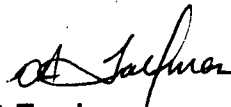
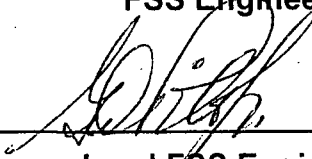
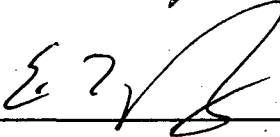


**Rancho Seco**  
**Final Status Survey Summary Report**  
**March 31, 2008**  
**Retention Basin Buffer Area**  
**Survey Unit F8480021**

Prepared By: Dan A. Tallman  Date: April 1, 2008  
FSS Engineer

Reviewed By:  Date: 4/1/08  
Lead FSS Engineer

Approved By:  Date: 5-5-08  
Dismantlement Superintendent, Radiological

## FINAL STATUS SURVEY SUMMARY REPORT

### Survey Unit:

F8480021, Retention Basin Buffer Area

### Survey Unit Description:

Operating History: This area is located at the southwest corner of the site. The area surrounds the structures that were used for containment and final treatment of liquid effluents prior to their release from the site. Contaminated resin was reported to have been found in the basins. Operating records and the HSA document occurrences of radioactive material with the potential for a release of radioactivity associated with this survey area. Records confirmed the presence of radioactive material within the area and basin sediment/soil contamination levels up to ~290 pCi/g. In addition, soil contamination levels up to ~5 pCi/g prior to some decontamination activities.

Site Characterization: Soil samples were collected and showed Cs-137 at mean activity levels of 0.086 pCi/g and a maximum activity of 0.196 pCi/g. Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the soil area around the asphalt was determined to be Class 3.

HSA Events: LER-8812.

### Survey Unit Design Information:

The Survey Unit Design Parameters are presented in Table 1 below. The survey unit and measurement locations are depicted on the maps in Attachment 1. Direct measurement locations were randomly determined and 1484 m<sup>2</sup> were scanned for approximately 14% coverage. Soil samples were collected at each direct measurement location and analyzed by HPGe detector. The instrumentation used for the survey along with the MDC values are listed in Tables 2-1 and 2-2 in Attachment 2.

**Table 1. Survey Unit Design Parameters**

<b>Survey Design Parameter</b>	<b>Value</b>	<b>Comment</b>
<b>Survey Area:</b>	F848	Retention Basin Buffer Area
<b>Survey Unit:</b>	0021	Open Land Area
<b>Class:</b>	3	LTP Table 5-4
<b>SU Area (m<sup>2</sup>):</b>	10845	
<b>Evaluator:</b>	D.A.Tallman	
<b>DCGL Cs137 surrogate (pCi/g):</b>	51.2	
<b>Area Factor:</b>	N/A	Class 3
<b>Design DCGL<sub>mc</sub> (pCi/g):</b>	N/A	Class 3
<b>LBGR (pCi/g):</b>	25.6	Default = 50% DCGL
<b>Design Sigma (pCi/g):</b>	0.047	DTBD-06-001, Table 5-4D
<b>Type I Error:</b>	0.05	
<b>Type II Error:</b>	0.05	
<b>Nuclide:</b>	Cs137	
<b>Sample Area (m<sup>2</sup>):</b>	N/A	Class 3
<b>Total Area Scanned (m<sup>2</sup>):</b>	1484	
<b>Scan Coverage (%):</b>	13.7%	Class 3
<b>Z<sub>1-α</sub>:</b>	1.645	
<b>Z<sub>1-β</sub>:</b>	1.645	
<b>Sign P:</b>	0.99865	
<b>Calculated Relative Shift:</b>	544.6	
<b>Relative Shift Used:</b>	3	Uses 3.0 if Rel Shift >3
<b>N-Value:</b>	11	
<b>Design N-Value + 20%:</b>	14	NUREG-1575 Table 5-5
<b>Grid Spacing L:</b>	N/A	Class 3

## Survey Results:

A total of 14 direct measurements were made in F8480021. The results including mean, median, standard deviation and range are shown in Table 2. All of the direct measurements were less than the DCGL. None of the scan measurements indicated areas of elevated activity. Soil samples were counted to the MDC shown in Table 2-1 of Attachment 2.

**Table 2. Direct Measurement Results**  
(all activity values in pCi/g)

Measurement ID	Cs137 MDA	Cs137 Activity	Uncertainty
<b>Mean:</b>		6.25E-02	
<b>Median:</b>		5.66E-02	
<b>Standard Deviation:</b>		2.49E-02	
<b>Range:</b>	4.27E-02 to 1.46E-01		
F8480021S0001SS	4.94E-02	< 4.94E-02	
F8480021S0002SS	5.15E-02	< 5.15E-02	
F8480021S0003SS	5.10E-02	< 5.10E-02	
F8480021S0004SS	5.80E-02	< 5.80E-02	
F8480021S0005SS	5.52E-02	< 5.52E-02	
F8480021S0006SS	7.03E-02	< 7.03E-02	
F8480021S0007SS	6.20E-02	< 6.20E-02	
F8480021S0008SS	6.03E-02	< 6.03E-02	
F8480021S0009SS	4.27E-02	< 4.27E-02	
F8480021S0010SS	5.34E-02	< 5.34E-02	
F8480021S0011SS	6.01E-02	< 6.01E-02	
F8480021S0012SS	5.46E-02	< 5.46E-02	
F8480021S0013SS	6.80E-02	1.46E-01	5.18E-02
F8480021S0014SS	6.12E-02	< 6.12E-02	

**Survey Unit Data Assessment:**

The survey design required 14 direct measurements for the Sign Test. The critical value and the results of the Sign Test are presented in Table 3. The sample mean and median values were less than the DCGL. The sample standard deviation was less than the design standard deviation so no additional samples were required.

**Table 3. Data Assessment Results**

<b>Survey Results Parameter</b>	<b>Value</b>	<b>Comment</b>
<b>Actual Direct Measurements (N):</b>	14	
<b>Median (pCi/g):</b>	5.66E-02	
<b>Mean (pCi/g):</b>	6.25E-02	
<b>Standard Deviation (pCi/g):</b>	2.49E-02	
<b>Maximum (pCi/g):</b>	1.46E-01	
<b>Sign Test Final N Value:</b>	14	
<b>S+ Value:</b>	14	
<b>Critical Value:</b>	10	
<b>Sufficient Samples Collected:</b>	Yes	
<b>Maximum Value &lt; DCGL:</b>	Yes	
<b>Median Value &lt; DCGL:</b>	Yes	
<b>Mean Value &lt; DCGL:</b>	Yes	
<b>Maximum Value &lt; DCGL<sub>emc</sub>:</b>	N/A	Class 3
<b>Standard Deviation &lt;= Sigma:</b>	Yes	
<b>Pass the Sign Test?</b>	Yes	
<b>Reject the Null Hypothesis?</b>	Yes	
<b>The survey unit passes all conditions?</b>	Yes	

**Survey Unit Investigations and Results:**

No investigations were required for either direct or scan measurements and no investigation results are reported.

**ALARA Statement:**

As stated in Chapter 4 of the LTP, as long as the residual activity within the survey unit is less than the DCGL (i.e. the survey unit average activity is less than the DCGL and the EMC criterion has been met), the ALARA criterion has been met.

**Changes in Initial Survey Unit Assumptions:**

The survey unit was designed as a Class 3 land survey and the sample results are consistent with that classification. The variability of the survey results was less than the characterization data used for survey design. No potential areas of elevated activity were detected.

**Conclusion:**

The FSS of this survey unit was properly designed as a Class 3 survey based on Table 5-4 of the LTP. The required number of direct measurements was made and the scan coverage met the requirement of Table 5-6 of the LTP. All of the direct measurements were less than the DCGL. No investigations were required.

The direct measurement data support rejection of the null hypothesis, providing high confidence that the survey unit satisfied the release criteria and that the data quality objectives were met.

It is concluded that survey unit F8480021 meets the release criteria of 10CFR20.1402.

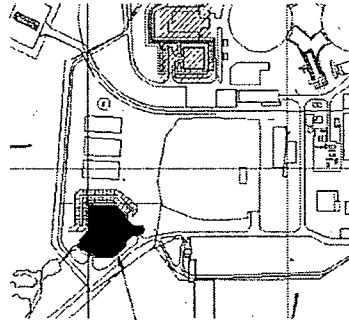
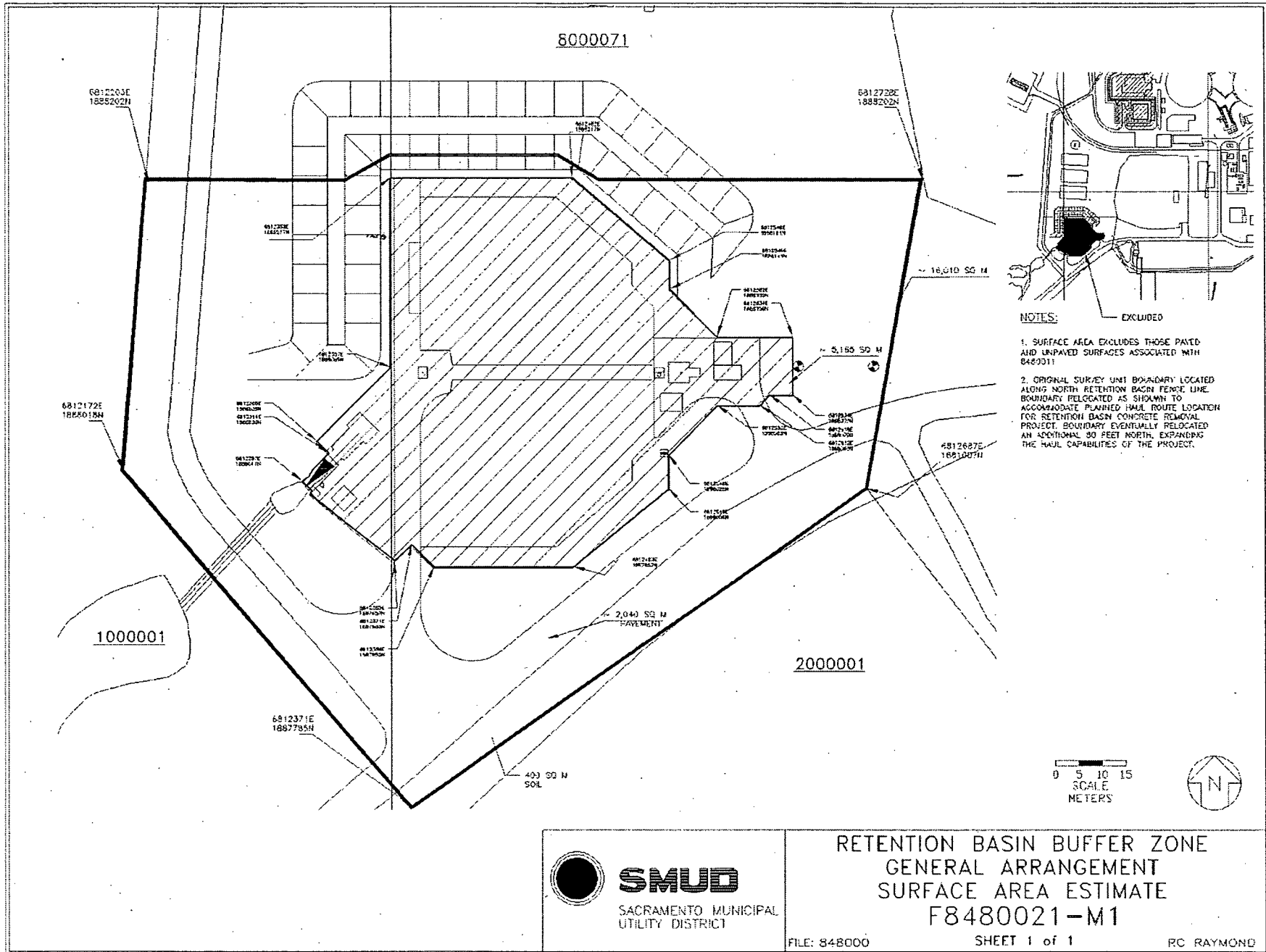
**Attachment 1**

**Maps**

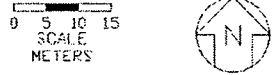
**March 31, 2008**

**Survey Unit F8480021**

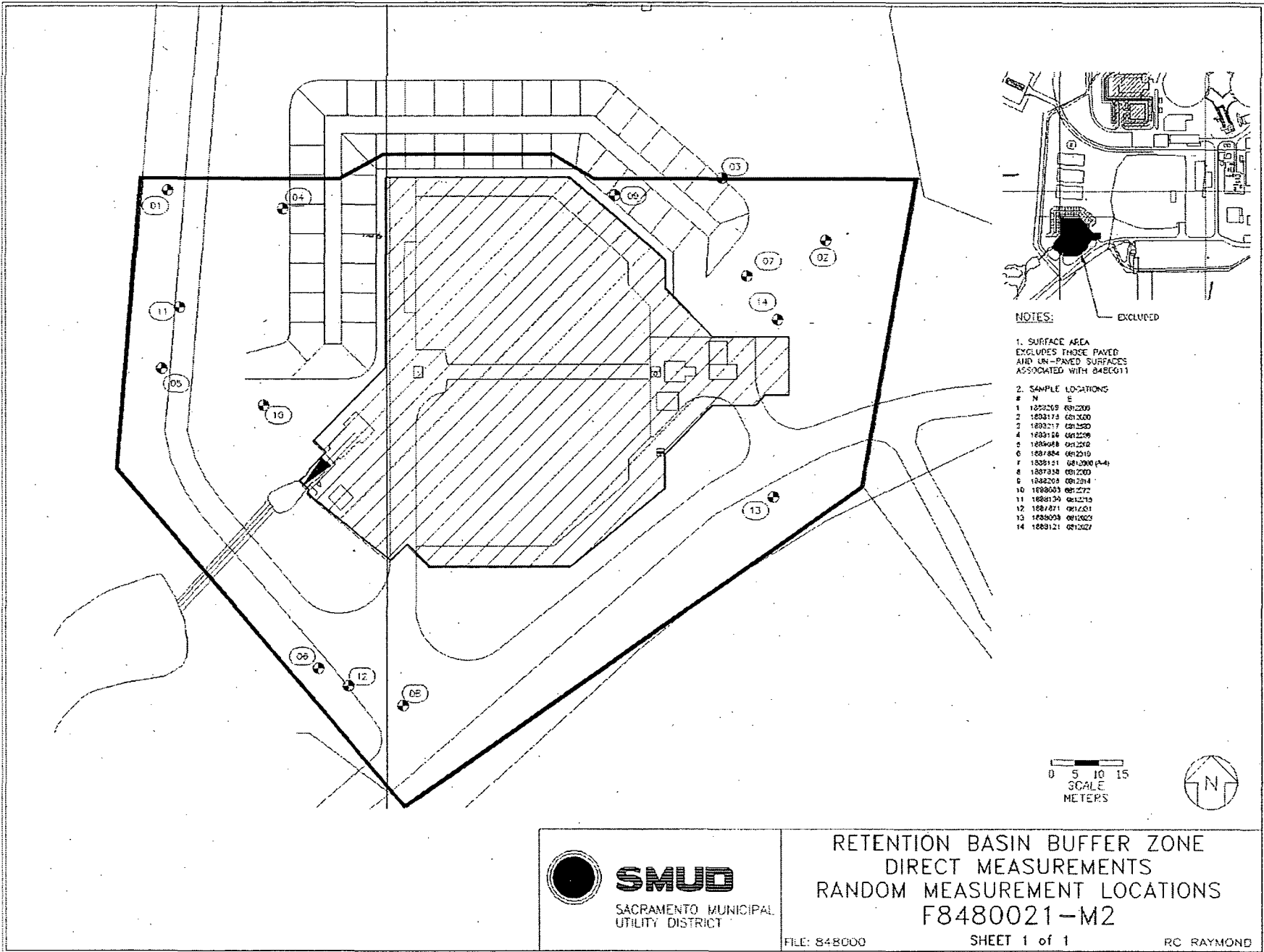


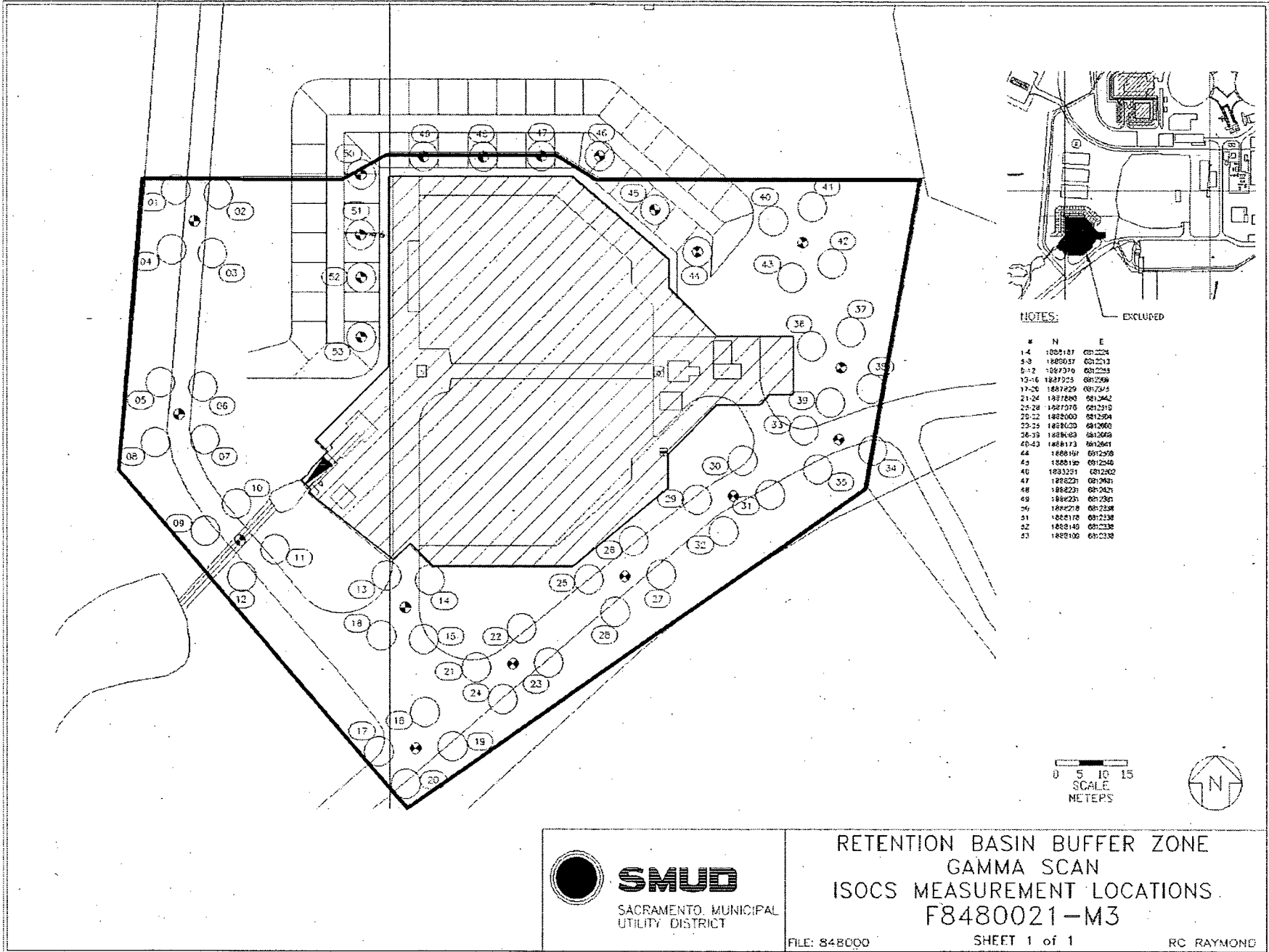


- NOTES:**
1. SURFACE AREA EXCLUDES THOSE PAVED AND UNPAVED SURFACES ASSOCIATED WITH 8469311
  2. ORIGINAL SURVEY UNIT BOUNDARY LOCATED ALONG NORTH RETENTION BASIN FENCE LINE. BOUNDARY RELOCATED AS SHOWN TO ACCOMMODATE PLANNED HAUL ROUTE LOCATION FOR RETENTION BASIN CONCRETE REMOVAL PROJECT. BOUNDARY EVENTUALLY RELOCATED AN ADDITIONAL 30 FEET NORTH, EXPANDING THE HAUL CAPABILITIES OF THE PROJECT.



**RETENTION BASIN BUFFER ZONE  
GENERAL ARRANGEMENT  
SURFACE AREA ESTIMATE  
F8480021-M1**

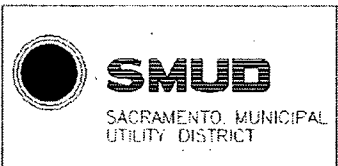
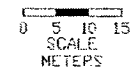




NOTES:

EXCLUDED

#	N	E
1-4	1885187	0812224
5-8	1885031	0812213
9-12	1887370	0812243
13-16	1887225	0812268
17-20	1887229	0812515
21-24	1887880	0812442
25-28	1887375	0812310
29-32	1885060	0812354
33-36	1888630	0812660
37-40	1888683	0812669
41-43	1888173	0812661
44	1888181	0812538
45	1888180	0812540
46	1883291	0812802
47	1886221	0812943
48	1886221	0812943
49	1886221	0812943
50	1884278	0812338
51	1888178	0812338
52	1888140	0812338
53	1888106	0812338



RETENTION BASIN BUFFER ZONE  
GAMMA SCAN  
ISOCs MEASUREMENT LOCATIONS  
F8480021-M3

FILE: 848000

SHEET 1 of 1

RC RAYMOND

**Attachment 2**  
**Instrumentation**  
**March 31, 2008**  
**Survey Unit F8480021**

**Table 2-1. Survey Unit Instrumentation**

<b>Instrument</b>	<b>Detector Model No.</b>	<b>Detector Serial No.</b>	<b>MDC</b>
HPGe	N/A	05069128	Soil – 0.0713 pCi/g Cs-137 Soil – 0.0642 pCi/g Co-69
ISOCS	N/A	2983947	Soil – 0.328 pCi/g Cs-137 Soil – 0.215 pCi/g Co-60

**Table 2-2. Investigation Criteria and DCGL**

<b>Instrument</b>	<b>Parameter</b>	<b>Value</b>
HPGe	Investigation Criteria	Soil – 25.6 pCi/g Cs-137 Soil – 6.3 pCi/g Co-60
ISOCS	Investigation Criteria - Scan	Soil – 20 pCi/g Cs-137 Soil – 5 pCi/g Co-60
All	DCGL <sub>w</sub>	51.2 Cs-137 12.6 Co-60

**Attachment 3**

**Investigation**

**March 31, 2008**

**Survey Unit F8480021**

**(none required)**

**Attachment 4**

**Data Assessment**

**March 31, 2008**

**Survey Unit F8480021**

