

Rancho Seco

Final Status Survey Summary Report

November 1, 2007

Misc. Waste Gas Condensate Tank Room Floor and Lower Walls  
(Room 021)

Survey Unit F8130261

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## FINAL STATUS SURVEY SUMMARY REPORT

### Survey Unit:

F8130261, Misc. Waste Gas Condensate Tank Room Floor and Lower Walls (Room 021)

### Survey Unit Description:

**Operating History:** The Misc. Waste Gas Condensate Tank Room is located on the -20' elevation of the Auxiliary Building. The Auxiliary Building is a reinforced concrete structure that, during power operations, contained the Radwaste processing and supporting systems. The building has six main elevations. Residual levels of surface radioactivity were detected on all interior elevations of the building. Operating records and the HSA document several events with the potential for a release of radioactivity inside this structure.

**Site Characterization:** Direct measurements were taken on each interior elevation of the Auxiliary Building. These measurements confirmed the presence of plant-derived radionuclides. Direct measurements taken on the -20' elevation, showed a mean gross activity level of 247,831 dpm/100 cm<sup>2</sup> and a maximum value of 10,080,000 dpm/100 cm<sup>2</sup>. Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the interior surfaces of the Auxiliary Building were determined primarily to be a Class 1 for the floors and lower walls (bottom 2 meters of the walls), and Class 2 for the upper walls and ceiling. Inside the Misc. Waste Gas Condensate Tank Room there were a number of areas on the floor where the gross surface activity levels were higher than the DCGL prior to remediation. Therefore, a Class 1 final status survey was performed on the floor and lower wall surfaces of the room.

HSA Events: HSA Report pg. 63.

### 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 determined using a random-start, fixed grid pattern and 133 m<sup>2</sup> were scanned for approximately 100% coverage. Samples of removable contamination were collected at each direct measurement location. 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

Survey Design Parameter	Value	Comment
Survey Area:	F813	Misc. Waste Gas Condensate Tank Room (Room 021)
Survey Unit:	0261	Structure Surface
Class:	1	LTP Table 5-4
SU Area (m <sup>2</sup> ):	133	
Evaluator:	Michael Stein	
DCGL (dpm/100 cm <sup>2</sup> ):	43000	Gross Activity DCGL
Area Factor:	3.2	Class 1
Design DCGL <sub>mc</sub> (dpm/100 cm <sup>2</sup> ):	137600	Class 1
LBGR (dpm/100 cm <sup>2</sup> ):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm <sup>2</sup> ):	12035	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m <sup>2</sup> ):	7	Class 1
Scan Area (m <sup>2</sup> ):	133	
Scan Coverage (%):	100%	Class 1
Z <sub>1-α</sub> :	1.645	
Z <sub>1-β</sub> :	1.645	
Sign P:	0.955435	
Calculated Relative Shift:	1.7	
Relative Shift Used:	1.7	Uses 3.0 if Relative Shift is >3
N-Value:	14	
Design N-Value + 20%:	17	NUREG-1575 Table 5-5
Design Min Samples N:	19	Class 1
Grid Spacing L:	2.6	Class 1

### Survey Results:

A total of 19 direct measurements were made in F8130261. The results including mean, median, standard deviation and range are shown in Table 2. All direct measurements were less than the DCGL. None of the scan measurements indicated areas of elevated activity. Scan activity ranged from 2,893 to 29,960 dpm/100 cm<sup>2</sup>, based on a surveyor efficiency of 0.5 and no background subtracted. Samples for removable surface activity were all less than 10% of the DCGL as shown in Table 3. Removable surface activity samples were counted for alpha activity and none was detected at the MDC shown in Table 2-1 of Attachment 2.

**Table 2. Direct Measurement Results**

Measurement ID	Gross Activity (dpm/100 cm <sup>2</sup> )
F8130261-C0001BD	1302
F8130261-C0002BD	1426
F8130261-C0003BD	1385
F8130261-C0004BD	1421
F8130261-C0005BD	2210
F8130261-C0006BD	3045
F8130261-C0007BD	2220
F8130261-C0008BD	2407
F8130261-C0009BD	2371
F8130261-C0010BD	1982
F8130261-C0011BD	2277
F8130261-C0012BD	2205
F8130261-C0013BD	1359
F8130261-C0014BD	1499
F8130261-C0015BD	1224
F8130261-C0016BD	1318
F8130261-C0017BD	1344
F8130261-C0018BD	1437
F8130261-C0019BD	1458
Mean:	1784
Median:	1458
Standard Deviation:	528
Range:	1224 - 3045

**Table 3. Removable Surface Activity Results**

<b>Measurement ID</b>	<b>Surface Beta Activity (dpm/100 cm<sup>2</sup>)</b>
F8130261C0001SM	4.86
F8130261C0002SM	-0.27
F8130261C0003SM	-1.55
F8130261C0004SM	3.58
F8130261C0005SM	21.52
F8130261C0006SM	24.09
F8130261C0007SM	21.52
F8130261C0008SM	17.68
F8130261C0009SM	47.16
F8130261C0010SM	31.78
F8130261C0011SM	30.49
F8130261C0012SM	20.24
F8130261C0013SM	7.42
F8130261C0014SM	1.01
F8130261C0015SM	1.01
F8130261C0016SM	-0.27
F8130261C0017SM	1.01
F8130261C0018SM	4.86
F8130261C0019SM	2.29
Mean:	12.55
Median:	4.86
Standard Deviation:	14
Range:	-1.55 to 47.16

**Survey Unit Data Assessment:**

The survey design required 19 direct measurements for the Sign Test. The critical value and the results of the Sign Test are presented in Table 4. 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 4. Data Assessment Results**

<b>Survey Results Parameter</b>	<b>Value</b>	<b>Comment</b>	
<b>Material Background Used</b> (dpm/100 cm <sup>2</sup> ):	N/A	Average Ambient BKG = 0	
<b>Ambient Background Used</b> (dpm/100 cm <sup>2</sup> ):	N/A		
<b>Actual Direct Measurements (N):</b>	19		
<b>Median</b> (dpm/100 cm <sup>2</sup> ):	1458		
<b>Mean</b> (dpm/100 cm <sup>2</sup> ):	1784		
<b>Direct Measurement Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	528		
<b>Total Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	528		Based on samples and backgrounds.
<b>Maximum</b> (dpm/100 cm <sup>2</sup> ):	3045		Background Subtract Not Applied
<b>Material Type:</b>	N/A		
<b>Sign Test Final N Value:</b>	19		Class 1
<b>S+ Value:</b>	19		
<b>Critical Value:</b>	13		
<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>	Yes		
<b>Total Standard Deviation &lt;= Sigma:</b>	Yes		
<b>Pass the Sign Test?</b>	Yes		
<b>Reject the Null Hypothesis?</b>	Yes		
<b>Does the Survey Unit Pass All Criteria?</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 1 structure 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. Therefore, the EMC criterion was met.

### **Conclusion:**

The FSS of this survey unit was properly designed as a Class 1 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. No direct measurements exceeded the DCGL of 43000 dpm/100 cm<sup>2</sup> and none of the removable surface activity measurements exceeded 10% of 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.

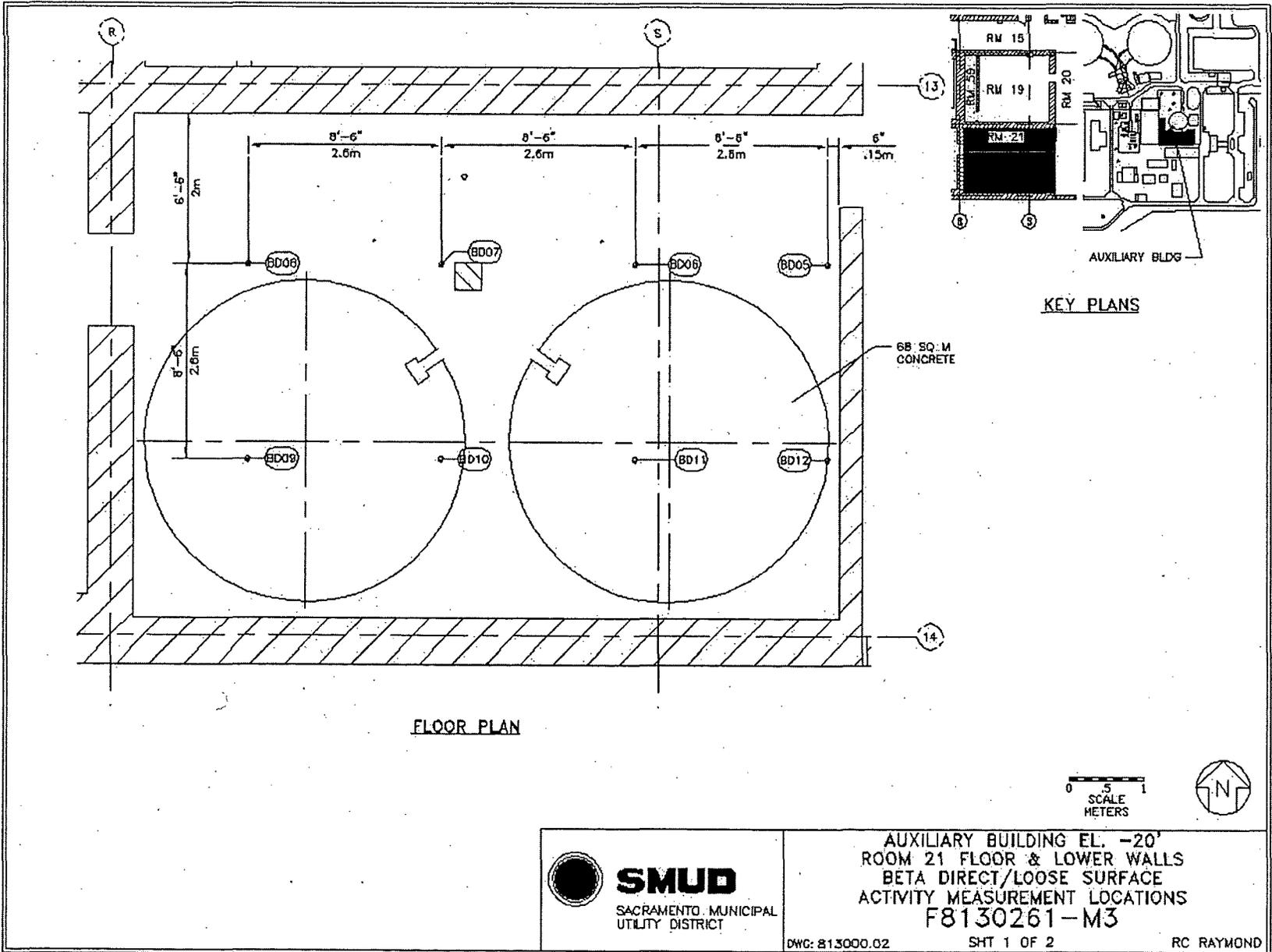
It is concluded that survey unit F8130261 meets the release criteria of 10CFR20.1402.

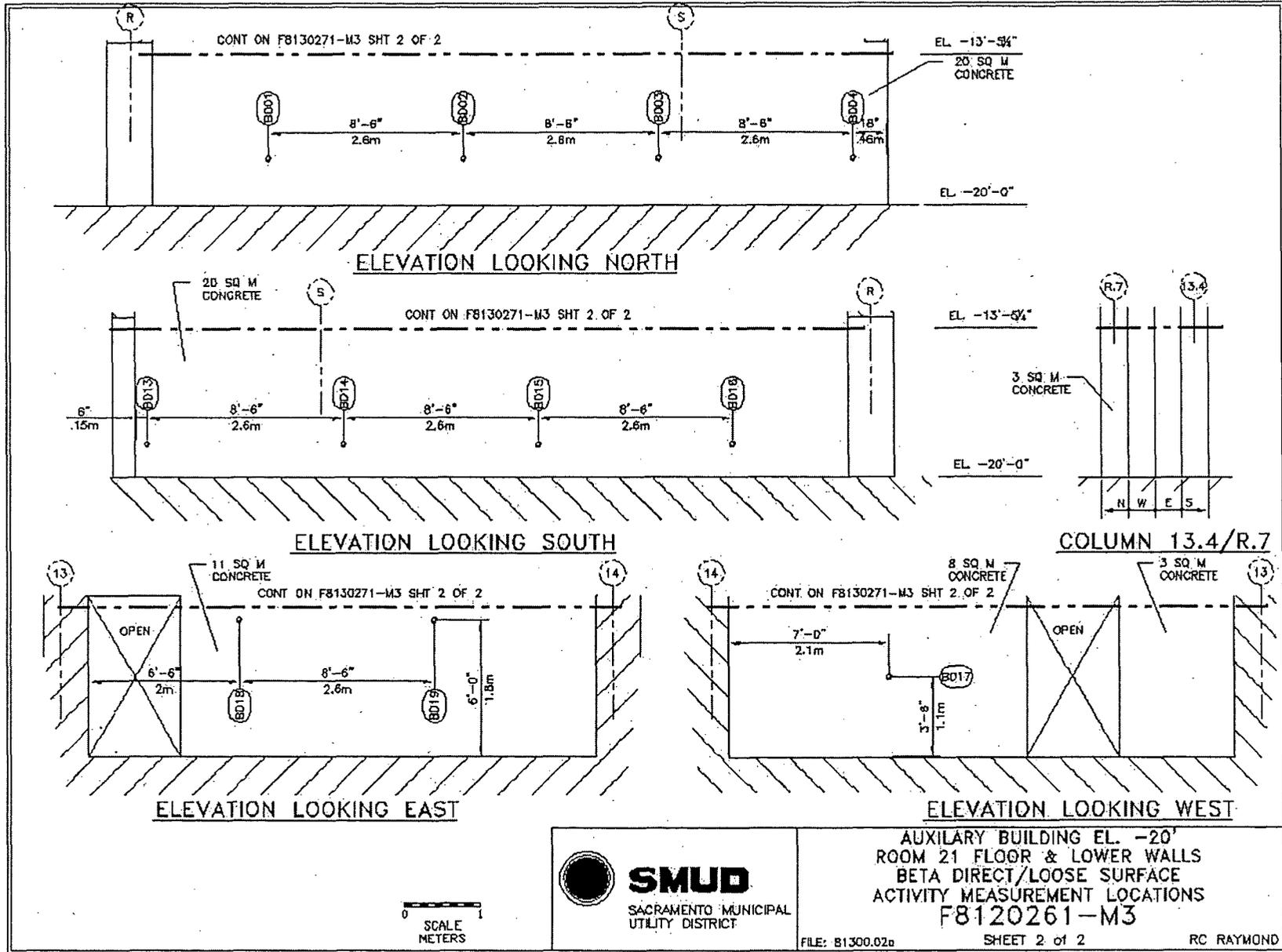
**Attachment 1**

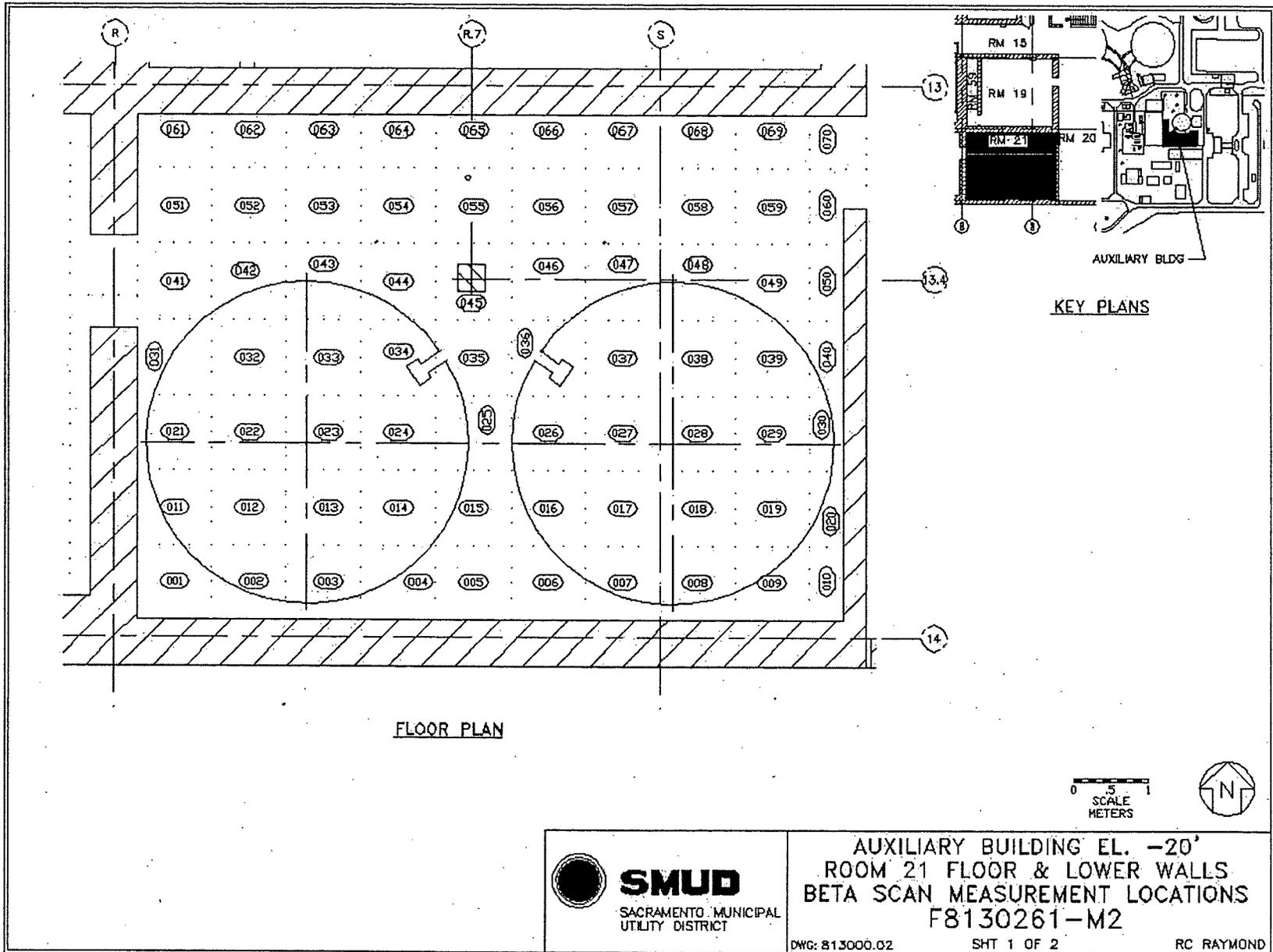
**Maps**

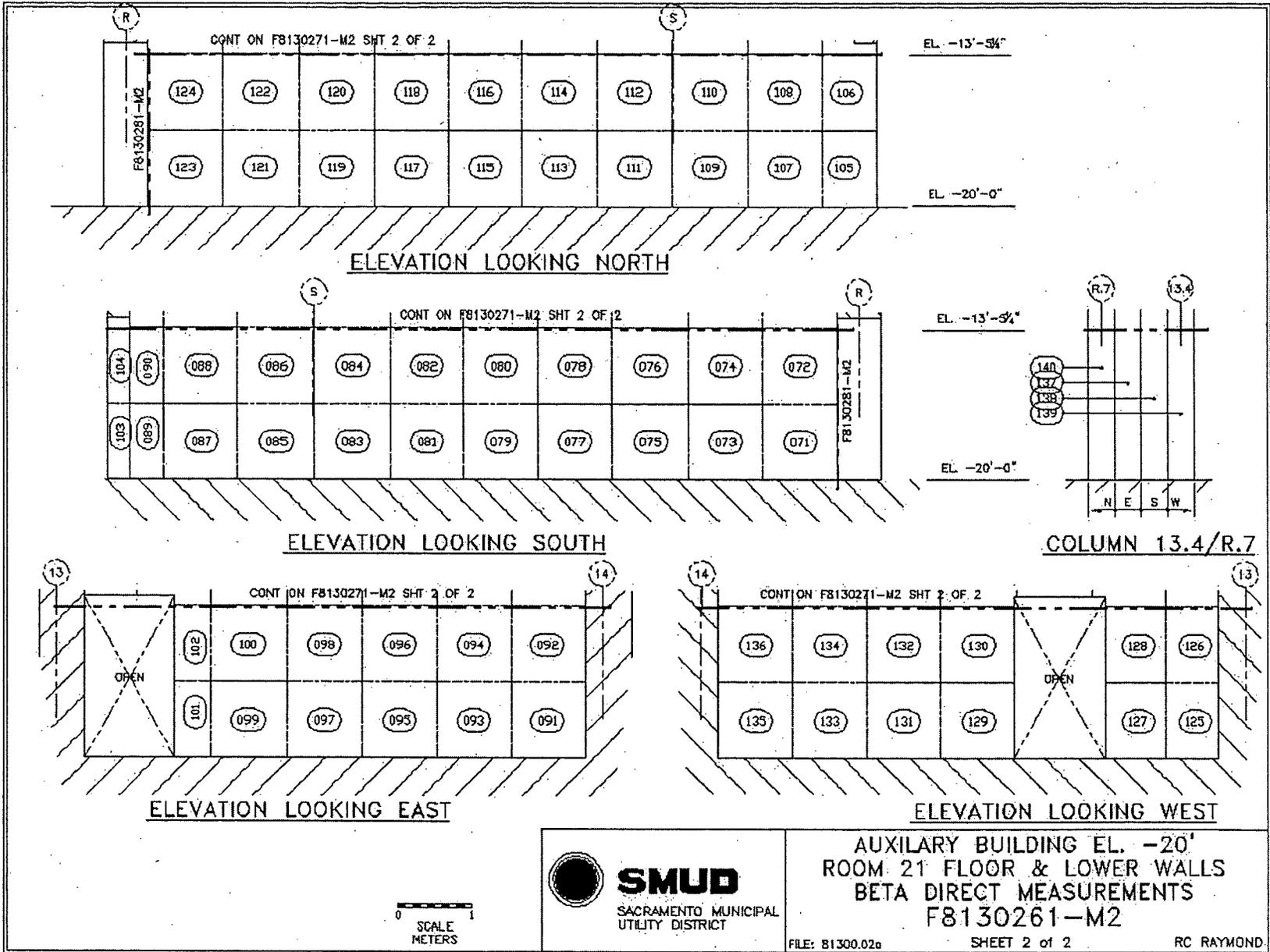
**November 1, 2007**

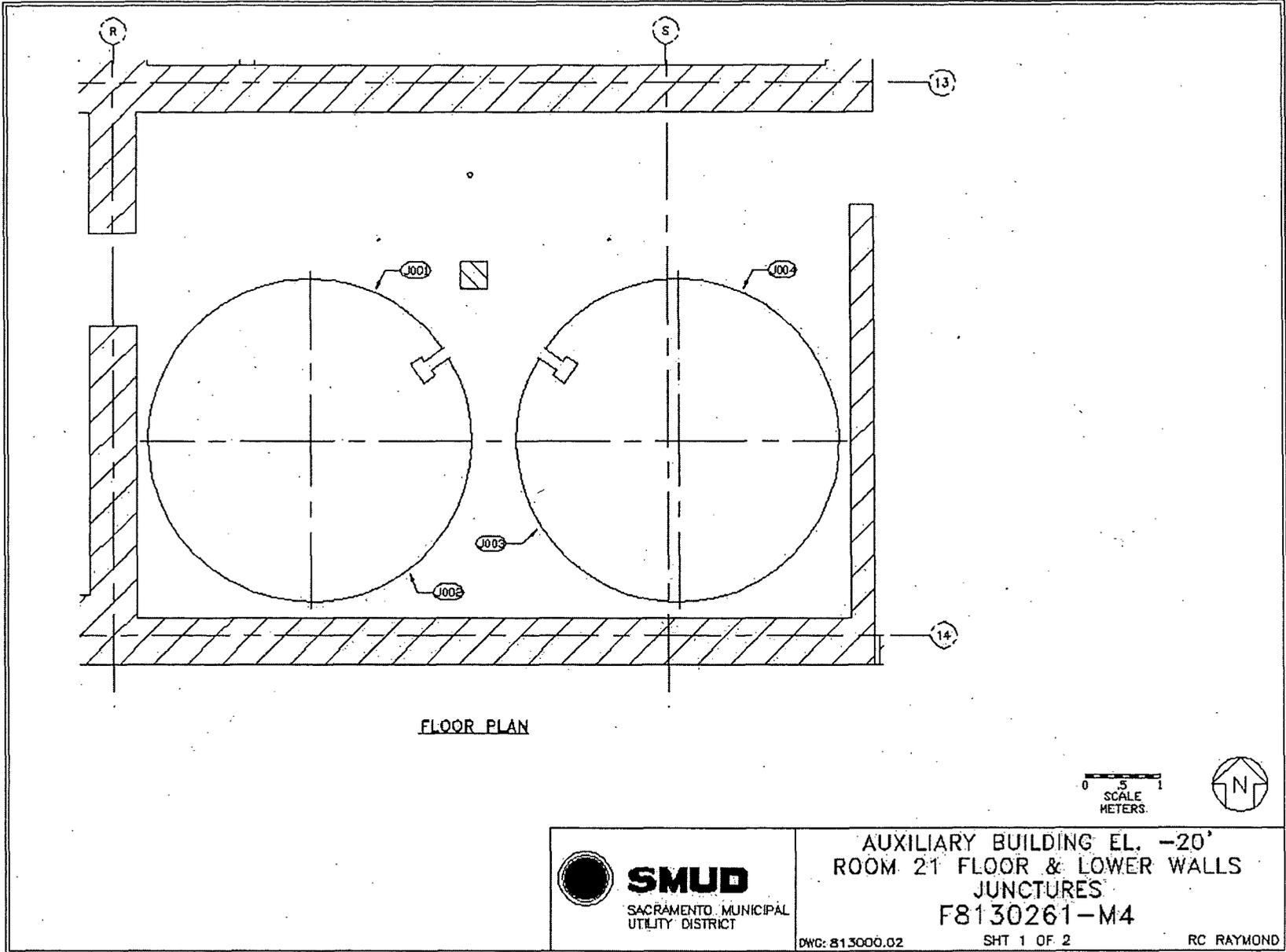
**Survey Unit F8130261**

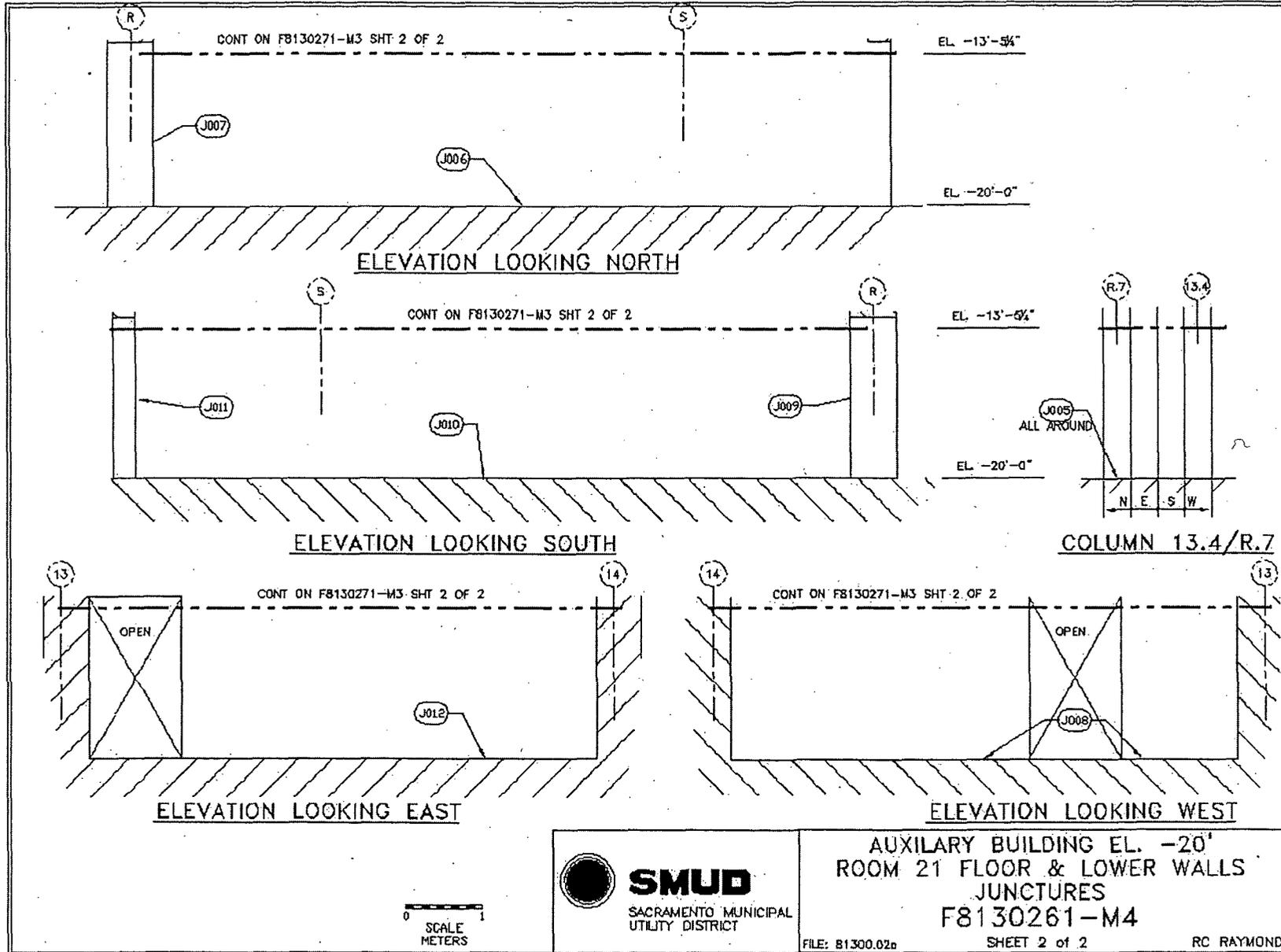












**Attachment 2**  
**Instrumentation**  
**November 1, 2007**  
**Survey Unit F8130261**

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

<b>Instrument Model; Serial No.</b>	<b>Detector Model; Serial No.</b>	<b>MDC Static (dpm/100 cm<sup>2</sup>)</b>	<b>MDC Scan (dpm/100 cm<sup>2</sup>)</b>
M2350; 193700	43-68B; 190294	433	1033
M2350; 203465	43-116-1B; 216073	796	5895
M2350; 203465	43-116-1B; 216073	491 ( $\beta$ juncture)	739 ( $\beta$ juncture)
Tennelec; 0401171	N/A	5 dpm $\alpha$ , 11 dpm $\beta$	N/A

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

<b>Parameter</b>	<b>Value (dpm/100 cm<sup>2</sup>)</b>
Investigation Criteria - Direct	137600
Investigation Criteria – Scan	137600
DCGL <sub>w</sub>	43000
DCGL <sub>EMC</sub>	137600

**Attachment 3**

**Investigation**

**November 1, 2007**

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**(none required)**

**Attachment 4**

**Data Assessment**

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