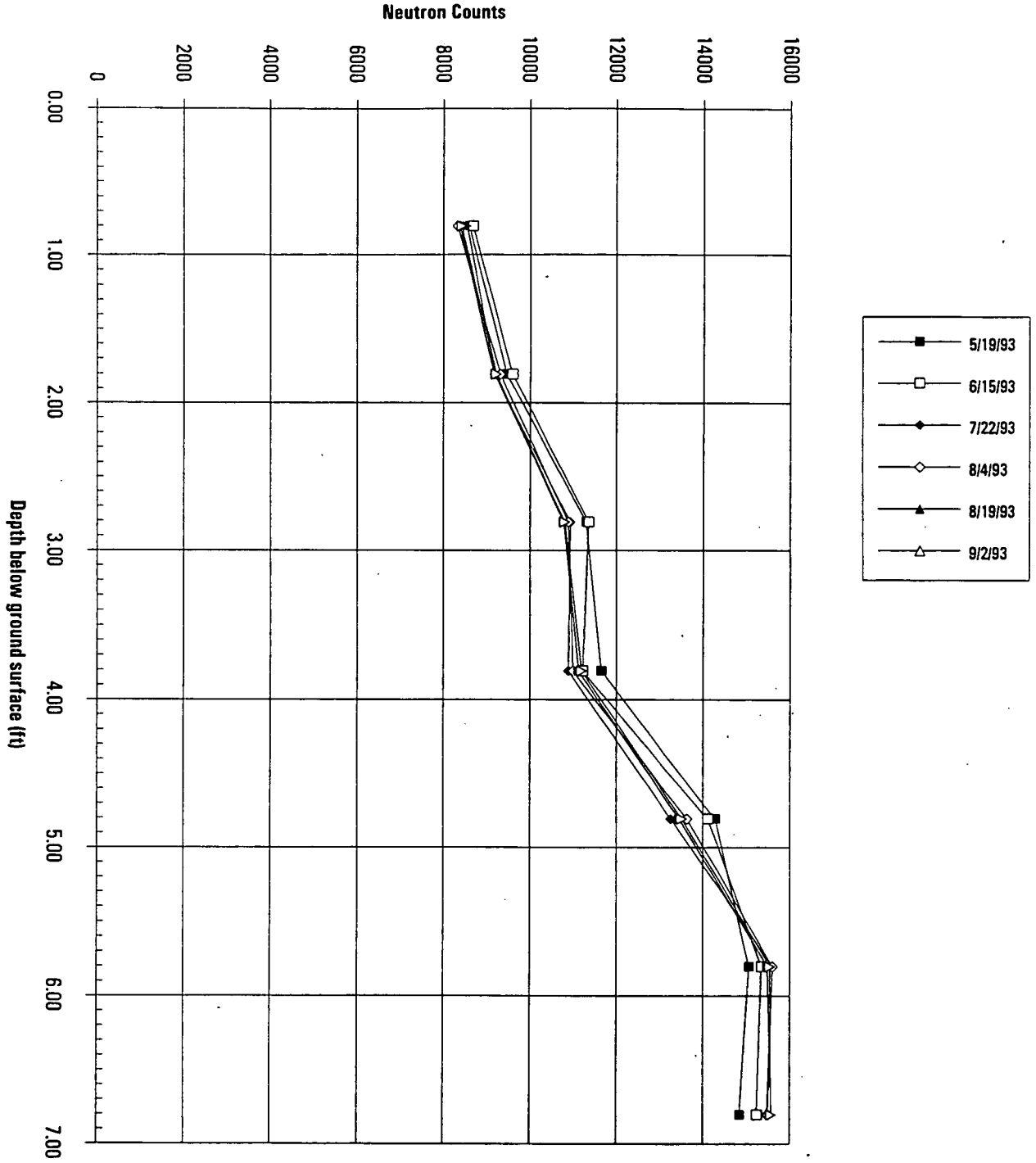

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Figure II.3.3-24

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 41593

rf85x11

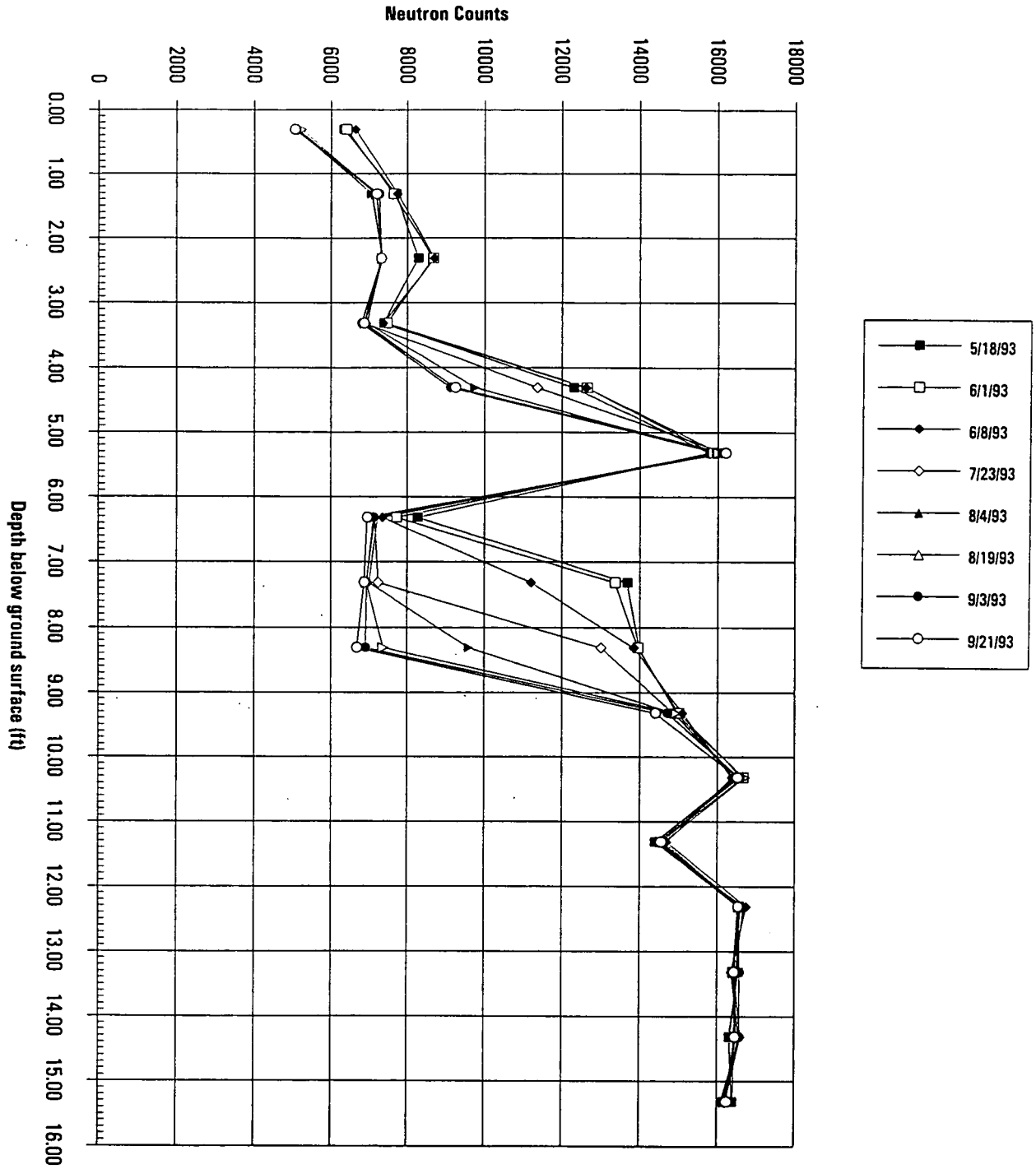

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Figure II.3.3-25

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 41793

rl85x11

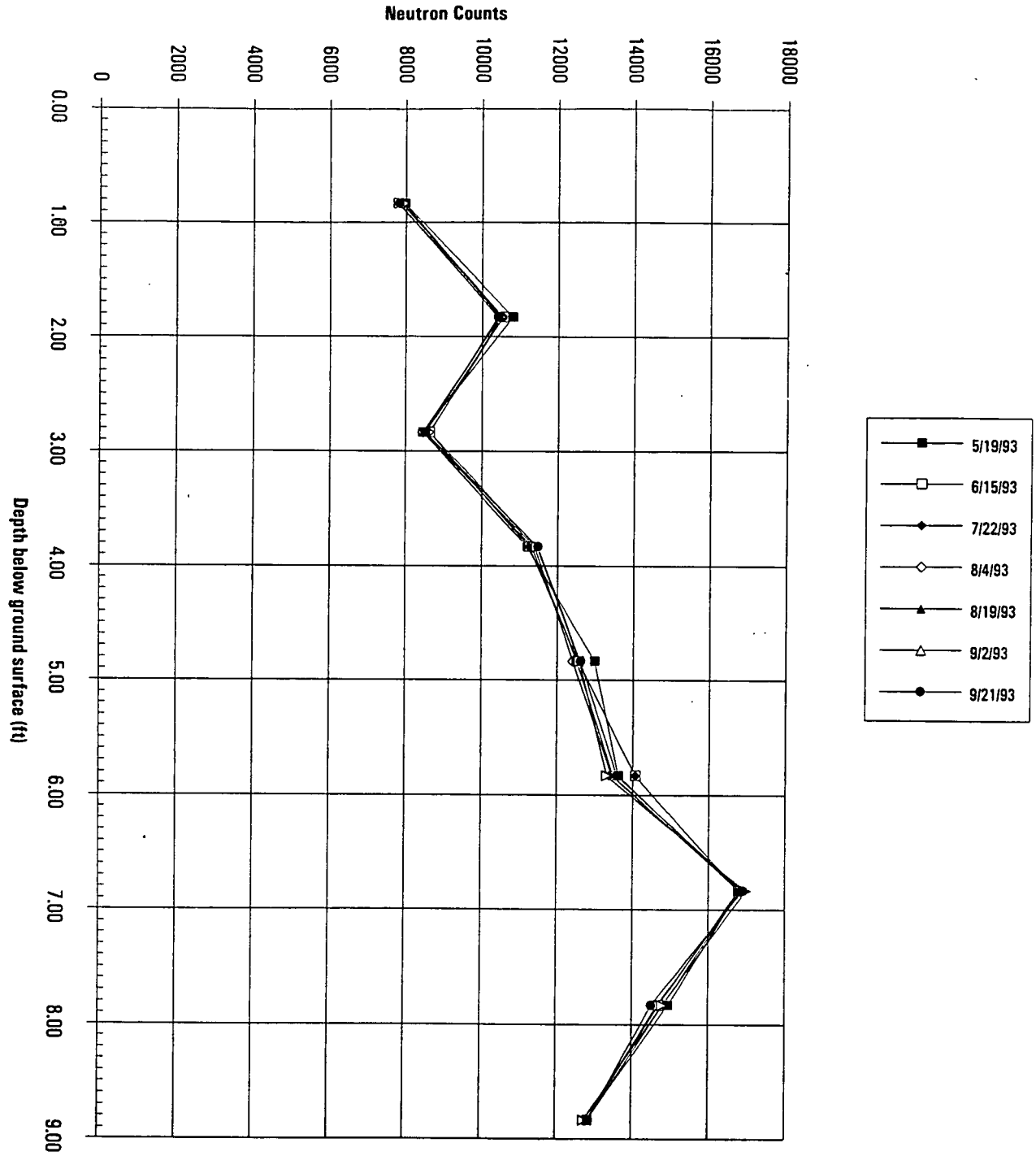

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Figure II.3.3-26

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 42493

rf85x11

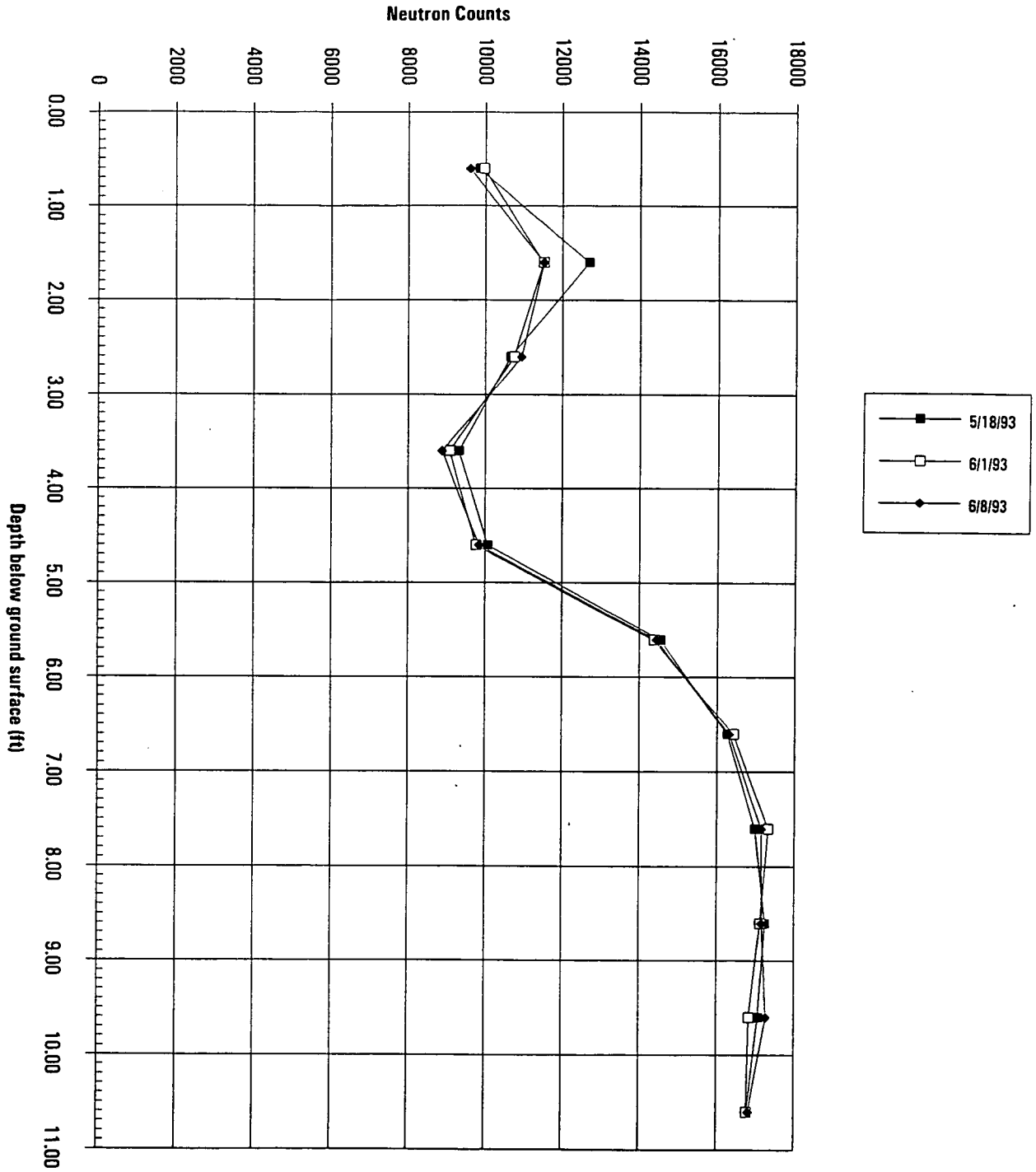

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Figure II.3.3-27

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 42893

rl85x11

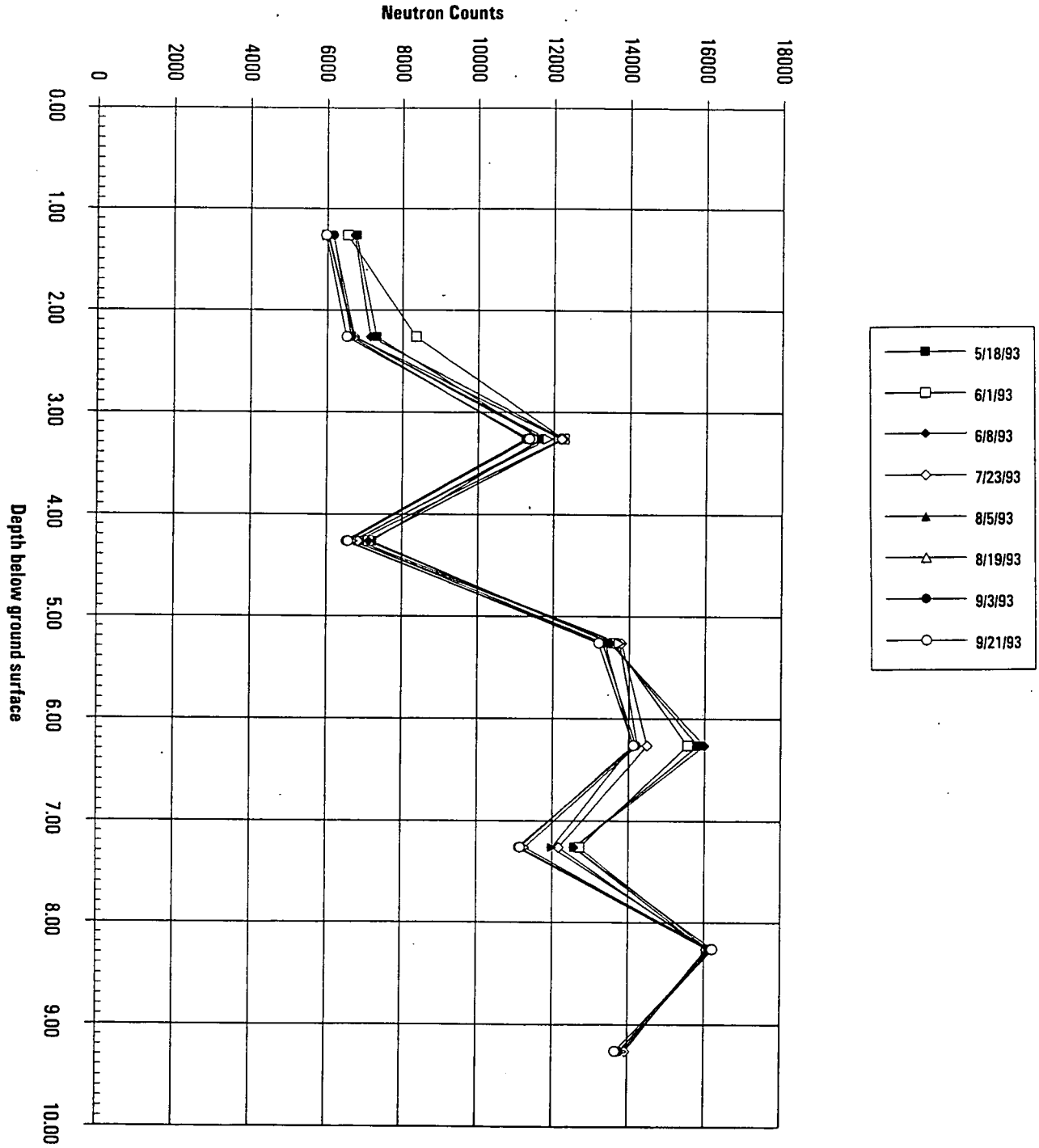

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Figure II.3.3-28

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 43193

r85x11

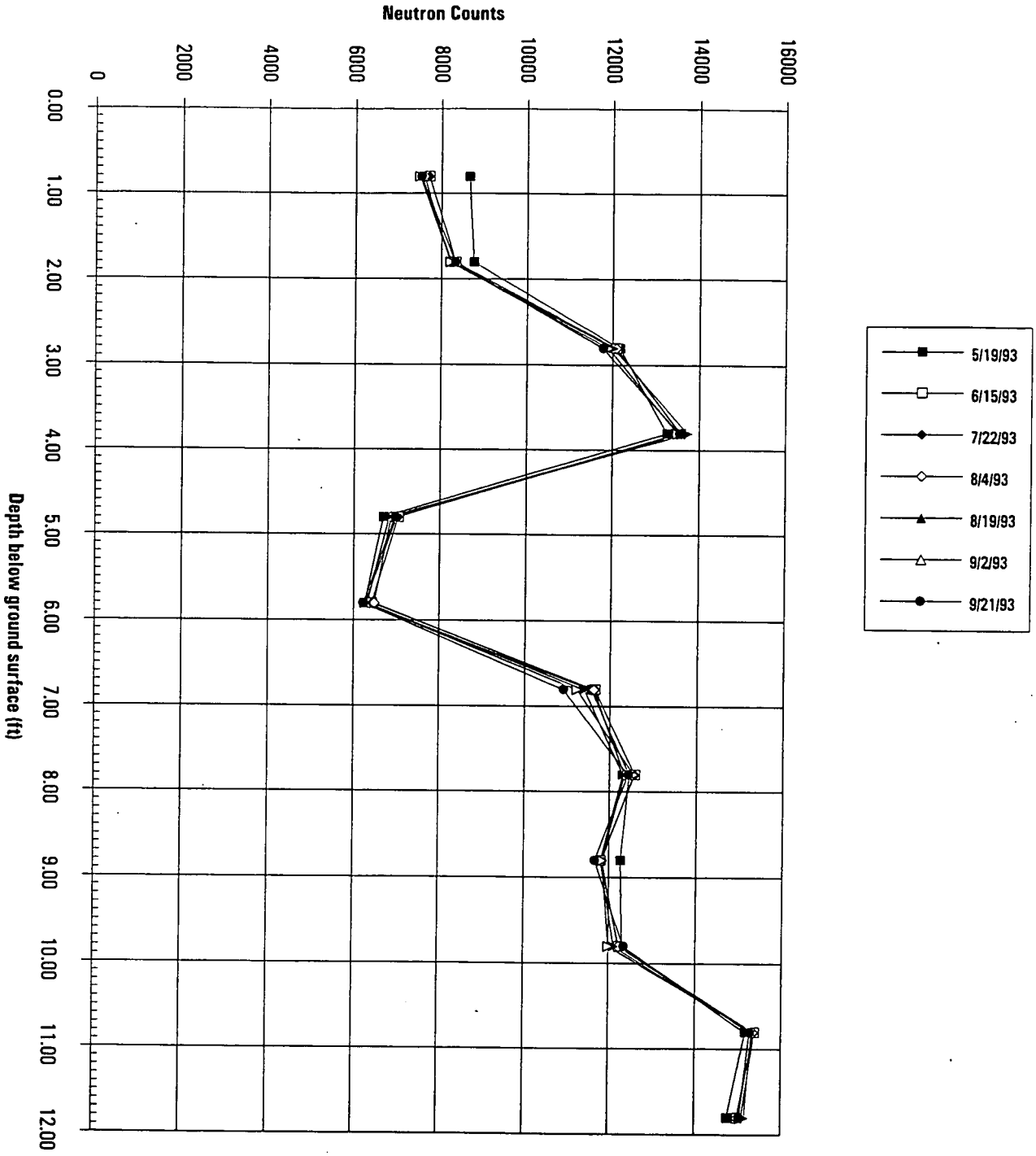

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Figure II.3.3-29

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 43693

rl85x11

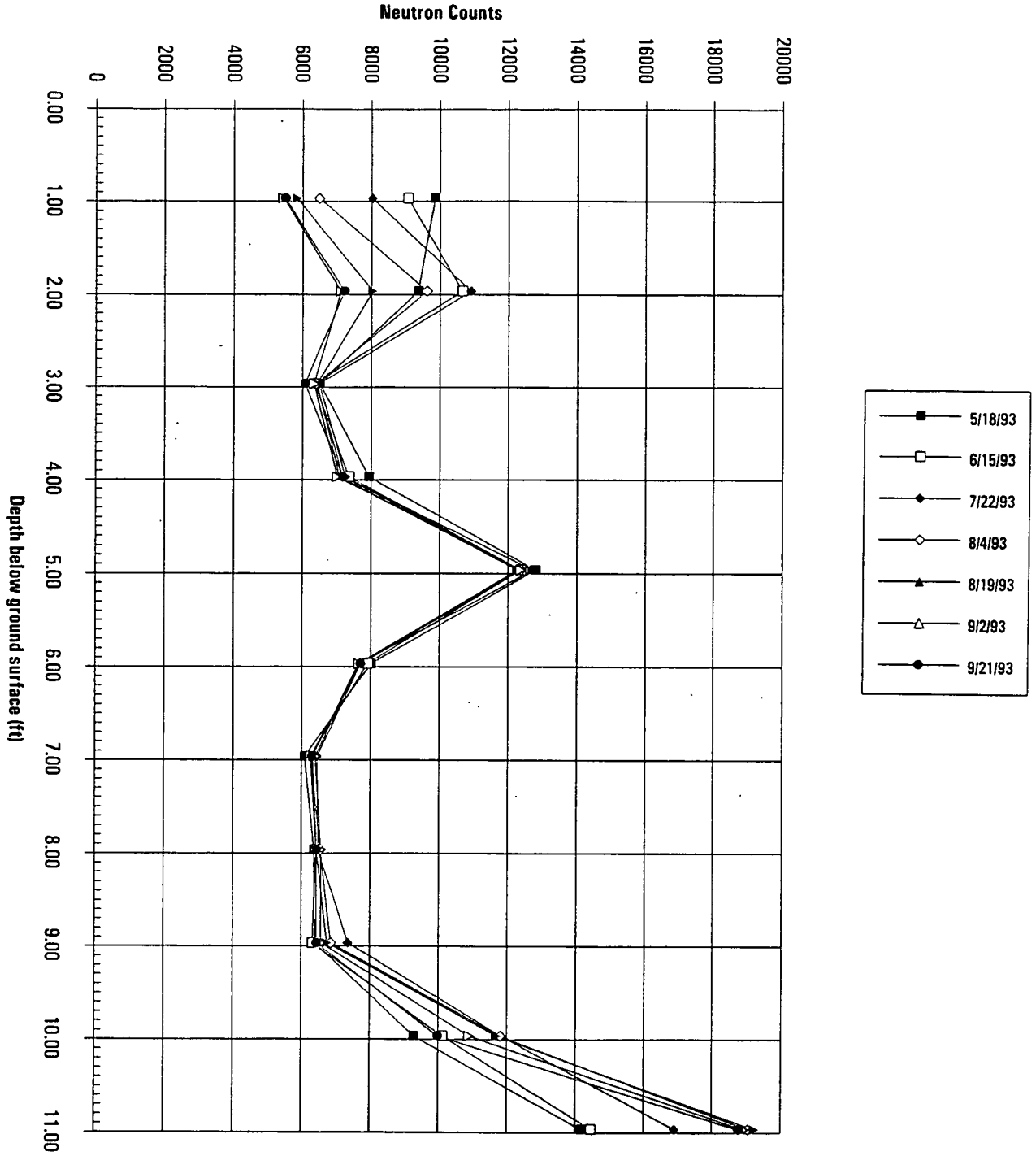

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Figure II.3.3-30

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 43793

rf85x11

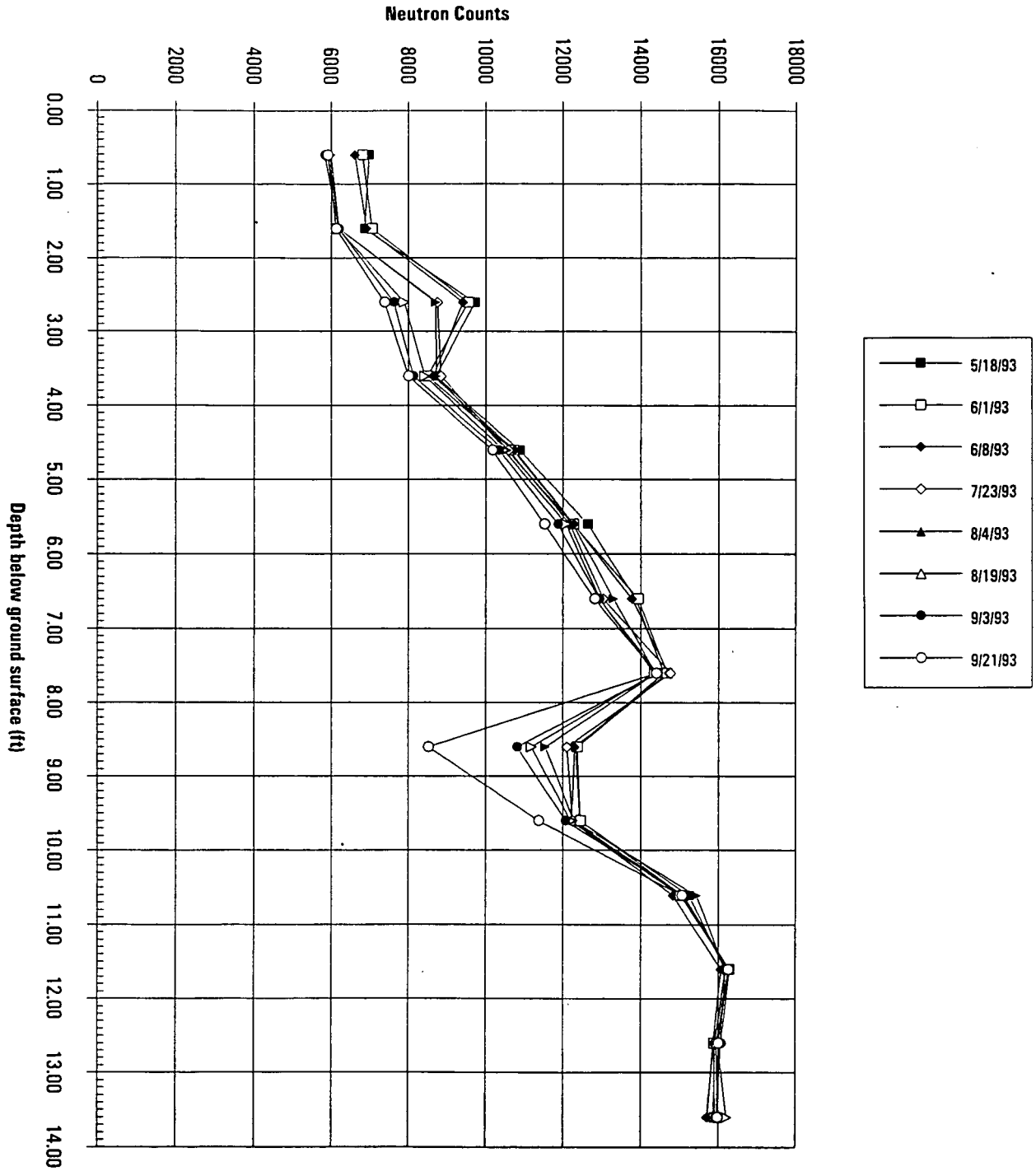

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Figure II.3.3-31

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 44093

rf85x11

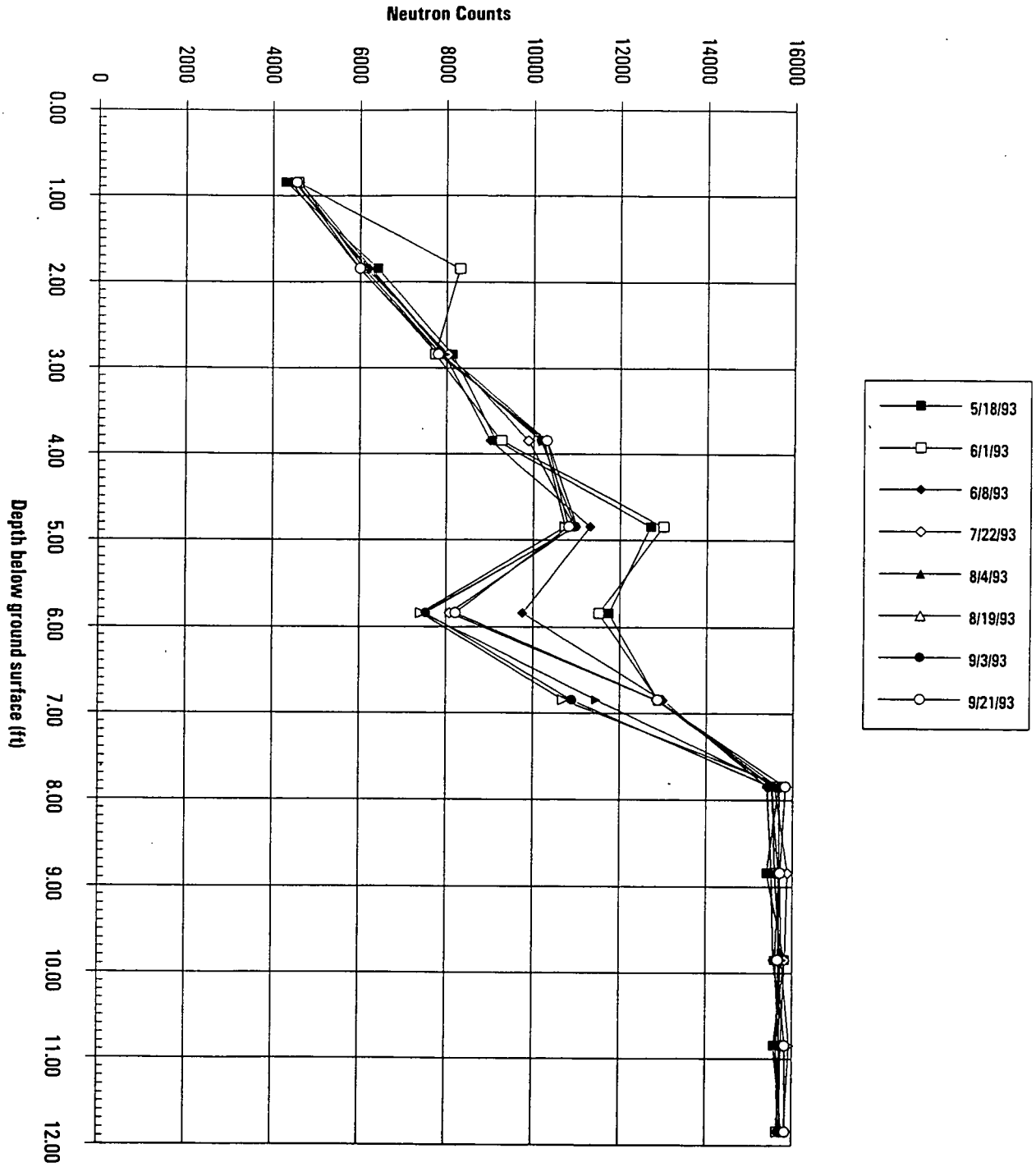

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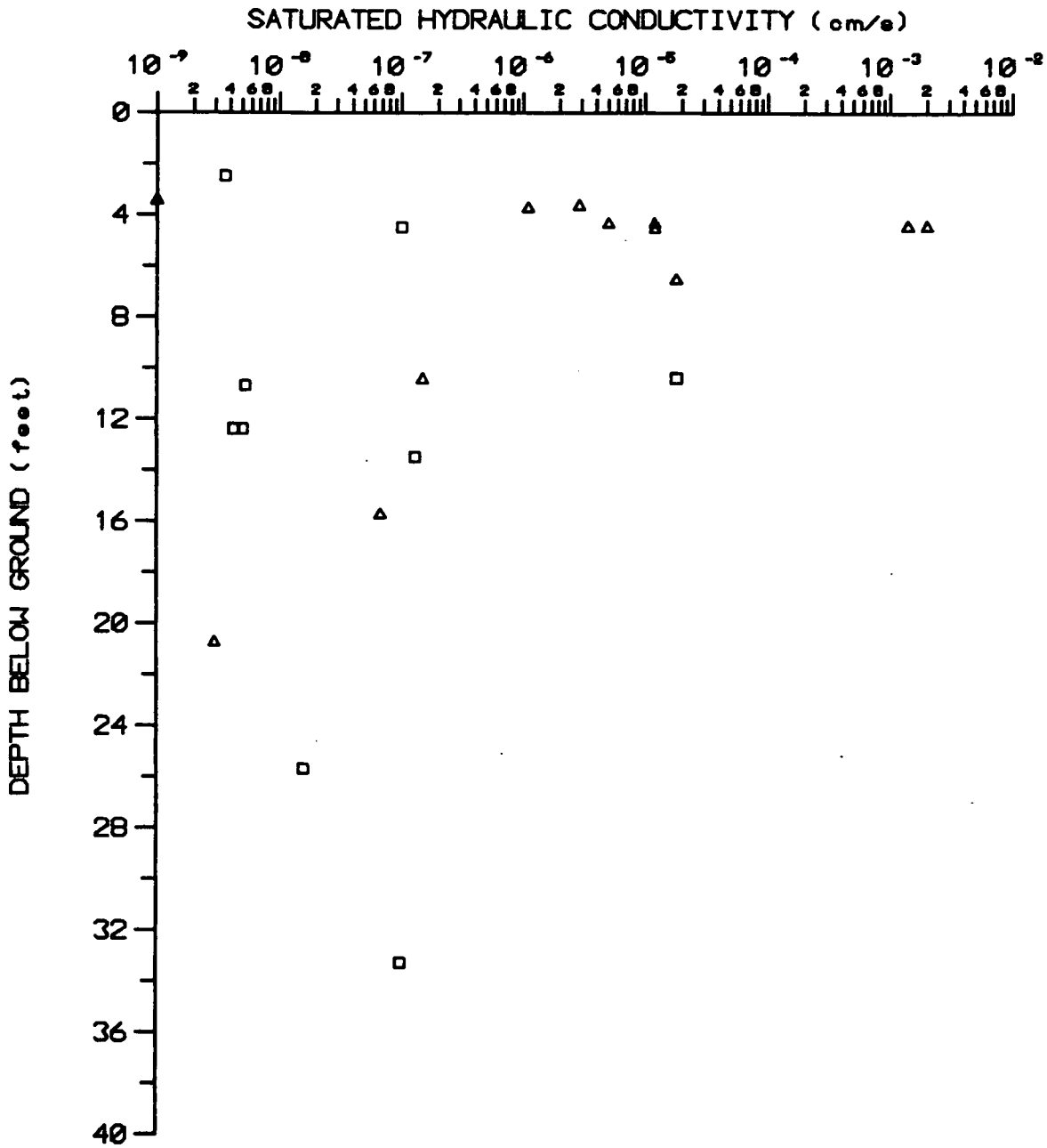
Figure II.3.3-32

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Neutron Probe Measurements - Borehole 44393

rl85x11



□ BEDROCK (SPRING '93)

△ ALLUVIUM (SPRING '93)

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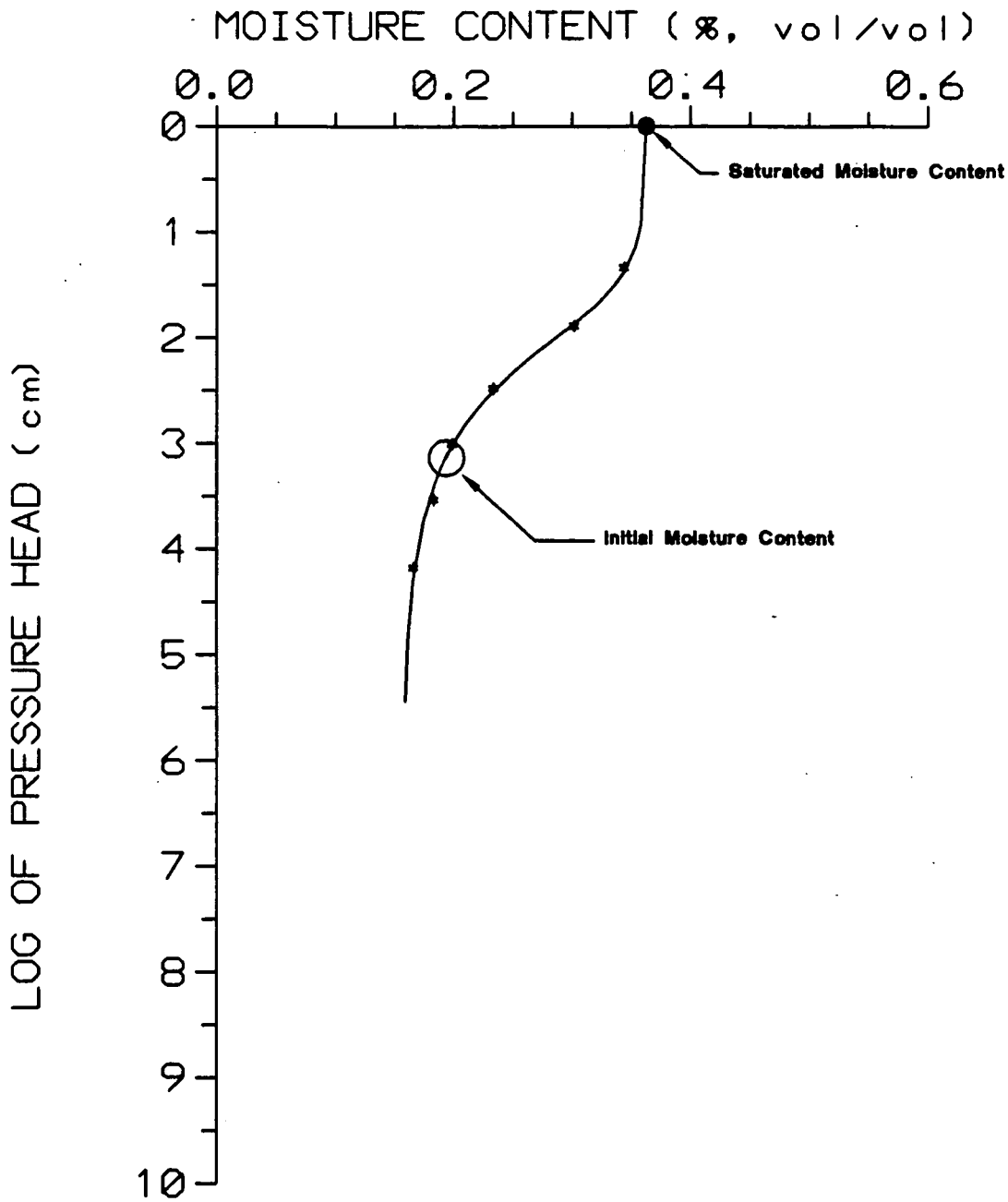
Figure II.3.3-33

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Saturated Hydraulic Conductivity versus Depth



●**** Observed Data

——— Calculated

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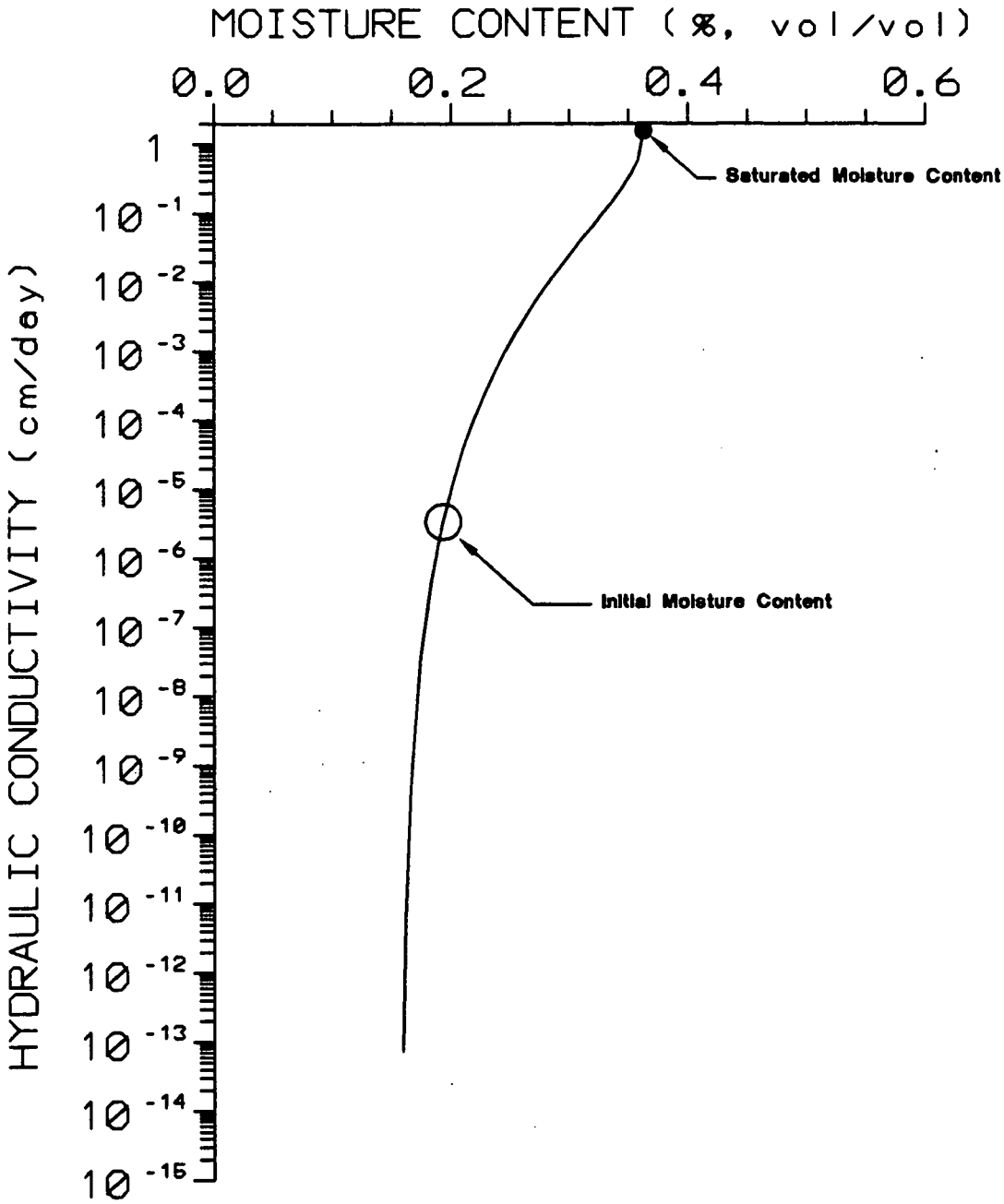
Figure II.3.3-34

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Example of Pressure Head-Moisture Content Relationship



Calculated

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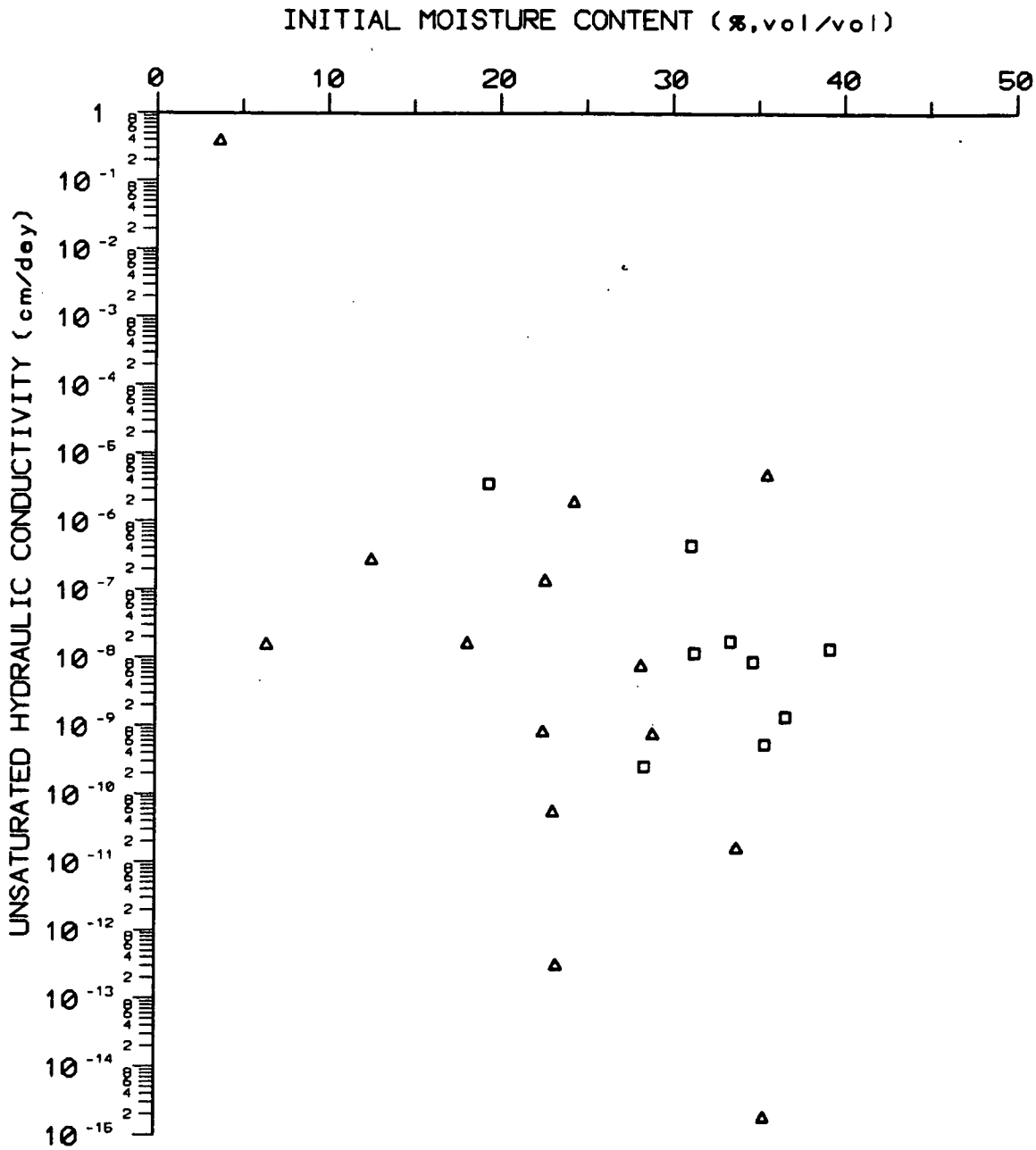
Figure II.3.3-35

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Example of Unsaturated Hydraulic Conductivity-Moisture Content Relationship



△ ALLUVIUM

□ BEDROCK

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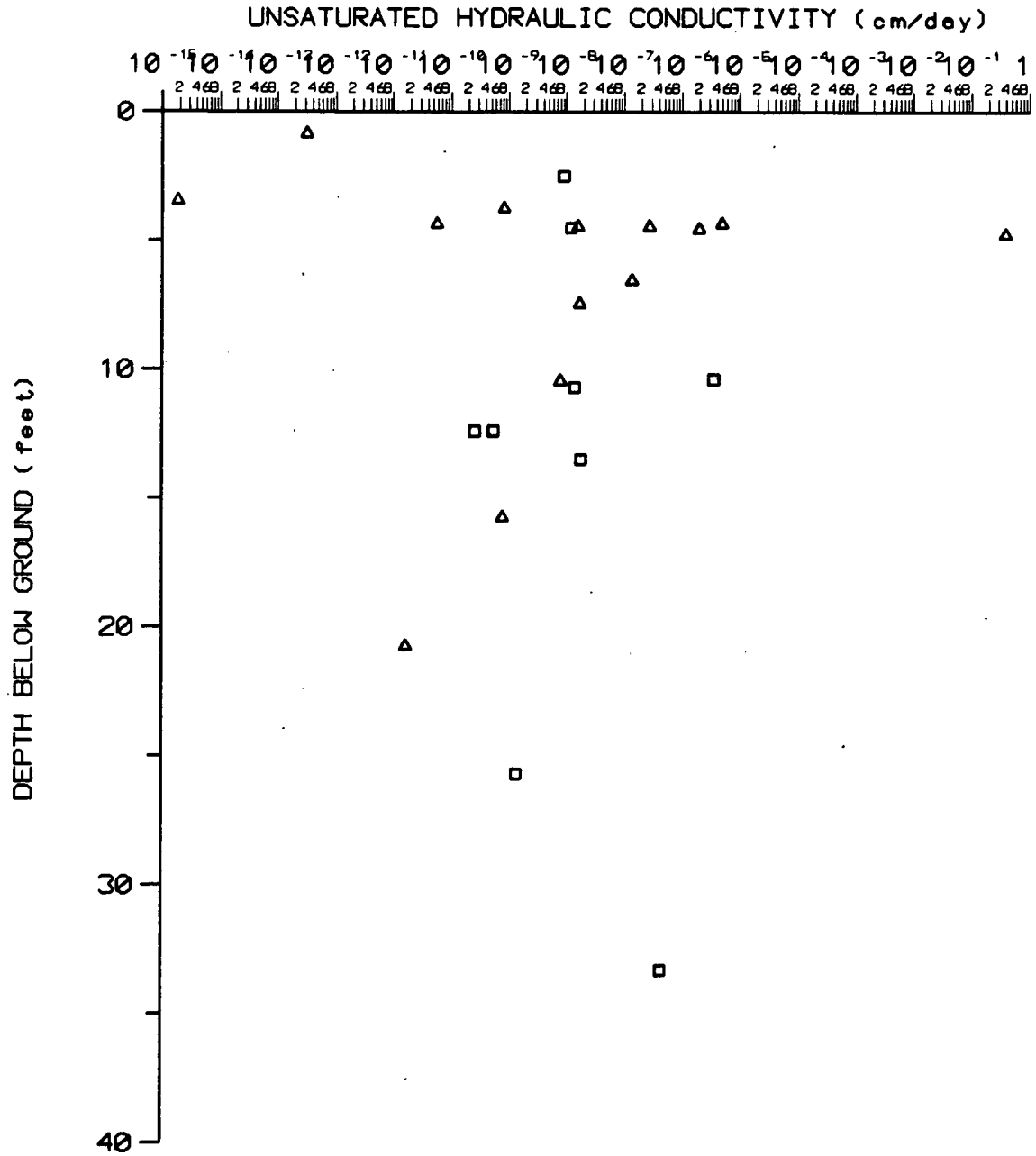
Figure II.3.3-36

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Unsaturated Hydraulic Conductivity versus Moisture Content



△ ALLUVIUM

□ BEDROCK

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Figure II.3.-37

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Unsaturated Hydraulic Conductivity versus Depth

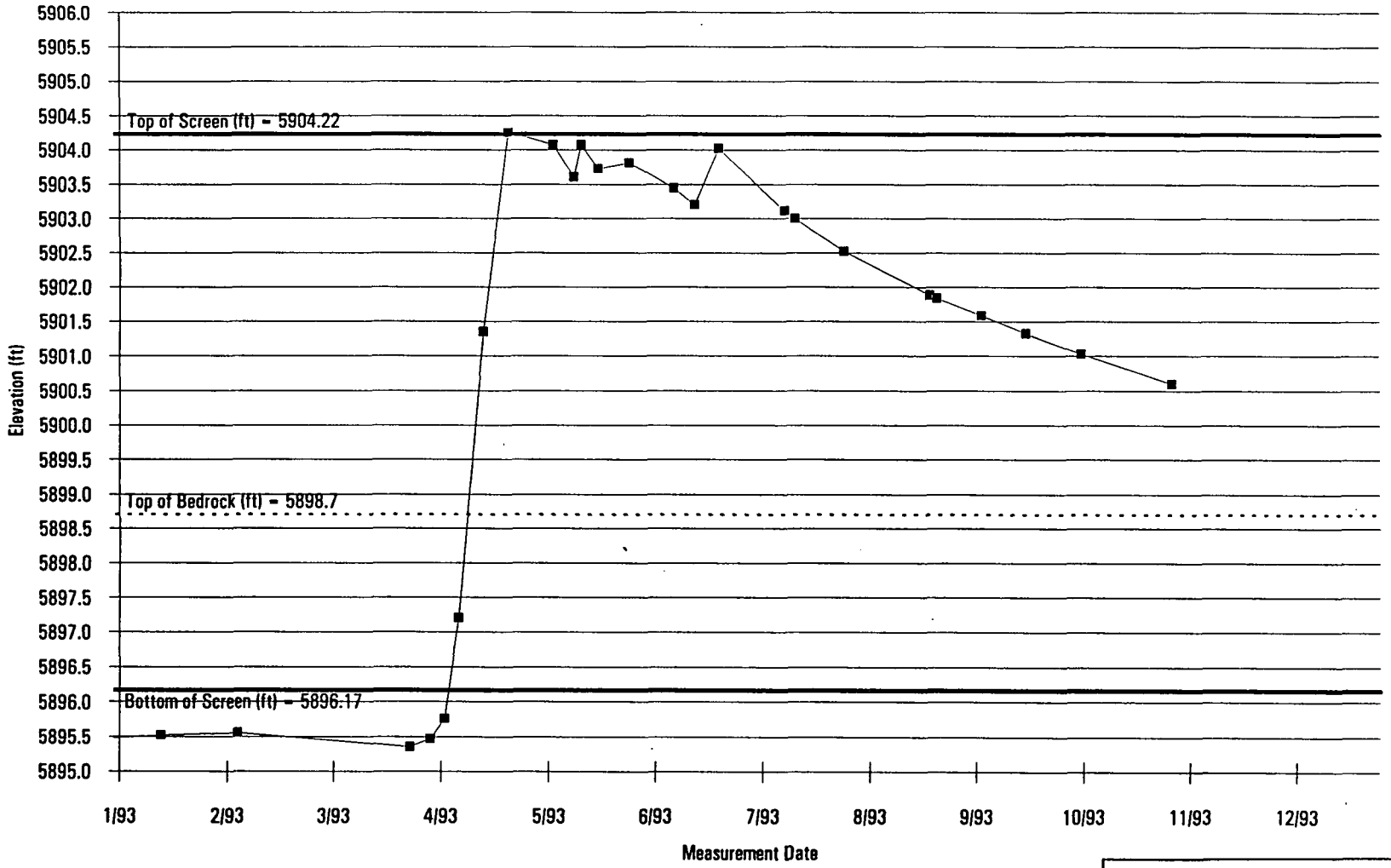

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Figure II.3.3-38

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
B208789 Hydrograph

rf85x11h

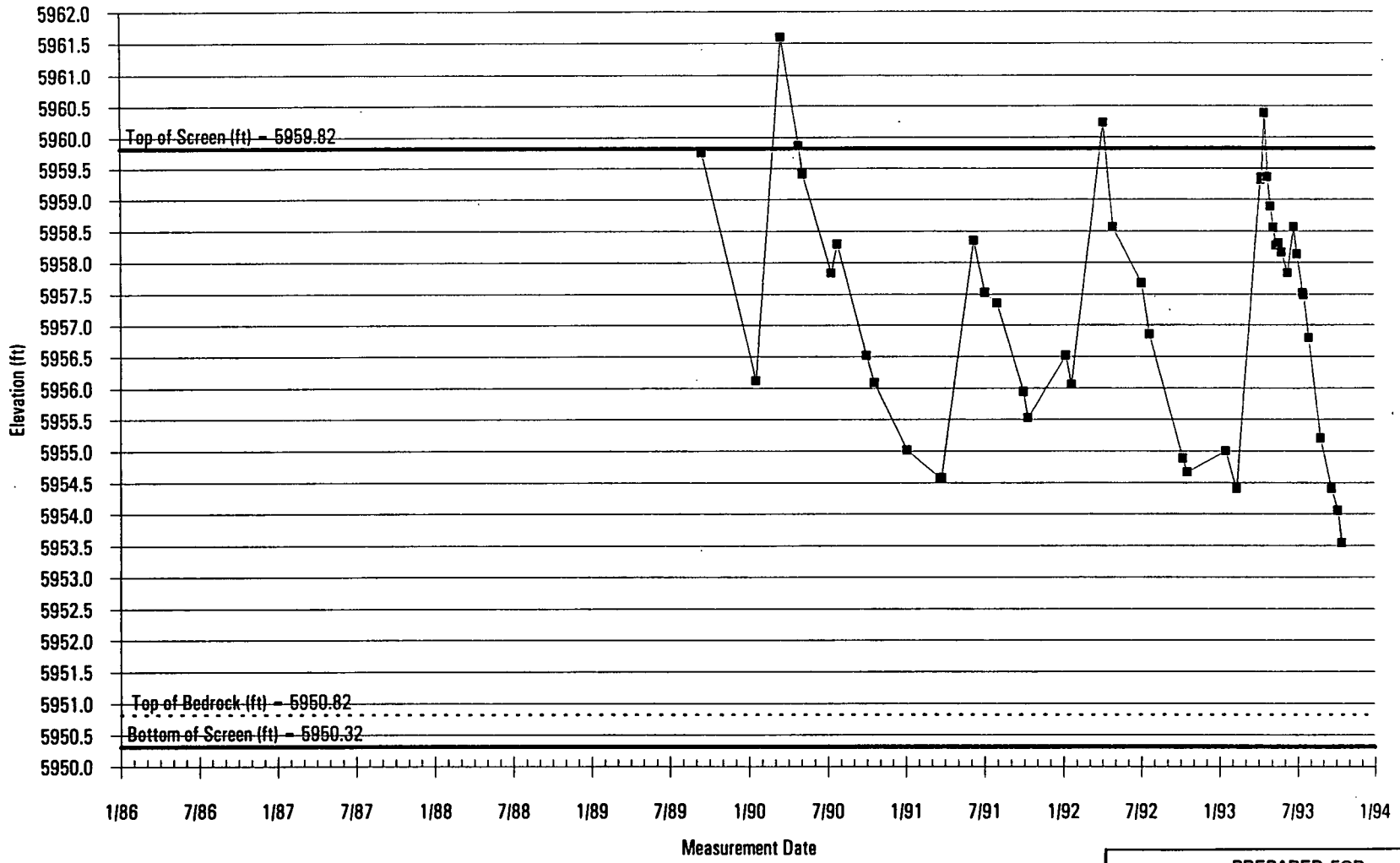

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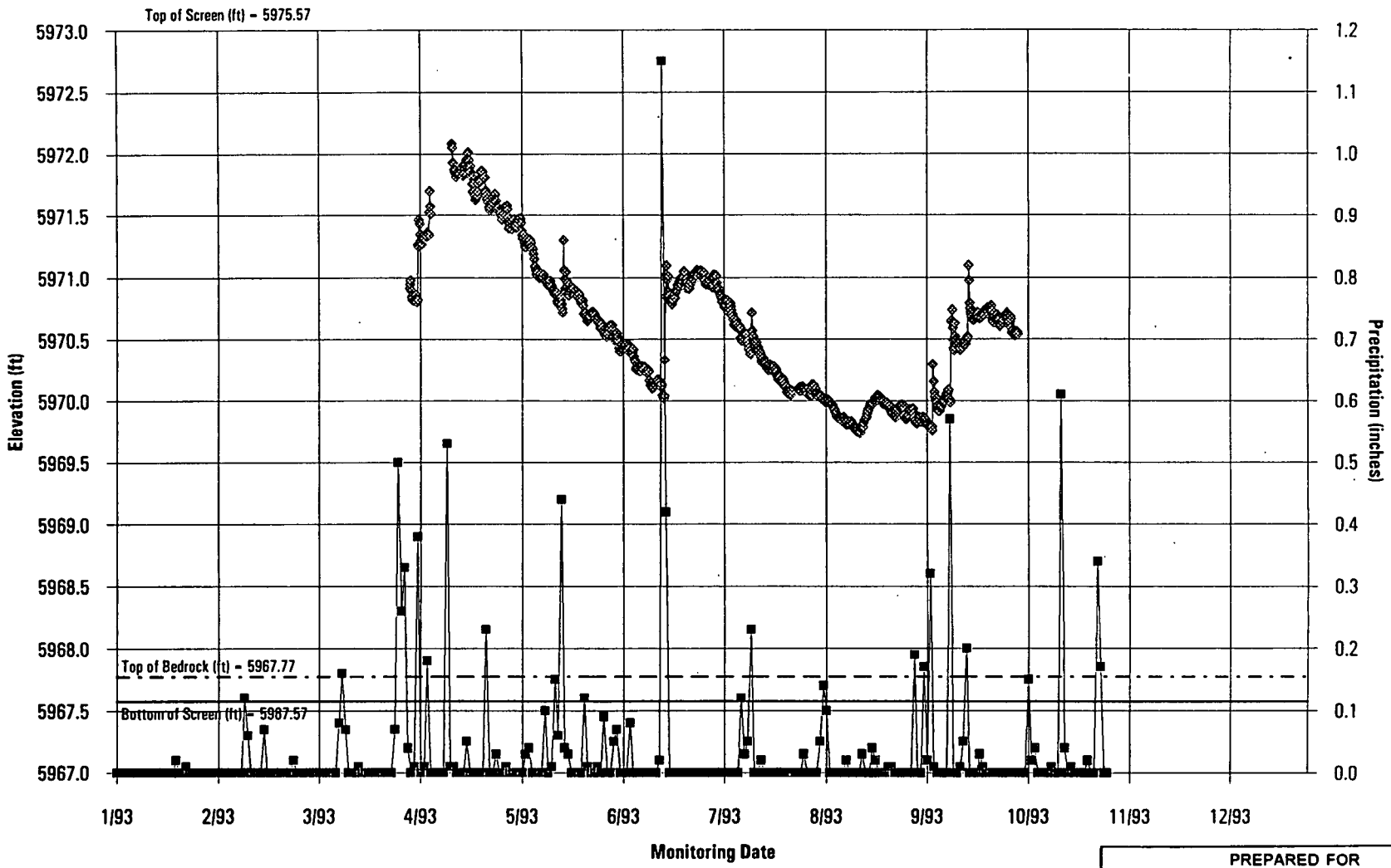
Figure II.3.3-39

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
P209789 Hydrograph

rf85x11h



LEGEND

- ■ PRECIPITATION (inches)
- ● GROUNDWATER ELEVATION (FEET)

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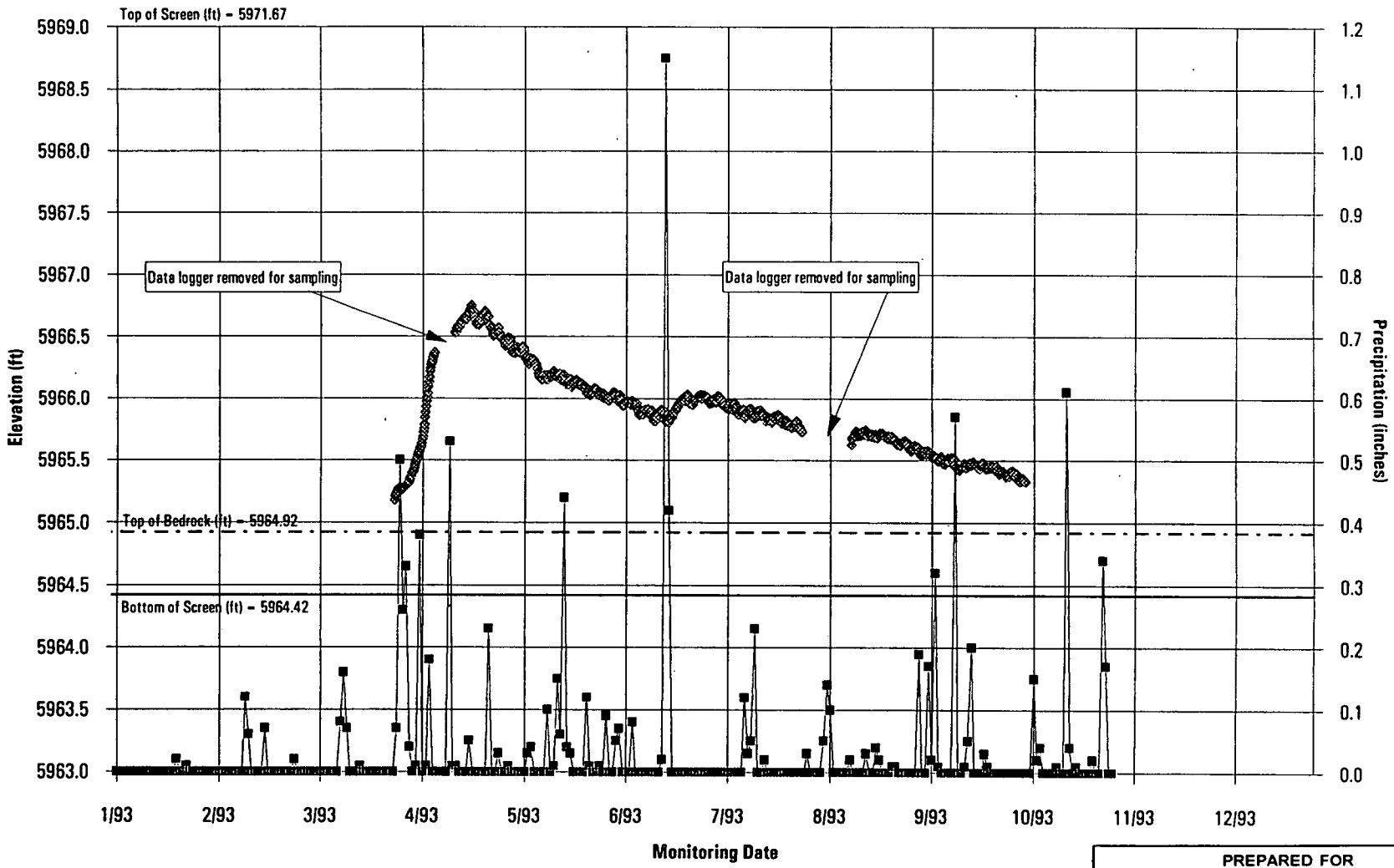
Figure II.3.3-41

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
2286 Hydrograph with Precipitation Data

f85x11h



LEGEND

- ■ PRECIPITATION (inches)
- ● GROUNDWATER ELEVATION (FEET)

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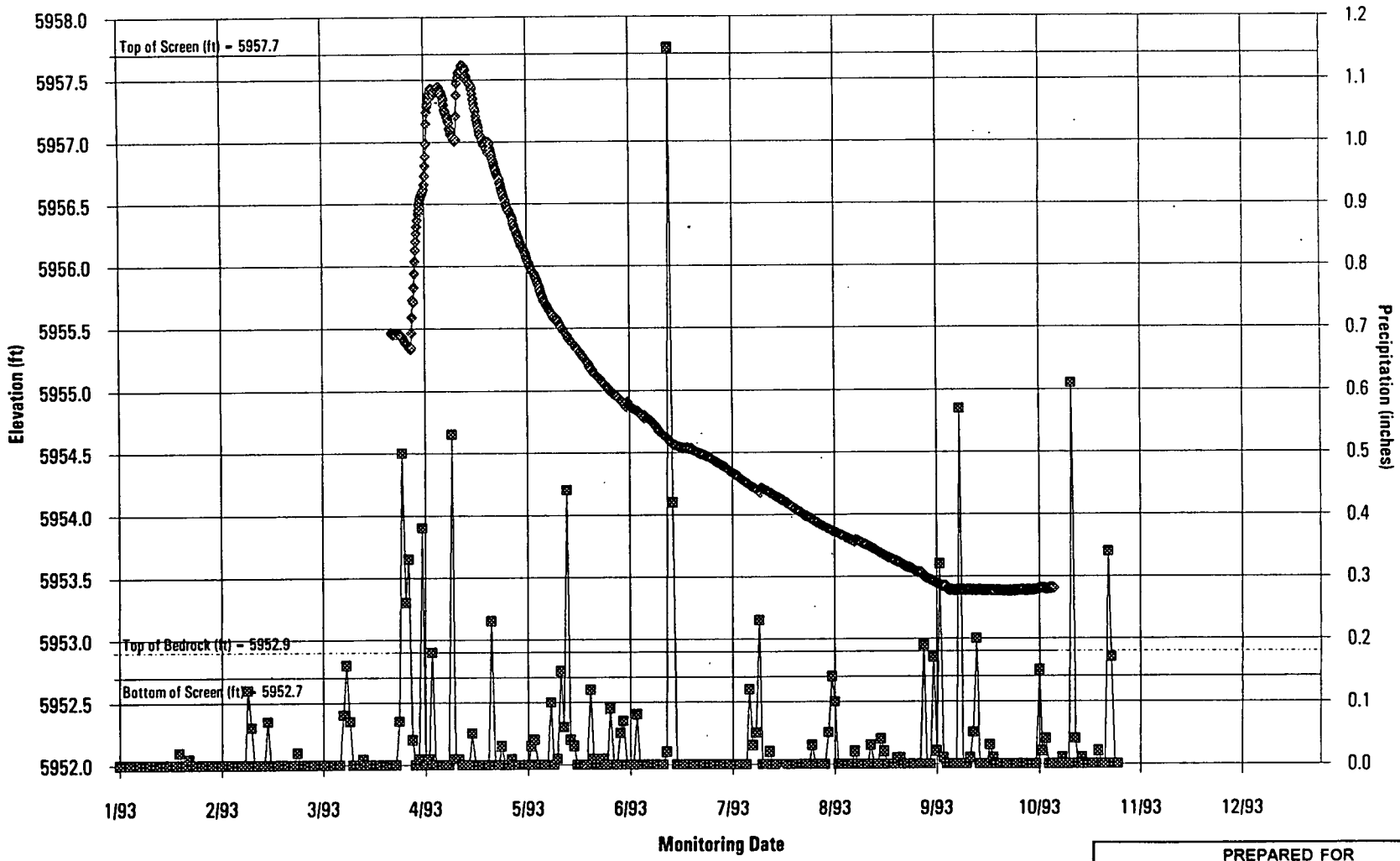
Figure II.3.3-42

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
2686 Hydrograph with Precipitation Data

rf85x11h



LEGEND

- ■ PRECIPITATION (inches)
- ◆ GROUNDWATER ELEVATION (FEET)

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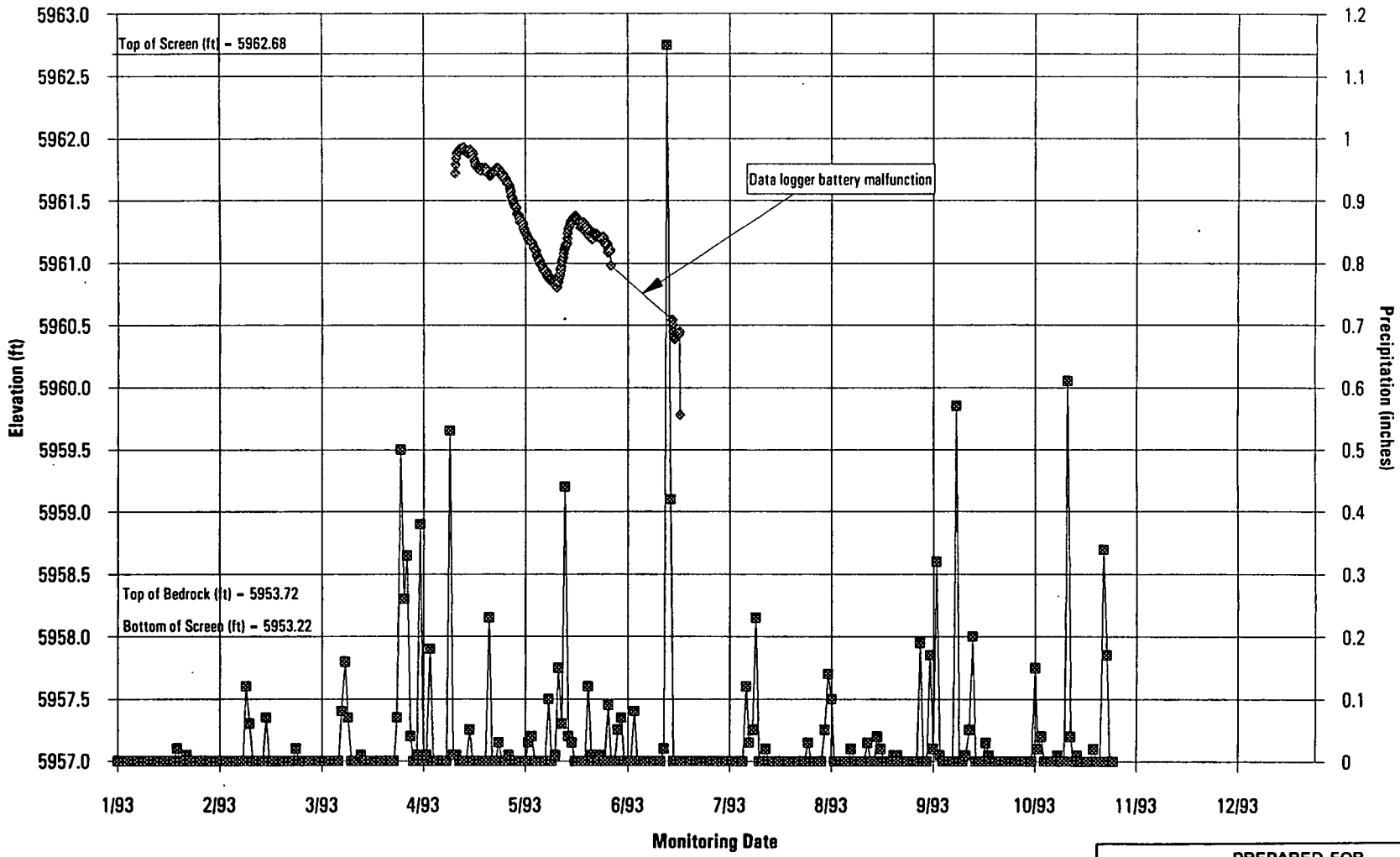
Figure II.3.3-43

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
41193 Hydrograph with Precipitation Data



LEGEND

- ■ PRECIPITATION (inches)
- ● GROUNDWATER ELEVATION (FEET)

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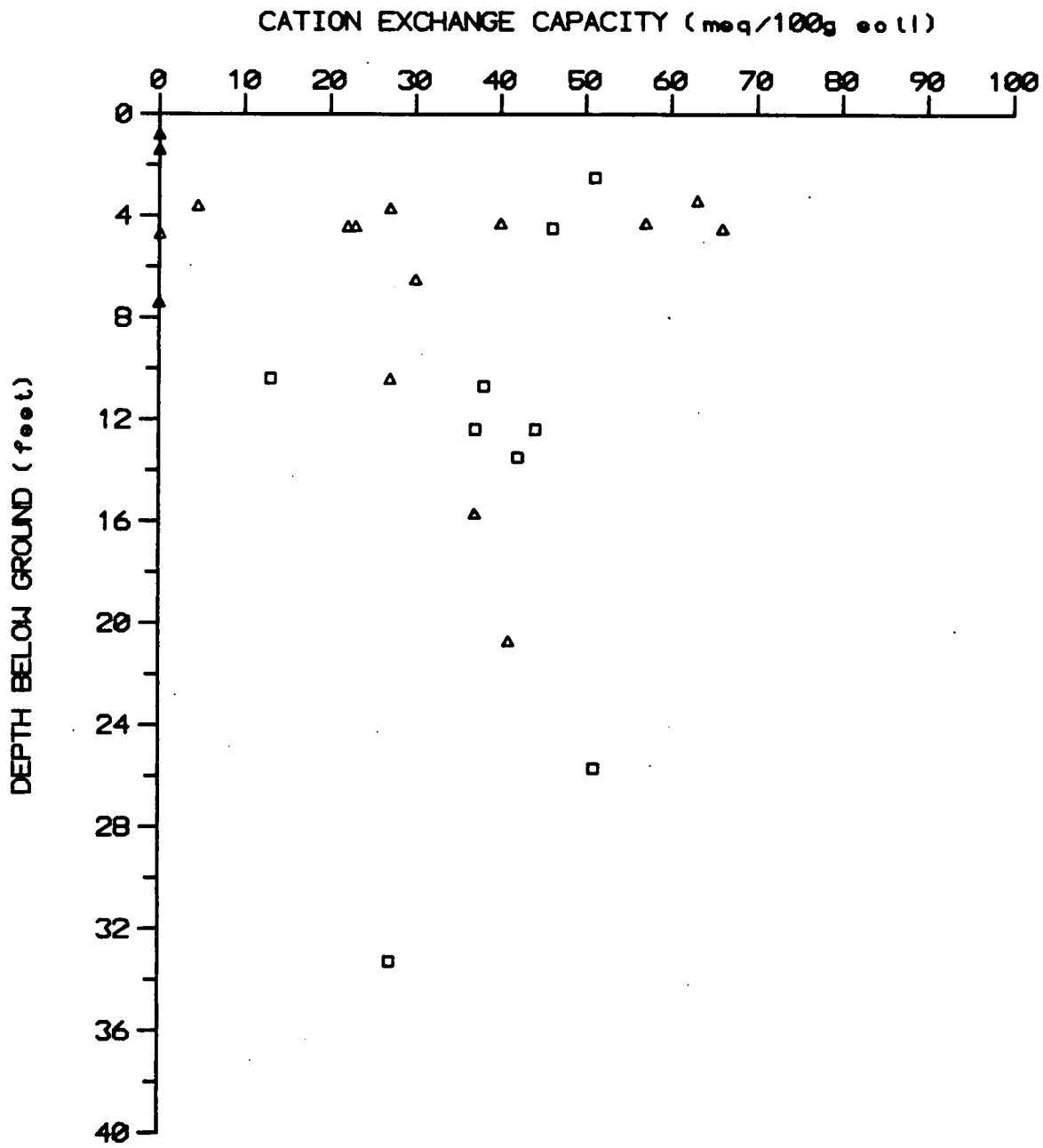
Figure II.3.3-44

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
P207689 Hydrograph with Precipitation Data

rf85x11h



□ BEDROCK

△ ALLUVIUM

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Figure II.3.3-53

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
CEC versus Depth

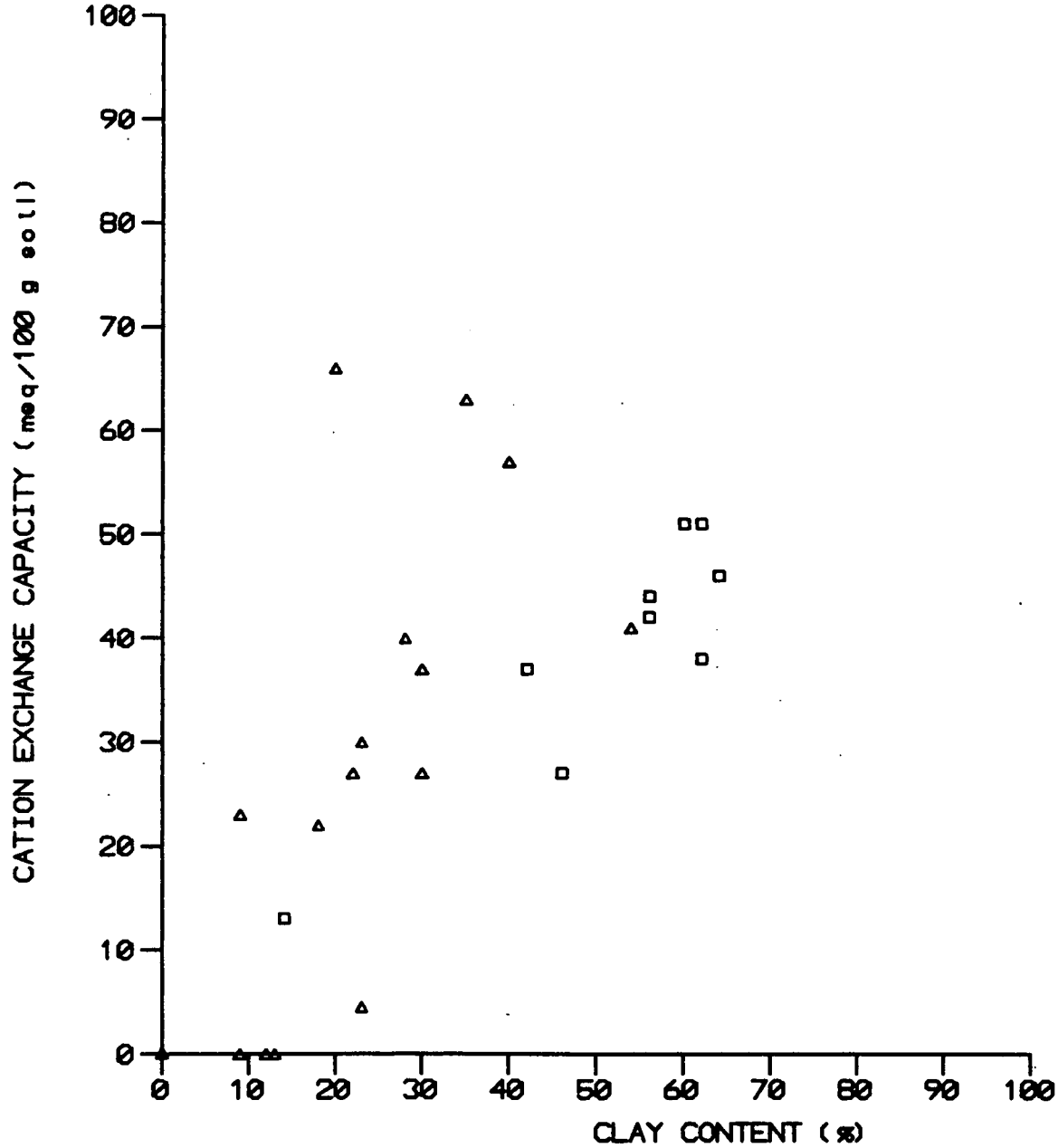

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Figure II.3.3-54

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
CEC versus Clay Content

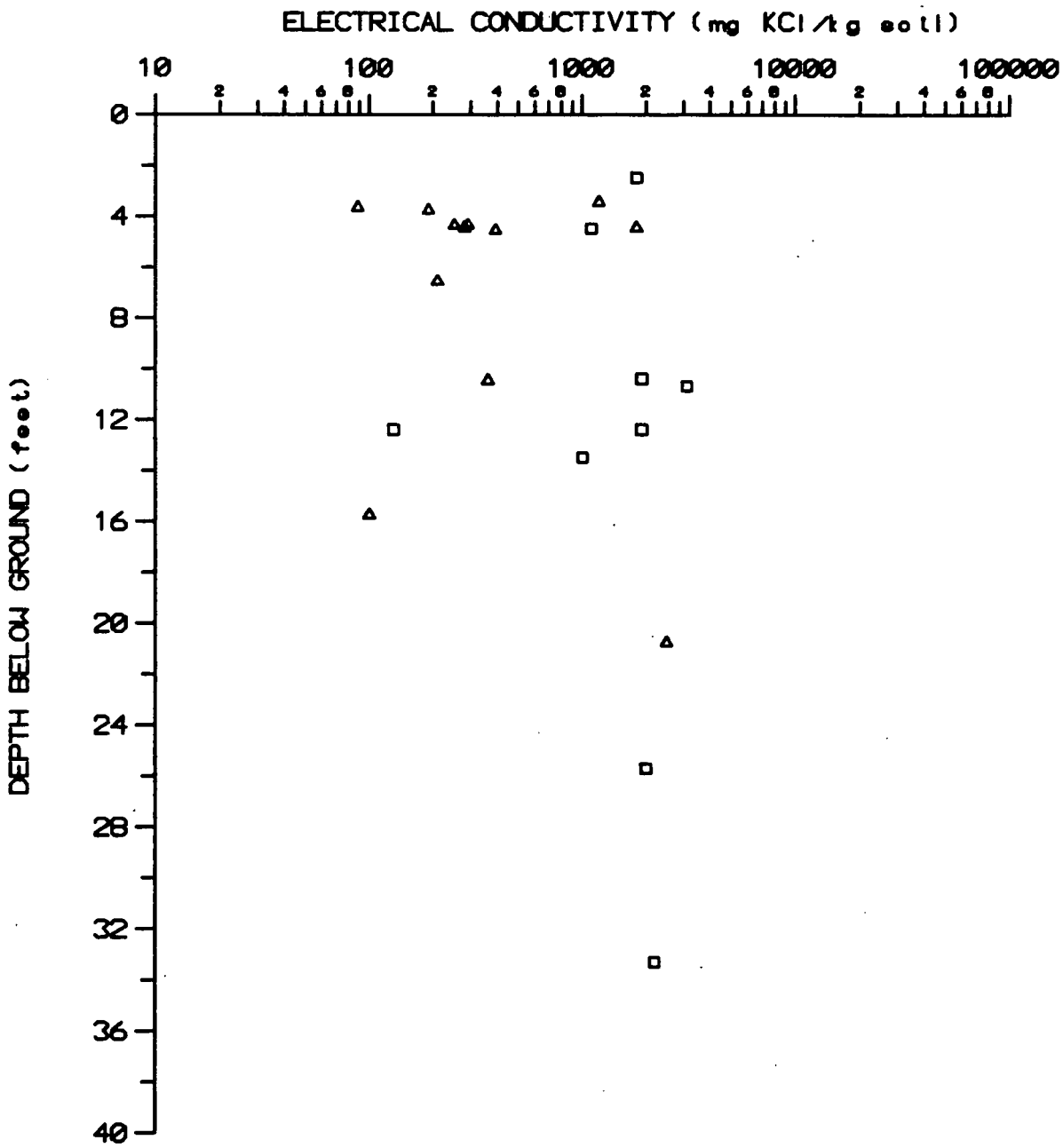

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Figure II.3.3-55

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Electrical Conductivity versus Depth

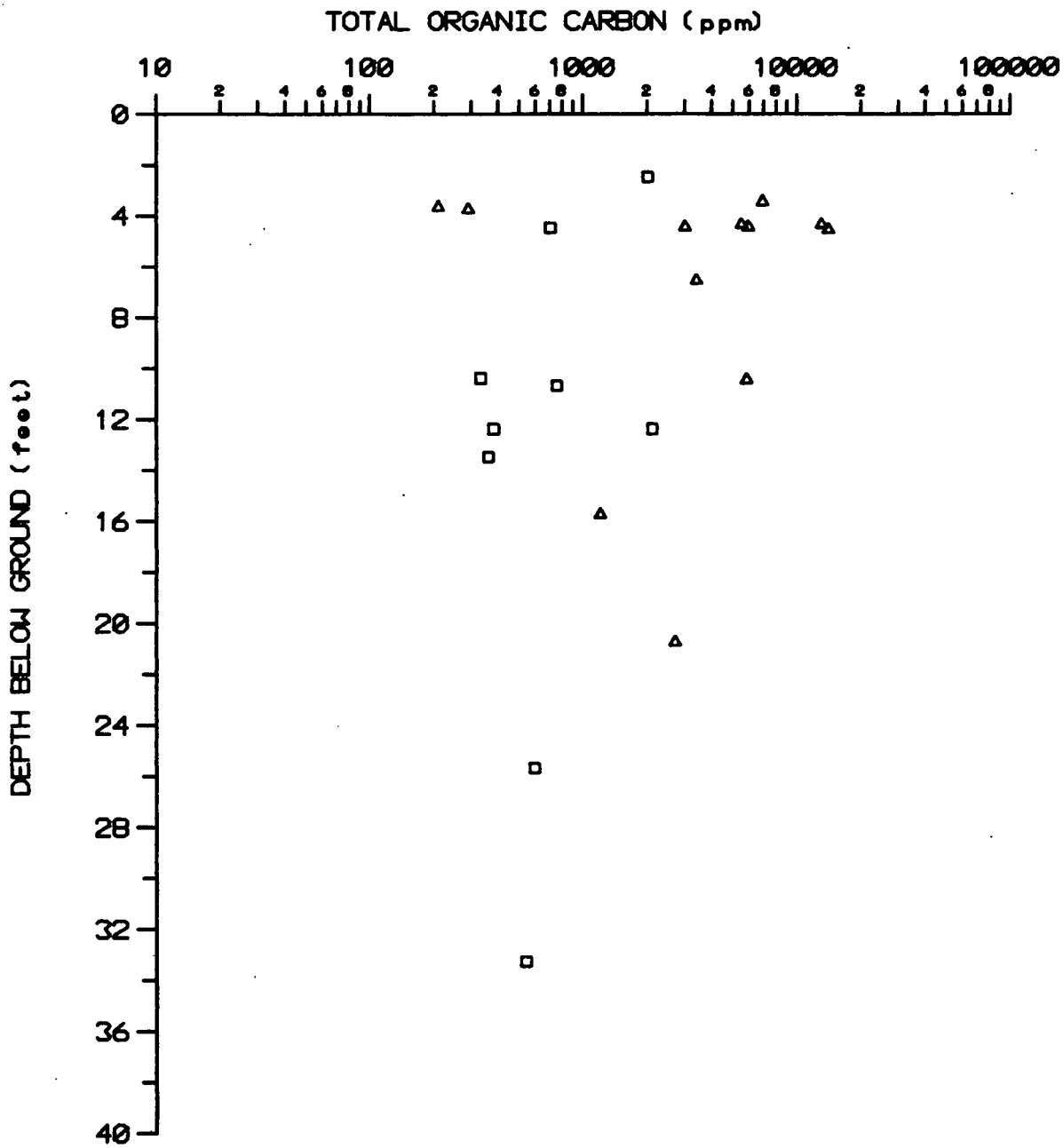

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Figure II.3.3-56

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
TOC versus Depth

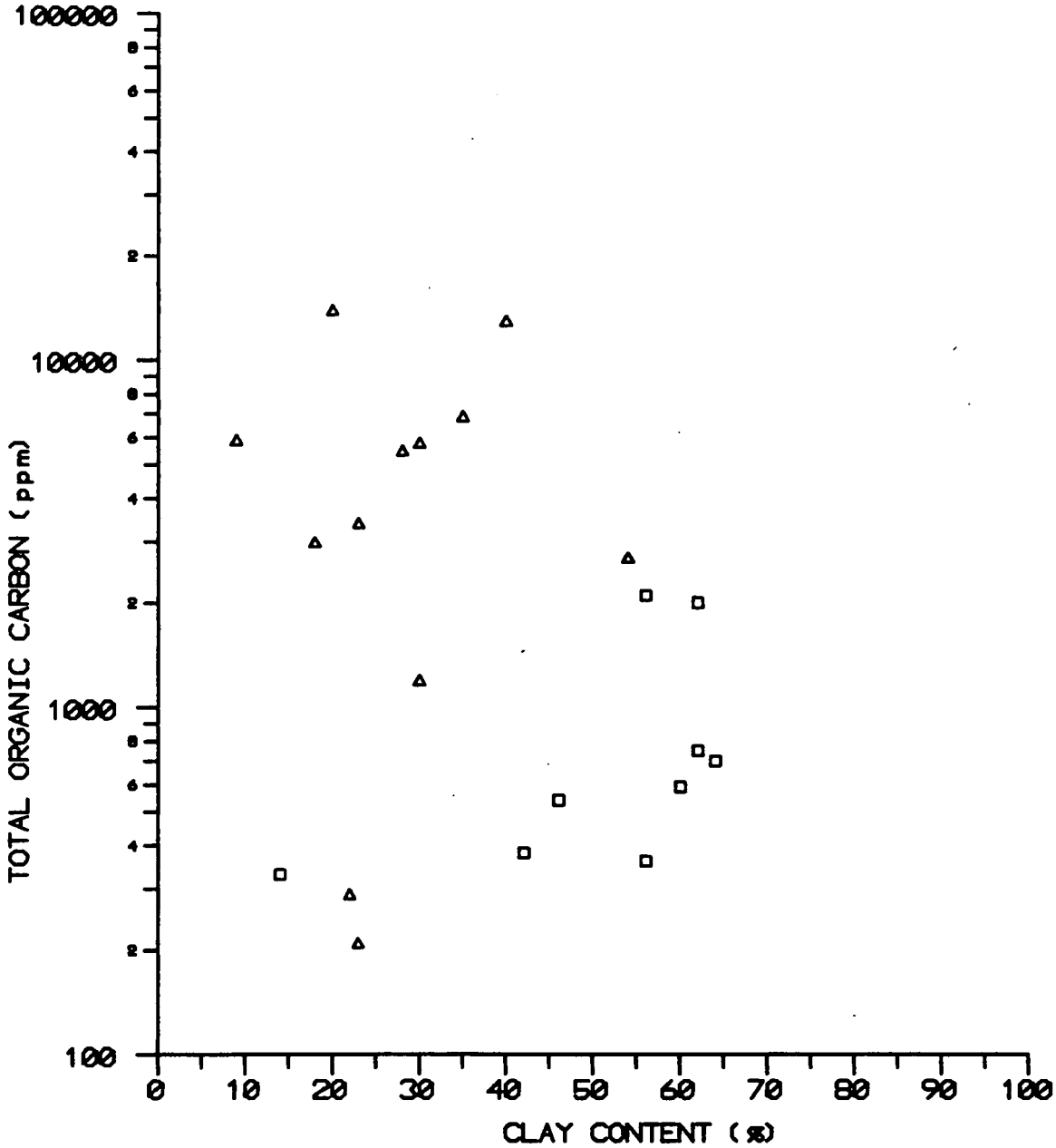

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Figure II.3.3-57

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
TOC versus Clay Content

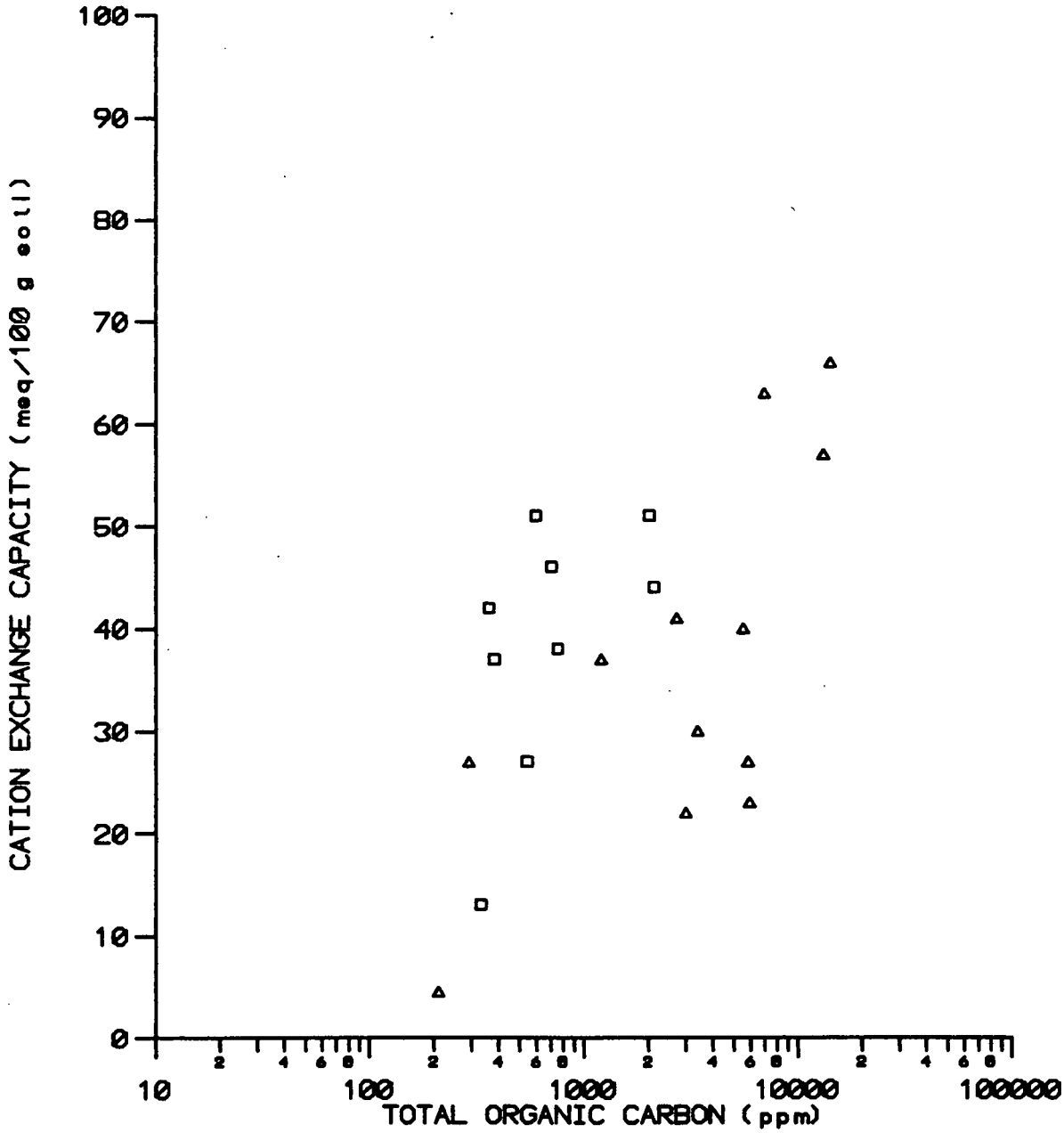

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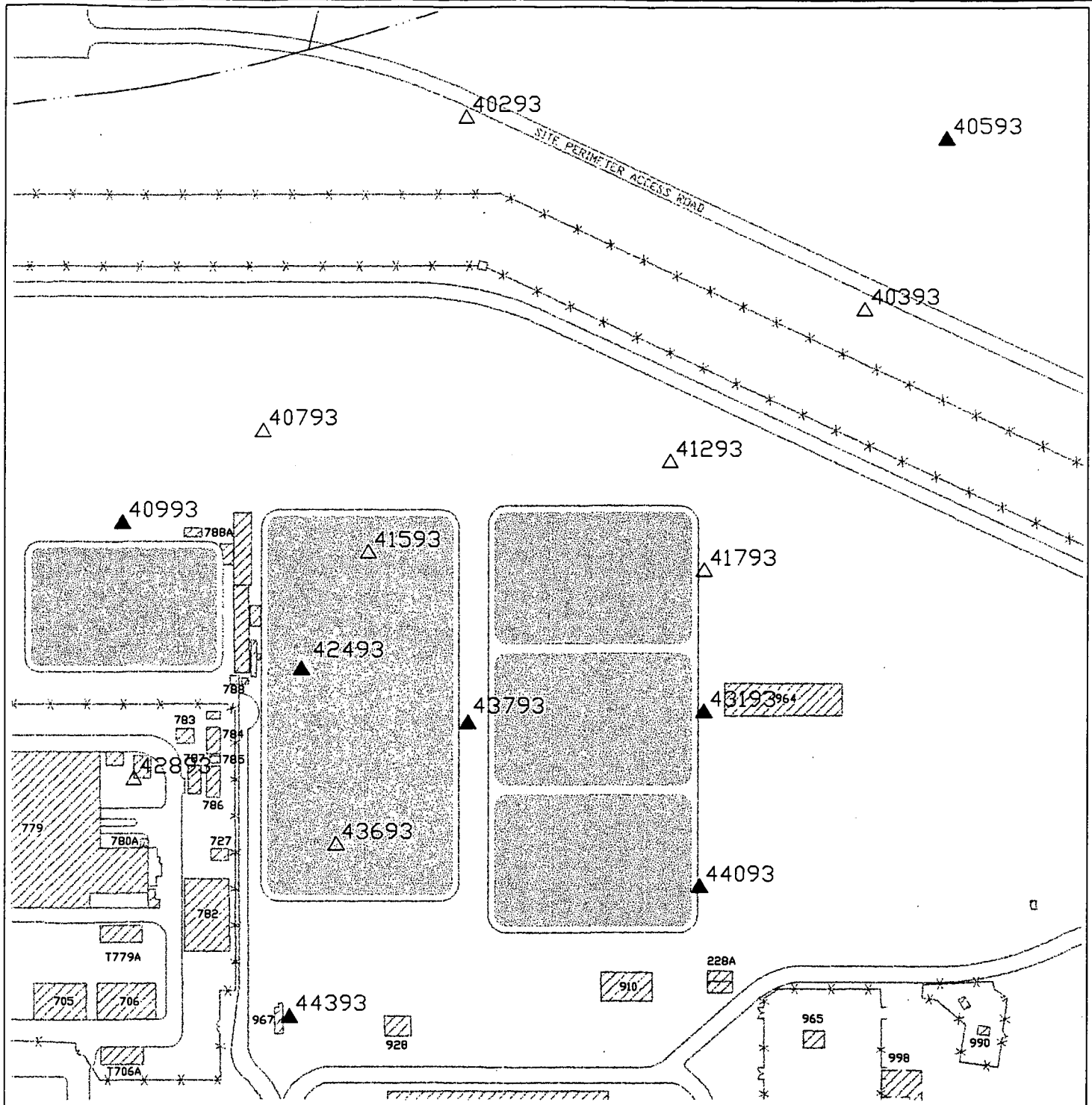
Figure II.3.3-58

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
TOC versus CEC



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- △ Single Lysimeter Location
- ▲ Dual Lysimeter Location

N

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Figure II.3.3-60

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Lysimeter Location Map

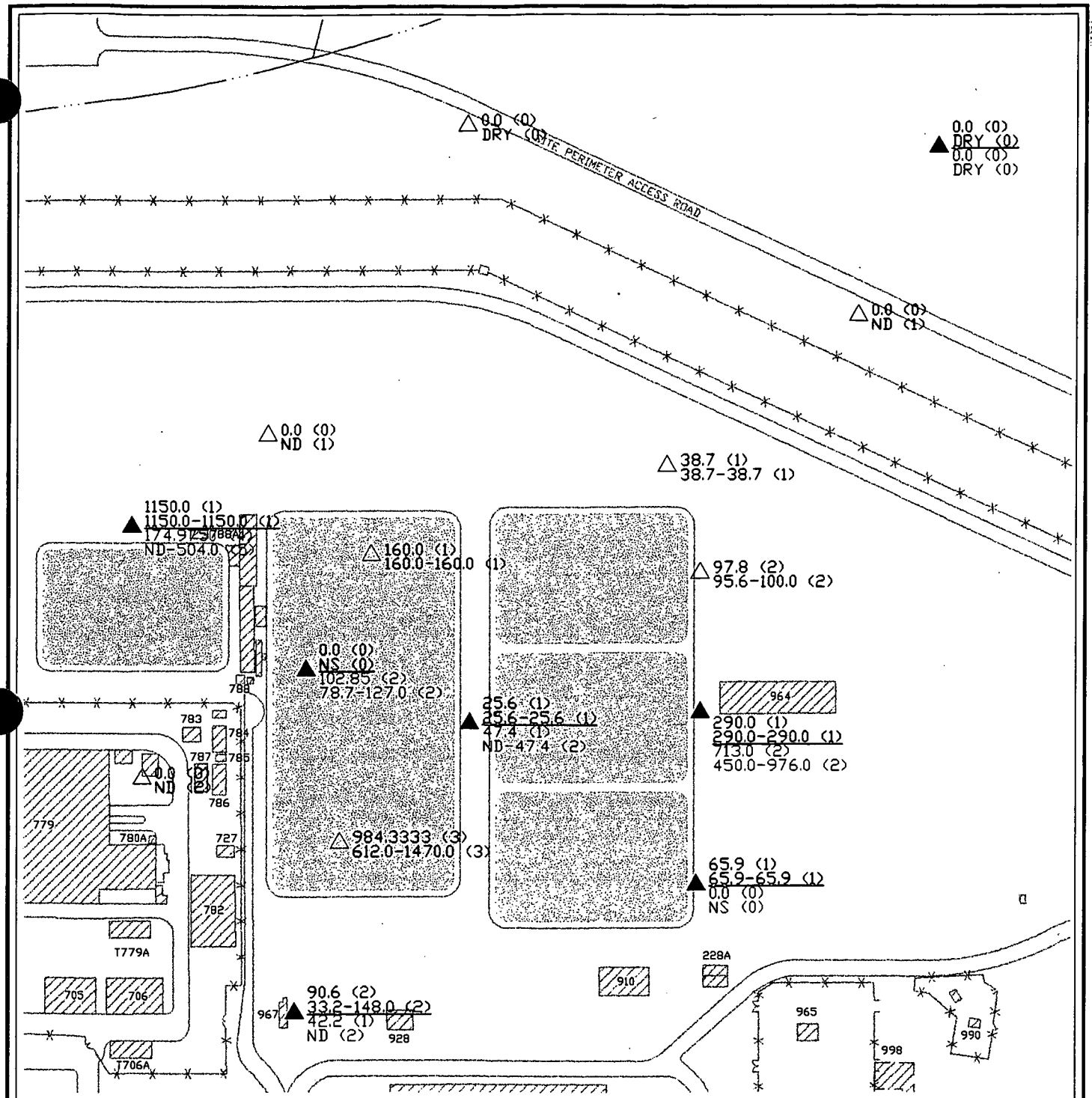

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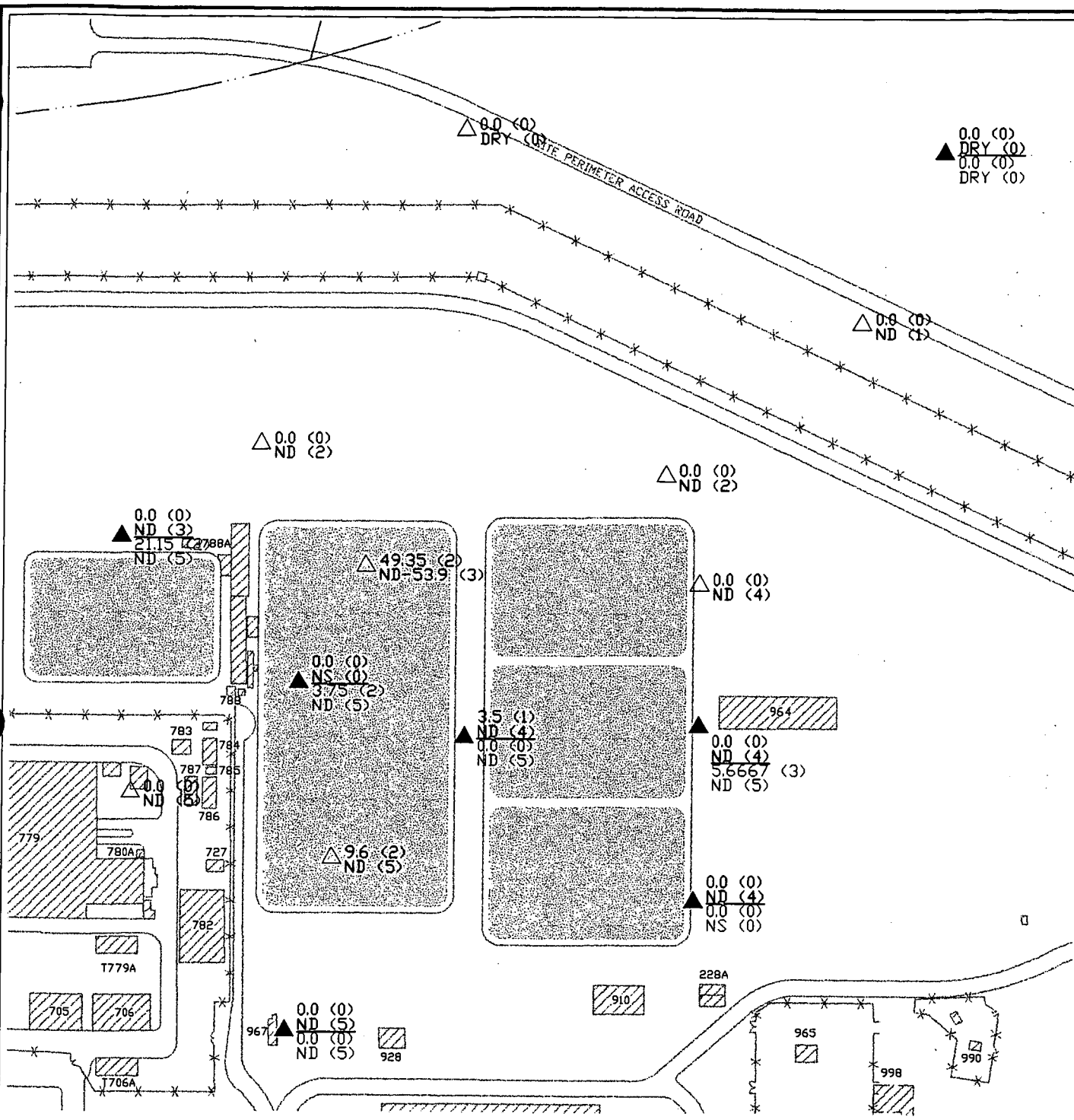
Figure II.3.3-61

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Barium (μg/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Upper
Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Lower

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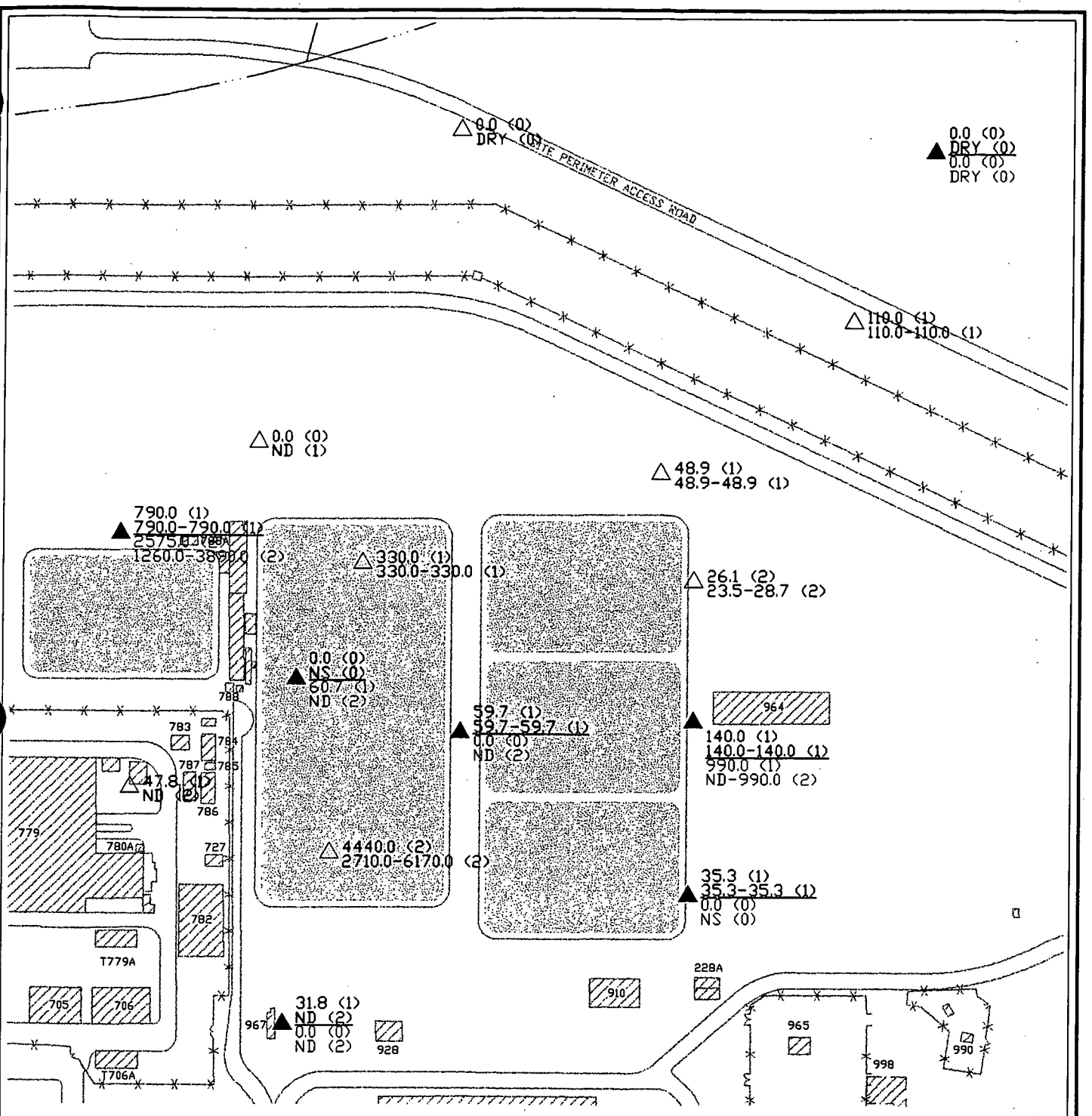
Figure II.3.3-62

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Cadmium (μg/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Upper
Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Lower

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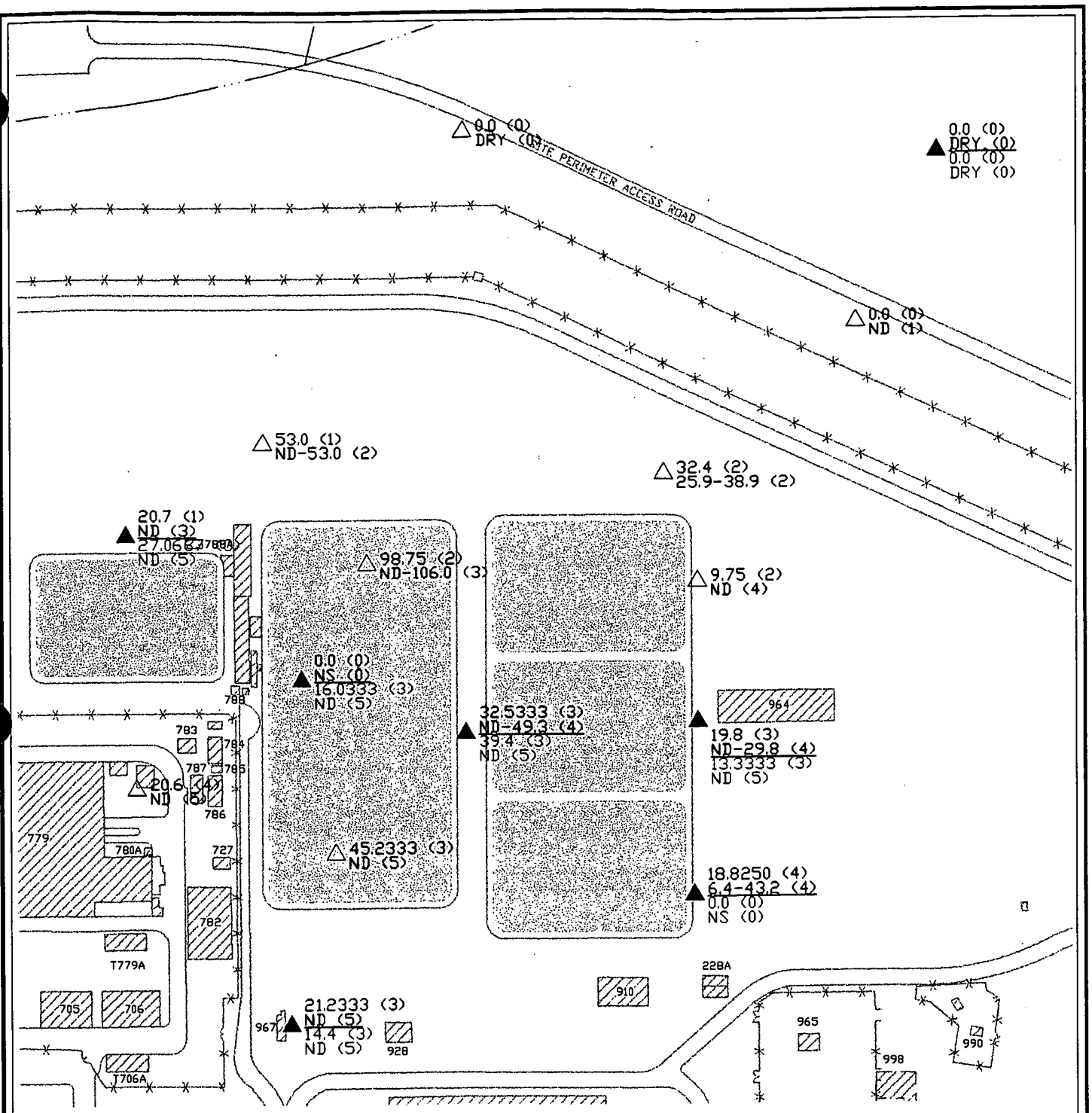
Figure II.3.3-63

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Lithium (μg/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Upper
Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Lower

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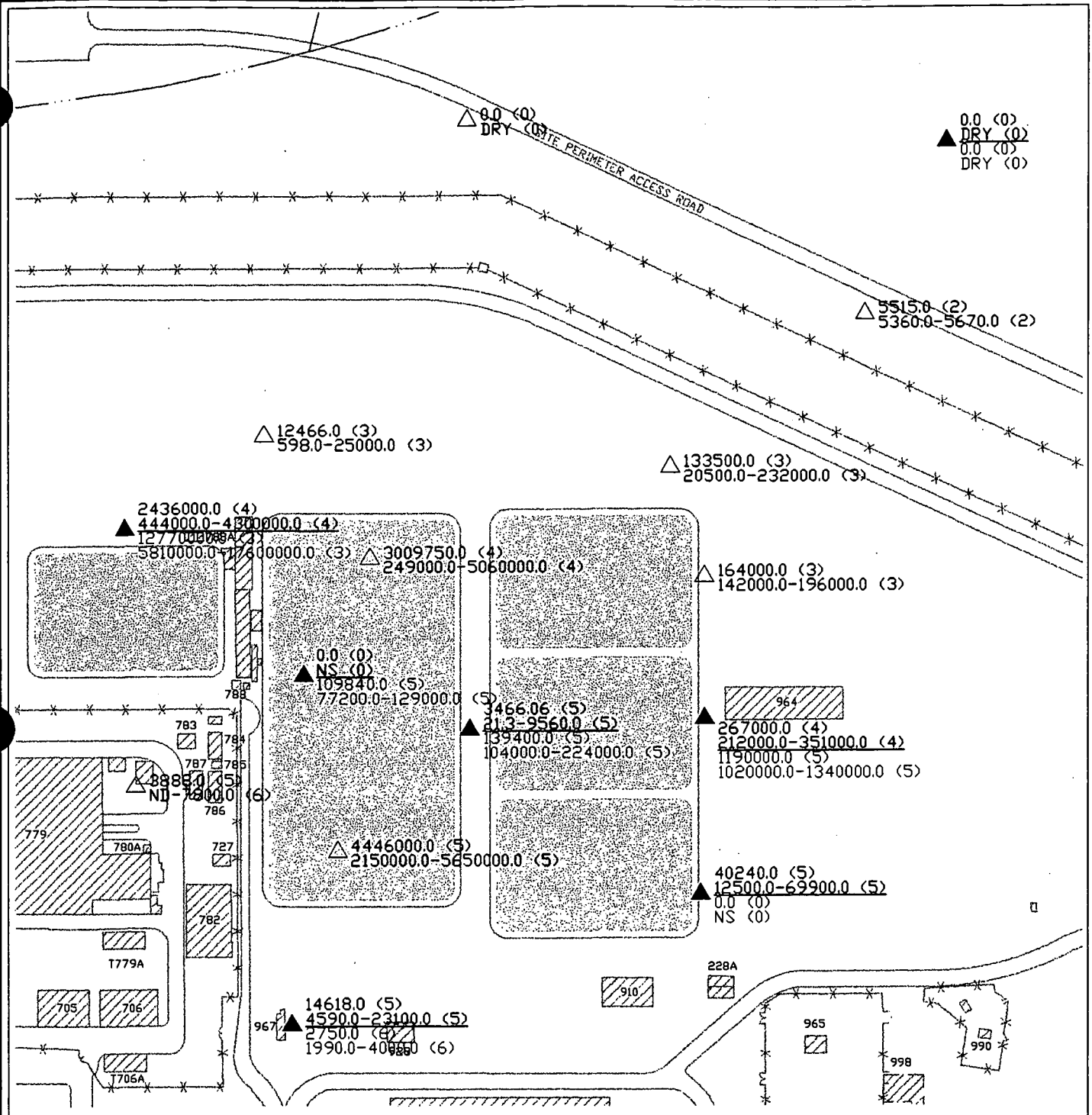
Figure II.3.3-64

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Zinc (μg/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Upper

Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Lower

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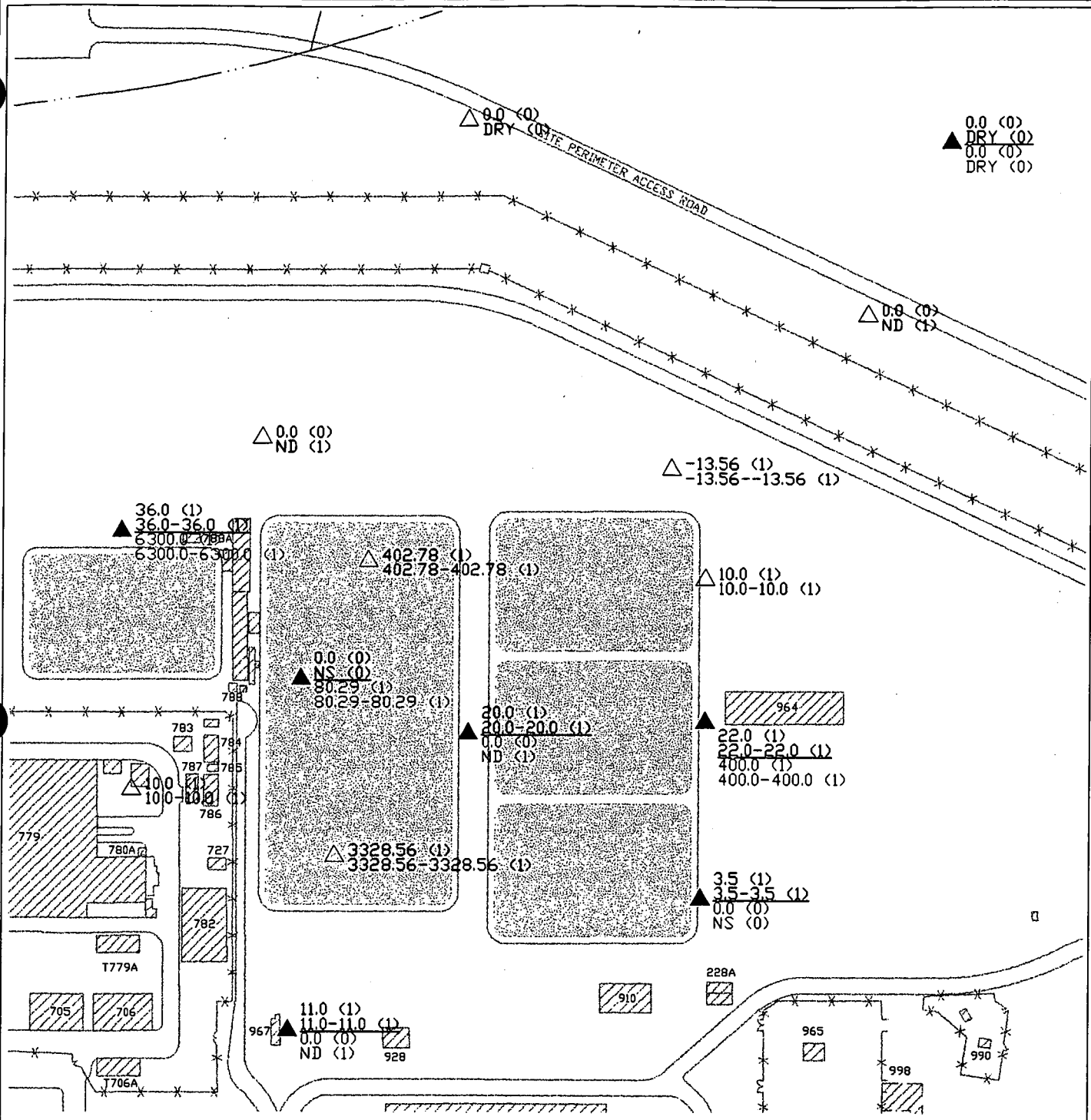
Figure II.3.3-65

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Nitrate/Nitrite (μg/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Upper
Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Lower

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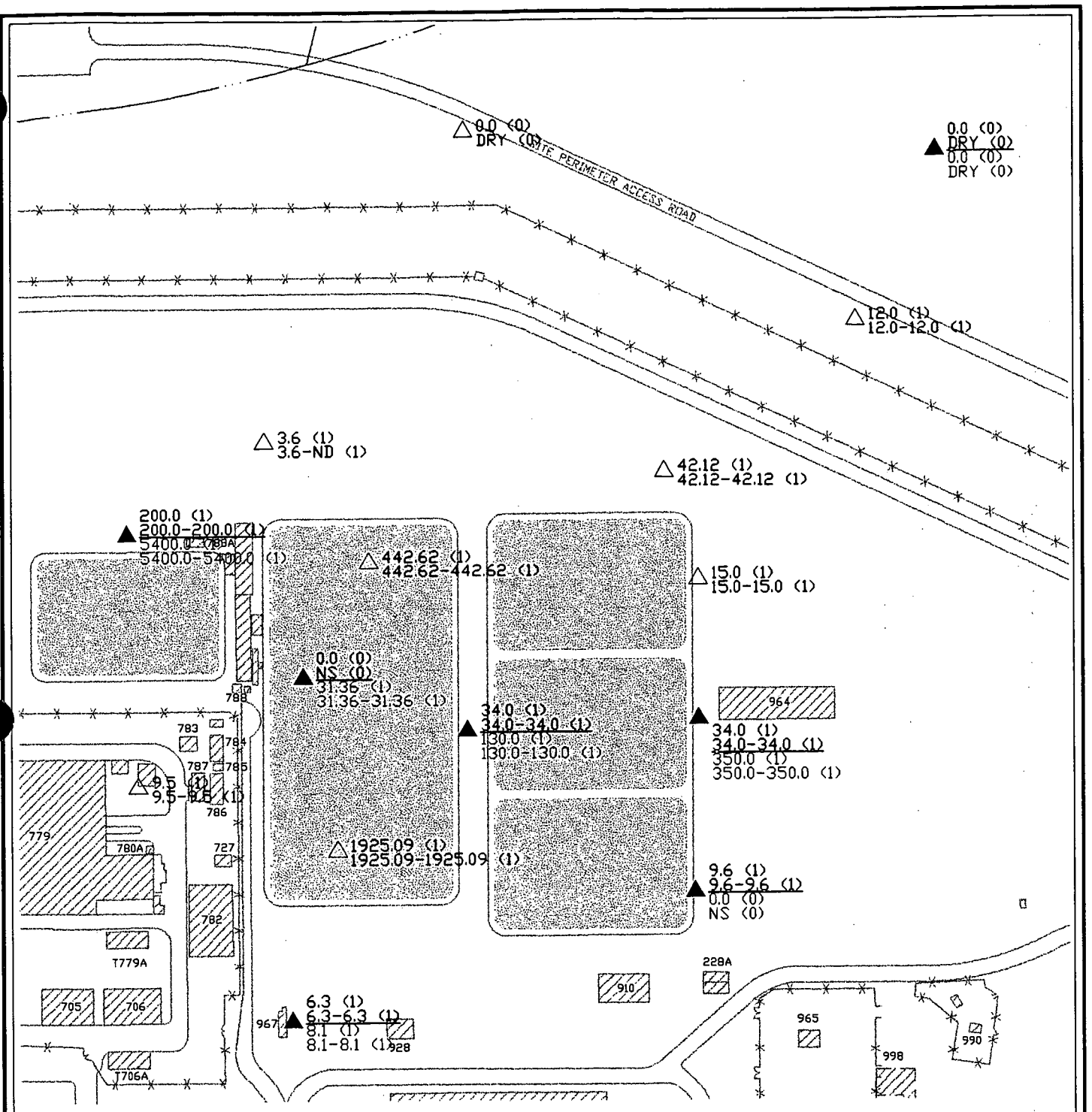
Figure II.3.3-66

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Gross Alpha (pCi/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Upper

Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Lower

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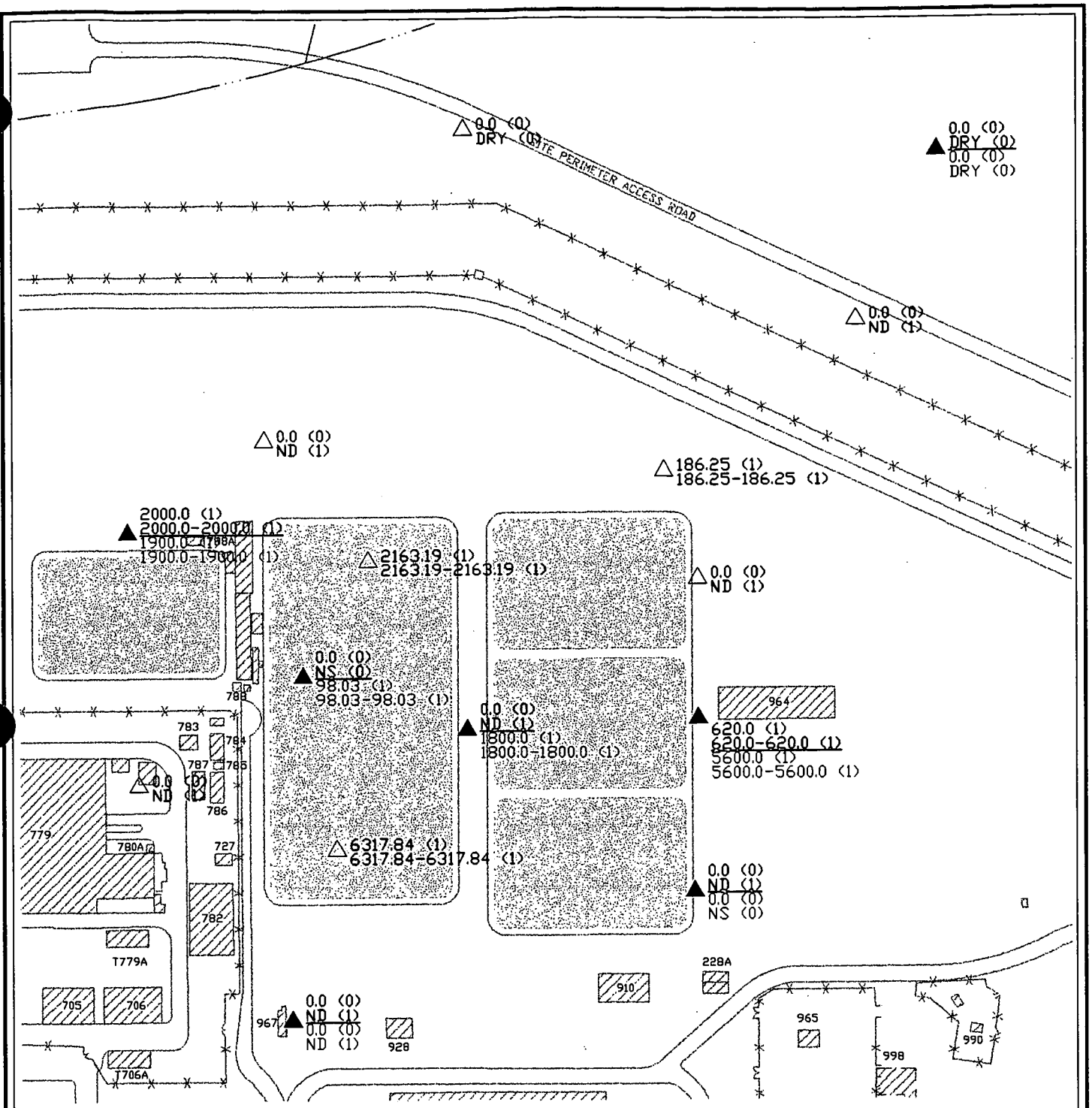
Figure II.3.3-67

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Gross Beta (pCi/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Upper

Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Lower

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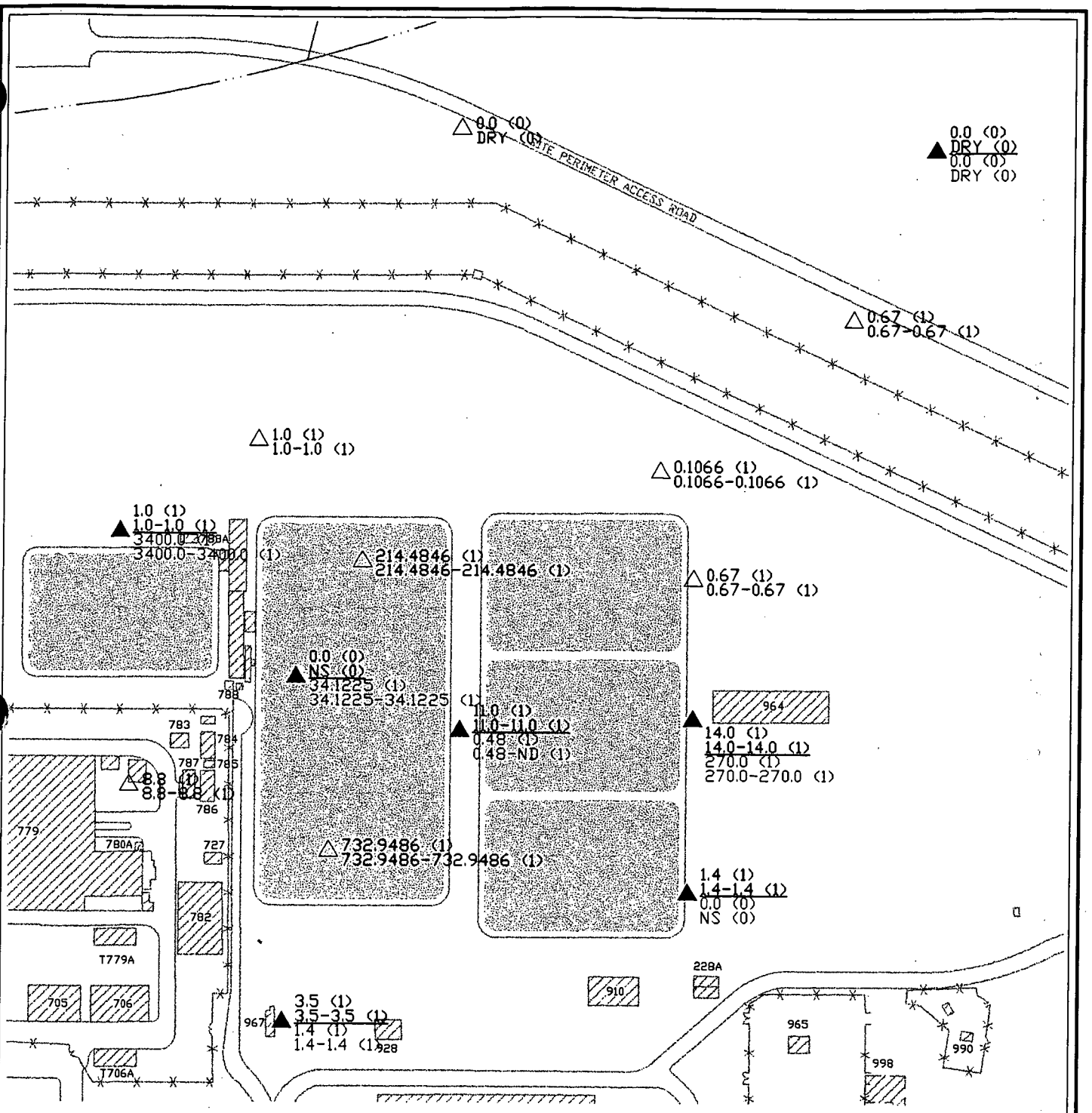
Figure II.3.3-68

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Tritium (pCi/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Upper

Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Lower

100 0 100 200 300 FEET

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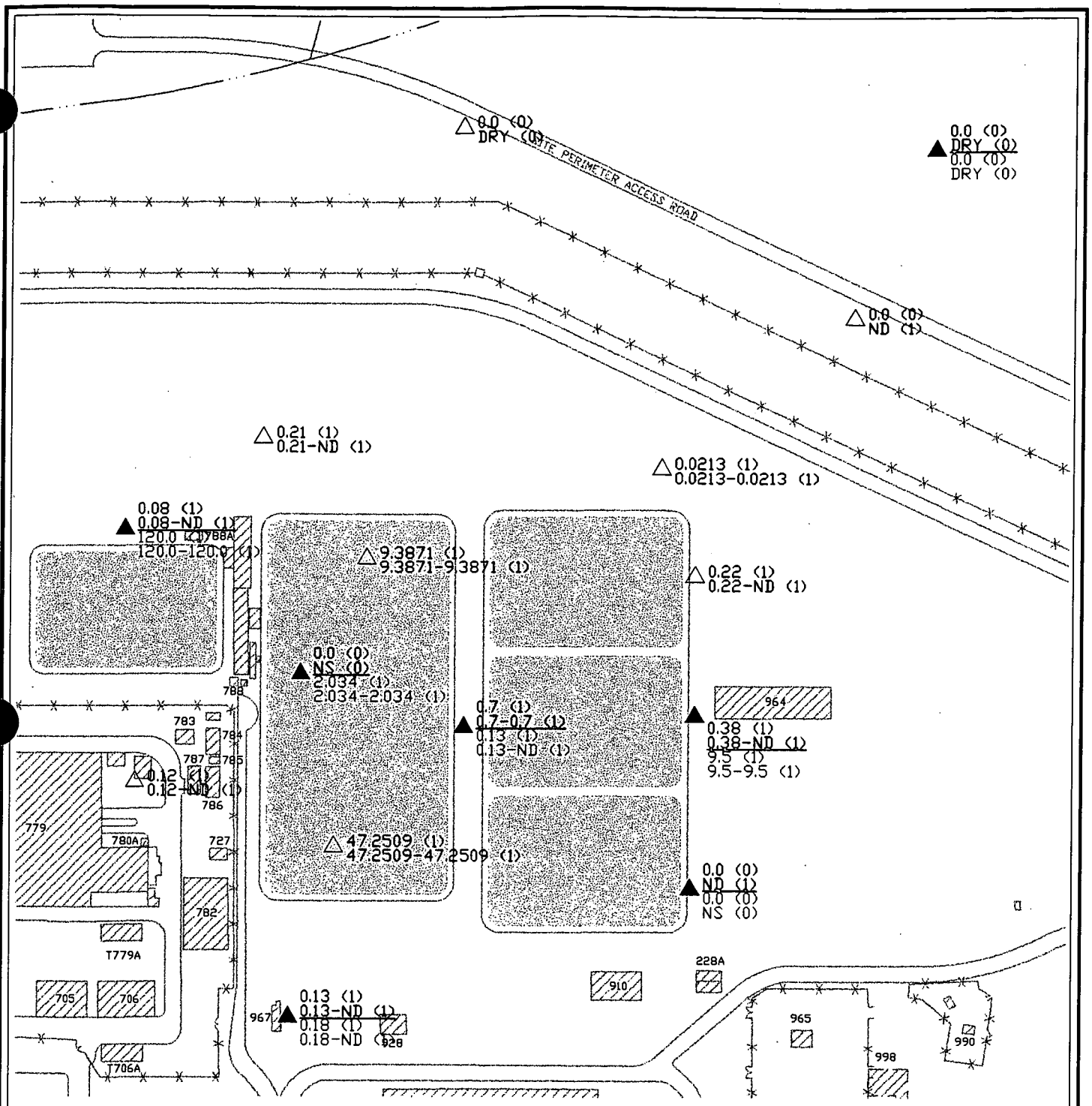
Figure II.3.3-69

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Uranium 235 (pCi/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Upper

Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)] Lower

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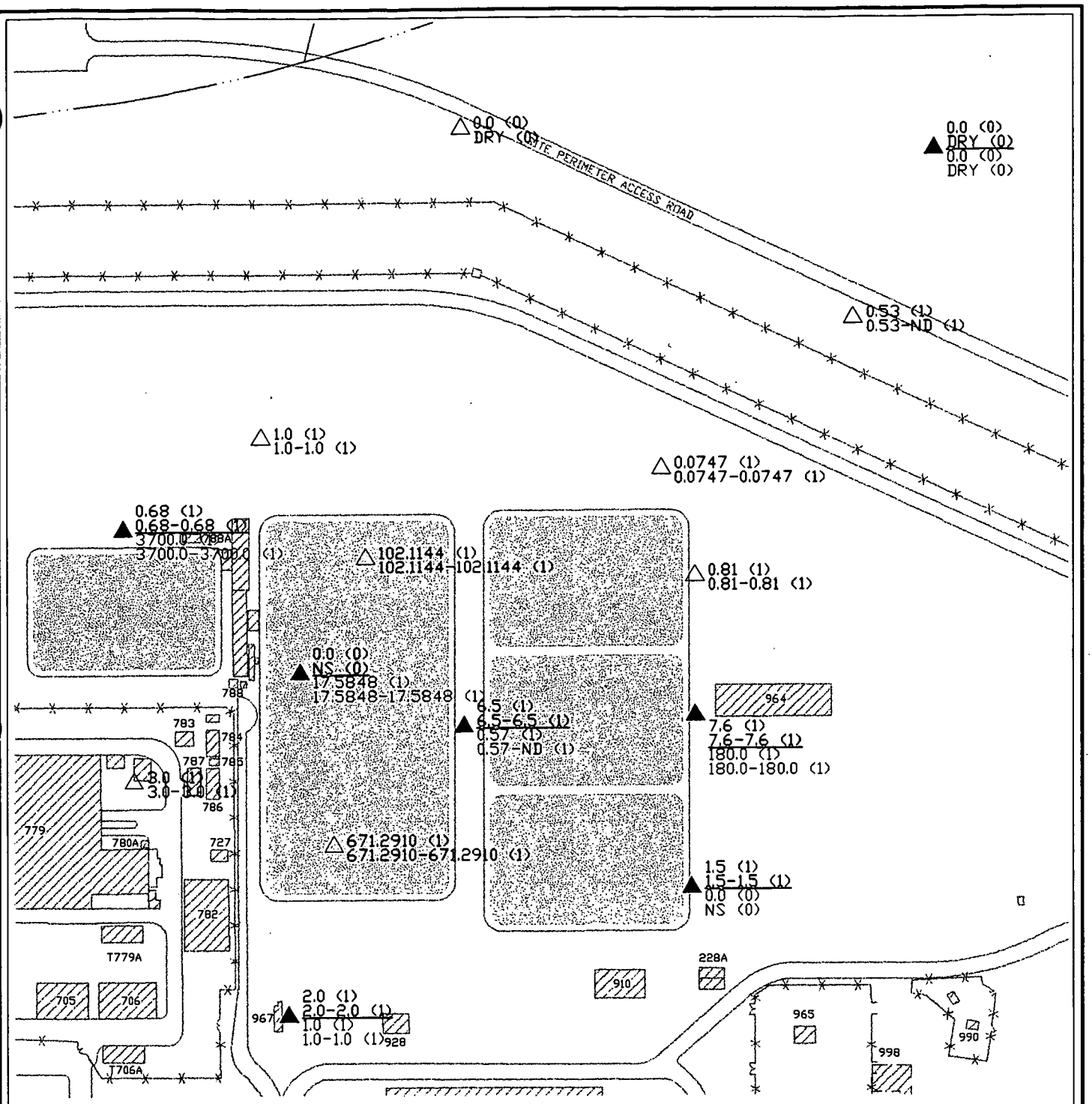
Figure II.3.3-70

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Uranium 233/234 (pCi/l)



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- NS Not Sampled
- ND Not Detected

SINGLE LYSIMETER

△40793 Concentration Mean (Number of Samples)
Range of Concentration (Number of Samples)

DUAL LYSIMETER

▲43193 Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Upper

Concentration Mean (Number of Samples) / Range of Concentration (Number of Samples) — Lower

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Figure II.3.3-71

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pore Water Results
Uranium 238 (pCi/l)

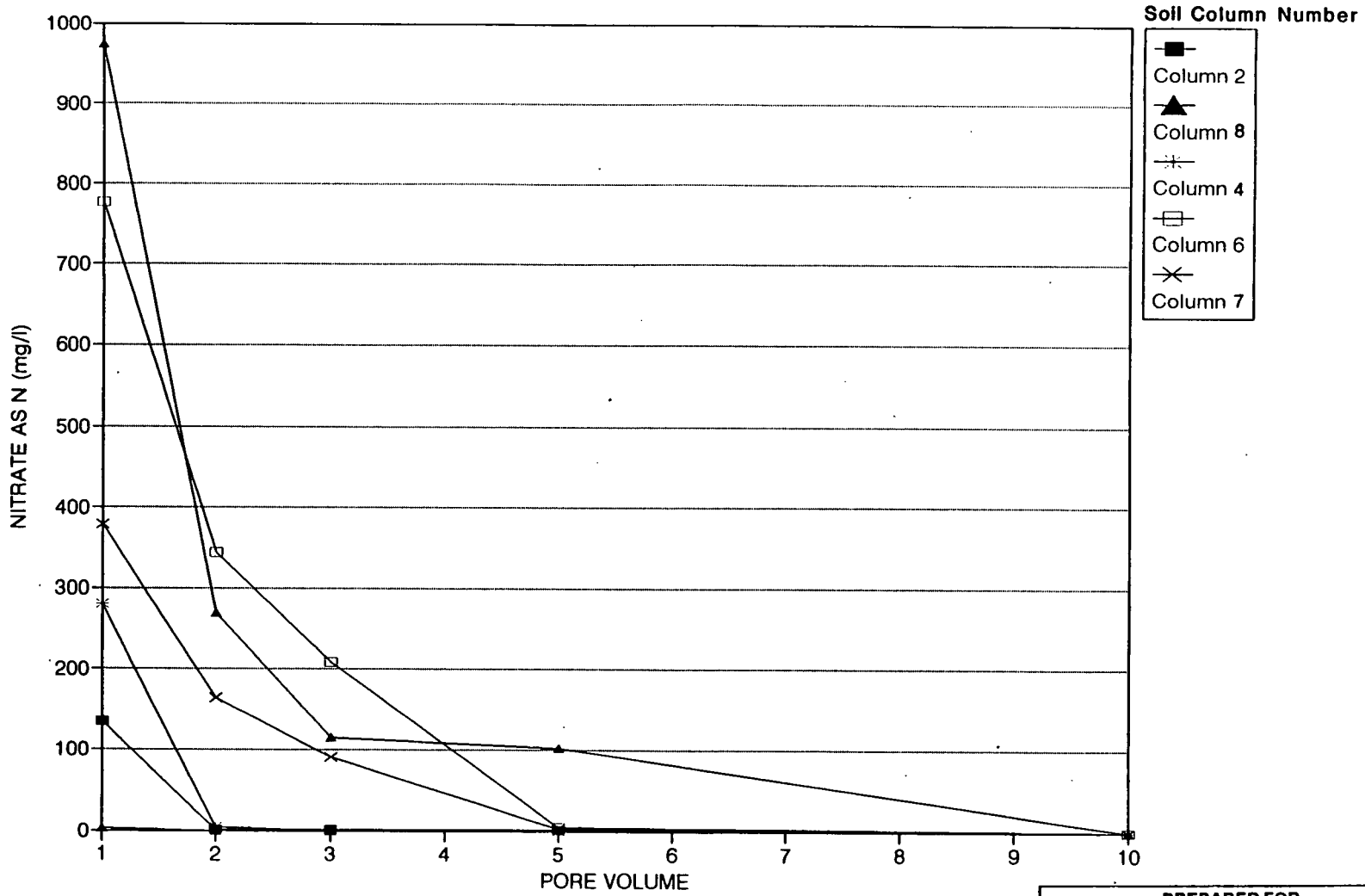

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Figure II.3.3-72

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Nitrate in Leachate

rf85x11h

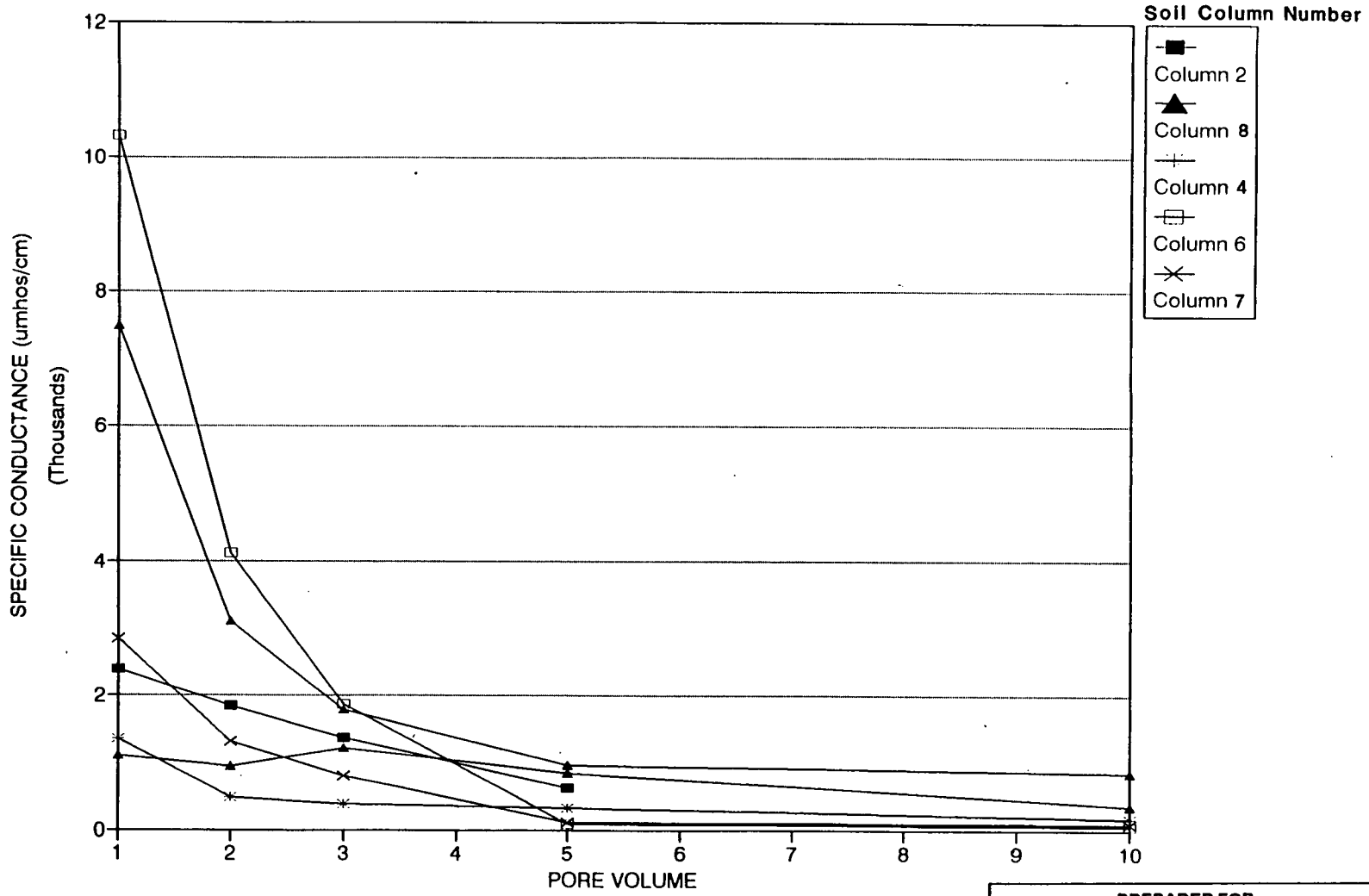

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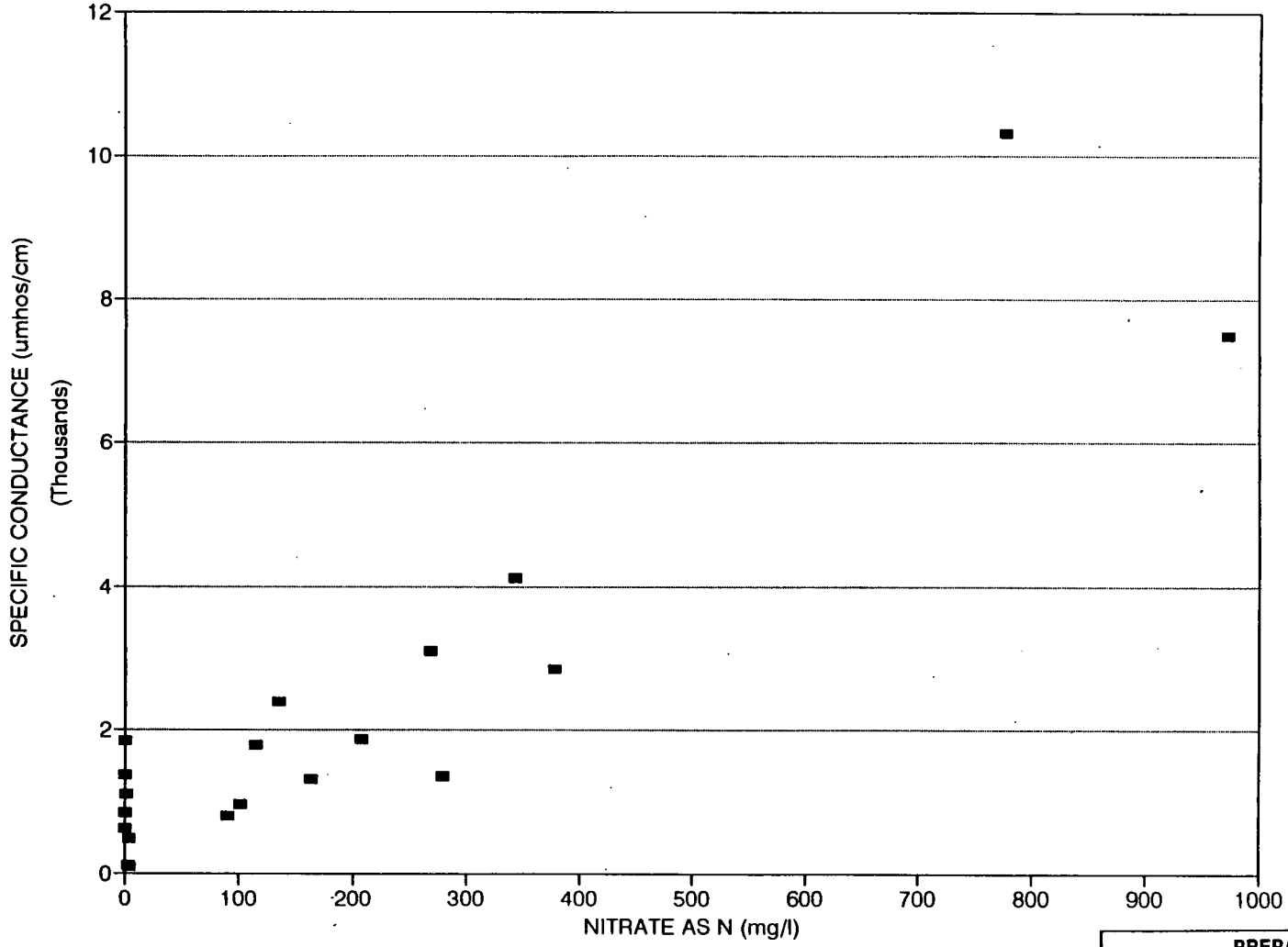
Figure II.3.3-73

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Specific Conductance in Leachate

i85x11h



LEGEND

■ SOIL SAMPLE VALVE RELATIVE TO PORE VOLUME EXCHANGES

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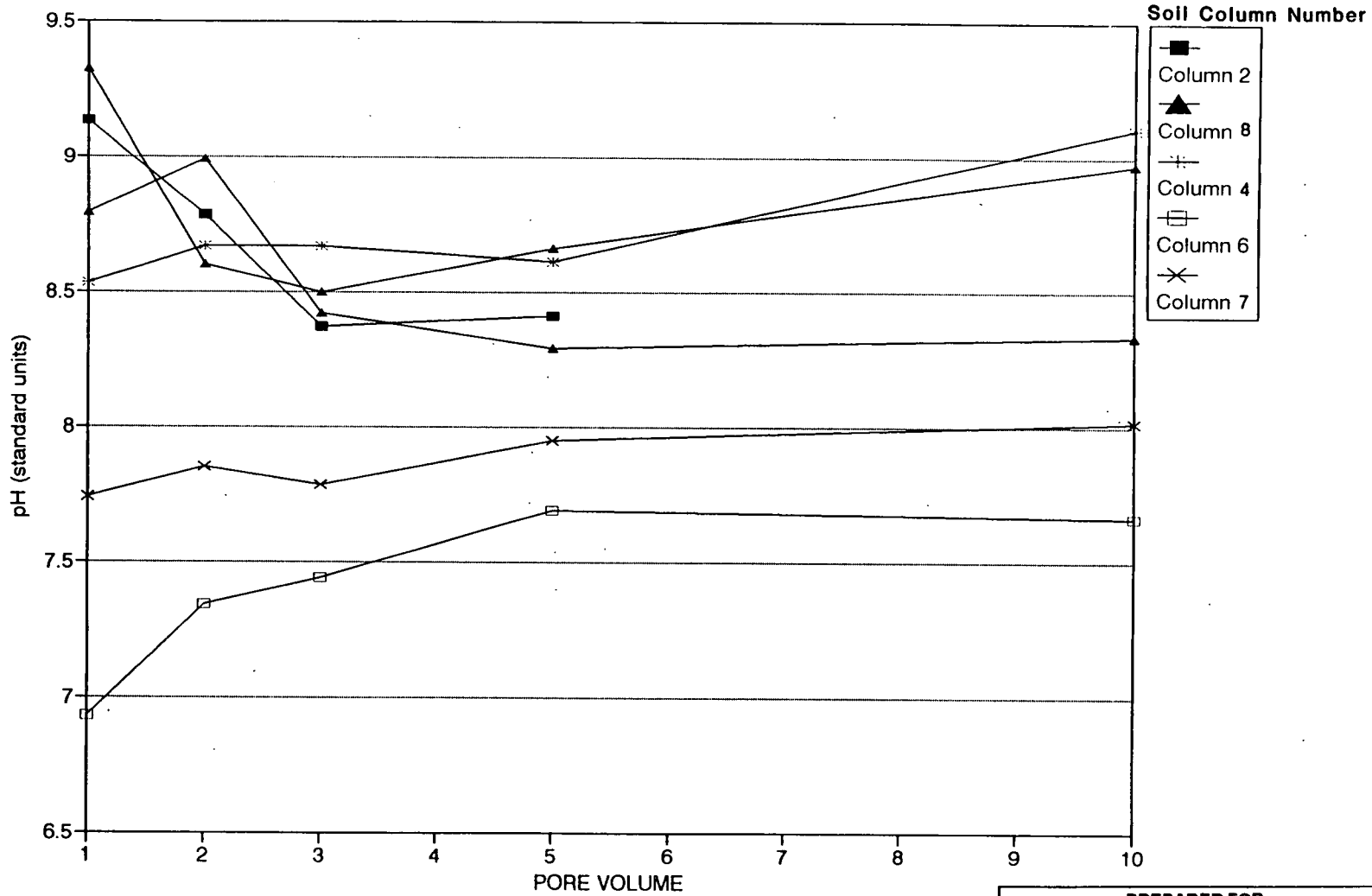
GOLDEN, COLORADO

Figure II.3.3-74

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Nitrate-Specific Conductance in Leachate

rf85x11h



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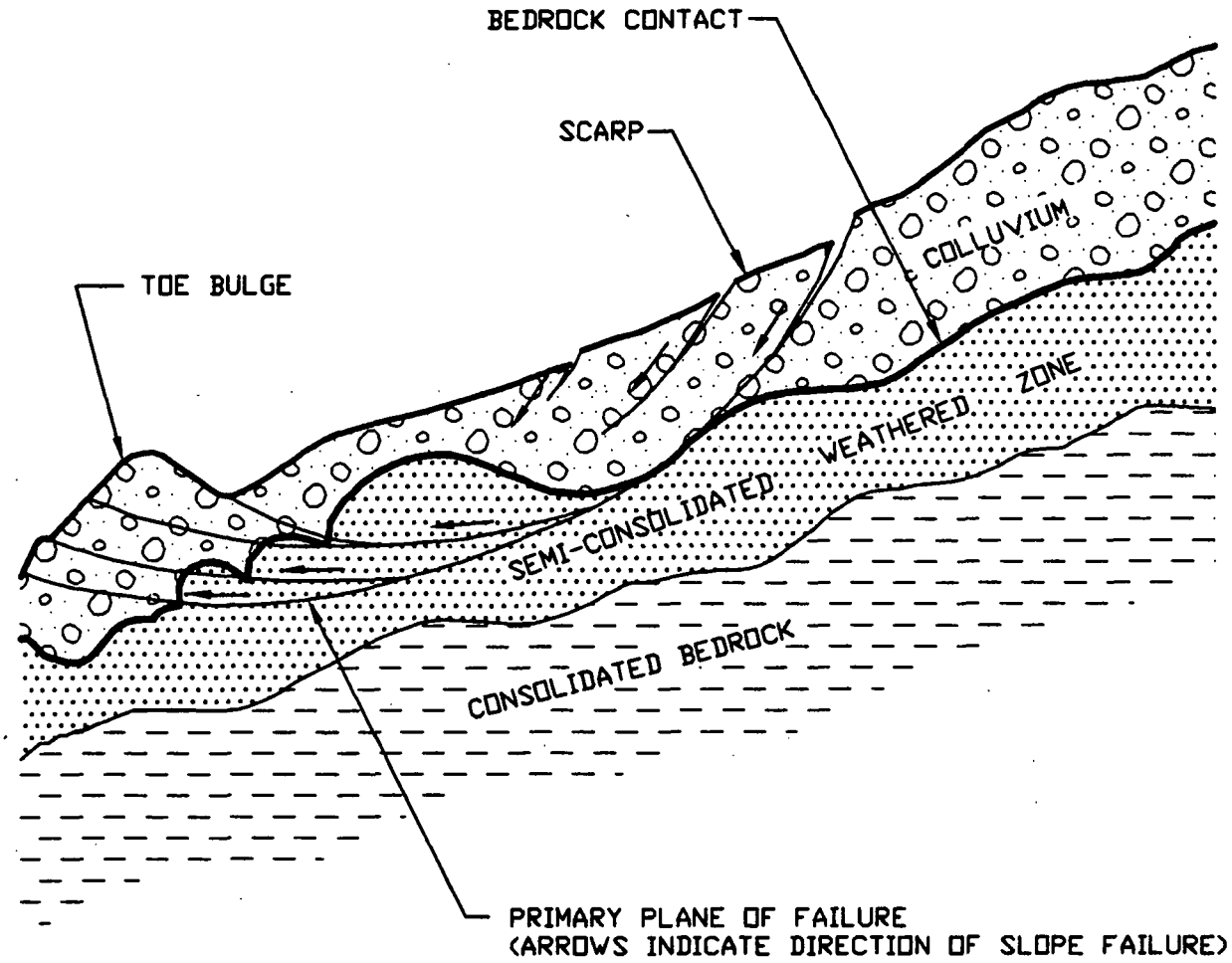
GOLDEN, COLORADO

Figure II.3.3-75

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
pH in Leachate

#85x11h



Source: P.H. Rahn, 1986

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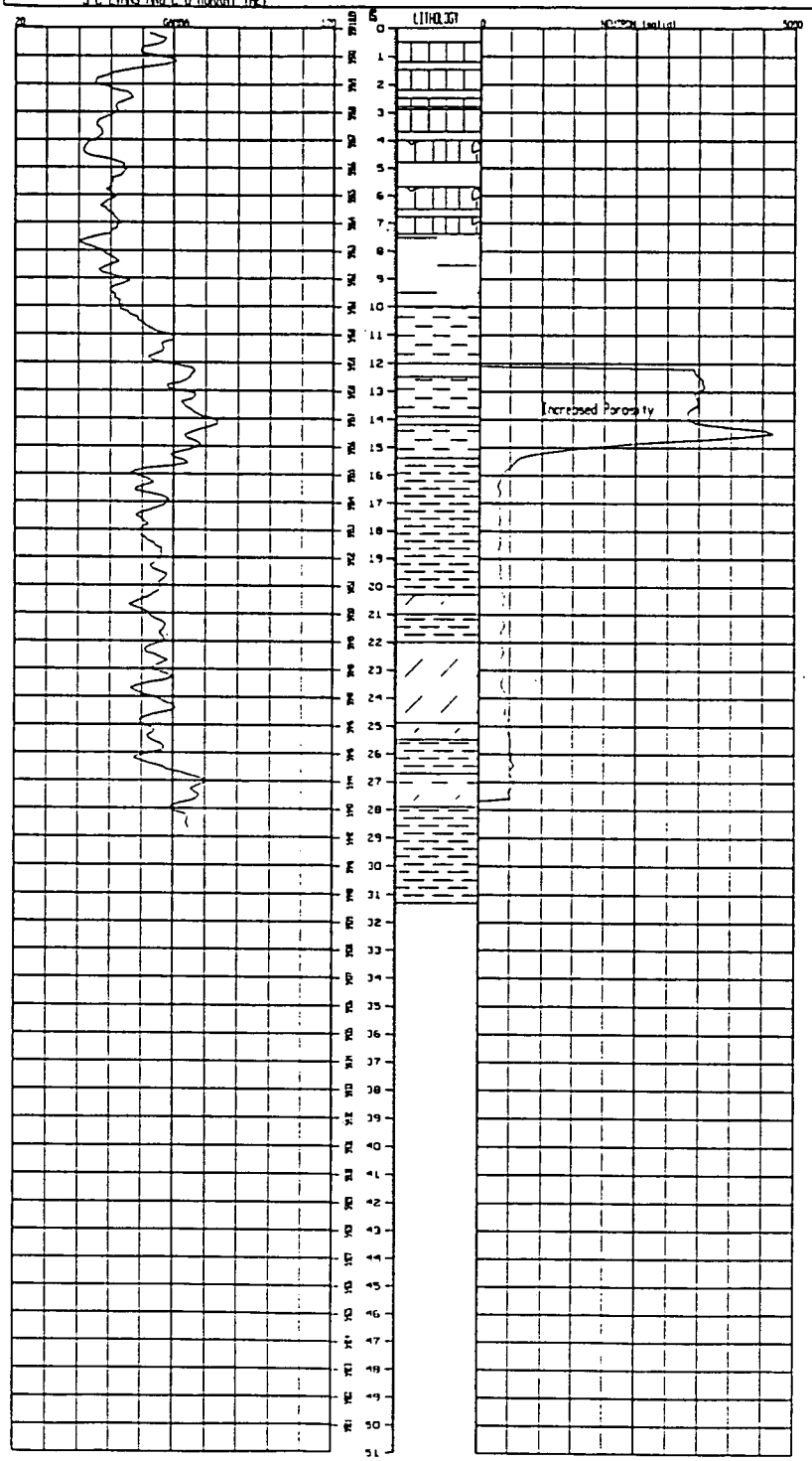
GOLDEN, COLORADO

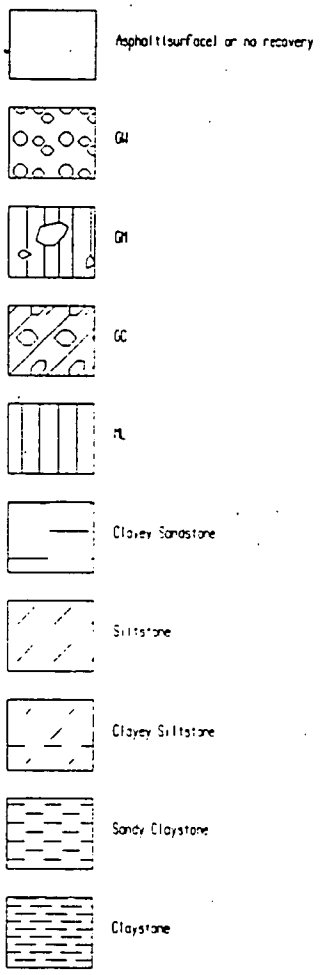
Figure II.3.5-15

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Idealized Slump-Block Profile

STATE PLANE COORDINATE	TOTAL DEPTH (FT) 31 30	GROUND ELEVATION (FT) 5971 03	PROJECT NUMBER	OU4-RFI/RI	LOG OF BORING NUMBER
NORTH 750876	AREA Pond 207A	CASING DIAMETER (IN)	GEOLOGIST	K R MIYOSHI	
EAST 2084701	LOCATOR NUMBER L10	BOREHOLE DIAMETER (IN) 8 00	DATE DRILLED	03/31/93	42193

REMARKS HOLLOW STEM AUGER AND CONVENTIONAL CORING BOREHOLE PLUGGED AND ABANDONED RIG GEOLOGY BY K R MIYOSHI (TE) CORE LOGGING BY J C EVANS AND C D MURRAY (AE)





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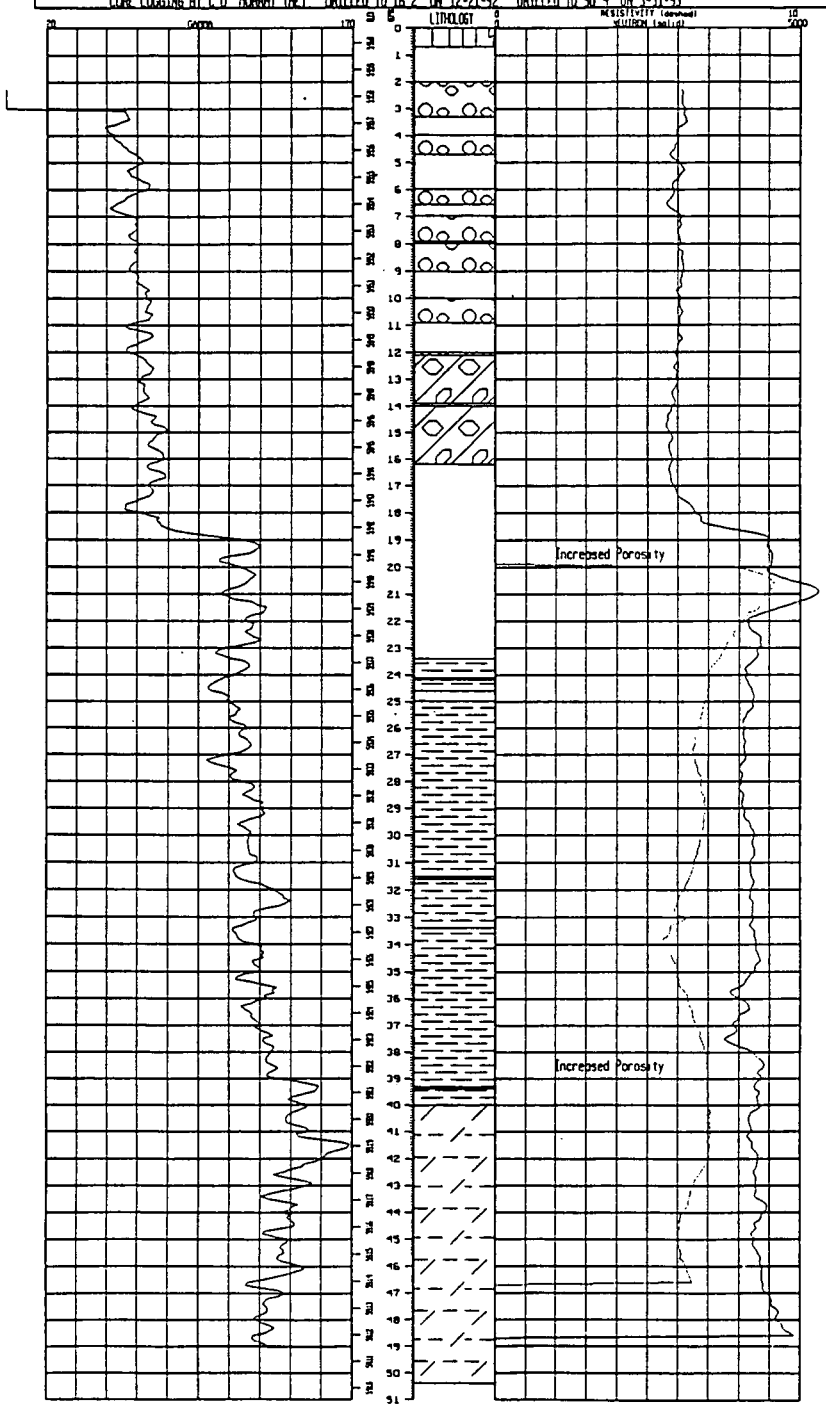
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
GOLDEN, COLORADO

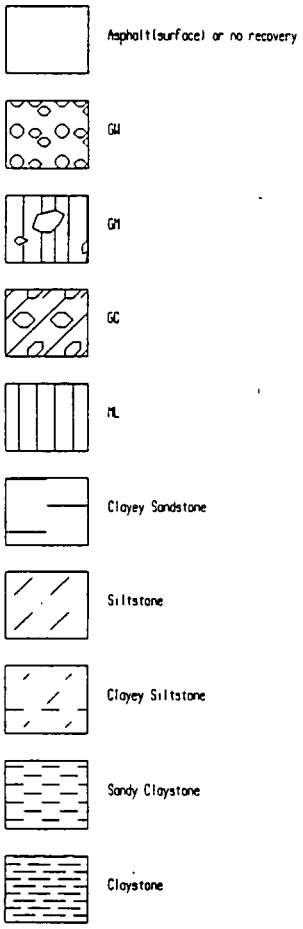
Figure II.3.5-17

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Borehole 42193 Geophysical Log

STATE PLANE COORDINATE: NORTH: 750435 EAST: 2085601
TOTAL DEPTH (FT) 50 40
AREA E OF 207B S
LOCATOR NUMBER: M10
GROUND ELEVATION (FT) 5960 55
CASING DIAMETER (IN)
BOREHOLE DIAMETER (IN) 8 00
PROJECT NUMBER 004-RFI/RI
GEOLOGIST JCE/KWP
DATE DRILLED: 03/30/93
LOG OF BORING NUMBER 44193

REMARKS: HOLLOW STEM AUGER AND CONVENTIONAL CORING. BOREHOLE PLUGGED AND ABANDONED RIG GEOLOGY BY J C EVANS (AE) AND K W PACHECO (TE), CORE LOGGING BY C D MURRAY (AE) DRILLED TO 16 2' ON 12-21-92 DRILLED TO 50 4' ON 3-31-93





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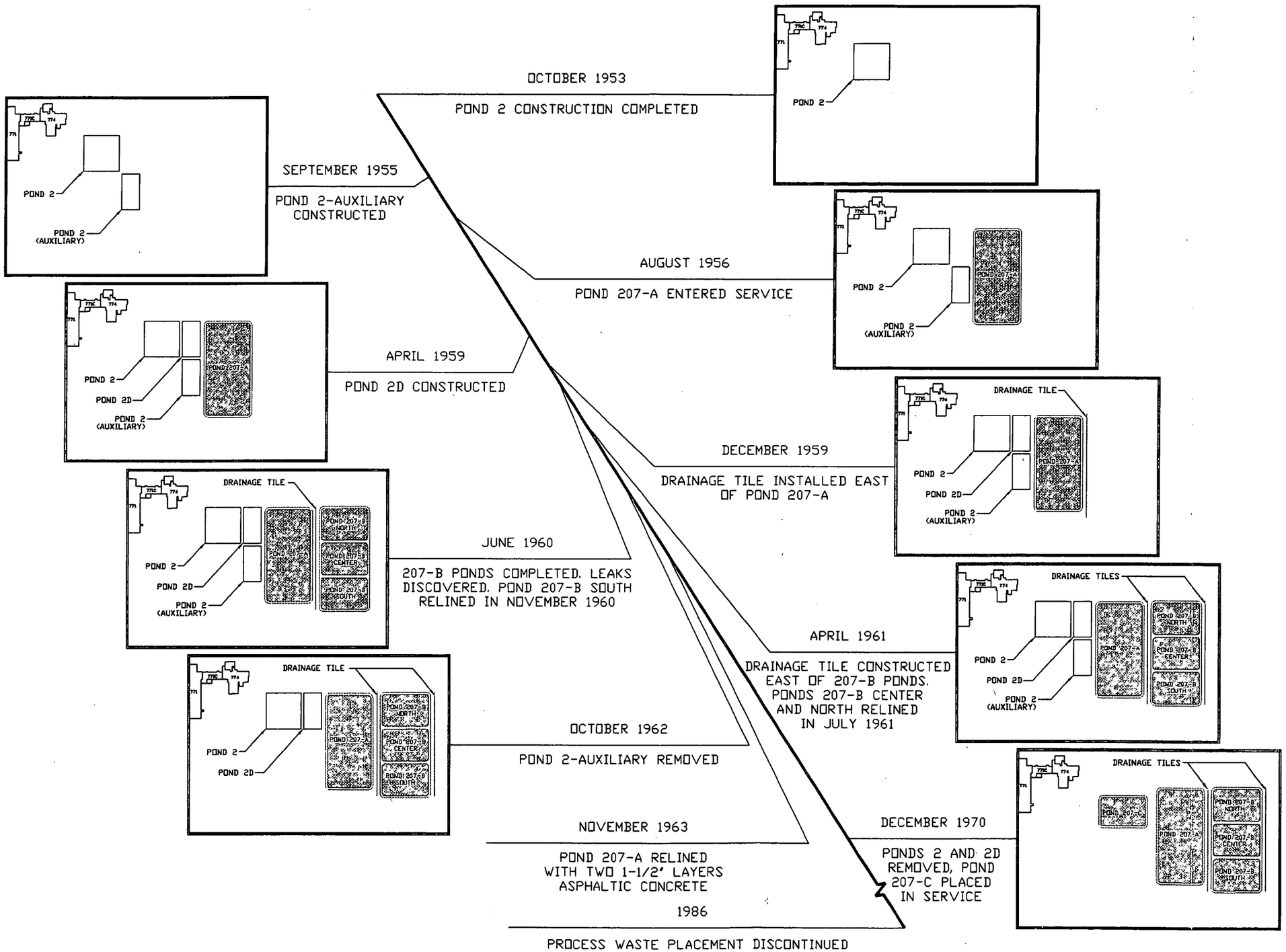
GOLDEN, COLORADO

Figure II.3.5-18

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Borehole 44193 Geophysical Log



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GOLDEN, COLORADO

Figure II.3.1-1

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Timeline Of Solar Pond Construction

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	1227 *	621 *	1117 *	1064 *	1165 *	1301 *	952 *	655 *	548 *	449 *	716 *	466 *	588 *	550 *	537 *
10	911 *	785 *	487 *	584 *	798 *	654 *	514 *	244 *	340 *	389 *	817 *	1066 *	650 *	1158 *	377 *
9	869 *	953 *	883 *	617 *	1233 *	989 *	839 *	1201 *	773 *	535 *	827 *	522 *	1267 *	611 *	815 *
8	846 *	726 *	742 *	1100 *	604 *	1133 *	2135 *	697 *	495 *	515 *	622 *	758 *	856 *	670 *	1146 *
7	506 *	465 *	705 *	697 *	683 *	685 *	1857 *	592 *	483 *	803 *	316 *	722 *	918 *	320 *	516 *
6	768 *	995 *	600 *	400 *	373 *	225 *	595 *	1110 *	622 *	476 *	696 *	716 *	802 *	1056 *	650 *
5	1013 *	1351 *	922 *	963 *	600 *	339 *	752 *	459 *	612 *	649 *	1081 *	917 *	662 *	1200 *	633 *
4	629 *	824 *	671 *	464 *	752 *	320 *	792 *	831 *	1049 *	1275 *	752 *	808 *	547 *	876 *	546 *
3	913 *	1153 *	637 *	749 *	335 *	423 *	1272 *	2551 *	2352 *	1965 *	825 *	665 *	1274 *	1317 *	1516 *
2	872 *	427 *	646 *	709 *	588 *	208 *	468 *	1842 *	1183 *	1441 *	757 *	748 *	1294 *	1166 *	1060 *
1	2980 *	695 *	710 *	557 *	564 *	243 *	730 *	561 *	898 *	721 *	953 *	894 *	756 *	496 *	527 *

SEP 207-B Center

LEGEND

516 * Survey Location and Result in Counts per Minute (cpm)

Approximate Scale: 1 Inch = 8 Meters

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GOLDEN, COLORADO

Figure II.3.1-26

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B Center
Gamma (FIDLER) Radiation Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	<250	250	300	300	<250	<250	250	<250	<250	<250	<250	<250	250	<250	<250
10	<250	<250	<250	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	250
9	<250	250	<250	250	300	<250	<250	<250	<250	<250	<250	<250	<250	250	<250
8	<250	300	<250	<250	300	<250	<250	<250	<250	<250	<250	<250	<250	250	<250
7	<250	<250	<250	300	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
6	<250	250	<250	250	<250	<250	<250	<250	<250	250	250	250	<250	300	<250
5	<250	300	<250	<250	<250	<250	<250	250	<250	<250	<250	300	<250	<250	<250
4	<250	<250	<250	<250	<250	<250	300	250	<250	<250	250	<250	250	<250	<250
3	<250	<250	<250	<250	<250	<250	250	<250	250	<250	<250	250	<250	<250	<250
2	<250	<250	<250	<250	250	250	<250	300	<250	<250	<250	<250	<250	<250	<250
1	<250	<250	<250	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	155

SEP 207-B North

LEGEND

250 Survey Location and Result in Counts per Minute (cpm)

Approximate Scale: 1 Inch = 8 Meters

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GOLDEN, COLORADO

Figure II.3.1-27

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B North
Direct Alpha Radiation
Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	0	0	0	0	0	0	6	0	3	3	3	0	3	0	6
10	0	0	0	0	0	6	0	3	0	0	3	0	6	0	0
9	9	0	3	0	0	0	0	0	6	3	3	0	0	6	0
8	0	6	3	3	3	6	3	6	0	0	0	0	3	0	3
7	0	0	3	3	3	0	0	0	0	0	0	3	3	0	3
6	0	3	0	3	3	6	0	0	0	3	3	0	0	0	9
5	3	12	0	0	6	0	0	3	3	0	3	0	0	3	0
4	3	12	0	0	0	6	0	0	0	6	0	0	6	3	0
3	0	6	3	0	6	0	0	0	0	0	0	0	3	3	0
2	0	3	6	9	6	0	3	3	0	0	0	3	3	0	0
1	0	3	3	0	3	3	0	0	0	0	6	0	9	3	3

SEP 207-B North

LEGEND

3 Survey Location and Result in Disintegrations per Minute per 100 cm^2 ($dpm/100cm^2$)

Approximate Scale: 1 inch = 8 Meters

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GOLDEN, COLORADO

Figure II.3.1-28

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B North
Removable (Smear) Alpha Radiation Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	<100	<100	500	<100	400	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
10	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
9	<100	<100	<100	<100	500	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
8	<100	<100	<100	<100	<100	<100	<100	<100	<100	500	<100	<100	<100	<100	<100
7	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	500	<100	<100
6	<100	<100	600	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
5	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
4	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
3	<100	<100	<100	<100	<100	<100	<100	700	<100	<100	<100	<100	<100	<100	<100
2	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
1	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100

SEP 207-B North

LEGEND

500 Survey Location and Result in Counts per Minute (cpm)

Approximate Scale: 1 Inch = 8 Meters

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GOLDEN, COLORADO

Figure II.3.1-29

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Pond 207-B North
Direct Beta Radiation
Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	12	6	30	12	0	0	24	9	15	9	9	0	12	18	0
10	0	0	0	0	21	3	12	57	6	12	33	21	30	18	15
9	0	15	18	45	0	6	9	0	0	36	60	24	15	15	24
8	39	0	0	9	30	30	0	12	0	0	0	18	36	0	3
7	33	15	24	3	48	15	0	33	21	15	6	30	0	48	9
6	12	0	15	0	36	12	12	9	30	0	21	12	3	18	12
5	15	36	30	21	6	0	54	3	33	3	12	9	12	30	0
4	15	18	30	0	3	0	18	0	9	6	39	0	18	9	30
3	0	33	12	12	33	24	6	3	12	27	0	27	0	0	12
2	12	0	54	54	0	30	30	15	18	0	0	12	0	15	18
1	0	3	0	9	24	12	33	48	0	24	54	21	15	27	21

SEP 207-B North

LEGEND

12 Survey Location and Result in Disintegrations per Minute per 100 cm^2 ($dpm/100cm^2$)

Approximate Scale: 1 inch = 8 Meters

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Figure II.3.1-30

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B North
Removable Beta (Smear) Radiation Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	300 *	250 *	<250 *	<250 *	300 *	250 *	<250 *	<250 *
10	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	300 *	300 *	<250 *	<250 *	<250 *	<250 *	<250 *
9	<250 *	<250 *	<250 *	<250 *	250 *	<250 *	<250 *	500 *	<250 *	400 *	<250 *	800 *	<250 *	<250 *	<250 *
8	<250 *	300 *	<250 *	<250 *	<250 *	250 *	500 *	300 *	<250 *	300 *	500 *	<250 *	800 *	600 *	<250 *
7	<250 *	<250 *	<250 *	<250 *	<250 *	250 *	<250 *	<250 *	300 *	250 *	250 *	<250 *	<250 *	500 *	<250 *
6	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	750 *	750 *	<250 *	<250 *	<250 *	500 *	250 *	<250 *
5	<250 *	<250 *	<250 *	<250 *	300 *	<250 *	<250 *	<250 *	250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *
4	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	250 *	250 *	<250 *	<250 *	300 *	<250 *	250 *	<250 *	<250 *
3	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *
2	<250 *	<250 *	<250 *	<250 *	250 *	<250 *	250 *	<250 *	250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *
1	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	<250 *	300 *

Pond 207-B Center

LEGEND

500 * Survey Location and Result in Counts per Minute (cpm)

Approximate Scale: 1 inch = 8 Meters

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Figure II.3.1-22

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B Center
Direct Alpha Radiation
Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	6 *	3 *	0 *	3 *	0 *	18 *	12 *	0 *	6 *	0 *	0 *	12 *	9 *	6 *	3 *
10	6 *	3 *	0 *	0 *	9 *	3 *	9 *	3 *	0 *	6 *	0 *	0 *	3 *	0 *	0 *
9	6 *	6 *	0 *	12 *	0 *	9 *	6 *	9 *	3 *	15 *	0 *	0 *	0 *	15 *	0 *
8	12 *	3 *	3 *	0 *	3 *	18 *	3 *	3 *	3 *	0 *	3 *	0 *	0 *	3 *	0 *
7	3 *	3 *	3 *	3 *	0 *	6 *	3 *	9 *	6 *	3 *	12 *	0 *	0 *	15 *	3 *
6	12 *	6 *	0 *	0 *	0 *	12 *	24 *	3 *	0 *	0 *	3 *	6 *	0 *	3 *	3 *
5	9 *	9 *	0 *	3 *	0 *	3 *	18 *	0 *	0 *	3 *	6 *	0 *	0 *	0 *	0 *
4	6 *	3 *	0 *	0 *	3 *	3 *	21 *	3 *	3 *	0 *	0 *	3 *	3 *	0 *	0 *
3	12 *	15 *	3 *	3 *	3 *	3 *	3 *	0 *	6 *	3 *	3 *	0 *	0 *	0 *	3 *
2	3 *	3 *	0 *	6 *	0 *	12 *	12 *	0 *	3 *	0 *	3 *	3 *	6 *	3 *	6 *
1	9 *	3 *	3 *	0 *	3 *	9 *	6 *	6 *	0 *	3 *	9 *	15 *	6 *	0 *	6 *

SEP 207-B Center

LEGEND

6 Survey Location and Result
* In Disintegrations per Minute per 100 cm^2 ($dpm/100cm^2$)

Approximate Scale: 1 Inch = 8 Meters

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Figure II.3.1-23

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B Center
Removable (Smear) Alpha Radiation Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	350 *	150 *	180 *	200 *	450 *	150 *	<BG *	<BG *	100 *	150 *	300 *	<BG *	<BG *	<BG *	400 *
10	250 *	200 *	250 *	100 *	300 *	100 *	<BG *	200 *	<BG *	<BG *	400 *	<BG *	<BG *	150 *	<BG *
9	100 *	160 *	150 *	150 *	200 *	100 *	150 *	200 *	<BG *	<BG *	<BG *	<BG *	<BG *	200 *	<BG *
8	150 *	180 *	350 *	200 *	250 *	250 *	<BG *	150 *	<BG *	100 *	<BG *	150 *	200 *	<BG *	<BG *
7	150 *	150 *	220 *	300 *	200 *	<BG *	<BG *	250 *	<BG *	<BG *	100 *	<BG *	<BG *	<BG *	<BG *
6	150 *	200 *	200 *	350 *	250 *	150 *	150 *	<BG *	<BG *	250 *	150 *	200 *	200 *	<BG *	<BG *
5	120 *	160 *	200 *	250 *	250 *	<BG *	<BG *	150 *	<BG *	100 *	150 *	200 *	<BG *	150 *	<BG *
4	140 *	180 *	180 *	150 *	250 *	<BG *	<BG *	300 *	<BG *	<BG *	<BG *	<BG *	100 *	<BG *	<BG *
3	150 *	150 *	200 *	200 *	200 *	100 *	150 *	350 *	<BG *	<BG *	300 *	500 *	350 *	<BG *	150 *
2	150 *	100 *	200 *	250 *	300 *	<BG *	250 *	150 *	100 *	200 *	400 *	150 *	<BG *	250 *	<BG *
1	6000 *	100 *	180 *	200 *	150 *	<BG *	<BG *	<BG *	<BG *	100 *	<BG *	300 *	200 *	150 *	<BG *

SEP 207-B Center

LEGEND

150 • Survey Location and Result in counts per minute (cpm)

<BG Less than Background

NOTE

1. Background measurement was not reported in field records Measurements reported in gross counts (without subtracting background counts).
2. Survey performed by E.G.&G.

Approximate Scale: 1 inch = 8 Meters

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Figure II.3.1-24

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B Center
Direct Beta Radiation
Survey Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	45 *	48 *	60 *	69 *	6 *	6 *	18 *	3 *	18 *	21 *	0 *	0 *	0 *	3 *	0 *
10	43 *	28 *	26 *	38 *	15 *	48 *	30 *	15 *	0 *	0 *	0 *	15 *	15 *	0 *	0 *
9	40 *	42 *	36 *	36 *	90 *	0 *	81 *	9 *	0 *	15 *	18 *	6 *	0 *	0 *	0 *
8	100 *	40 *	80 *	44 *	15 *	75 *	15 *	21 *	12 *	0 *	0 *	12 *	0 *	21 *	9 *
7	60 *	34 *	47 *	50 *	27 *	18 *	12 *	30 *	0 *	0 *	0 *	0 *	39 *	0 *	6 *
6	54 *	44 *	36 *	36 *	33 *	36 *	39 *	27 *	0 *	0 *	15 *	0 *	0 *	0 *	0 *
5	50 *	69 *	37 *	70 *	21 *	45 *	0 *	0 *	0 *	0 *	0 *	0 *	0 *	9 *	0 *
4	70 *	46 *	51 *	48 *	60 *	0 *	0 *	30 *	0 *	0 *	36 *	12 *	0 *	0 *	3 *
3	61 *	43 *	38 *	72 *	24 *	24 *	60 *	12 *	15 *	0 *	21 *	24 *	0 *	6 *	0 *
2	46 *	66 *	50 *	64 *	48 *	21 *	90 *	15 *	18 *	9 *	6 *	18 *	0 *	30 *	6 *
1	48 *	111 *	64 *	55 *	50 *	39 *	18 *	54 *	3 *	0 *	12 *	0 *	0 *	6 *	12 *

SEP 207-B Center

LEGEND

6 • Survey Location and Result in Disintegrations per Minute per 100 cm^2 ($dpm/100cm^2$)

Approximate Scale: 1 Inch = 8 Meters

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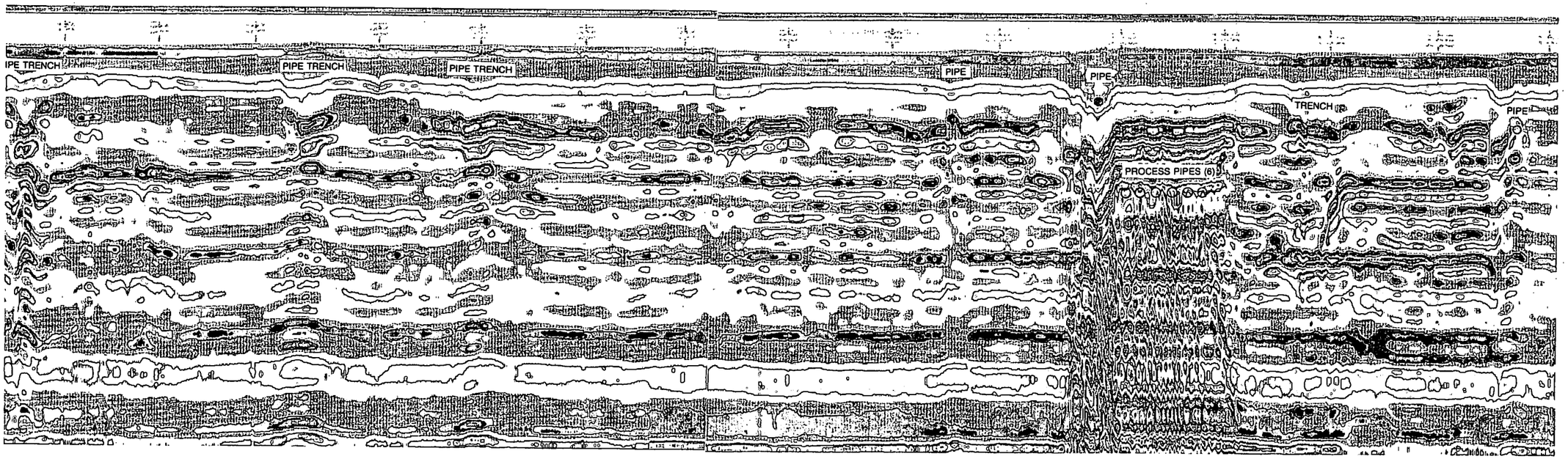
Figure II.3.1-25

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B Center
Removable Beta (Smear) Radiation Survey Results



NOTES:
1. Horizontal distance scale in feet
2. Vertical time scale
   = 35 nanoseconds
3. Approximate depth = 3 – 8 feet
4. Vertical boxcar filter
   low pass n = 15
   high pass n = 60

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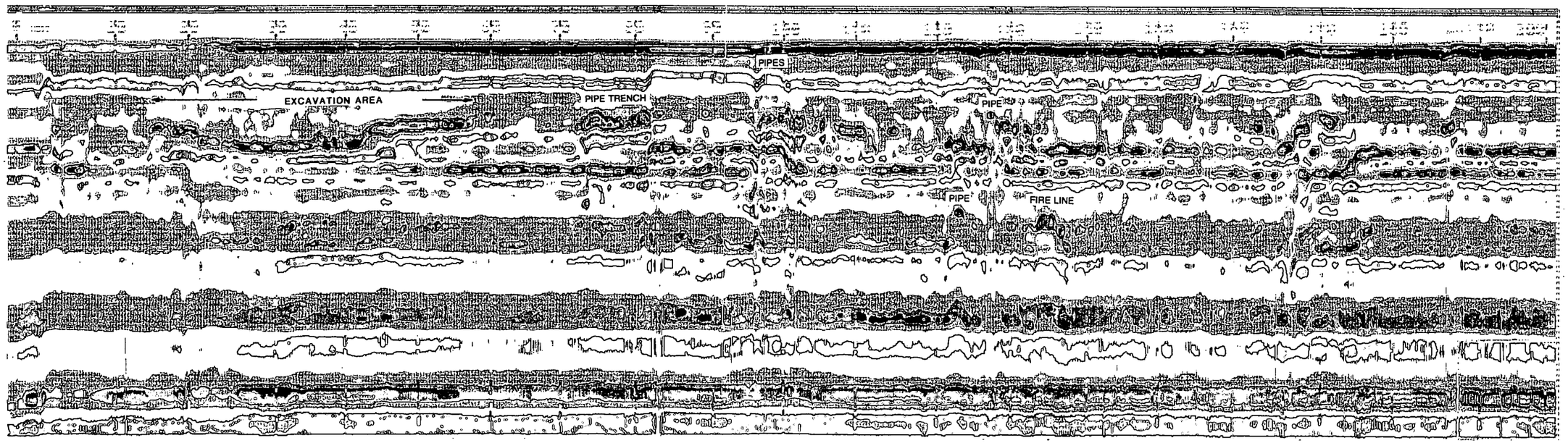
Figure II.3.1-14

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
GPR Profile
Line 5



NOTES:
1. Horizontal distance scale in feet
2. Vertical time scale
   = 35 nanoseconds
3. Approximate depth = 3 – 8 feet
4. Vertical boxcar filter
   low pass n = 15
   high pass n = 60

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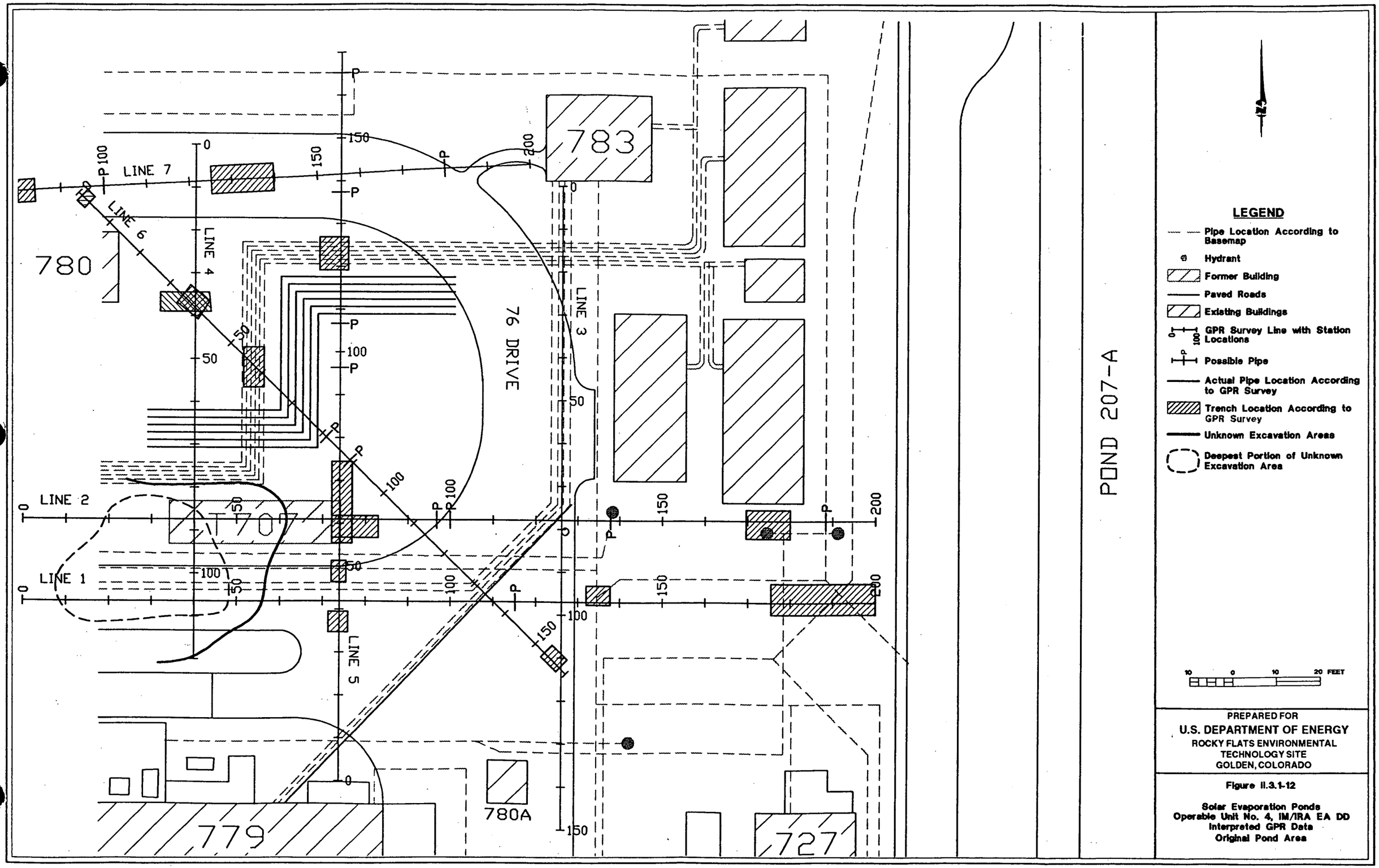
Figure II.3.1-13

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
GPR Profile
Line 1


LINE 7
LINE 6
LINE 4
LINE 3
LINE 2
LINE 1
LINE 5
780
783
76 DRIVE
770
779
780A
727
POND 207-A
LEGEND
Pipe Location According to Basemap
Hydrant
Former Building
Paved Roads
Existing Buildings
GPR Survey Line with Station Locations
Possible Pipe
Actual Pipe Location According to GPR Survey
Trench Location According to GPR Survey
Unknown Excavation Areas
Deepest Portion of Unknown Excavation Area
10 0 10 20 FEET
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GOLDEN, COLORADO
Figure II.3.1-12
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Interpreted GPR Data
Original Pond Area

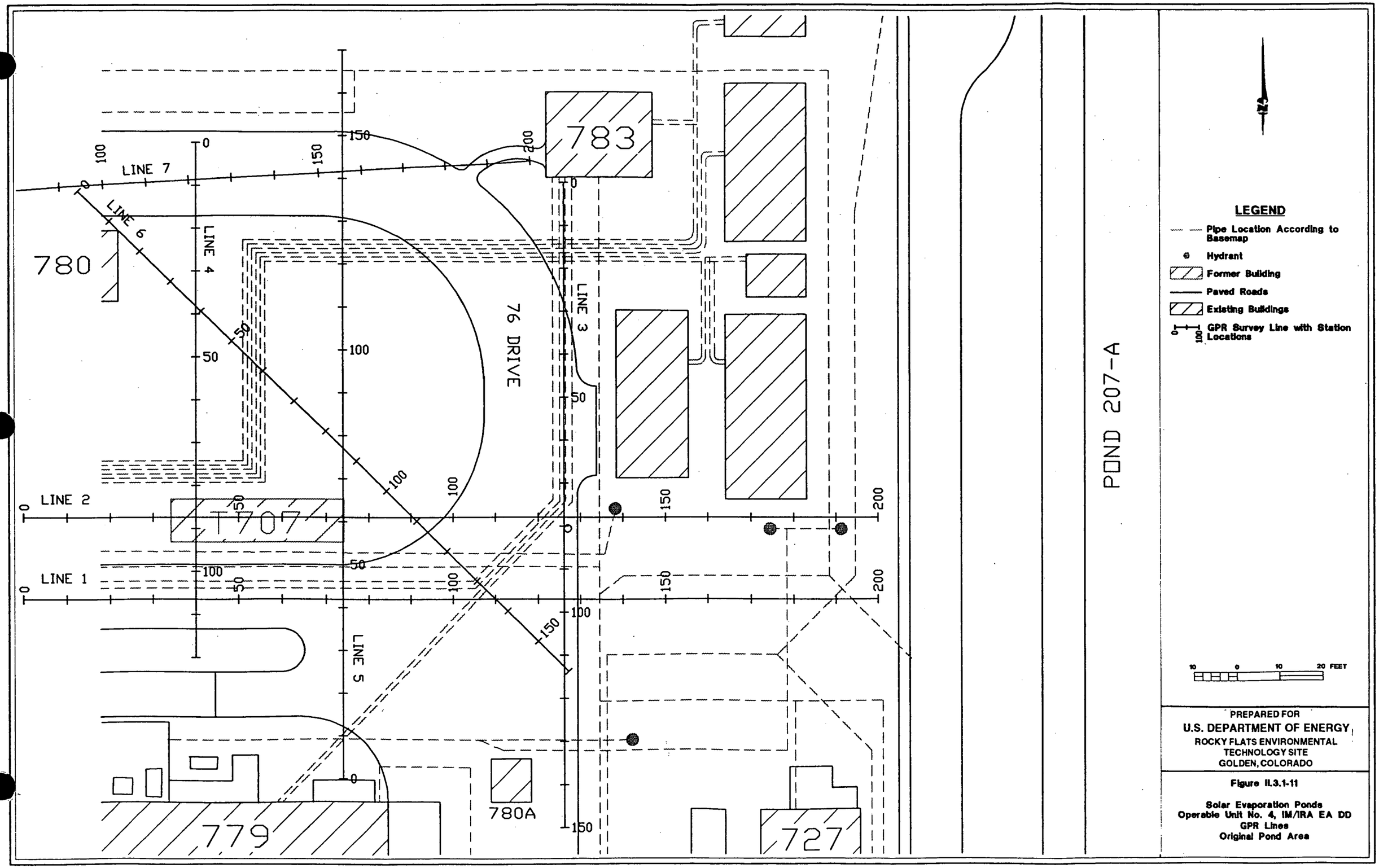
LINE 7
LINE 6
LINE 4
LINE 2
LINE 1
LINE 3
LINE 5
76 DRIVE
783
780
707
779
780A
727
POND 207-A
LEGEND
Pipe Location According to Basemap
Hydrant
Former Building
Paved Roads
Existing Buildings
GPR Survey Line with Station Locations
10 0 10 20 FEET
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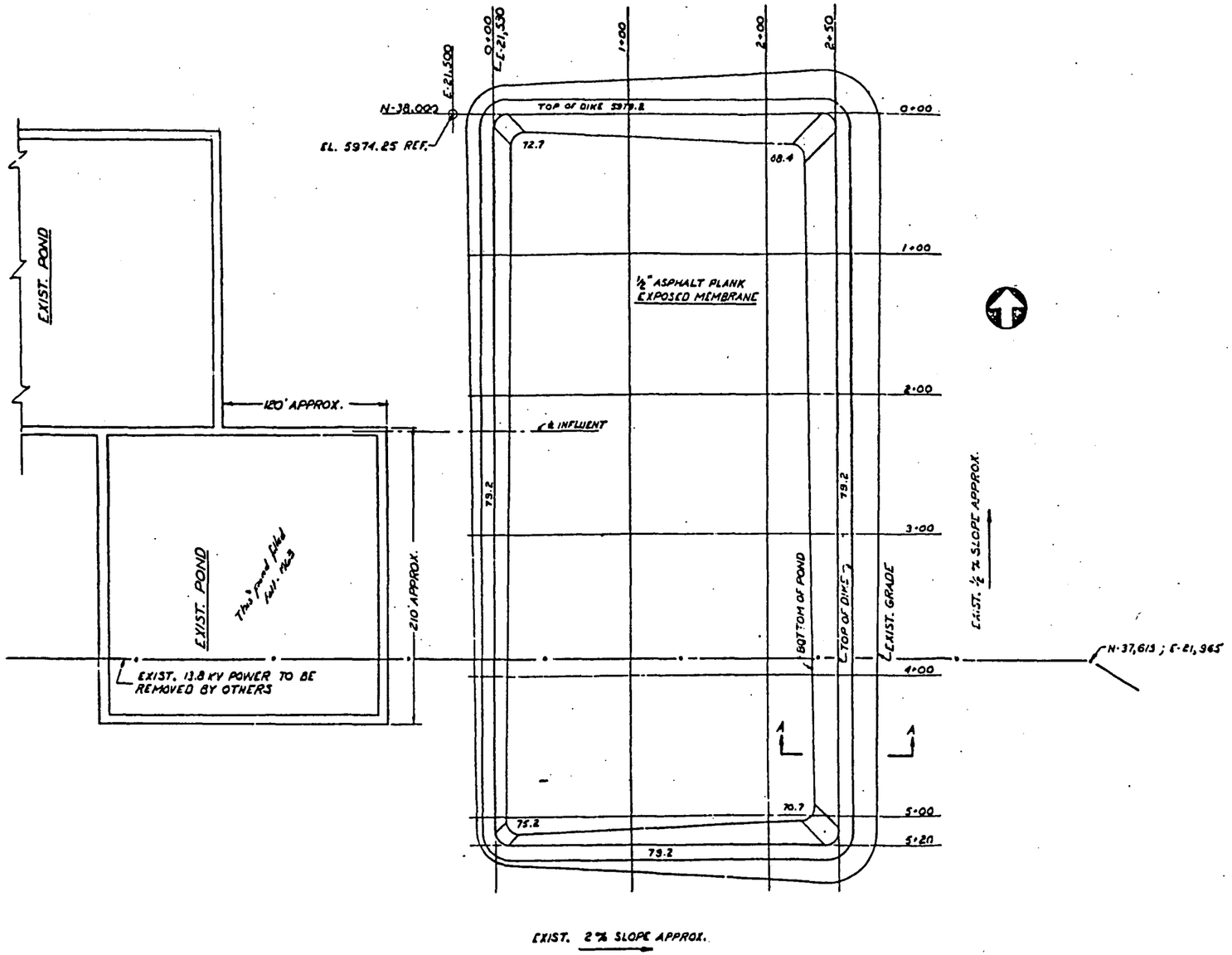
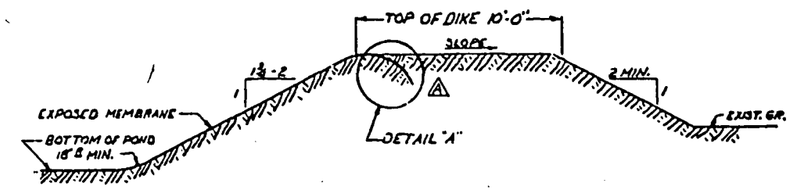
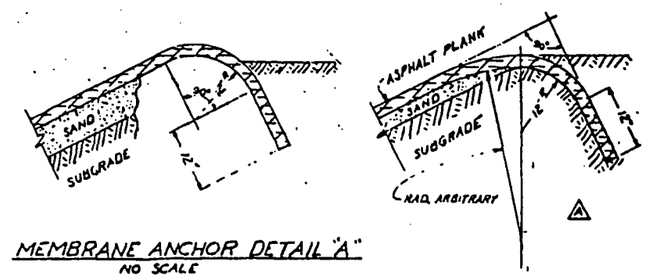
Figure II.3.1-11
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
GPR Lines
Original Pond Area



PLAN
SCALE: 1" = 40'



SECTION A-A (TYP.)
NO SCALE



MEMBRANE ANCHOR DETAIL "A"
NO SCALE

NOTES:

1. MAT'LS & CONSTR. TO CONFORM WITH PROVISIONS OF THE SPECS.
2. INSIDE CORNERS OF POND, TOP & BOTTOM OF DIKE, TO BE 10' RAD.
3. A DOUBLE THICKNESS OF ASPHALT PLANK SHALL BE USED AT THE LOCATION OF THE INFLUENT. THE ADDITIONAL LAYER SHALL BE A MIN. OF 3' WIDE & SHALL EXTEND FROM THE TOP OF THE DIKE TO THE BOTTOM OF THE POND & A DISTANCE OF AT LEAST 10' ALONG THE BOTTOM
4. POND INFLUENT LINE FROM 200,000 GAL. STORAGE TANK BY OTHERS.

NOMINAL AREA - 3 ACRES
NOMINAL CAP. - 17 ACRE-FEET

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Figure II.3.1-10

Solar Evaporation Ponds
Operable Unit No. 4, IM/RA EA DD
Engineering Drawing Showing Location of Pond 2 and 2-Auxiliary Relative to SEP 207-A

Source: Closure Plans for the Solar Evaporation Ponds, 1988

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
11	394 *	676 *	851 *	771 *	852 *	618 *	947 *	753 *	416 *	547 *	806 *	551 *	416 *	554 *	554 *
10	697 *	796 *	1199 *	918 *	879 *	3890 *	431 *	814 *	782 *	631 *	299 *	719 *	273 *	661 *	540 *
9	753 *	882 *	762 *	977 *	980 *	957 *	784 *	797 *	867 *	172 *	69 *	307 *	319 *	457 *	874 *
8	788 *	638 *	32 *	1017 *	1162 *	525 *	755 *	438 *	248 *	206 *	109 *	517 *	412 *	747 *	783 *
7	735 *	1094 *	-8 *	591 *	742 *	469 *	633 *	812 *	793 *	322 *	91 *	727 *	912 *	806 *	954 *
6	715 *	1042 *	1138 *	507 *	982 *	688 *	536 *	647 *	144 *	238 *	314 *	602 *	631 *	202 *	981 *
5	576 *	924 *	454 *	576 *	1103 *	697 *	752 *	754 *	622 *	881 *	765 *	164 *	759 *	143 *	104 *
4	557 *	1007 *	707 *	923 *	779 *	747 *	1061 *	451 *	633 *	643 *	238 *	413 *	559 *	1 *	105 *
3	589 *	658 *	881 *	779 *	910 *	566 *	697 *	415 *	127 *	851 *	525 *	265 *	640 *	1004 *	912 *
2	650 *	1031 *	1071 *	990 *	672 *	453 *	635 *	956 *	751 *	292 *	661 *	752 *	1020 *	1056 *	746 *
1	636 *	1207 *	567 *	723 *	600 *	641 *	667 *	658 *	703 *	794 *	655 *	747 *	884 *	1263 *	607 *

SEP 207-B North

LEGEND

783 • Survey Location and Result in Counts per Minute (cpm)

Approximate Scale: 1 inch = 8 Meters

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Figure II.3.1-31

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
SEP 207-B North
Gamma (FIDLER) Radiation Survey Results

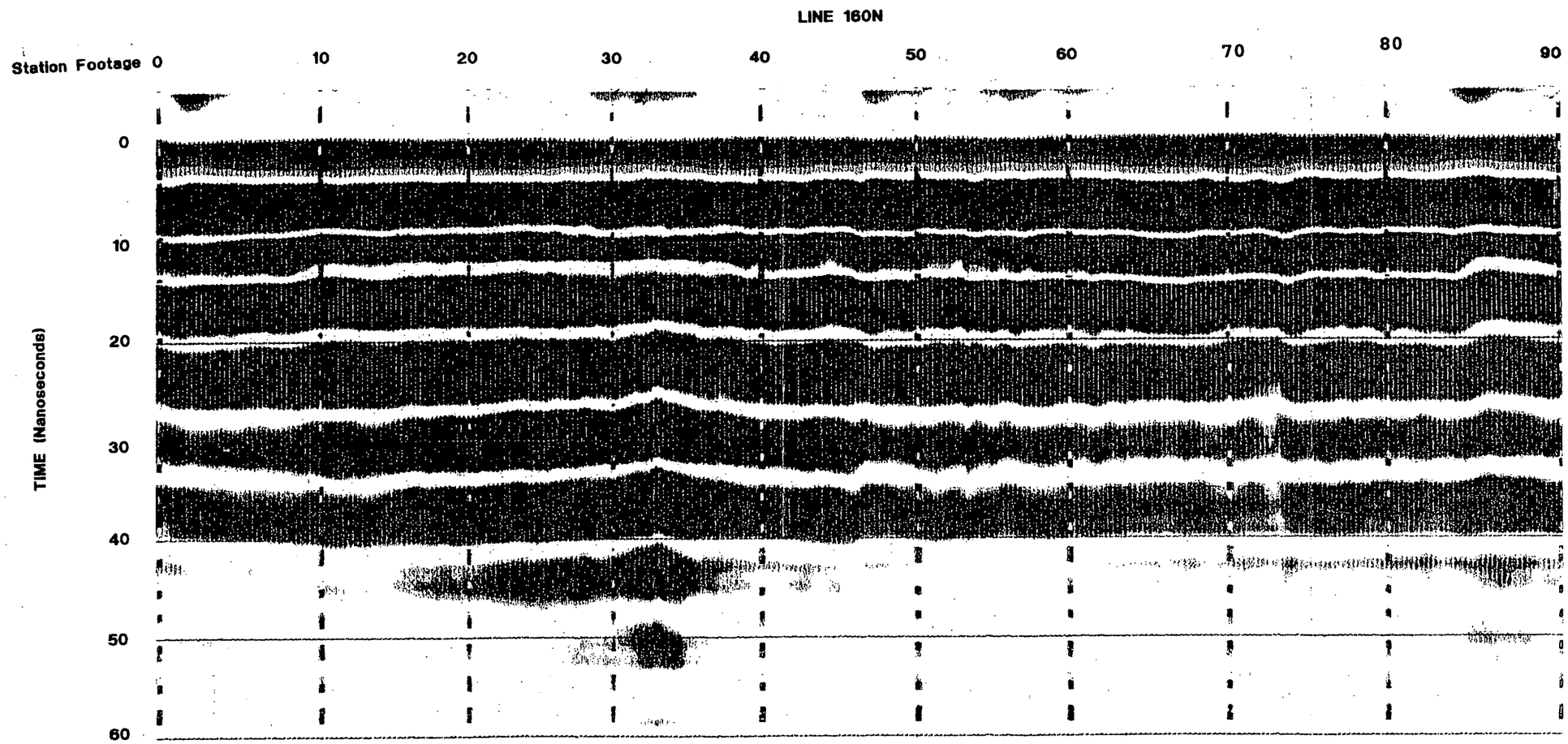

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Figure II.3.1-33

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Typical GPR Record
SEP 207-A - 300 MHz Antenna

LINE 180N

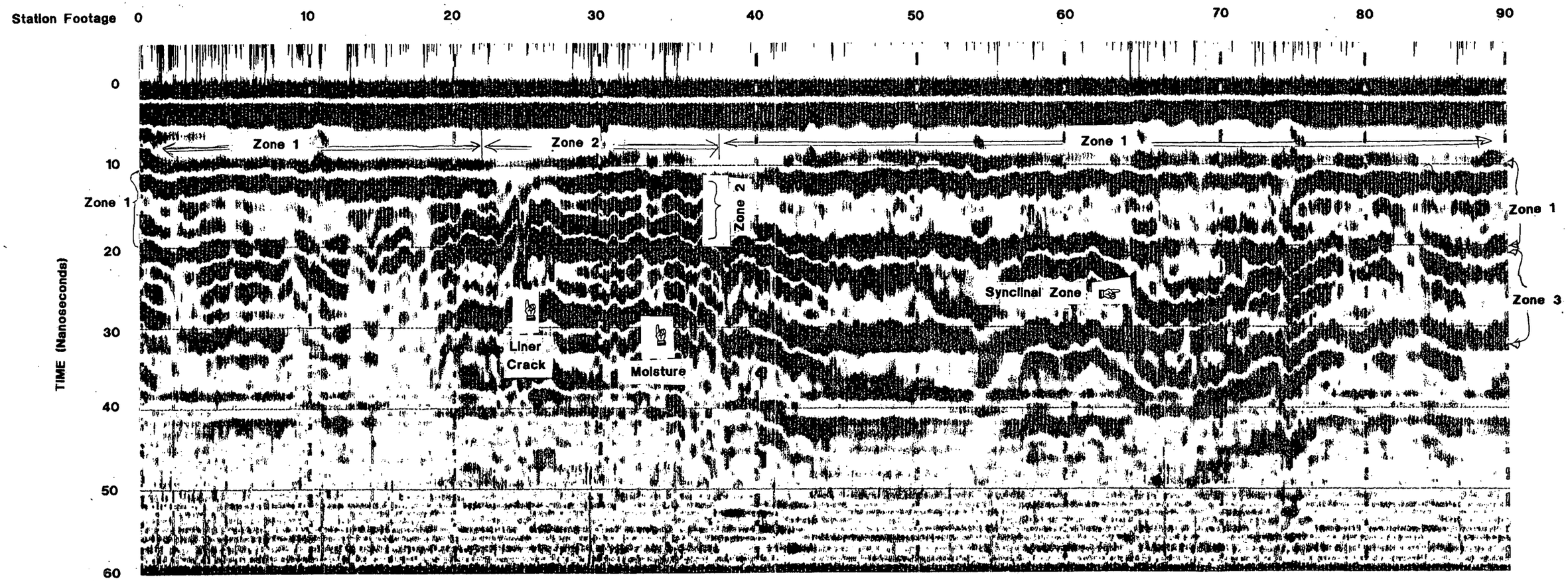

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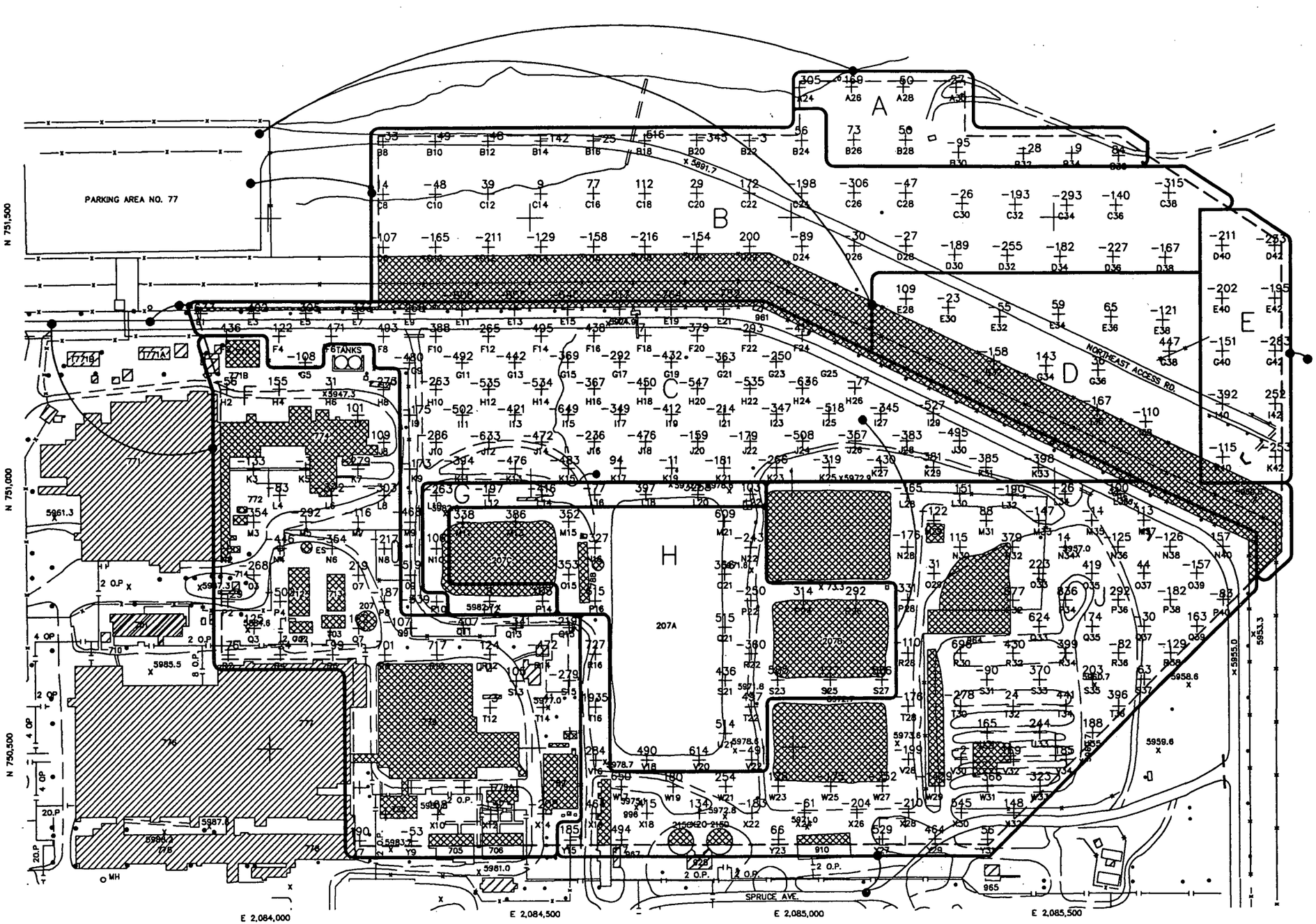
Figure II.3.1-34

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Typical GPR Record
SEP 207-A - 900 MHz Antenna



LEGEND

- Roads
- Drainage/Stream
- −531 Radiological Instrument Reading (cpm)
- D38 Grid Location of Radiological Reading
- Areas Inaccessible for Radiological Survey
- Surficial Soil Sample Boundary
- FIDLER Checkpoint Reading Location
- Radiological Survey Boundary

BOUNDED REGION	BACKGROUND READING (cpm)
A	1947
B	2311
C	1929
D	1947
E	1954
F	1855
G	1547
H	1834
J	1429

100 0 100 200 Feet

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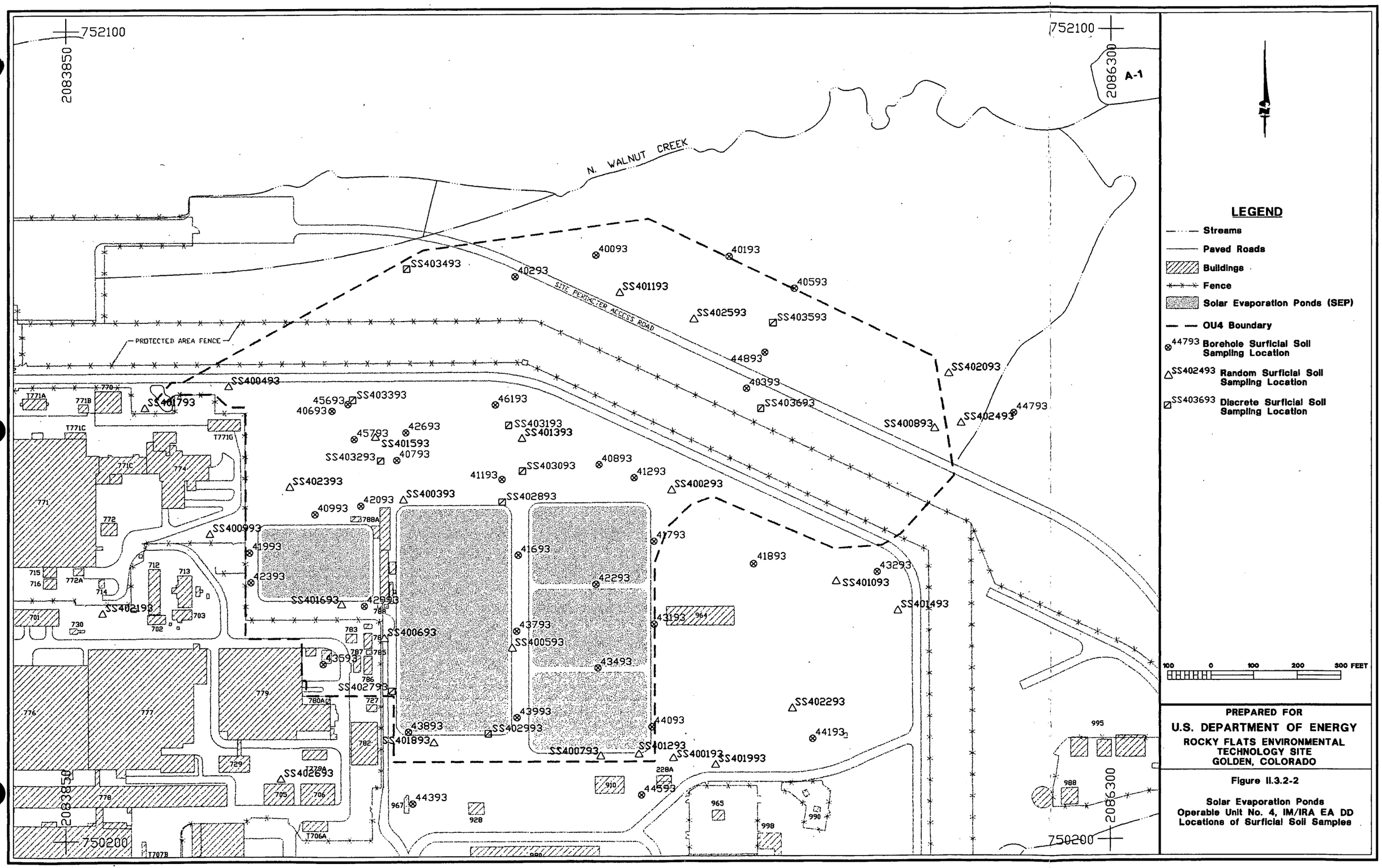
Figure II.3.2-1

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
OU4-Wide Gamma (FIDLER) Survey Results

* SEPs 207-A, 207-B Center, and 207-B North radiological surveys were completed by EG&G.
Negative values indicate instrument reading at survey location was less than associated checkpoint.


752100
2083850
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
Solar Evaporation Ponds (SEP)
OU4 Boundary
44793 Borehole Surficial Soil Sampling Location
SS402493 Random Surficial Soil Sampling Location
SS403693 Discrete Surficial Soil Sampling Location
100 0 100 200 300 FEET
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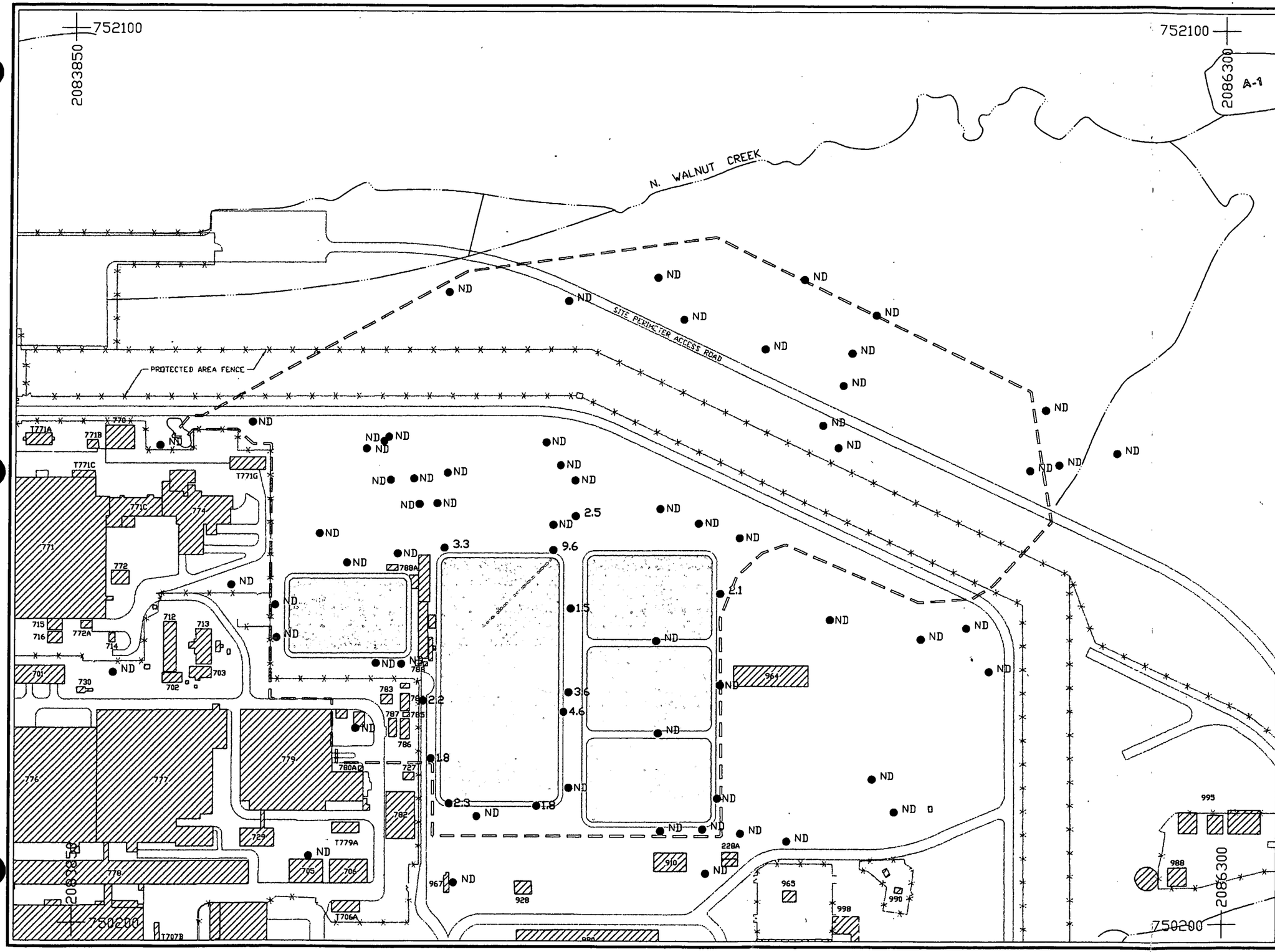
GOLDEN, COLORADO
Figure II.3.2-2
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Locations of Surficial Soil Samples



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 2.20 Results in mg/kg
- ND Not Detected

NOTES

1. Results in red exceed the background level of 0.92 mg/kg

100 0 100 200 300 FEET

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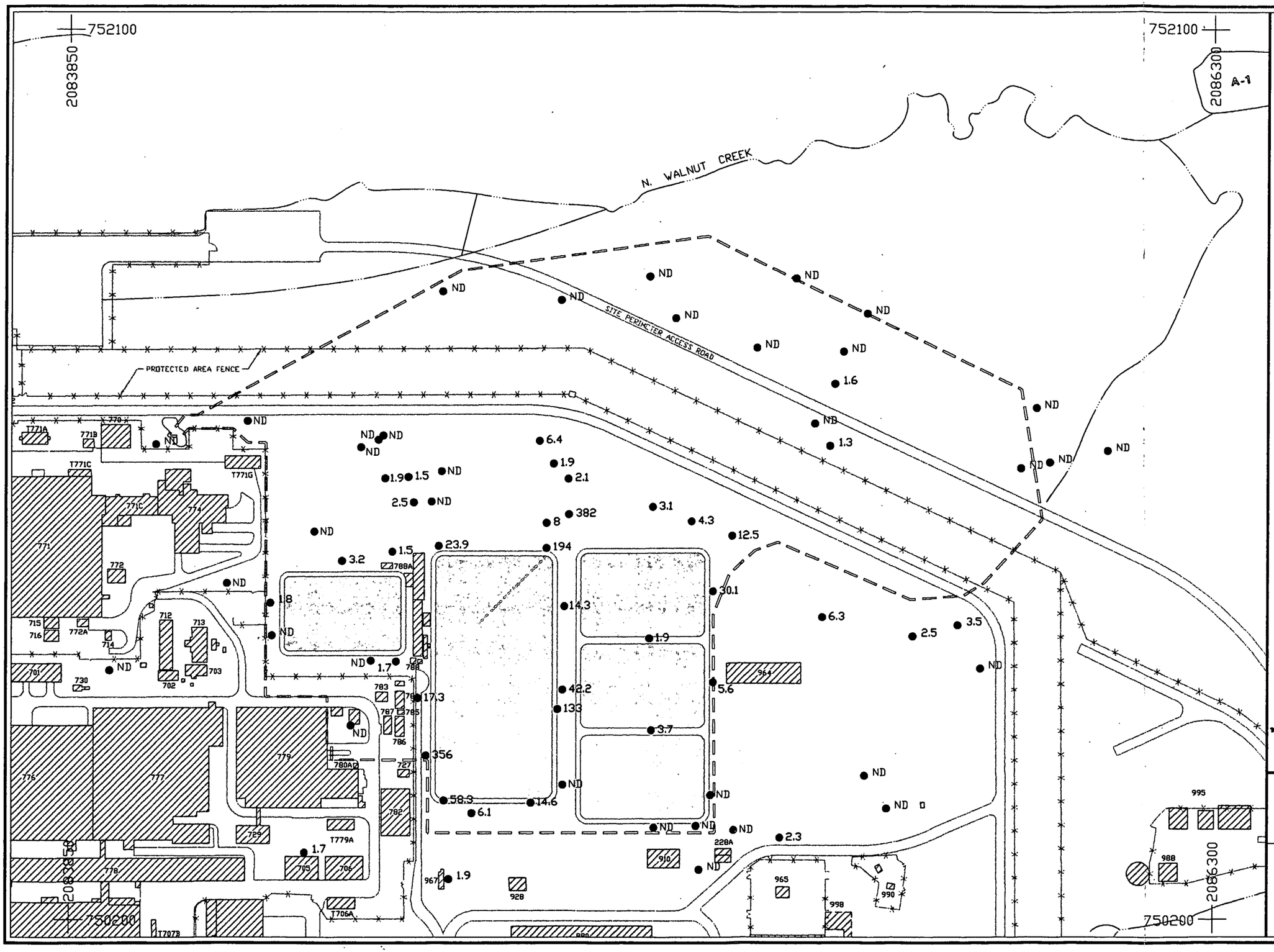
Figure II.3.2-3

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Beryllium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 2.20 Results in mg/kg
- ND Not Detected

NOTES

1. Results in red exceed the background level of 0.64 mg/kg

100 0 100 200 300 FEET

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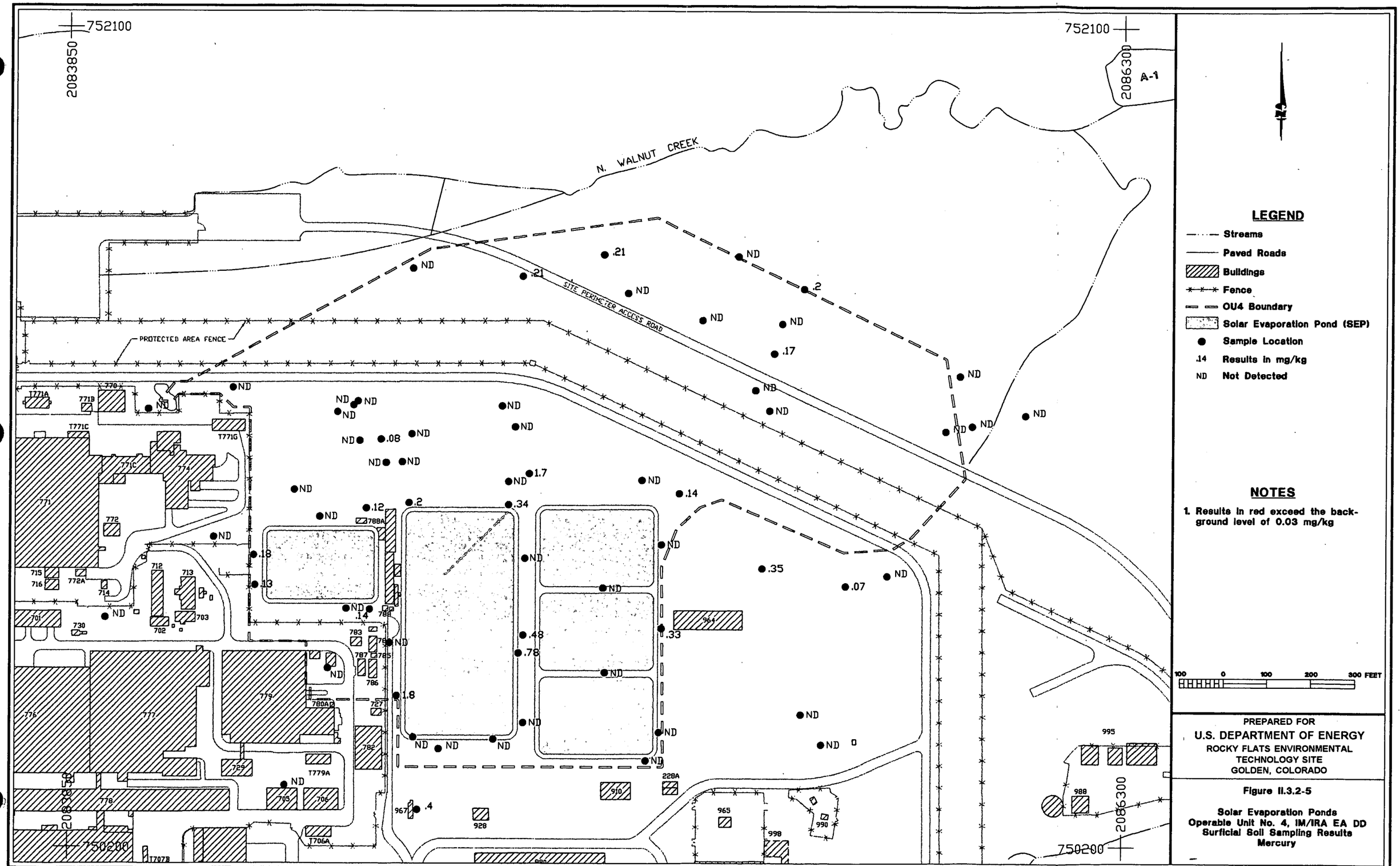
Figure II.3.2-4

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Cadmium


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.14 Results in mg/kg
ND Not Detected
NOTES
1. Results in red exceed the background level of 0.03 mg/kg
100 0 100 200 300 FEET
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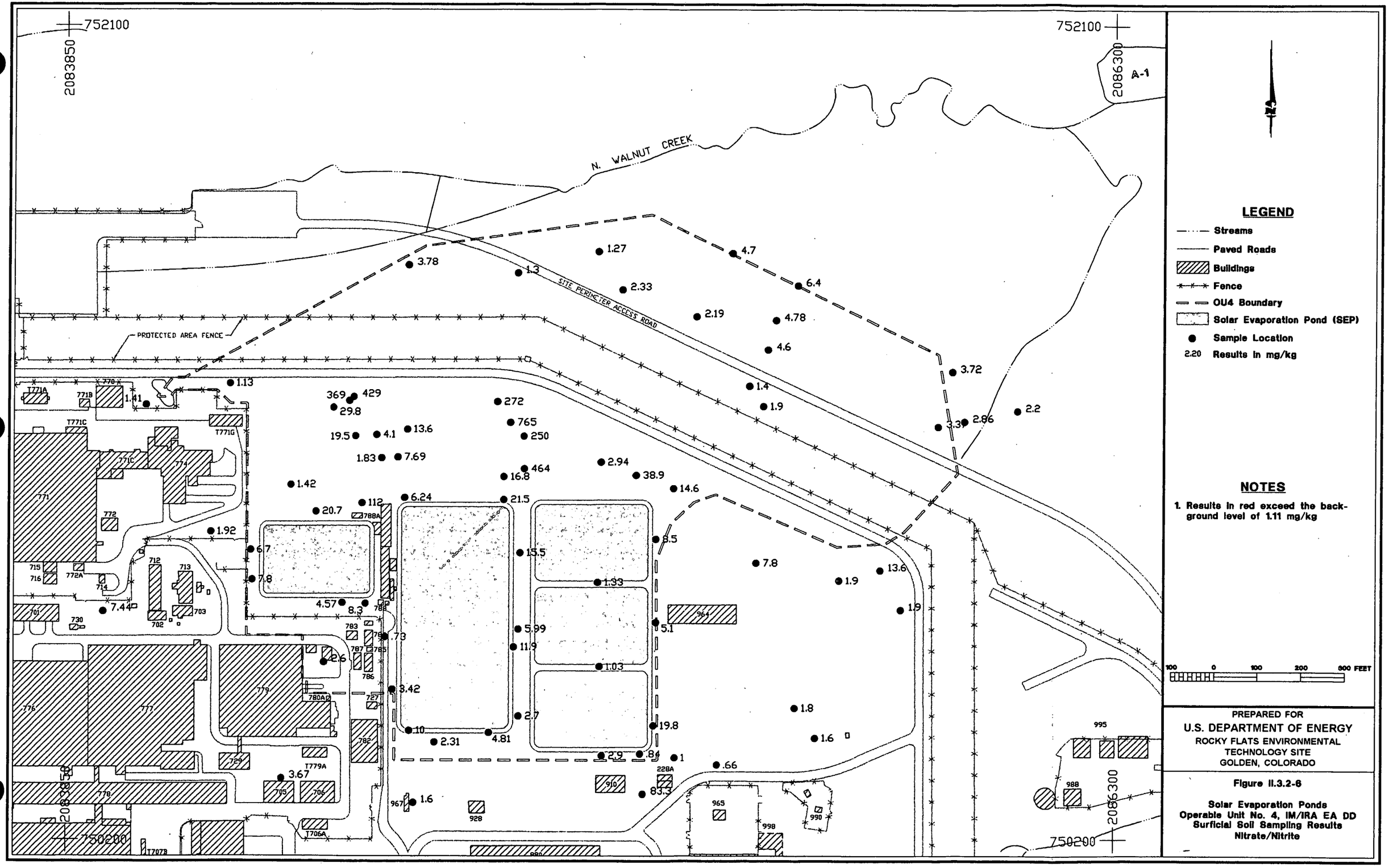
GOLDEN, COLORADO
Figure II.3.2-5
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Mercury
750200
2083850
750200
2086300


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
2.20 Results in mg/kg
NOTES
1. Results in red exceed the background level of 1.11 mg/kg
100 0 100 200 300 FEET
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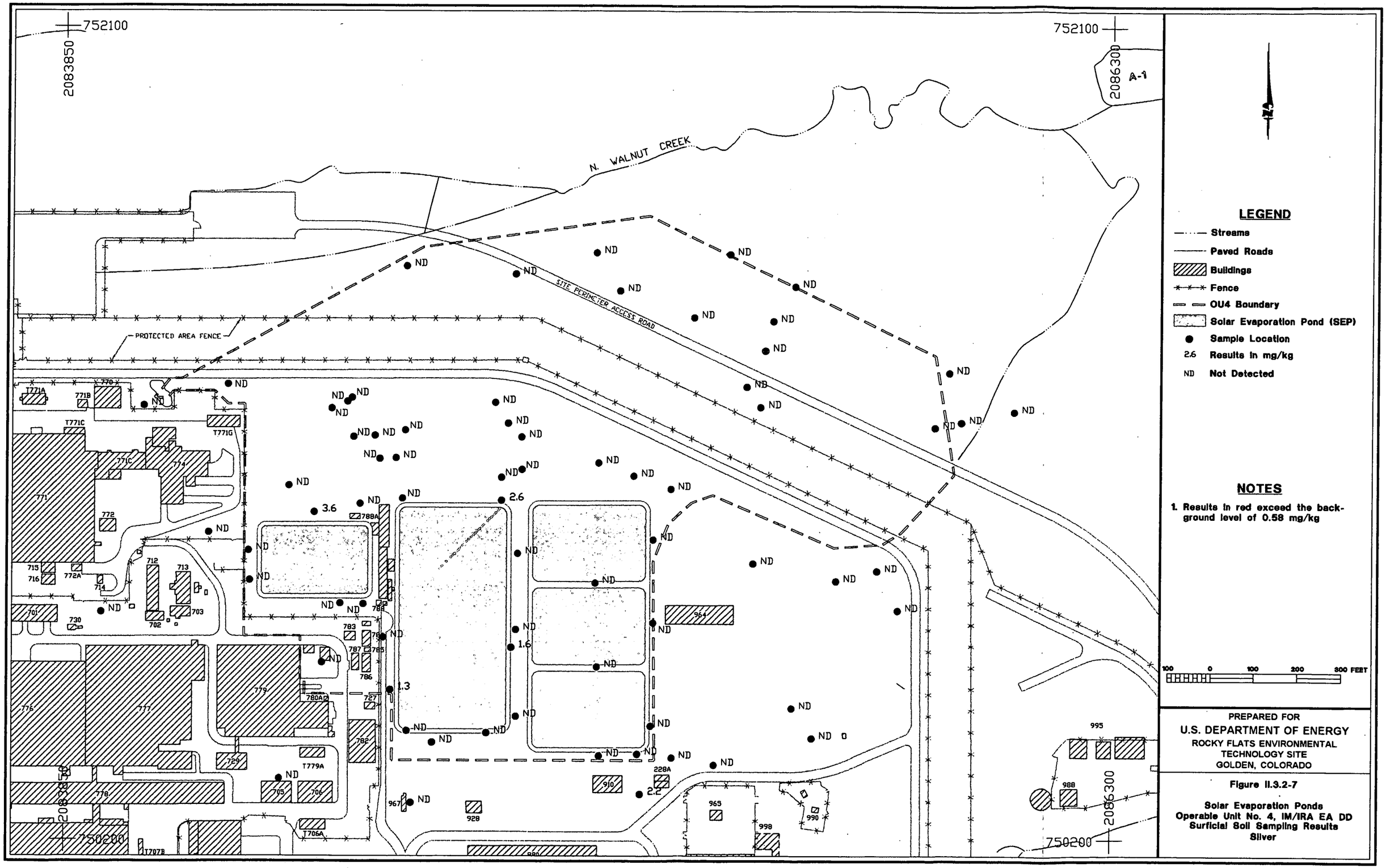
GOLDEN, COLORADO
Figure II.3.2-6
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Nitrate/Nitrite
750200
2083350
2086300
750200


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
2.6 Results in mg/kg
ND Not Detected
NOTES
1. Results in red exceed the background level of 0.58 mg/kg
100 0 100 200 300 FEET
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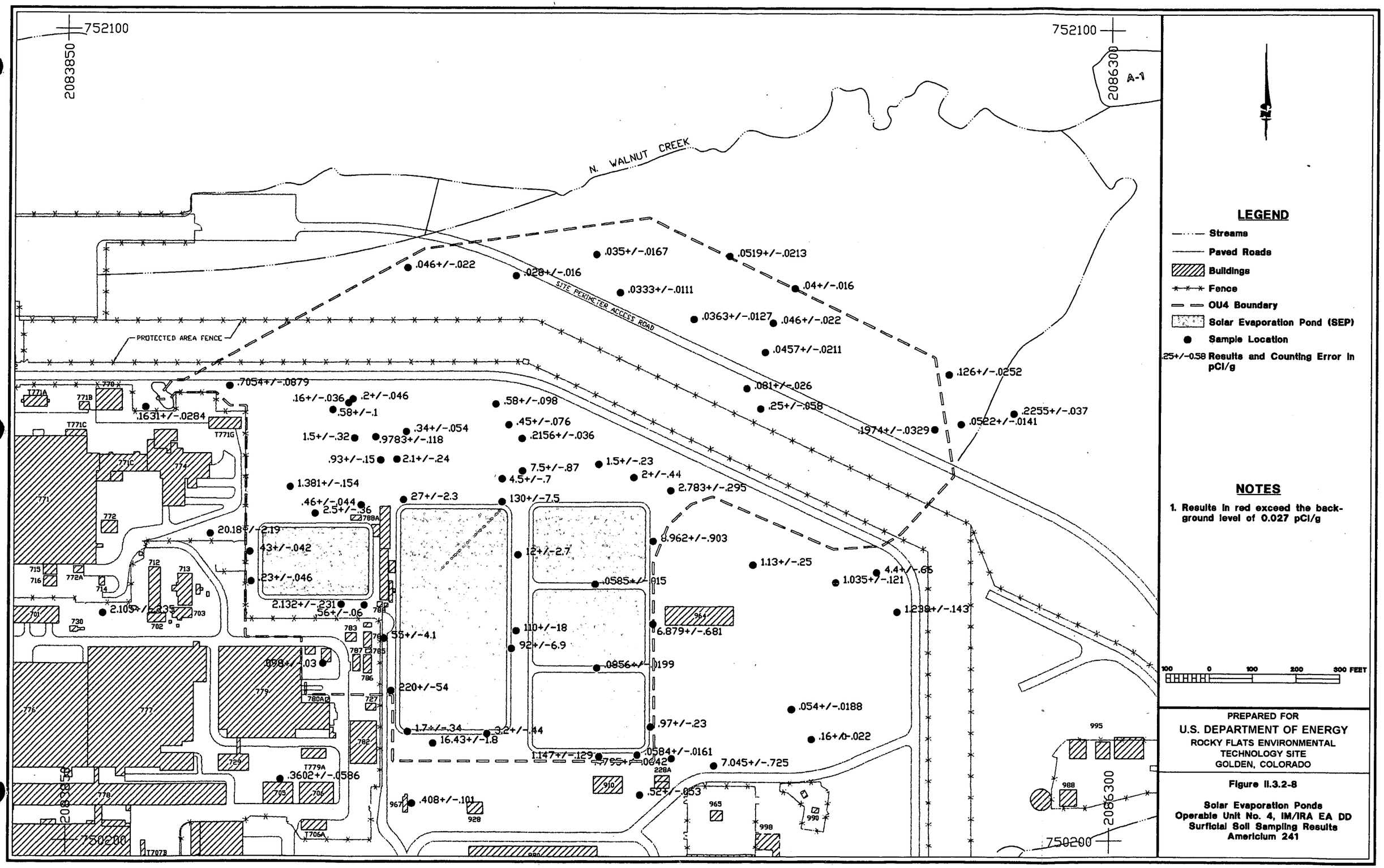
GOLDEN, COLORADO
Figure II.3.2-7
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Silver
750200
2083850
750200
2086300


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
.035+/-.0167
.0519+/-.0213
.046+/-.022
.028+/-.016
.0333+/-.0111
.04+/-.016
.0363+/-.0127
.046+/-.022
.0457+/-.0211
.126+/-.0252
.081+/-.026
.25+/-.058
.2255+/-.037
.0522+/-.0141
.1974+/-.0329
.7054+/-.0879
.16+/-.036
.2+/-.046
.58+/-.1
.58+/-.098
.1631+/-.0284
.45+/-.076
.34+/-.054
1.5+/-.32
.9783+/-.118
.2156+/-.036
.93+/-.15
2.1+/-.24
7.5+/-.87
1.5+/-.23
2+/-.44
4.5+/-.7
1.381+/-.154
2.783+/-.295
27+/-2.3
130+/-7.5
.46+/-.044
2.5+/-.36
20.18+/-2.19
8.962+/-.903
43+/-.042
12+/-2.7
1.13+/-.25
4.4+/-.65
.0585+/-.015
1.035+/-.121
23+/-.046
2.132+/-.231
56+/-.06
2.105+/-.235
1.238+/-.143
110+/-18
6.879+/-.681
55+/-4.1
92+/-6.9
.098+/-.03
.0856+/-.199
220+/-54
.054+/-.0188
1.7+/-.34
3.2+/-.44
.97+/-.23
16.43+/-1.8
.16+/-.022
1.147+/-.129
.0584+/-.0161
.0642
7.045+/-.725
.3602+/-.0586
.52+/-.053
.408+/-.101
750200
750200
2083850
2086300
771A
771B
770
771C
771G
774
771
772
772A
715
716
714
712
713
703
702
701
730
783
784
787
785
786
779
780A
727
776
777
782
789
779A
705
706
706A
707B
788A
788
964
995
988
990
998
965
910
228A
967
928
980
N
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.25+/-0.58 Results and Counting Error in pCi/g
NOTES
1. Results in red exceed the background level of 0.027 pCi/g
100 0 100 200 300 FEET
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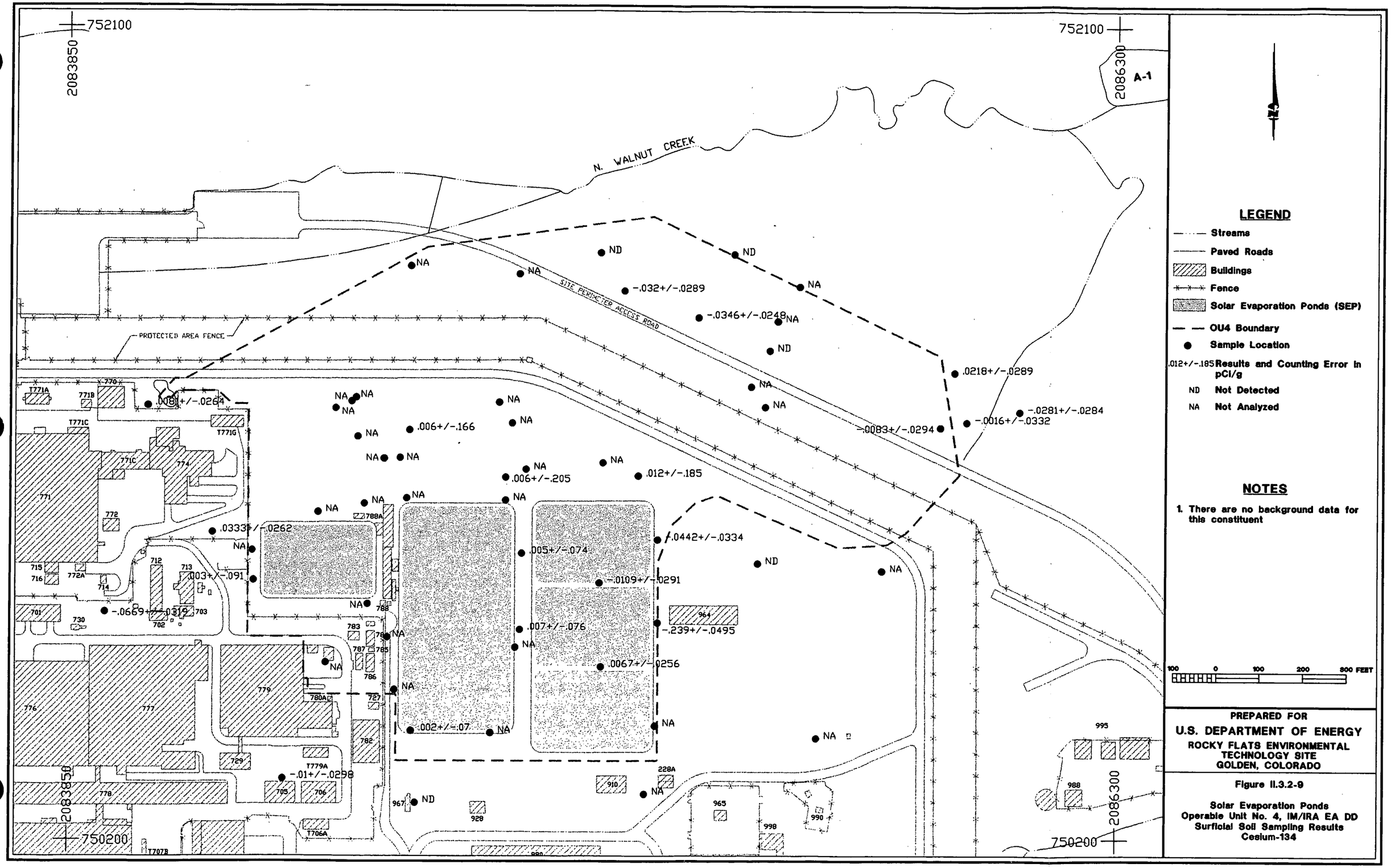
GOLDEN, COLORADO
Figure II.3.2-8
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Americium 241



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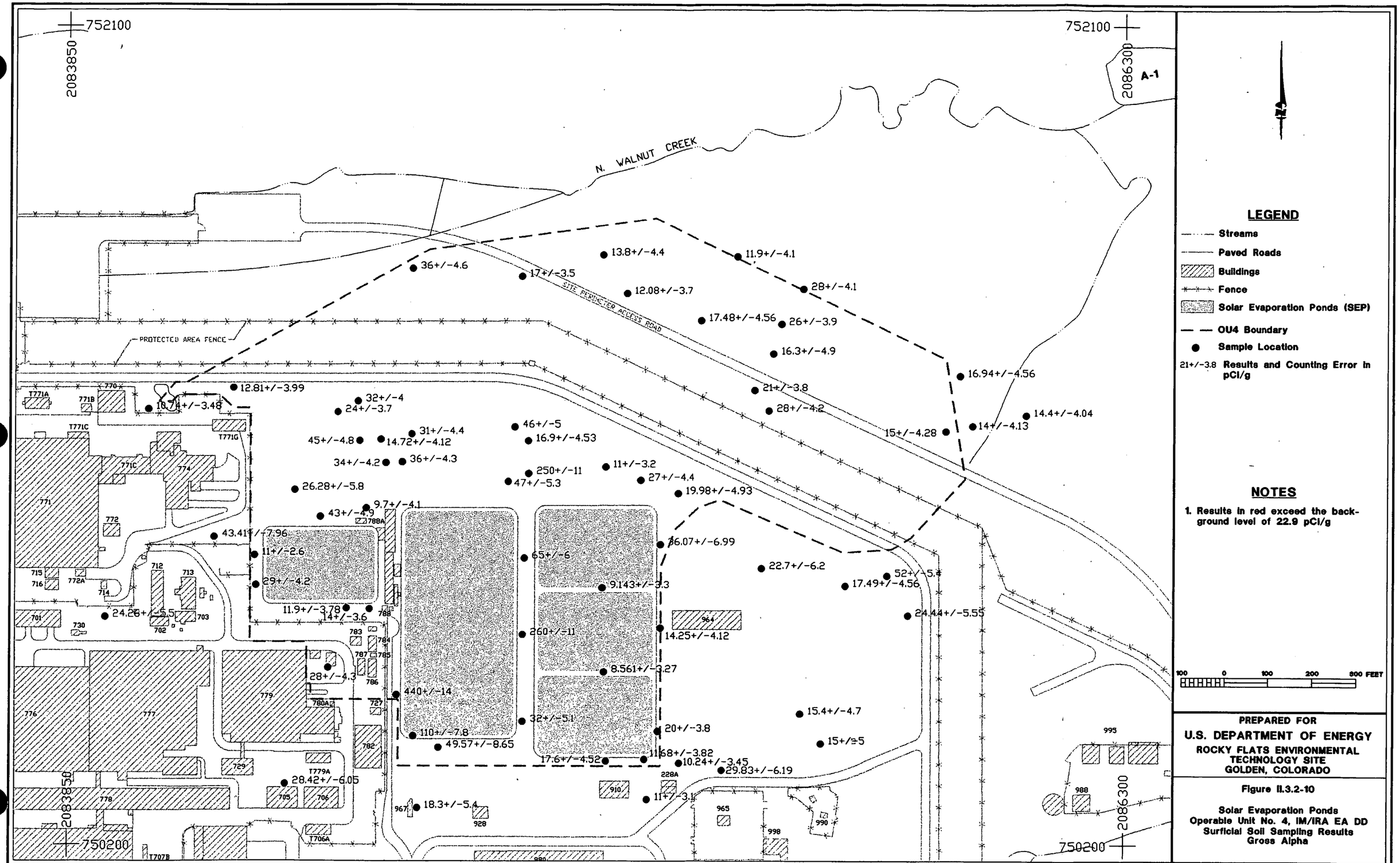
GOLDEN, COLORADO

Figure II.3.2-9

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Cesium-134



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- OU4 Boundary
- Sample Location
- 21+/-3.8 Results and Counting Error in pCi/g

NOTES

1. Results in red exceed the background level of 22.9 pCi/g

100 0 100 200 300 FEET

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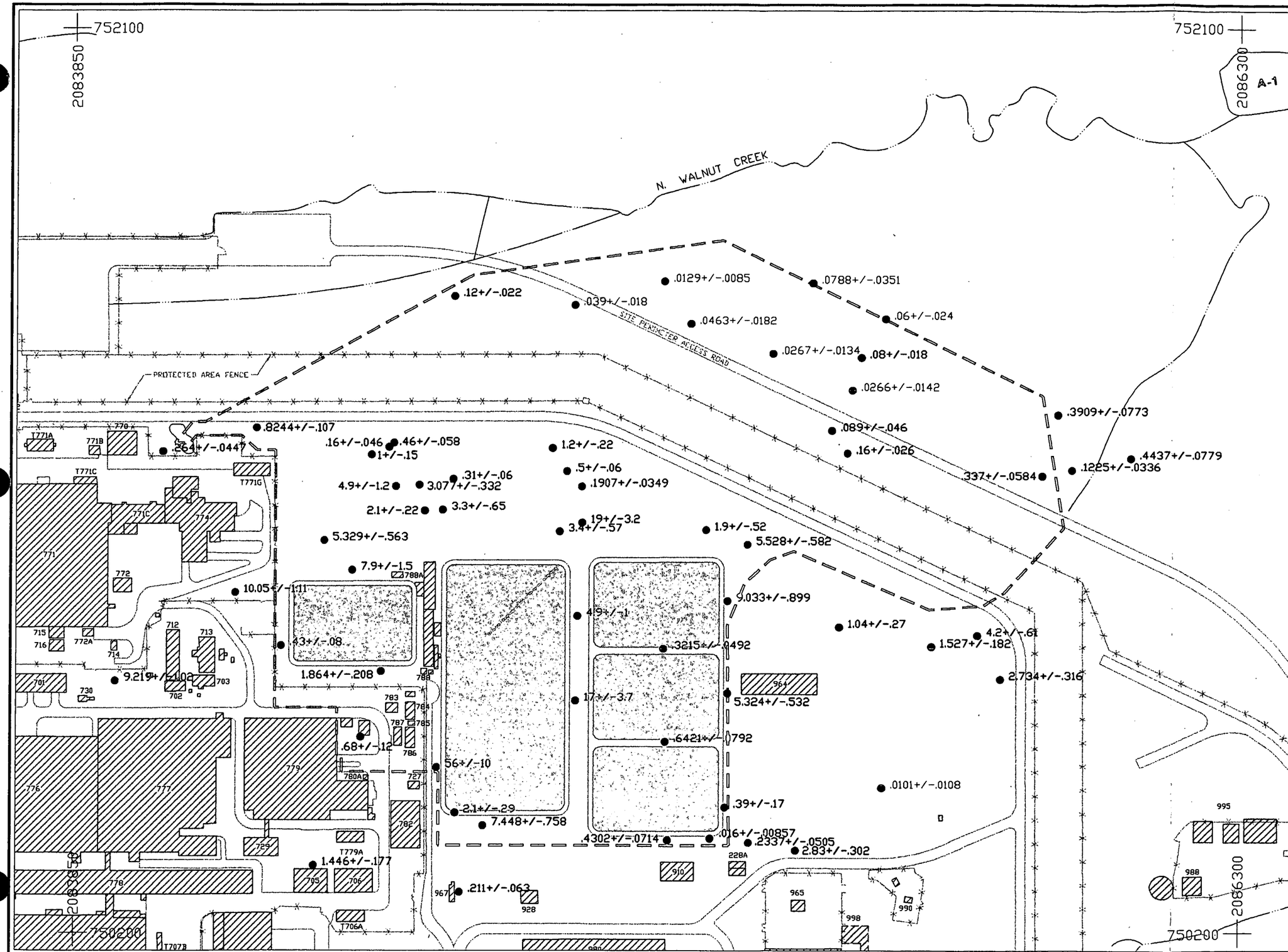
Figure II.3.2-10

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Gross Alpha



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 1.9+/-.52 Results and Counting Error in pCi/g

NOTES

1. Results in red exceed the background level of 0.062 pCi/g

100 0 100 200 300 FEET

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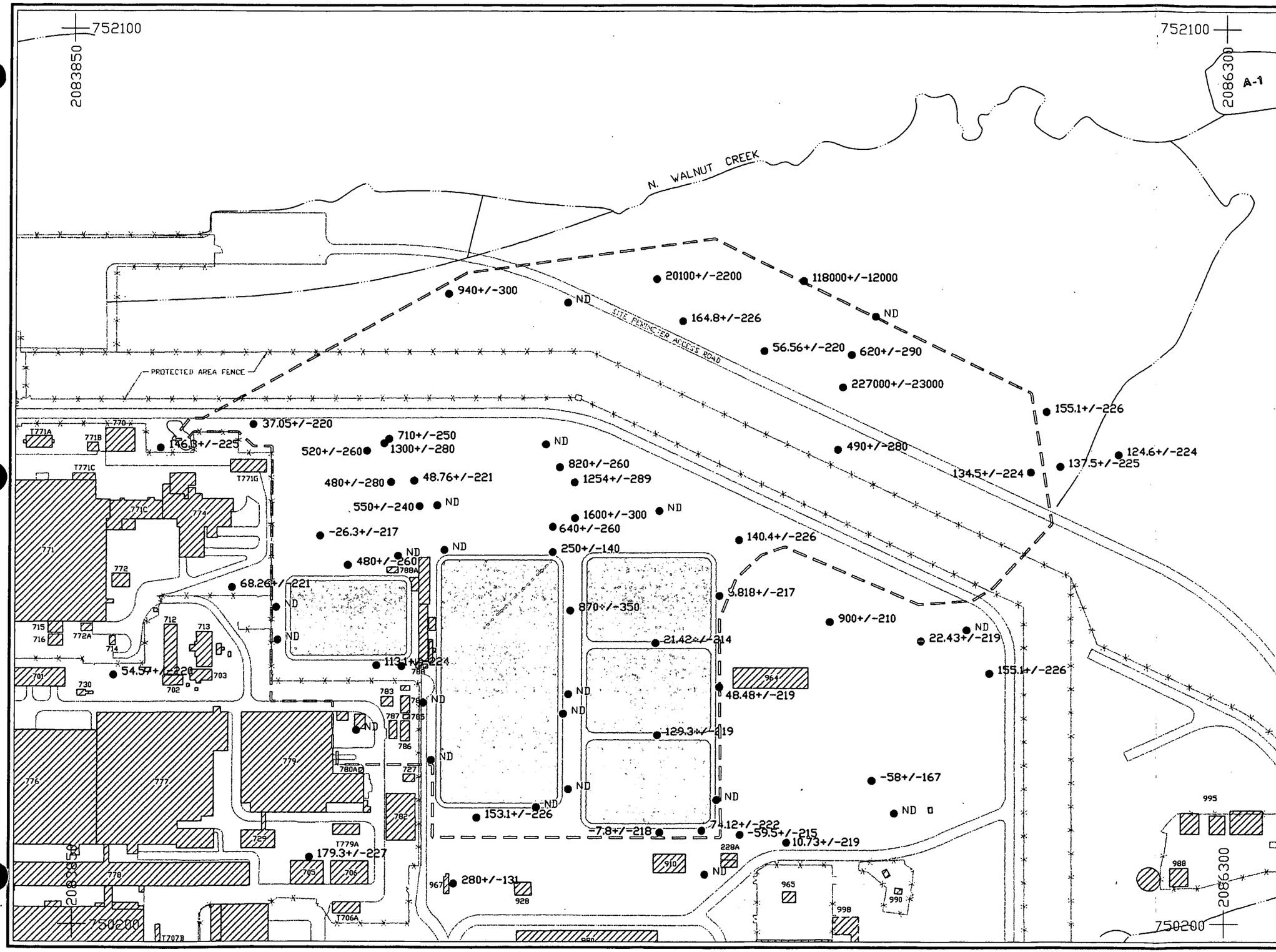
Figure II.3.2-11

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Surficial Soil Sampling Results Plutonium 239/240



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- -58+/-167 Results and Counting Error in pCi/l
- ND Not Detected

NOTES

1. There are no background data for this constituent

100 0 100 200 300 FEET

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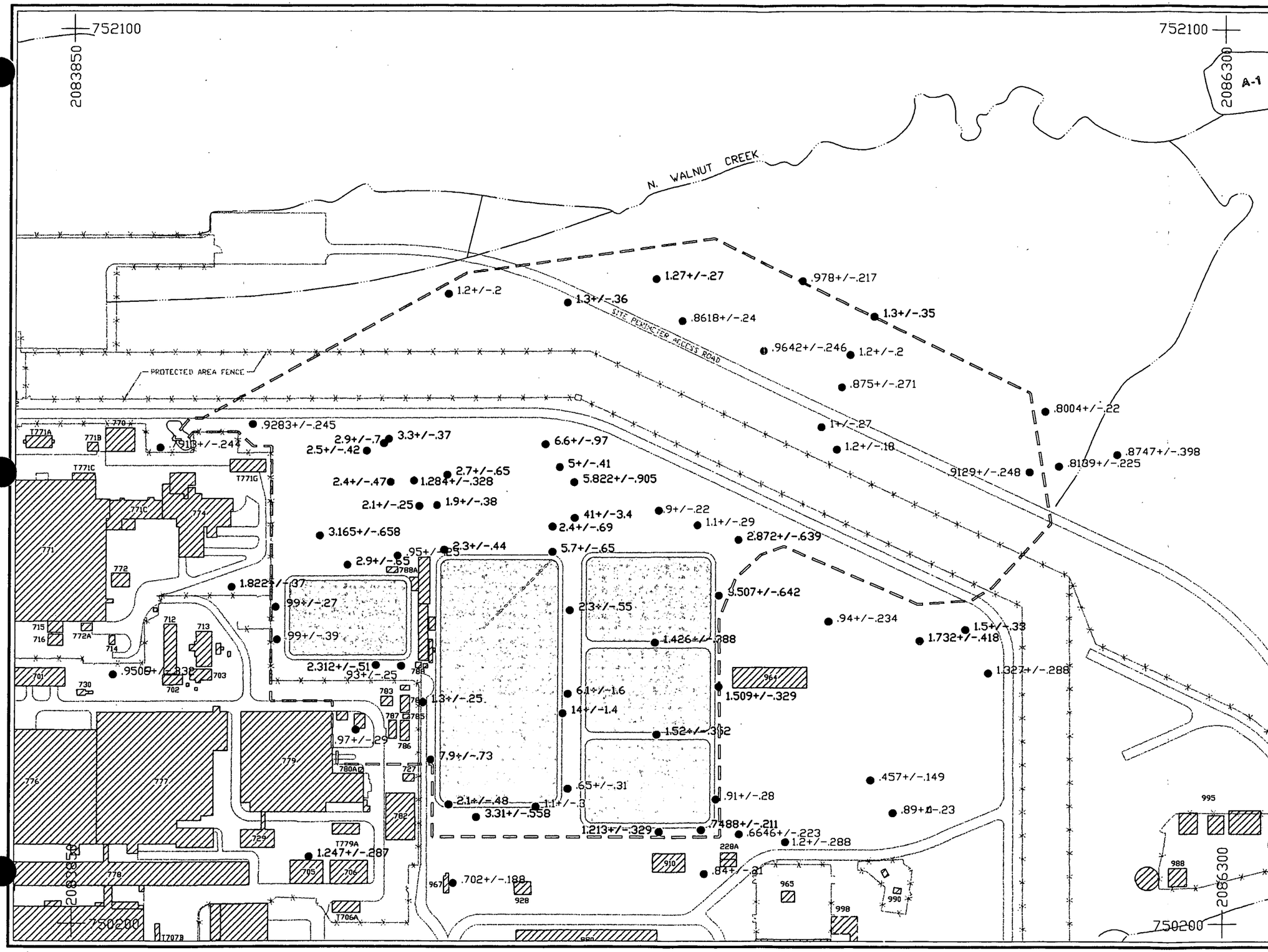
Figure II.3.2-12

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Tritium



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 1.2+/-.18 Results and Counting Error in pCi/g

NOTES

1. Results in red exceed the background level of 1.22 pCi/g

100 0 100 200 300 FEET

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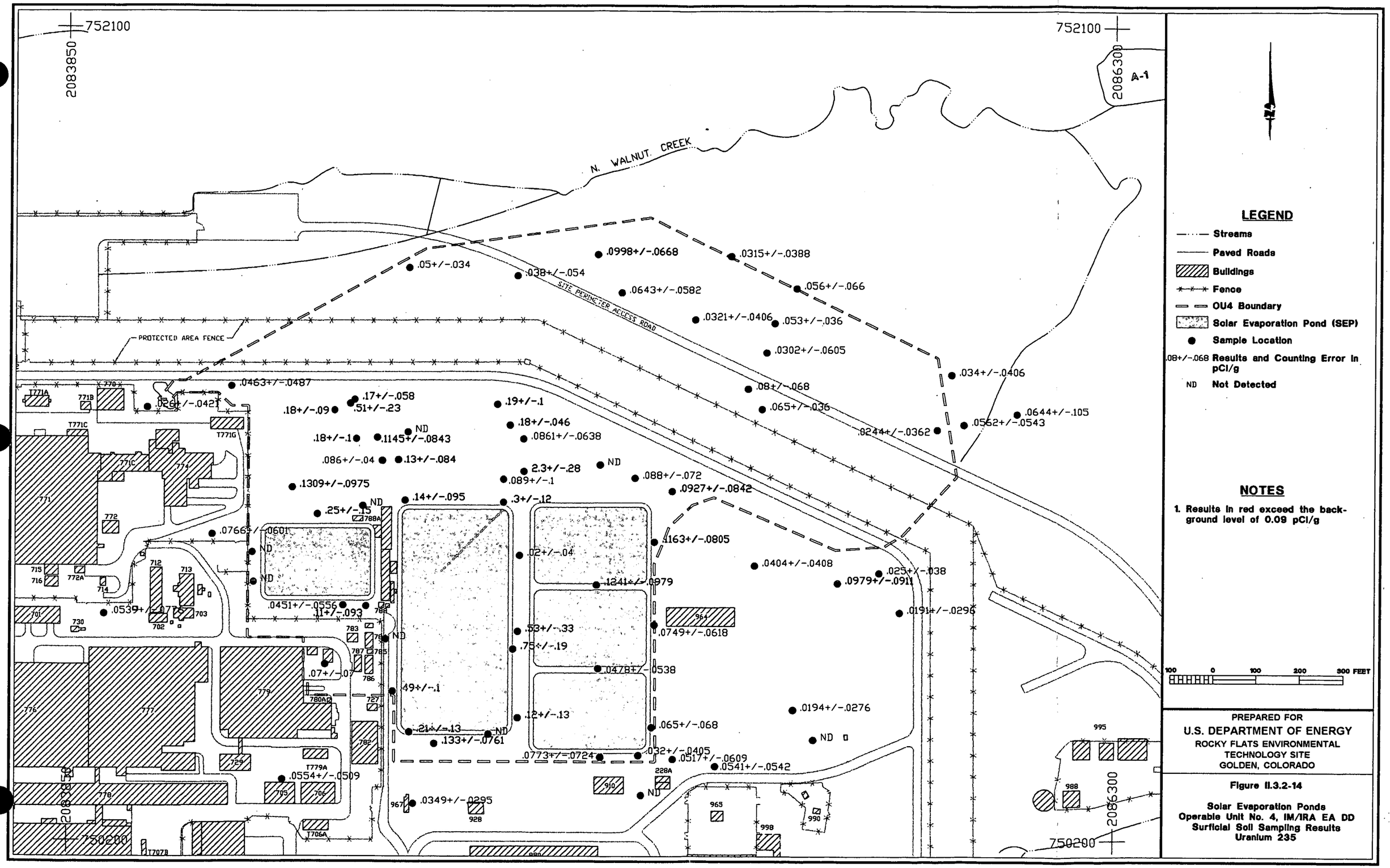
Figure II.3.2-13

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Uranium 233/234



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .08+/-.068 Results and Counting Error in pCi/g
- ND Not Detected

NOTES

1. Results in red exceed the background level of 0.09 pCi/g

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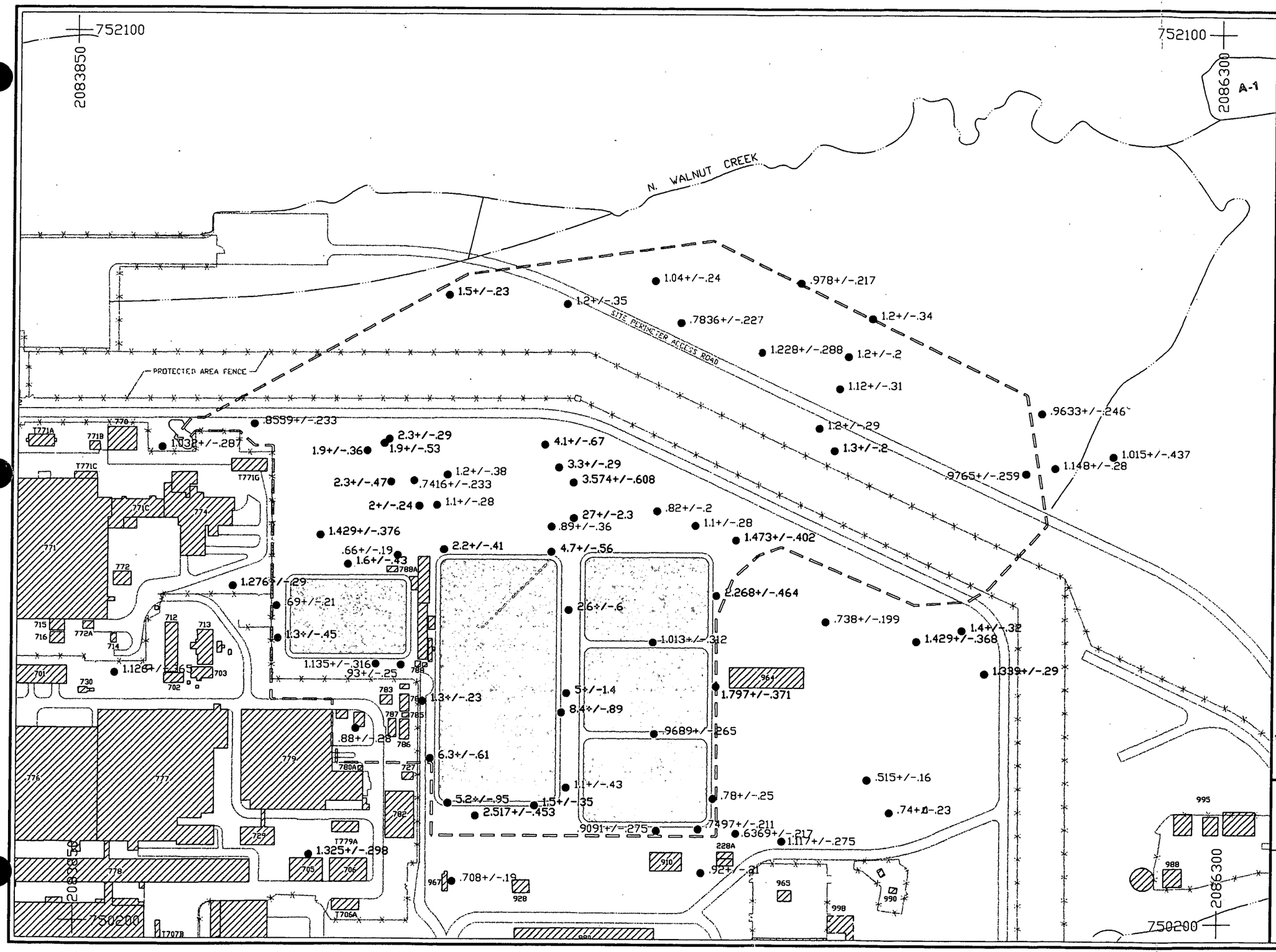
Figure II.3.2-14

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Uranium 235



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .82+/-.2 Results and Counting Error in pCi/g

NOTES

1. Results in red exceed the background level of 1.27 pCi/g

100 0 100 200 300 FEET

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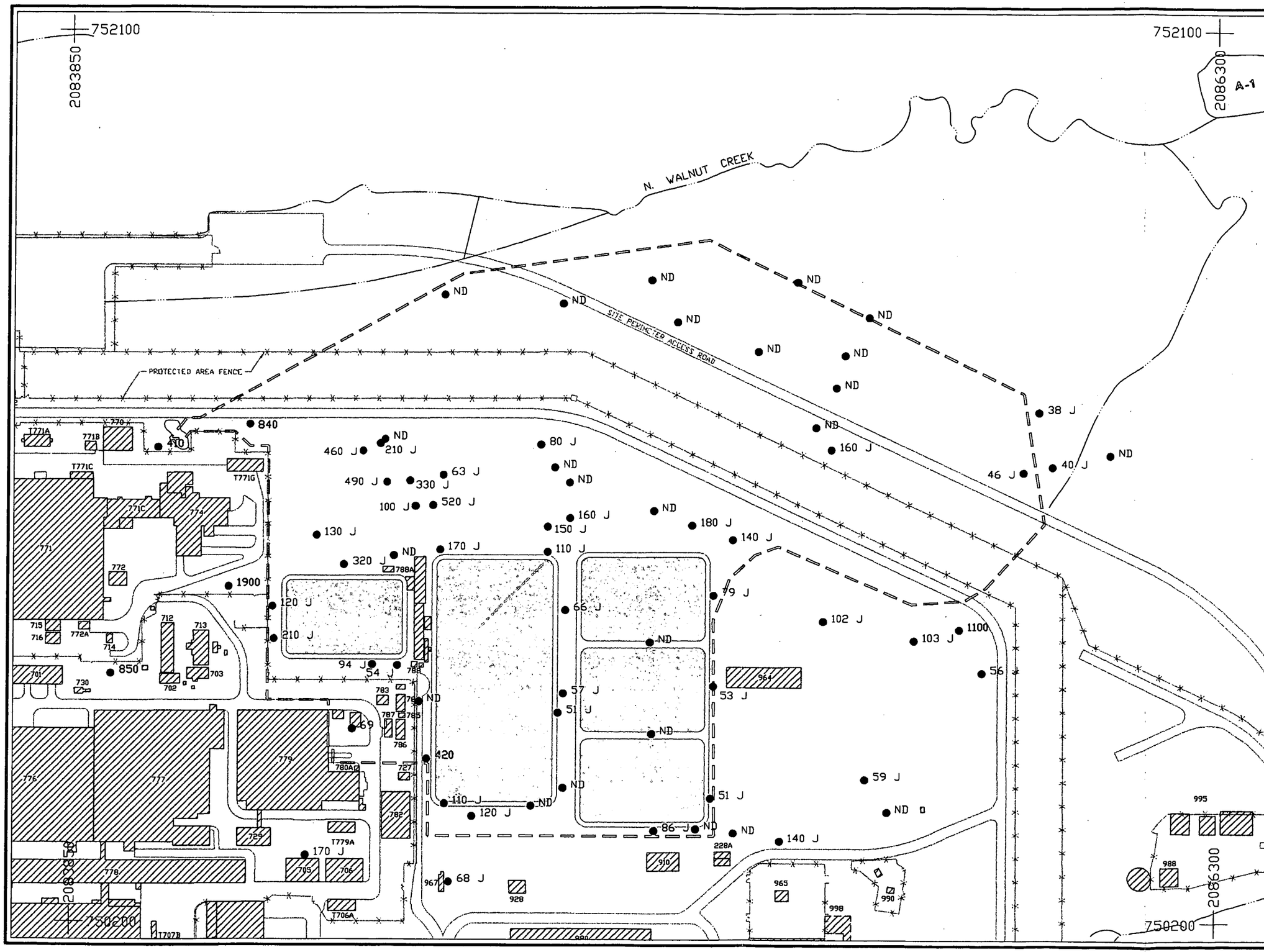
GOLDEN, COLORADO

Figure II.3.2-15

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Surficial Soil Sampling Results Uranium 238



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 38 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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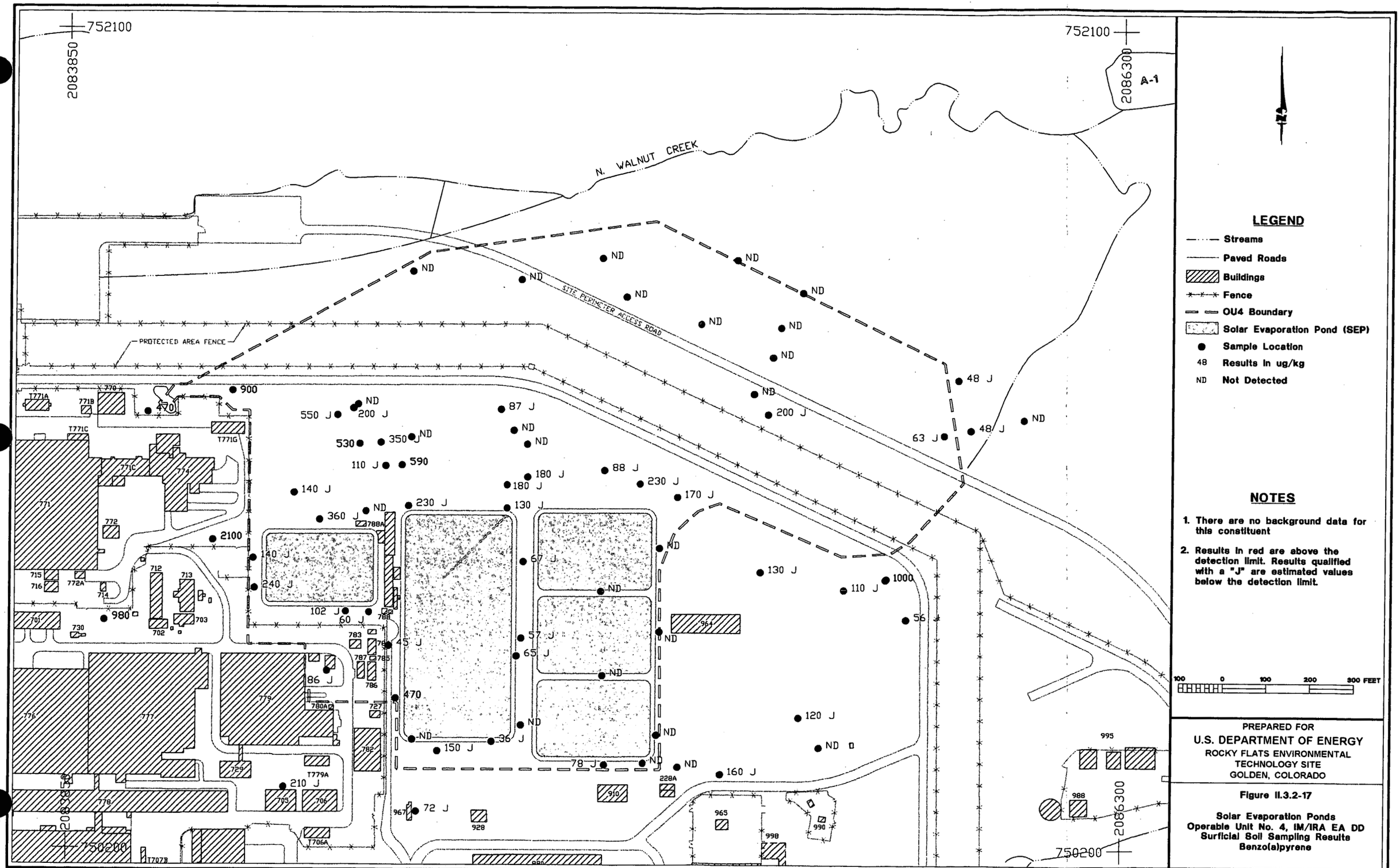
GOLDEN, COLORADO

Figure II.3.2-16

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Surficial Soil Sampling Results Benzo(a)anthracene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 48 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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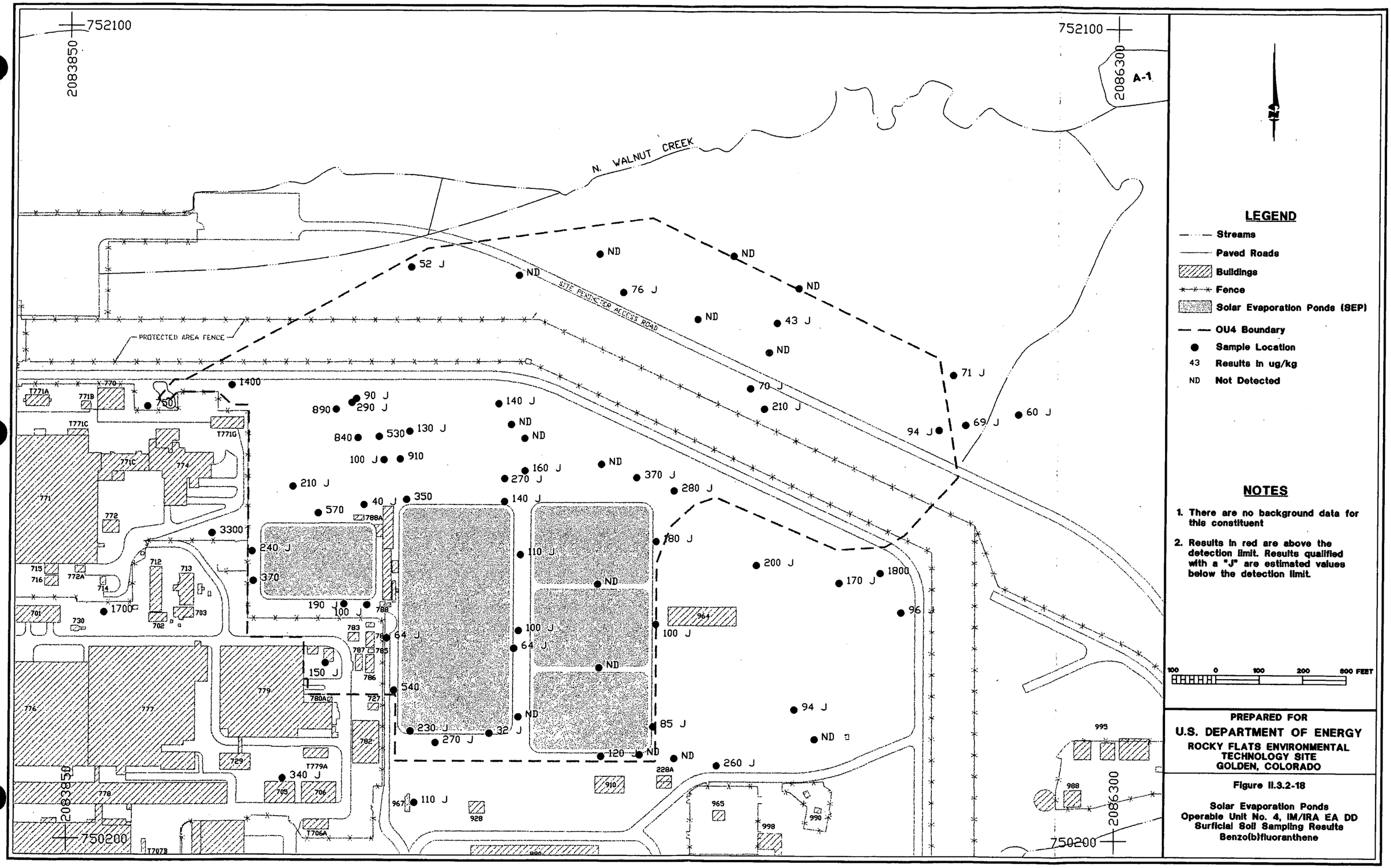
Figure II.3.2-17

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Surficial Soil Sampling Results Benzo(a)pyrene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- OU4 Boundary
- ● Sample Location
- 43 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 600 FEET

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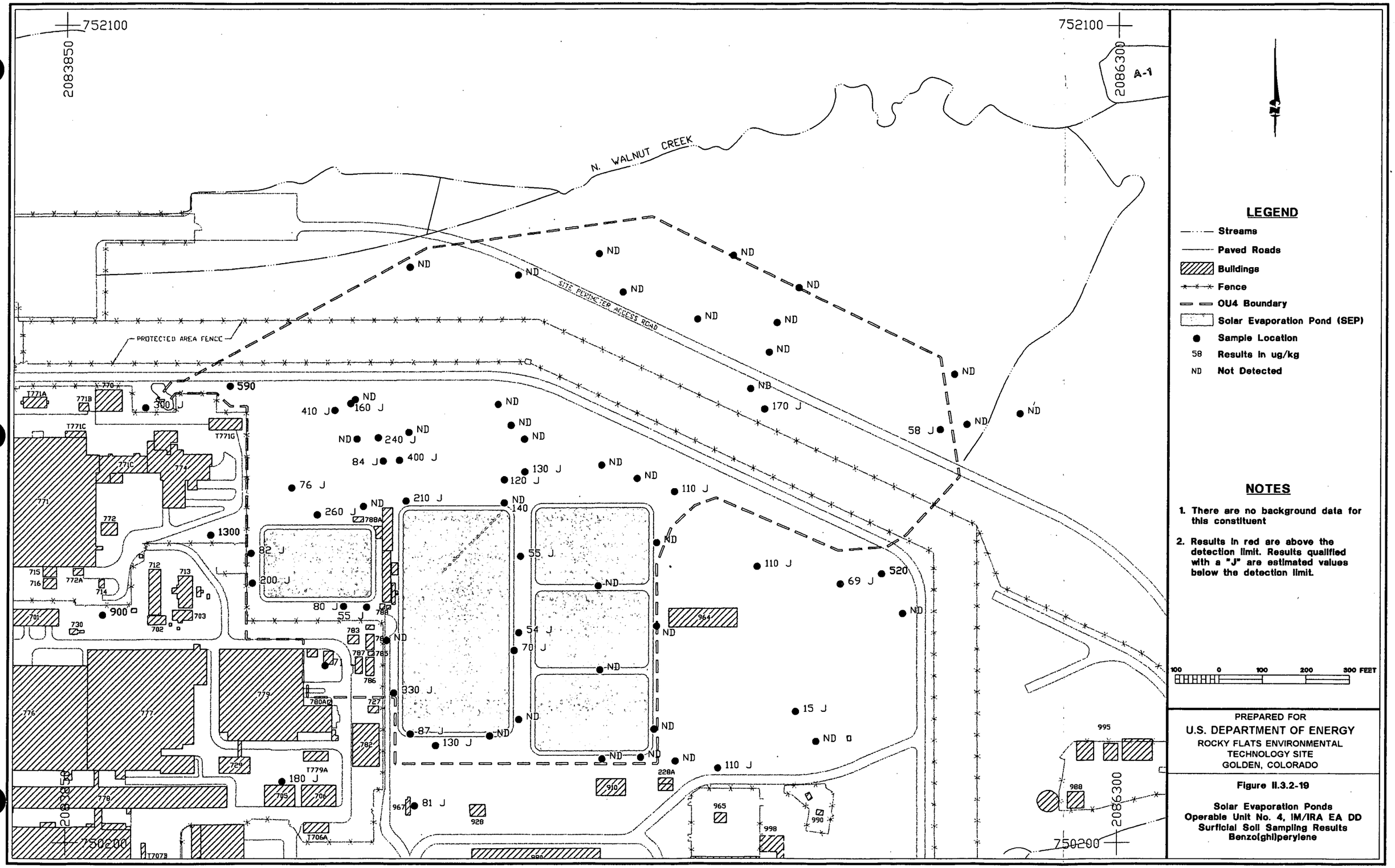
Figure II.3.2-18

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Benzo(b)fluoranthene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 58 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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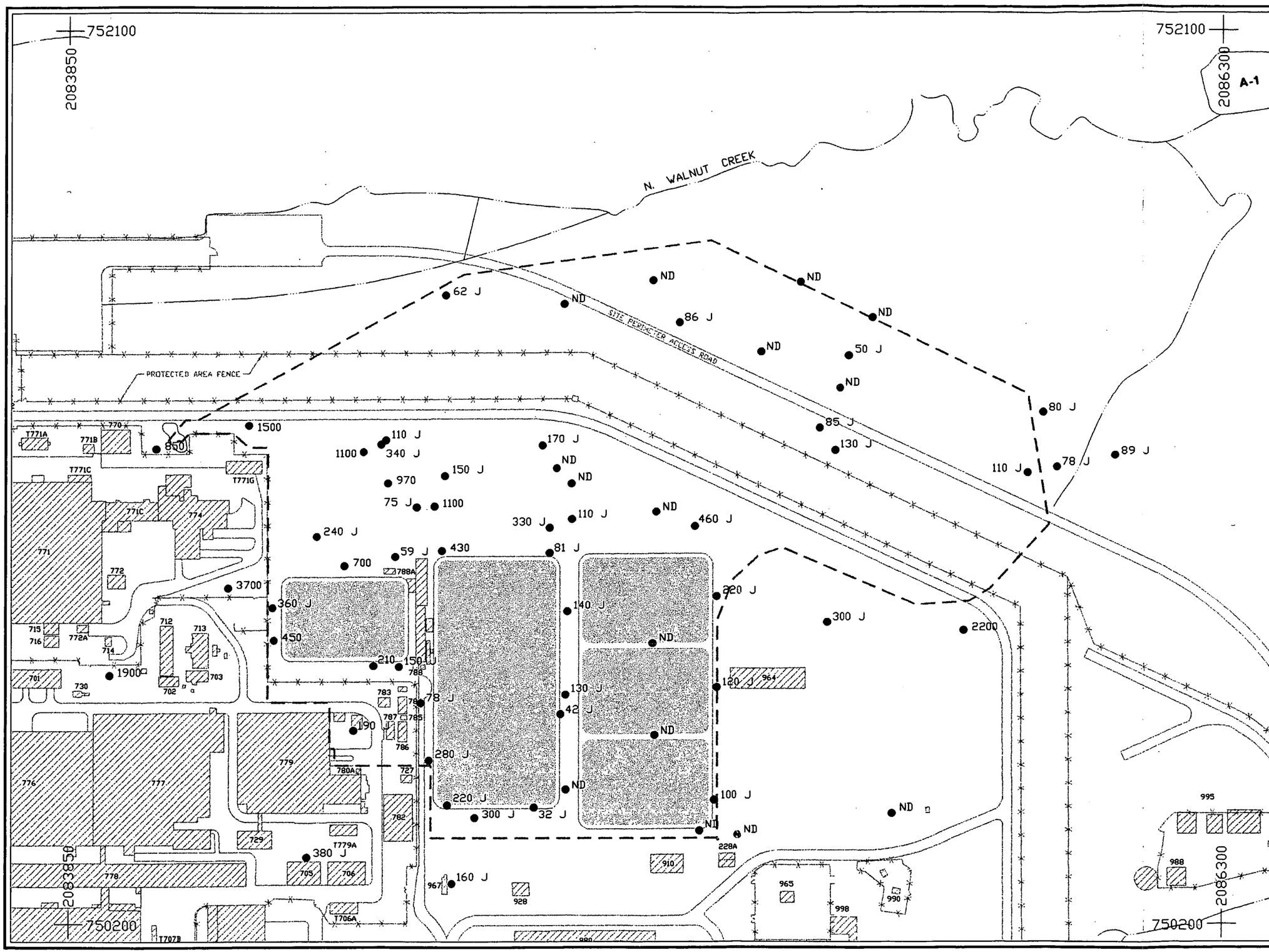
Figure II.3.2-19

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Benzo(ghi)perylene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- OU4 Boundary
- Sample Location
- 50.00 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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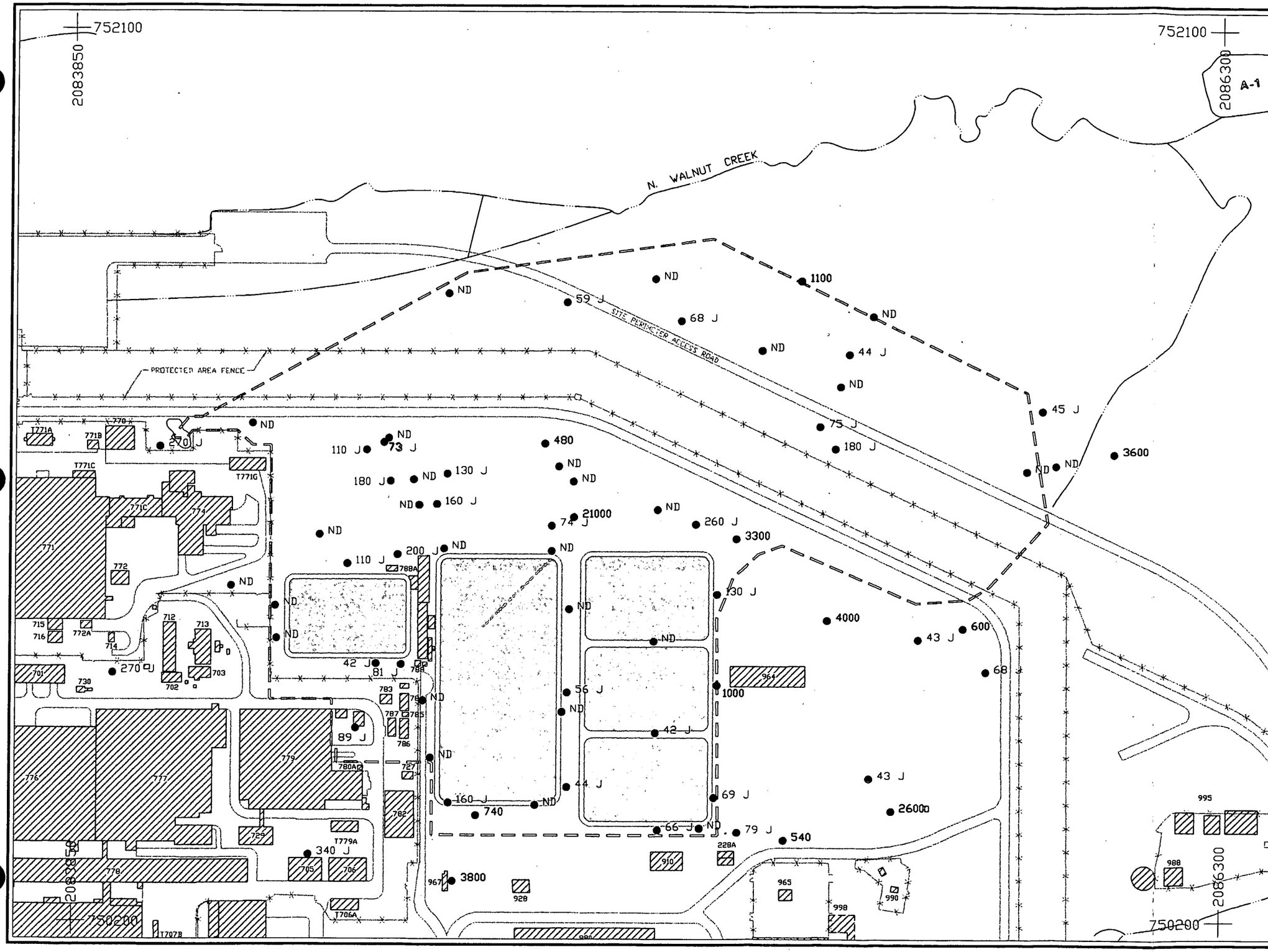
Figure II.3.2-20

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Benzo(k)fluoranthene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 45 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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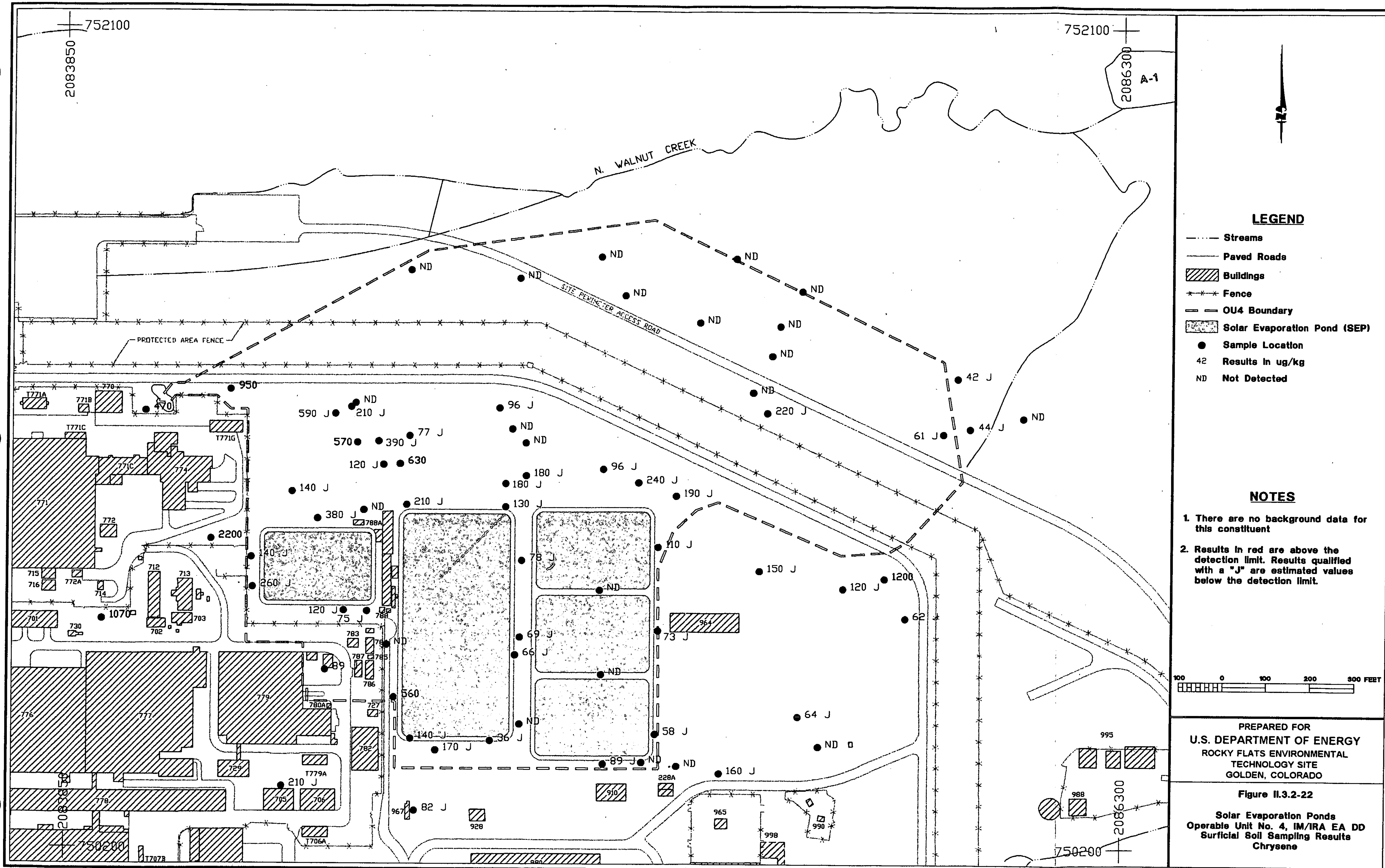
Figure II.3.2-21

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Bis(2-ethylhexyl)phthalate


752100
2083850
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
42 Results in ug/kg
ND Not Detected
NOTES
1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.
100 0 100 200 300 FEET
750200
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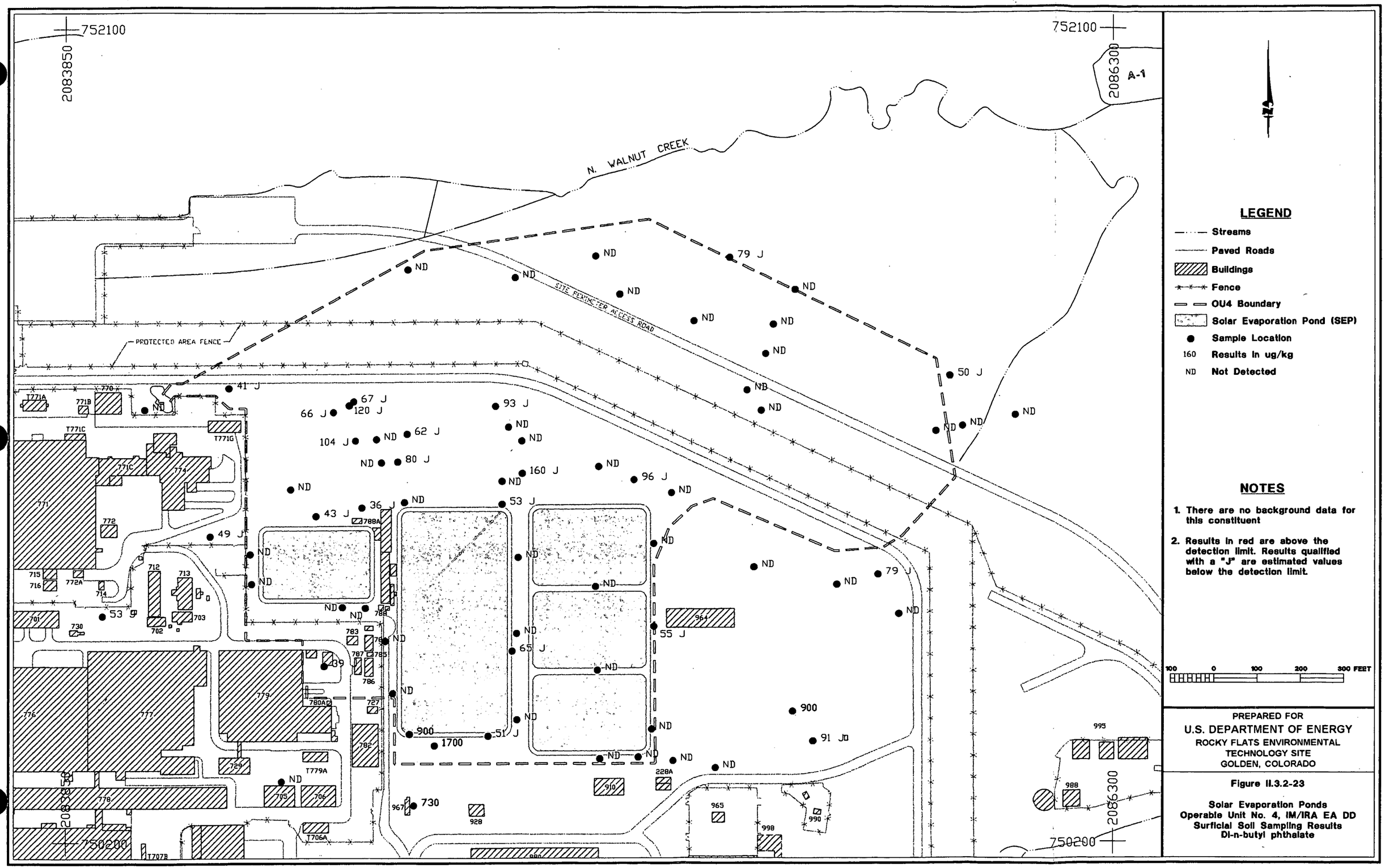
GOLDEN, COLORADO
Figure II.3.2-22
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Chrysene


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
160 Results in ug/kg
ND Not Detected
NOTES
1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.
100 0 100 200 300 FEET
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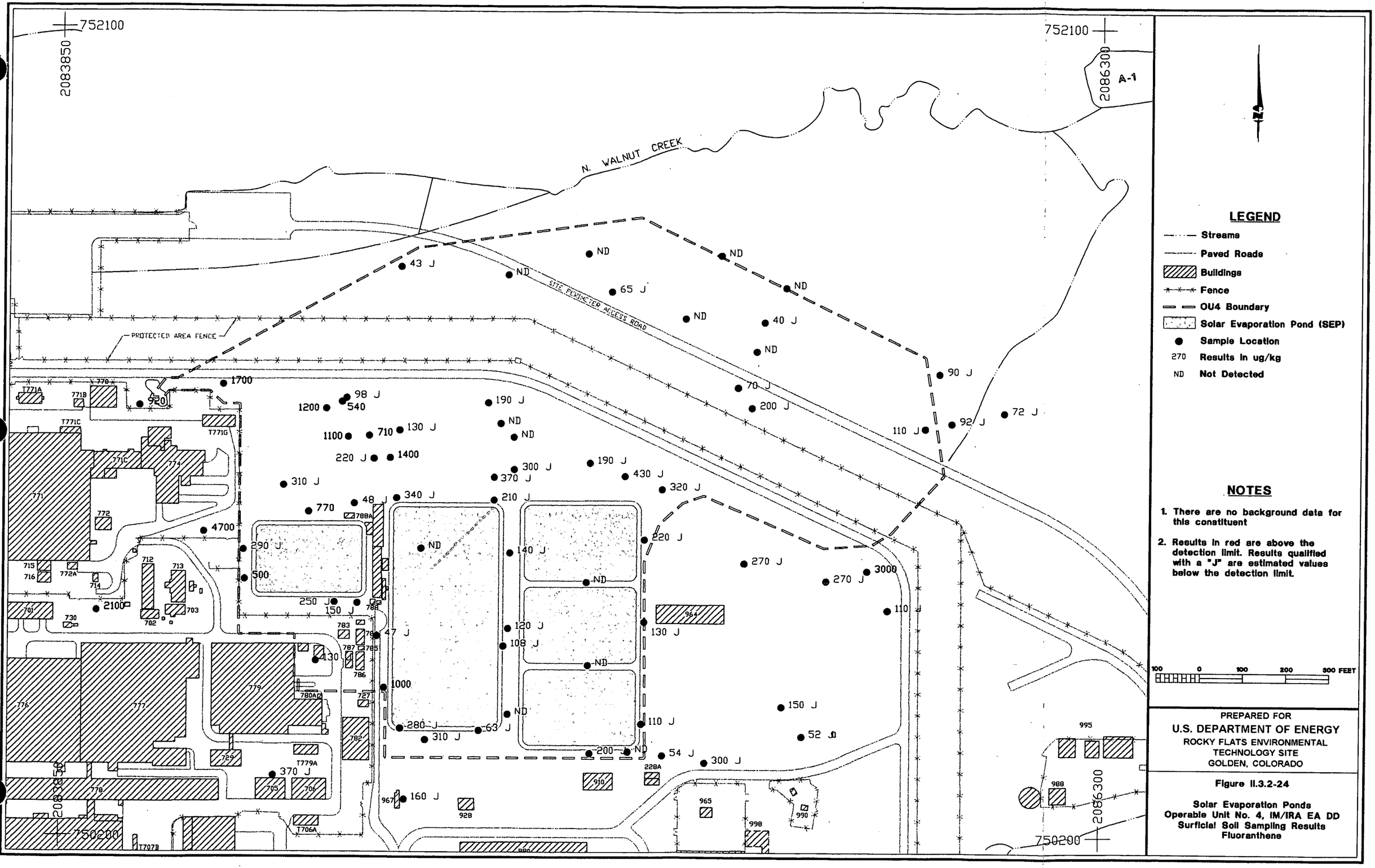
GOLDEN, COLORADO
Figure II.3.2-23
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Di-n-butyl phthalate
750200
2083300
2086300


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
270 Results in ug/kg
ND Not Detected
NOTES
1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.
100 0 100 200 300 FEET
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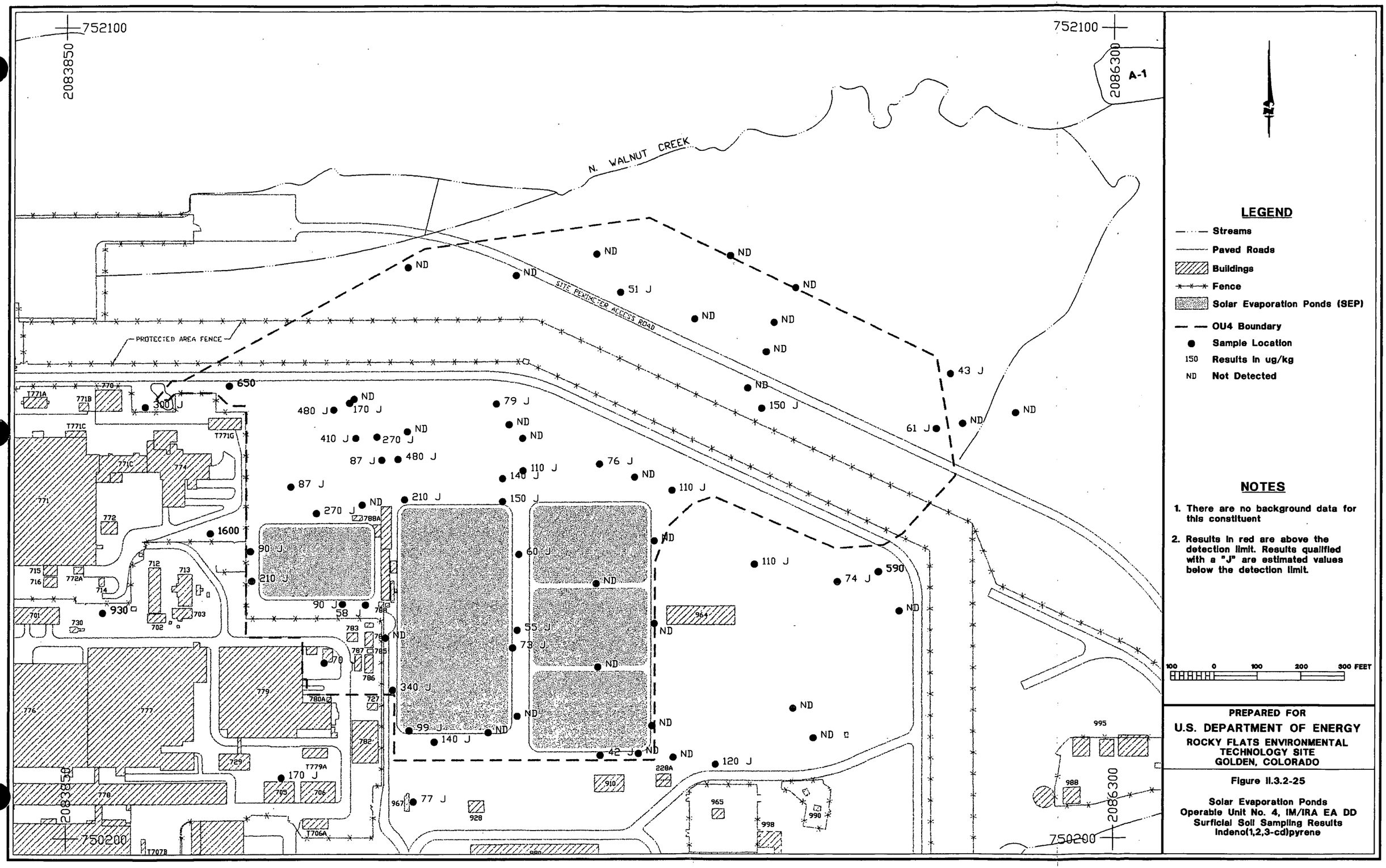
GOLDEN, COLORADO
Figure II.3.2-24
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Fluoranthene
750200
2083800
750200
2086300



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Solar Evaporation Ponds (SEP)
- OU4 Boundary
- Sample Location
- 150 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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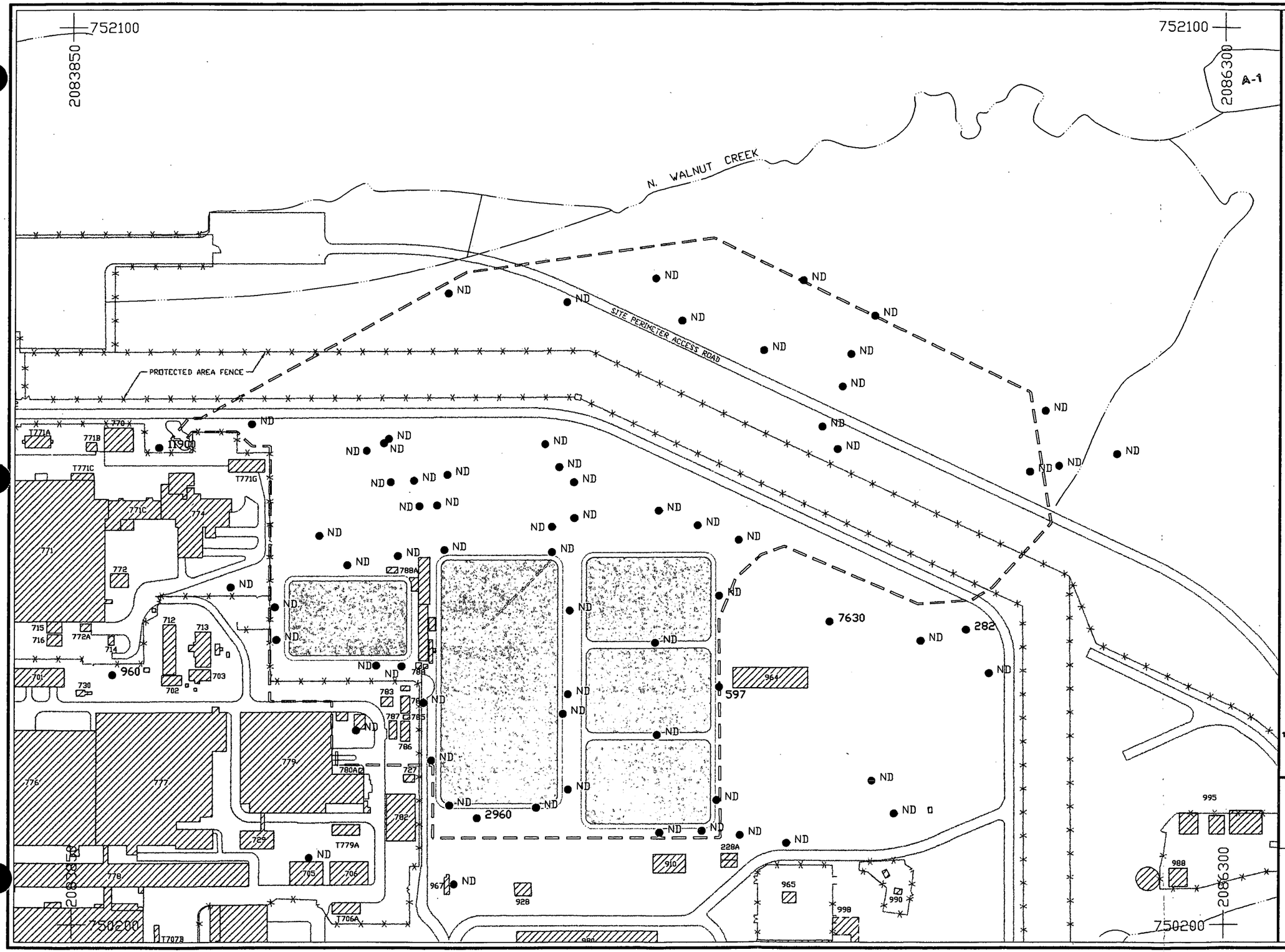
GOLDEN, COLORADO

Figure II.3.2-25

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Indeno(1,2,3-cd)pyrene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 282 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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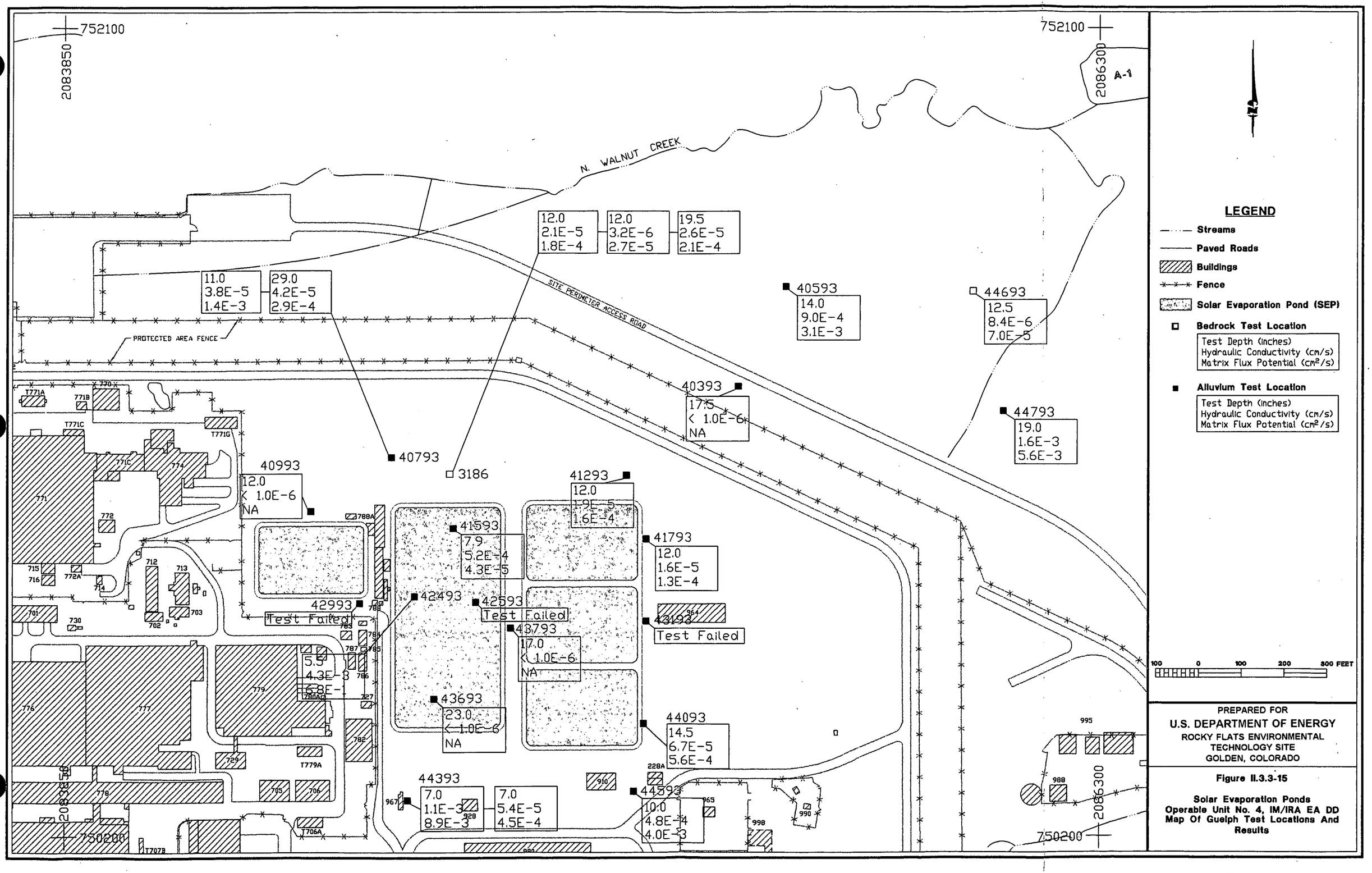
GOLDEN, COLORADO

Figure II.3.2-28

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Aroclor-1254


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
12.0
2.1E-5
1.8E-4
12.0
3.2E-6
2.7E-5
19.5
2.6E-5
2.1E-4
11.0
3.8E-5
1.4E-3
29.0
4.2E-5
2.9E-4
40593
14.0
9.0E-4
3.1E-3
44693
12.5
8.4E-6
7.0E-5
40393
17.5
< 1.0E-6
NA
44793
19.0
1.6E-3
5.6E-3
40793
3186
40993
12.0
< 1.0E-6
NA
41293
12.0
1.9E-5
1.6E-4
41593
7.9
5.2E-4
4.3E-5
41793
12.0
1.6E-5
1.3E-4
42993
Test Failed
42493
42593
Test Failed
43193
Test Failed
43793
17.0
< 1.0E-6
NA
5.5
4.3E-3
6.8E-1
43693
23.0
< 1.0E-6
NA
44093
14.5
6.7E-5
5.6E-4
44393
7.0
1.1E-3
8.9E-3
7.0
5.4E-5
4.5E-4
44593
10.0
4.8E-4
4.0E-3
2083300
750200
2086300
750200
LEGEND
Streams
Paved Roads
Buildings
Fence
Solar Evaporation Pond (SEP)
Bedrock Test Location
Test Depth (inches)
Hydraulic Conductivity (cm/s)
Matrix Flux Potential (cm²/s)
Alluvium Test Location
Test Depth (inches)
Hydraulic Conductivity (cm/s)
Matrix Flux Potential (cm²/s)
100 0 100 200 300 FEET
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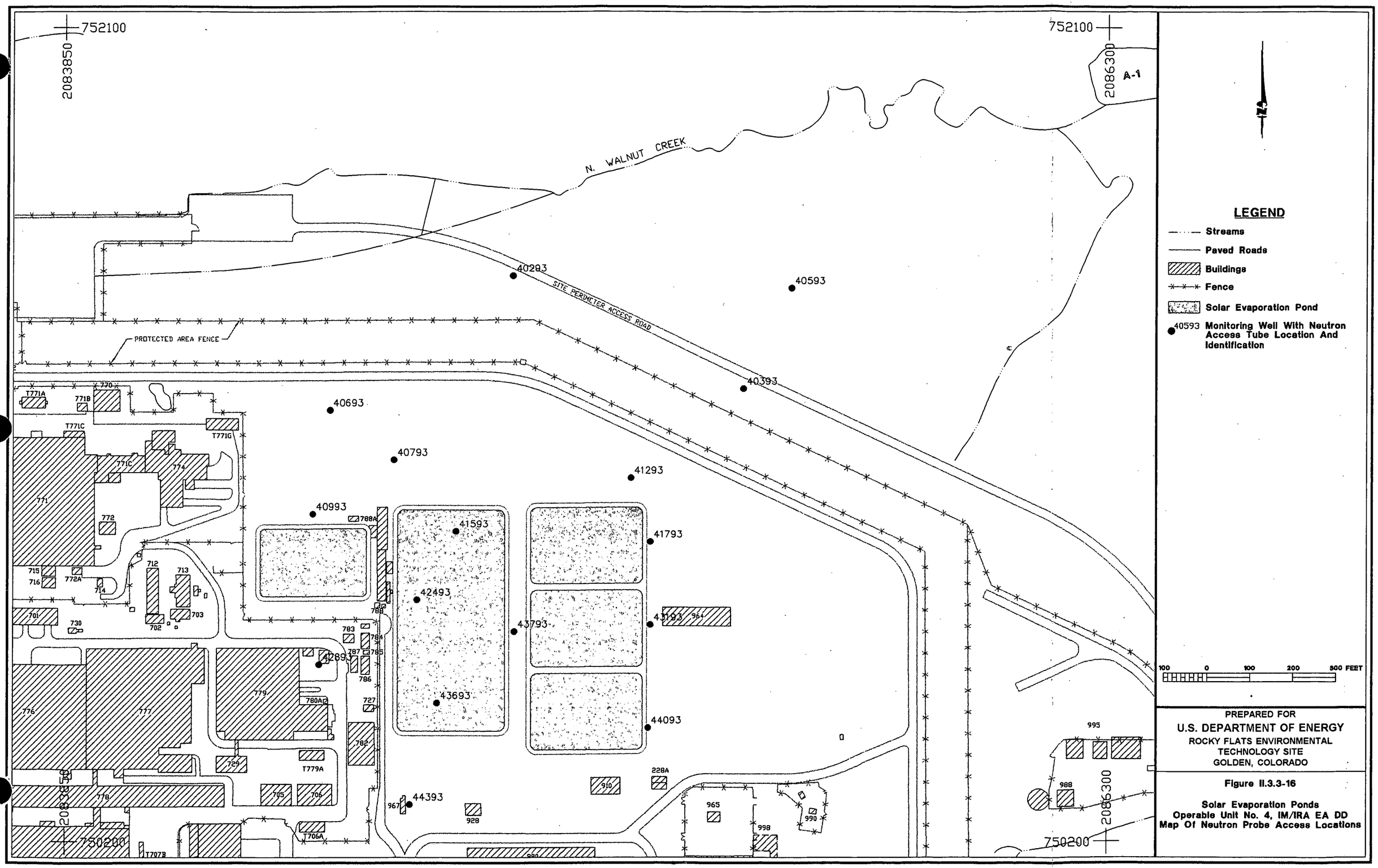
GOLDEN, COLORADO
Figure II.3.3-15
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Map Of Guelph Test Locations And Results



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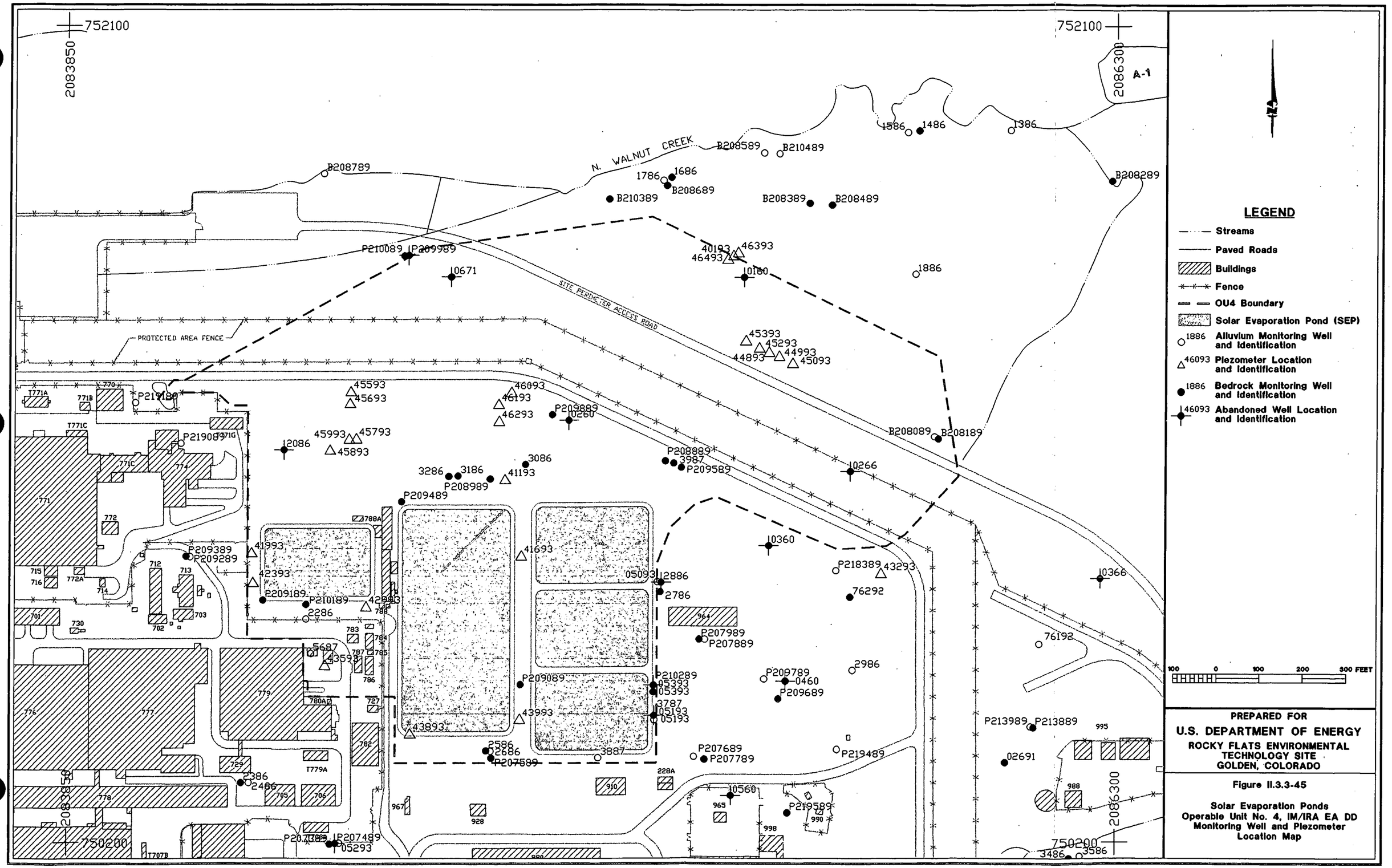
GOLDEN, COLORADO

Figure II.3.3-16

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Map Of Neutron Probe Access Locations



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- 1886 Alluvium Monitoring Well and Identification
- 46093 Piezometer Location and Identification
- 1886 Bedrock Monitoring Well and Identification
- 46093 Abandoned Well Location and Identification

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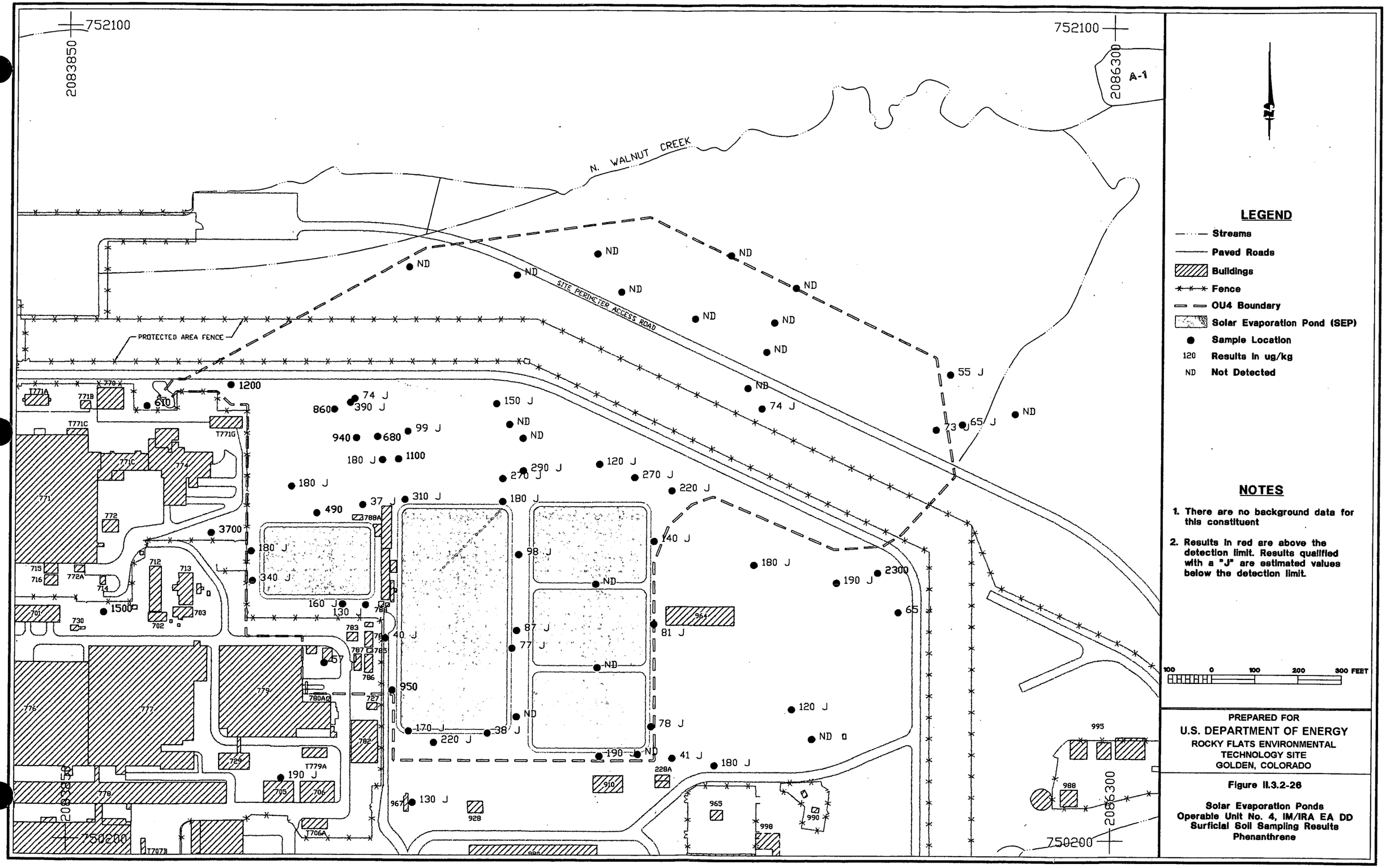
GOLDEN, COLORADO

Figure II.3.3-45

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Monitoring Well and Piezometer Location Map



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 120 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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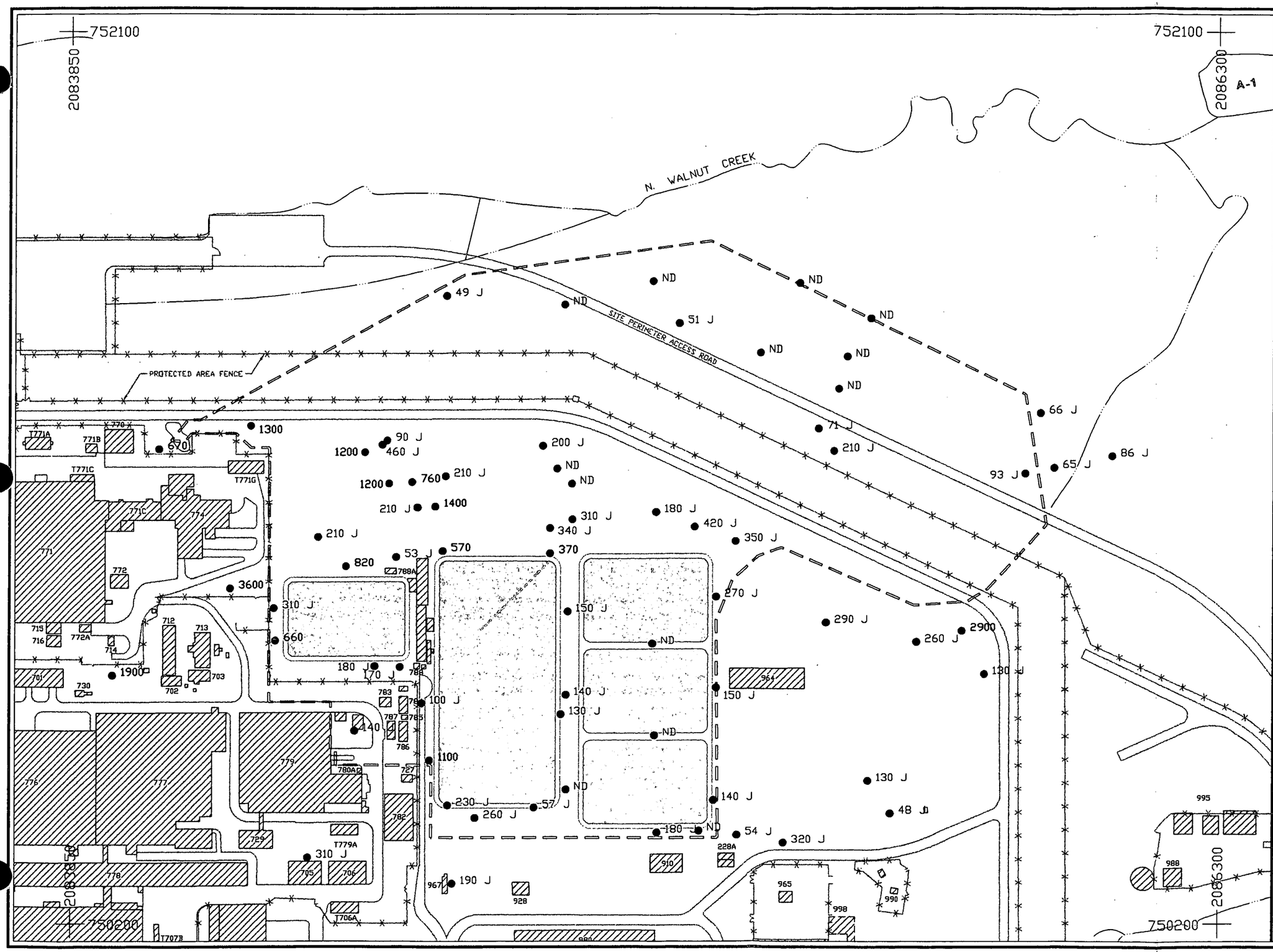
GOLDEN, COLORADO

Figure II.3.2-26

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Phenanthrene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 420 Results in ug/kg
- ND Not Detected

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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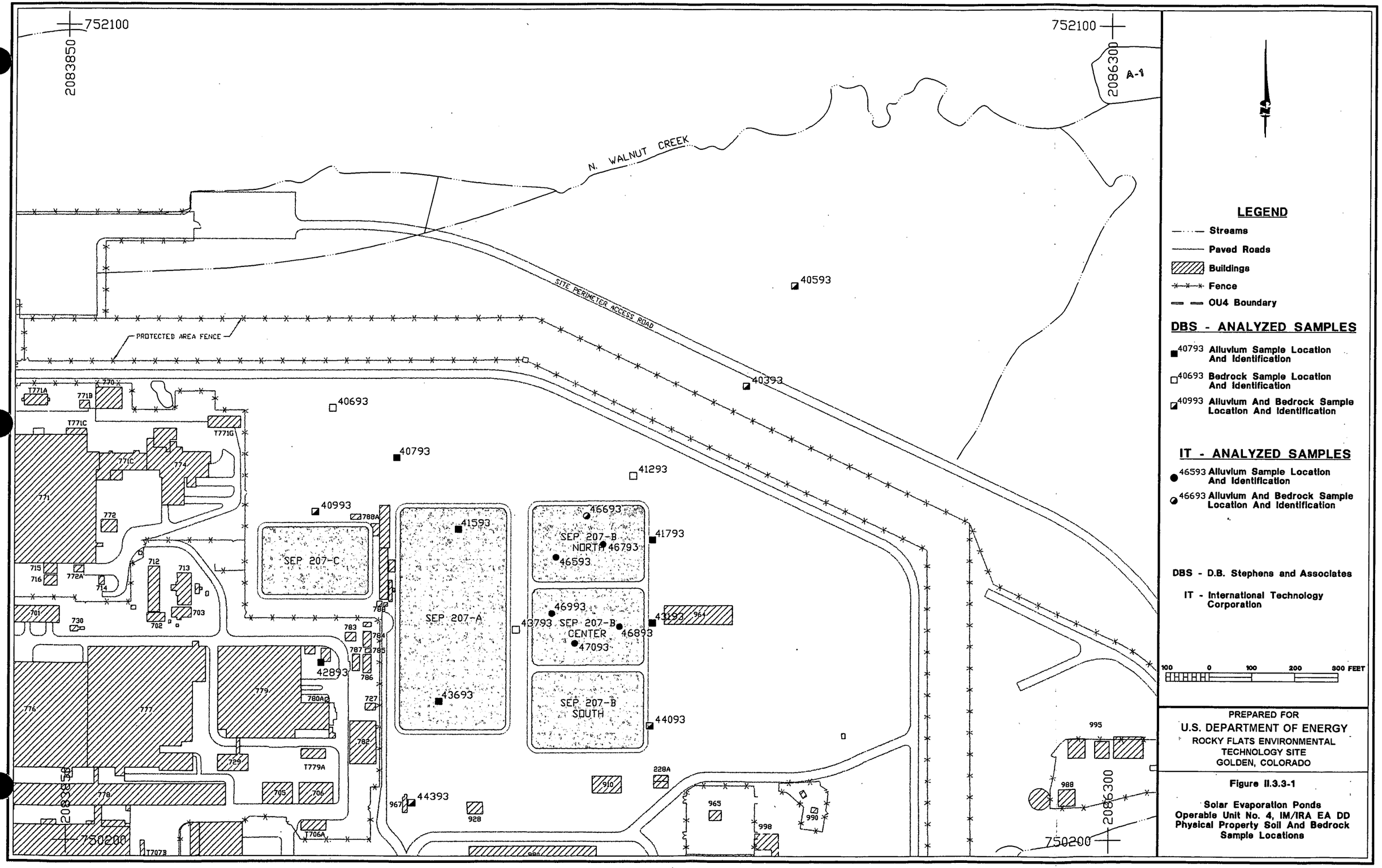
Figure II.3.2-27

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Soil Sampling Results
Pyrene



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary

DBS - ANALYZED SAMPLES

- 40793 Alluvium Sample Location And Identification
- 40693 Bedrock Sample Location And Identification
- 40993 Alluvium And Bedrock Sample Location And Identification

IT - ANALYZED SAMPLES

- 46593 Alluvium Sample Location And Identification
- 46693 Alluvium And Bedrock Sample Location And Identification

DBS - D.B. Stephens and Associates

IT - International Technology Corporation

100 0 100 200 300 FEET

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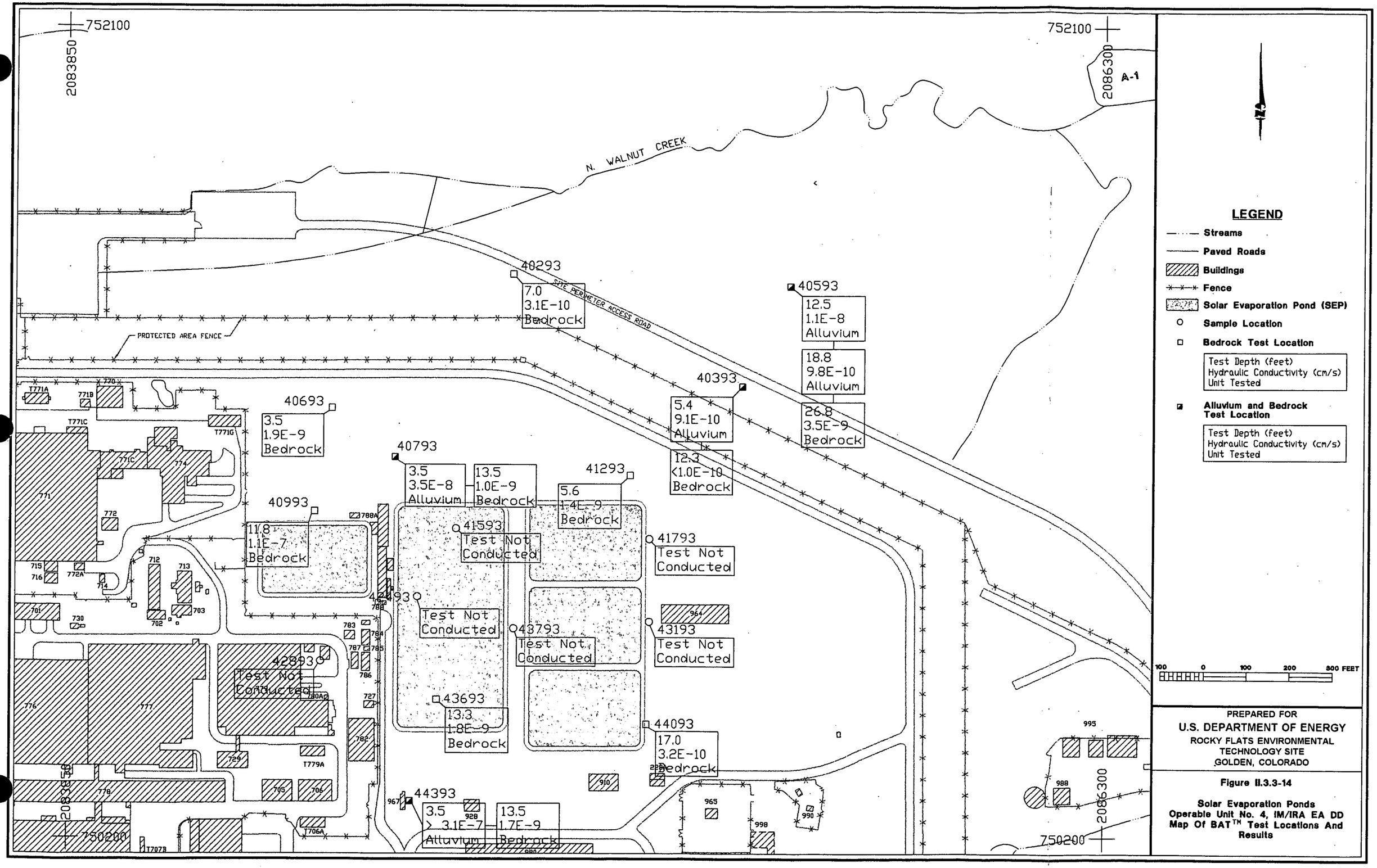
GOLDEN, COLORADO

Figure II.3.3-1

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Physical Property Soil And Bedrock Sample Locations



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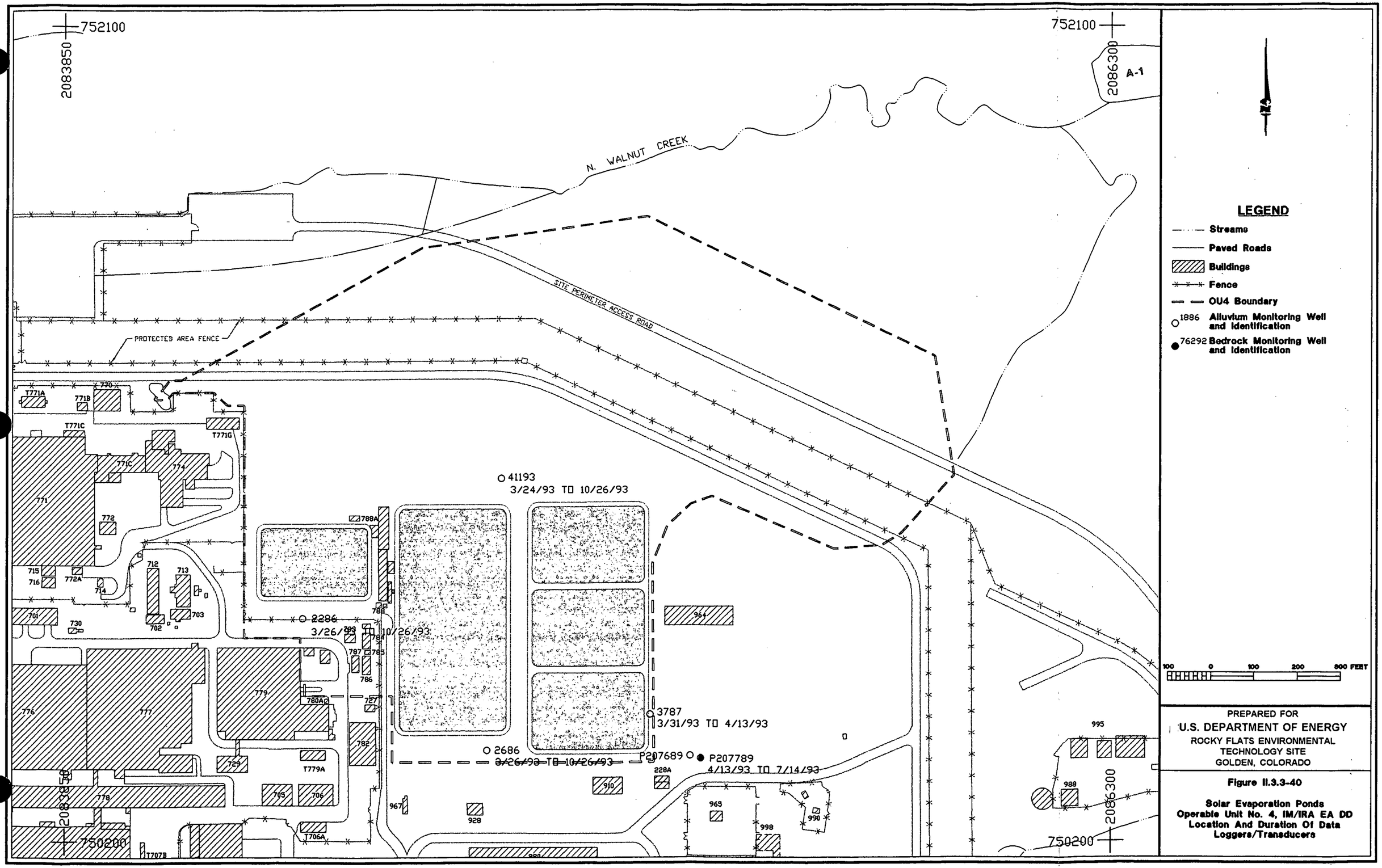
GOLDEN, COLORADO

Figure II.3.3-14

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Map Of BAT™ Test Locations And Results


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
T771A
771B
770
T771C
T771G
771C
774
771
772
715
716
772A
714
712
713
703
702
701
730
788A
788
O 41193
3/24/93 TO 10/26/93
O 2286
3/26/93 TO 10/26/93
293
784
787
785
786
779
780A
727
776
777
782
729
T779A
705
706
778
967
928
T706A
T707B
750200
2083850
964
O 3787
3/31/93 TO 4/13/93
O 2686
~~3/26/93 TO 10/26/93~~
P207689
P207789
4/13/93 TO 7/14/93
228A
910
965
998
990
995
988
2086300
750200
N
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
1886 Alluvium Monitoring Well and Identification
76292 Bedrock Monitoring Well and Identification
100 0 100 200 800 FEET
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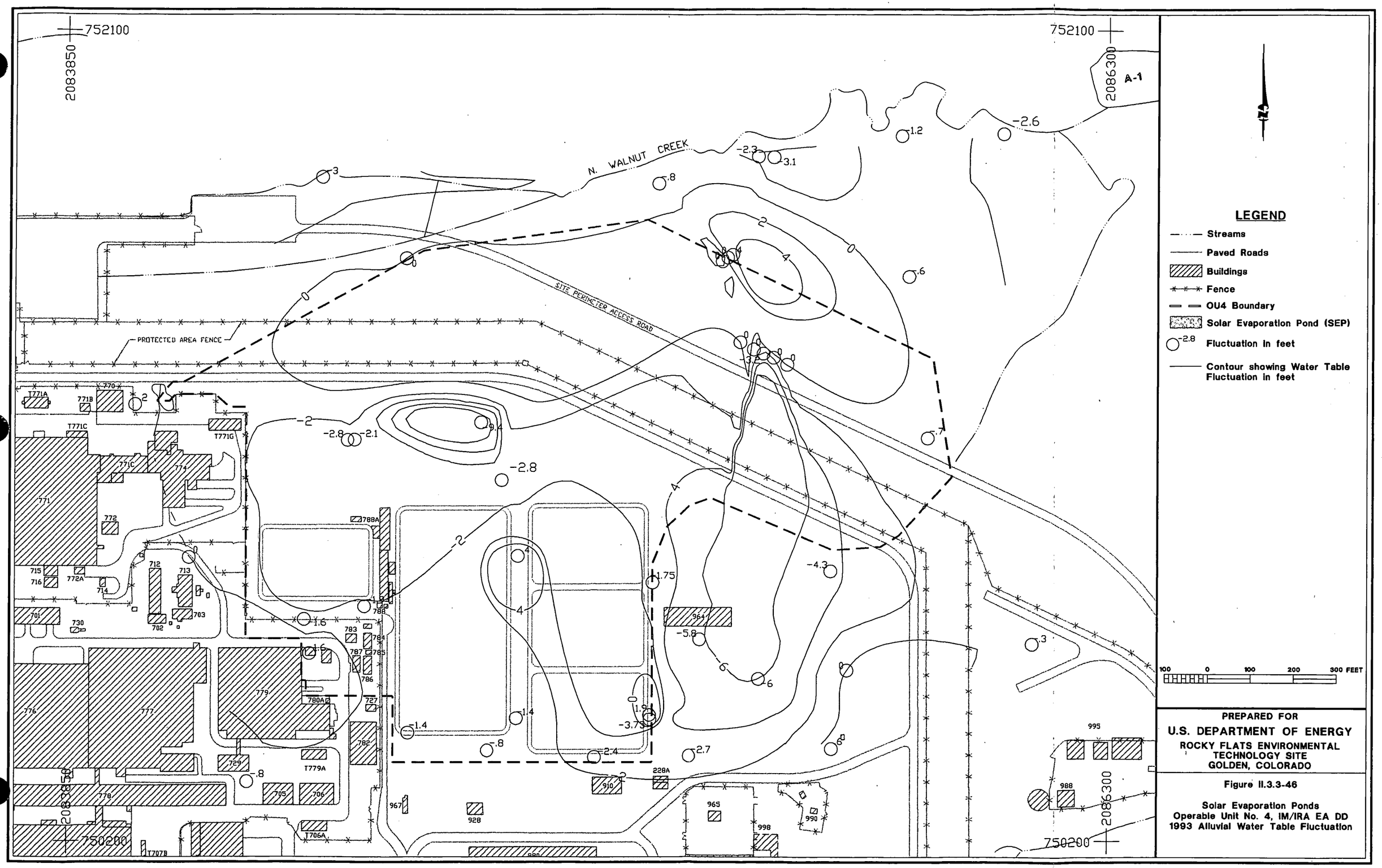
GOLDEN, COLORADO
Figure II.3.3-40
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Location And Duration Of Data Loggers/Transducers


752100
2083850
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
750200
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Fluctuation in feet
Contour showing Water Table Fluctuation in feet
100 0 100 200 300 FEET
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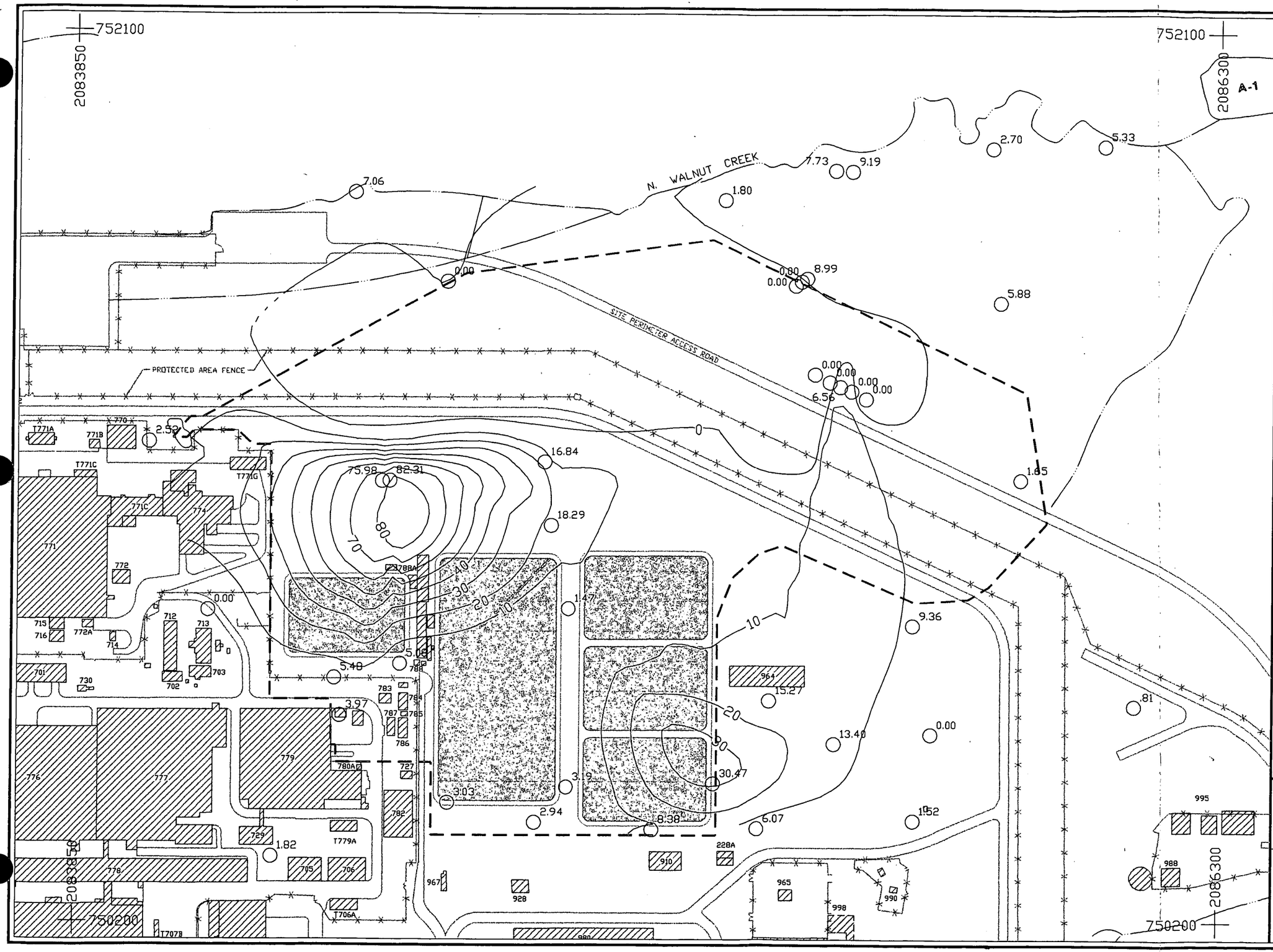
GOLDEN, COLORADO
Figure II.3.3-46
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
1993 Alluvial Water Table Fluctuation



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- 1.65 Relative Hydraulic Conductivity at Alluvial Monitoring Well
- Contour showing Relative Hydraulic Conductivity in cm/sec

NOTES

1. Relative hydraulic conductivity is calculated by dividing the approximate difference between the 1993 maximum and the minimum ground water levels by the length of time between them
2. Units = 10^{-6} cm/sec

100 0 100 200 300 FEET

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GOLDEN, COLORADO

Figure II.3.3-47

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Alluvial Relative Hydraulic Conductivity

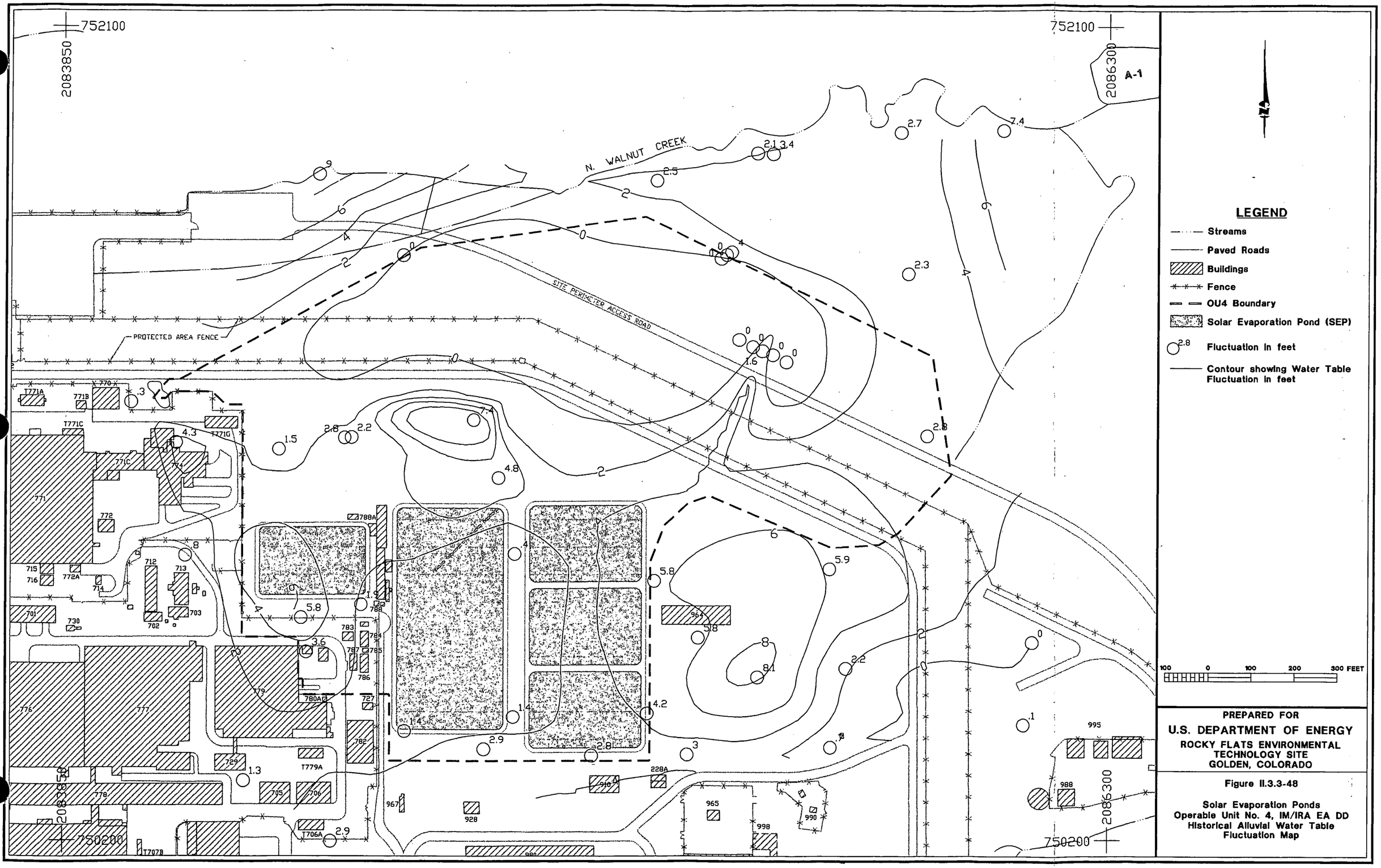
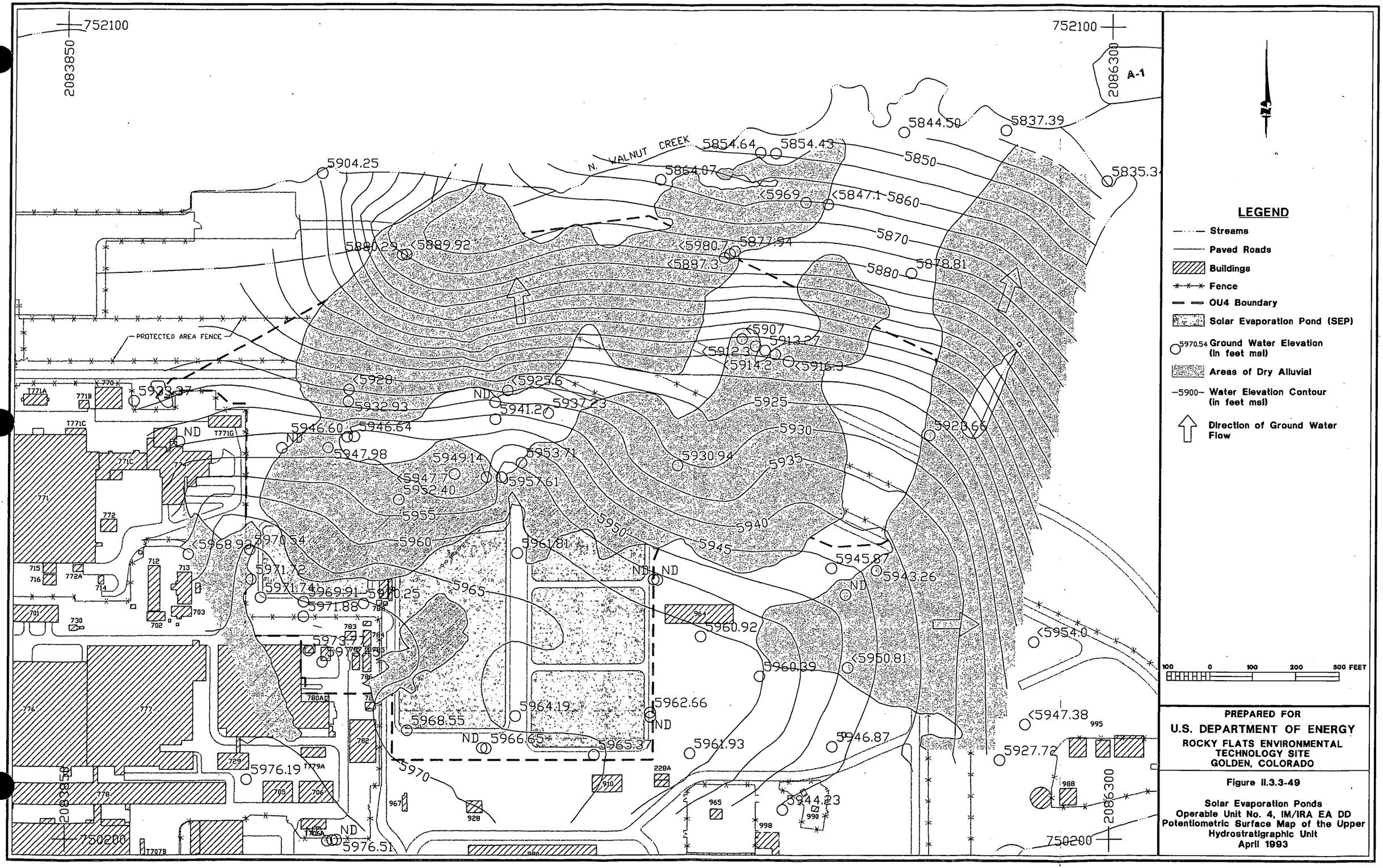


Figure II.3.3-48

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Historical Alluvial Water Table Fluctuation Map



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- 5970.54 Ground Water Elevation (in feet msl)
- Areas of Dry Alluvial
- 5900 Water Elevation Contour (in feet msl)
- Direction of Ground Water Flow

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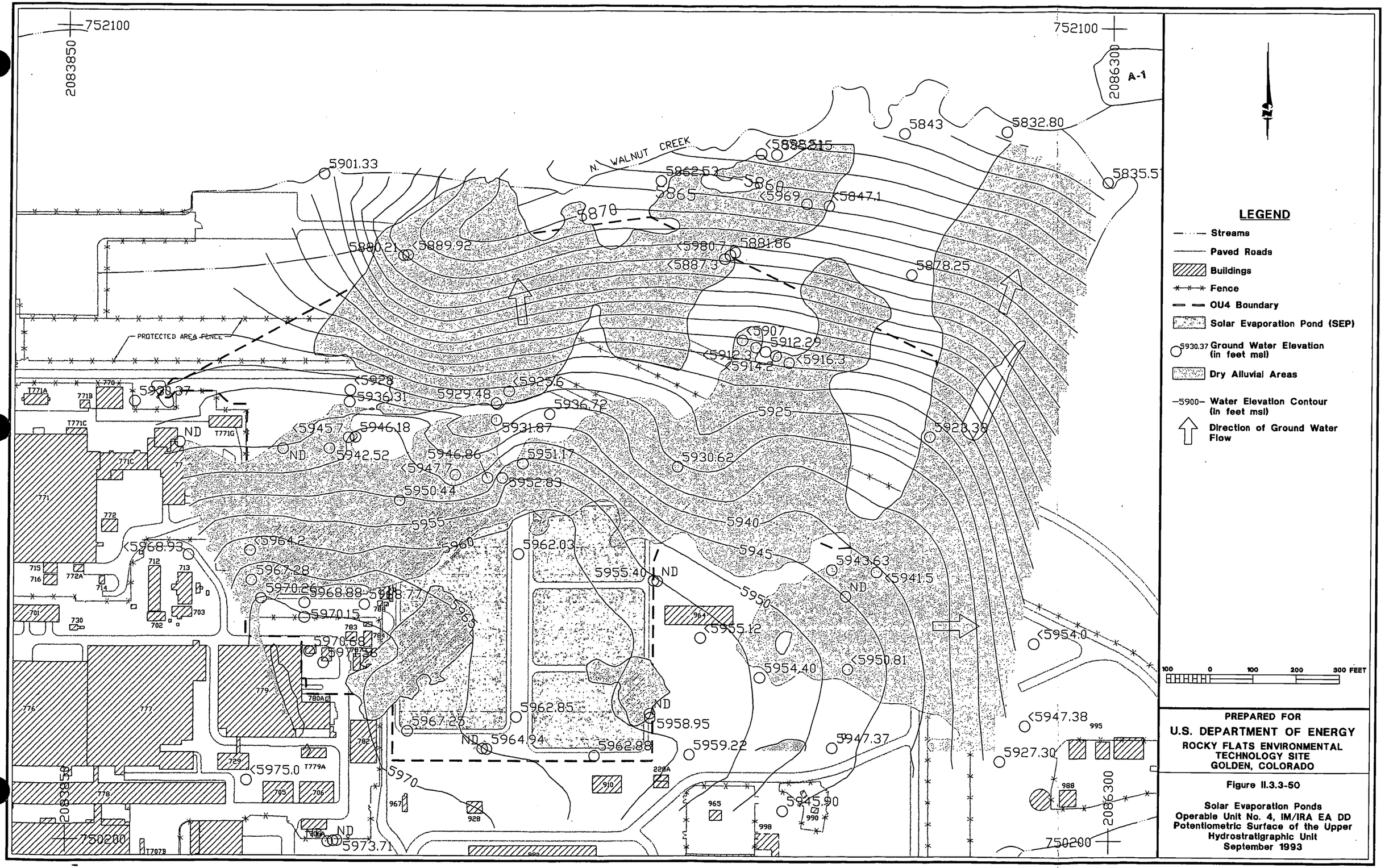
GOLDEN, COLORADO

Figure II.3.3-49

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Potentiometric Surface Map of the Upper Hydrostratigraphic Unit
April 1993



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- 5930.37 Ground Water Elevation (in feet msl)
- Dry Alluvial Areas
- –5900– Water Elevation Contour (in feet msl)
- Direction of Ground Water Flow

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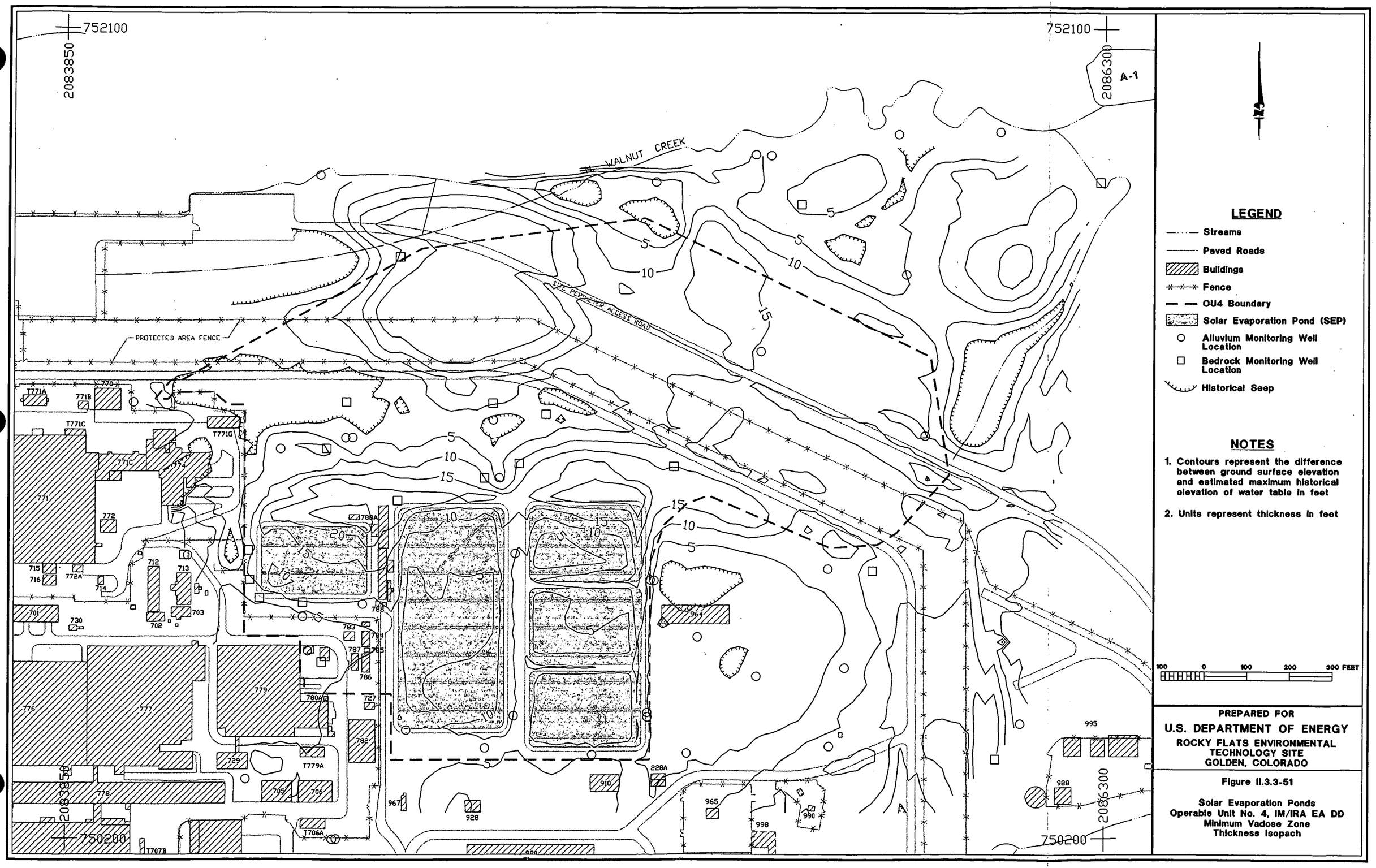
GOLDEN, COLORADO

Figure II.3.3-50

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Potentiometric Surface of the Upper Hydrostratigraphic Unit
September 1993



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GOLDEN, COLORADO

Figure II.3.3-51

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Minimum Vadose Zone
Thickness Isopach

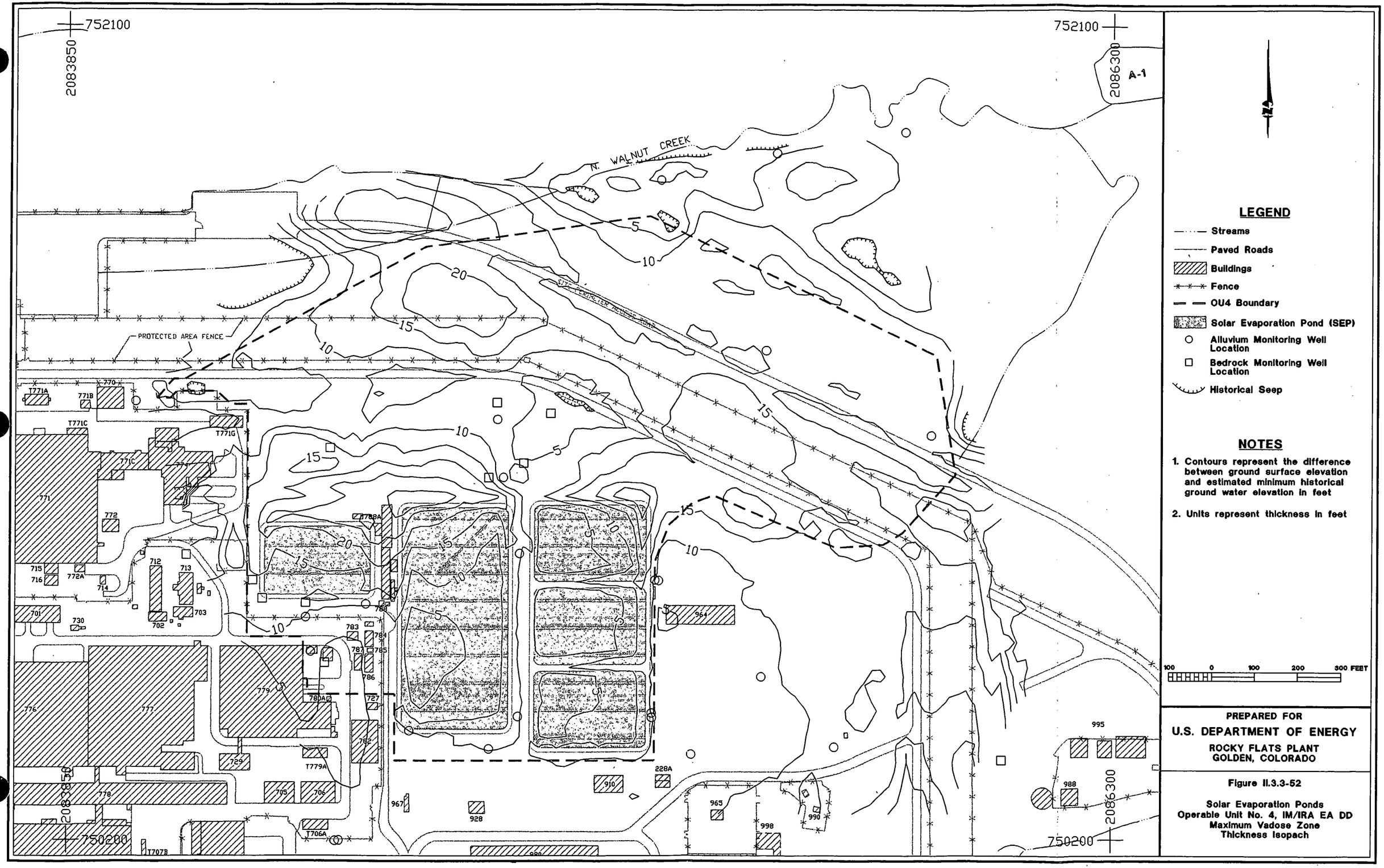
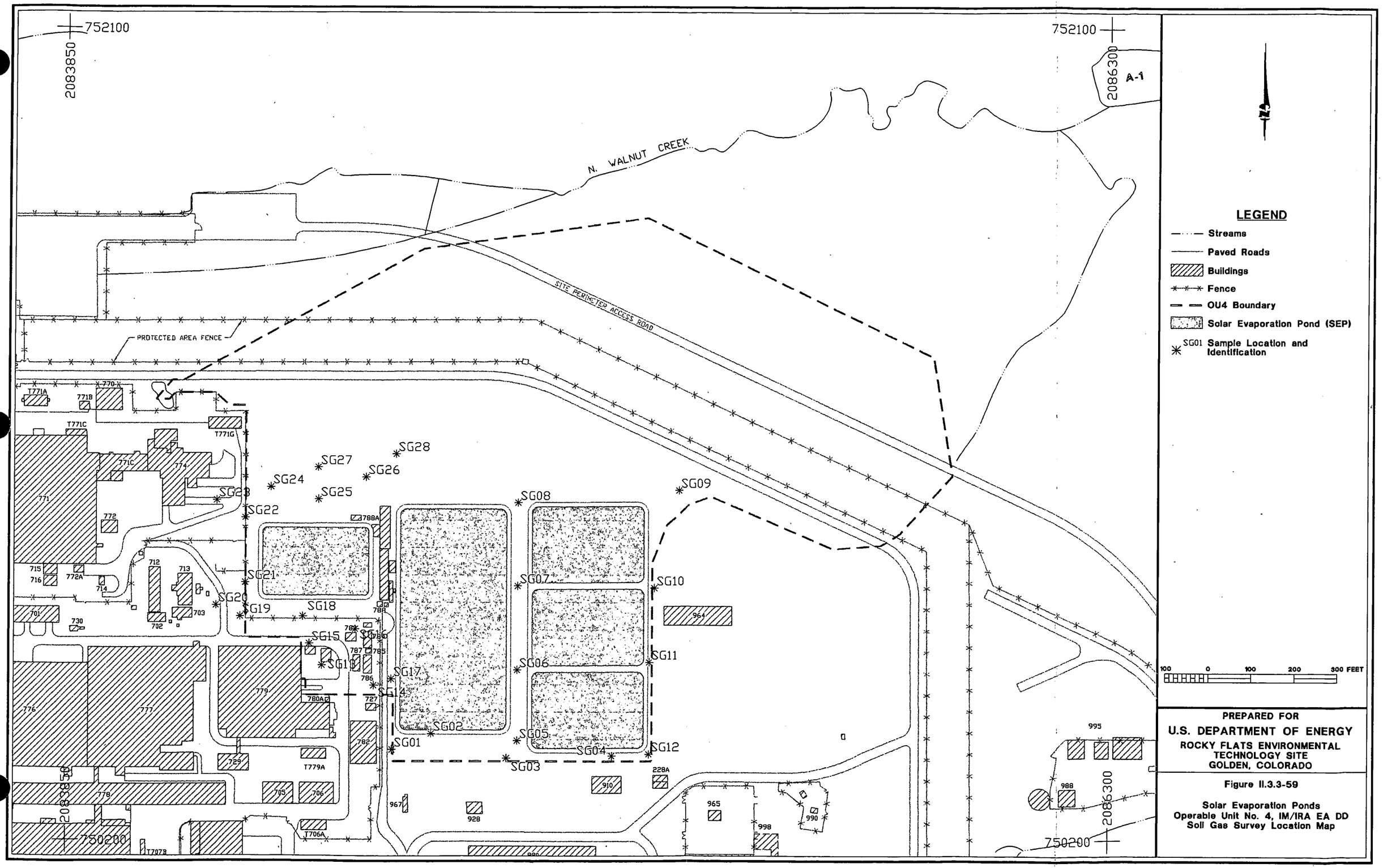


Figure II.3.3-52

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Maximum Vadose Zone
Thickness Isopach


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
T771A
771B
770
T771C
T771G
771C
774
771
772
SG28
SG27
SG26
SG24
SG25
SG23
SG22
SG21
SG20
SG19
SG18
SG15
SG16
SG13
SG17
SG14
SG08
SG09
SG07
SG10
SG06
SG11
SG02
SG01
SG05
SG04
SG12
SG03
788A
788
964
715
716
772A
714
712
713
703
702
701
730
787
785
786
779
780A
776
777
727
782
729
T779A
705
706
778
967
928
910
228A
965
998
990
995
988
T706A
T707B
750200
2083850
750200
2086300
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
SG01 Sample Location and Identification
100 0 100 200 300 FEET
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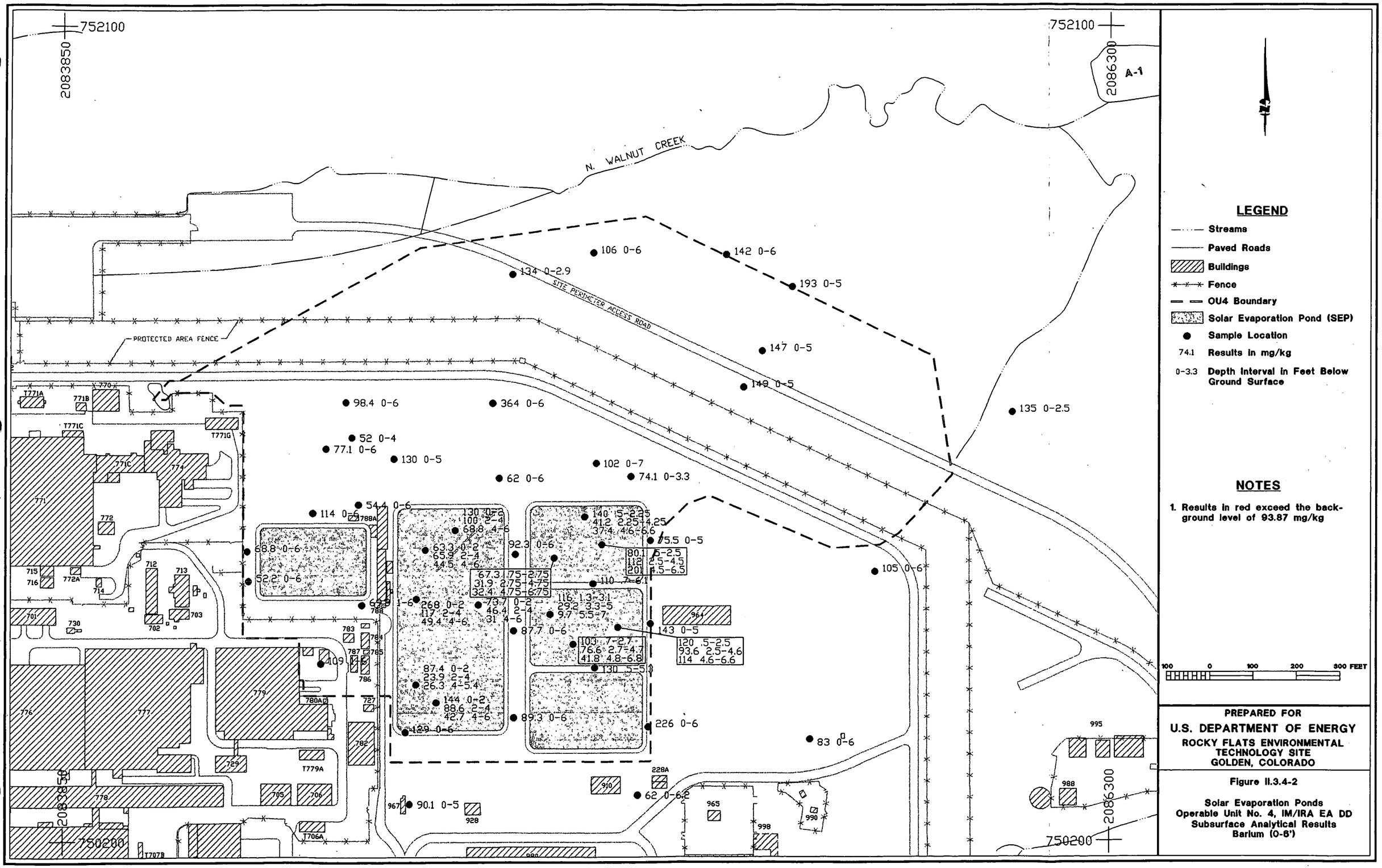
GOLDEN, COLORADO
Figure II.3.3-59
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Soil Gas Survey Location Map



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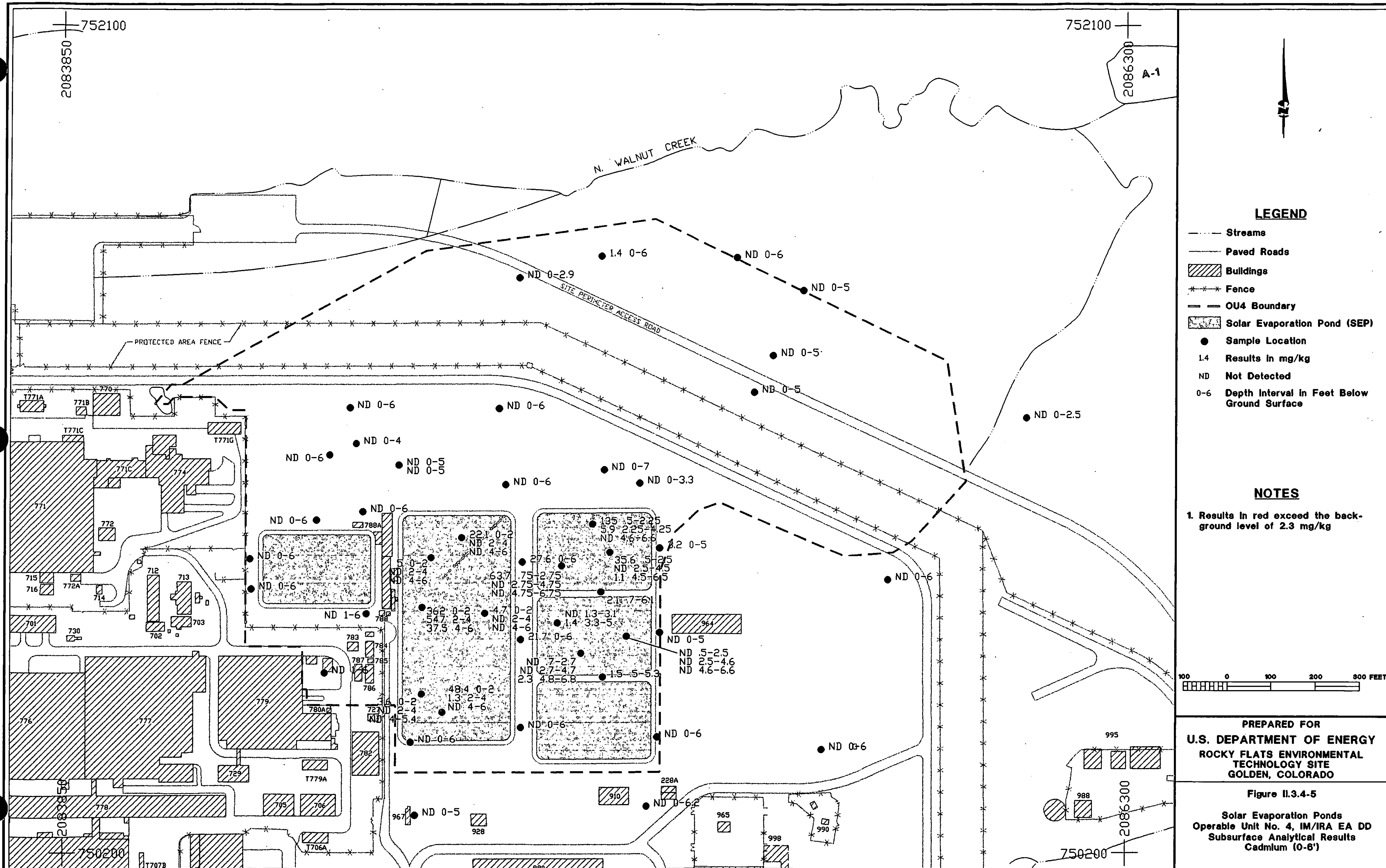
GOLDEN, COLORADO

Figure II.3.4-2

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Barium (0-6')



N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
1.4 Results in mg/kg
ND Not Detected
0-6 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 2.3 mg/kg
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GOLDEN, COLORADO
Figure II.3.4-5
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cadmium (0-6')

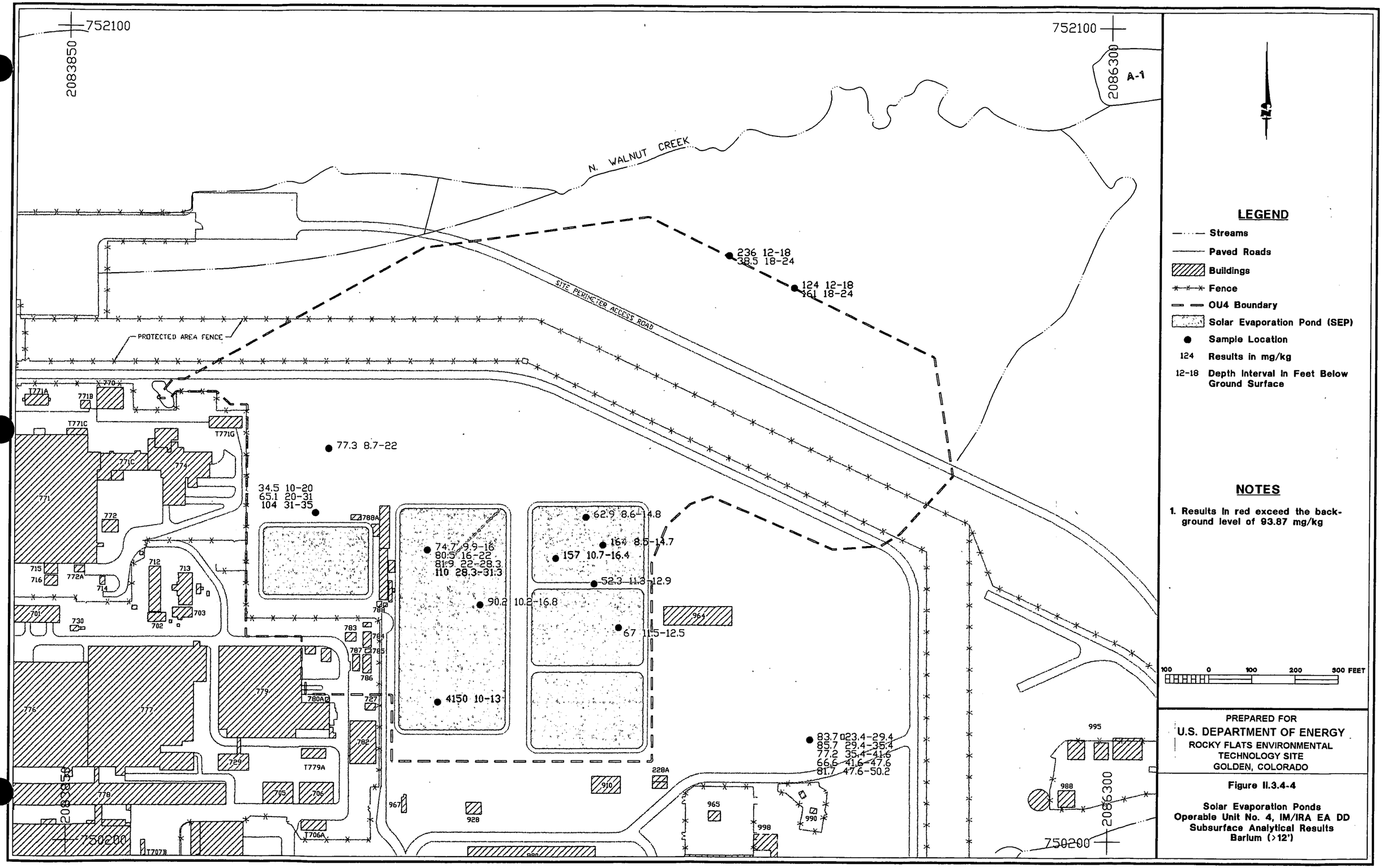
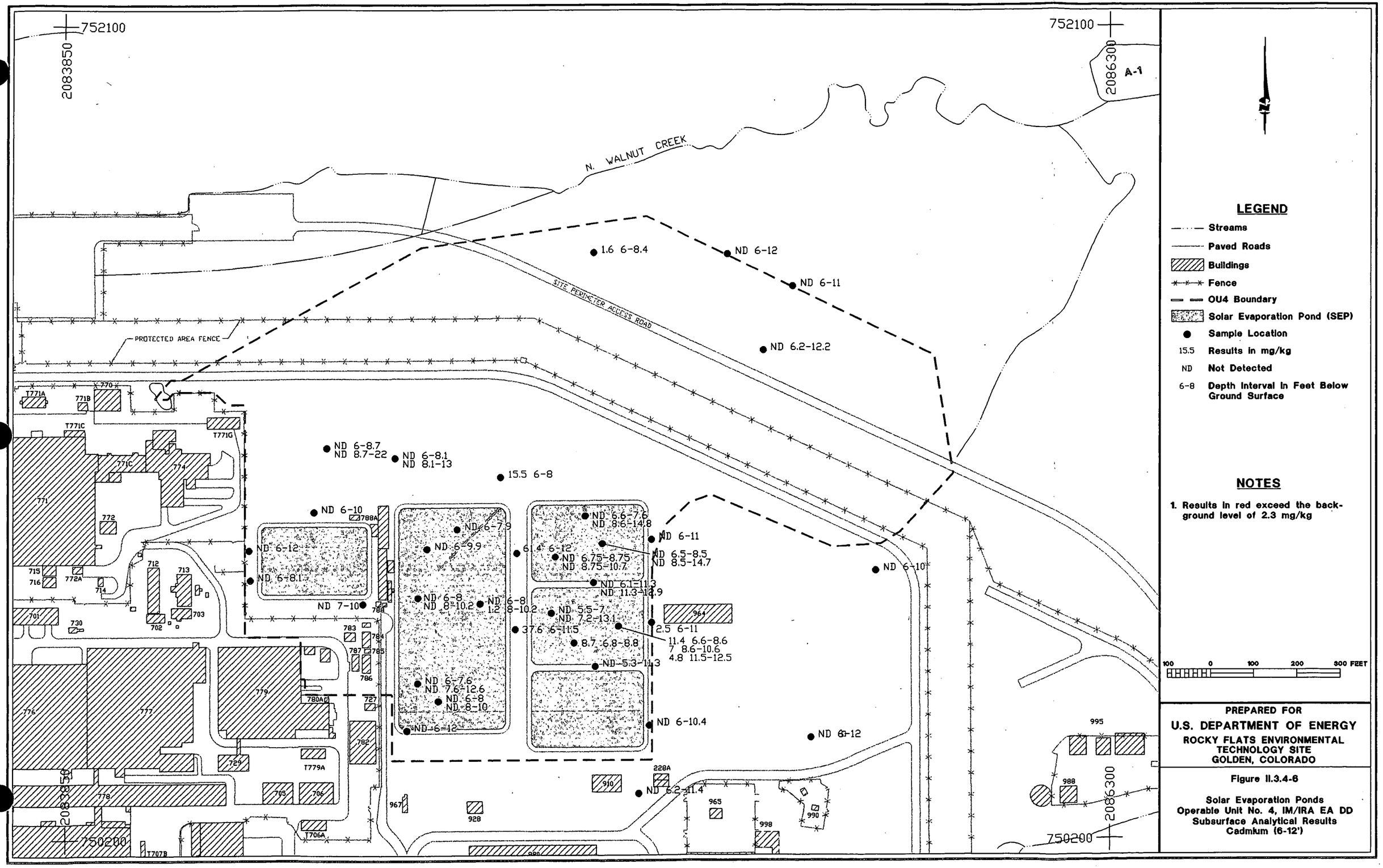


Figure II.3.4-4

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Barium (>12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 15.5 Results in mg/kg
- ND Not Detected
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 2.3 mg/kg

100 0 100 200 300 FEET

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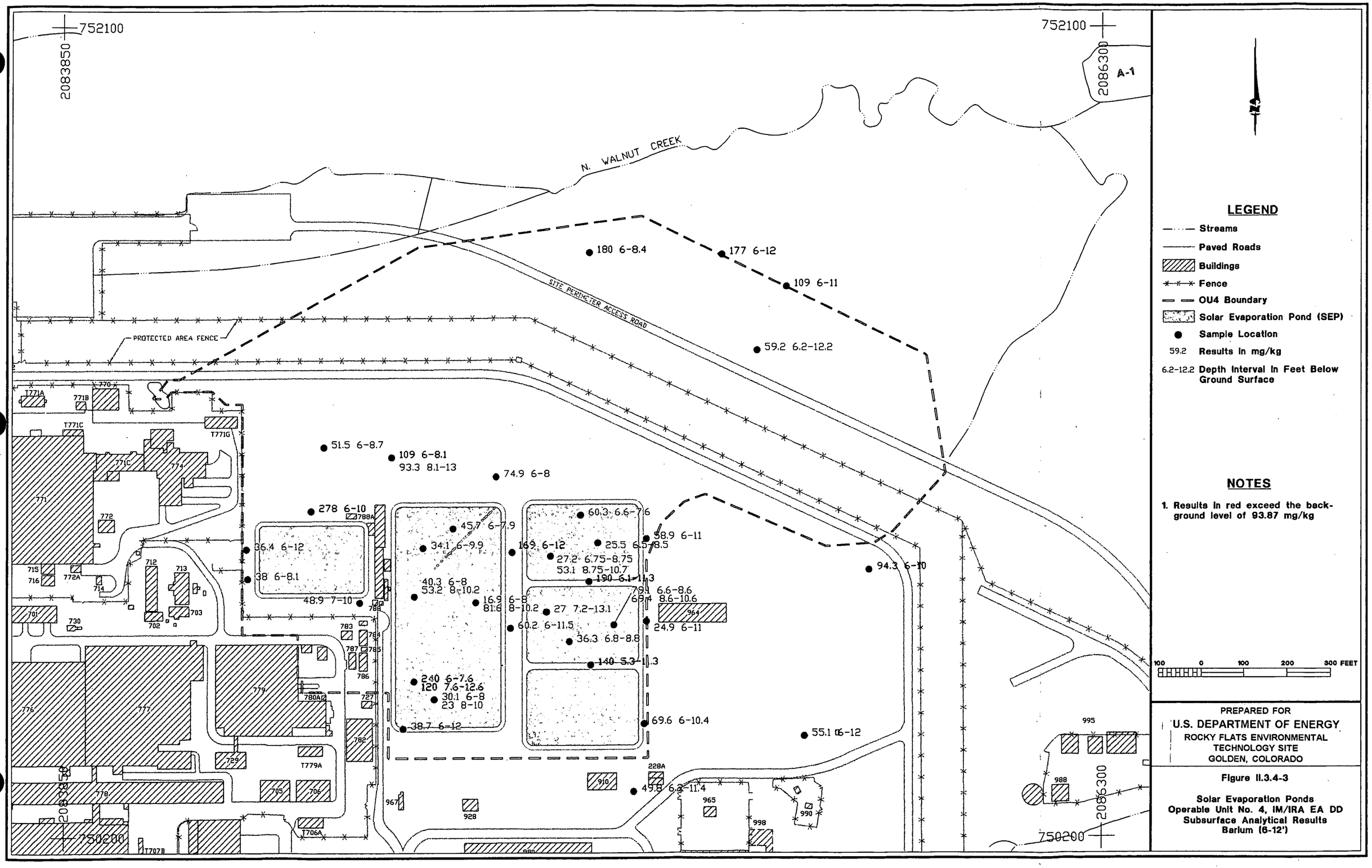
GOLDEN, COLORADO

Figure II.3.4-6

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cadmium (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 59.2 Results in mg/kg
- 6.2-12.2 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 93.87 mg/kg

100 0 100 200 300 FEET

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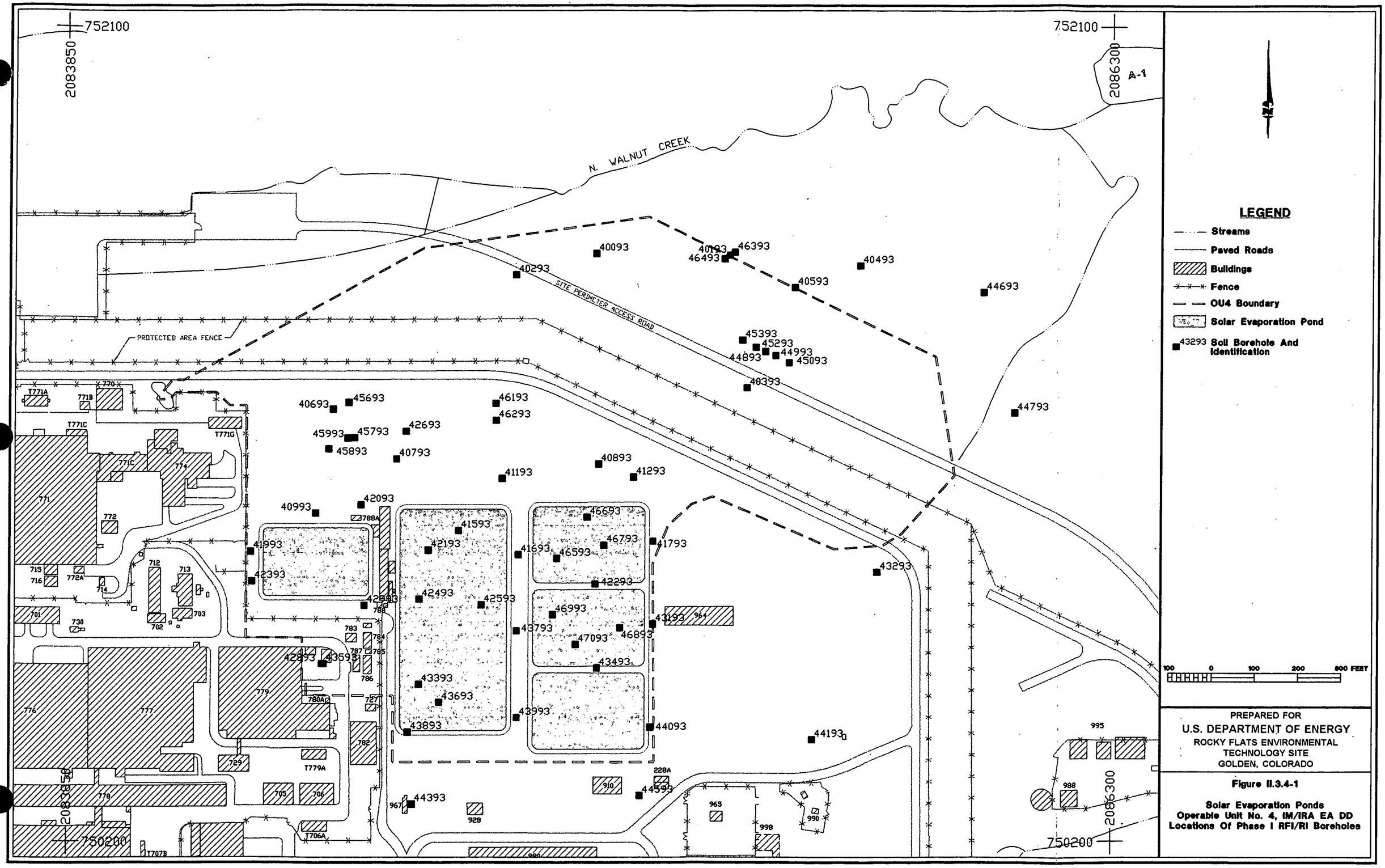
GOLDEN, COLORADO

Figure II.3.4-3

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Barium (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond
- 43293 Soil Borehole And Identification

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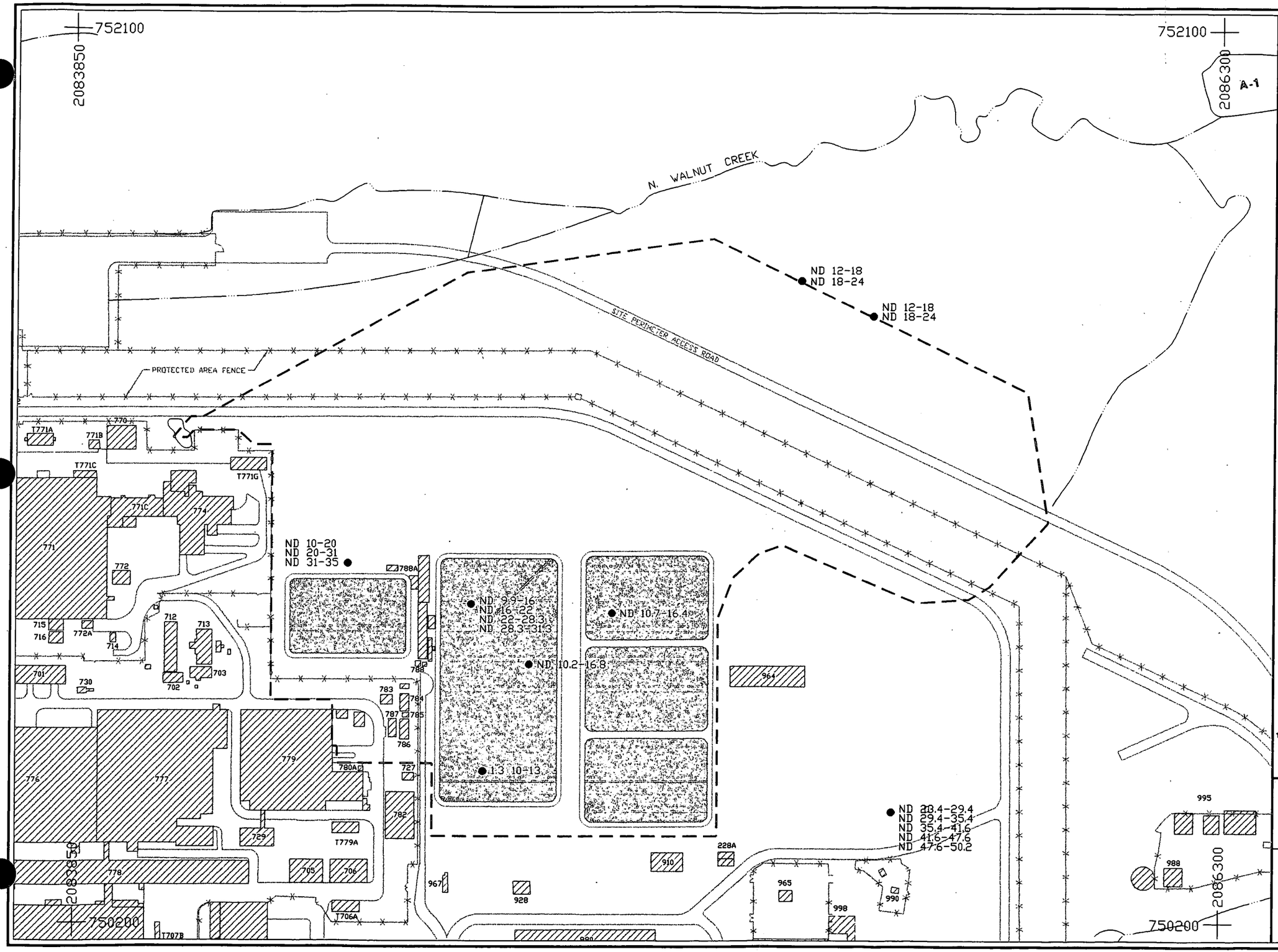
Figure II.3.4-1

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Locations Of Phase I RFI/RI Boreholes



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 1.2 Results in mg/kg
- ND Not Detected
- 18-24 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 2.3 mg/kg

100 0 100 200 300 FEET

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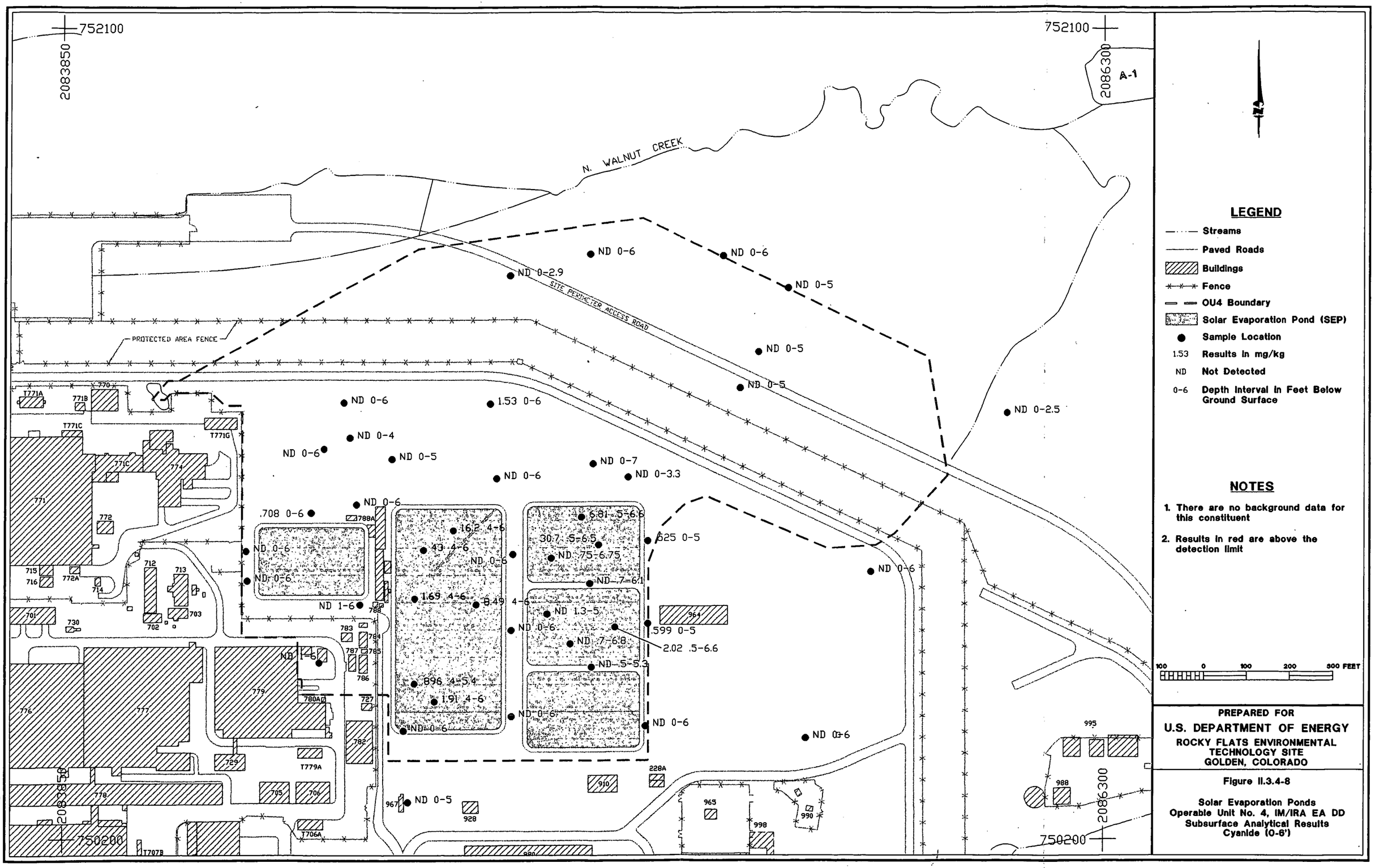
Figure II.3.4-7

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cadmium (>12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 1.53 Results in mg/kg
- ND Not Detected
- 0-6 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit

100 0 100 200 300 FEET

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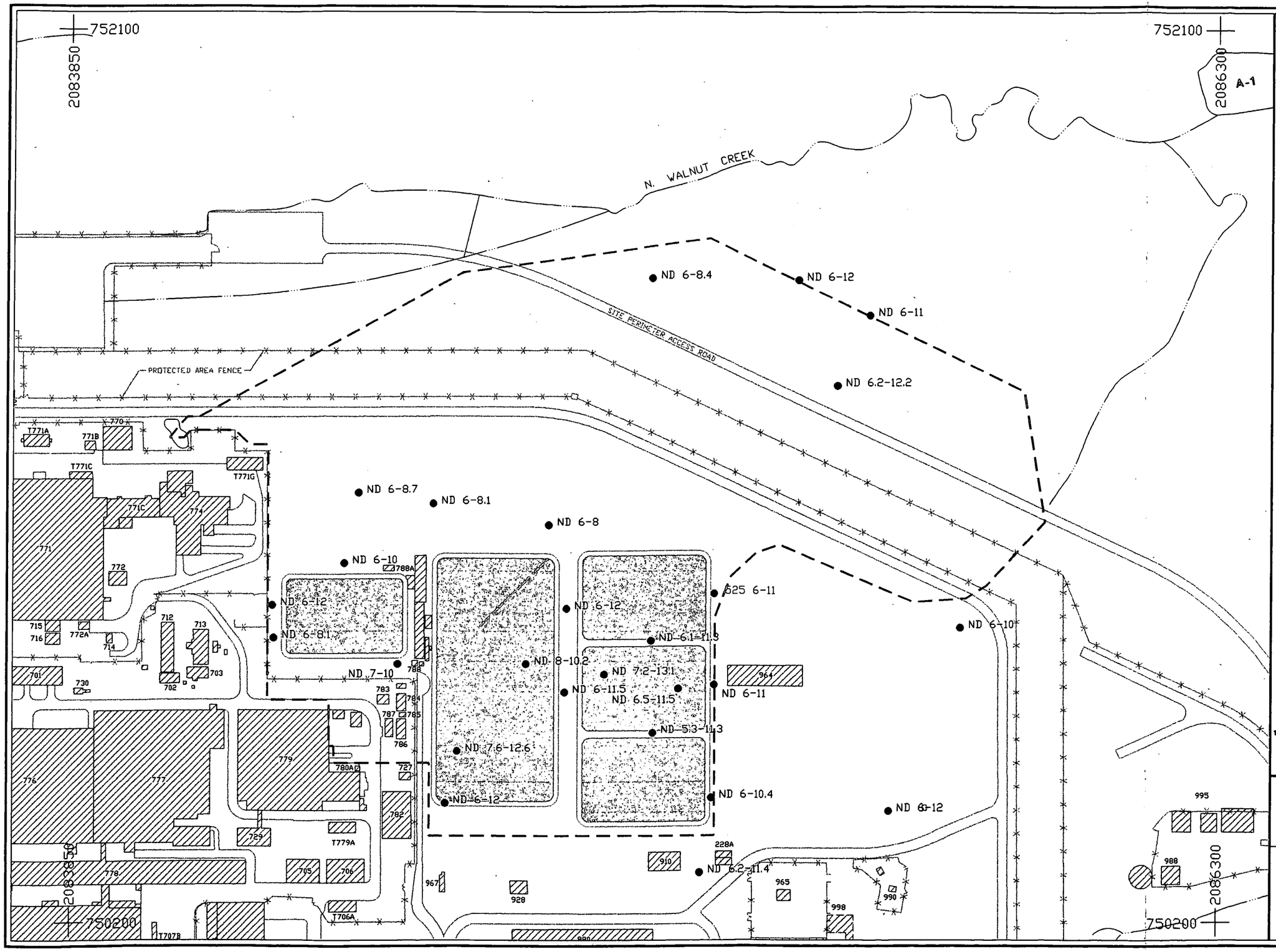
Figure II.3.4-8

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cyanide (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .525 Results in mg/kg
- ND Not Detected
- 6-11 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit

100 0 100 200 300 FEET

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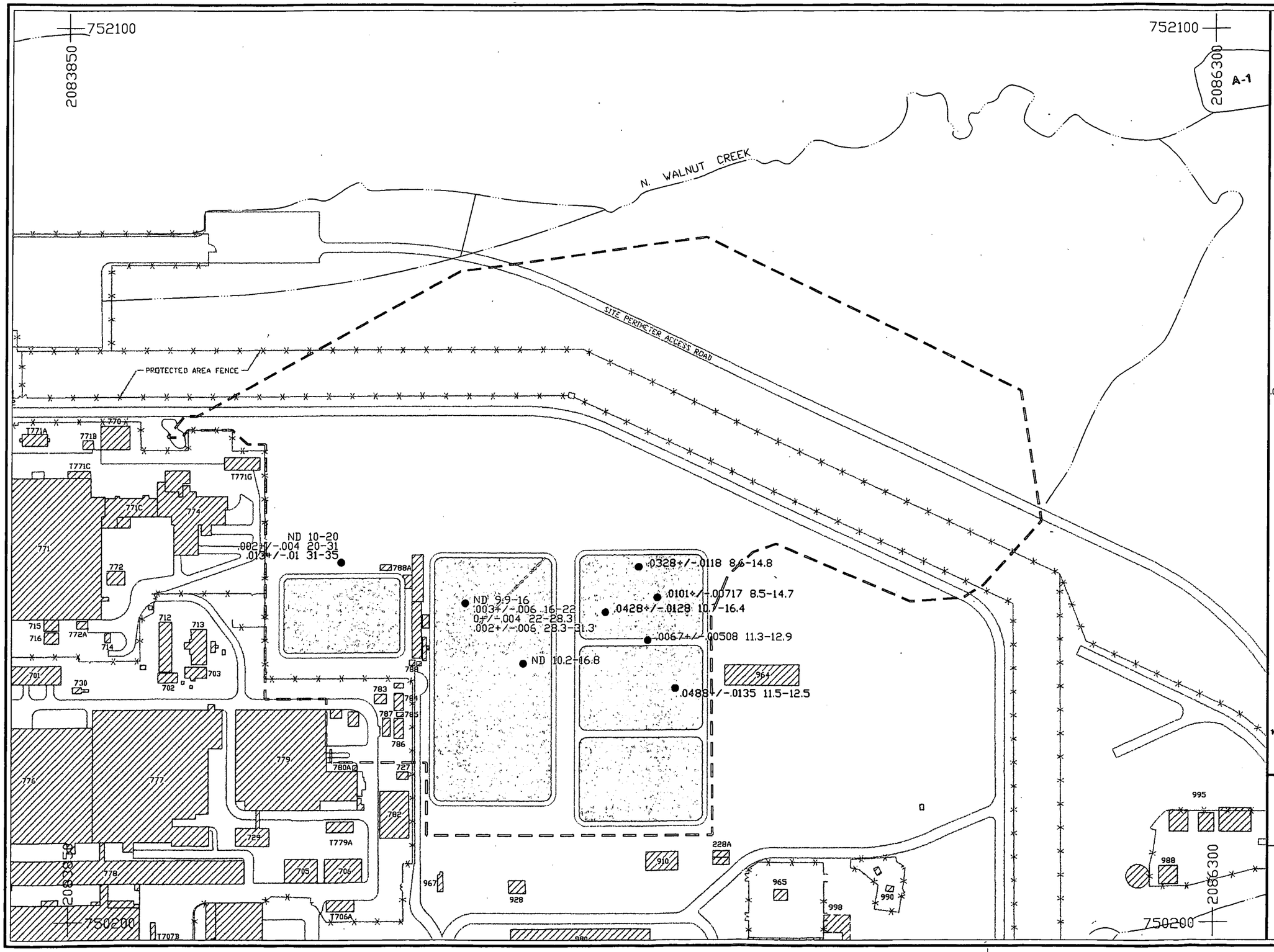
Figure II.3.4-9

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cyanide (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .003+/-.006 Result and Counting Error in pCi/g
- ND Not Detected
- 16-22 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.01 pCi/g

100 0 100 200 300 FEET

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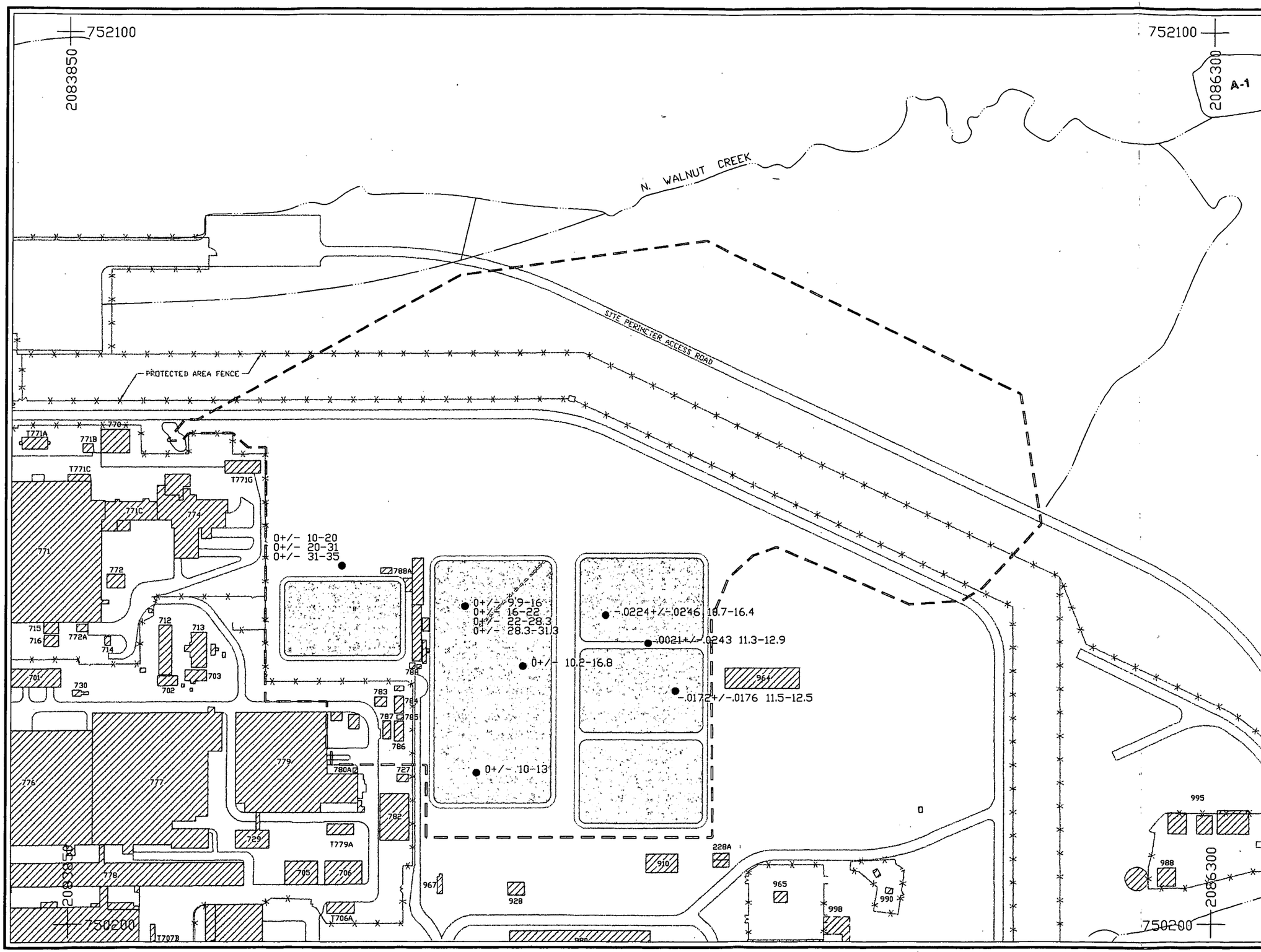
Figure II.3.4-21

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Americium 241 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .0021+/-.0246 Result and Counting Error in pCi/g
- ND Not Detected
- 11.3-12.9 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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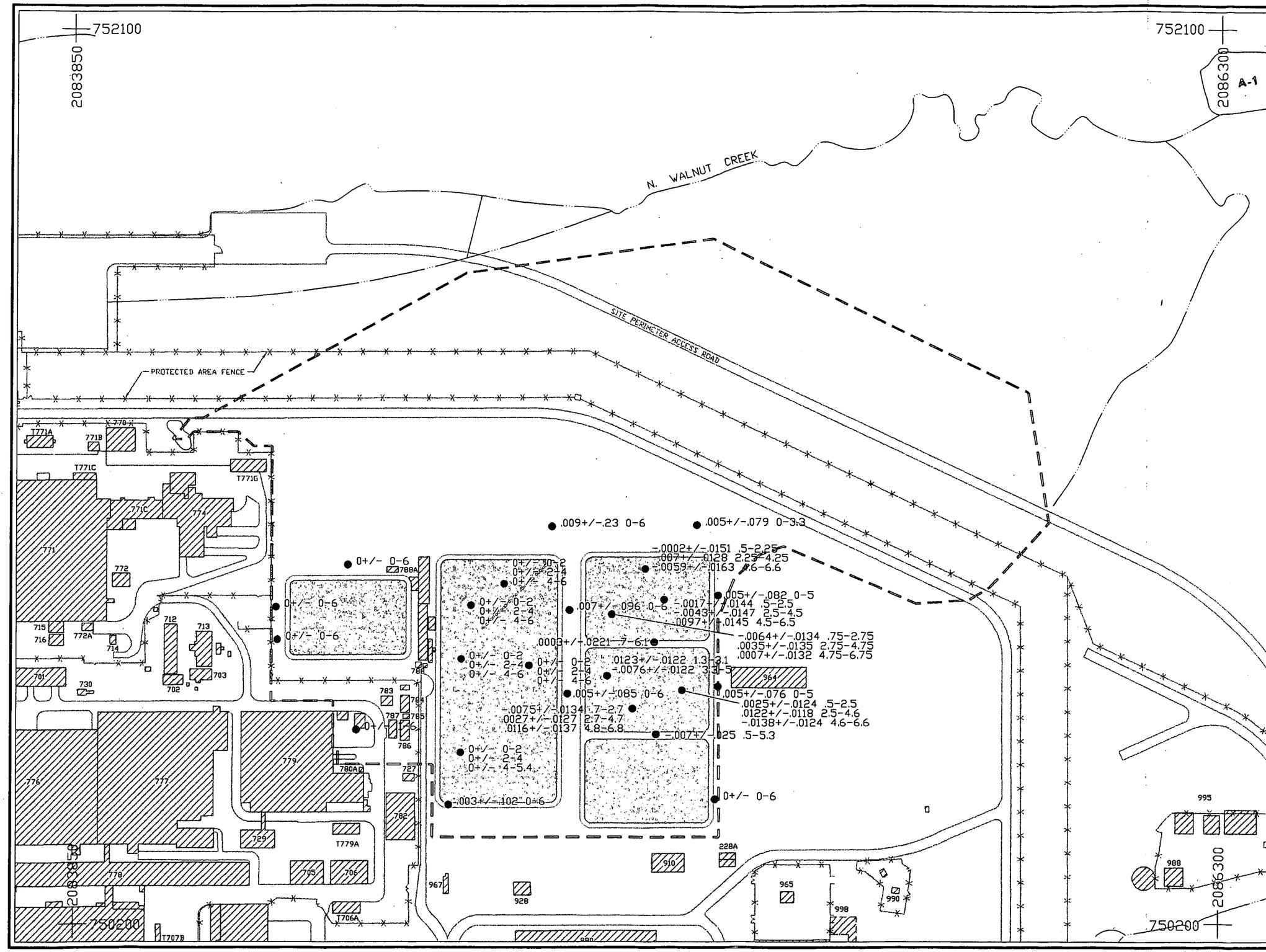
Figure II.3.4-24

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cesium-134 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .009+/-.23 Result and Counting Error in pCi/g pCi/l
- ND Not Detected
- 0-6 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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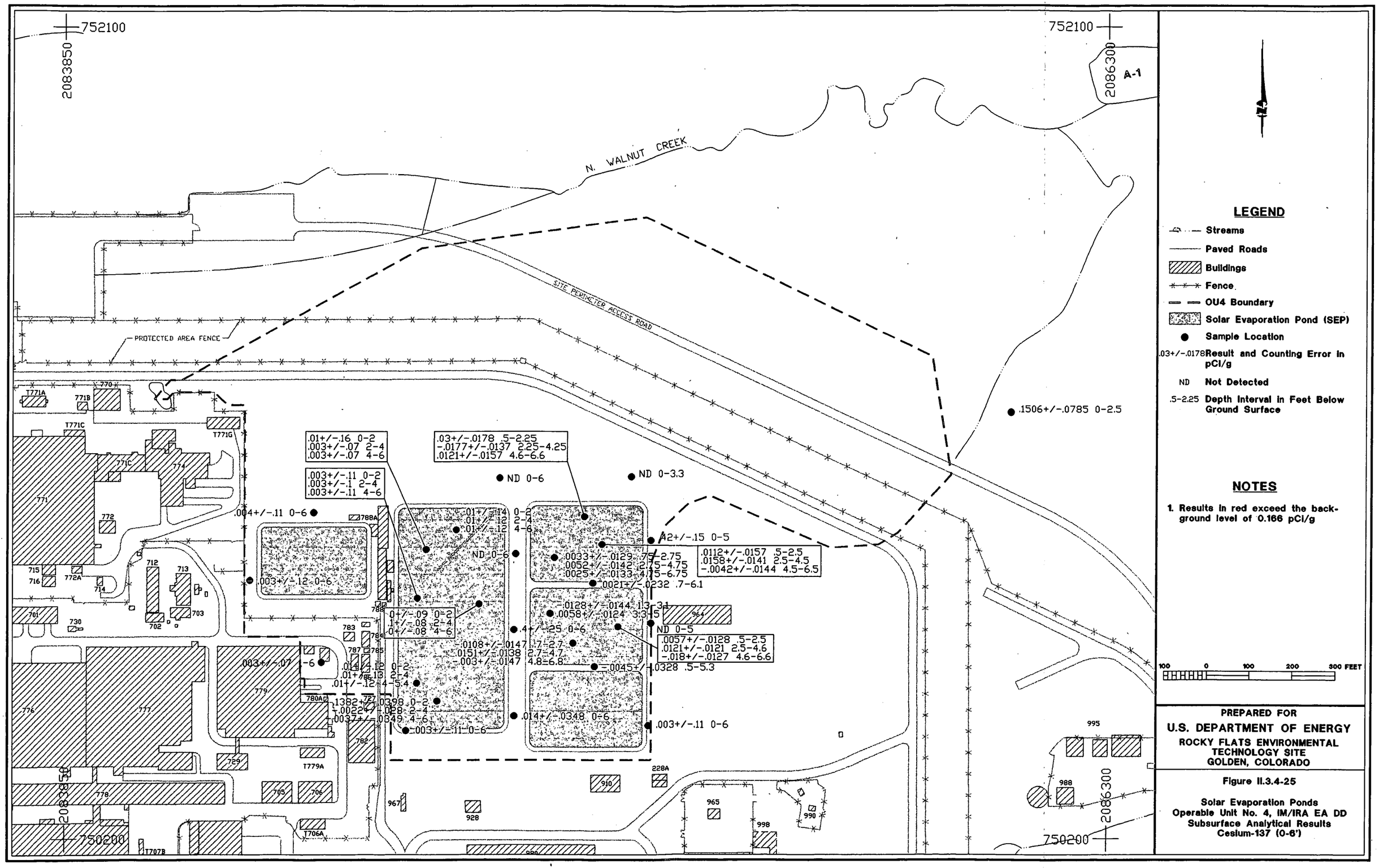
Figure II.3.4-22

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Subsurface Analytical Results Cesium-134 (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .03+/-.0178 Result and Counting Error in pCi/g
- ND Not Detected
- .5-2.25 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.166 pCi/g

100 0 100 200 300 FEET

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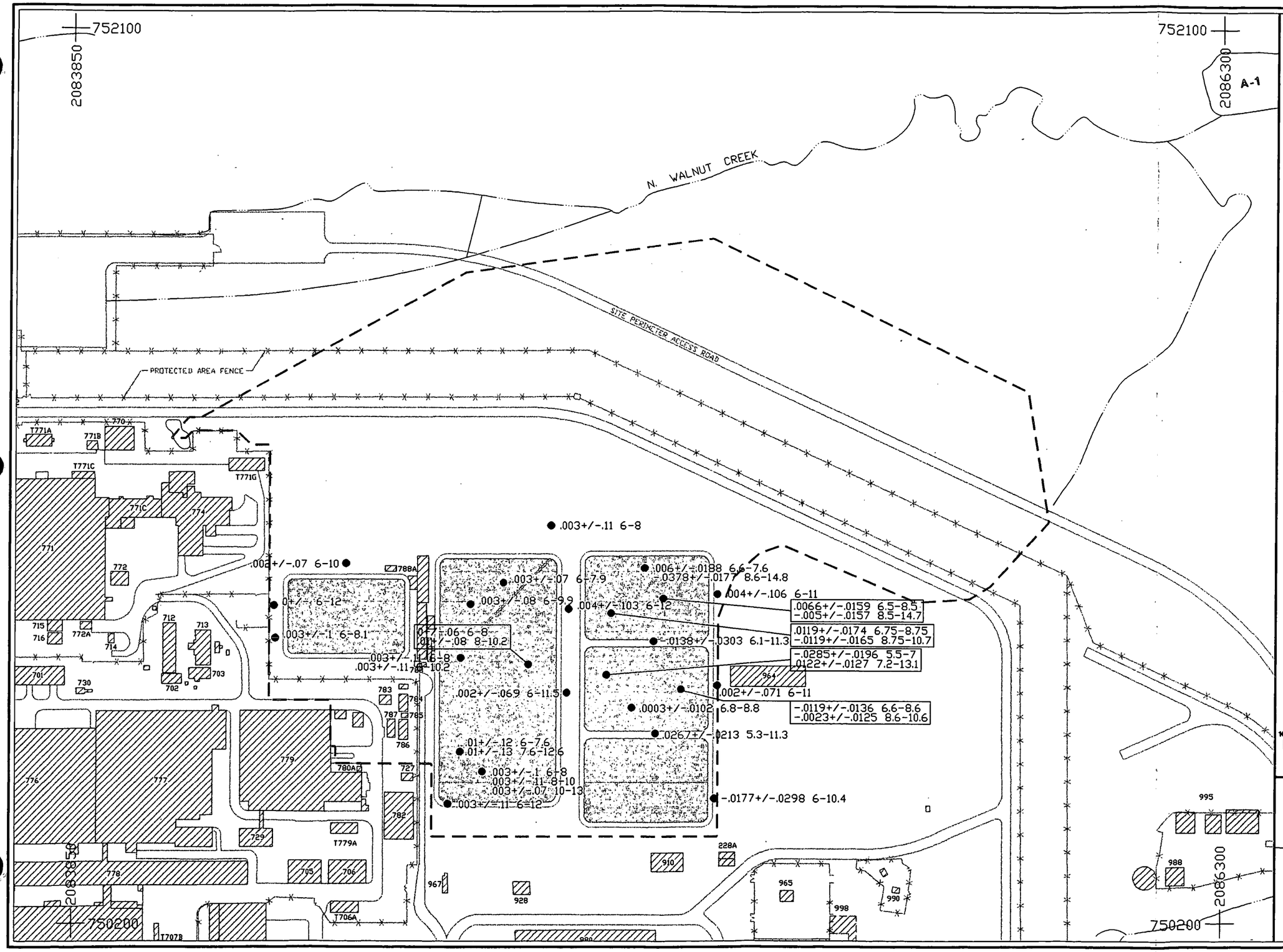
Figure II.3.4-25

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cesium-137 (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .003+/-.11 Result and Counting Error in pCi/g
- ND Not Detected
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.166 pCi/g

100 0 100 200 300 FEET

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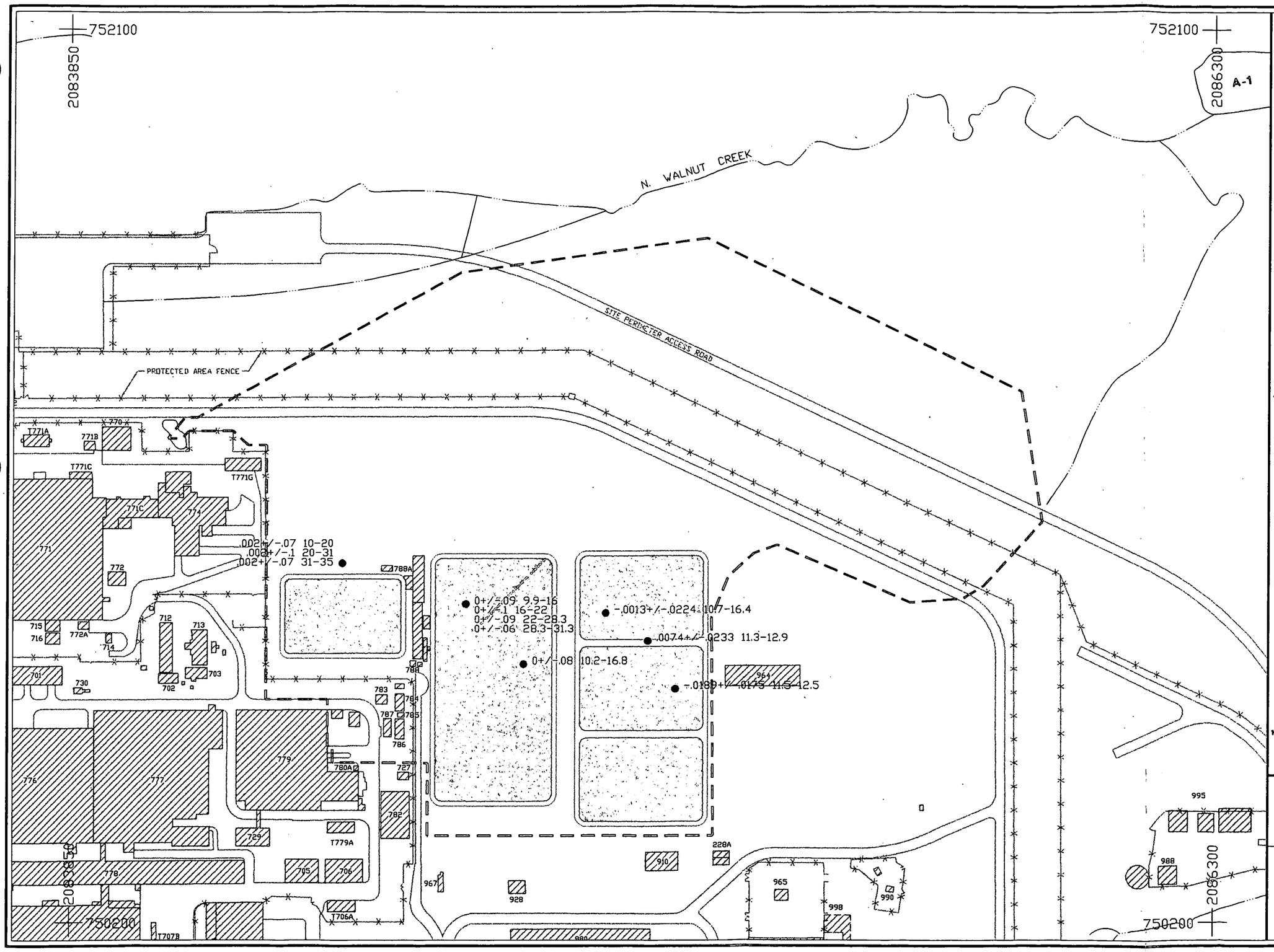
Figure II.3.4-26

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cesium-137 (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .002+/-.07 Result and Counting Error in pCi/g
- ND Not Detected
- 10-20 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.166 pCi/g

100 0 100 200 300 FEET

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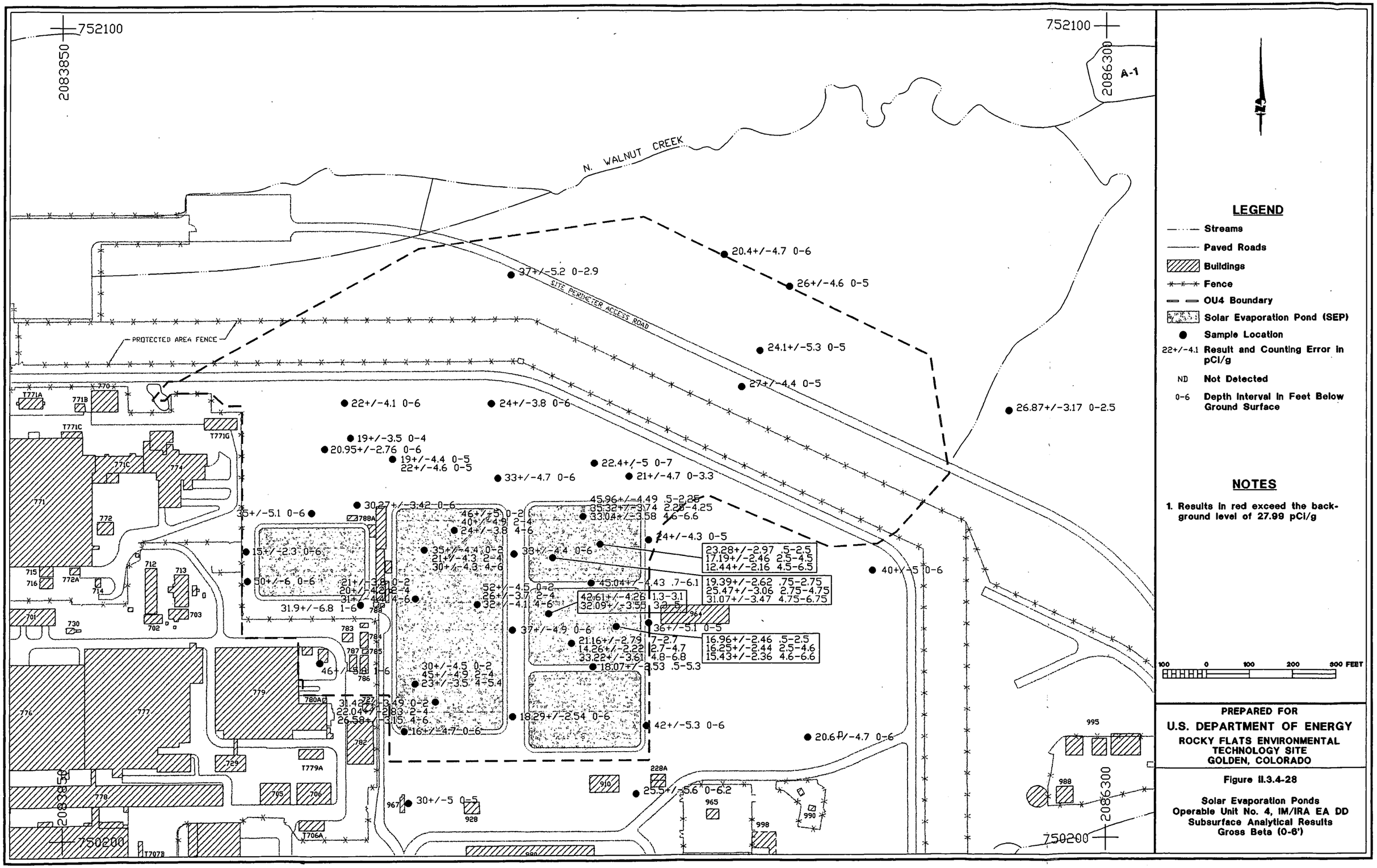
Figure II.3.4-27

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cesium-137 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 22+/-4.1 Result and Counting Error in pCi/g
- ND Not Detected
- 0-6 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 27.99 pCi/g

100 0 100 200 300 FEET

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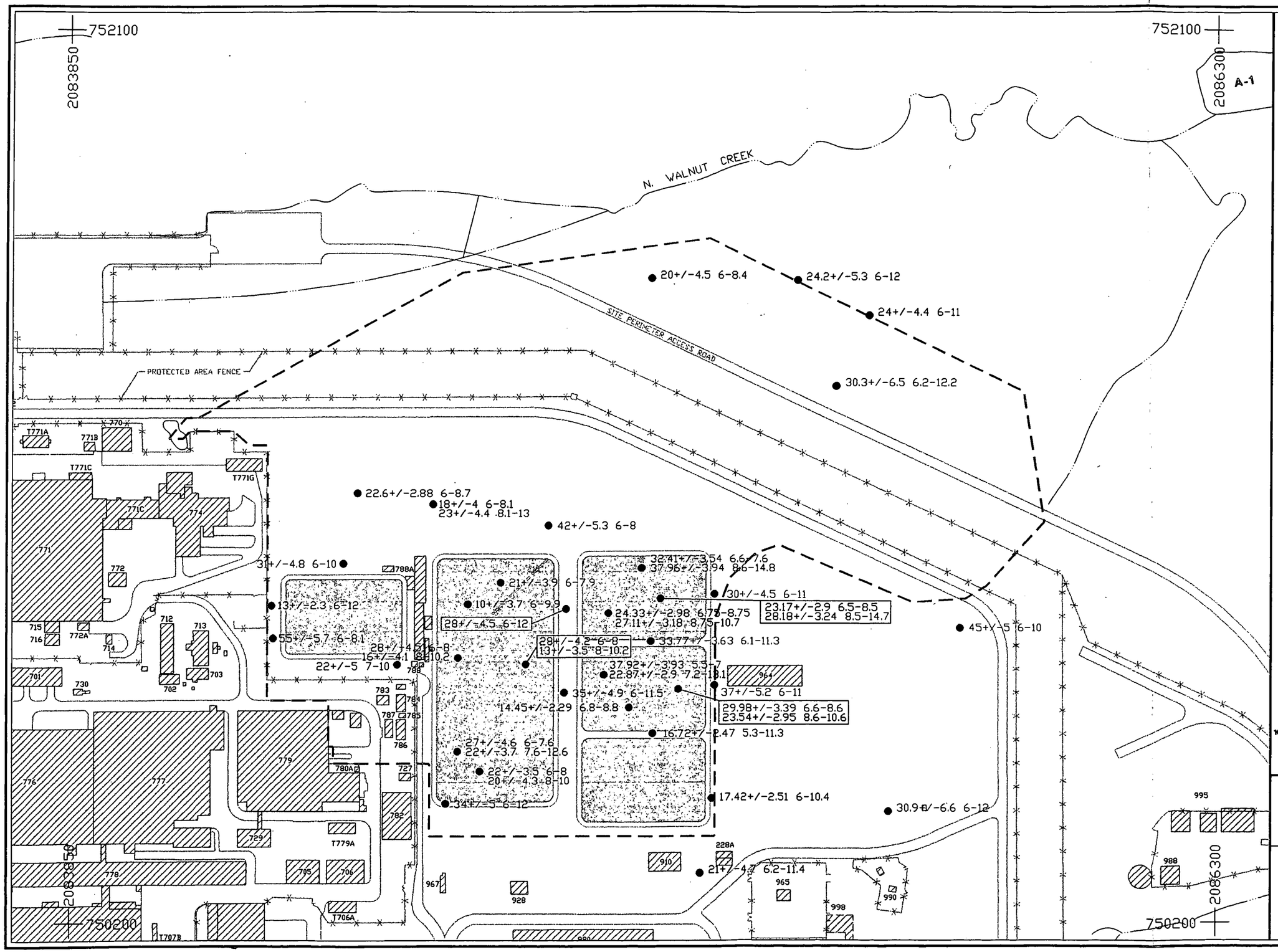
Figure II.3.4-28

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Gross Beta (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 23+/-4.4 Result and Counting Error in pCi/g
- ND Not Detected
- 8.1-13 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 27.99 pCi/g

100 0 100 200 800 FEET

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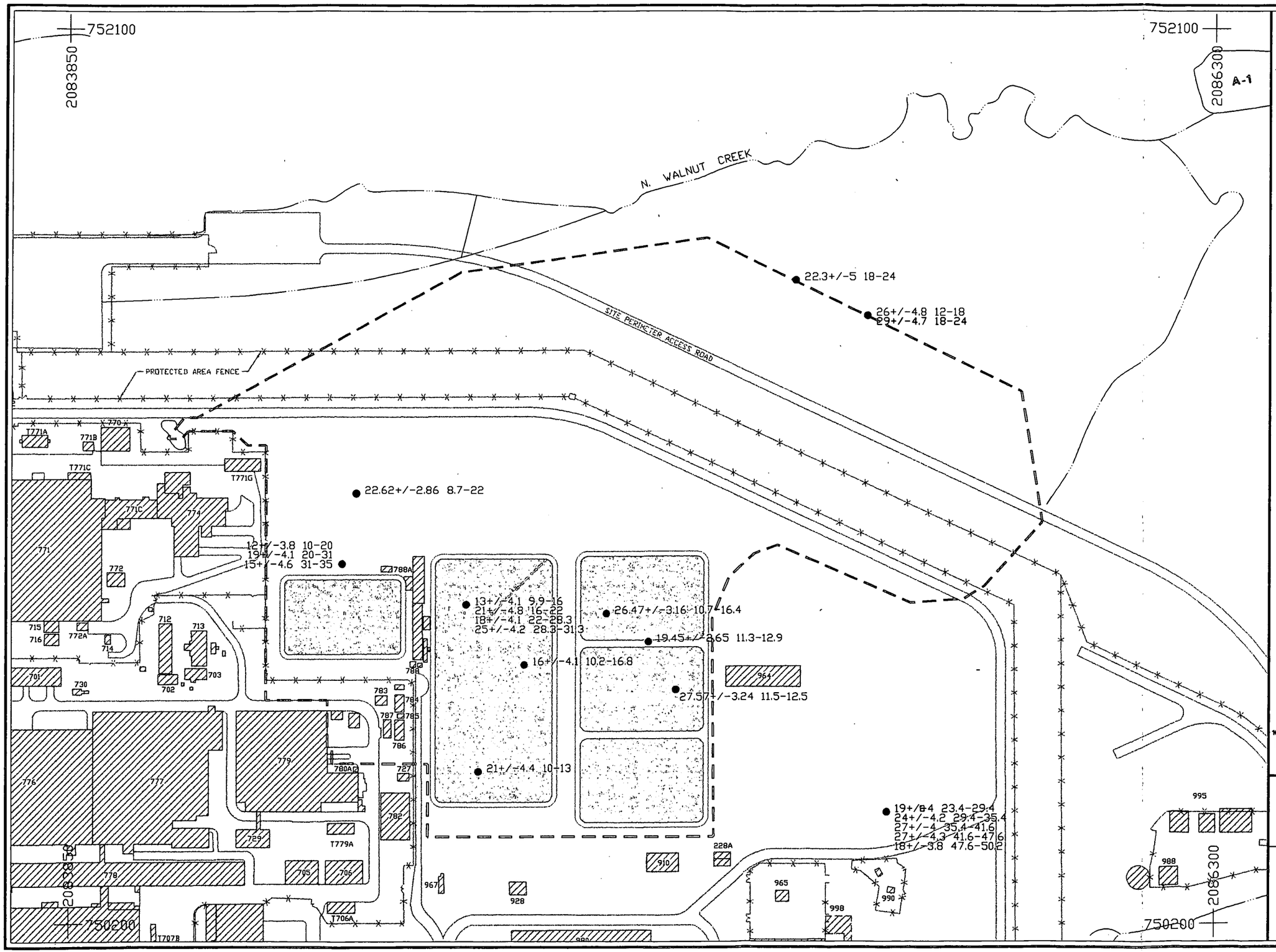
Figure II.3.4-29

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Gross Beta (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 26+/-4.8 Result and Counting Error in pCi/g
- ND Not Detected
- 12-18 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 27.99 pCi/g

100 0 100 200 300 FEET

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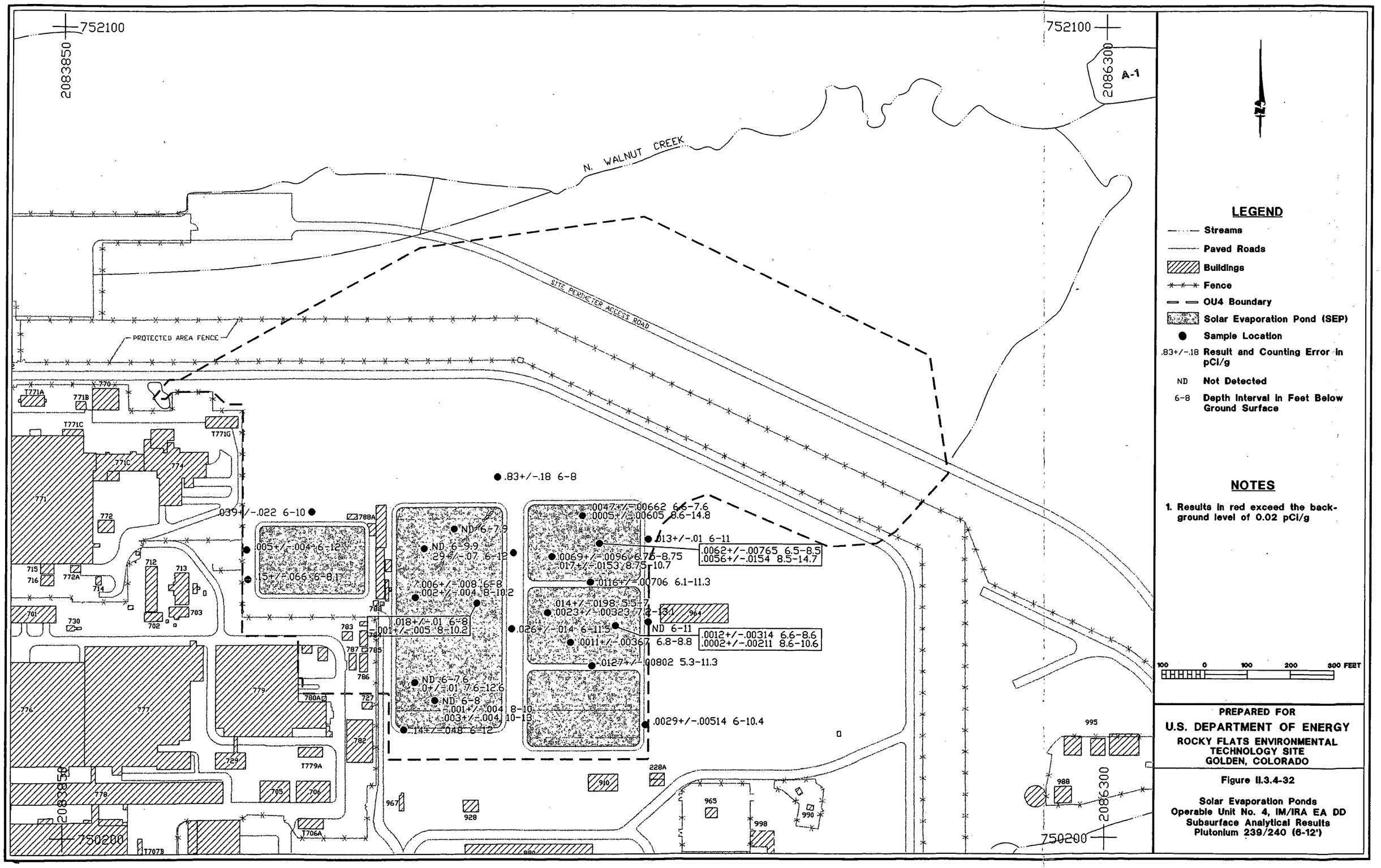
Figure II.3.4-30

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Gross Beta (> 12')


752100
2083850
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
.83+/-.18 6-8
.039+/-.022 6-10
.005+/-.004 6-12
.15+/-.066 6-8.1
ND 6-7.9
ND 6-9.9
.29+/-.07 6-12
.006+/-.008 6-8
.002+/-.004 8-10.2
.018+/-.01 6-8
.001+/-.005 8-10.2
ND 6-7.6
.0+/-.01 7.6-12.6
ND 6-8
.001+/-.004 8-10
.003+/-.004 10-13
.14+/-.048 6-12
.0047+/-.00662 6.6-7.6
.0005+/-.00605 8.6-14.8
.013+/-.01 6-11
.0062+/-.00765 6.5-8.5
.0056+/-.0154 8.5-14.7
.0069+/-.0096 6.75-8.75
.017+/-.0153 8.75-10.7
.0116+/-.00706 6.1-11.3
.014+/-.0198 5.5-7
.0023+/-.00323 7.2-13.1
.026+/-.014 6-11.5
ND 6-11
.0012+/-.00314 6.6-8.6
.0002+/-.00211 8.6-10.6
.0011+/-.00367 6.8-8.8
.0127+/-.00802 5.3-11.3
.0029+/-.00514 6-10.4
750200
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.83+/-.18 Result and Counting Error in pCi/g
ND Not Detected
6-8 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 0.02 pCi/g
100 0 100 200 300 FEET
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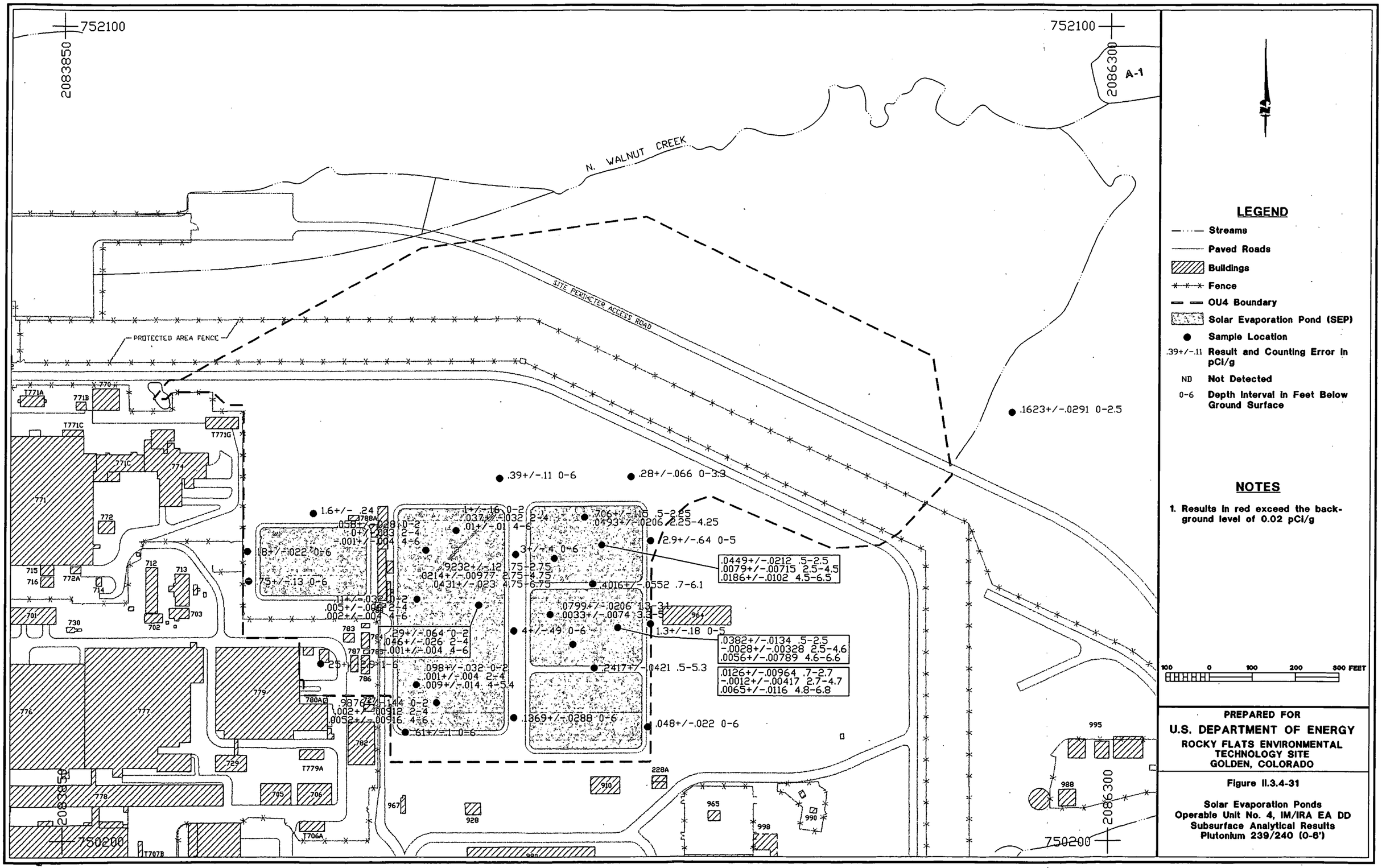
GOLDEN, COLORADO
Figure II.3.4-32
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Plutonium 239/240 (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .39+/-.11 Result and Counting Error in pCi/g
- ND Not Detected
- 0-6 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.02 pCi/g

100 0 100 200 300 FEET

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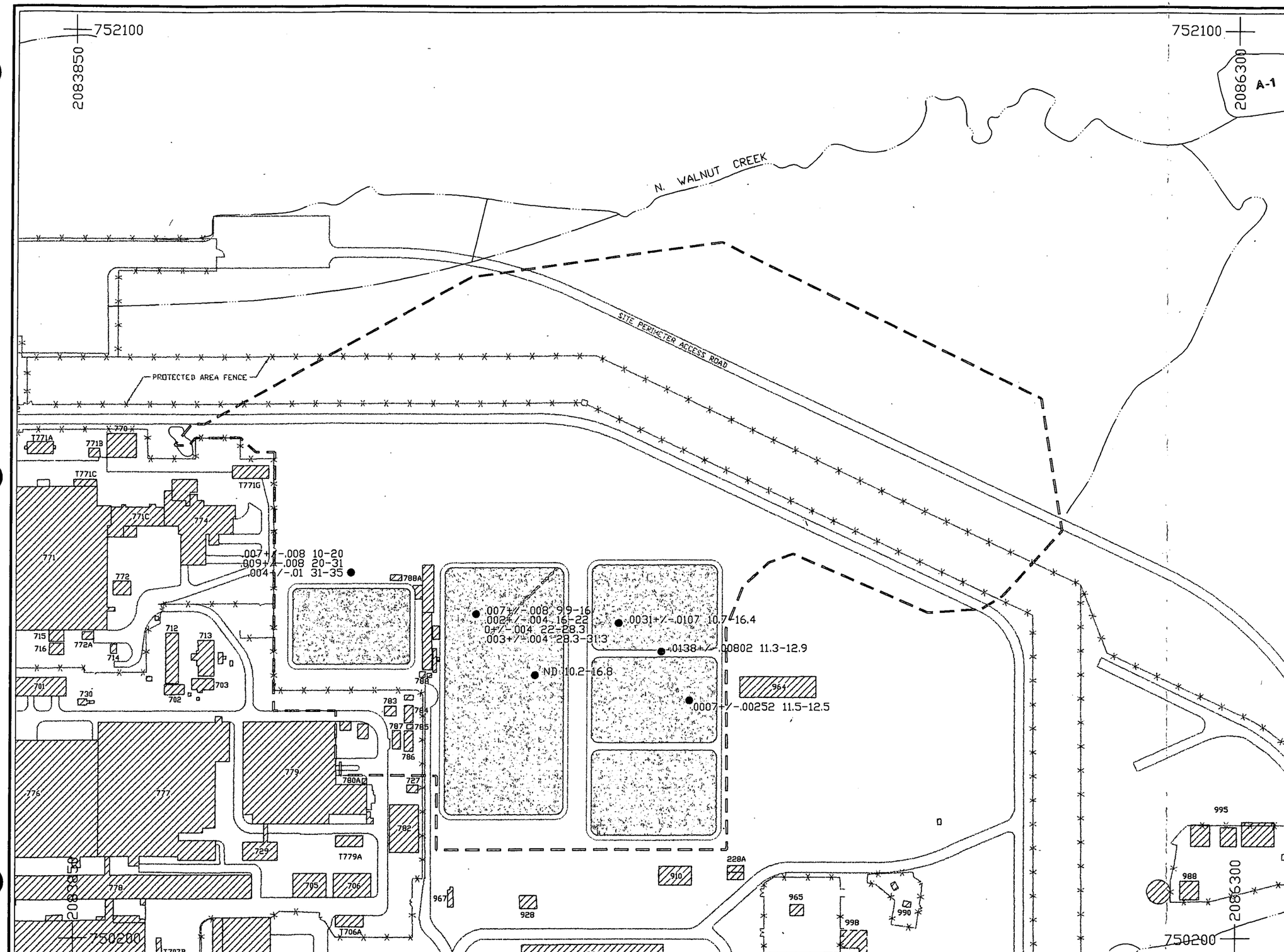
Figure II.3.4-31

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Plutonium 239/240 (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .007+/-.008 Result and Counting Error in pCi/g
- ND Not Detected
- 9.9-16 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.02 pCi/g

100 0 100 200 300 FEET

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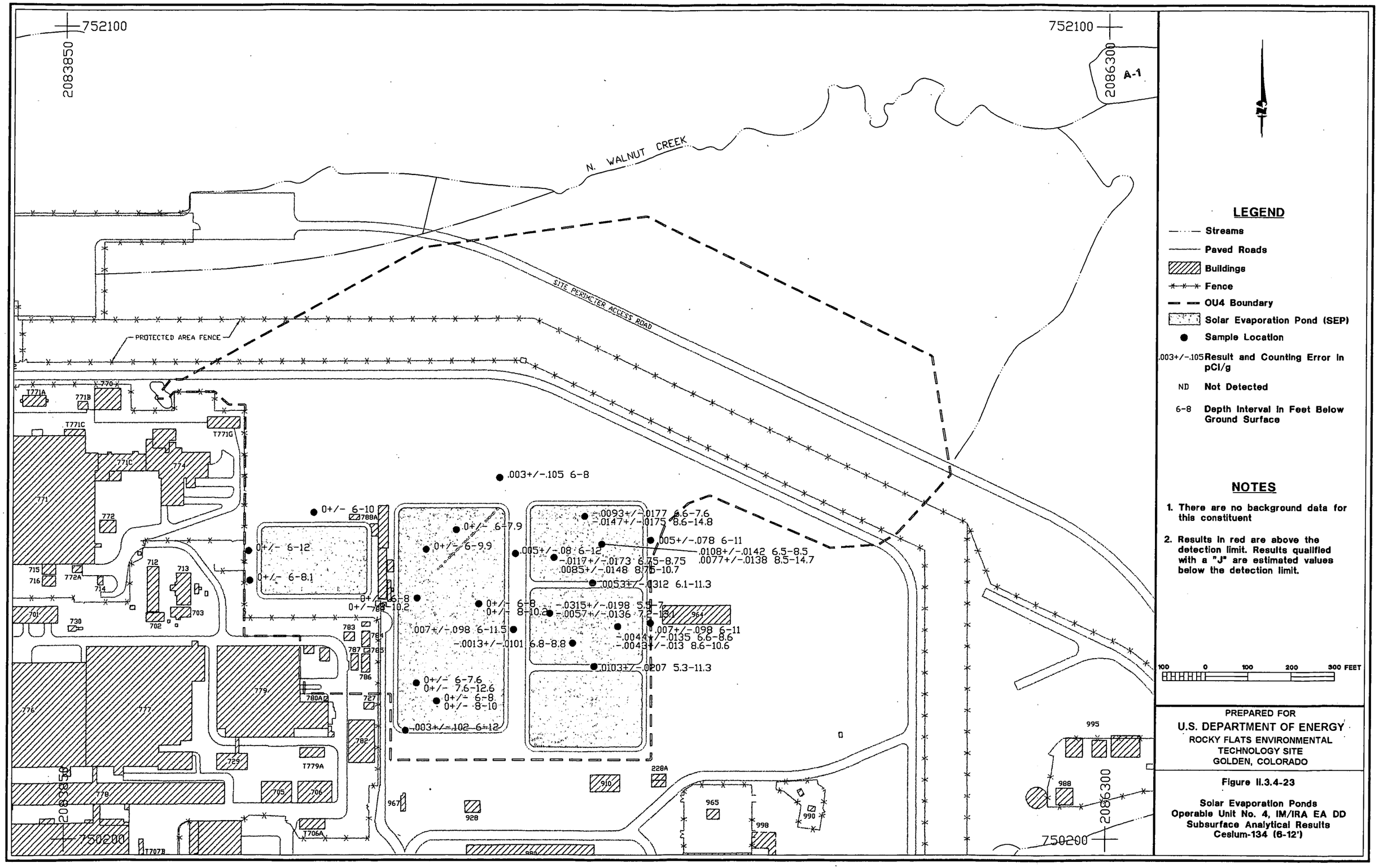
Figure II.3.4-33

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Plutonium 239/240 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .003+/-.105 Result and Counting Error in pCi/g
- ND Not Detected
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit. Results qualified with a "J" are estimated values below the detection limit.

100 0 100 200 300 FEET

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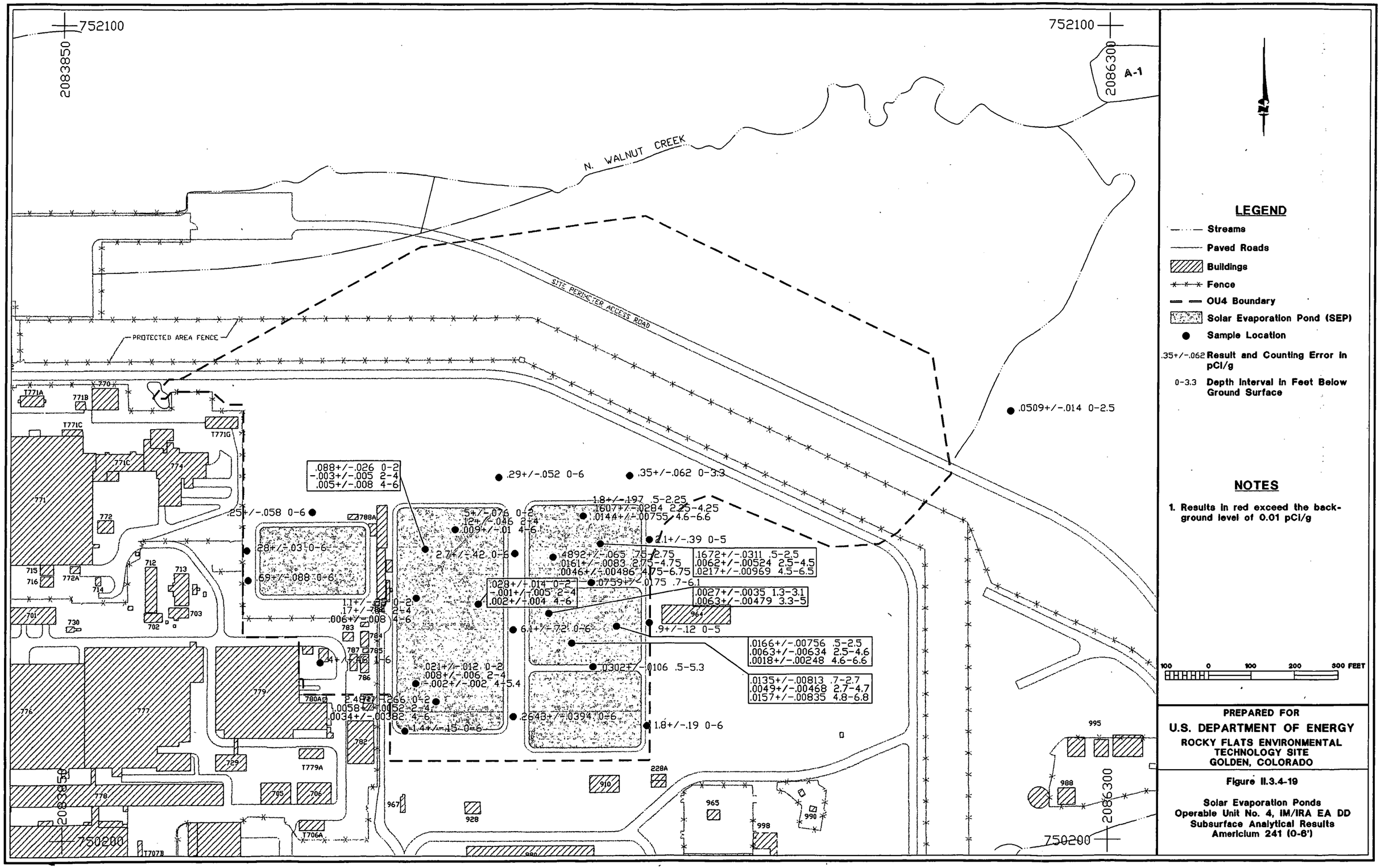
Figure II.3.4-23

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cesium-134 (6-12')


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
.0509+/-.014 0-2.5
.088+/-.026 0-2
-.003+/-.005 2-4
.005+/-.008 4-6
.29+/-.052 0-6
.35+/-.062 0-3.3
1.8+/-.197 5-2.25
.1607+/-.0284 2.25-4.25
.0144+/-.00755 4.6-6.6
.25+/-.058 0-6
5+/-.076 0-2
.12+/-.046 2-4
.009+/-.01 4-6
2.1+/-.39 0-5
28+/-.03 0-6
2.7+/-.42 0-6
.4892+/-.065 .75-2.75
.0161+/-.0083 2.75-4.75
.0046+/-.00486 4.75-6.75
.1672+/-.0311 .5-2.5
.0062+/-.00524 2.5-4.5
.0217+/-.00969 4.5-6.5
.69+/-.088 0-6
.028+/-.014 0-2
-.001+/-.005 2-4
.002+/-.004 4-6
.0759+/-.0175 .7-6.1
.0027+/-.0035 1.3-3.1
.0063+/-.00479 3.3-5
1.1+/-.25 0-2
.17+/-.784 2-4
.006+/-.008 4-6
6.1+/-.72 0-6
.9+/-.12 0-5
.0166+/-.00756 .5-2.5
.0063+/-.00634 2.5-4.6
.0018+/-.00248 4.6-6.6
.021+/-.012 0-2
.008+/-.006 2-4
-.002+/-.002 4-5.4
.0302+/-.0106 .5-5.3
.0135+/-.00813 .7-2.7
.0049+/-.00468 2.7-4.7
.0157+/-.00835 4.8-6.8
2.48+/-.266 0-2
.0058+/-.0052 2-4
.0034+/-.00382 4-6
.2648+/-.0394 0-6
1.4+/-.15 0-6
1.8+/-.19 0-6
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.35+/-.062 Result and Counting Error in pCi/g
0-3.3 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 0.01 pCi/g
100 0 100 200 300 FEET
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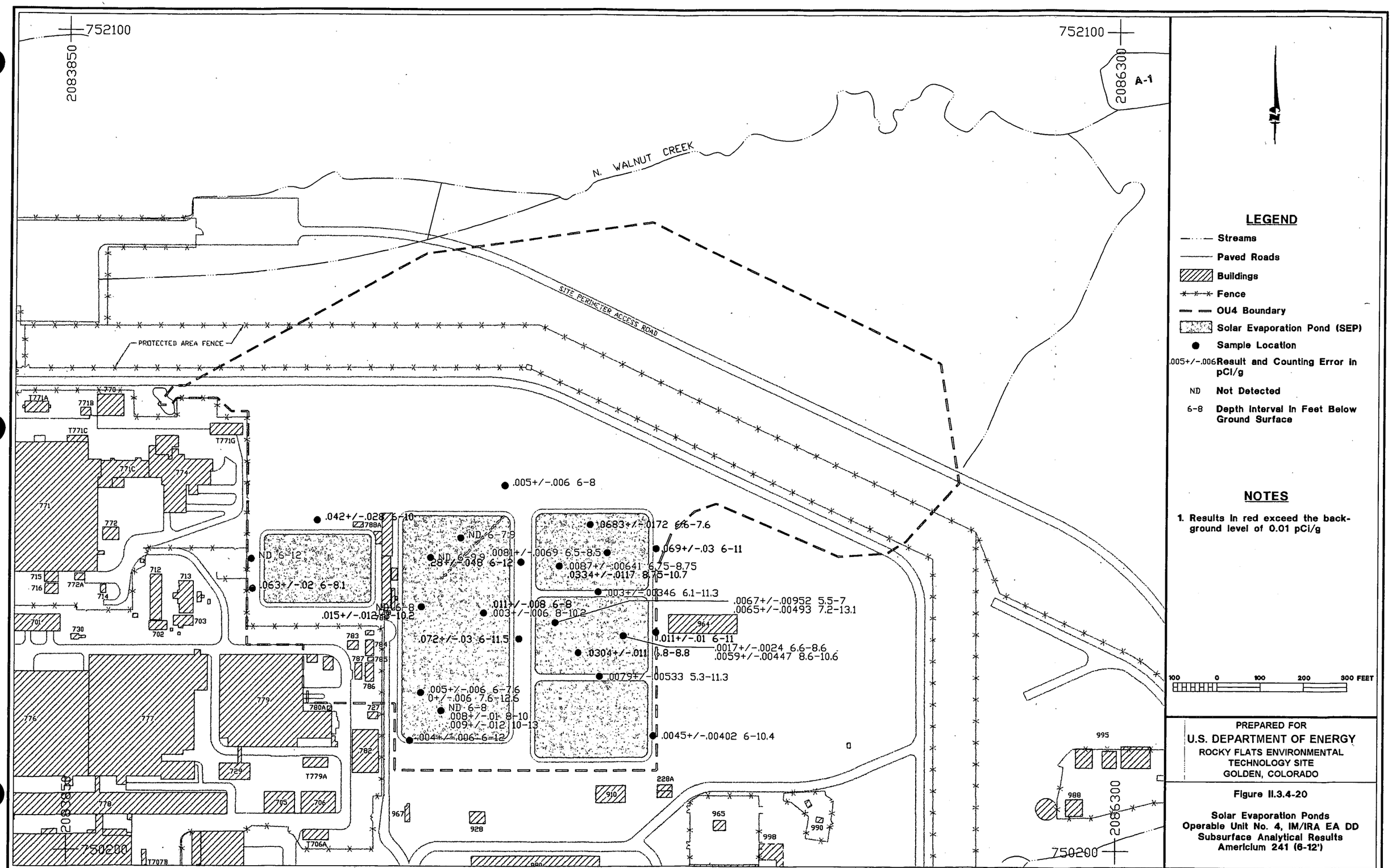
GOLDEN, COLORADO
Figure II.3.4-19
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Americium 241 (0-6')


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
.005+/-.006 6-8
.042+/-.028 6-10
ND 6-12
.063+/-.02 6-8.1
ND 6-7.9
ND 6-9.9
.0081+/-.0069 6.5-8.5
.28+/-.048 6-12
.0683+/-.0172 6.6-7.6
.069+/-.03 6-11
.0087+/-.00641 6.75-8.75
.0334+/-.0117 8.75-10.7
.003+/-.00346 6.1-11.3
.0067+/-.00952 5.5-7
.0065+/-.00493 7.2-13.1
.011+/-.008 6-8
.003+/-.006 8-10.2
.015+/-.012 6-10.2
.072+/-.03 6-11.5
.011+/-.01 6-11
.0017+/-.0024 6.6-8.6
.0304+/-.011 6.8-8.8
.0059+/-.00447 8.6-10.6
.0079+/-.00533 5.3-11.3
.005+/-.006 6-7.6
.0+/-.006 7.6-12.6
ND 6-8
.008+/-.01 8-10
.009+/-.012 10-13
.004+/-.006 6-12
.0045+/-.00402 6-10.4
750200
2086300
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.005+/-.006 Result and Counting Error in pCi/g
ND Not Detected
6-8 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 0.01 pCi/g
100 0 100 200 300 FEET
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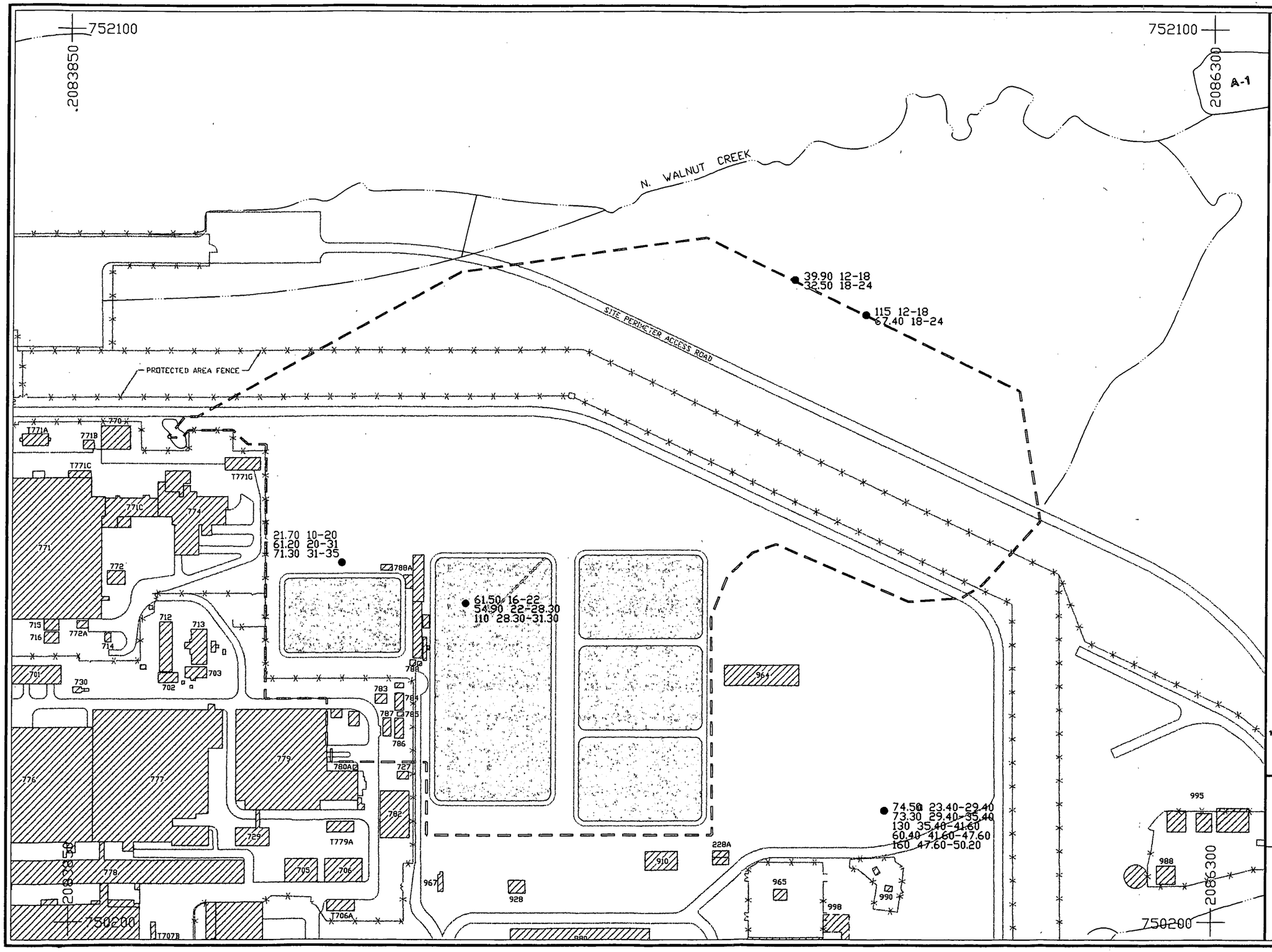
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
GOLDEN, COLORADO
Figure II.3.4-20
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Americium 241 (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 39.90 Results in mg/kg
- 12-18 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 23.64 mg/kg

100 0 100 200 300 FEET

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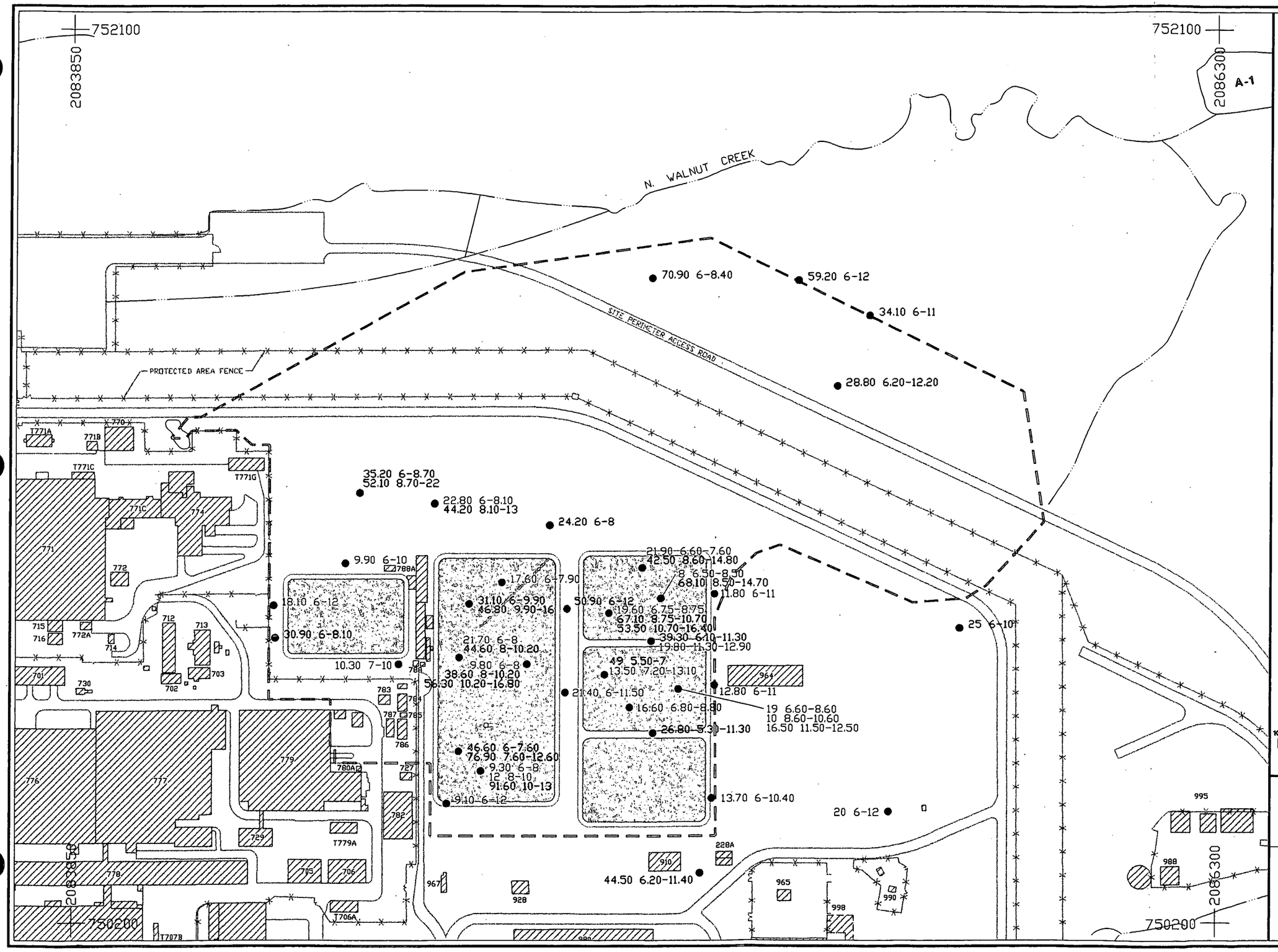
Figure II.3.4-18

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Subsurface Analytical Results Zinc (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 24.20 Results in mg/kg
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 23.64 mg/kg

100 0 100 200 300 FEET

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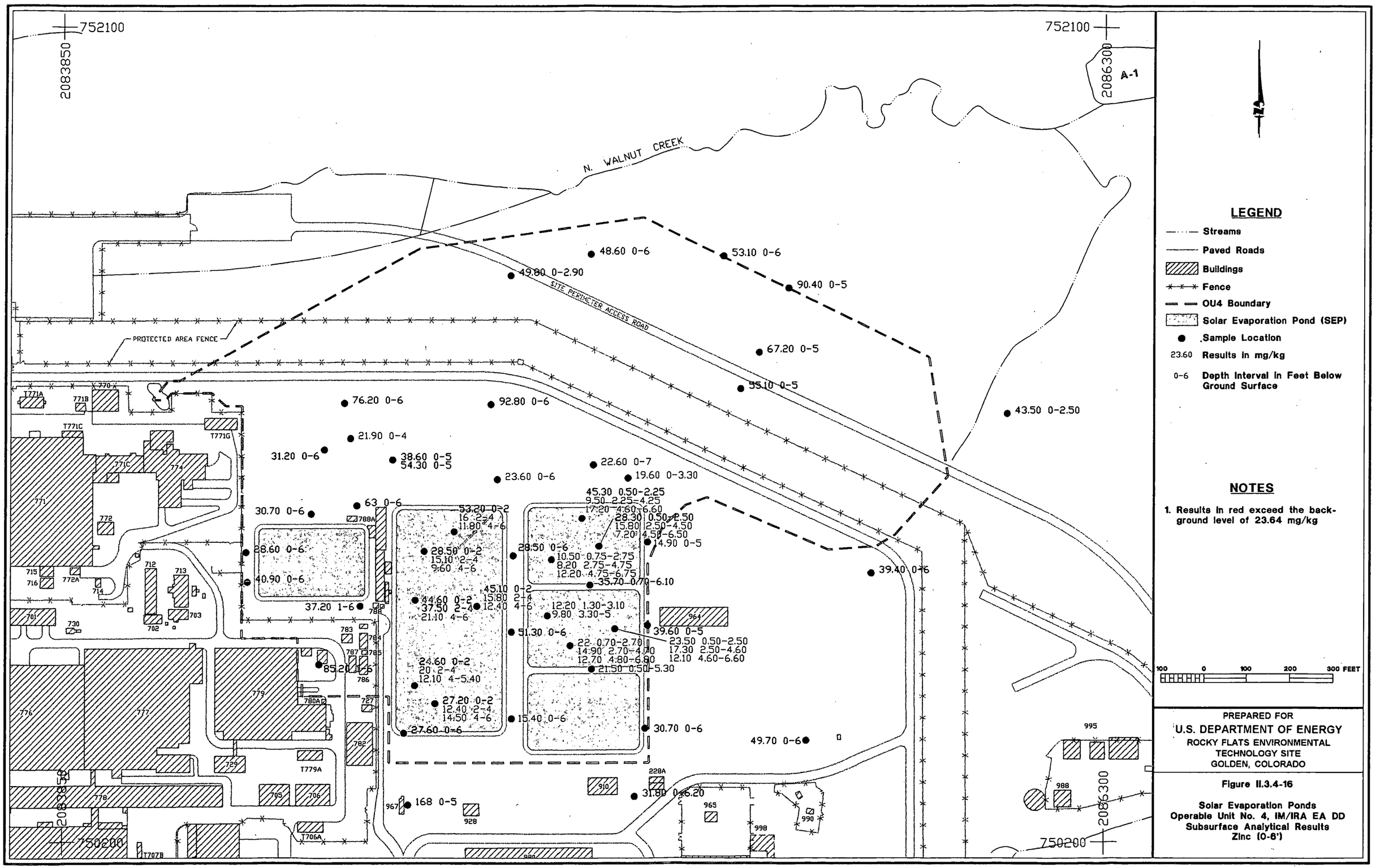
GOLDEN, COLORADO

Figure II.3.4-17

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Zinc (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 23.60 Results in mg/kg
- 0-6 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 23.64 mg/kg

100 0 100 200 300 FEET

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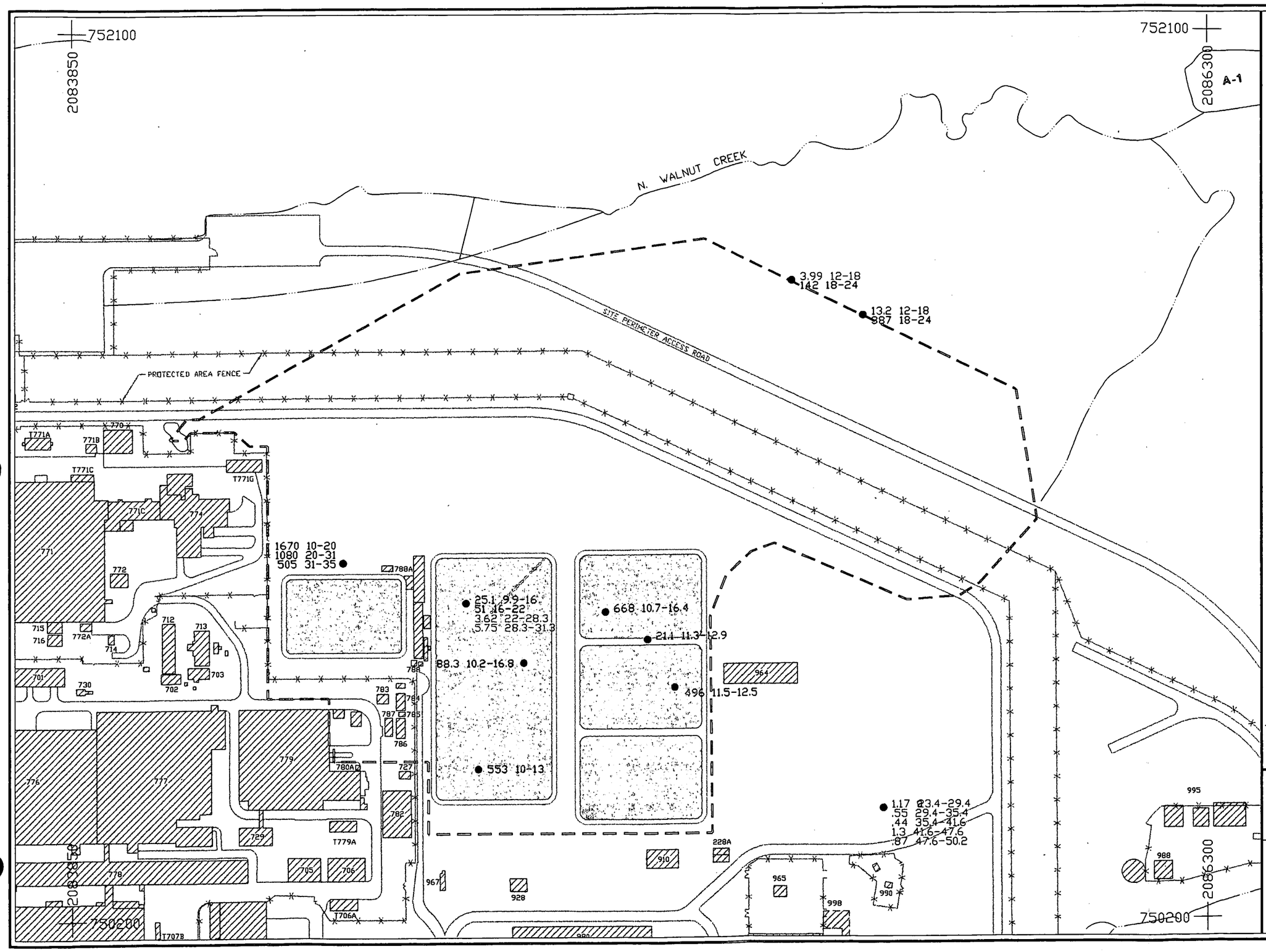
Figure II.3.4-16

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Subsurface Analytical Results Zinc (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 13.2 Results in mg/kg
- 12-18 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 7.1 mg/kg

100 0 100 200 300 FEET

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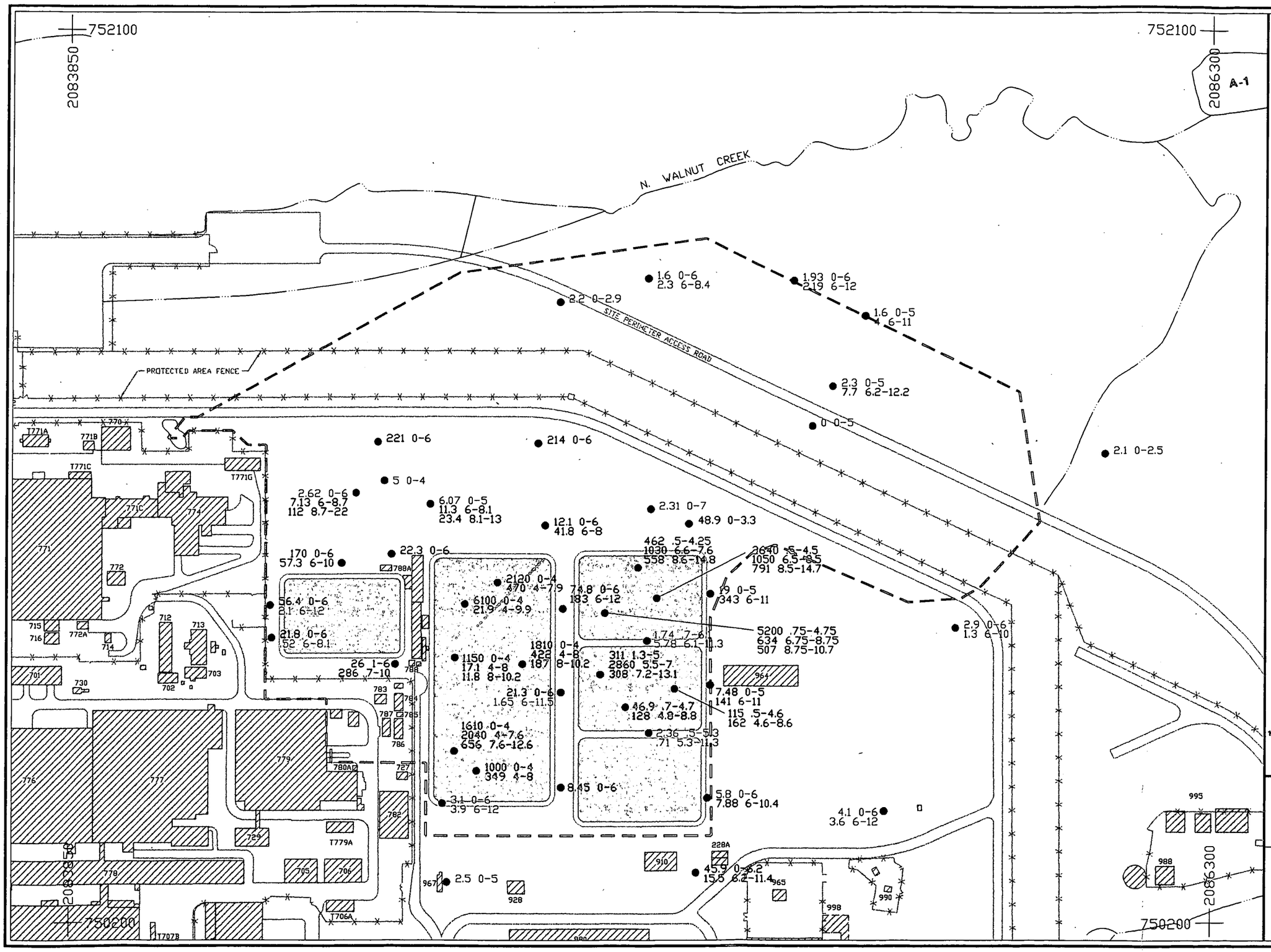
Figure II.3.4-15

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Nitrate/Nitrite (>12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 2.31 Results in mg/kg
- 0-7 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 7.1 mg/kg

100 0 100 200 300 FEET

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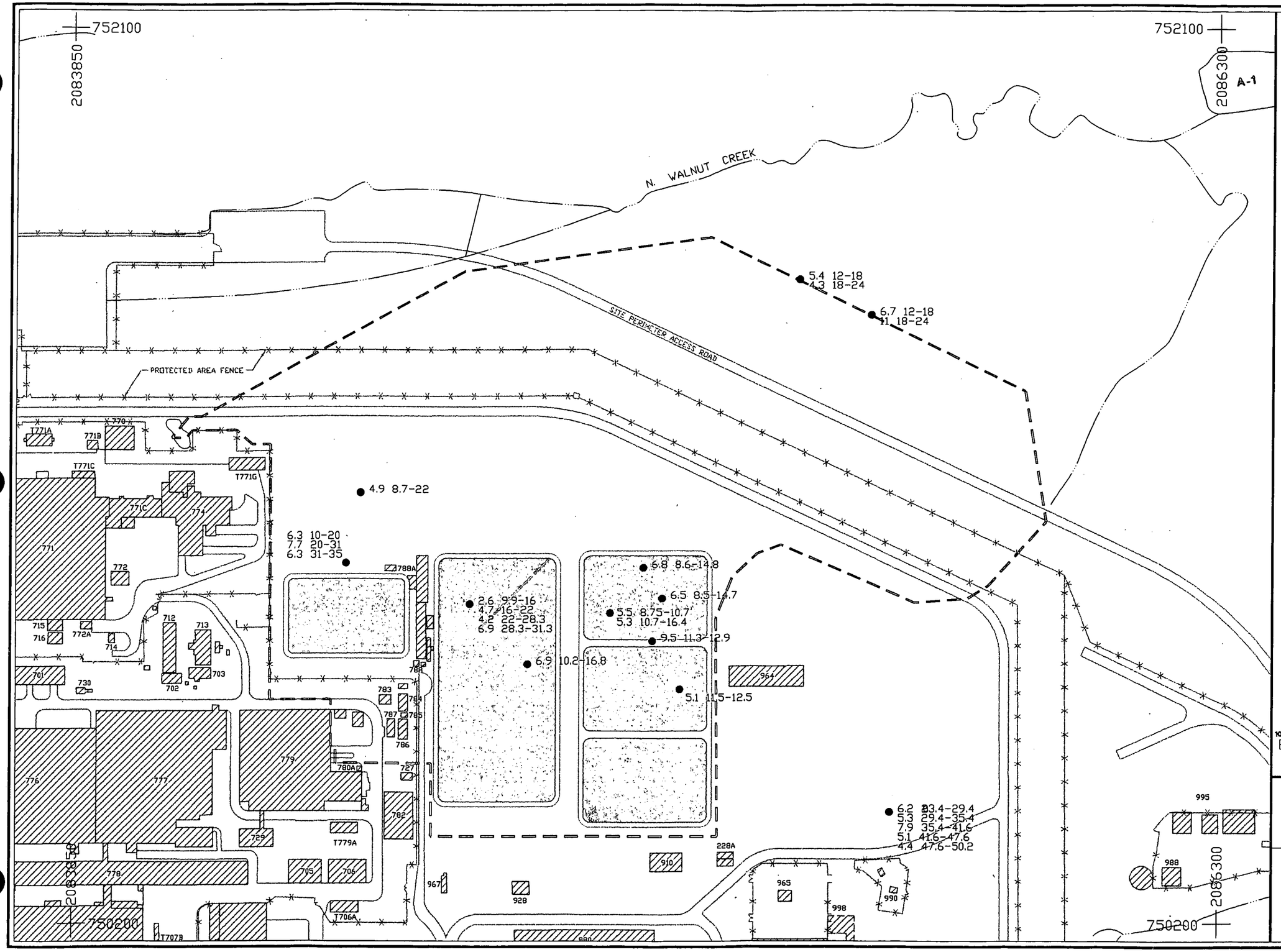
Figure II.3.4-14

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Subsurface Analytical Results Nitrate/Nitrite (0-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 5.1 Results in mg/kg
- 11.5-12.5 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 83.2 mg/kg

100 0 100 200 300 FEET

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Figure II.3.4-13

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Lithium (> 12')

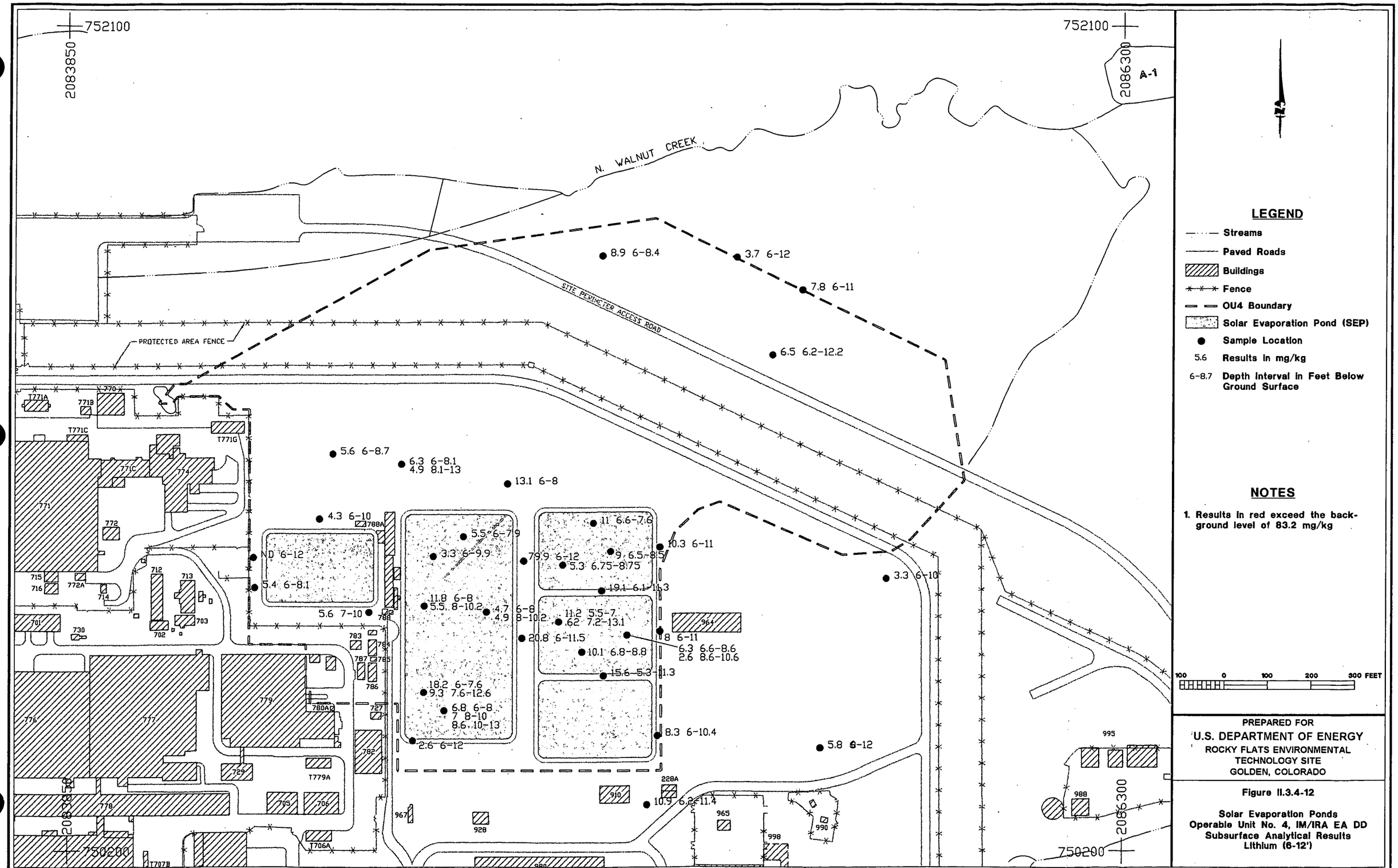

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Figure II.3.4-12

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Lithium (6-12')

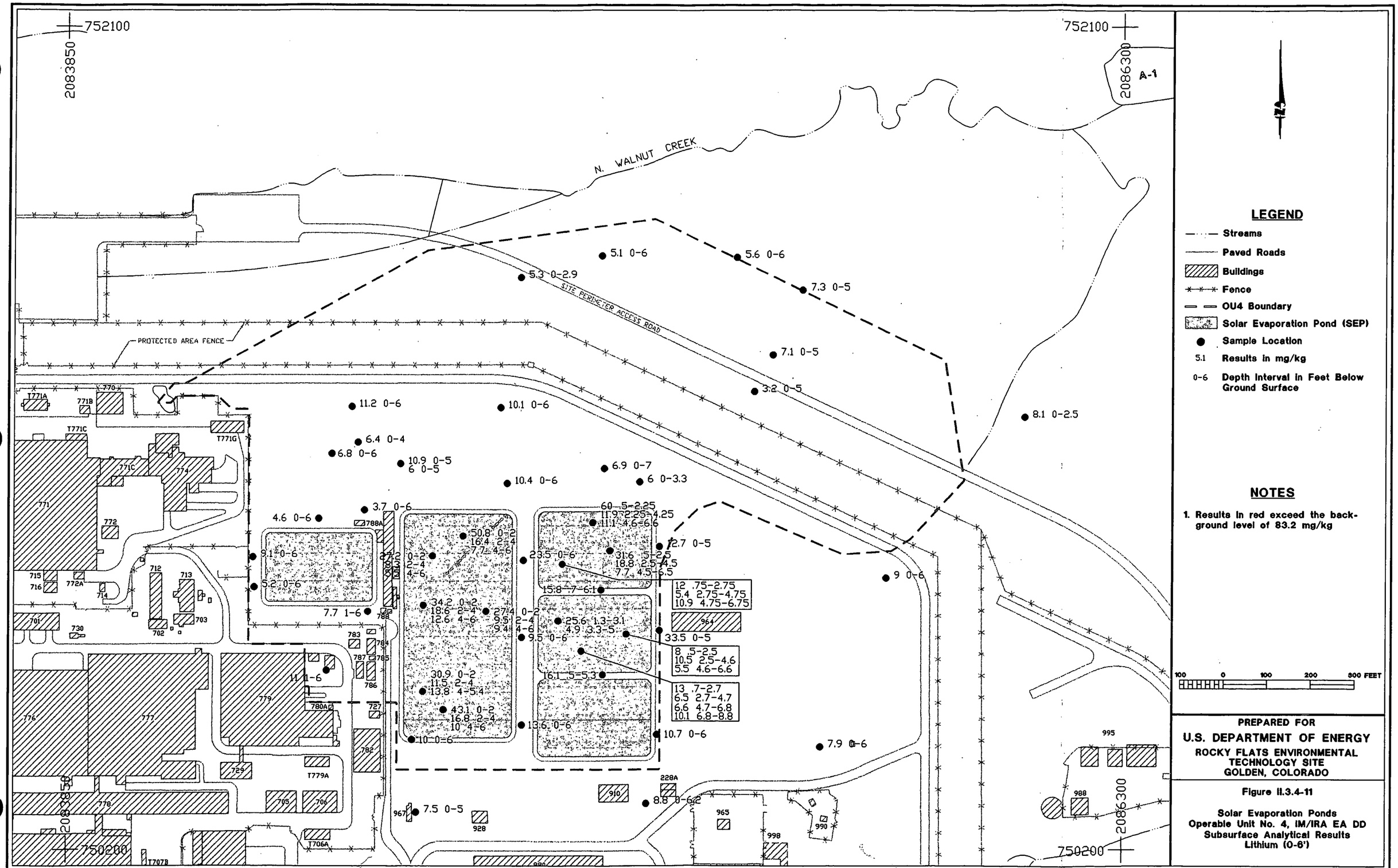

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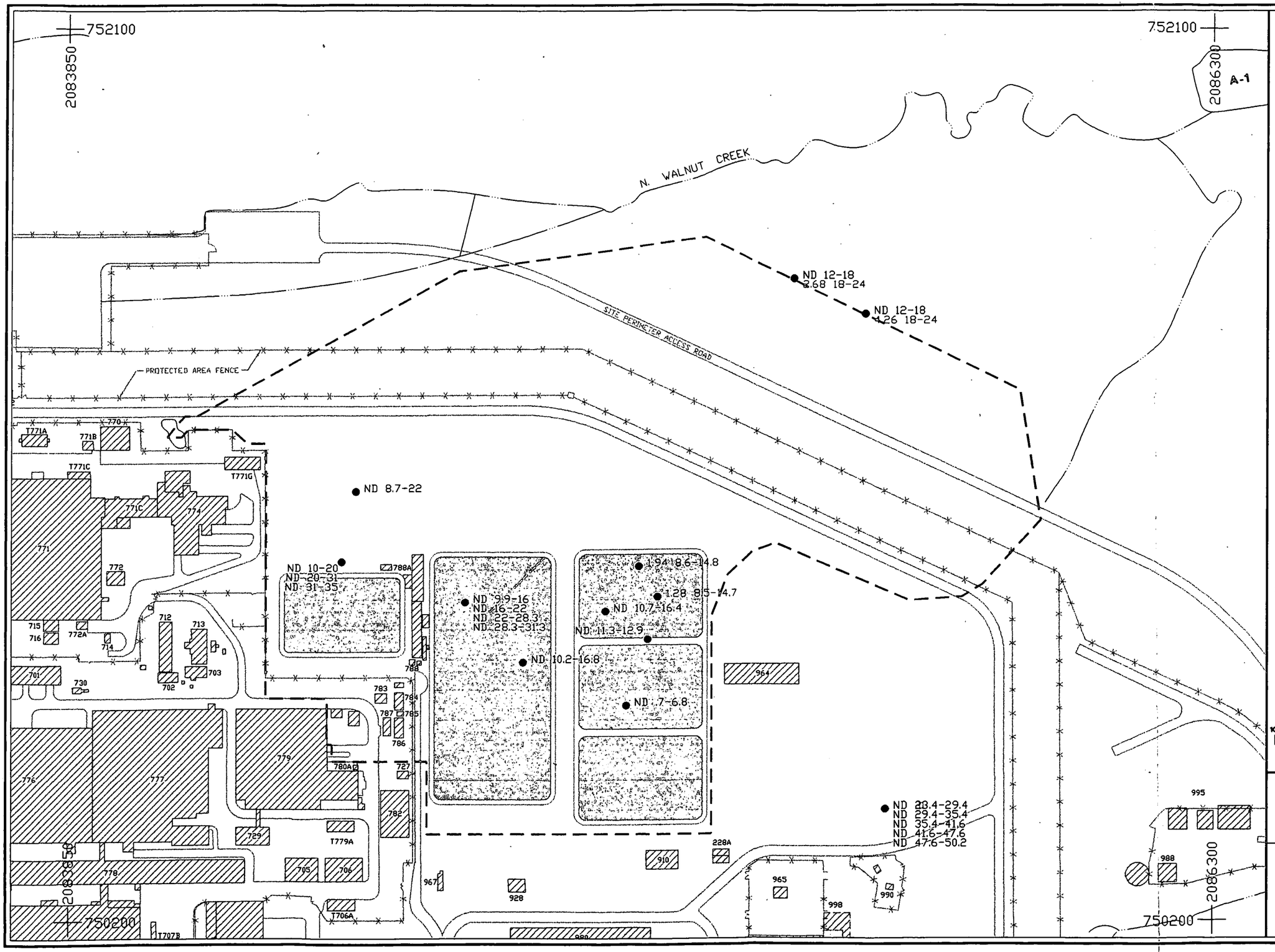
Figure II.3.4-11

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Lithium (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 2.68 Results in mg/kg
- ND Not Detected
- 18-24 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the detection limit

100 0 100 200 300 FEET

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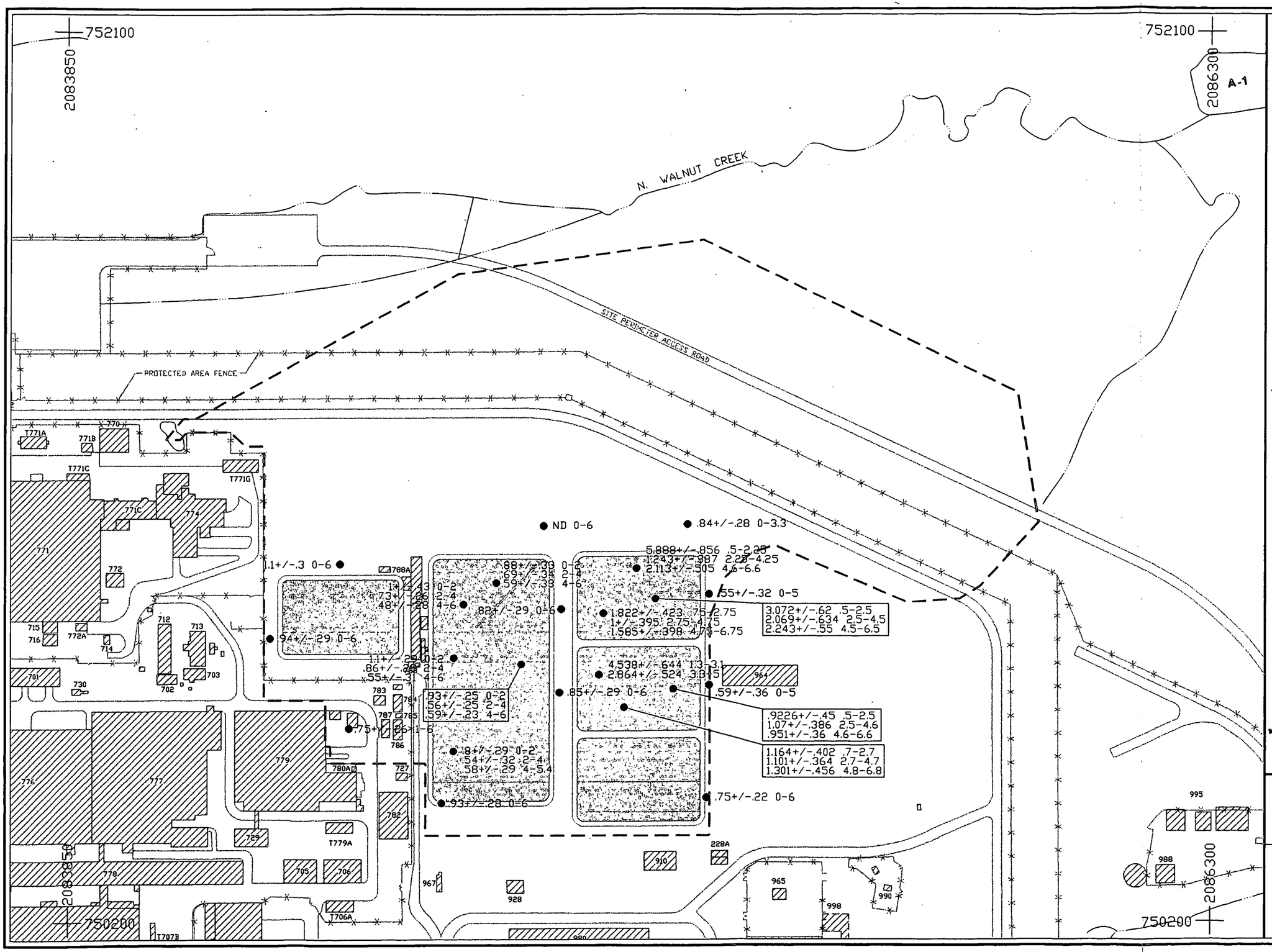
Figure II.3.4-10

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Cyanide (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .75+/-.22 Result and Counting Error in pCi/g
- ND Not Detected
- 0-6 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.65 pCi/g

100 0 100 200 300 FEET

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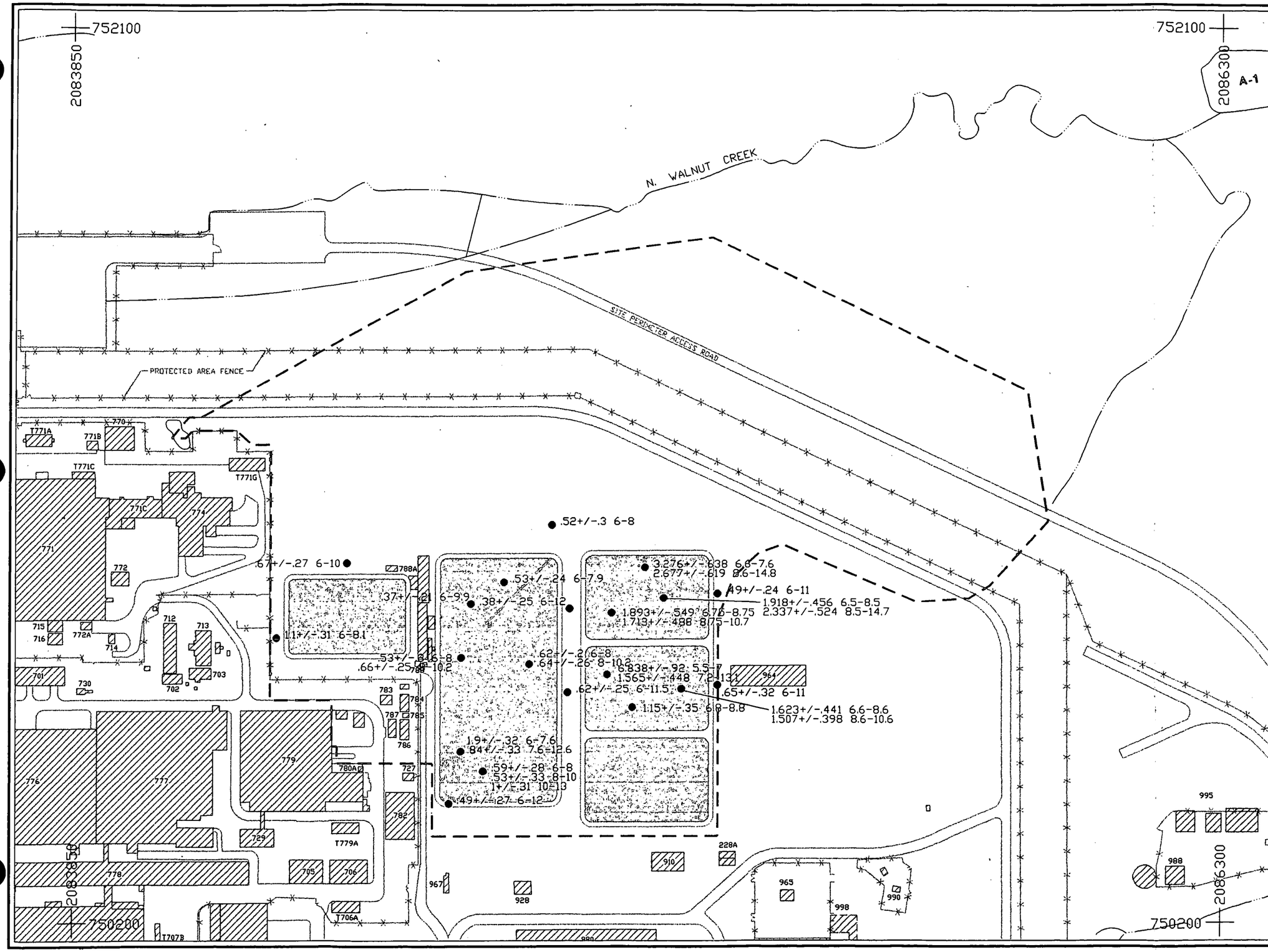
Figure II.3.4-34

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Ra-226 (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .52+/-.3 Result and Counting Error in pCi/g
- ND Not Detected
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.65 pCi/g

100 0 100 200 300 FEET

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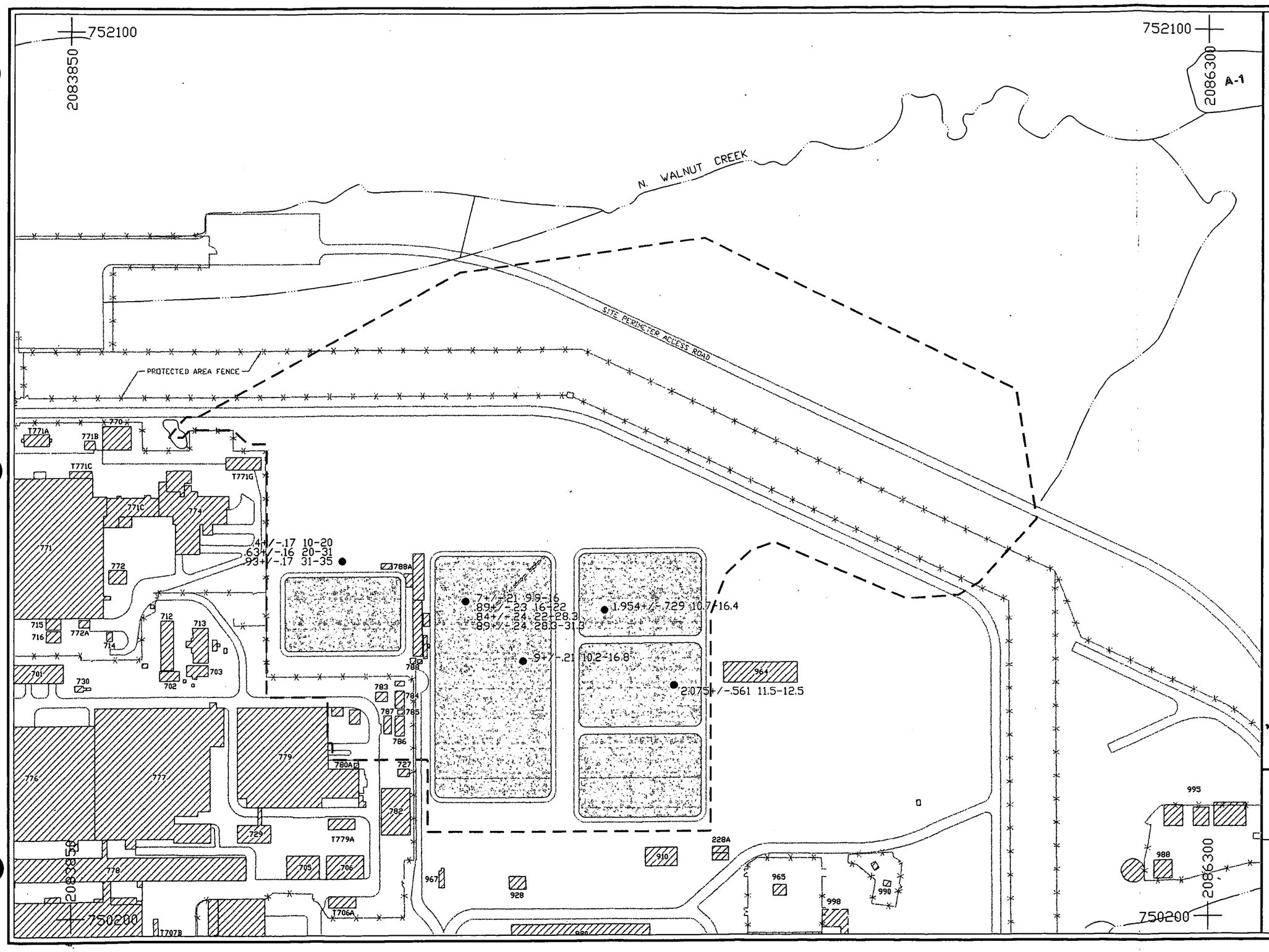
Figure II.3.4-35

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Radium (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .9+/-.21 Result and Counting Error in pCi/g
- ND Not Detected
- 10.2-16.8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.65 pCi/g

100 0 100 200 300 FEET

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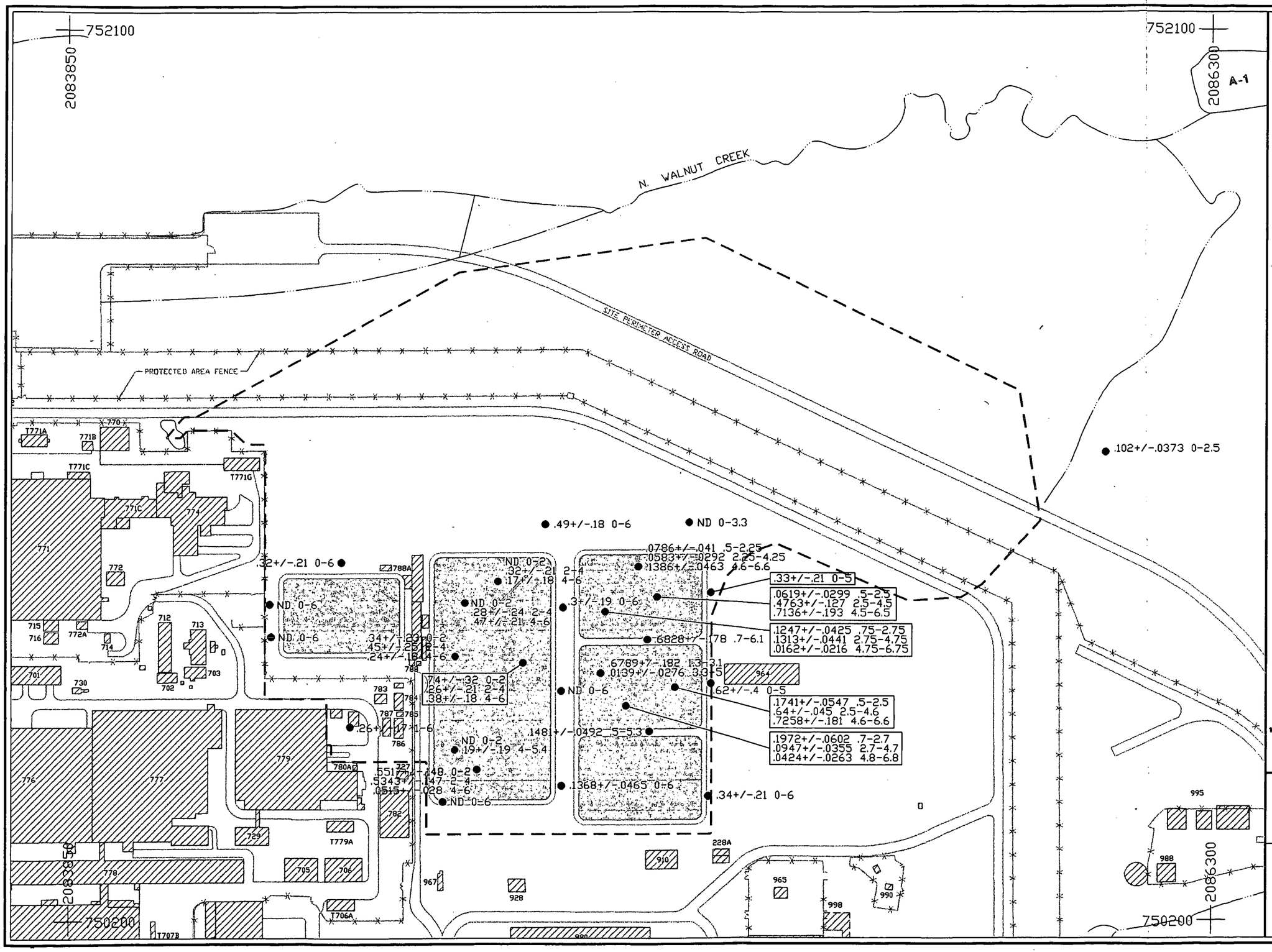
Figure II.3.4-36

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Ra-226 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .49+/-.18 Result and Counting Error in pCi/g
- ND Not Detected
- 0-6 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.54 pCi/g

100 0 100 200 300 FEET

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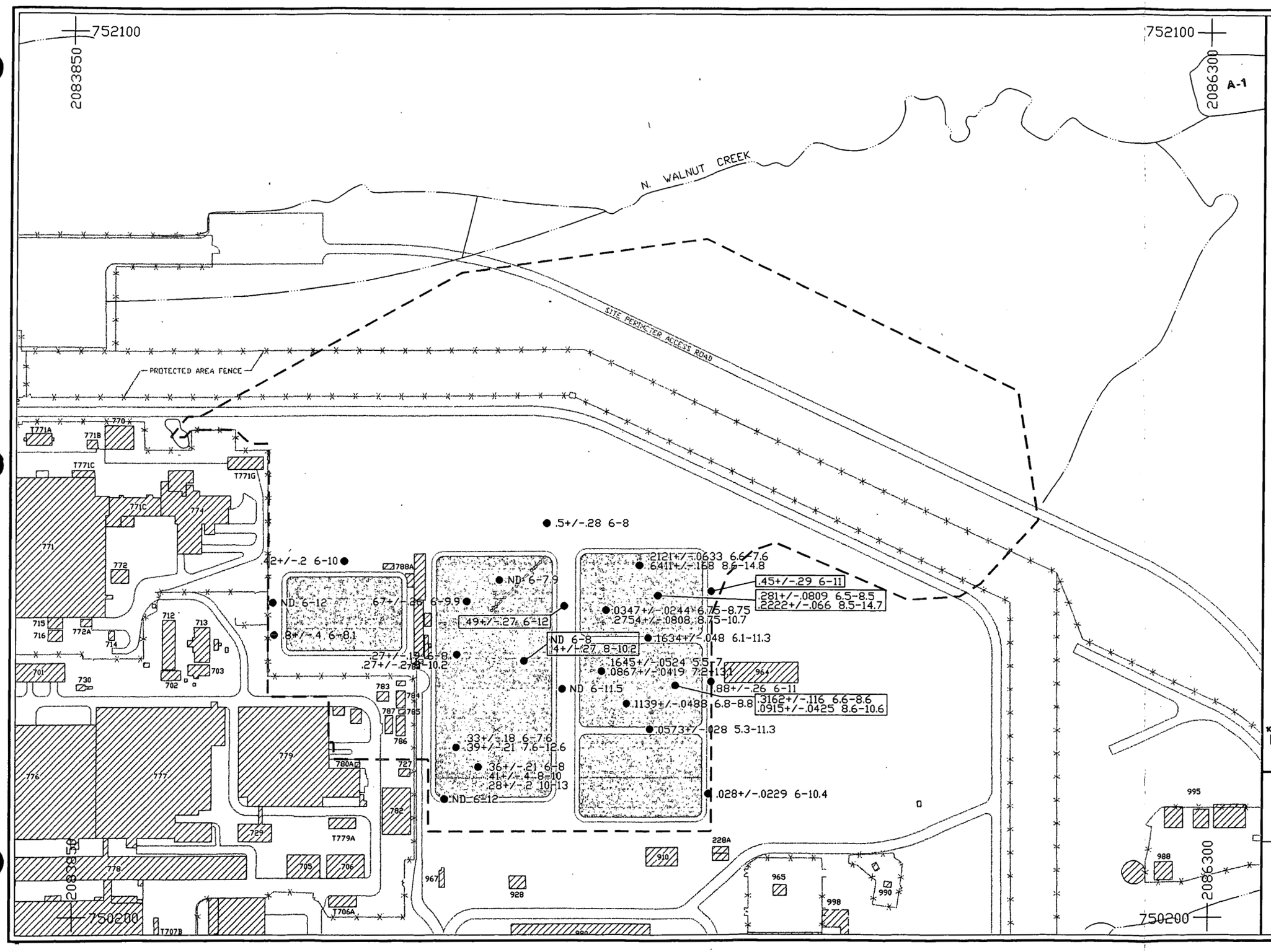
Figure II.3.4-37

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Strontium-89/90 (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- .5+/-.28 Result and Counting Error in pCi/g
- ND Not Detected
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.54 pCi/g

100 0 100 200 300 FEET

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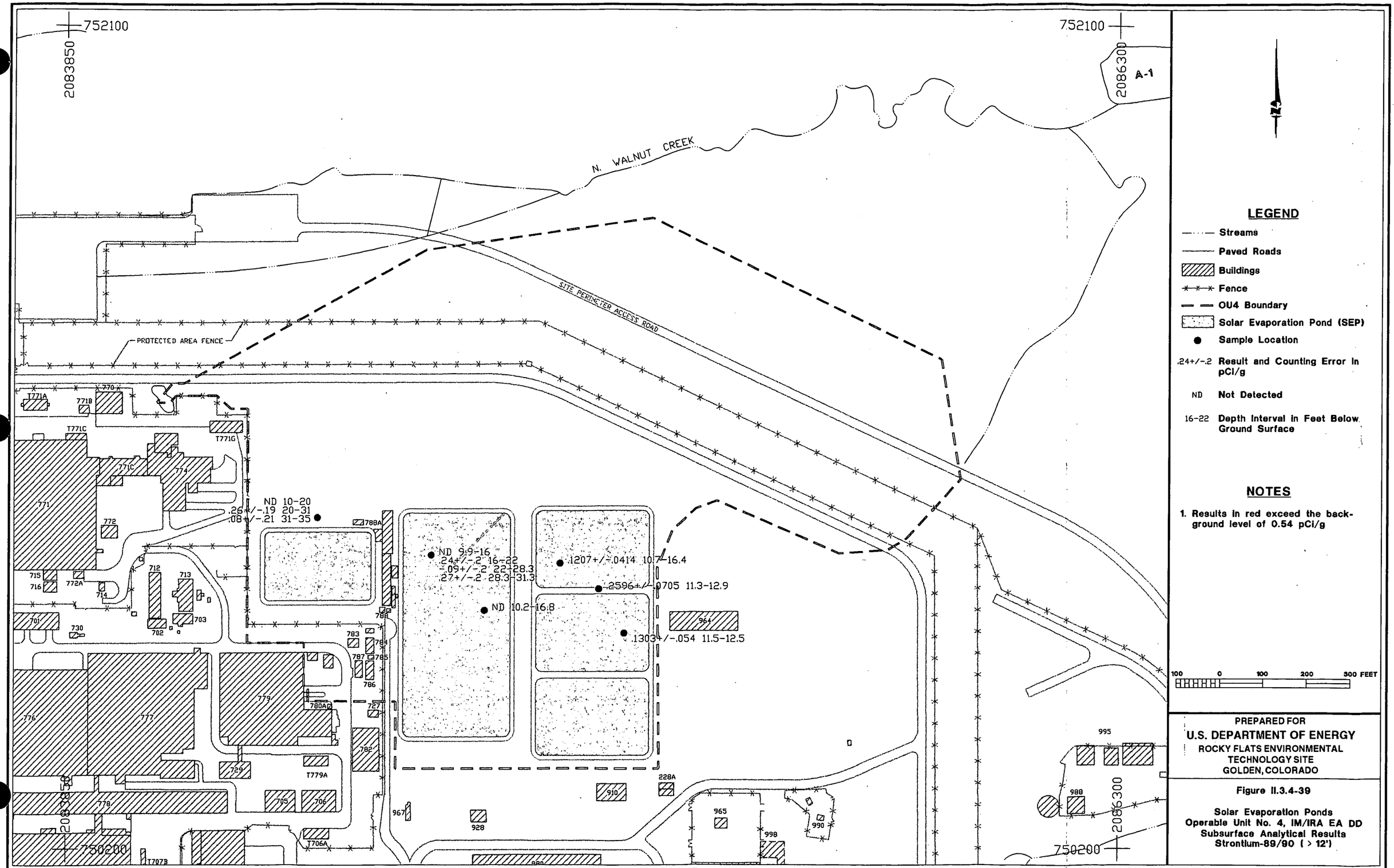
Figure II.3.4-38

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Strontium-89/90 (6-12')


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
ND 10-20
.26+/-.19 20-31
.08+/-.21 31-35
ND 9.9-16
.24+/-.2 16-22
.09+/-.2 22-28.3
.27+/-.2 28.3-31.3
ND 10.2-16.8
.1207+/-.0414 10.7-16.4
.2596+/-.0705 11.3-12.9
.1303+/-.054 11.5-12.5
750200
2083850
750200
2086300
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.24+/-.2 Result and Counting Error in pCi/g
ND Not Detected
16-22 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 0.54 pCi/g
100 0 100 200 300 FEET
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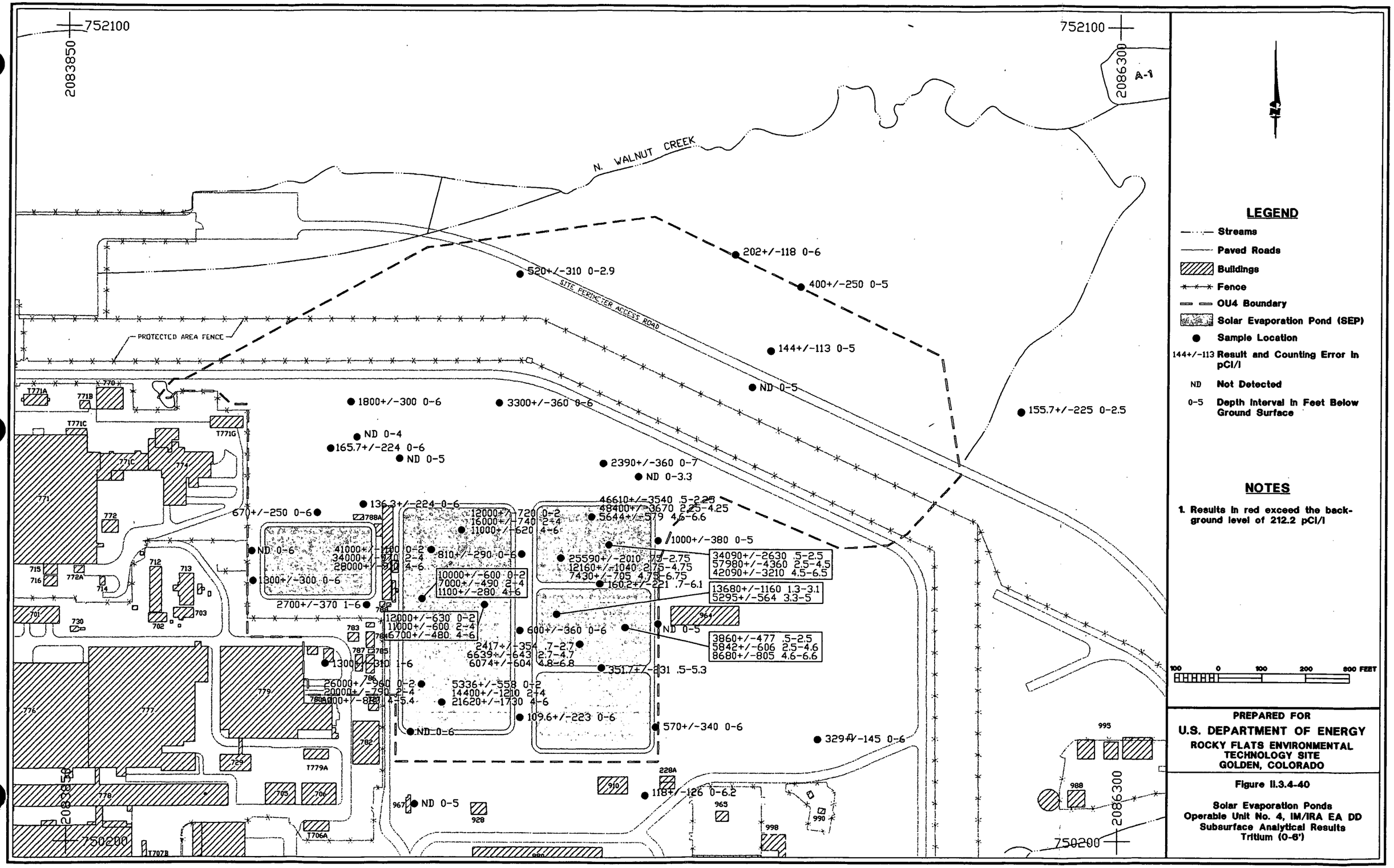
GOLDEN, COLORADO
Figure II.3.4-39
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Strontium-89/90 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 144+/-113 Result and Counting Error in pCi/l
- ND Not Detected
- 0-5 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 212.2 pCi/l

100 0 100 200 300 FEET

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Figure II.3.4-40

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Tritium (0-6')

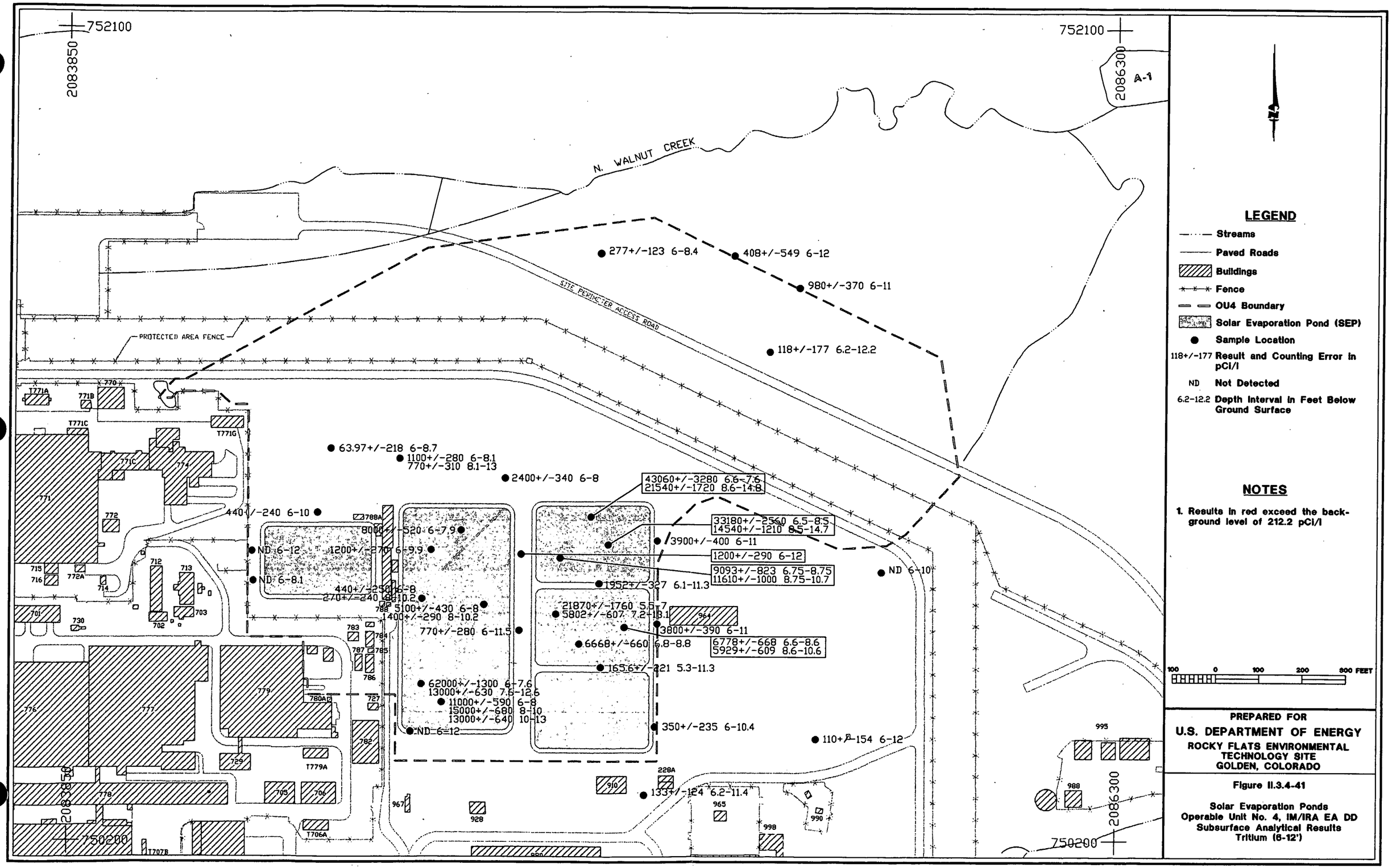
752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
277+/-123 6-8.4
408+/-549 6-12
980+/-370 6-11
118+/-177 6.2-12.2
63.97+/-218 6-8.7
1100+/-280 6-8.1
770+/-310 8.1-13
2400+/-340 6-8
43060+/-3280 6.6-7.6
21540+/-1720 8.6-14.8
440+/-240 6-10
8000+/-520 6-7.9
33180+/-2560 6.5-8.5
14540+/-1210 8.5-14.7
3900+/-400 6-11
ND 6-12
1200+/-270 6-9.9
1200+/-290 6-12
9093+/-823 6.75-8.75
11610+/-1000 8.75-10.7
ND 6-8.1
440+/-250 6-8
270+/-240 8-10.2
1952+/-327 6.1-11.3
ND 6-10
5100+/-430 6-8
1400+/-290 8-10.2
21870+/-1760 5.5-7
5802+/-607 7.2-13.1
770+/-280 6-11.5
3800+/-390 6-11
6668+/-660 6.8-8.8
6778+/-668 6.6-8.6
5929+/-609 8.6-10.6
165.6+/-221 5.3-11.3
62000+/-1300 6-7.6
13000+/-630 7.6-12.6
11000+/-590 6-8
15000+/-680 8-10
13000+/-640 10-13
ND 6-12
350+/-235 6-10.4
110+/-154 6-12
133+/-124 6.2-11.4
2083850
750200
2086300
750200
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
118+/-177 Result and Counting Error in pCi/l
ND Not Detected
6.2-12.2 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 212.2 pCi/l
100 0 100 200 800 FEET
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Figure II.3.4-41
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Tritium (6-12')

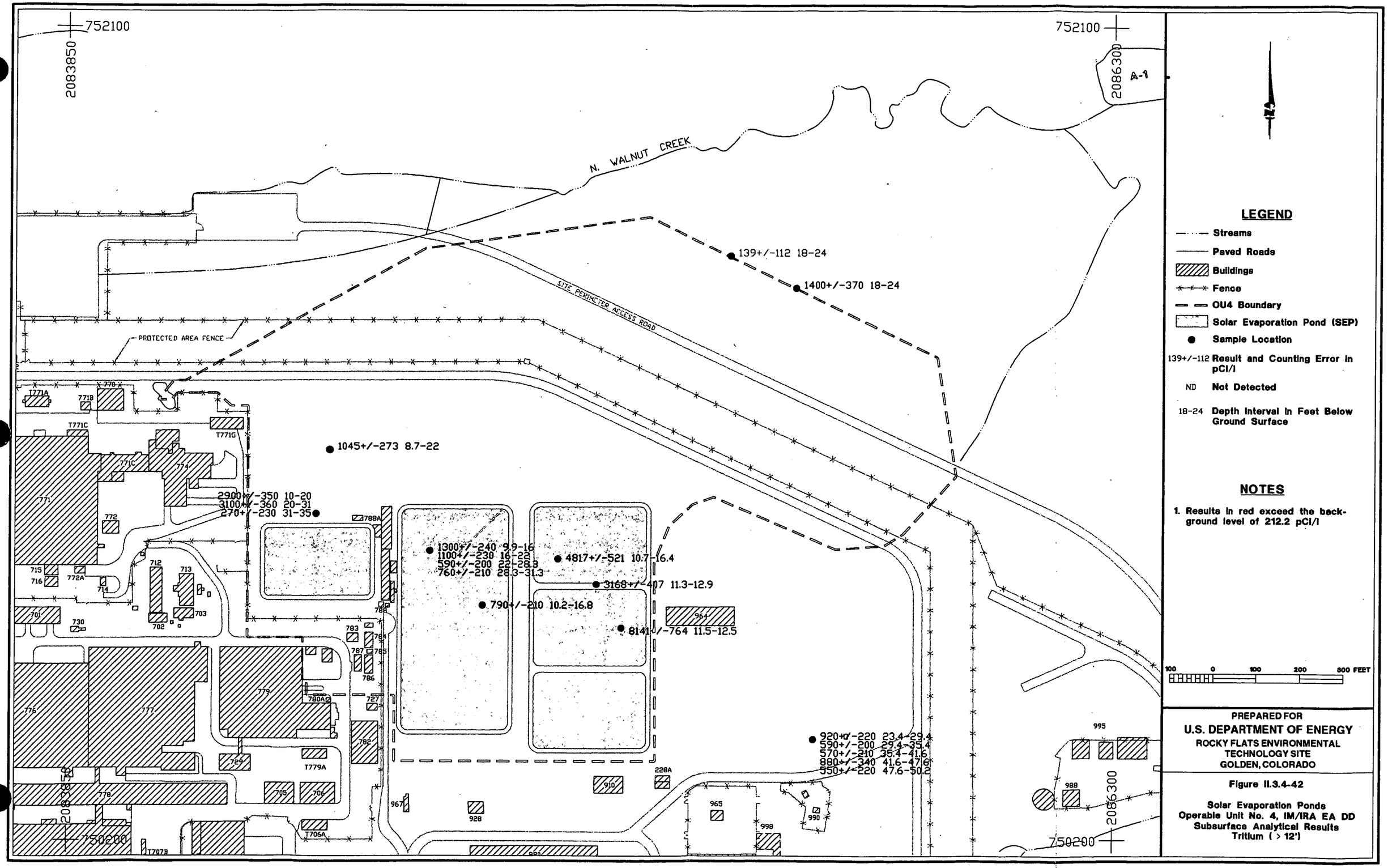
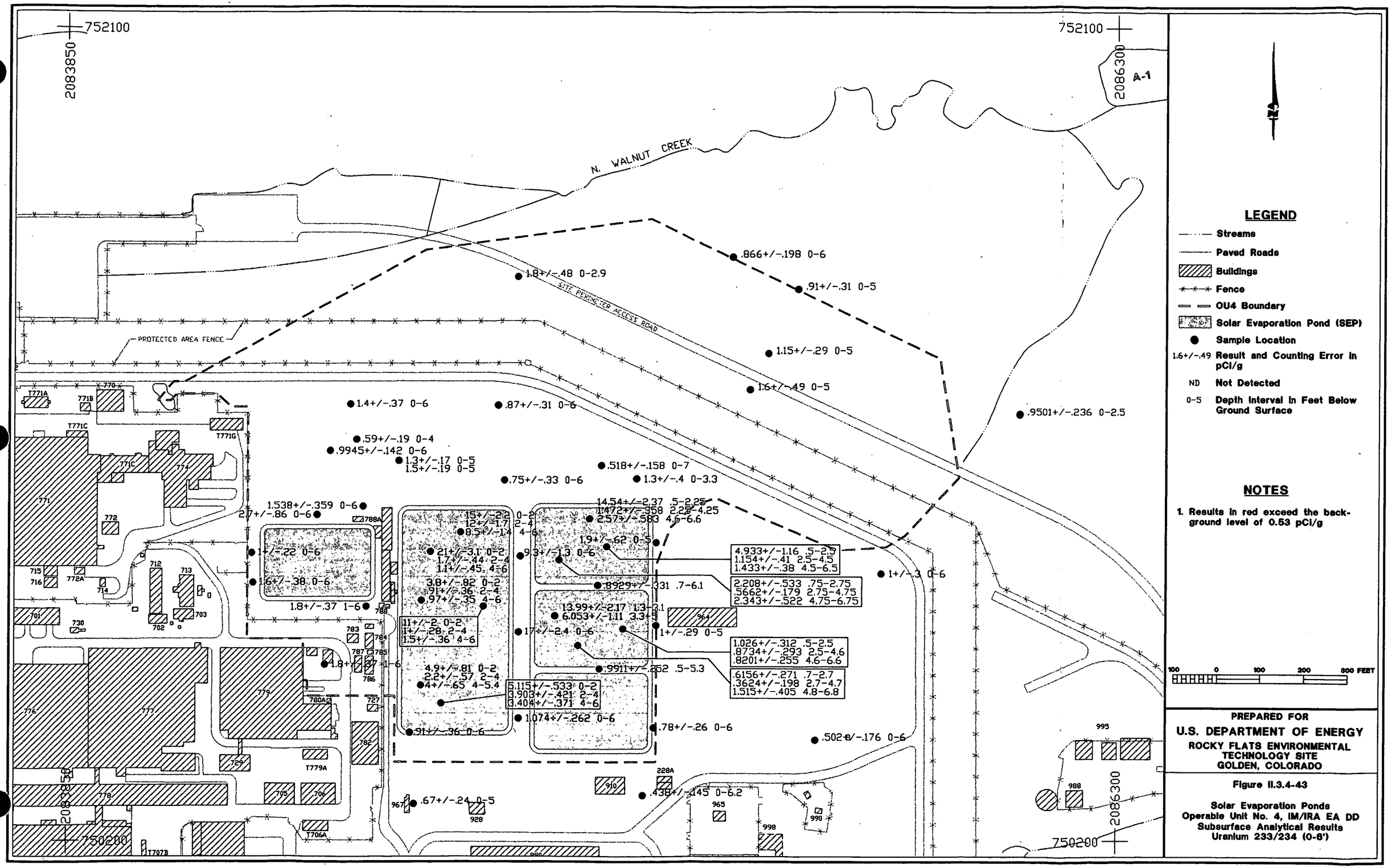


Figure II.3.4-42

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Tritium (> 12')


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
.866+/-.198 0-6
.91+/-.31 0-5
1.8+/-.48 0-2.9
1.15+/-.29 0-5
1.6+/-.49 0-5
.9501+/-.236 0-2.5
1.4+/-.37 0-6
.87+/-.31 0-6
.59+/-.19 0-4
.9945+/-.142 0-6
1.3+/-.17 0-5
1.5+/-.19 0-5
.518+/-.158 0-7
.75+/-.33 0-6
1.3+/-.4 0-3.3
1.538+/-.359 0-6
2.7+/-.86 0-6
14.54+/-2.37 .5-2.25
1.472+/-.358 2.25-4.25
2.573+/-.583 4.6-6.6
1.9+/-.62 0-5
4.933+/-1.16 .5-2.5
1.154+/-.41 2.5-4.5
1.433+/-.38 4.5-6.5
2.208+/-.533 .75-2.75
.5662+/-.179 2.75-4.75
2.343+/-.522 4.75-6.75
.8929+/-.331 .7-6.1
1+/-.3 0-6
1+/-.22 0-6
1.6+/-.38 0-6
1.8+/-.37 1-6
13.99+/-2.17 1.3-9.1
6.053+/-1.11 3.3-9
1+/-.29 0-5
1.026+/-.312 .5-2.5
.8734+/-.293 2.5-4.6
.8201+/-.255 4.6-6.6
.9911+/-.262 .5-5.3
.6156+/-.271 .7-2.7
.3624+/-.198 2.7-4.7
1.515+/-.405 4.8-6.8
5.115+/-.533 0-2
3.903+/-.421 2-4
3.404+/-.371 4-6
1.074+/-.262 0-6
.78+/-.26 0-6
.502+/-.176 0-6
.91+/-.36 0-6
.67+/-.24 0-5
.438+/-.145 0-6.2
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
1.6+/-.49 Result and Counting Error in pCi/g
ND Not Detected
0-5 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 0.53 pCi/g
100 0 100 200 300 FEET
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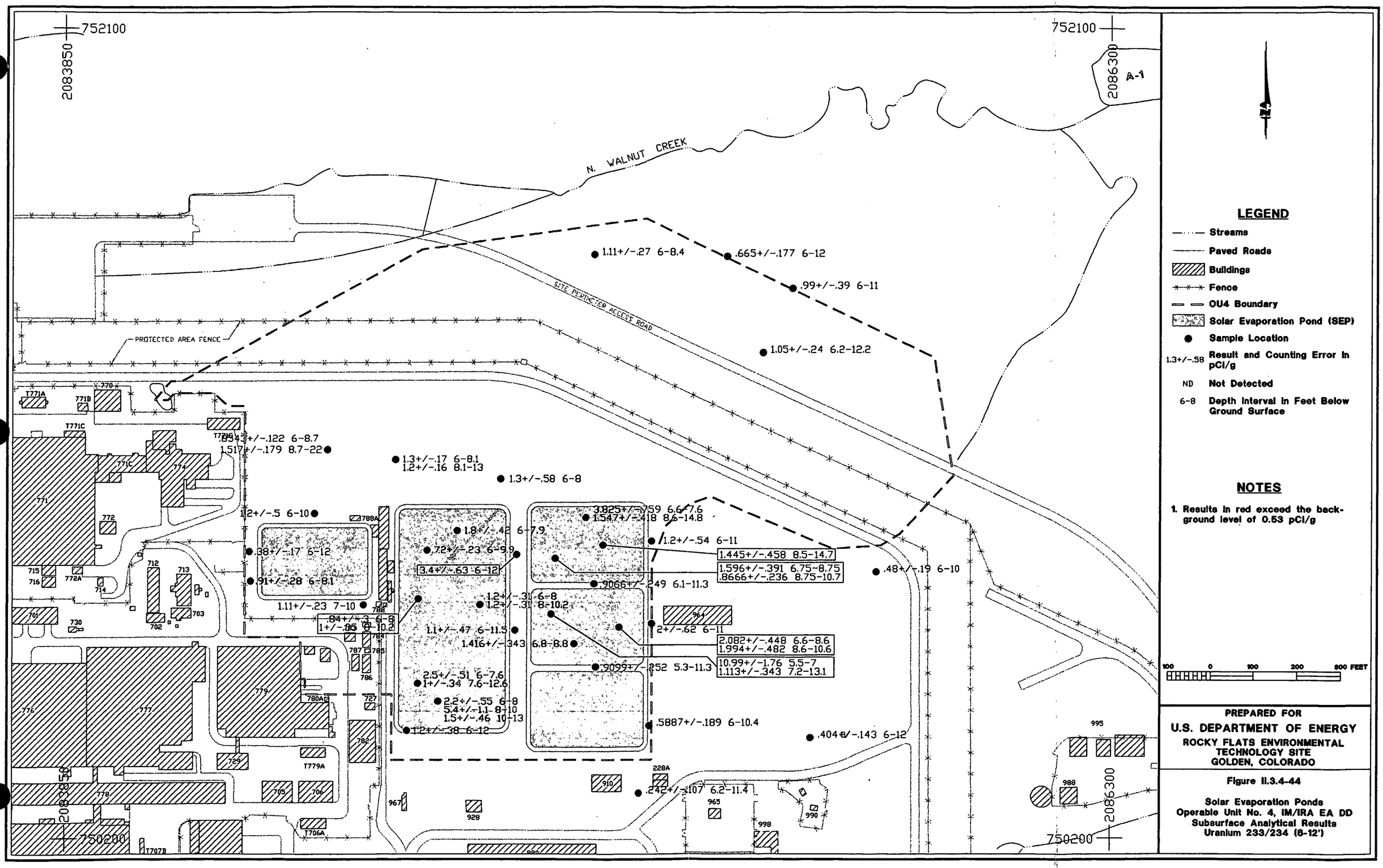
GOLDEN, COLORADO
Figure II.3.4-43
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Uranium 233/234 (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 1.3+/-.58 Result and Counting Error in pCi/g
- ND Not Detected
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.53 pCi/g

100 0 100 200 300 FEET

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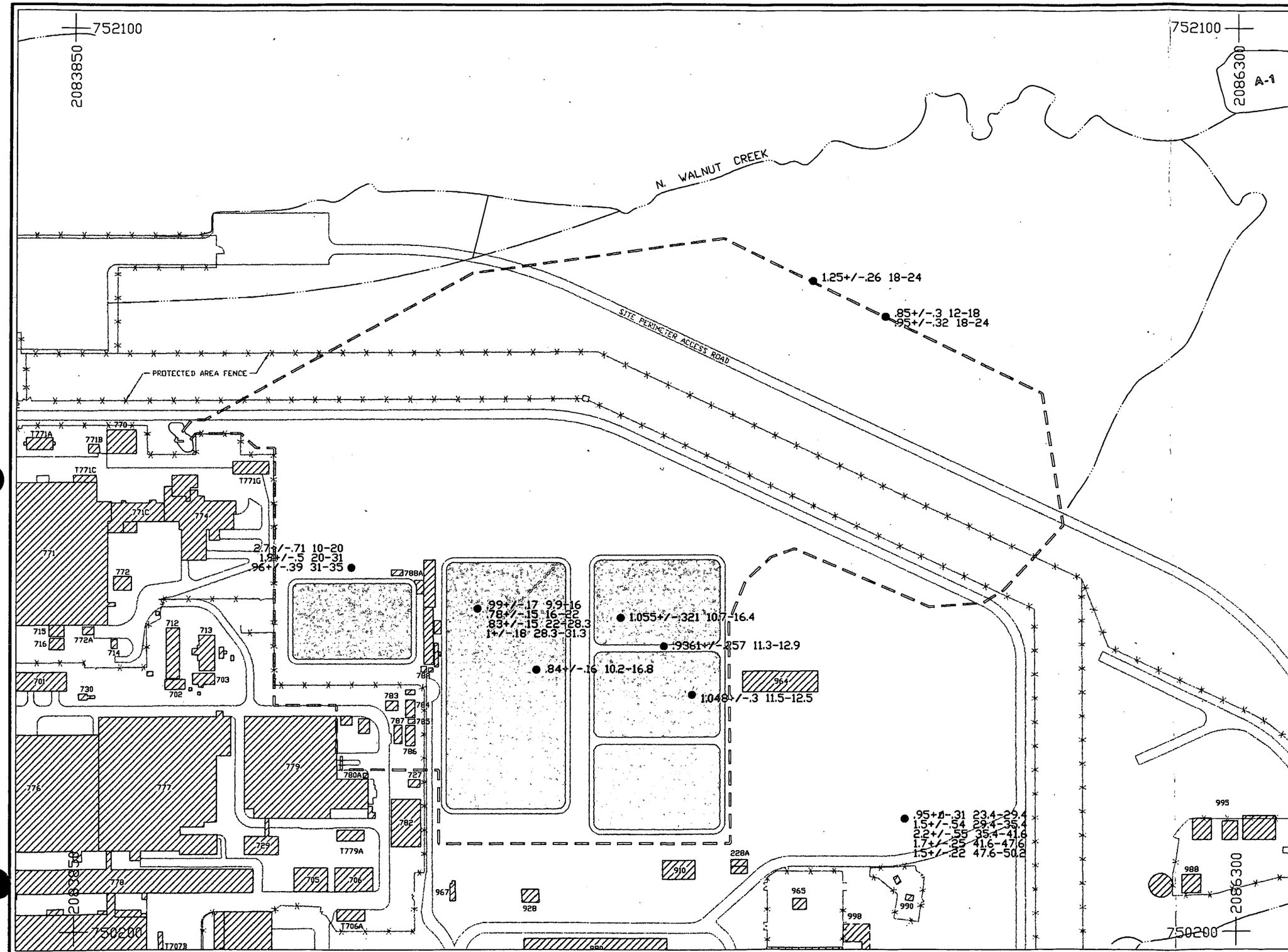
Figure II.3.4-44

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Uranium 233/234 (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 2.7+/-.71 Result and Counting Error in pCi/g
- ND Not Detected
- 10-20 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.53 pCi/g

100 0 100 200 300 FEET

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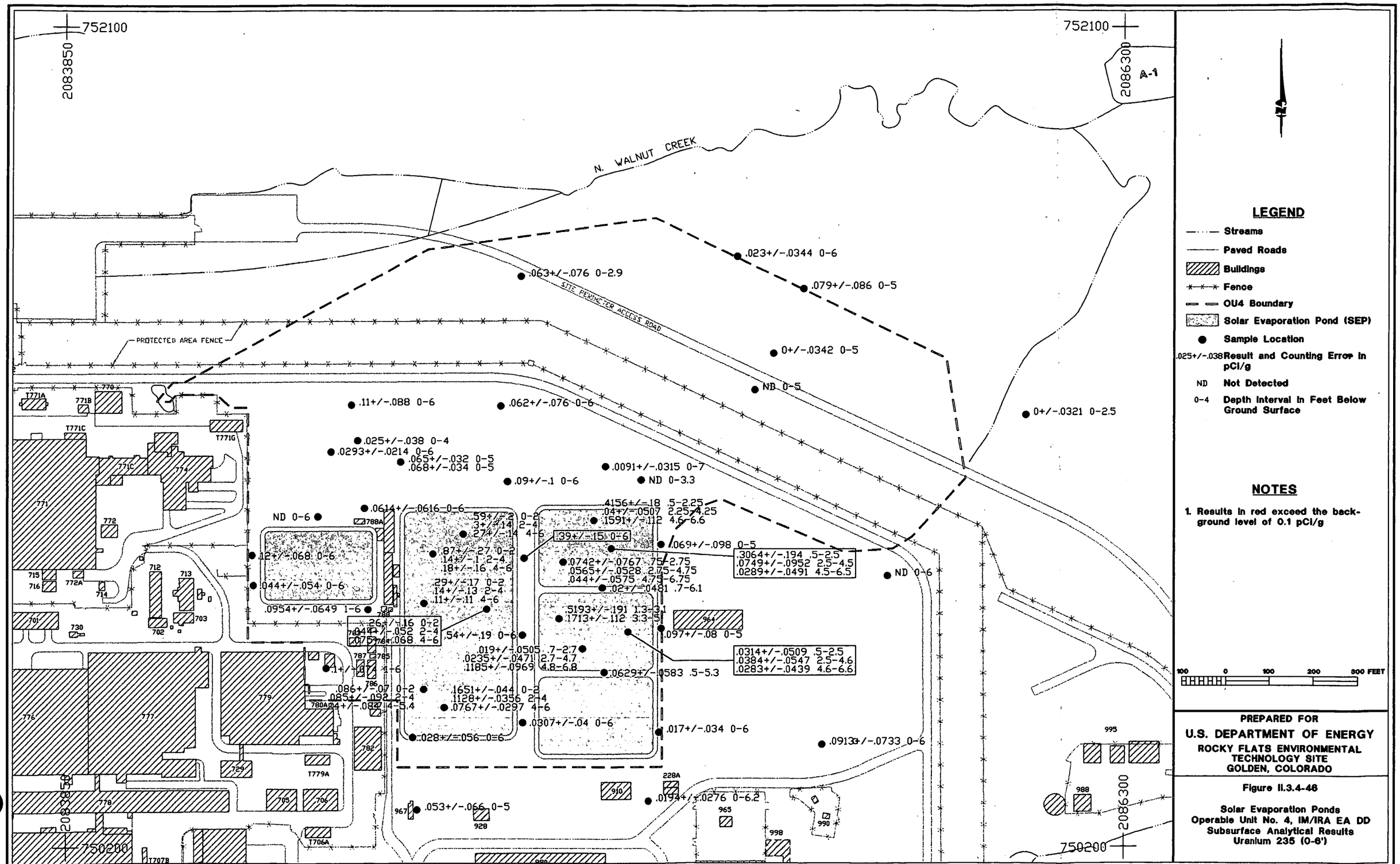
GOLDEN, COLORADO

Figure II.3.4-45

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Subsurface Analytical Results Uranium 233/234 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .025+/-.038 Result and Counting Error in pCi/g
- ND Not Detected
- 0-4 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.1 pCi/g

100 0 100 200 300 FEET

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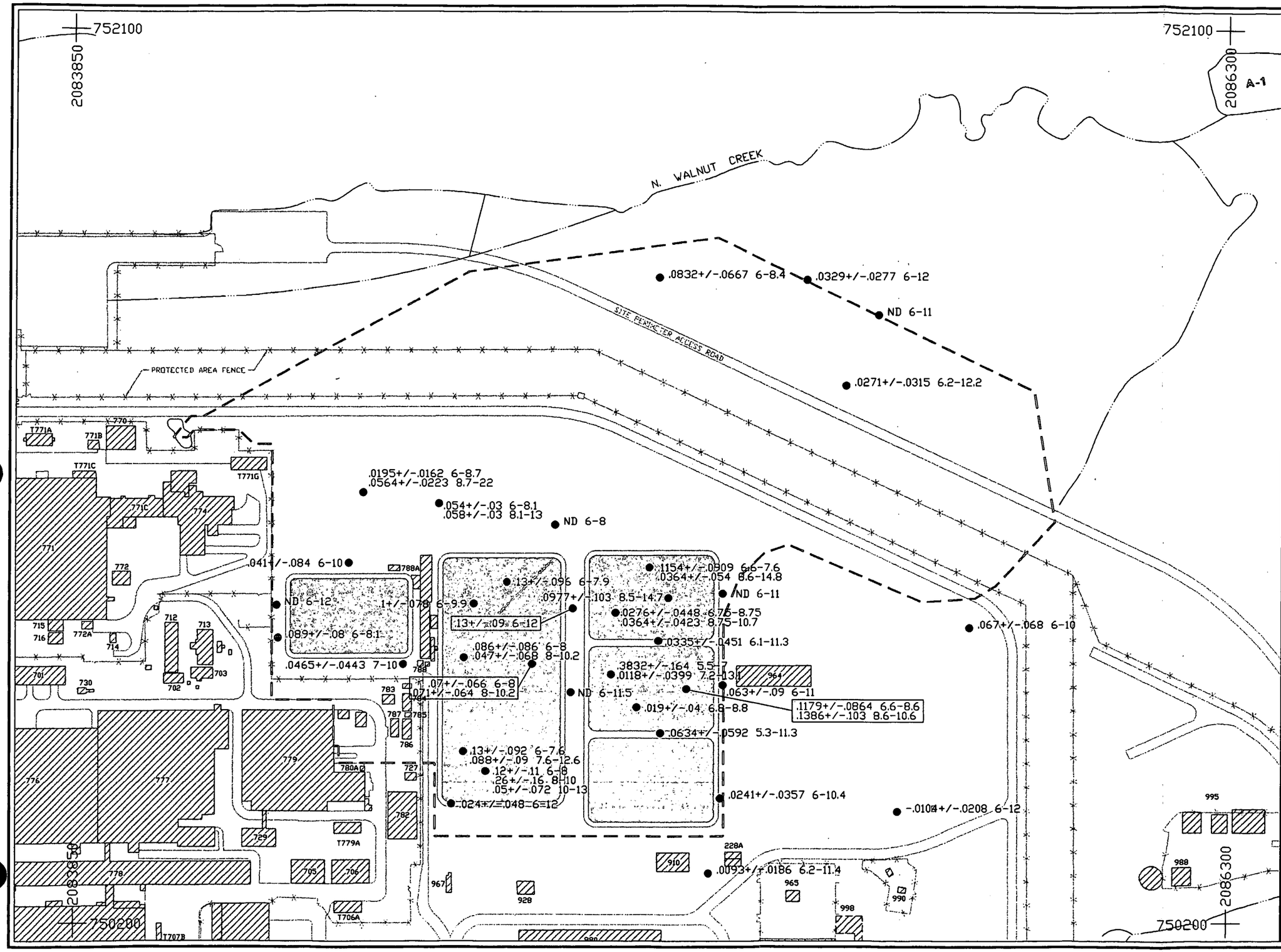
Figure II.3.4-46

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Uranium 235 (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .019+/-.04 Result and Counting Error in pCi/g
- ND Not Detected
- 6.8-8.8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.1 pCi/g

100 0 100 200 600 FEET

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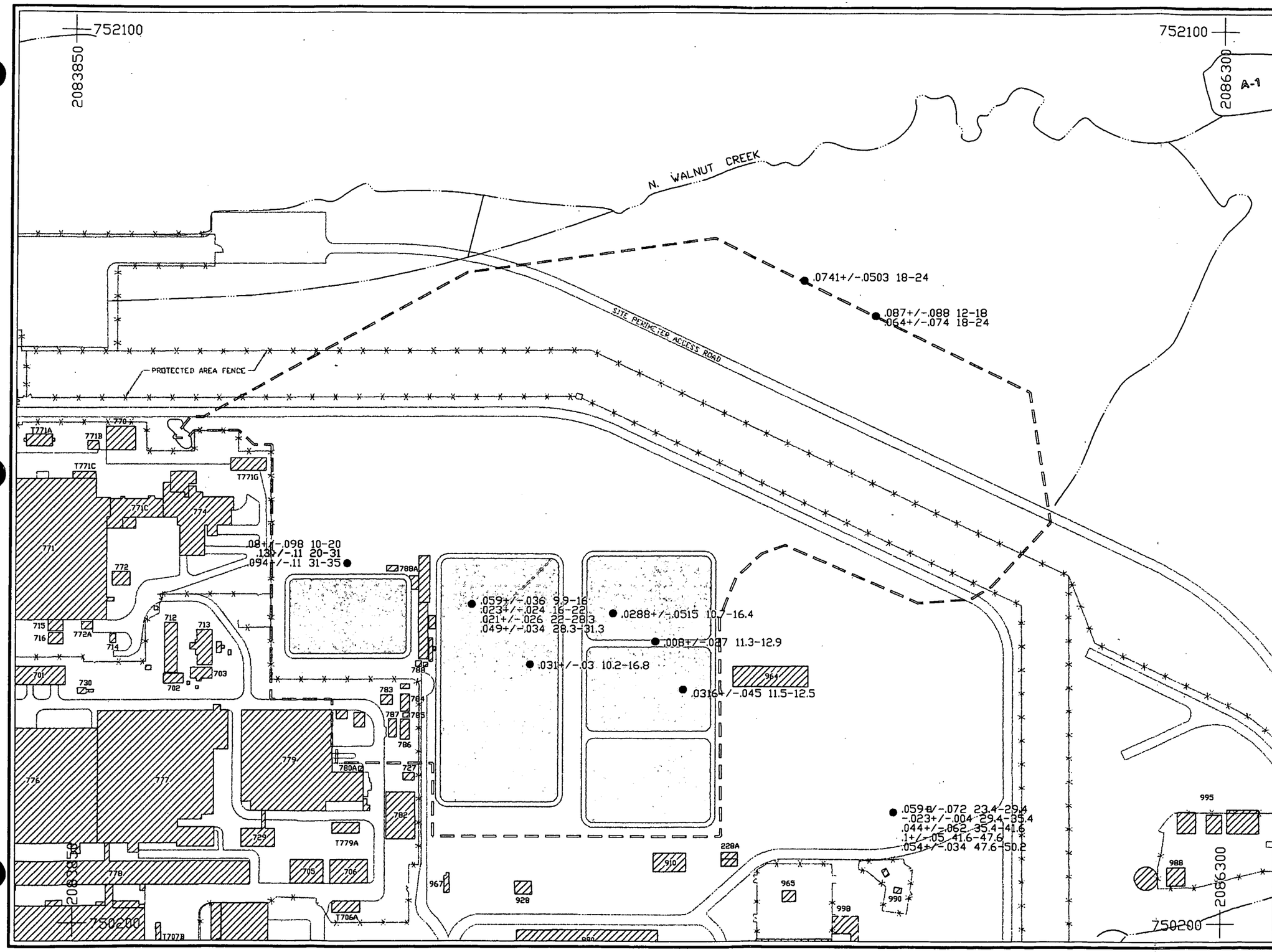
Figure II.3.4-47

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Uranium 235 (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- .087+/-.088 Result and Counting Error in pCi/g
- ND Not Detected
- 12-18 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.1 pCi/g

100 0 100 200 300 FEET

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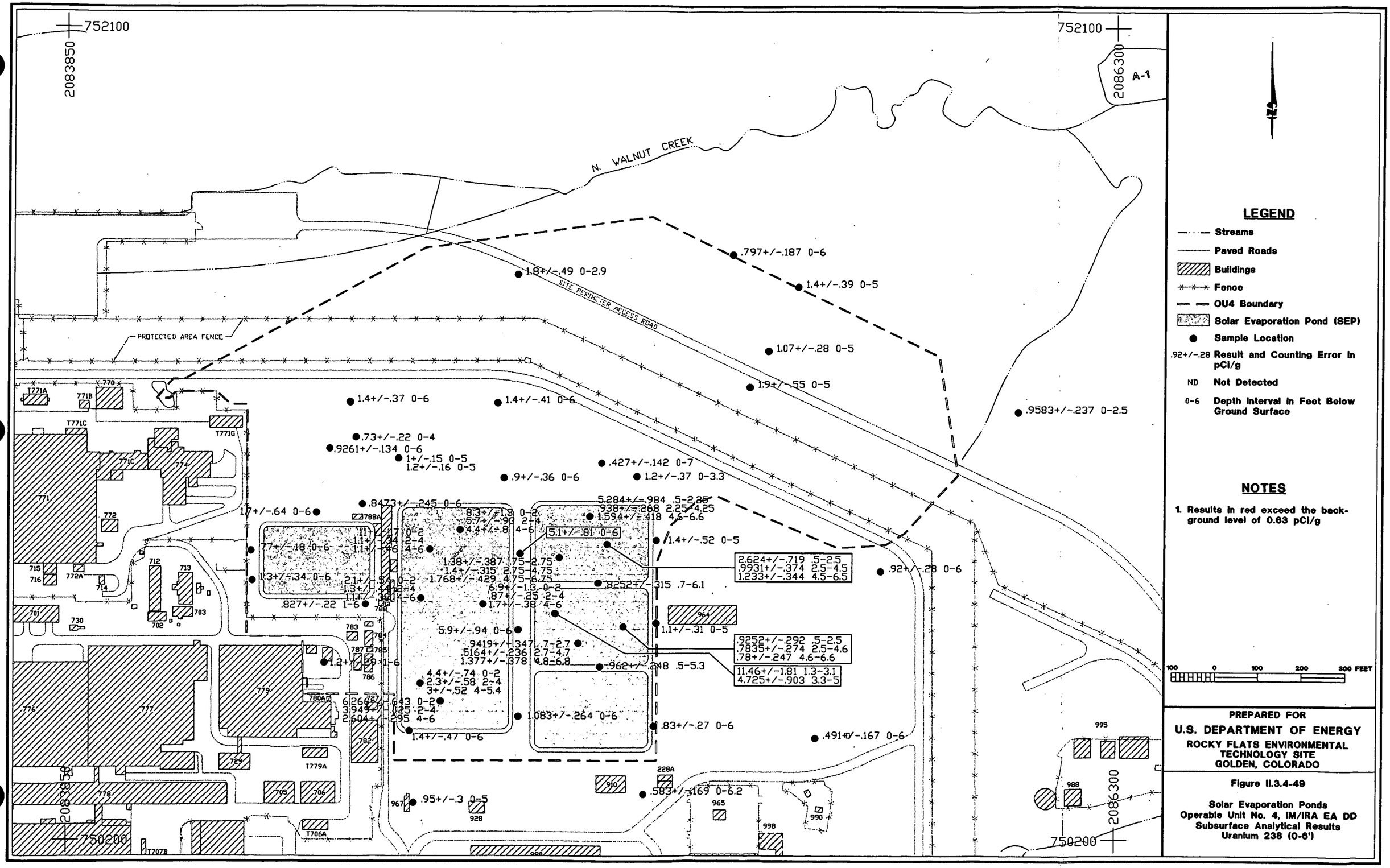
GOLDEN, COLORADO

Figure II.3.4-48

Solar Evaporation Ponds Operable Unit No. 4, IM/IRA EA DD Subsurface Analytical Results Uranium 235 (> 12')



752100
2083850
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
.797+/-.187 0-6
1.8+/-.49 0-2.9
1.4+/-.39 0-5
1.07+/-.28 0-5
1.9+/-.55 0-5
.9583+/-.237 0-2.5
1.4+/-.37 0-6
1.4+/-.41 0-6
.73+/-.22 0-4
.9261+/-.134 0-6
1+/-.15 0-5
1.2+/-.16 0-5
.427+/-.142 0-7
.9+/-.36 0-6
1.2+/-.37 0-3.3
.8473+/-.245 0-6
1.7+/-.64 0-6
5.284+/-.984 .5-2.25
.938+/-.268 2.25-4.25
1.594+/-.418 4.6-6.6
5.1+/-.81 0-6
1.4+/-.52 0-5
2.624+/-.719 .5-2.5
.9931+/-.374 2.5-4.5
1.233+/-.344 4.5-6.5
.92+/-.28 0-6
.8252+/-.315 .7-6.1
1.1+/-.31 0-5
.9252+/-.292 .5-2.5
.7835+/-.274 2.5-4.6
.78+/-.247 4.6-6.6
11.46+/-1.81 1.3-3.1
4.725+/-.903 3.3-5
.962+/-.248 .5-5.3
.827+/-.22 1-6
5.9+/-.94 0-6
.9419+/-.347 .7-2.7
.5164+/-.236 2.7-4.7
1.377+/-.378 4.8-6.8
4.4+/-.74 0-2
2.3+/-.58 2-4
3+/-.52 4-5.4
1.083+/-.264 0-6
.83+/-.27 0-6
1.4+/-.47 0-6
.491+/-.167 0-6
.583+/-.169 0-6.2
.95+/-.3 0-5
750200
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.92+/-.28 Result and Counting Error in pCi/g
ND Not Detected
0-6 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 0.63 pCi/g
100 0 100 200 300 FEET
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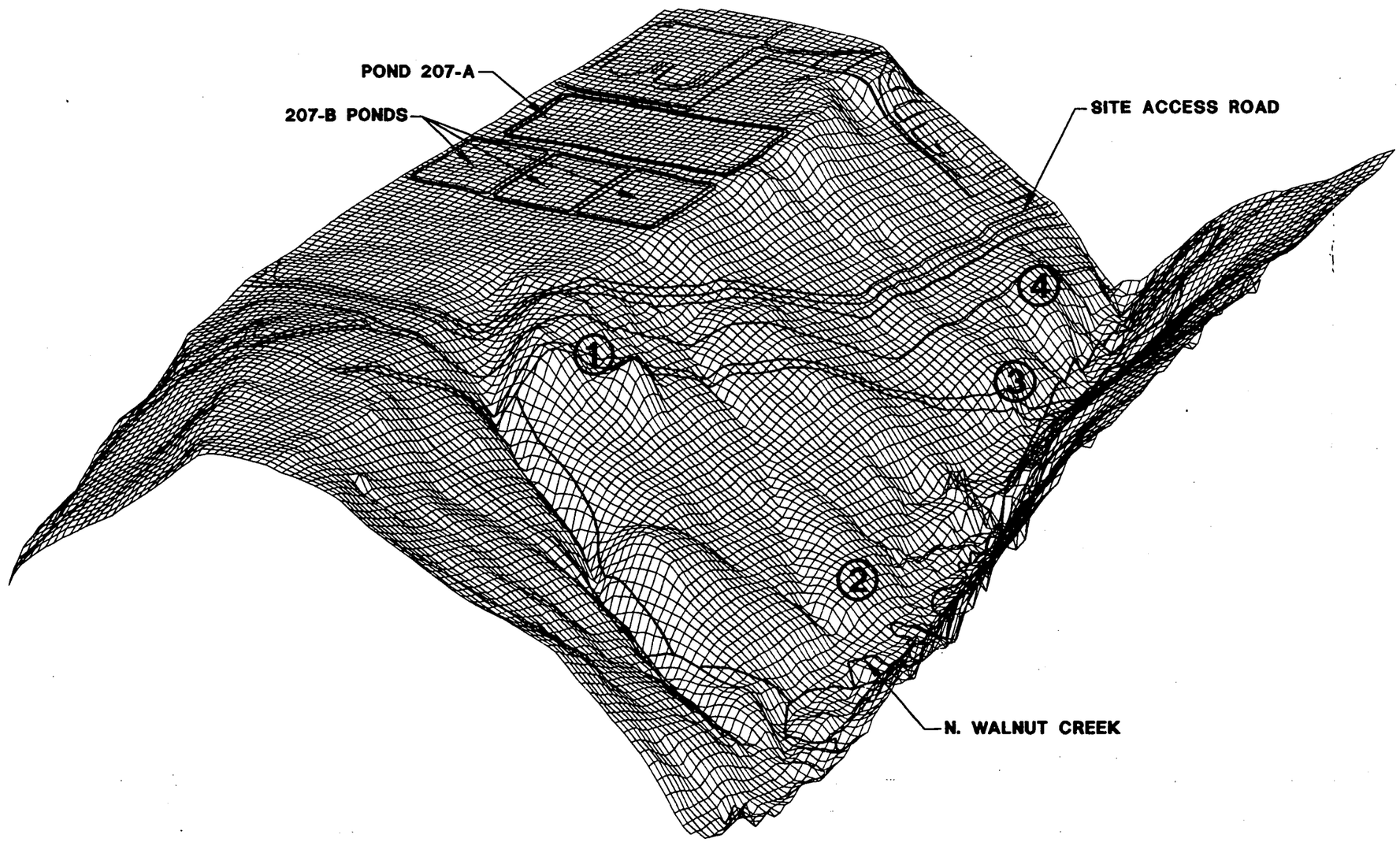
GOLDEN, COLORADO
Figure II.3.4-49
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Uranium 238 (0-6')

1951 Surface Topography



Note: Pond Outlines and Other Cultural Features Shown For Comparative Purposes.

LEGEND:

Inferred Slump Block Locations

100 0 100 200 300 FEET

Note: Vertical Exaggeration 5X

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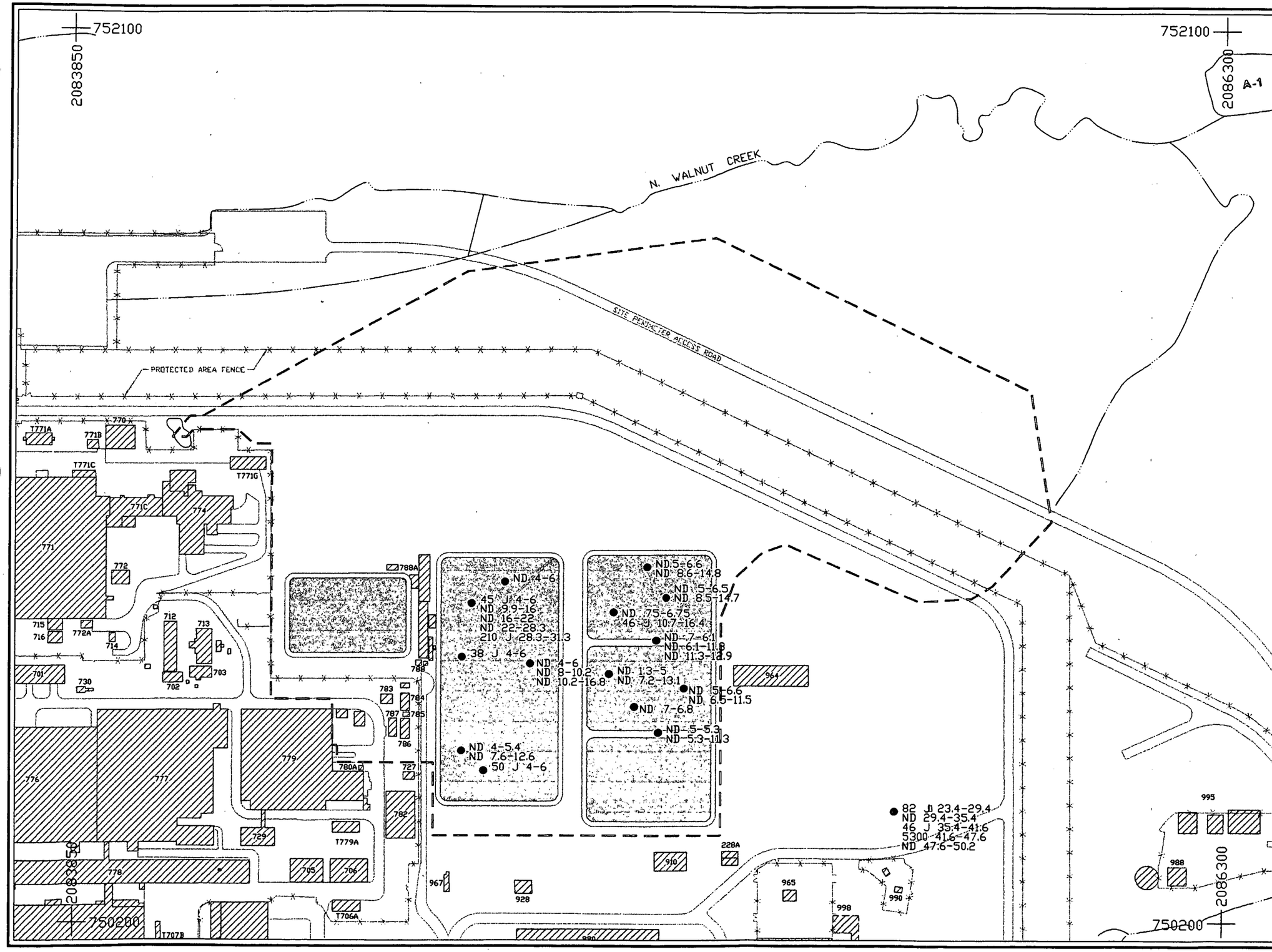
Figure II.3.5-2

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
1951 Surface Topography
OU4 Area



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 5300 Results in ug/kg
- ND Not Detected
- 41.6-47.6 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL
3. Results in black are qualified with a "J" and are estimated values below the CRQL
4. This map represents all results for all depth intervals

100 0 100 200 300 FEET

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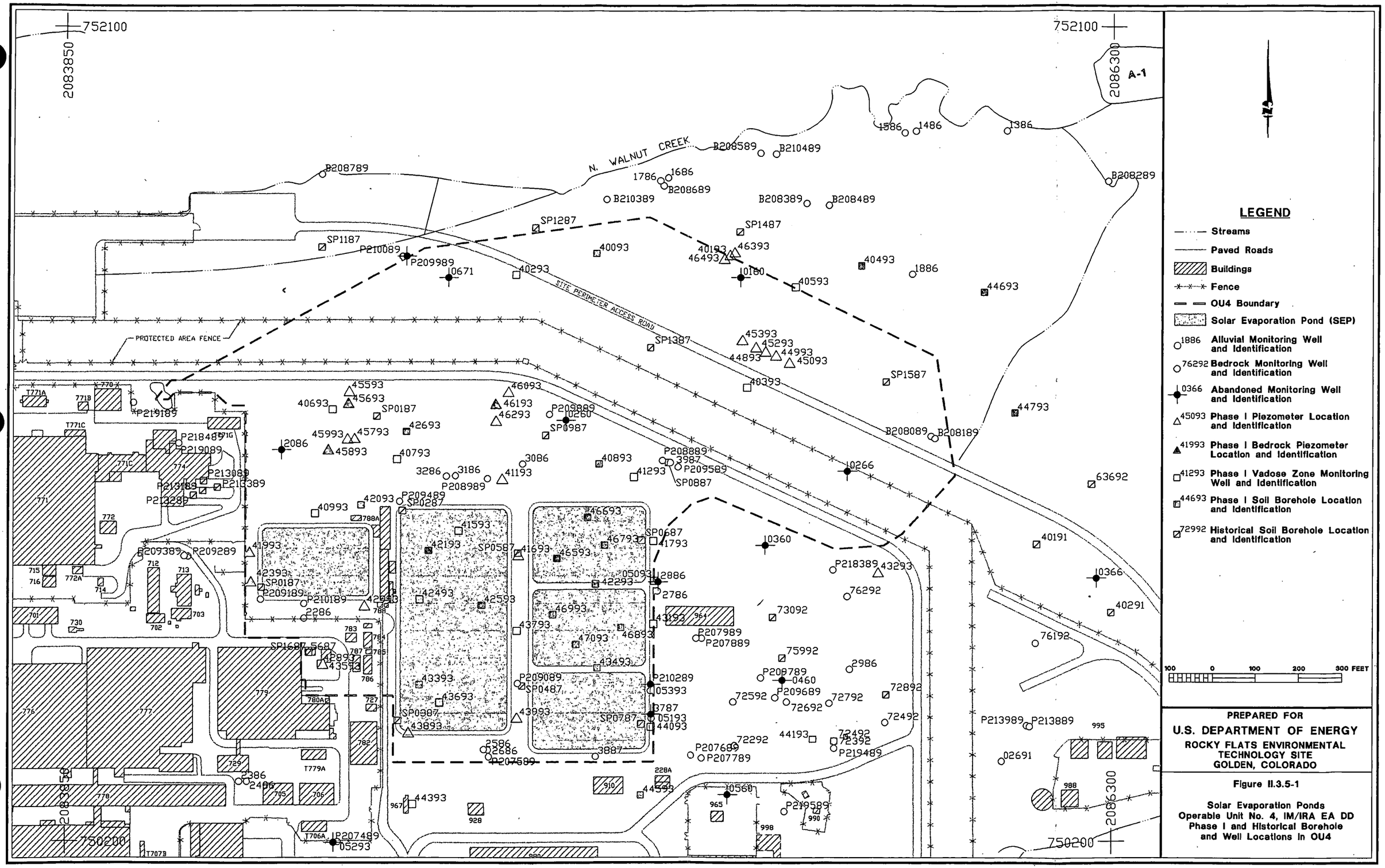
GOLDEN, COLORADO

Figure II.3.4-61

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Bis(2-ethylhexyl)phthalate


752100
2083850
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
750200
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
1886 Alluvial Monitoring Well and Identification
76292 Bedrock Monitoring Well and Identification
0366 Abandoned Monitoring Well and Identification
45093 Phase I Piezometer Location and Identification
41993 Phase I Bedrock Piezometer Location and Identification
41293 Phase I Vadose Zone Monitoring Well and Identification
44693 Phase I Soil Borehole Location and Identification
72992 Historical Soil Borehole Location and Identification
100 0 100 200 300 FEET
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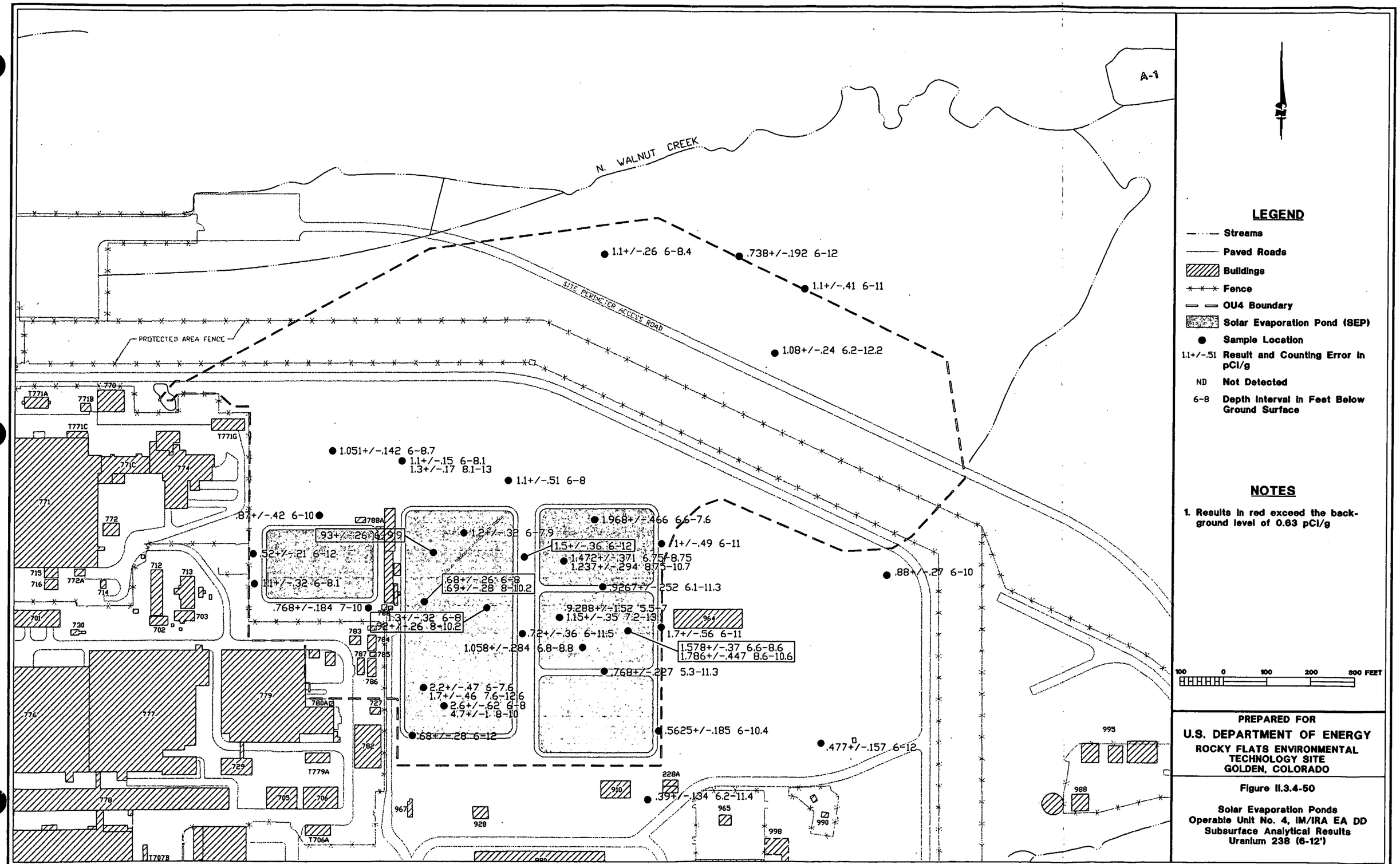
GOLDEN, COLORADO
Figure II.3.5-1
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Phase I and Historical Borehole and Well Locations in OU4



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- Sample Location
- 1.1+/-.51 Result and Counting Error in pCi/g
- ND Not Detected
- 6-8 Depth Interval in Feet Below Ground Surface

NOTES

1. Results in red exceed the background level of 0.63 pCi/g

100 0 100 200 300 FEET

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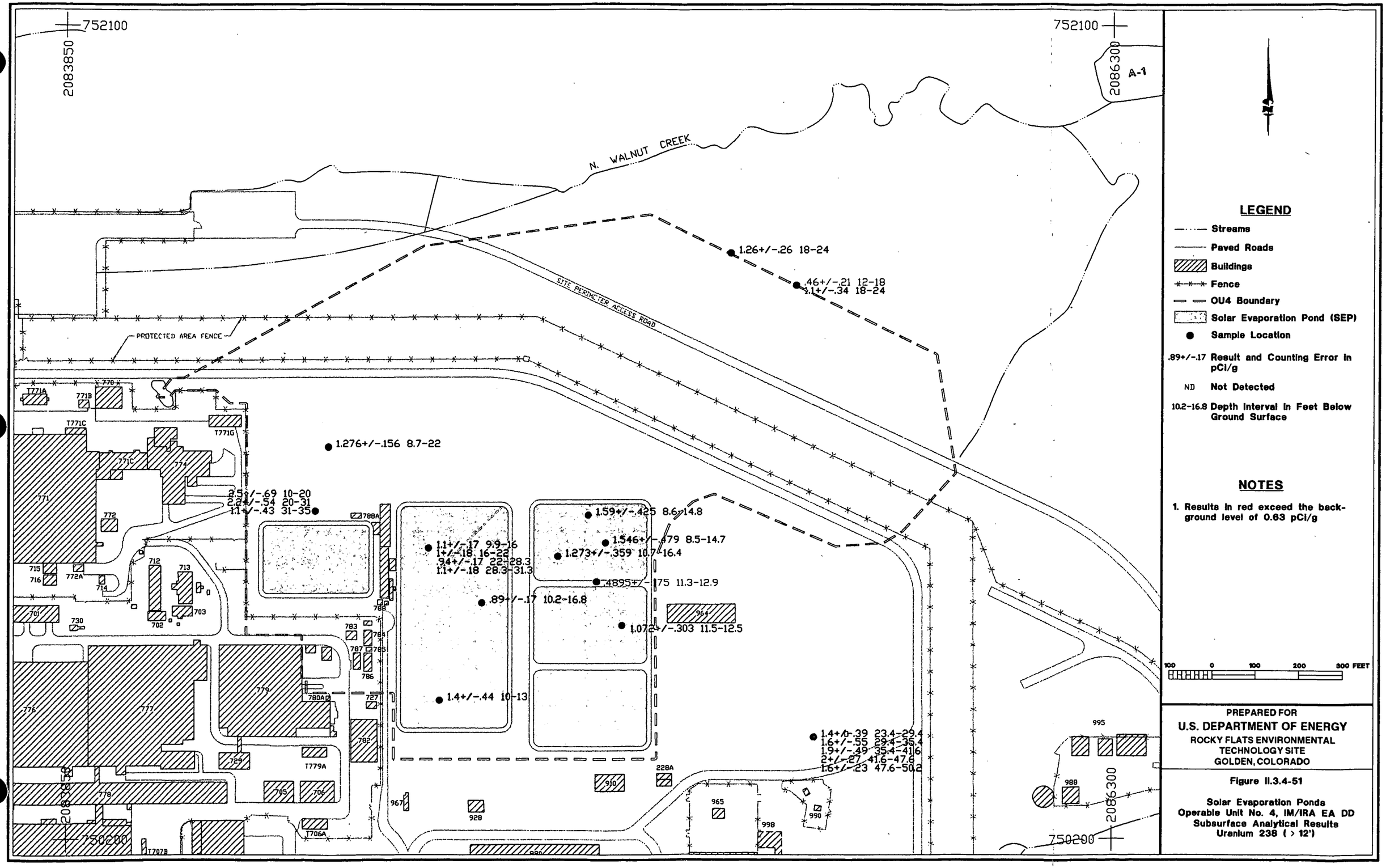
Figure II.3.4-50

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Uranium 238 (6-12')


752100
2083850
752100
2086300
A-1
N. WALNUT CREEK
SITE PERIMETER ACCESS ROAD
PROTECTED AREA FENCE
1.26+/-.26 18-24
.46+/-.21 12-18
1.1+/-.34 18-24
1.276+/-.156 8.7-22
2.5+/-.69 10-20
2.2+/-.54 20-31
1.1+/-.43 31-35
1.59+/-.425 8.6-14.8
1.546+/-.479 8.5-14.7
1.1+/-.17 9.9-16
1+/-.18 16-22
.94+/-.17 22-28.3
1.1+/-.18 28.3-31.3
1.273+/-.359 10.7-16.4
.4895+/-.175 11.3-12.9
.89+/-.17 10.2-16.8
1.072+/-.303 11.5-12.5
1.4+/-.44 10-13
1.4+/-.39 23.4-29.4
1.6+/-.55 29.4-35.4
1.9+/-.49 35.4-41.6
2+/-.27 41.6-47.6
1.6+/-.23 47.6-50.2
771
771A
771B
770
771C
771G
774
772
772A
715
716
714
712
713
703
702
701
730
788A
788
783
784
787
785
786
779
780A
727
782
789
T779A
776
777
778
705
706
T706A
T707B
967
928
910
228A
965
998
990
988
995
964
750200
2083850
2086300
LEGEND
Streams
Paved Roads
Buildings
Fence
OU4 Boundary
Solar Evaporation Pond (SEP)
Sample Location
.89+/-.17 Result and Counting Error in pCi/g
ND Not Detected
10.2-16.8 Depth Interval in Feet Below Ground Surface
NOTES
1. Results in red exceed the background level of 0.63 pCi/g
100 0 100 200 300 FEET
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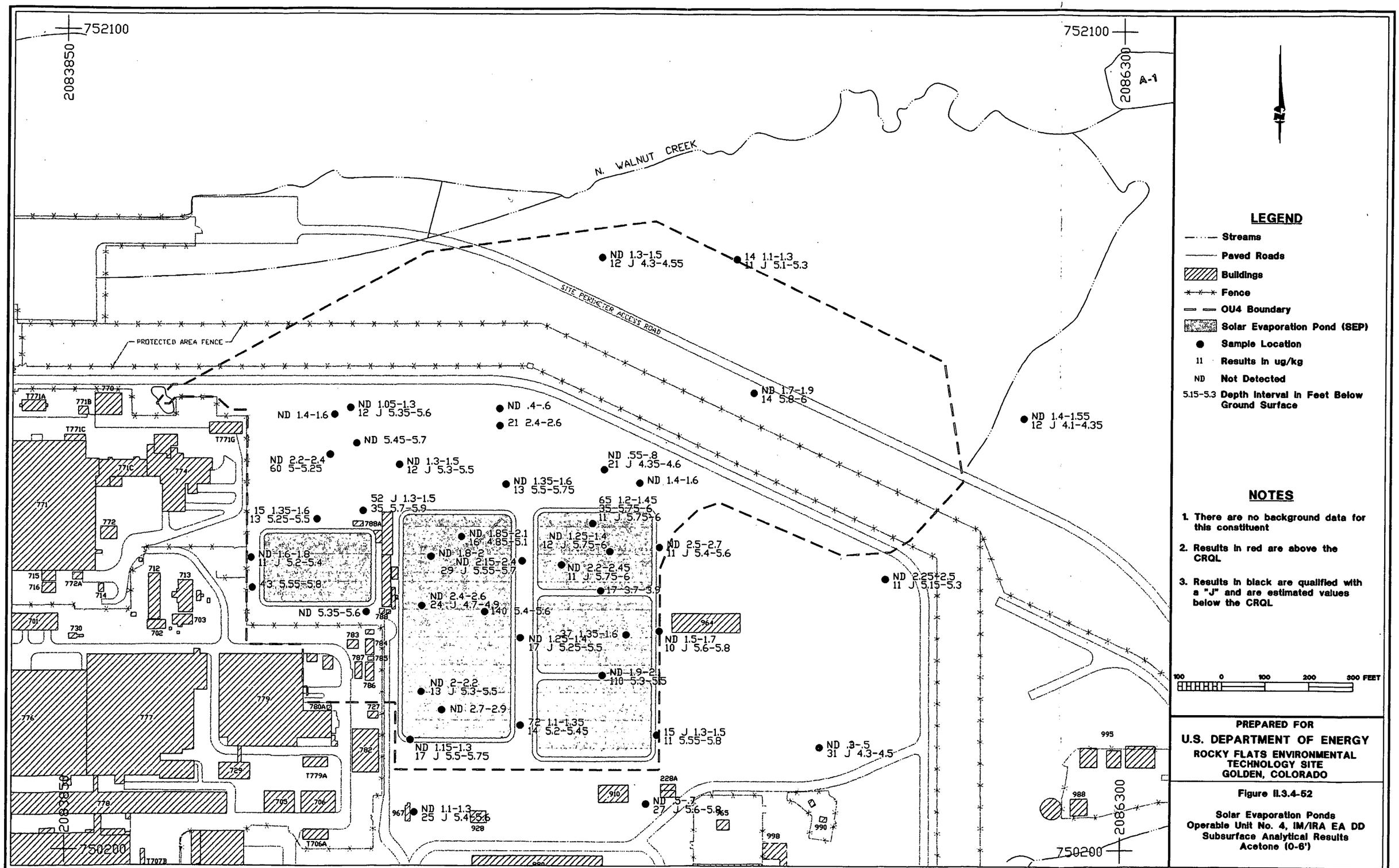
GOLDEN, COLORADO
Figure II.3.4-51
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Uranium 238 (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 11 Results in ug/kg
- ND Not Detected
- 5.15-5.3 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL
3. Results in black are qualified with a "J" and are estimated values below the CRQL

100 0 100 200 300 FEET

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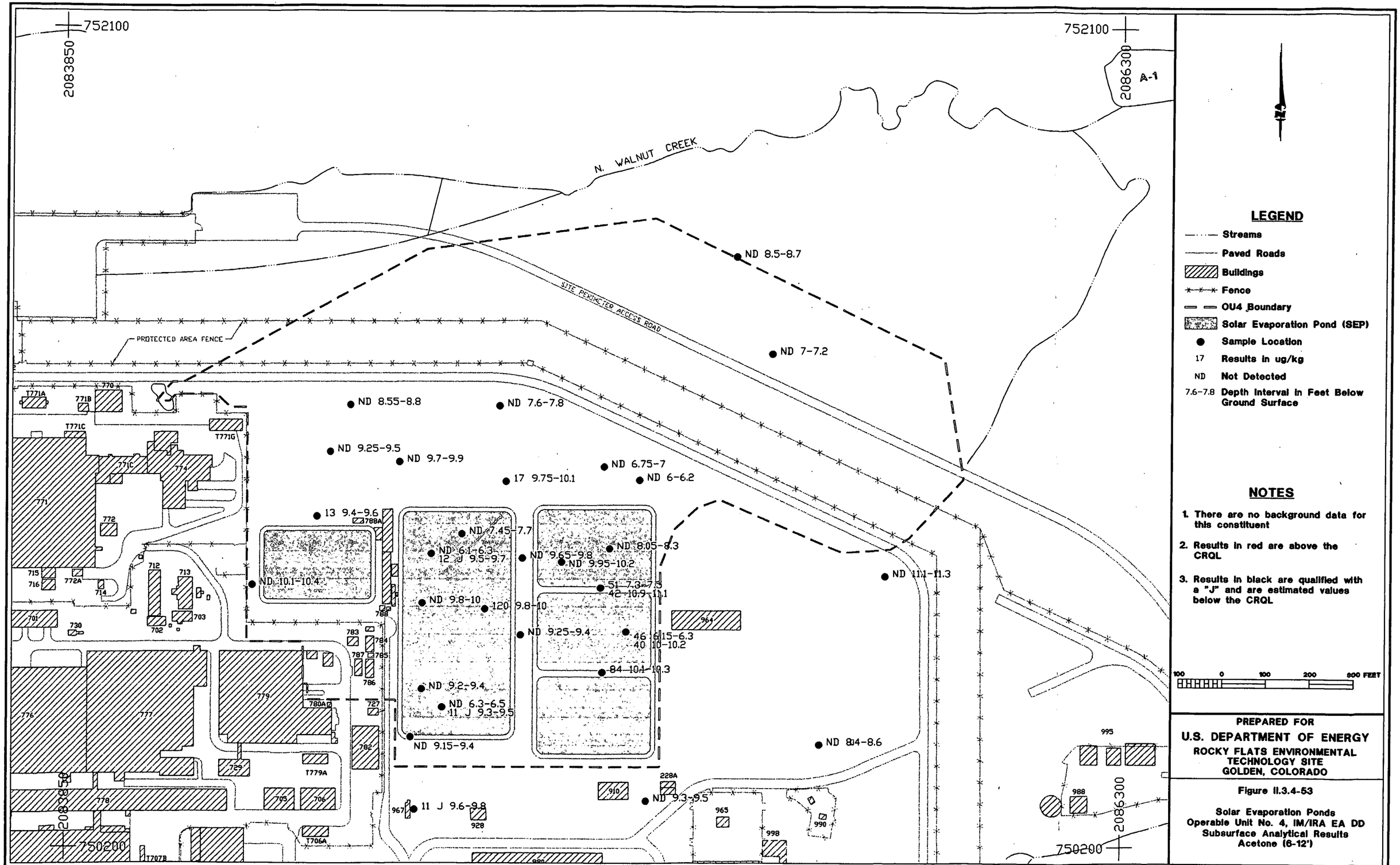
Figure II.3.4-52

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Acetone (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 17 Results in ug/kg
- ND Not Detected
- 7.6-7.8 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL
3. Results in black are qualified with a "J" and are estimated values below the CRQL

100 0 100 200 800 FEET

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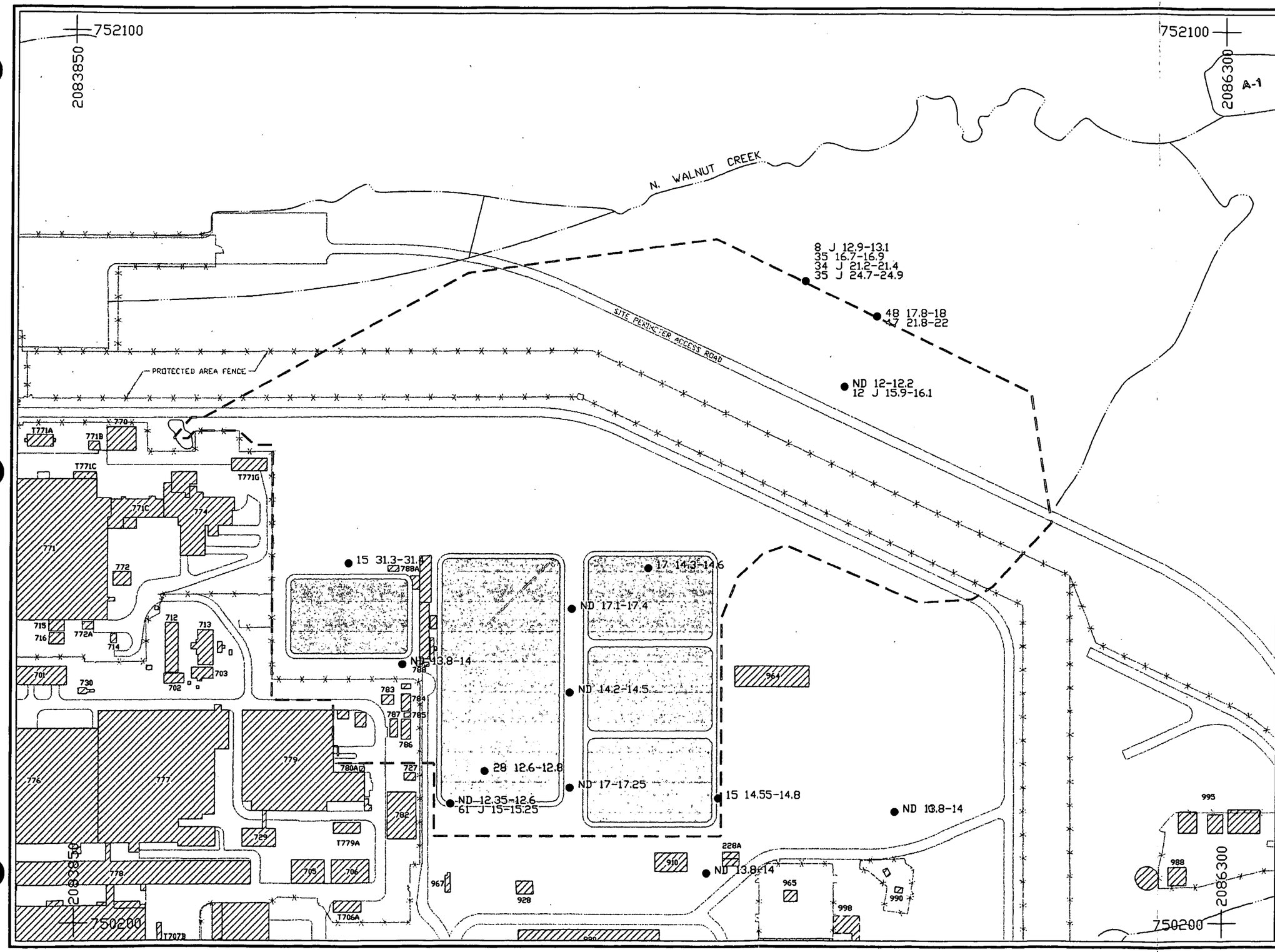
Figure II.3.4-53

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Acetone (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 17 Results in ug/kg
- ND Not Detected
- 17.1-17.4 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL
3. Results in black are qualified with a "J" and are estimated values below the CRQL

100 0 100 200 300 FEET

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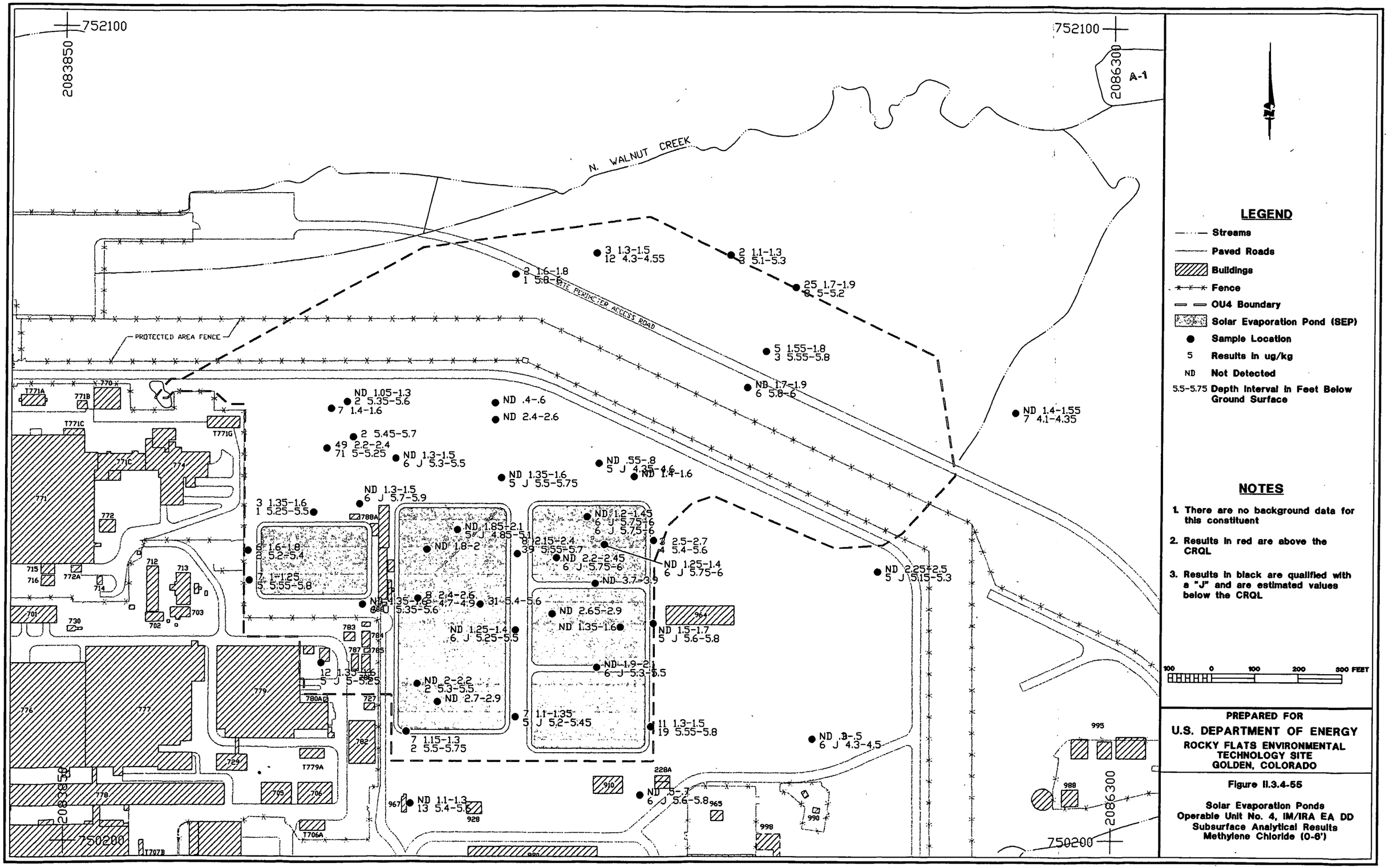
Figure II.3.4-54

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Acetone (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 5 Results in ug/kg
- ND Not Detected
- 5.5-5.75 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL
3. Results in black are qualified with a "J" and are estimated values below the CRQL

100 0 100 200 300 FEET

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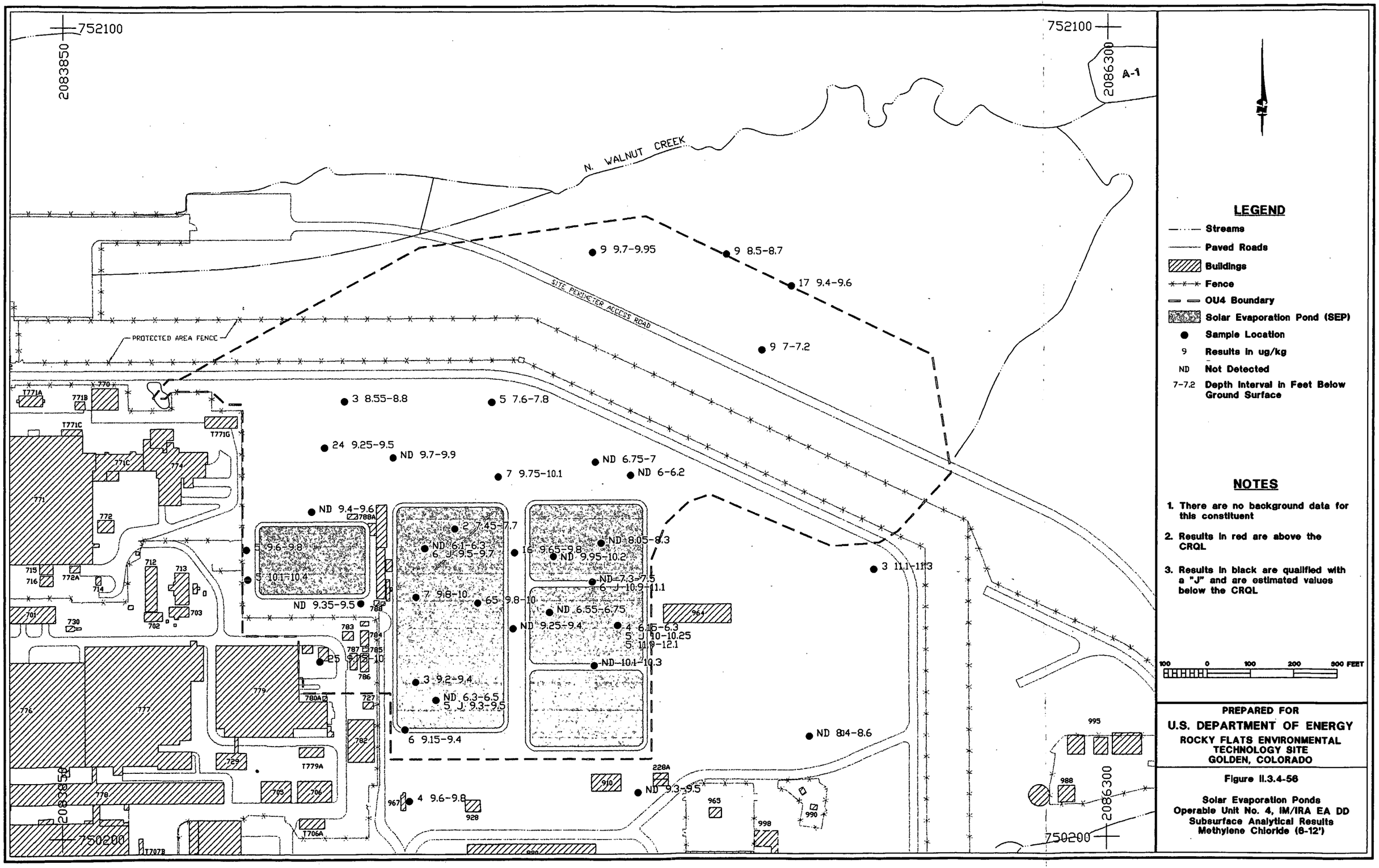
Figure II.3.4-55

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Methylene Chloride (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 9 Results in ug/kg
- ND Not Detected
- 7-7.2 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL
3. Results in black are qualified with a "J" and are estimated values below the CRQL

100 0 100 200 300 FEET

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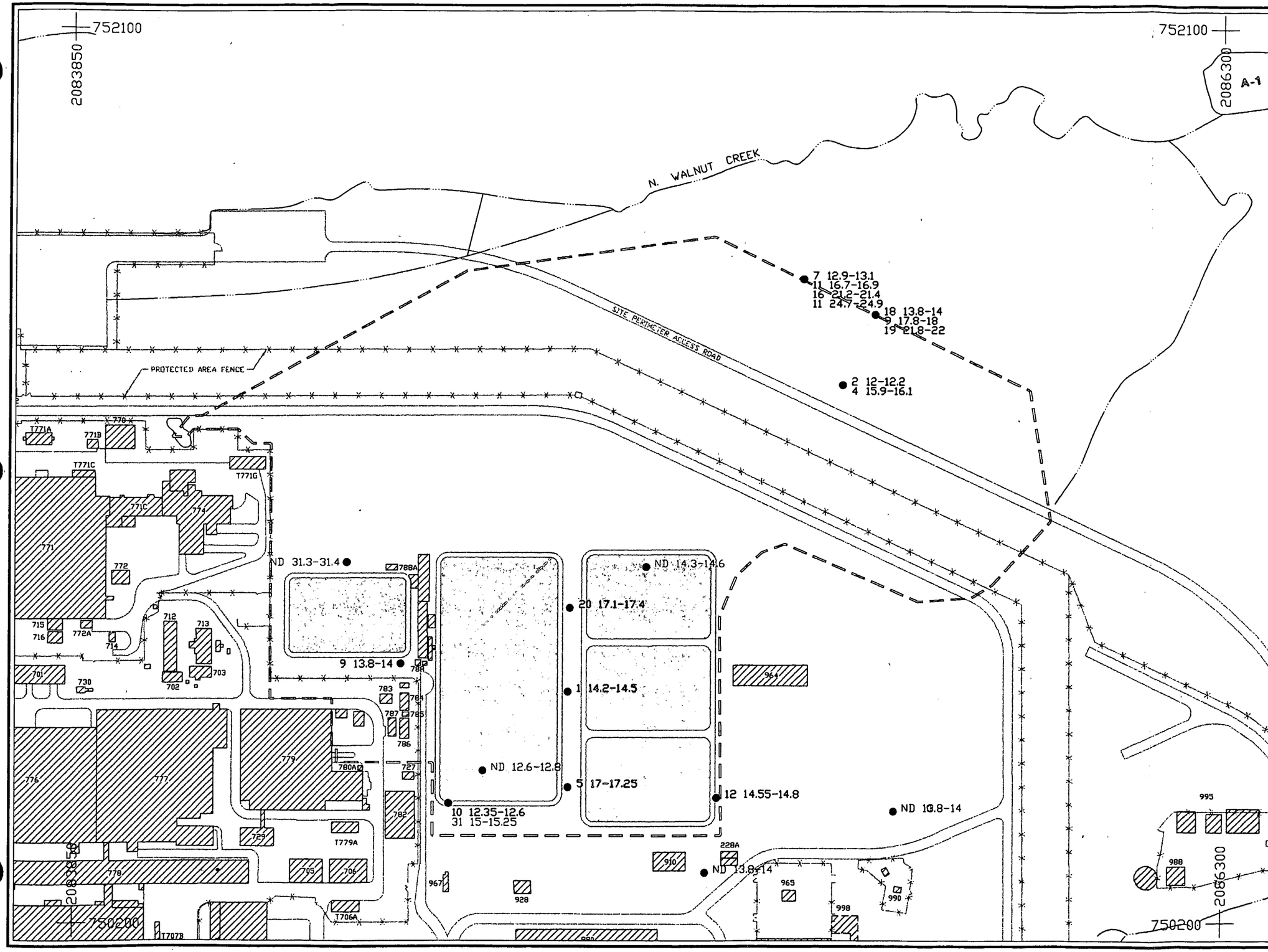
Figure II.3.4-56

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Methylene Chloride (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 2 Results in ug/kg
- ND Not Detected
- 12-12.2 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL

100 0 100 200 300 FEET

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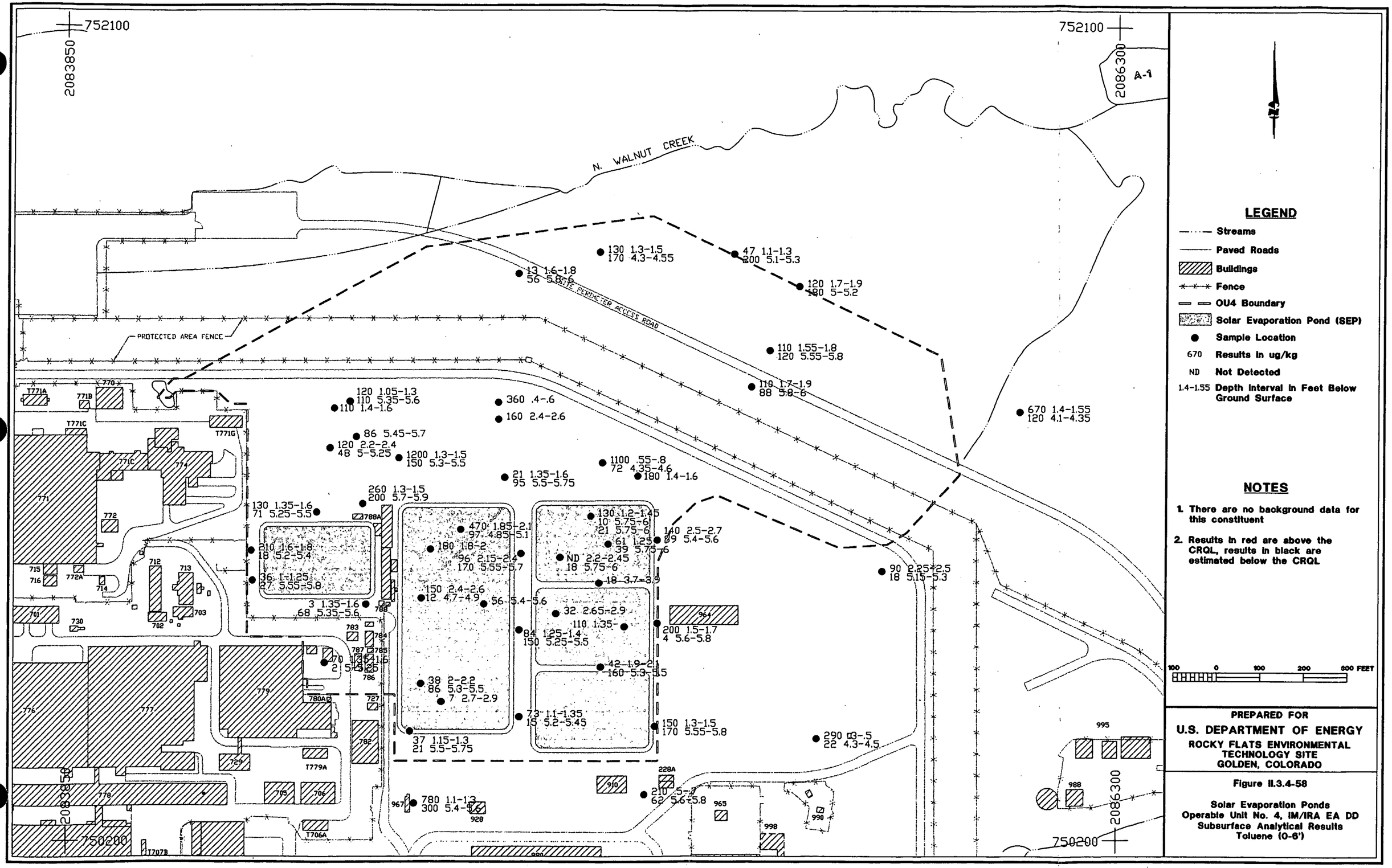
Figure II.3.4-57

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Methylene Chloride (> 12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 670 Results in ug/kg
- ND Not Detected
- 1.4-1.55 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL, results in black are estimated below the CRQL

100 0 100 200 300 FEET

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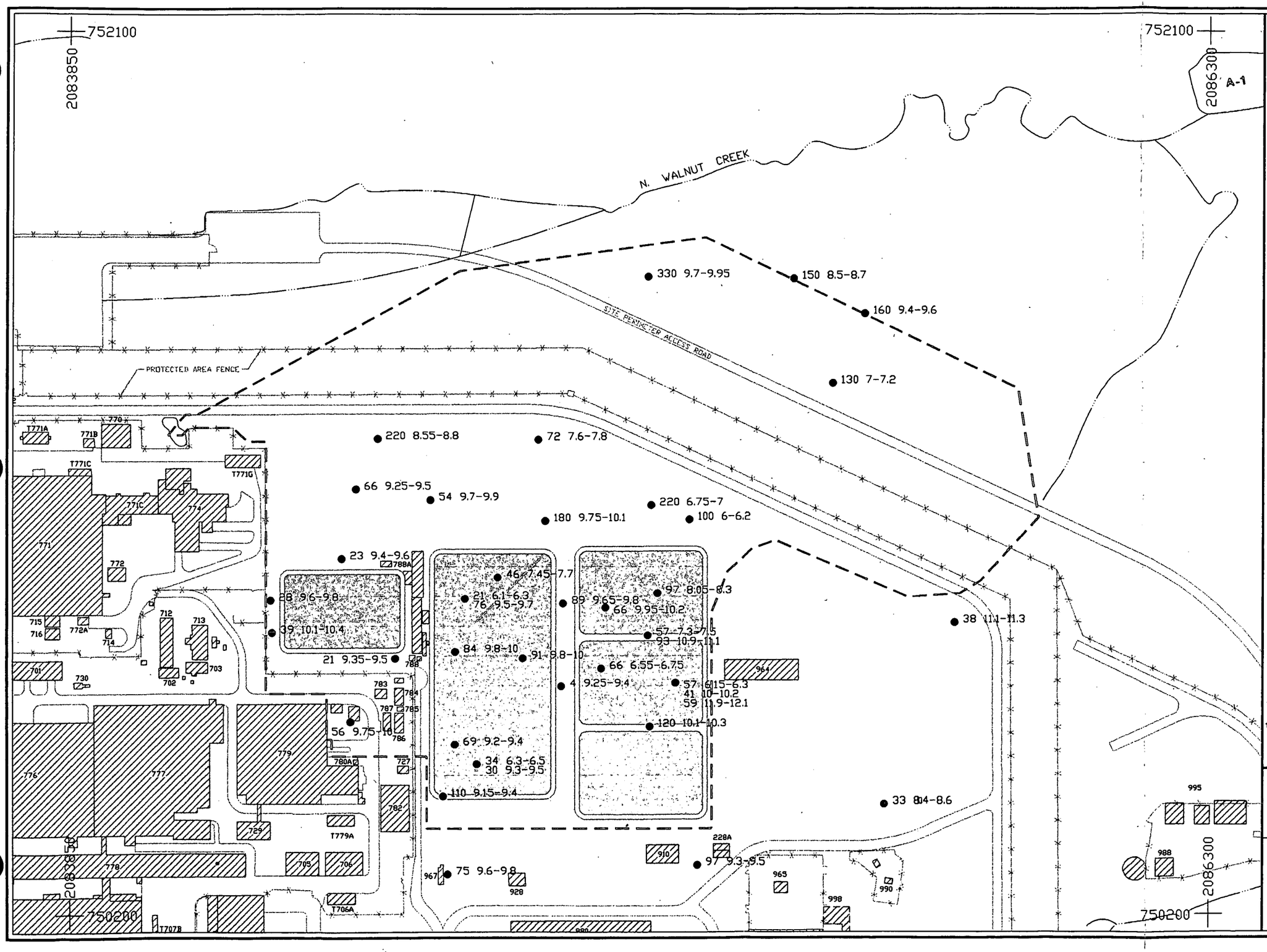
Figure II.3.4-58

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Toluene (0-6')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 130 Results in ug/kg
- ND Not Detected
- 7-7.2 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL, results in black are estimated below the CRQL

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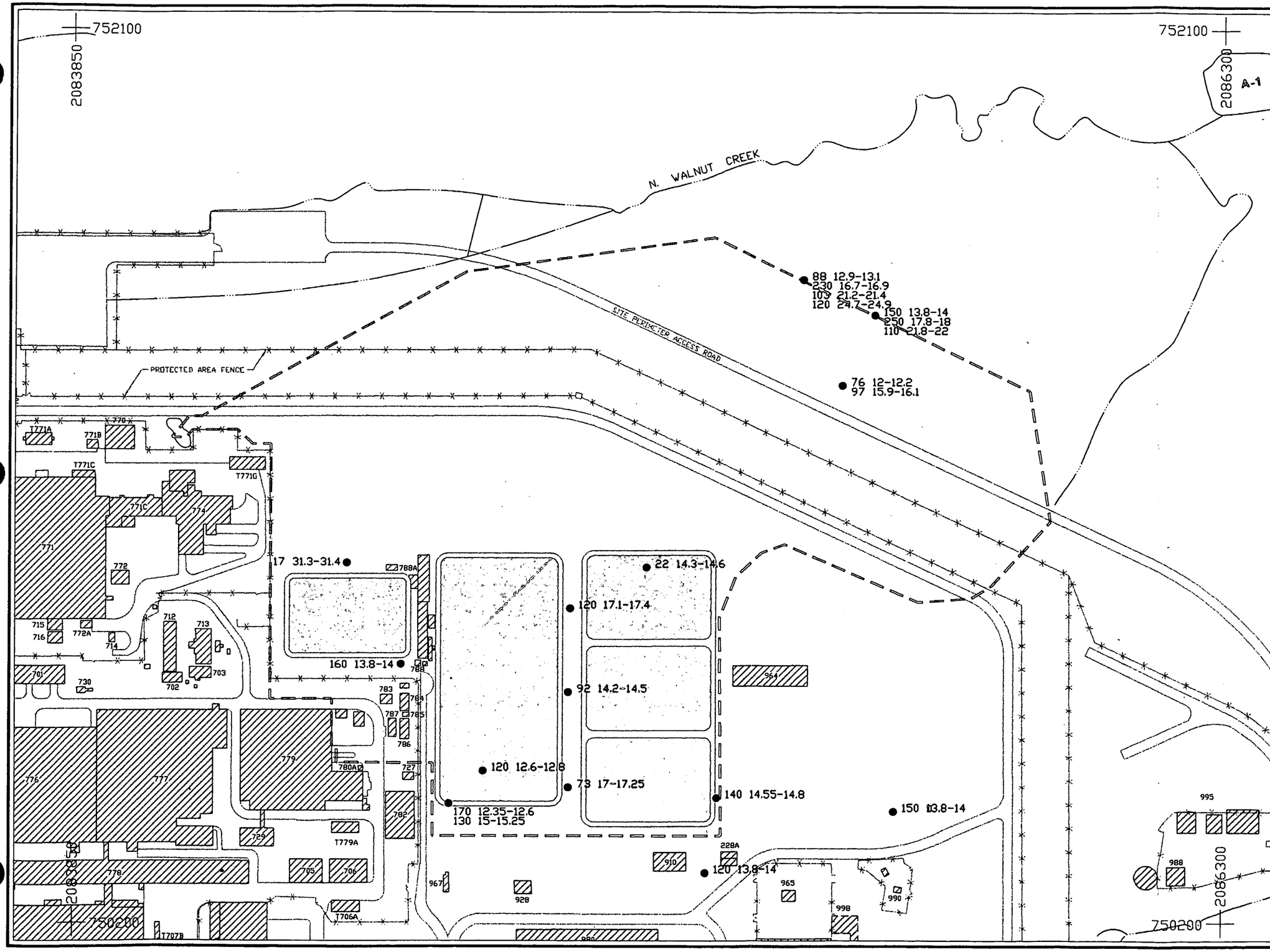
GOLDEN, COLORADO

Figure II.3.4-59

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Toluene (6-12')



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Solar Evaporation Pond (SEP)
- ● Sample Location
- 76 Results in ug/kg
- 12-12.2 Depth Interval in Feet Below Ground Surface

NOTES

1. There are no background data for this constituent
2. Results in red are above the CRQL

100 0 100 200 300 FEET

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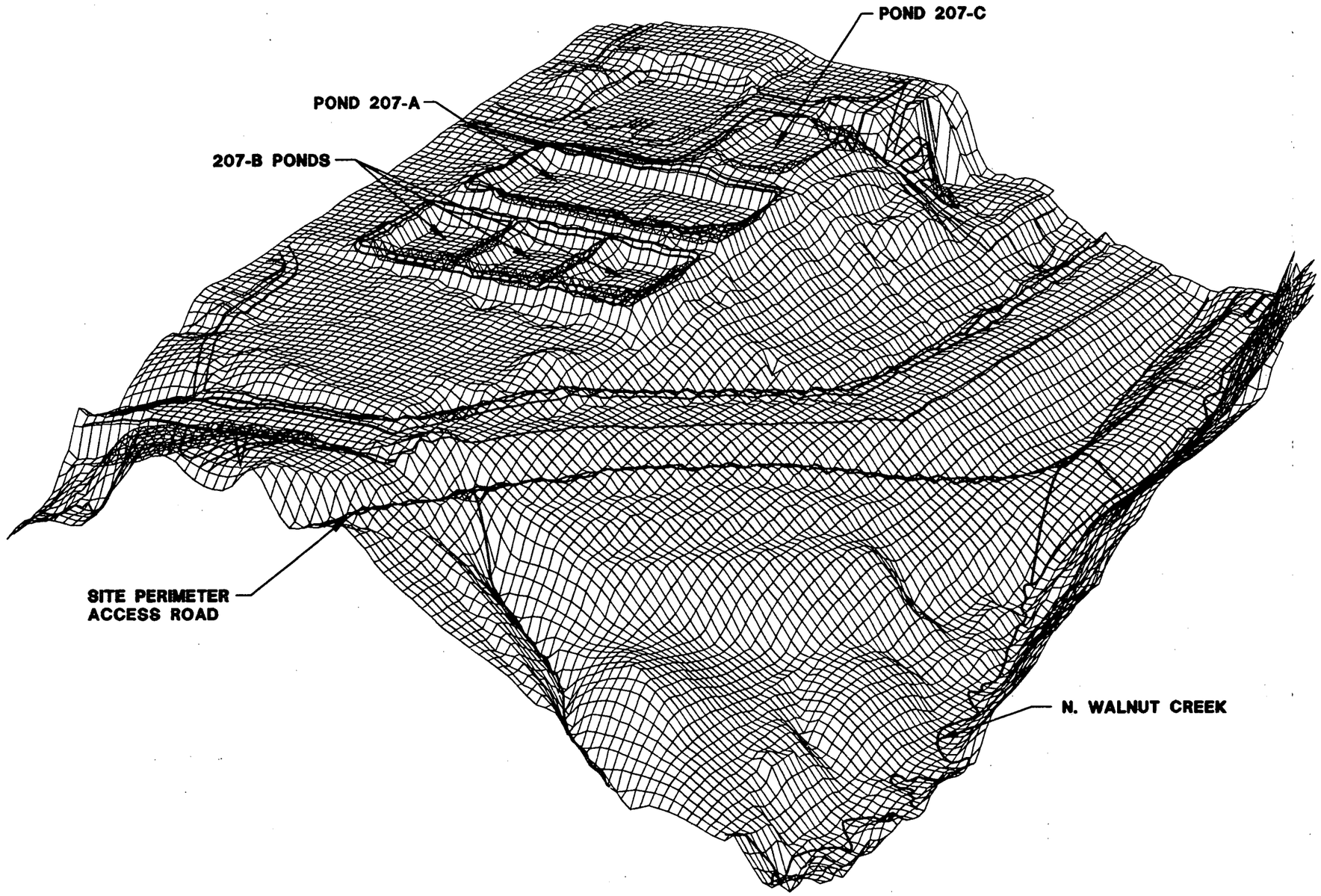
Figure II.3.4-60

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subsurface Analytical Results
Toluene (> 12')

1986 Surface Topography



Note: Pond Outlines and Other Cultural Features Shown For Comparative Purposes.

100 0 100 200 300 FEET

Note: Vertical Exaggeration 5X

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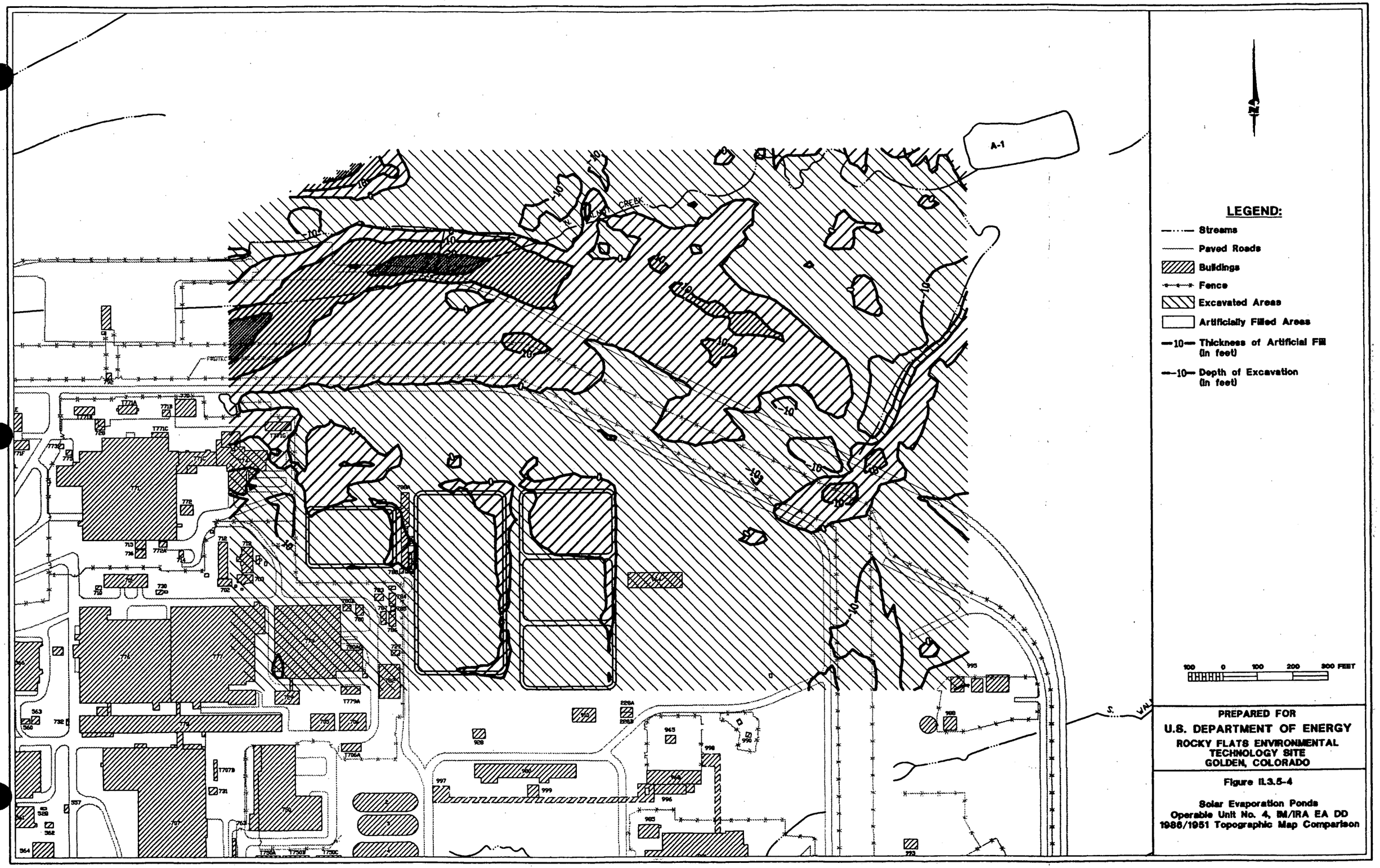
TECHNOLOGY SITE
GOLDEN, COLORADO

Figure II.3.5-3

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
1986 Surface Topography
OU4 Area


A-1
LEGEND:
Streams
Paved Roads
Buildings
Fence
Excavated Areas
Artificially Filled Areas
10 Thickness of Artificial Fill (in feet)
10 Depth of Excavation (in feet)
100 0 100 200 300 FEET
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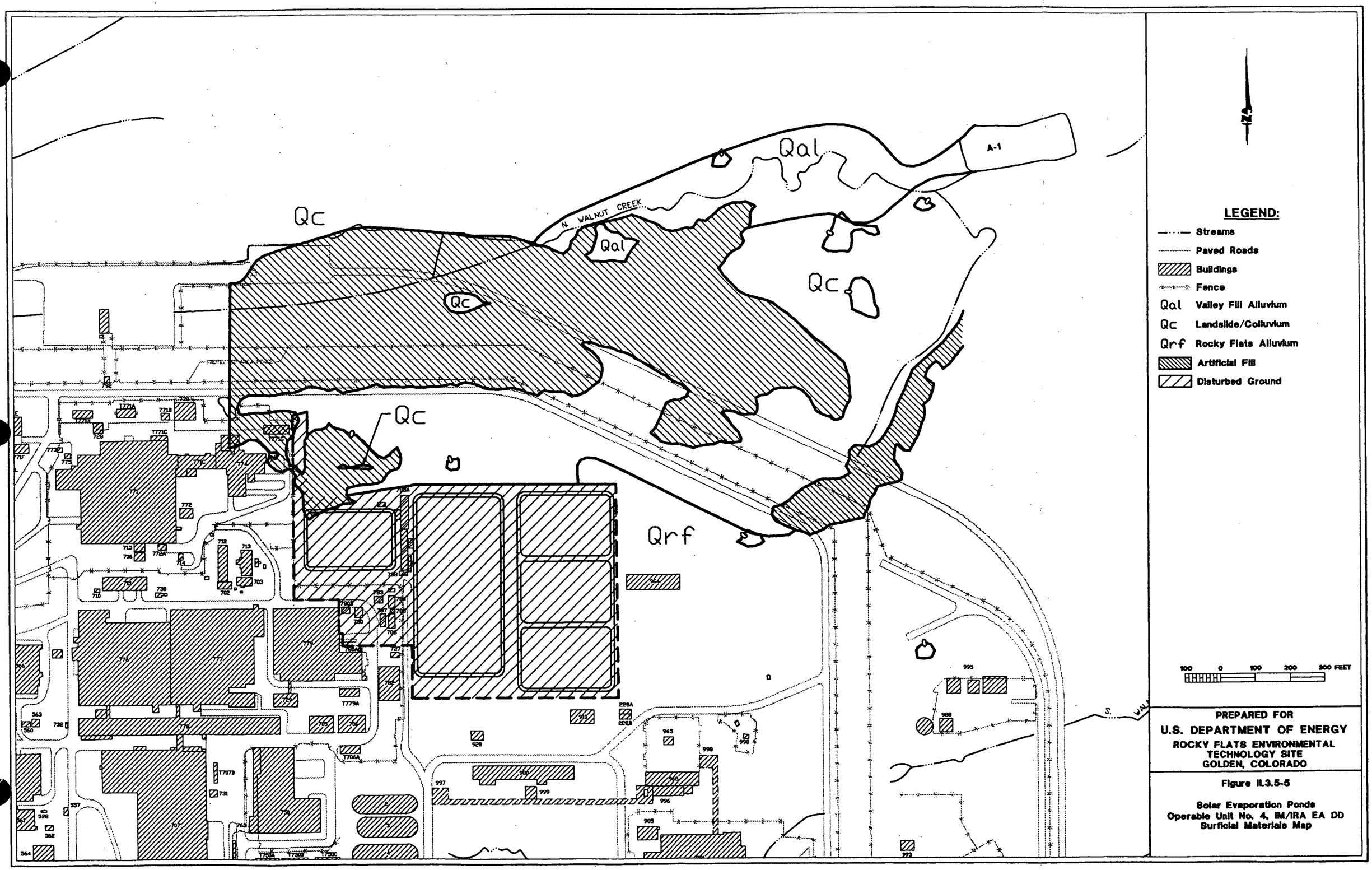
GOLDEN, COLORADO
Figure II.3.5-4
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
1986/1951 Topographic Map Comparison


Qal
A-1
Qc
N. WALNUT CREEK
Qal
Qc
Qc
Qc
Qrf
LEGEND:
Streams
Paved Roads
Buildings
Fence
Qal Valley Fill Alluvium
Qc Landslide/Colluvium
Qrf Rocky Flats Alluvium
Artificial Fill
Disturbed Ground
100 0 100 200 300 FEET
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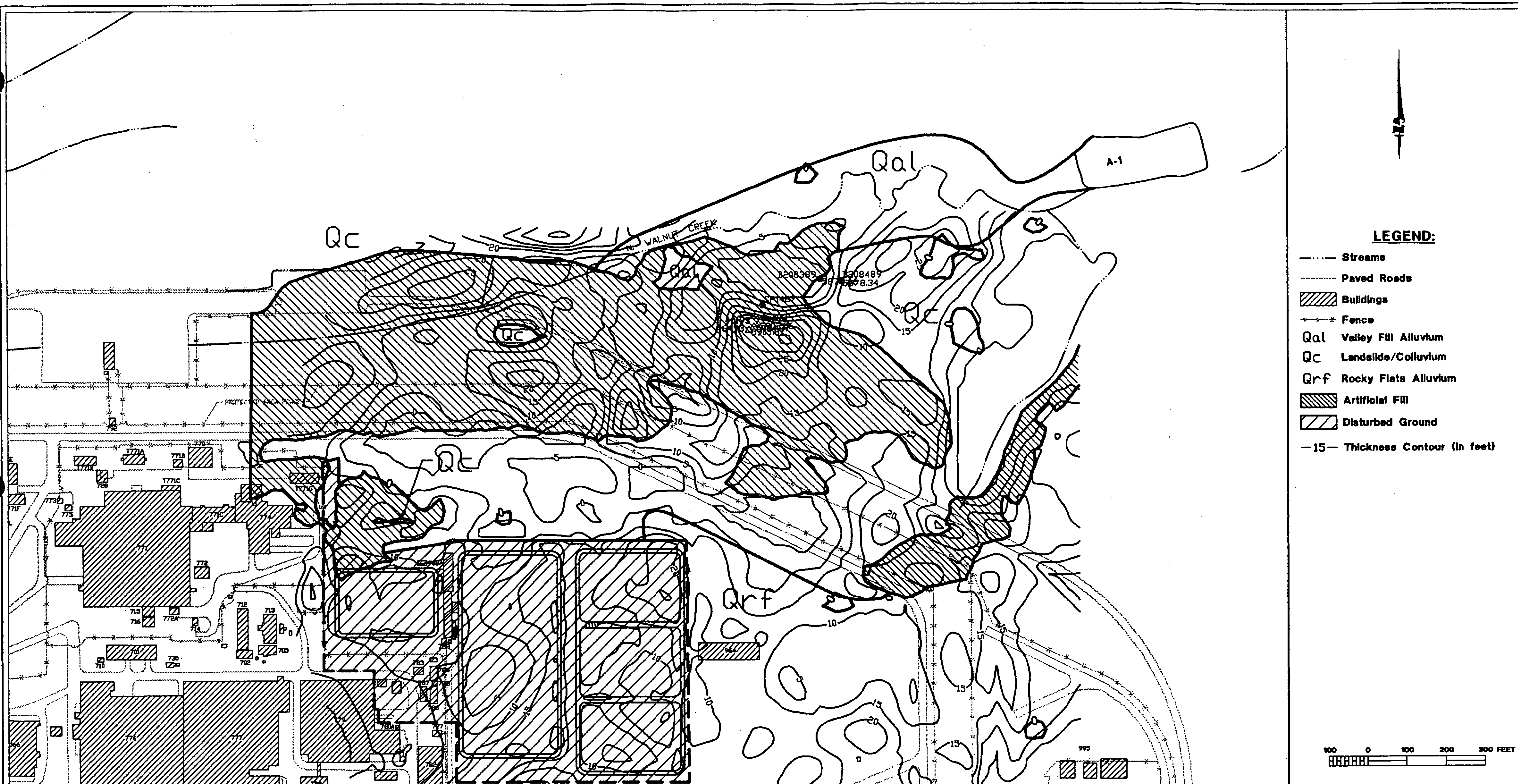
TECHNOLOGY SITE
GOLDEN, COLORADO
Figure II.3.5-5
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Materials Map



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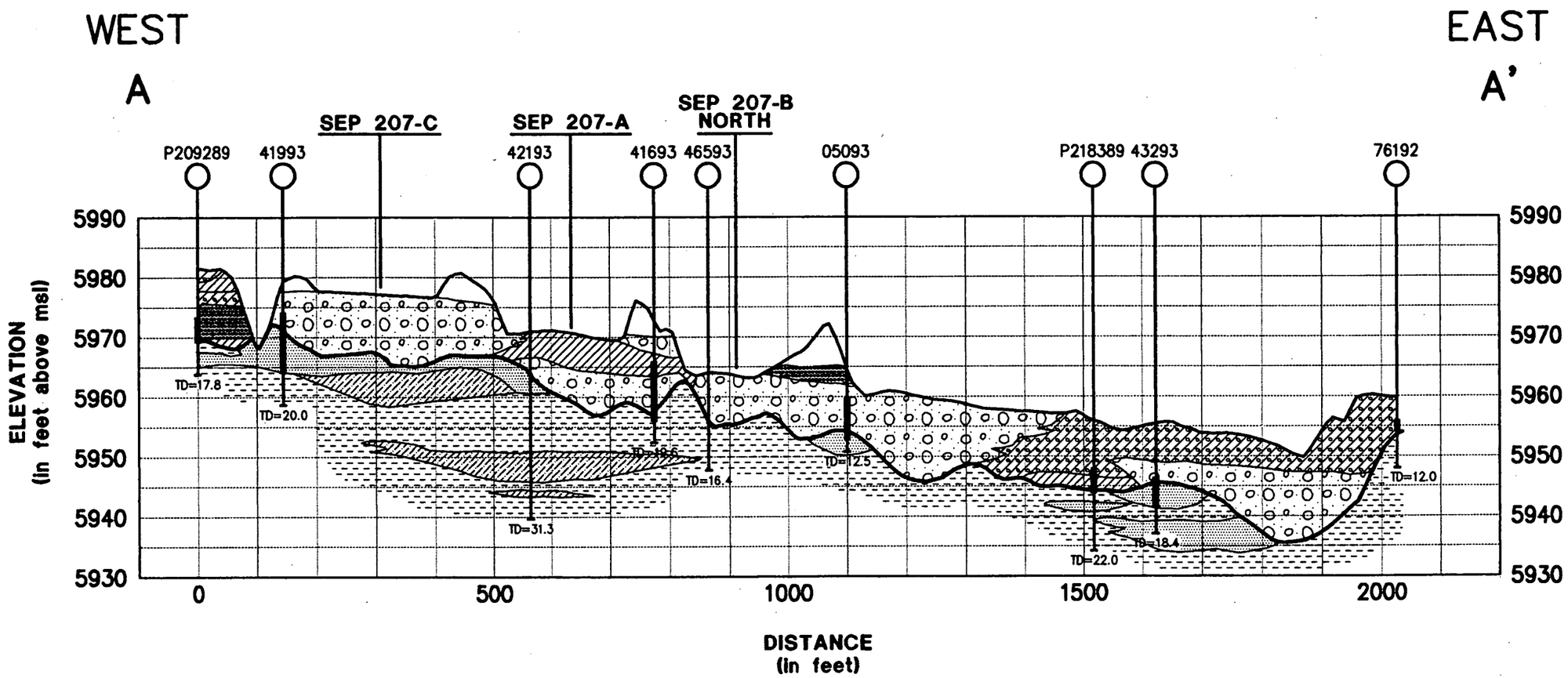
GOLDEN, COLORADO

Figure II.3.5-6

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Surficial Materials Isopach Map



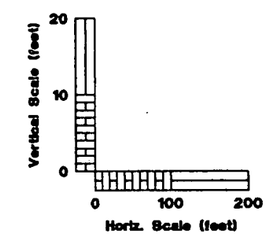
LEGEND

UNCONSOLIDATED MATERIALS

- Sandy Lithofacies
- Sandy Gravel Lithofacies
- Clayey Silty Gravel Lithofacies
- Clayey & Silty Lithofacies
- Artificial Fill or Colluvium

BEDROCK

- Sandstone
- Siltstone
- Claystone
- Screened Interval
- Borehole/Well No.
- Bedrock - Unconsolidated Materials Contact



Note: Vertical Exaggeration 10x

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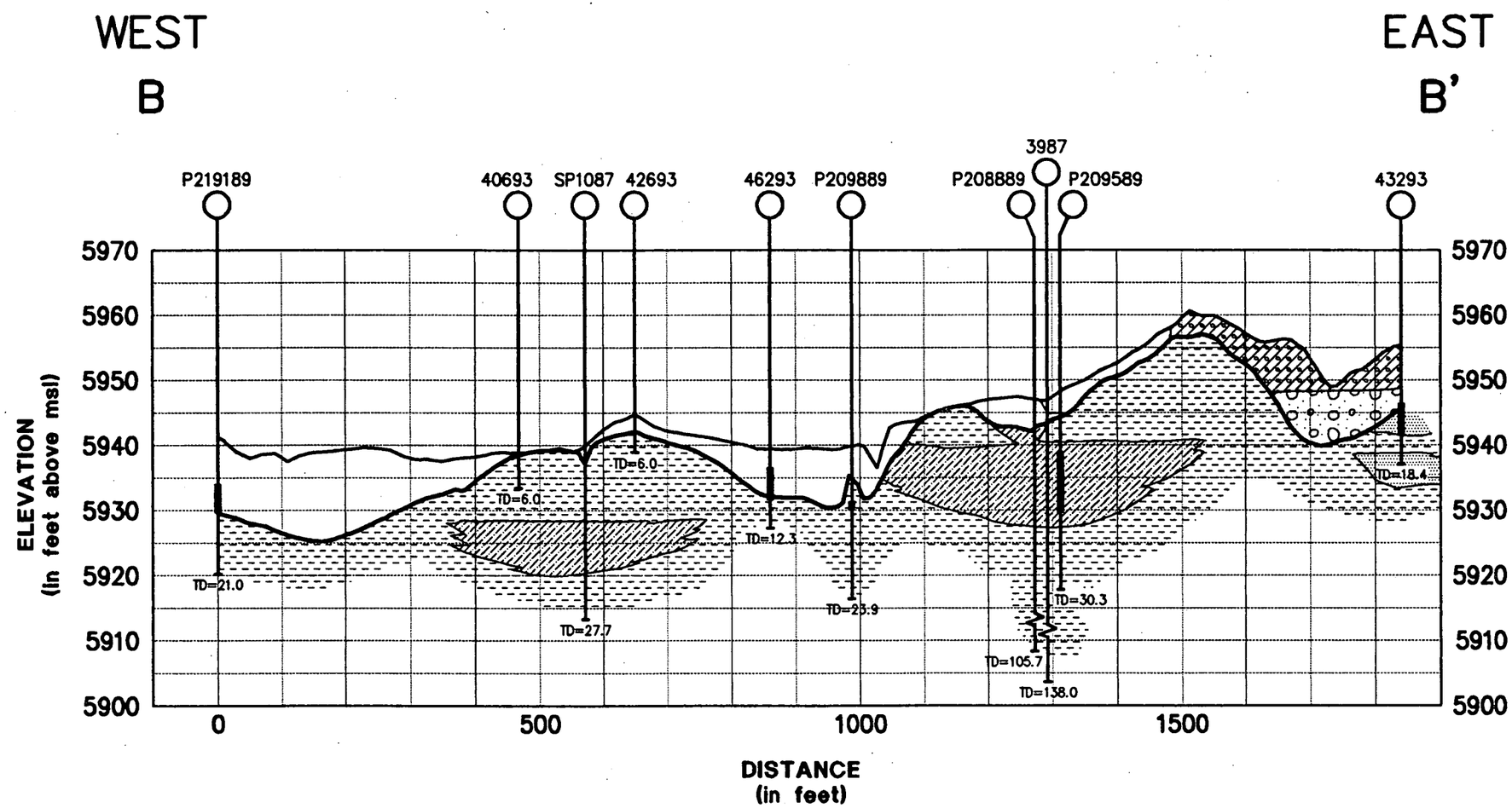
GOLDEN, COLORADO

Figure II.3.5-8

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Alluvium and Bedrock Cross-Section A-A'



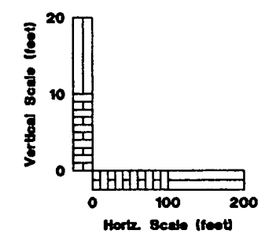
LEGEND

UNCONSOLIDATED MATERIALS

- Sandy Lithofacies
- Sandy Gravel Lithofacies
- Clayey Silty Gravel Lithofacies
- Clayey & Silty Lithofacies
- Artificial Fill or Colluvium

BEDROCK

- Sandstone
- Siltstone
- Claystone
- Screened Interval
- Borehole/Well No.
- Bedrock - Unconsolidated Materials Contact



Note: Vertical Exaggeration 10x

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Figure II.3.5-9

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Alluvium and Bedrock Cross-Section B-B'

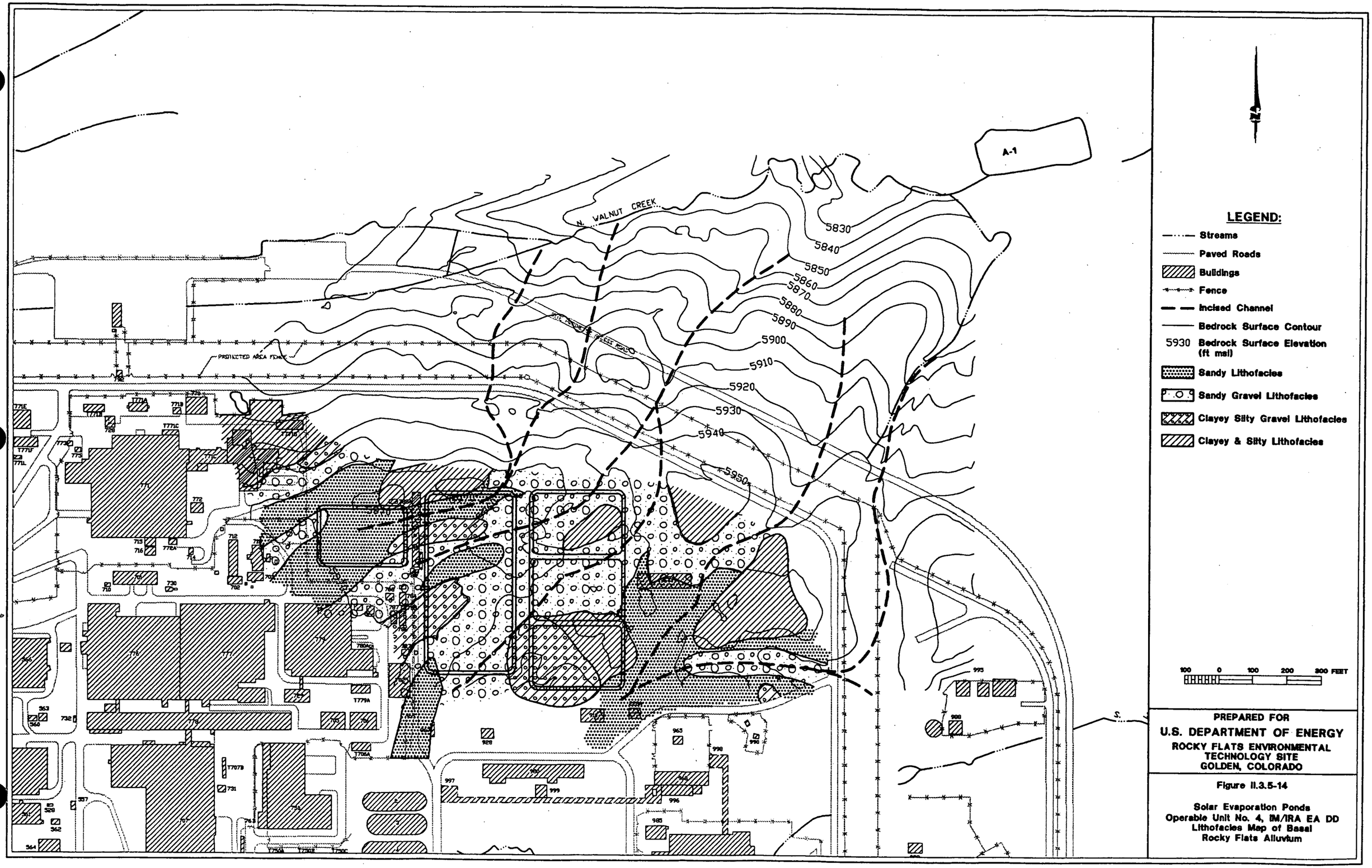
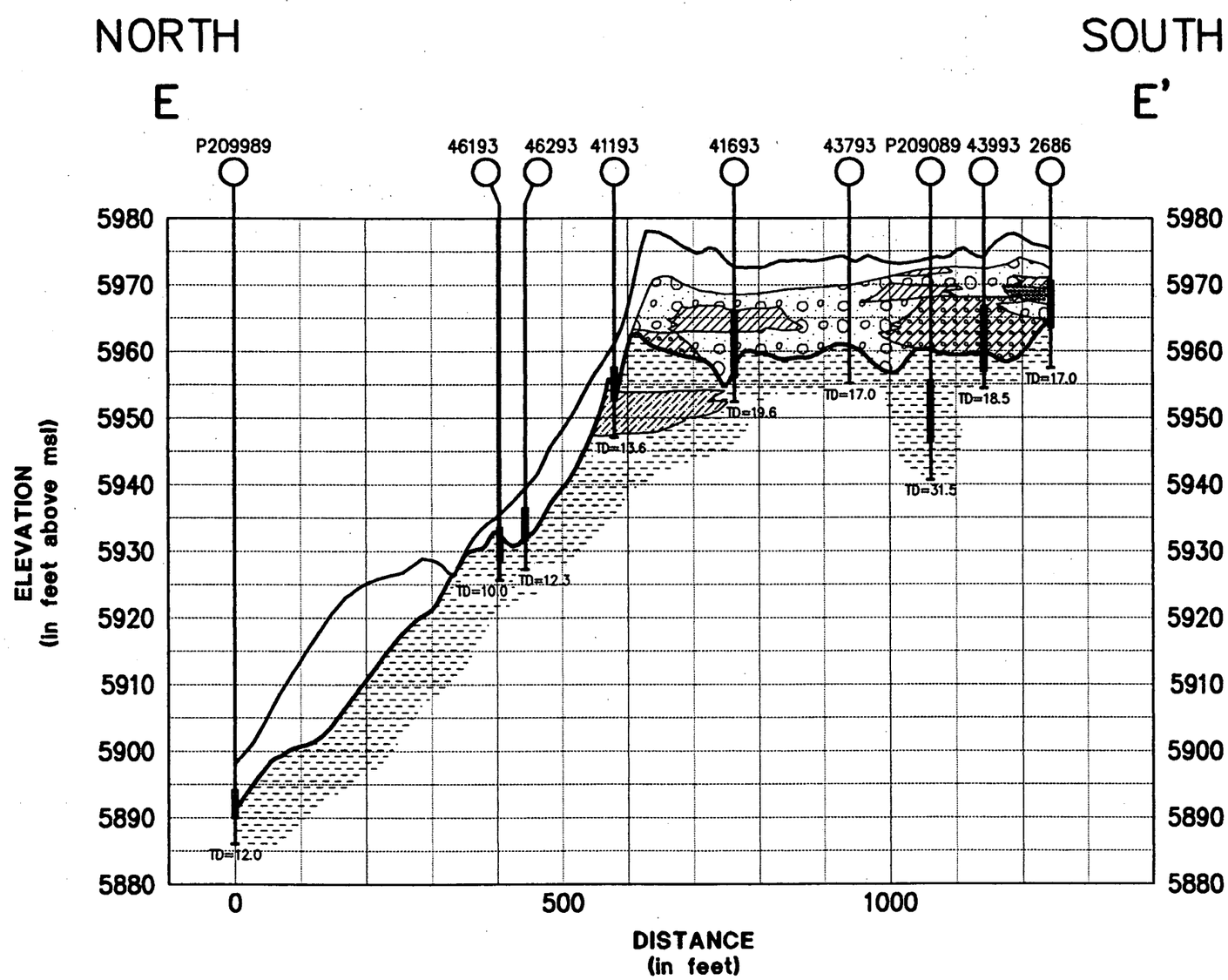


Figure II.3.5-14

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Lithofacies Map of Basal
Rocky Flats Alluvium



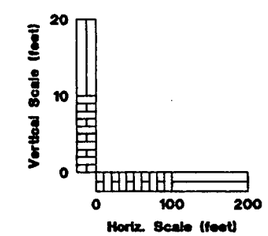
LEGEND

UNCONSOLIDATED MATERIALS

- Sandy Lithofacies
- Sandy Gravel Lithofacies
- Clayey Silty Gravel Lithofacies
- Clayey & Silty Lithofacies
- Artificial Fill or Colluvium

BEDROCK

- Sandstone
- Siltstone
- Claystone
- Screened Interval
- Borehole/Well No.
- Bedrock - Unconsolidated Materials Contact



Note: Vertical Exaggeration 10x

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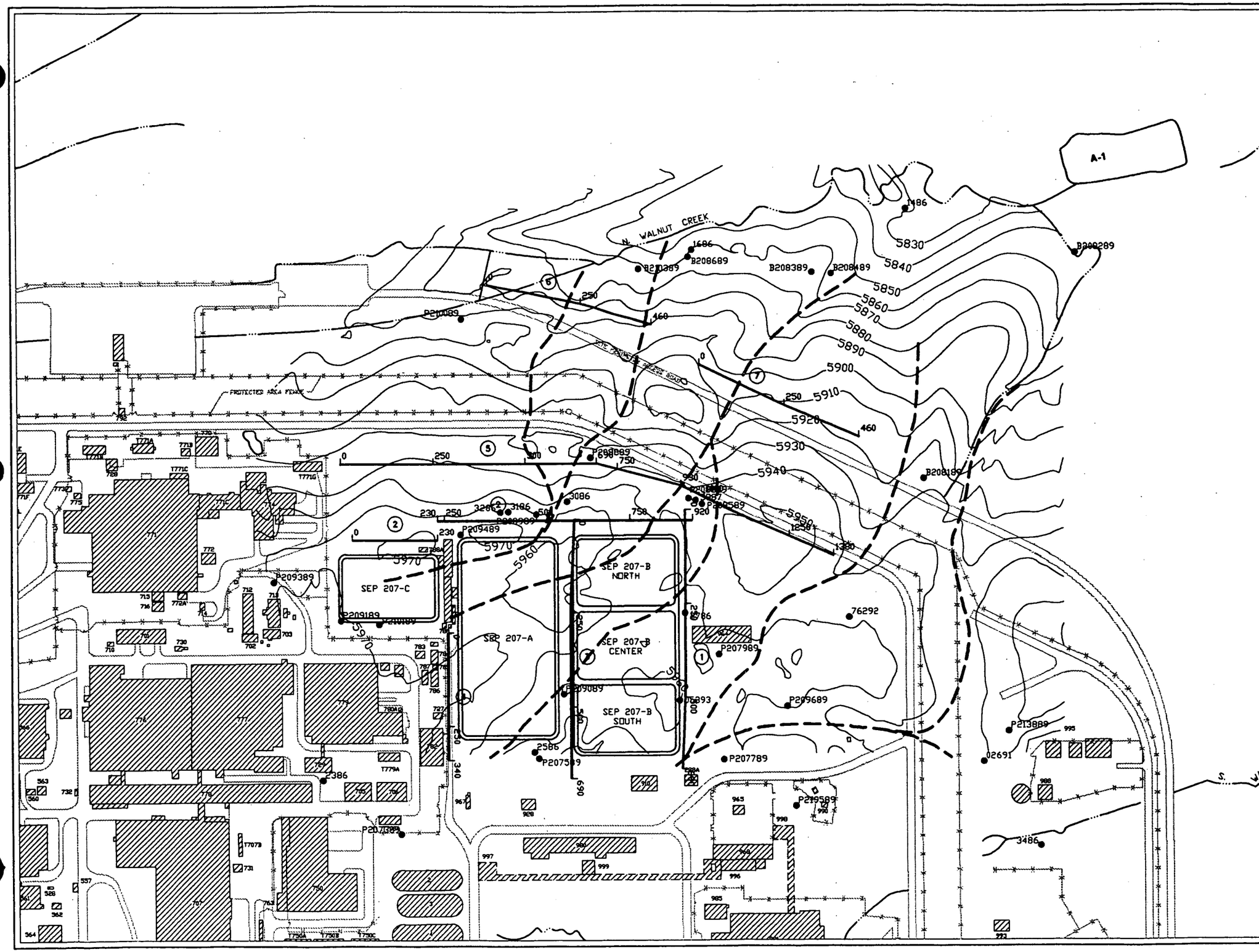
Figure II.3.5-12

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Alluvium and Bedrock Cross-Section E-E'



LEGEND:

- Streams
- Paved Roads
- Buildings
- Fence
- OU4 Boundary
- Incised Channel
- (1) Refraction Line with Identification
- Bedrock Monitoring Well
- Bedrock Surface Contour
- 5940 Bedrock Structure Contour Elevation (ft msl)

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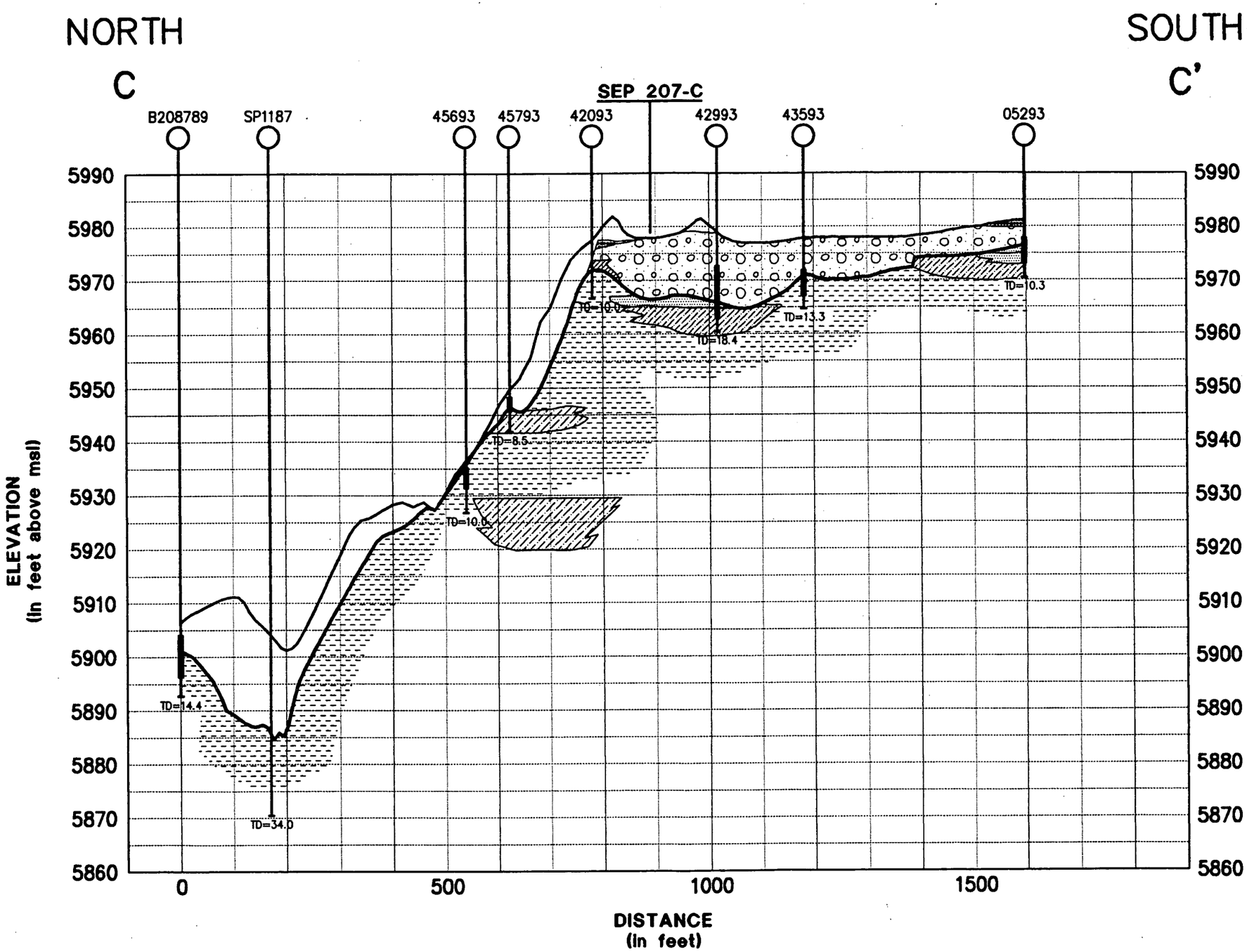
Figure II.3.5-13

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Bedrock Paleotopograph



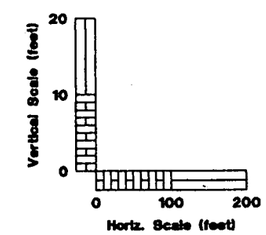
LEGEND

UNCONSOIDATED MATERIALS

- Sandy Lithofacies
- Sandy Gravel Lithofacies
- Clayey Silty Gravel Lithofacies
- Clayey & Silty Lithofacies
- Artificial Fill or Colluvium

BEDROCK

- Sandstone
- Siltstone
- Claystone
- Screened Interval
- Borehole/Well No.
- Bedrock - Unconsolidated Materials Contact



Note: Vertical Exaggeration 10x

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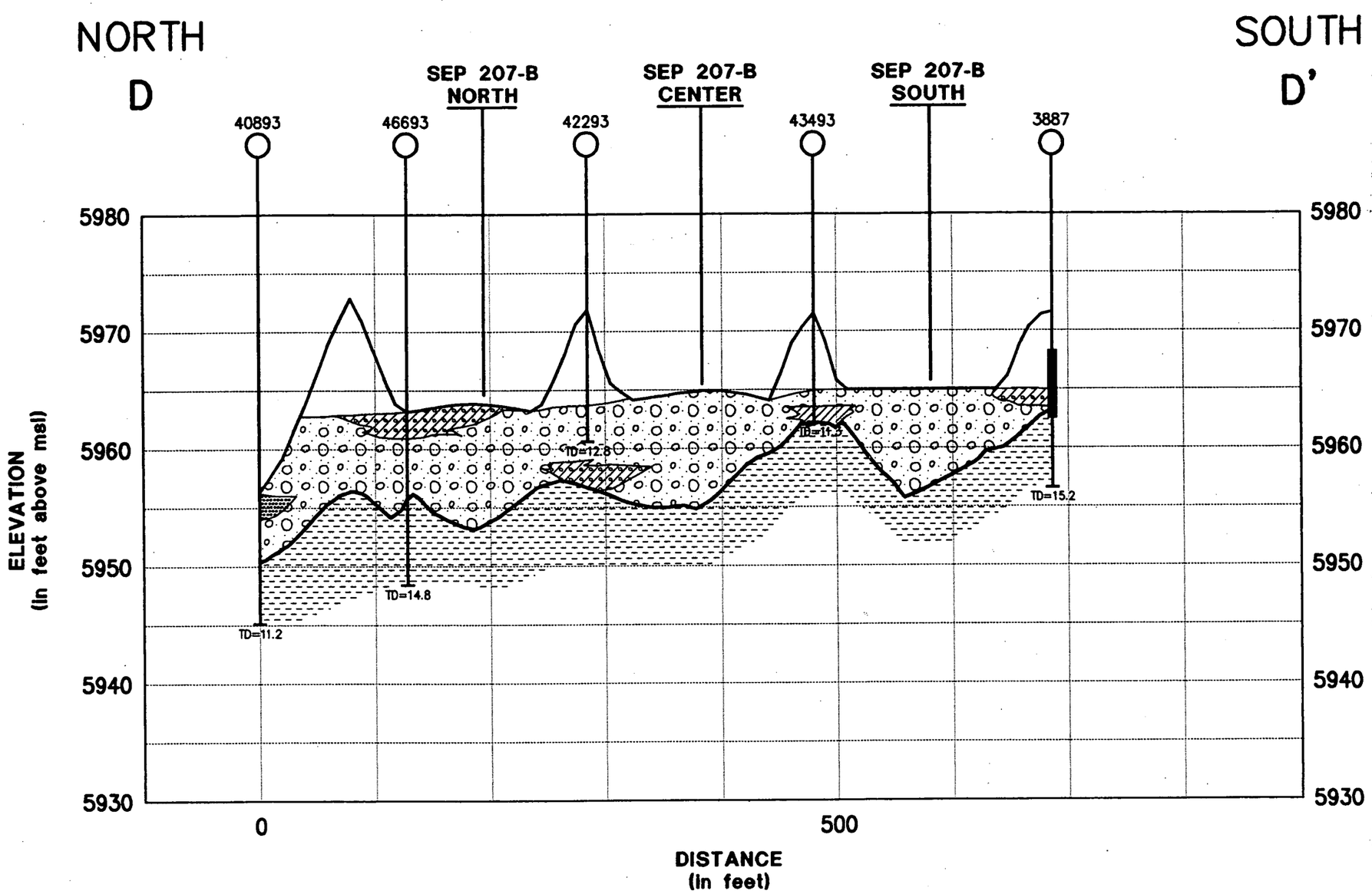
GOLDEN, COLORADO

Figure II.3.5-10

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Alluvium and Bedrock Cross-Section C-C'



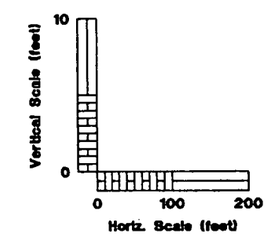
LEGEND

UNCONSOLIDATED MATERIALS

- Sandy Lithofacies
- Sandy Gravel Lithofacies
- Clayey Silty Gravel Lithofacies
- Clayey & Silty Lithofacies
- Artificial Fill or Colluvium

BEDROCK

- Sandstone
- Siltstone
- Claystone
- Screened Interval
- Borehole/Well No.
- Bedrock - Unconsolidated Materials Contact



Note: Vertical Exaggeration 20x

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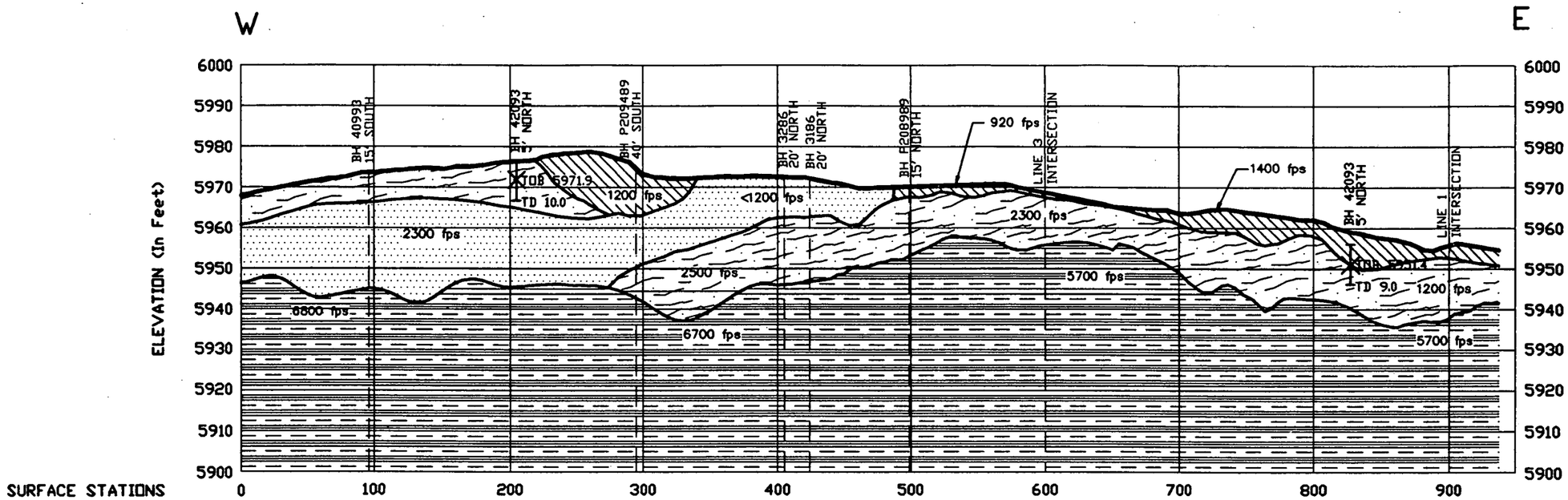
Figure II.3.5-11

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Alluvium and Bedrock Cross-Section D-D'



LINE 2

LEGEND

- Primarily Fine Grained Alluvium
- Semi-Consolidated Bedrock
- Sandstone
- Consolidated Bedrock

2500 fps — Acoustic velocity of the subsurface materials measured in feet per second

BH 42093 — Borehole Number

5' NORTH — Borehole Location Relative To The Survey Line

Borehole bedrock elevation

Borehole total depth

Indicates spotted borehole (no surface elevation or TD)

LINE 3 INTERSECTION — Indicates intersection of this line with another geophysical line

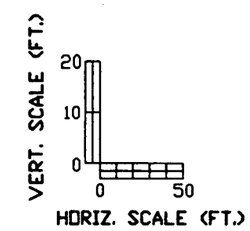


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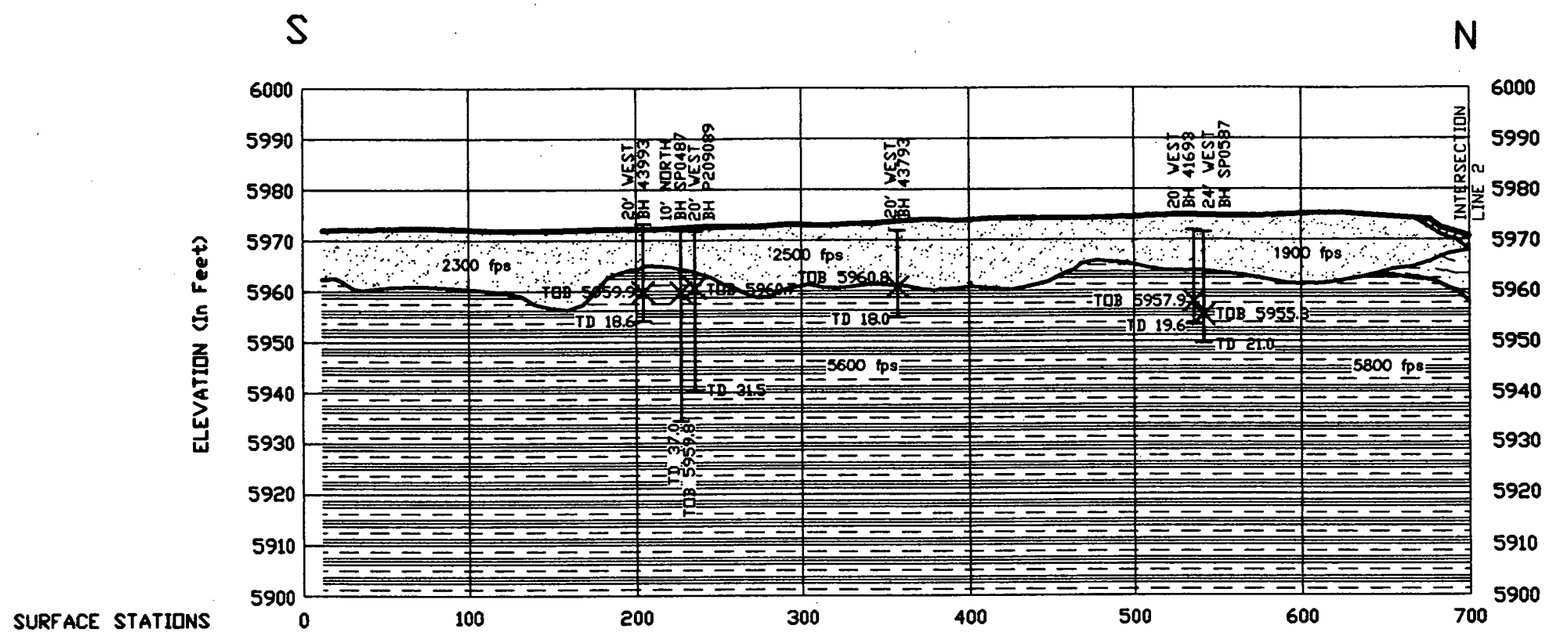
Figure II.3.5-20

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Geophysical Line 2



LINE 3

LEGEND

- Primarily Fine Grained Alluvium
- Primarily Coarse Grained Alluvium
- Semi-Consolidated Bedrock
- Consolidated Bedrock

2500 fps — Acoustic velocity of the subsurface materials measured in feet per second

BH 42093 — Borehole number

5' NORTH — Borehole location relative to the survey line

Borehole bedrock elevation

Borehole total depth

Indicates spotted borehole (no surface elevation or TD)

LINE 3 INTERSECTION — Indicates intersection of this line with another geophysical line

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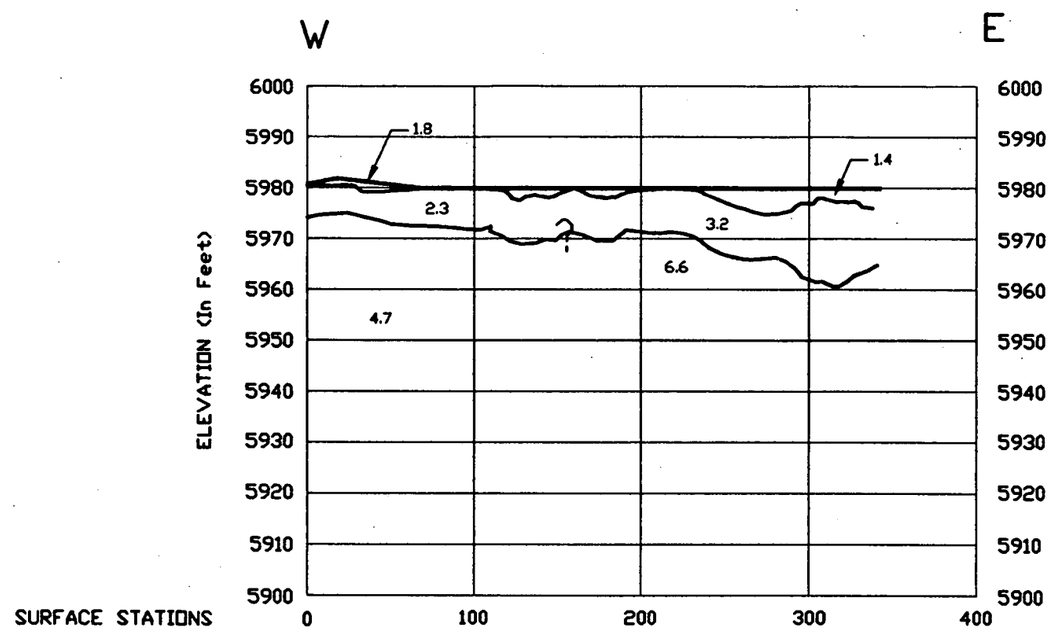
GOLDEN, COLORADO

Figure II.3.5-21

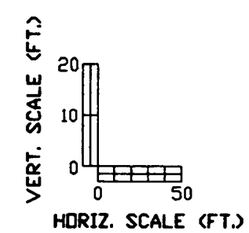
Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Geophysical Line 3



LINE 4

LEGEND

1.4	Acoustic velocity of the subsurface materials measured in kilofeet per seconds
?	Questionable velocity contacts along profile
———	Ground surface



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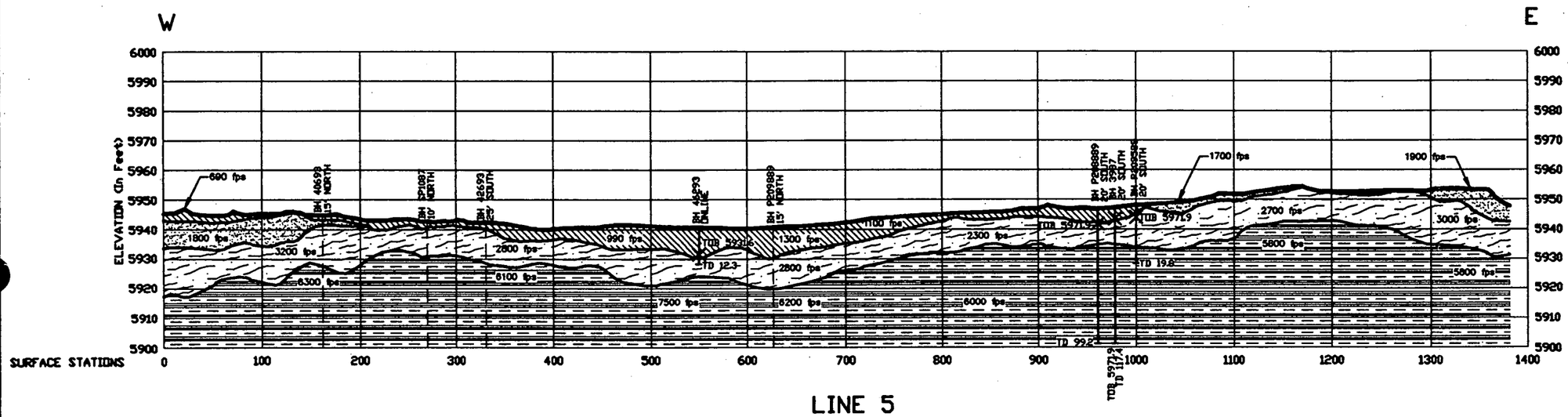
GOLDEN, COLORADO

Figure II.3.5-22

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Geophysical Line 4



LINE 5

LEGEND

- Primarily Fine Grained Alluvium
- Primarily Coarse Grained Alluvium
- Semi-Consolidated Bedrock
- Consolidated Bedrock

2500 fps Acoustic velocity of the subsurface materials measured in feet per seconds

BH 42093 Borehole number

5' NORTH Borehole location relative to the survey line

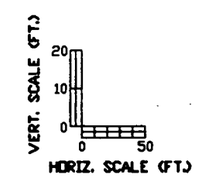
Borehole bedrock elevation

Borehole total depth

Indicates spotted borehole (no surface elevation or TD)

LINE 3 INTERSECTION

Indicates intersection of this line with another geophysical line



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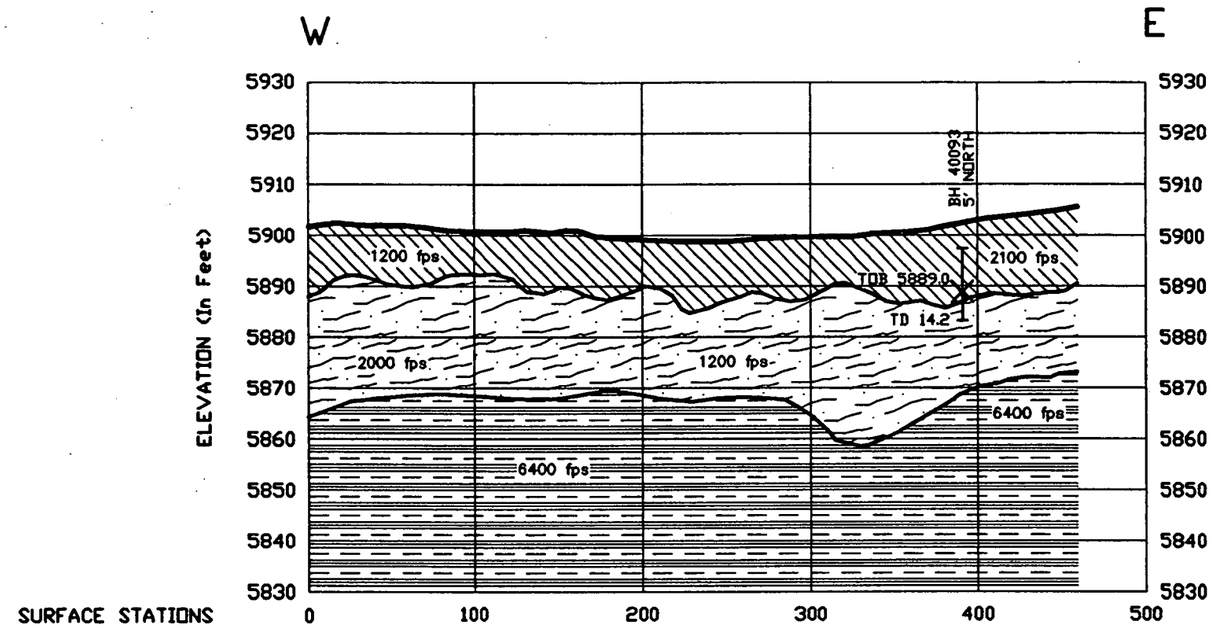
GOLDEN, COLORADO

Figure II.3.5-23

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Geophysical Line 5



LINE 6

LEGEND

- Primarily Fine Grained Alluvium
- Primarily Coarse Grained Alluvium
- Semi-Consolidated Bedrock
- Consolidated Bedrock

2500 fps — Acoustic velocity of the subsurface materials measured in feet per second

BH 42093 — Borehole number

5' NORTH — Borehole location relative to the survey line

Borehole Surface Elevation
Borehole Bedrock Elevation
Borehole Total Depth

Indicates Spotted Borehole (No Surface Elevation or TD)

LINE 3 INTERSECTION — Indicates intersection of this line with another Geophysical Line

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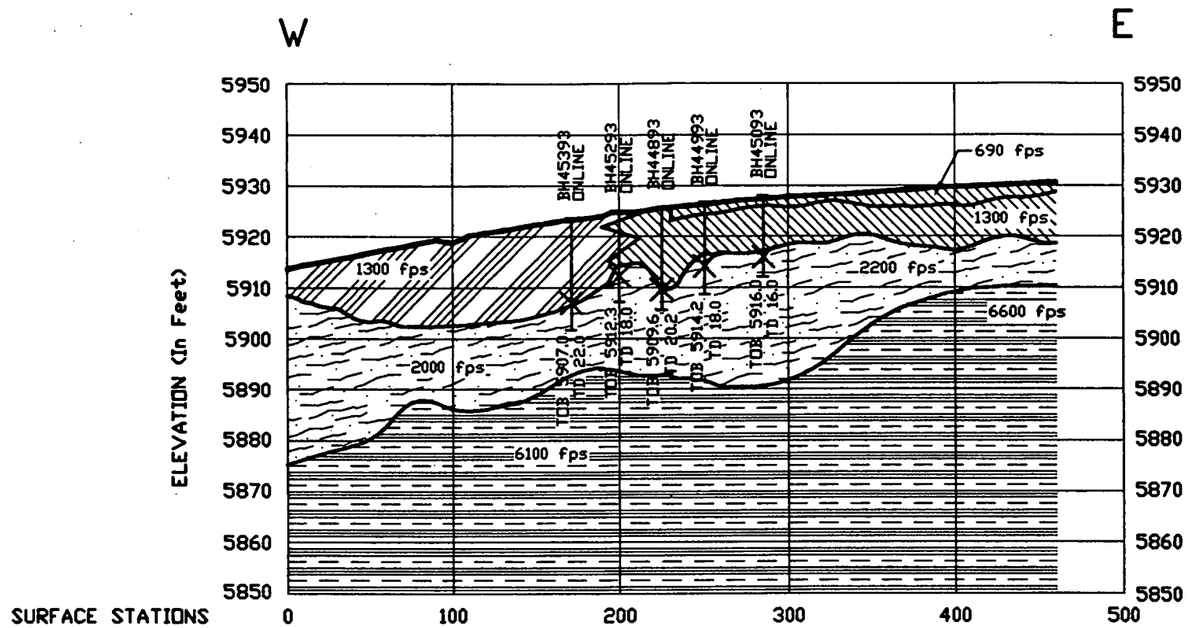
GOLDEN, COLORADO

Figure II.3.5-24

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Geophysical Line 6



LINE 7

LEGEND

- Primarily Fine Grained Alluvium
- Sandy Alluvium
- Semi-Consolidated Bedrock
- Consolidated Bedrock

2500 fps — Acoustic velocity of the subsurface materials measured in feet per second

BH 42093 — Borehole number

5' NORTH — Borehole location relative to the survey line

Borehole bedrock elevation

Borehole total depth

Indicates spotted borehole (no surface elevation or TD)

LINE 3 INTERSECTION — Indicates intersection of this line with another geophysical line

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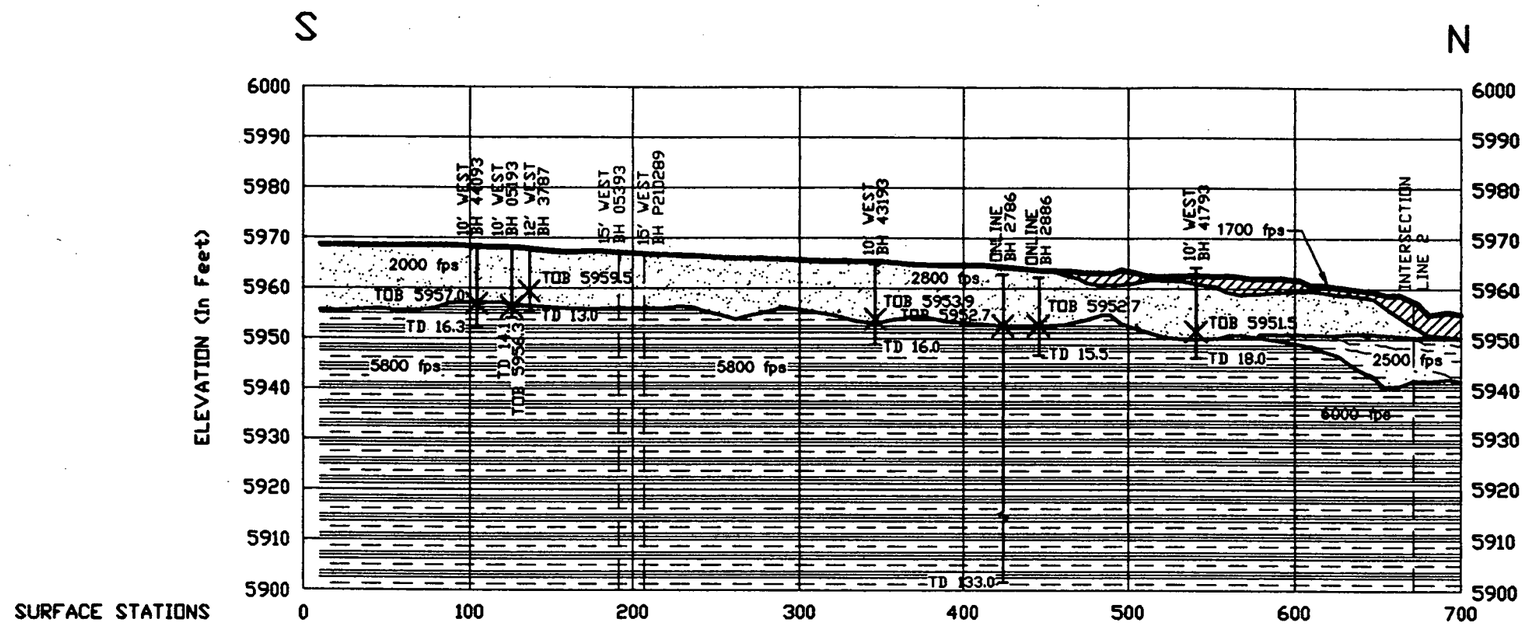
GOLDEN, COLORADO

Figure II.3.5-25

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Geophysical Line 7



LINE 1

LEGEND

- Primarily Fine Grained Alluvium
- Primarily Coarse Grained Alluvium
- Semi-Consolidated Bedrock
- Consolidated Bedrock

2500 fps — Acoustic velocity of the subsurface materials measured in feet per second

BH 42093 — Borehole number

5' NORTH — Borehole location relative to the survey line

Borehole bedrock elevation

Borehole total depth

Indicates spotted borehole (no surface elevation or TD)

LINE 3 INTERSECTION — Indicates intersection of this line with another geophysical line

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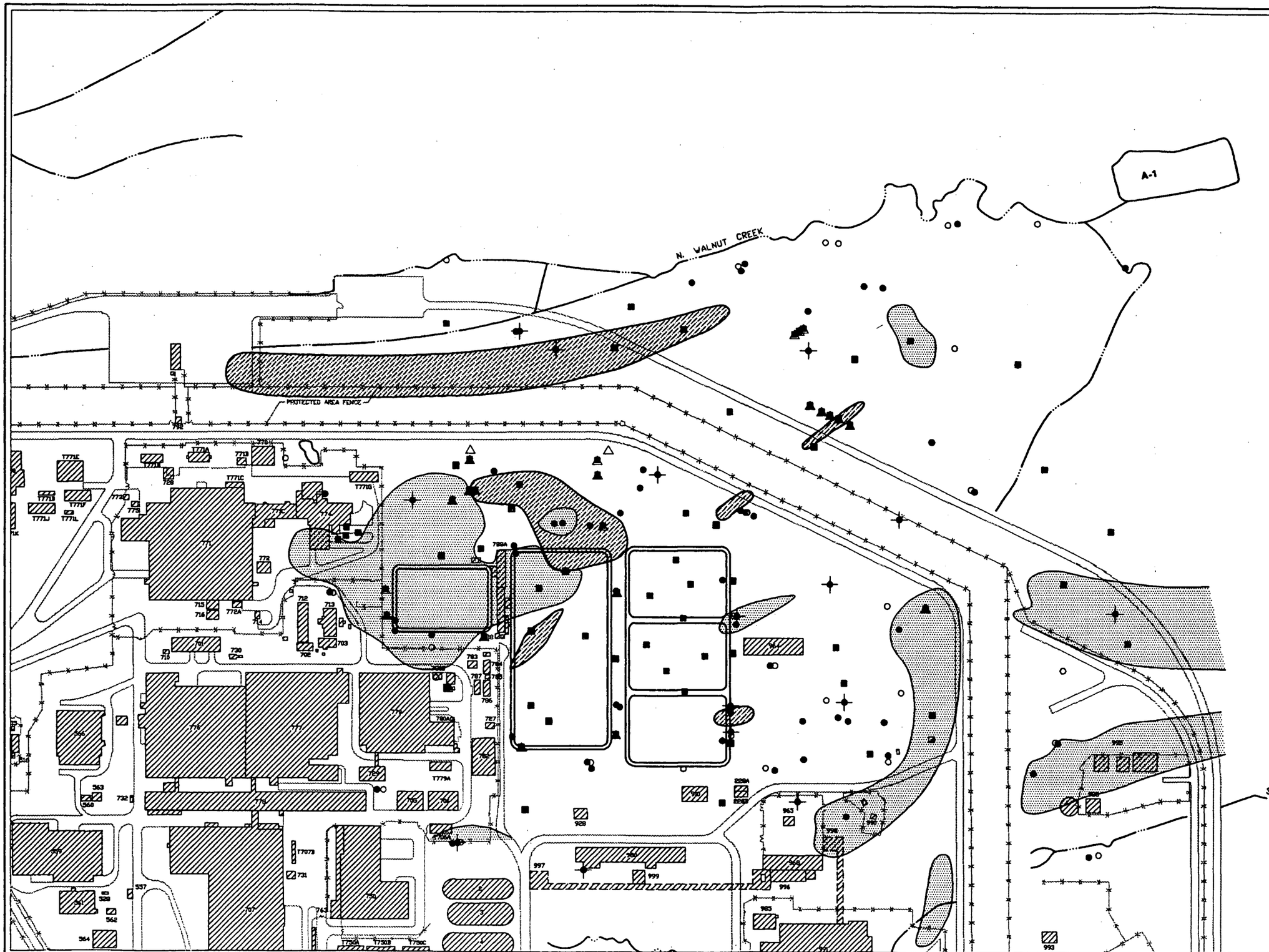
GOLDEN, COLORADO

Figure II.3.5-19

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Geophysical Line 1



LEGEND

- Streams
- Paved Roads
- Buildings
- Fence
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- Abandoned Monitoring Well
- Soil Sample/Borehole Location
- Sandstone
- Siltstone

NOTES

1. Areas without hatching are considered Claystone

100 0 100 200 300 FEET

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Figure II.3.5-16

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Subcropping Bedrock
Lithology Map

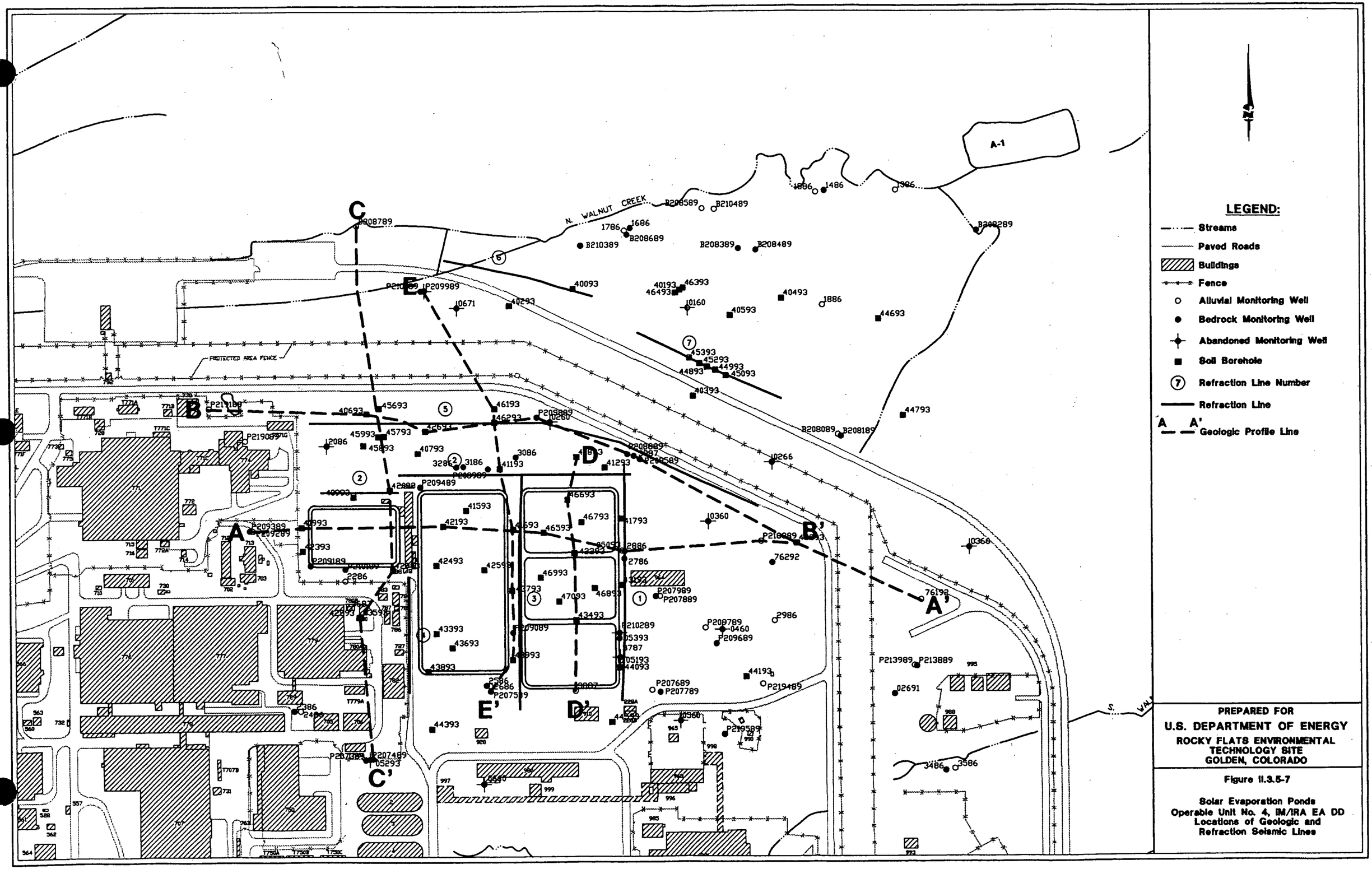

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Figure II.3.5-7

Solar Evaporation Ponds
Operable Unit No. 4, IM/IRA EA DD
Locations of Geologic and Refraction Seismic Lines