

TA-53

Addendum II to the RFI Work Plan and Sampling and Analysis Plan for Potential Release Sites 53-002(a) and 53-002(b) and Associated Piping and Drainages at TA-53

Presented by

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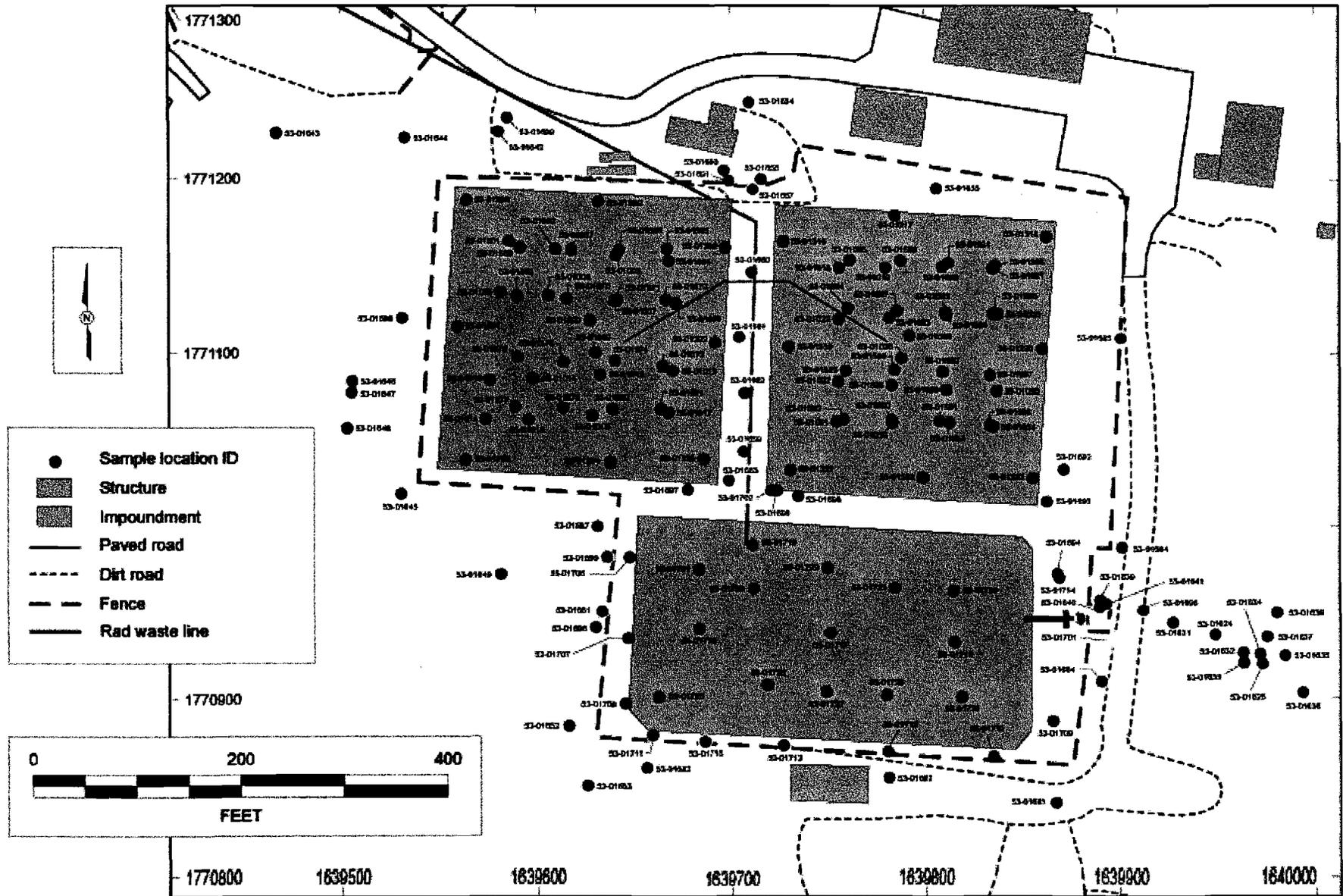
Los Alamos National Laboratory



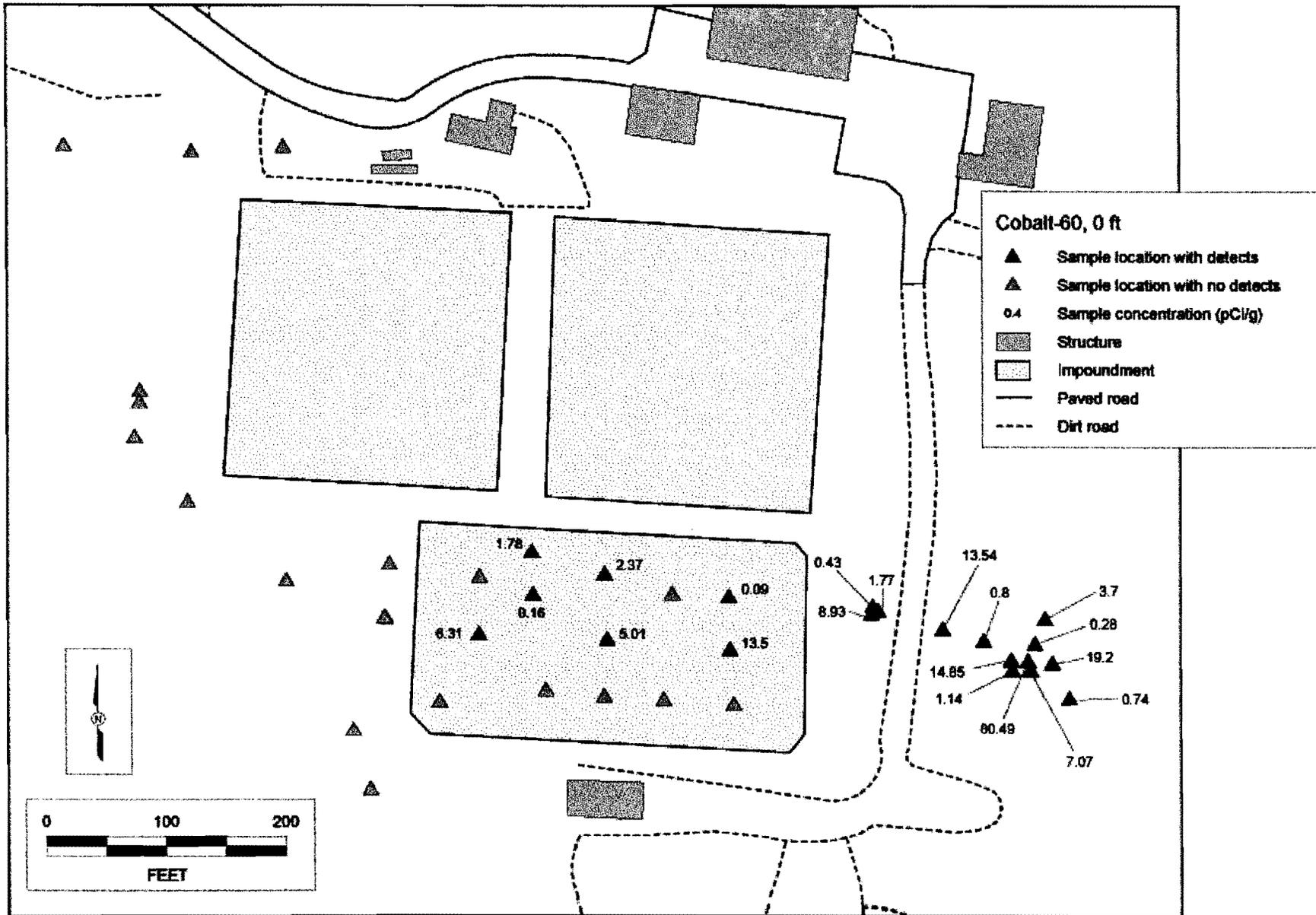
Summary of Presentation

- **Overview of previous sampling results**
- **Data Gaps**
- **Model for Tritium Transport**
- **Proposed Sampling Activities**
 - **IA confirmatory sampling**
 - **Extent sampling**
 - **Extent of Tritium sampling**

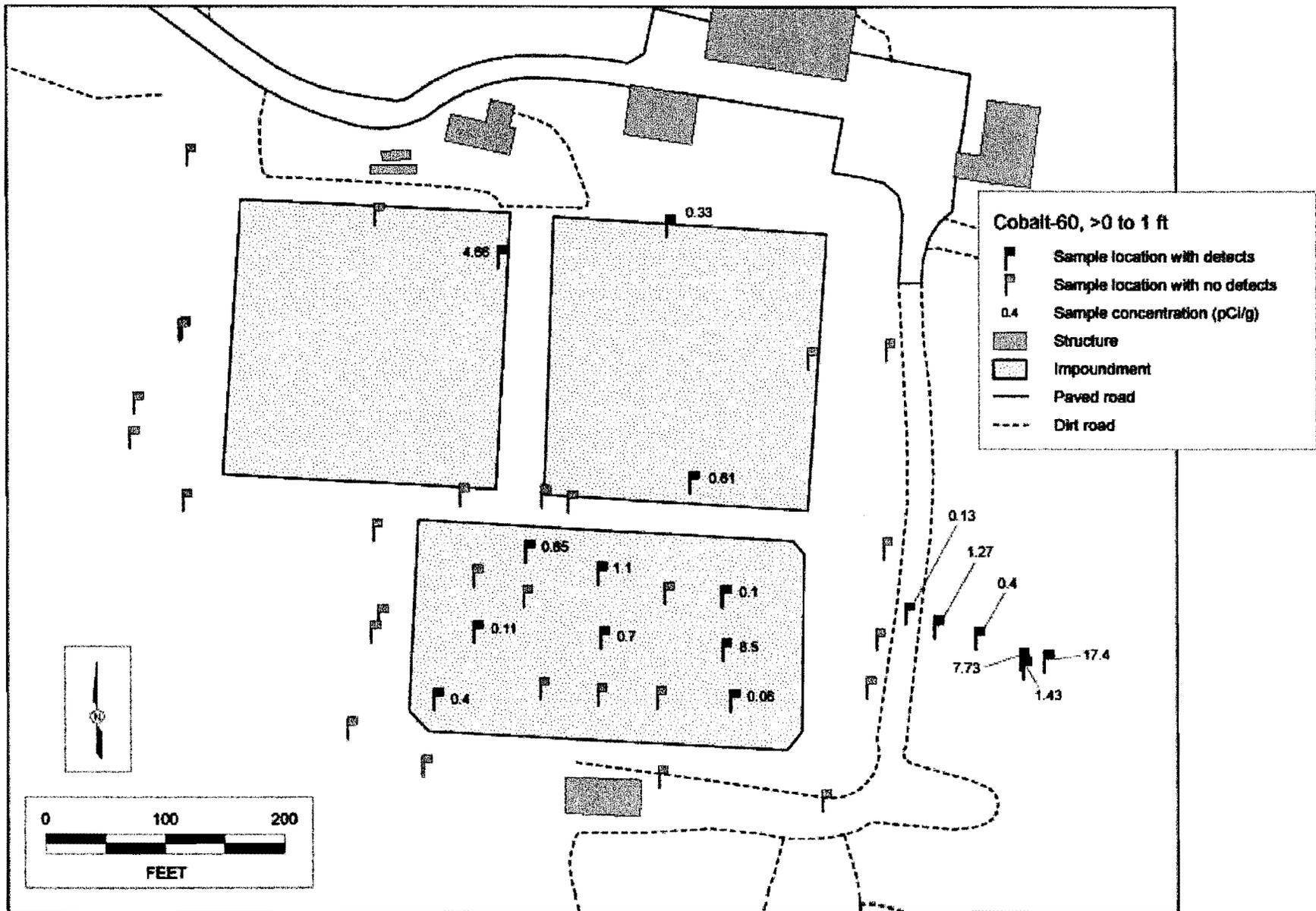
Sample Locations For the 1994/1995 and 1999/2000 Sampling Campaigns



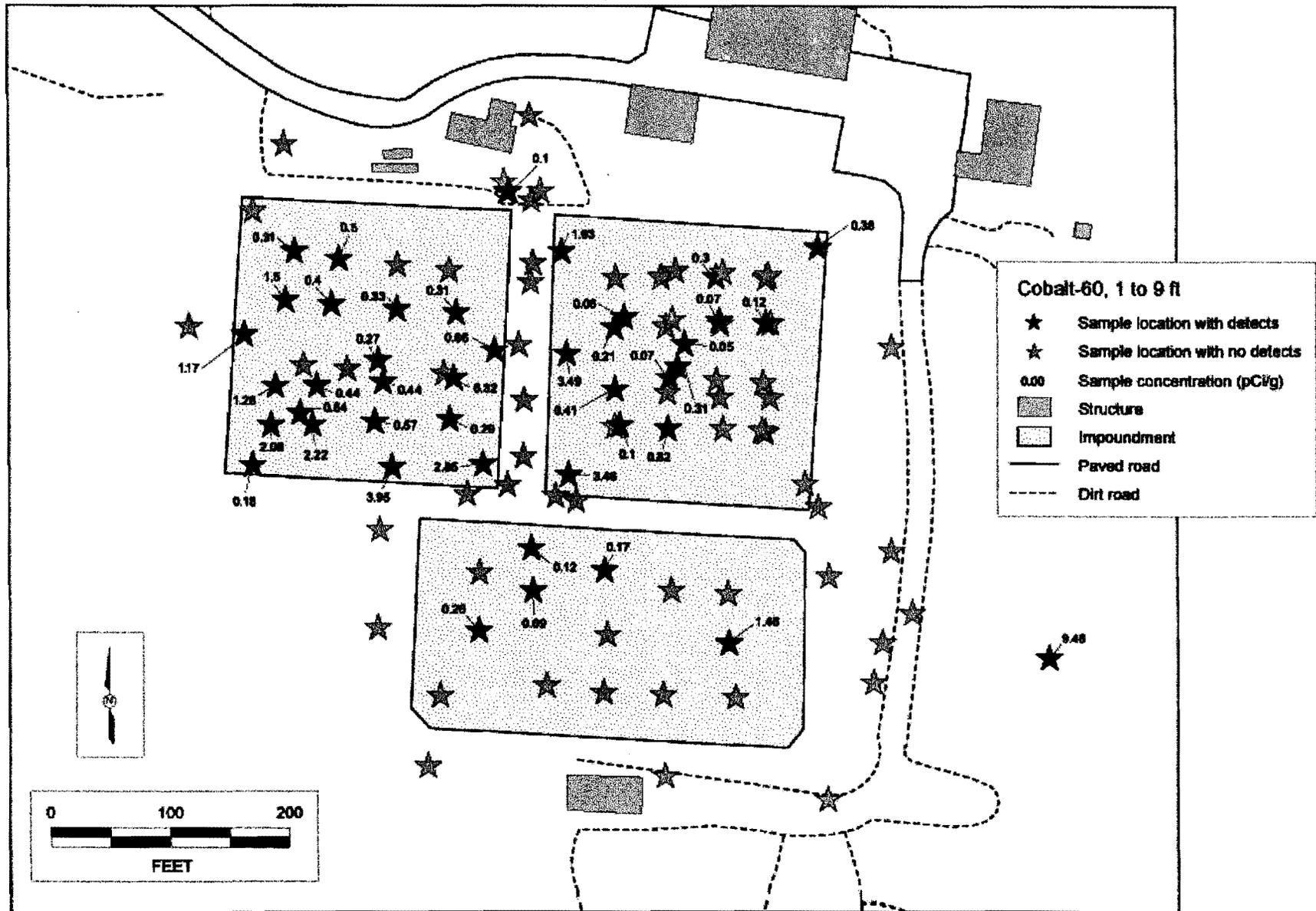
Cobalt-60 at 0 ft (Surface)



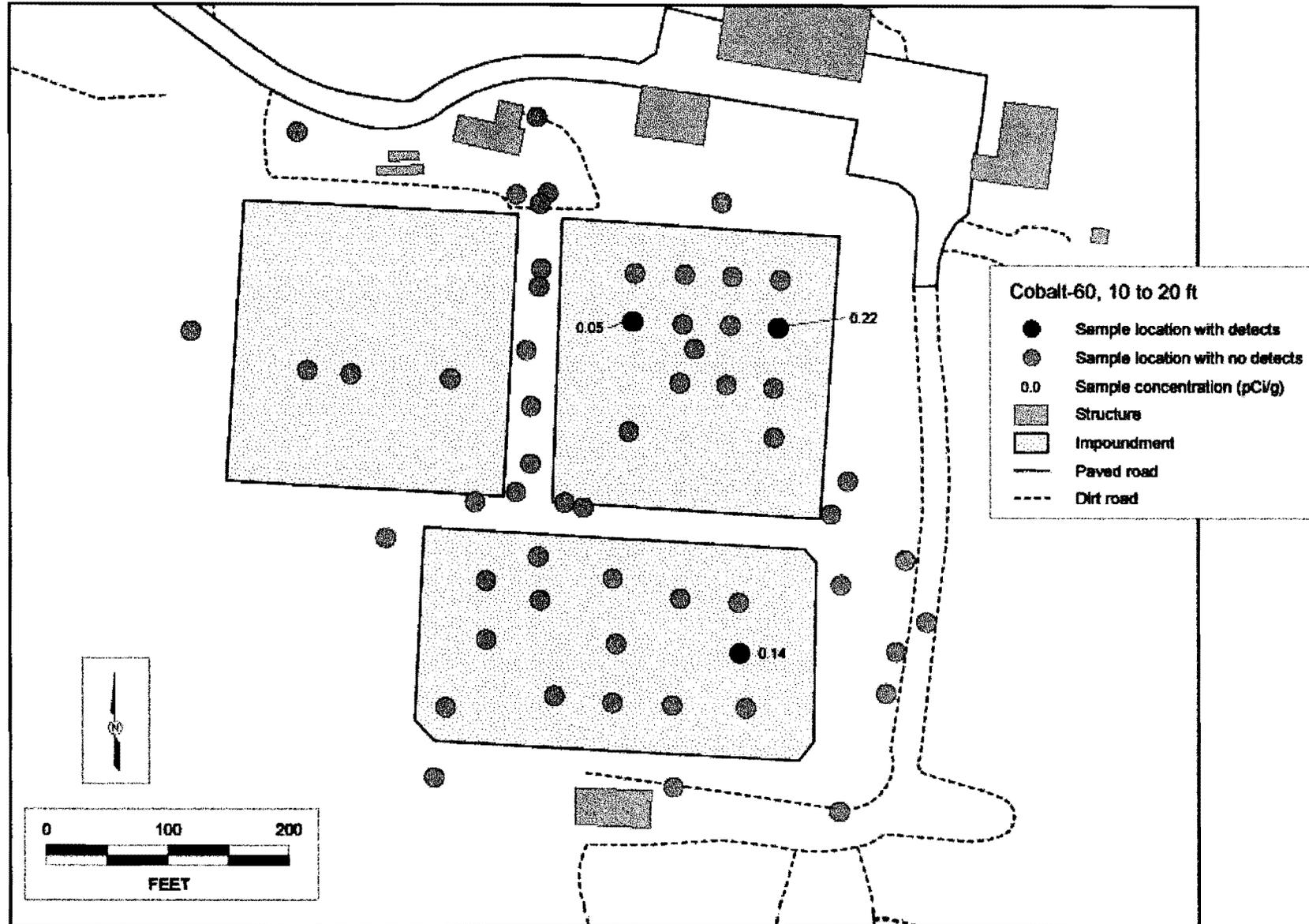
Cobalt-60 at Depths Greater Than 0 to 1 ft



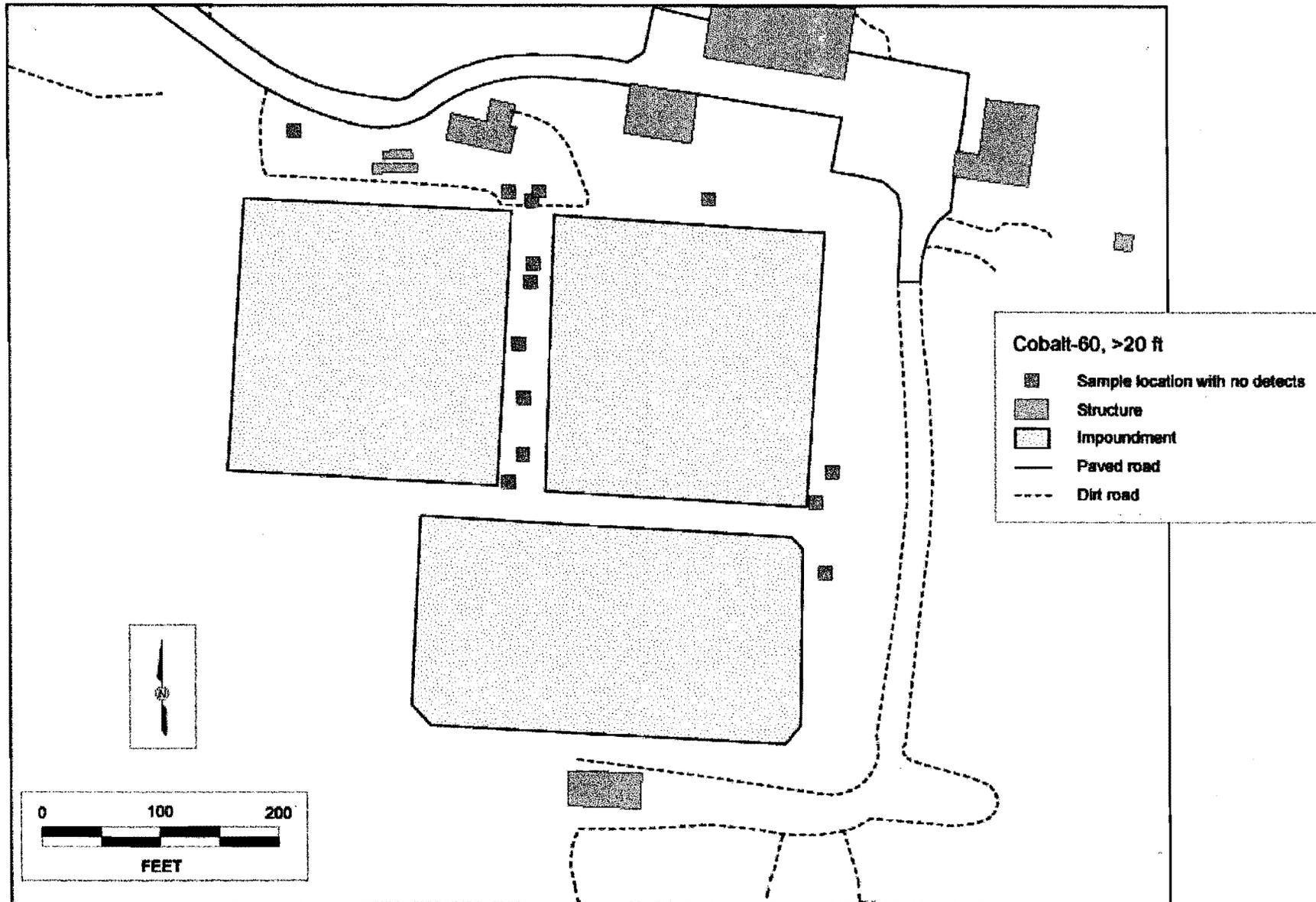
Cobalt-60 at Depths From 1 to 9 ft



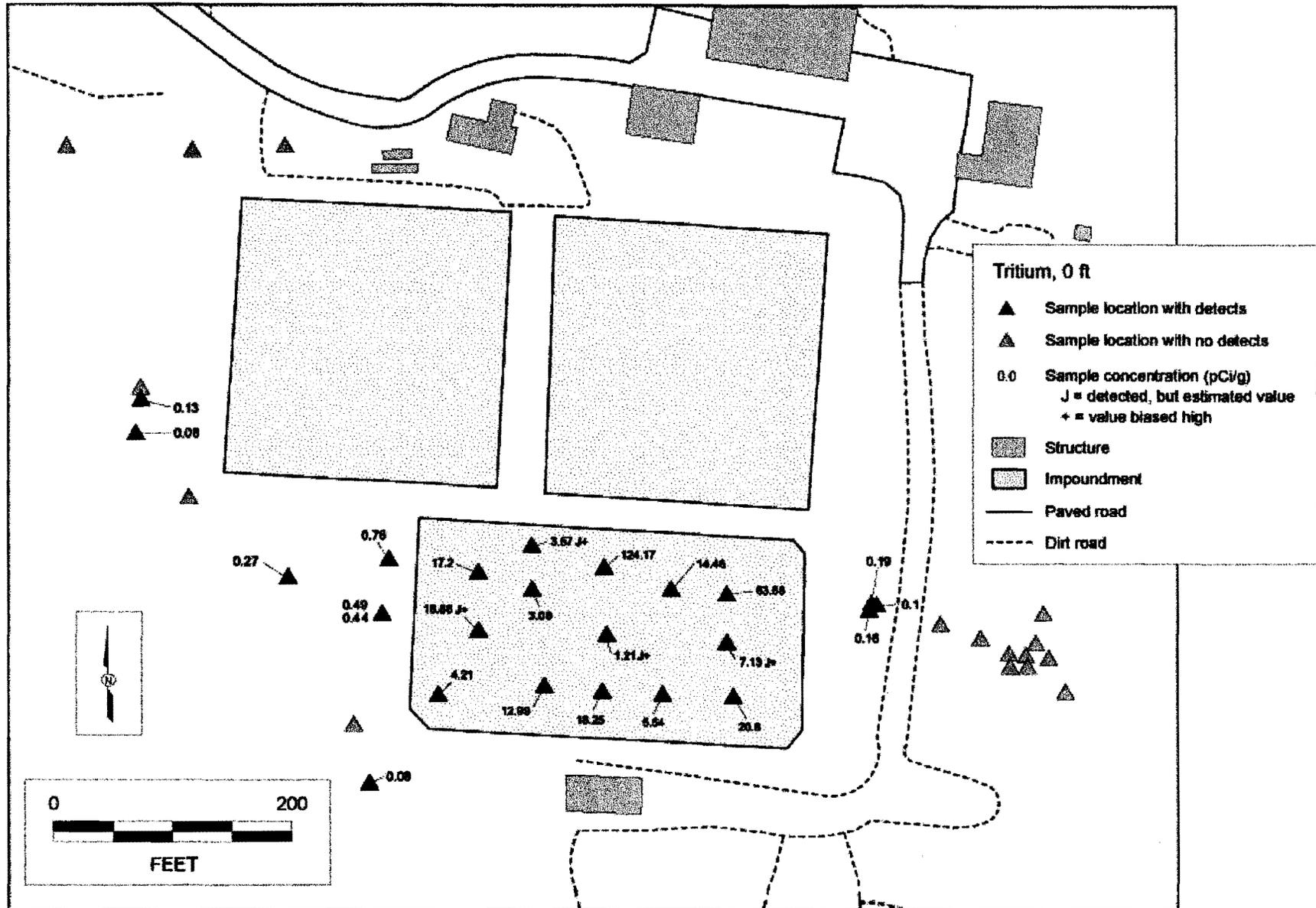
Cobalt-60 at Depths From 10 to 20 ft



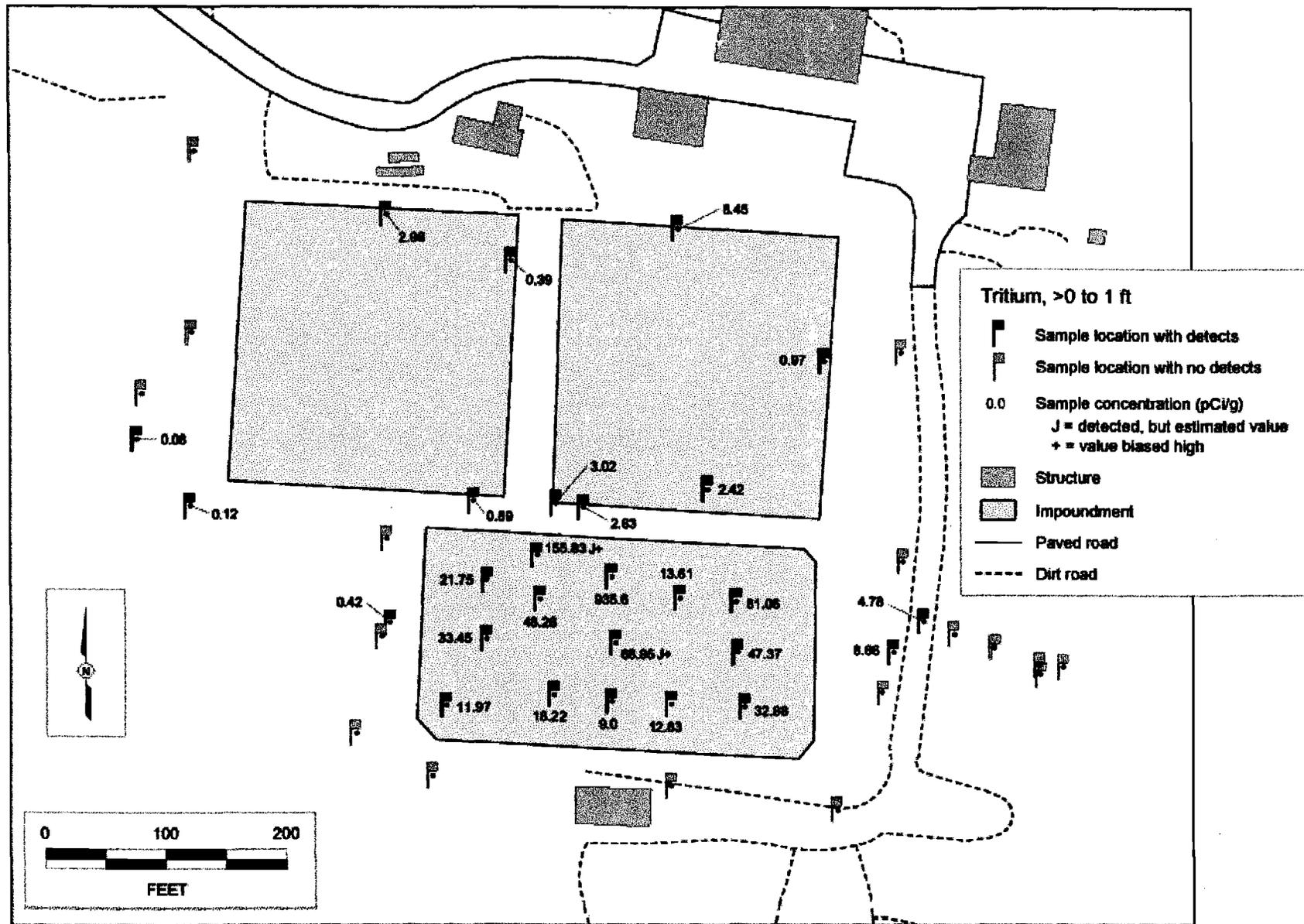
Cobalt-60 at Depths Greater Than 20 ft



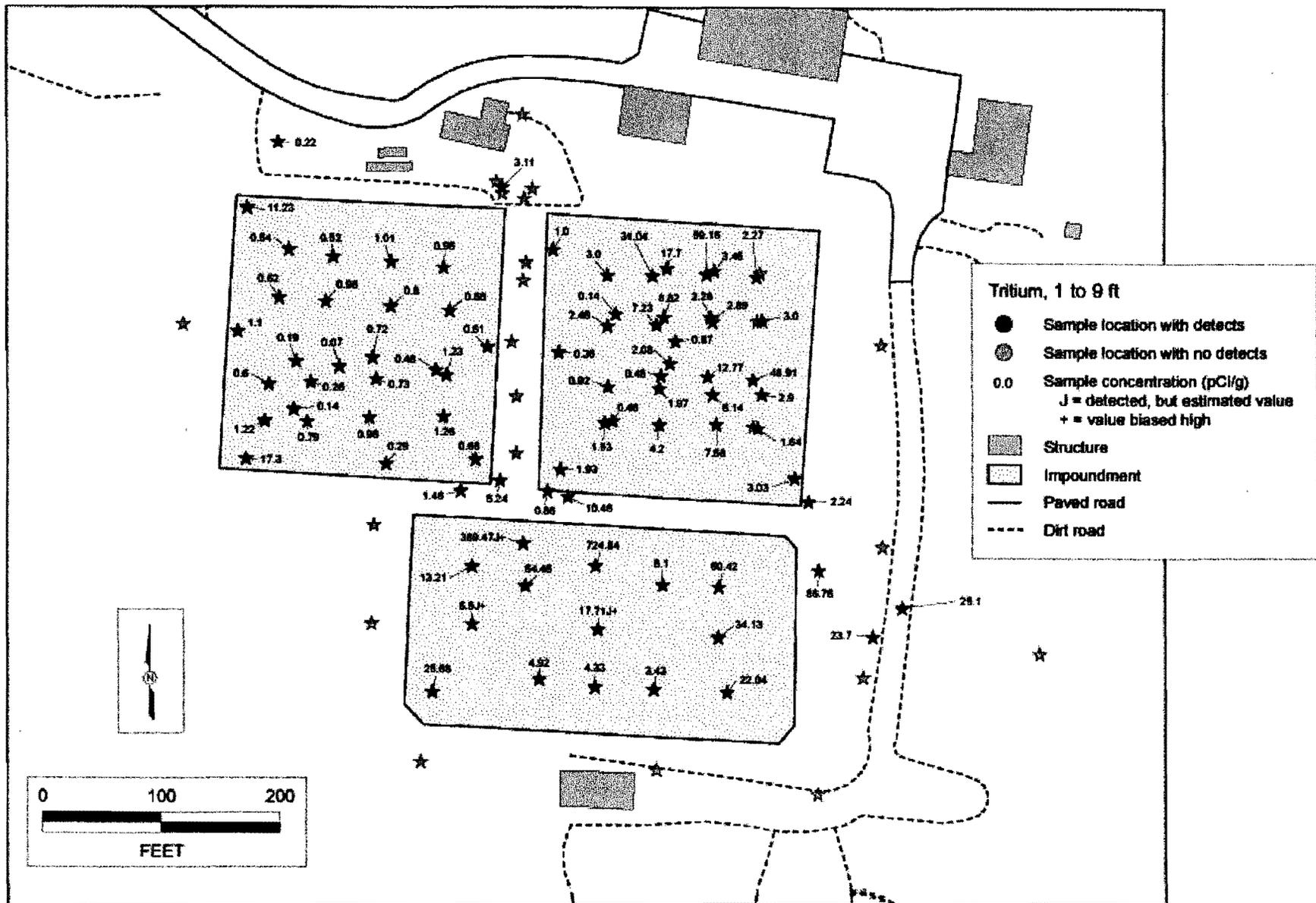
Tritium at 0 ft (Surface)



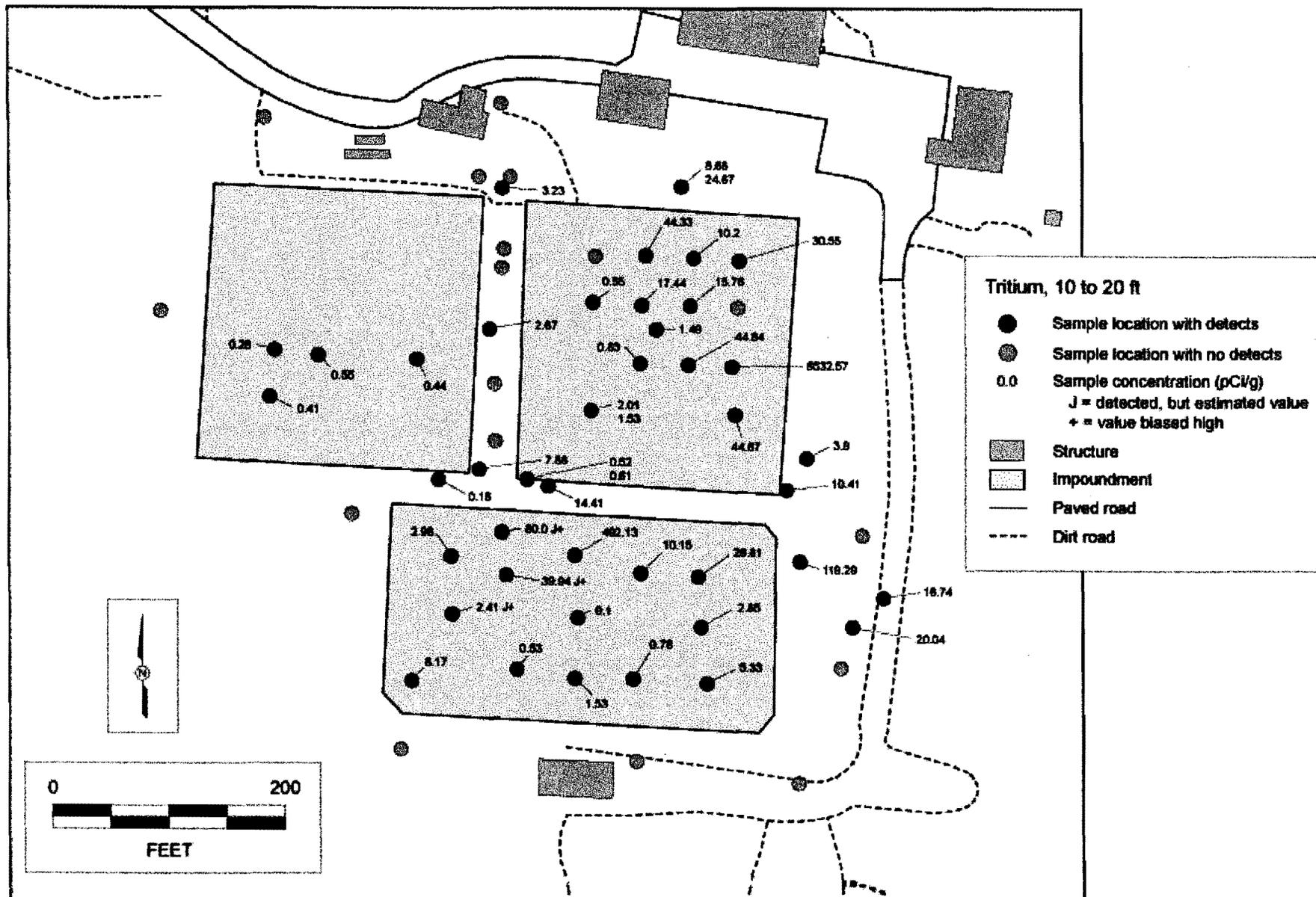
Tritium at Depths Greater Than 0 ft to 1 ft



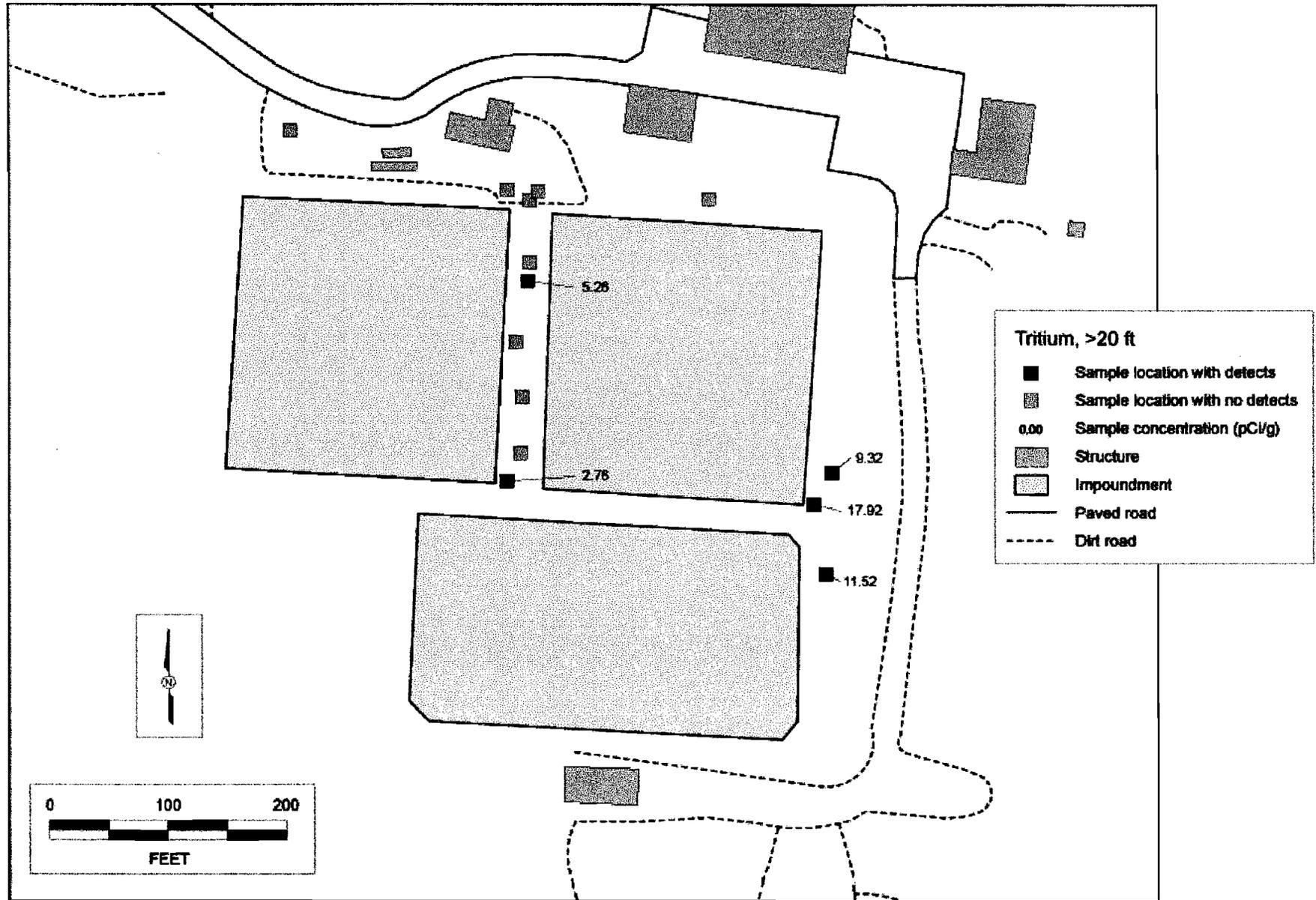
Tritium at Depths of 1 to 9 ft



Tritium at Depths of 10 to 20 ft



Tritium at Depths Greater Than 20 ft



Data Gaps

- **Between the northern impoundments: Sr-90, Tritium**
- **Under northern impoundments: Co-60, Sr-90, Tritium, VOCs**
- **Around the impoundments: Co-60, Sr-90, Tritium, SVOCs**
- **In the drainage area: Cs-134, Co-60, Sr-90, PCBs**

Model for Tritium Transport

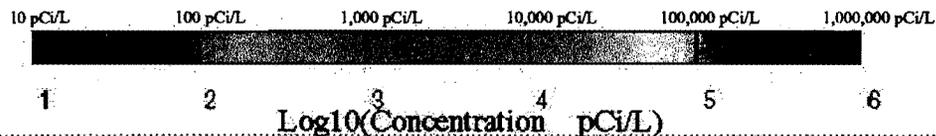
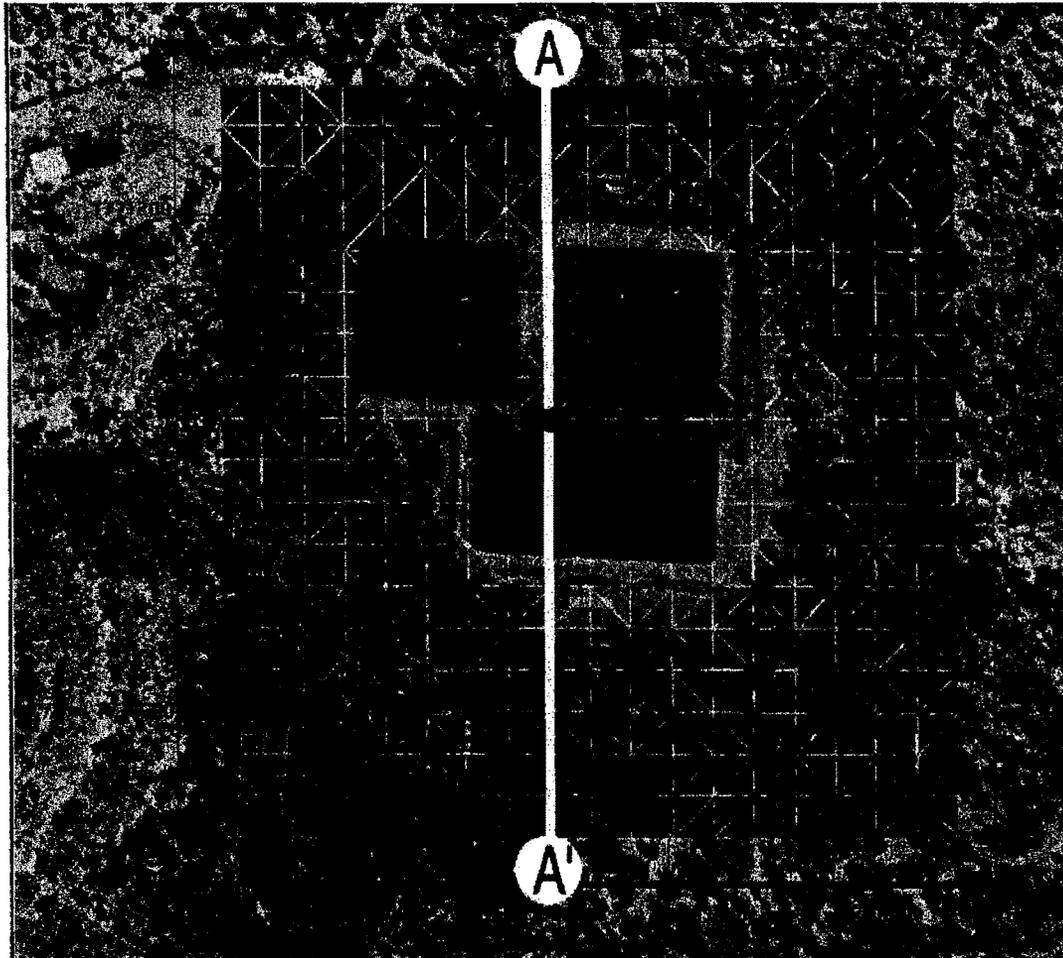
- **Purpose**
 - **Used to support decisions about the placement of boreholes**
 - **Help define drilling depth**
 - **Will support future decisions for the site**
- **Background**
 - **Conceptual and numerical model peer-reviewed**
 - **Model used at MDAs G, H, F, L, AB in support of environmental decision making**
 - **Model results have been published in journals** *what journals*

Model for Tritium Transport - *input*

- **Started with site-specific data: site data on tritium and water discharges from the northern impoundments**
 - **For the 15 yrs of effluent discharge to the outfall, 60 million gallons with approximately 187 Ci of Tritium.**
 - **Conservatively extrapolated to a 25 yr range (1970 to 1995) with approximately 266 Ci of Tritium and 85 million gallons.**
- **Used general Pajarito Plateau hydrologic data and the LANL site-wide geologic model**
- **The uncertain variables (infiltration rate, area, total volume, concentration, and diffusion coefficient) used in the simulation were conservative and represent a *worst-case scenario***

Model for Tritium Transport - *results*

- **Worst case model shows during the first 25 yrs of the simulation, the leading edge of the tritium contamination migrates to a depth of 370 ft with concentrations nearly 100,000 pCi/L at the 220-ft depth**
- **Worst case after 75 more years, with source removed, process of diffusion, dilution, and radioactive decay, the maximum concentration is reduced to 4000 pCi/L**

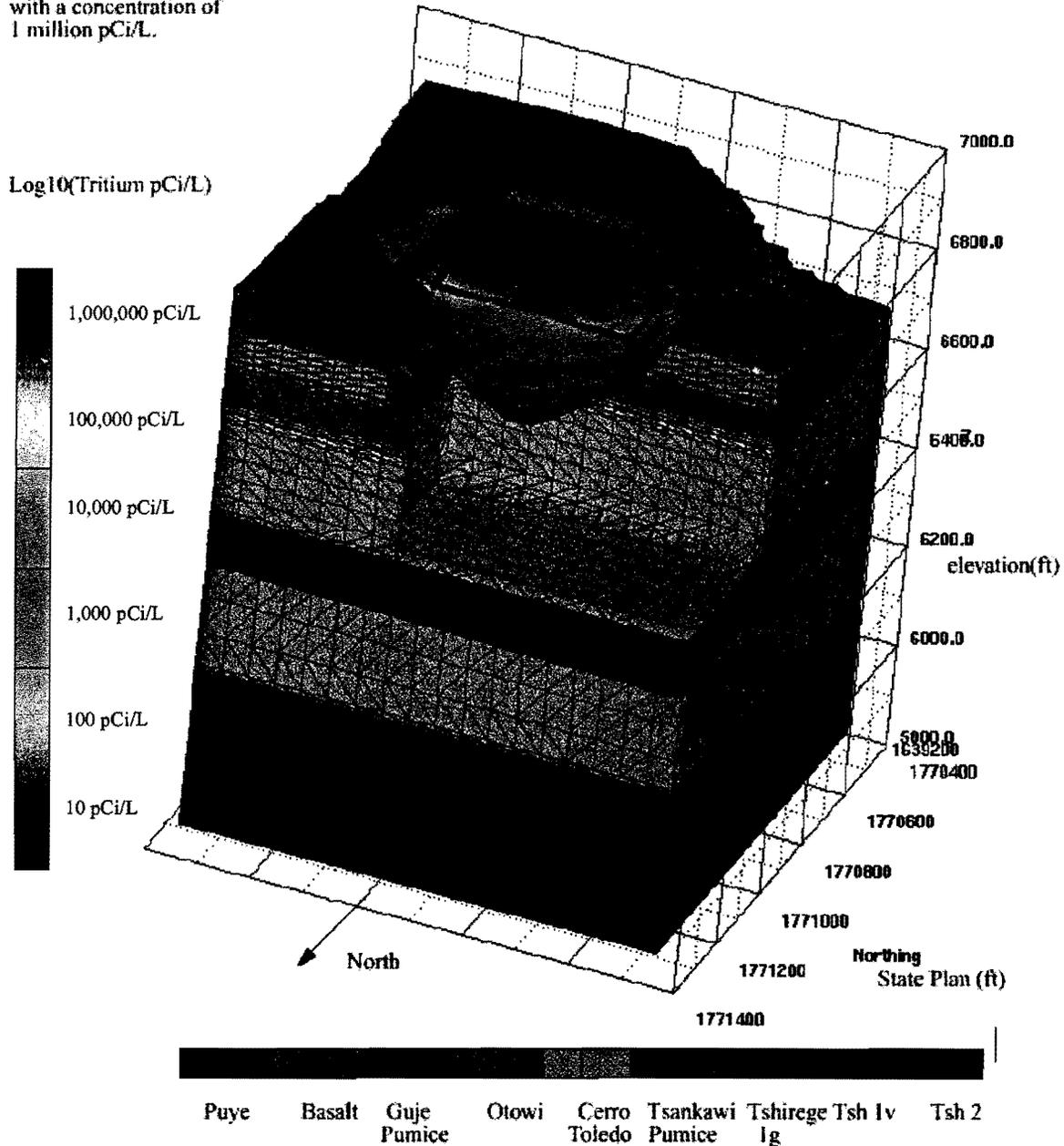


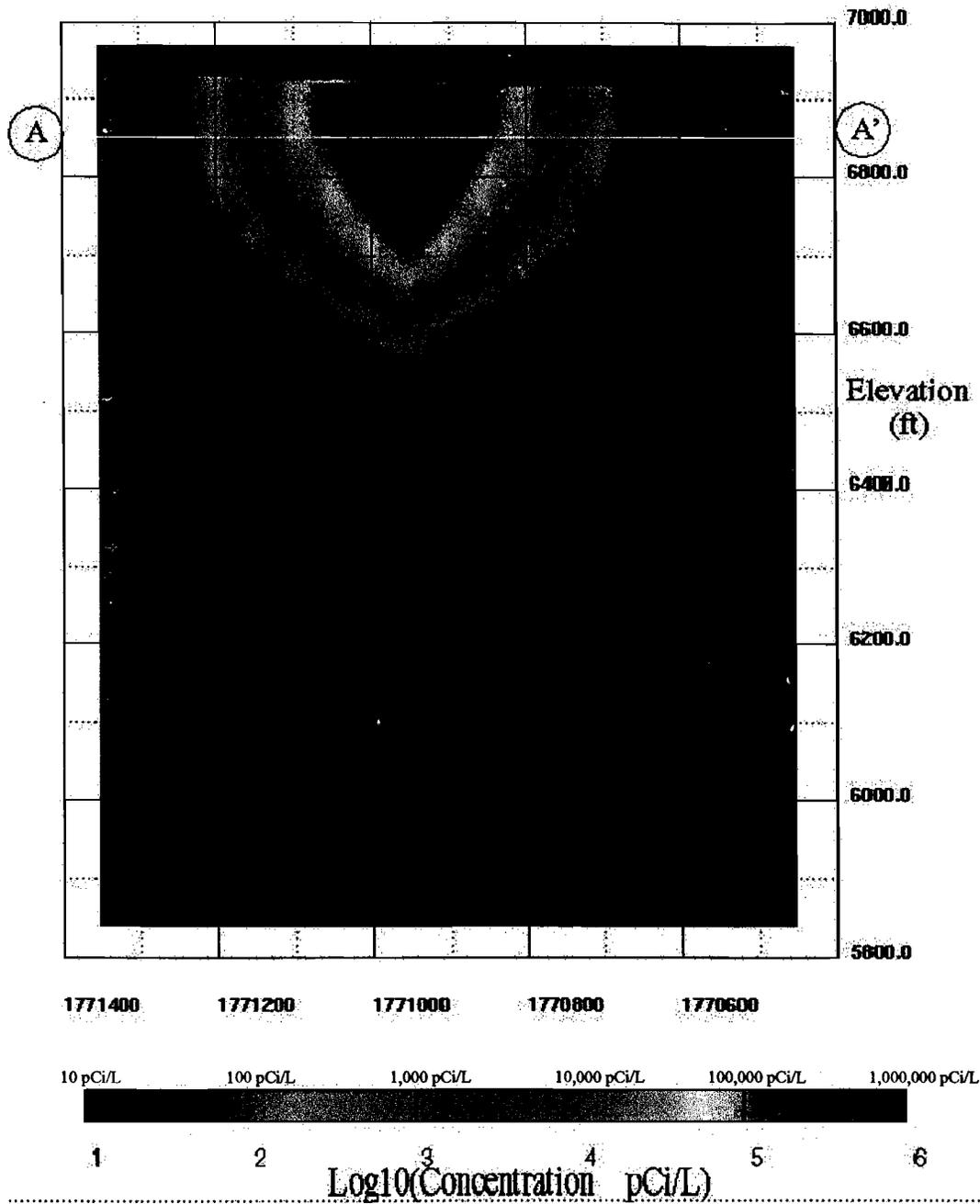
Horizontal slice of tritium concentration after 25 yrs of high infiltration (2m/yr) from the 4 nodes shown in pink

Numerical Grid for Tritium Simulations Showing Topography, Impoundment Placement, Geology, and the 1000-pCi/L Tritium Contour From a High-Infiltration Simulation (2 m/yr for 25 years)

Extent of the 1000 pCi/L contour as seen from the N.W. corner of the grid.
The heavy black line on the surface shows the location of the lagoons.

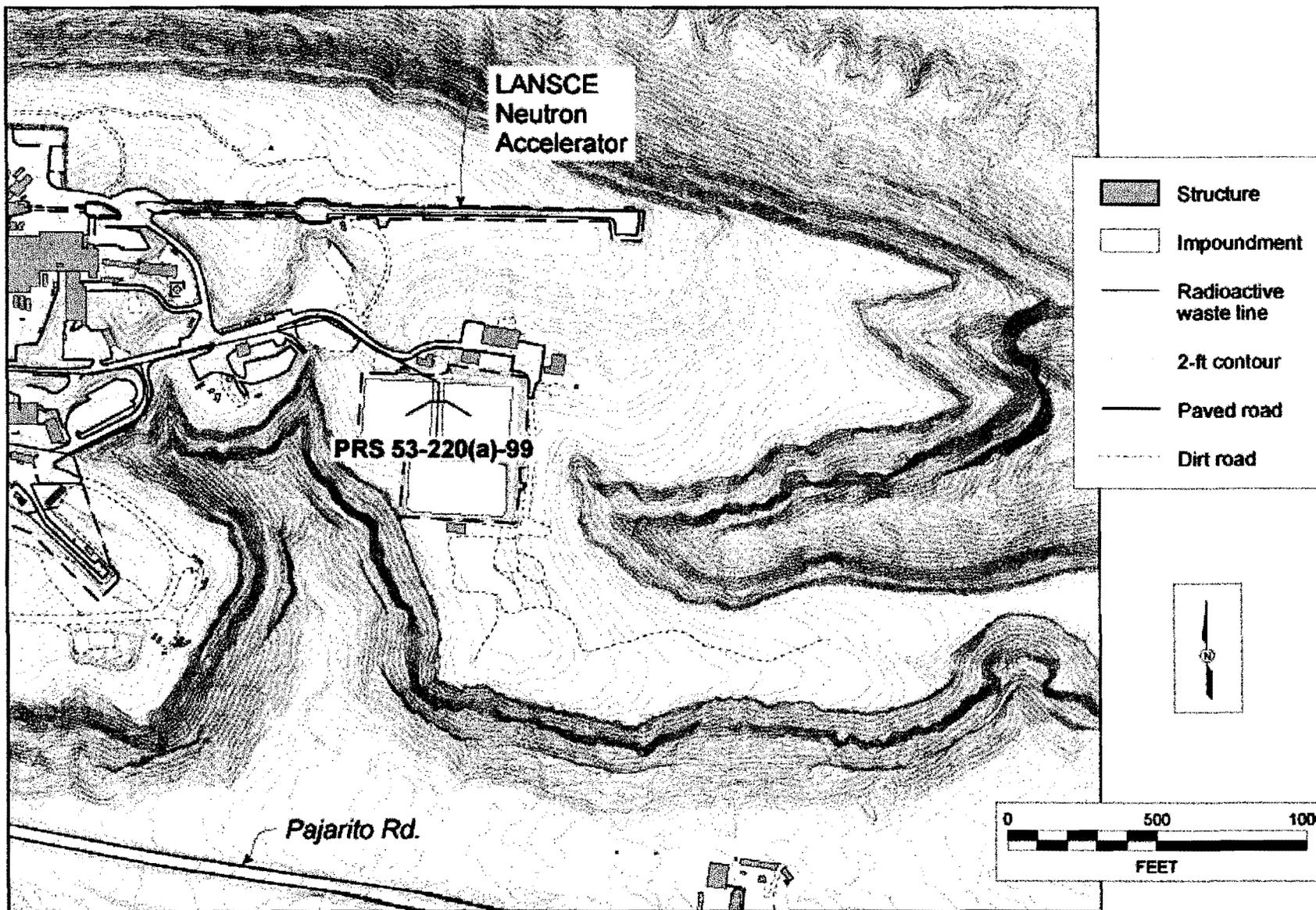
25 years of high infiltration with a concentration of 1 million pCi/L.



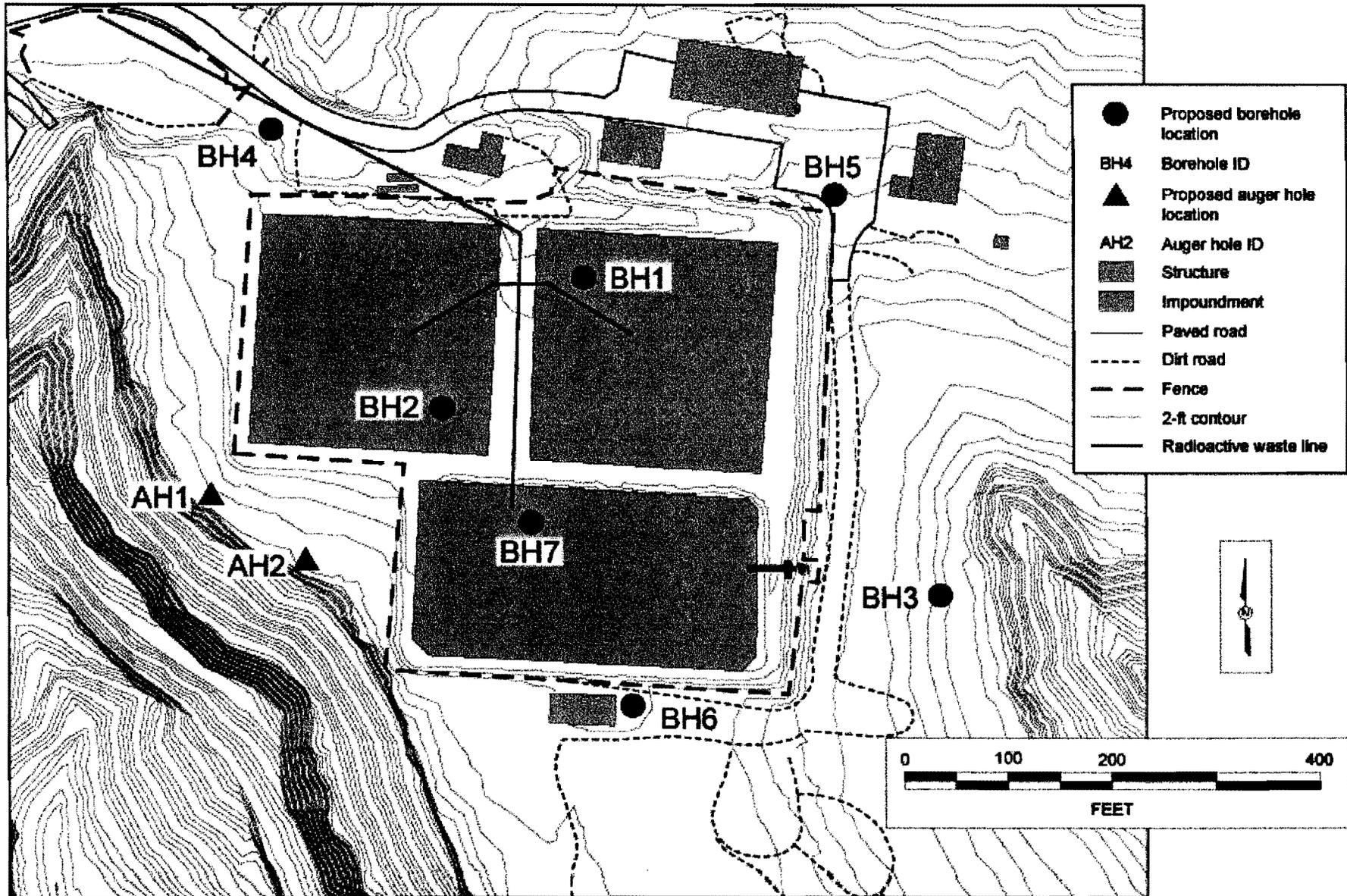


**Predicted Tritium concentrations
[log₁₀(pCi/L)
for 1995 on
cross section A-A'**

Site Map of TA-53 East



Proposed Auger Holes and Boreholes



Proposed Auger Holes and Boreholes and Sample Analyses for TA-53 Surface Impoundments

Auger/Borehole Number	Depth(s) (ft)	Number and Type of Sample Analyses					
		Tritium	Gamma Spectroscopy	Strontium-90	SVOCs	PCBs	VOCs
AH1	0.5	0	0	1	1	0	0
	6	0	0	1	1	0	0
	Total for AH1	0	0	2	2	0	0
AH2	0.5	0	0	1	1	0	0
	6	0	0	1	1	0	0
	Total for AH2	0	0	2	2	0	0
BH1*	0.5	0	1	0	0	0	0
	30	1	1	1	1	0	1
	50	1	1	1	1	0	1
Total for BH1	2	3	2	2	0	2	
BH2*	0.5	0	1	0	0	0	0
	30	1	1	1	1	0	1
	50	1	1	1	1	0	1
Total for BH2	2	3	2	2	0	2	
BH3	30	1	1	1	1	1	0
	50	1	1	1	1	1	0
Total for BH3	2	2	2	2	2	0	
BH4, BH5, BH6, BH7	10	4	0	0	0	0	0
	20	4	0	0	0	0	0
	30	4	4	4	4	0	1
	40	4	0	0	0	0	0
	50	4	4	4	4	0	1
	60	4	0	0	0	0	0
	70	4	0	0	0	0	0
	80	4	0	0	0	0	0
	90	4	0	0	0	0	0
	100	4	4	4	0	0	0
	110	4	0	0	0	0	0
	120	4	0	0	0	0	0
	130	4	0	0	0	0	0
	140	4	0	0	0	0	0
	150	4	0	0	0	0	0
160	4	0	0	0	0	0	
170	4	0	0	0	0	0	
180	4	0	0	0	0	0	
190	4	0	0	0	0	0	
200	4	0	0	0	0	0	
BH7	210-300	10	0	0	0	0	0
Total for BH4-BH7		90	12	12	8	0	2
Grand Total Borehole Samples		96	20	22	18	2	6

* = Collocated with IA confirmatory samples (see Table 4.1-1).



Deeper?

Deeper?

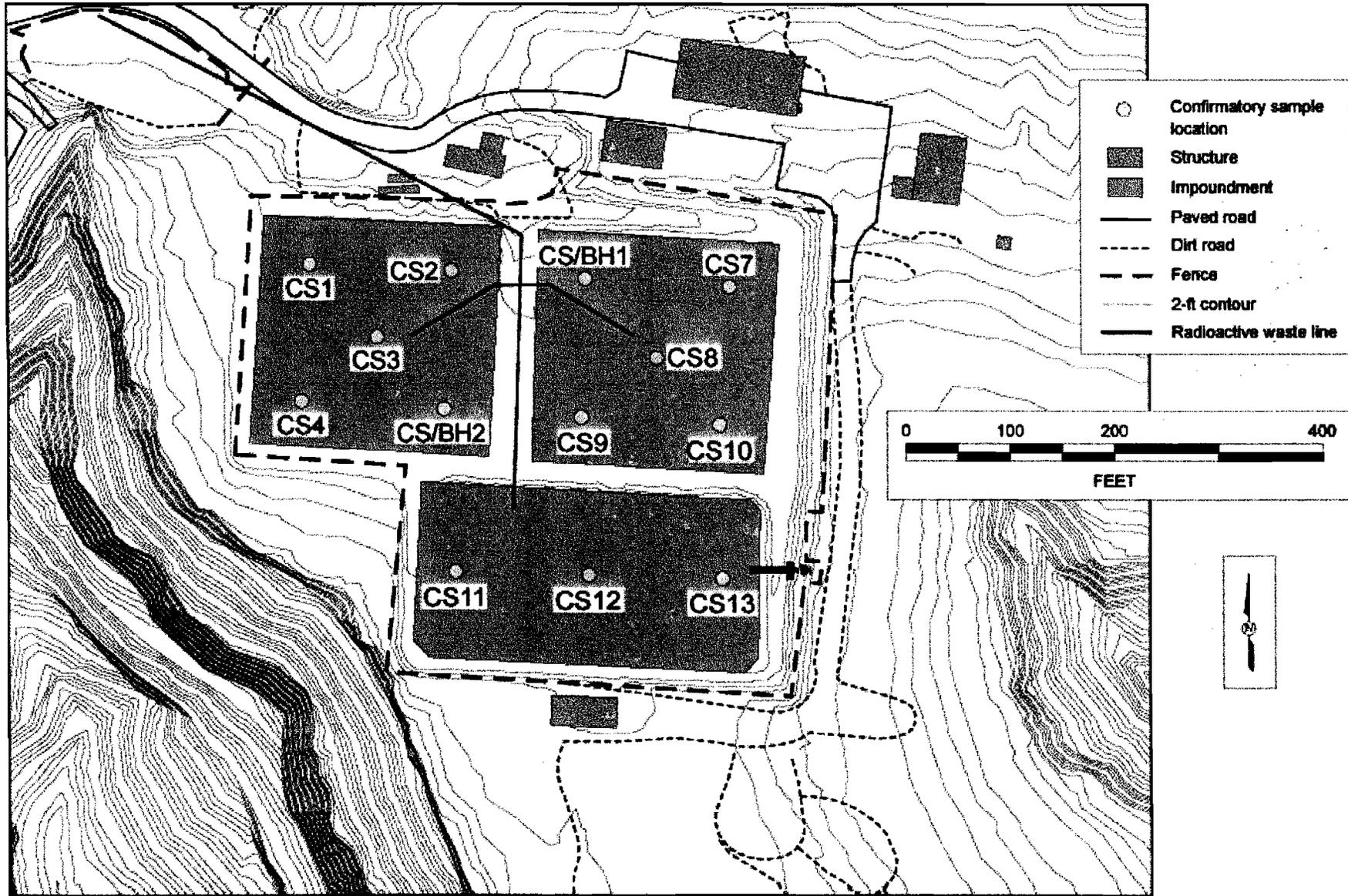
Vapor Monitoring Well

Vapor Probe?

LAMM Will

Focus: Fractures, Sandstone, Gerts Toledo, Tuffice Beds

Interim Action Confirmatory Sample Locations



Proposed Confirmatory Sample Analyses for the Interim Actions

Sample Location	Sample Number	Sample Depth (in.)	Gamma Spectroscopy
Northeast surface impoundment	1	0-6	1
	2	0-6	1
	3	0-6	1
	4	0-6	1
	BH2*	0-6	1
Northwest surface impoundment	BH1*	0-6	1
	7	0-6	1
	8	0-6	1
	9	0-6	1
	10	0-6	1
Southern surface impoundment	11	0-6	1
	12	0-6	1
	13	0-6	1
Total Number of Samples			13

