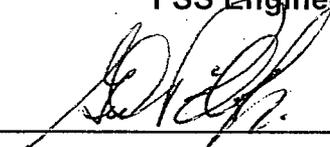


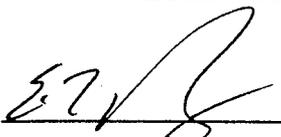
Rancho Seco  
Final Status Survey Summary Report  
October 30, 2007  
Training and Records Building  
(exterior)  
Survey Unit F8140002

Prepared By:  Dan A. Tallman Date: 10/30/2007

FSS Engineer

Reviewed By:  Date: 10/30/07

Lead FSS Engineer

Approved By:  Date: 10-31-07

Dismantlement Superintendent, Radiological

## FINAL STATUS SURVEY SUMMARY REPORT

### Survey Unit:

F8140002, Training and Records Building (exterior)

### Survey Unit Description:

Operating History: The multi-story structure provided office and laboratory space for site personnel. The interior of this area was sometimes used for processing and measuring samples of radioactive material. Operating records and the HSA document multiple events with the potential for a minor release of radioactivity associated within this building. The contamination potential for this survey area (building exterior) is minimal.

Site Characterization: Direct measurements were made of the interior and exterior surfaces of the structure which confirmed the absence of plant-derived radionuclides. Direct measurements of the exterior showed a mean gross activity level of 1,865 dpm/100 cm<sup>2</sup> and a maximum value of 2,995 dpm/100 cm<sup>2</sup>. Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the area was determined to be a Class 3 area.

### 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 98 m<sup>2</sup> were scanned for approximately 2% 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:	F814	Training and Records
Survey Unit:	0002	Building exterior
Class:	3	Structure Surface
SU Area (m <sup>2</sup> ):	4303	LTP Table 5-4
Evaluator:	DA Tallman	
DCGL (dpm/100 cm <sup>2</sup> ):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL <sub>emc</sub> (dpm/100 cm <sup>2</sup> ):	N/A	Class 3
LBGR (dpm/100 cm <sup>2</sup> ):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm <sup>2</sup> ):	435	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m <sup>2</sup> ):	N/A	Class 3
Scan Area (m <sup>2</sup> ):	98	
Scan Coverage (%):	2%	Class 3
Z <sub>1-α</sub> :	1.645	
Z <sub>1-β</sub> :	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	49.4	
Relative Shift Used:	3	Uses 3.0 if Relative Shift is >3
N-Value:	11	
Design N-Value + 20%:	14	NUREG-1575 Table 5-5
Design Min Samples N:	14	Class 3
Grid Spacing L:	N/A	Class 3

### Survey Results:

A total of 14 direct measurements were made in F8140002. 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 (range 2450 dpm/100 cm<sup>2</sup> - 13,036 dpm/100 cm<sup>2</sup>). 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> )
F8140002-Q0001BD	1893
F8140002-Q0002BD	2308
F8140002-Q0003BD	1883
F8140002-Q0004BD	2858
F8140002-L0005BD	1307
F8140002-L0006BD	1940
F8140002-L0007BD	1297
F8140002-L0008BD	1063
F8140002-L0009BD	1141
F8140002-L0010BD	1027
F8140002-L0011BD	1110
F8140002-L0012BD	1235
F8140002-L0013BD	1437
F8140002-L0014BD	923
Mean:	1530
Median:	1302
Standard Deviation:	566
Range:	923 - 2858

**Table 3. Removable Surface Activity Results**

Measurement ID	Surface Beta Activity (dpm/100 cm <sup>2</sup> )
F8140002Q0001SM	12.55
F8140002Q0002SM	8.7
F8140002Q0003SM	4.86
F8140002Q0004SM	8.7
F8140002L0005SM	3.58
F8140002L0006SM	3.58
F8140002L0007SM	2.29
F8140002L0008SM	7.42
F8140002L0009SM	3.58
F8140002L0011SM	-0.27
F8140002L0013SM	6.14
F8140002L0010SM	4.86
F8140002L0012SM	3.58
F8140002L0014SM	2.29
Mean:	5.13
Median:	4.22
Standard Deviation:	3.3
Range:	-0.27 to 12.55

**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 4. The sample mean and median values were less than the DCGL. The sample standard deviation exceeded the design standard deviation however, both values of sigma result in a relative shift of greater than three (3) 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>	14		
<b>Median</b> (dpm/100 cm <sup>2</sup> ):	1302		
<b>Mean</b> (dpm/100 cm <sup>2</sup> ):	1530		
<b>Direct Measurement Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	566		
<b>Total Standard Deviation</b> (dpm/100 cm <sup>2</sup> ):	566		Based on samples and backgrounds.
<b>Maximum</b> (dpm/100 cm <sup>2</sup> ):	2858		Background Subtract Not Applied
<b>Material Type:</b>	N/A		
<b>Sign Test Final N Value:</b>	14		Class 3 no additional samples are required
<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		
<b>Total Standard Deviation &lt;= Sigma:</b>	Investigate		
<b>Pass the Sign Test?</b>	Yes		
<b>Reject the Null Hypothesis?</b>	Yes	Survey unit passes all conditions – no additional samples required	
<b>Does the Survey Unit Pass All Criteria?</b>	Investigate		

### **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 structure survey and the sample results are consistent with that classification. The variability of the survey results, while greater than the characterization data used for survey design, did not require any additional samples. 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. 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.

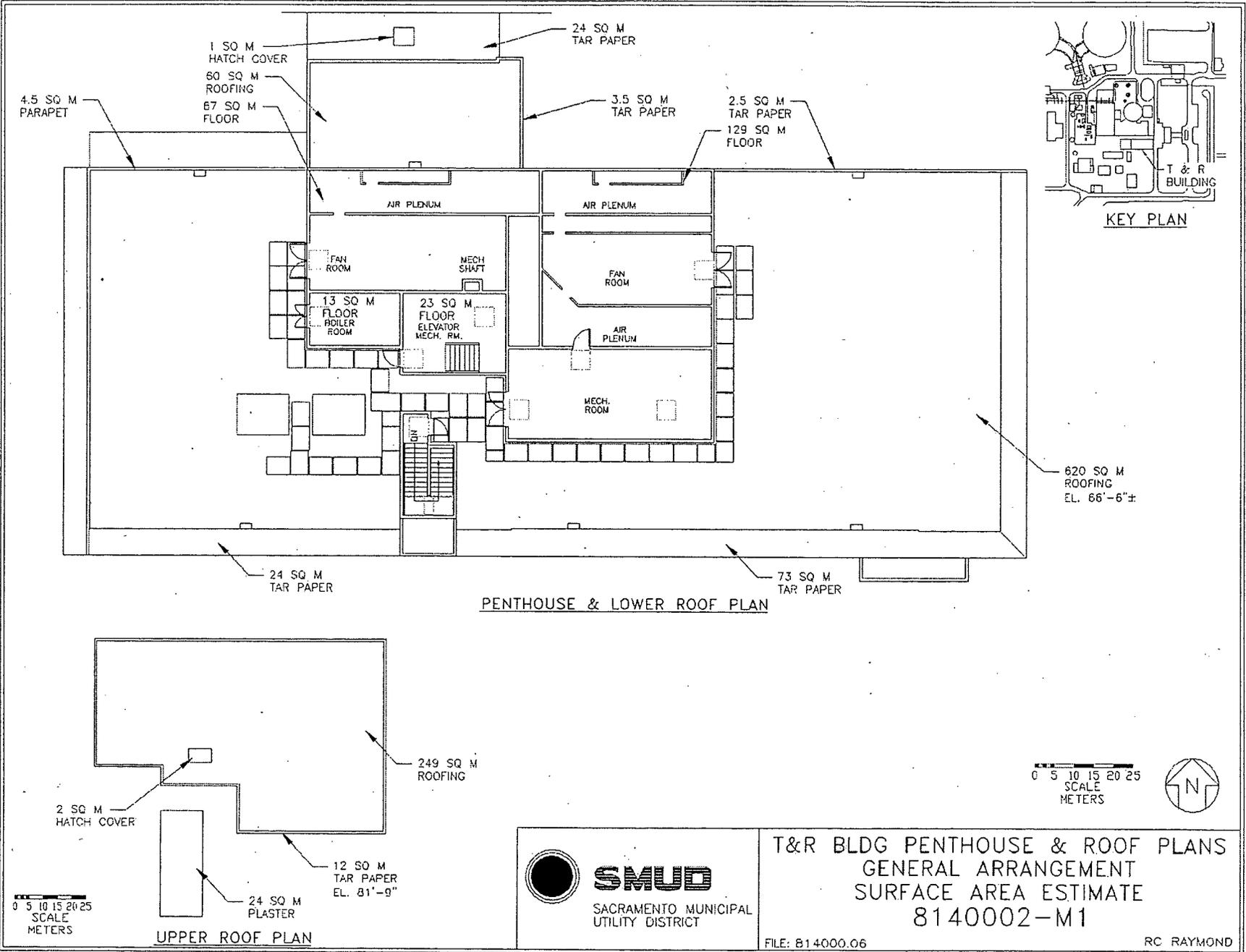
It is concluded that survey unit F8140002 meets the release criteria of 10CFR20.1402.

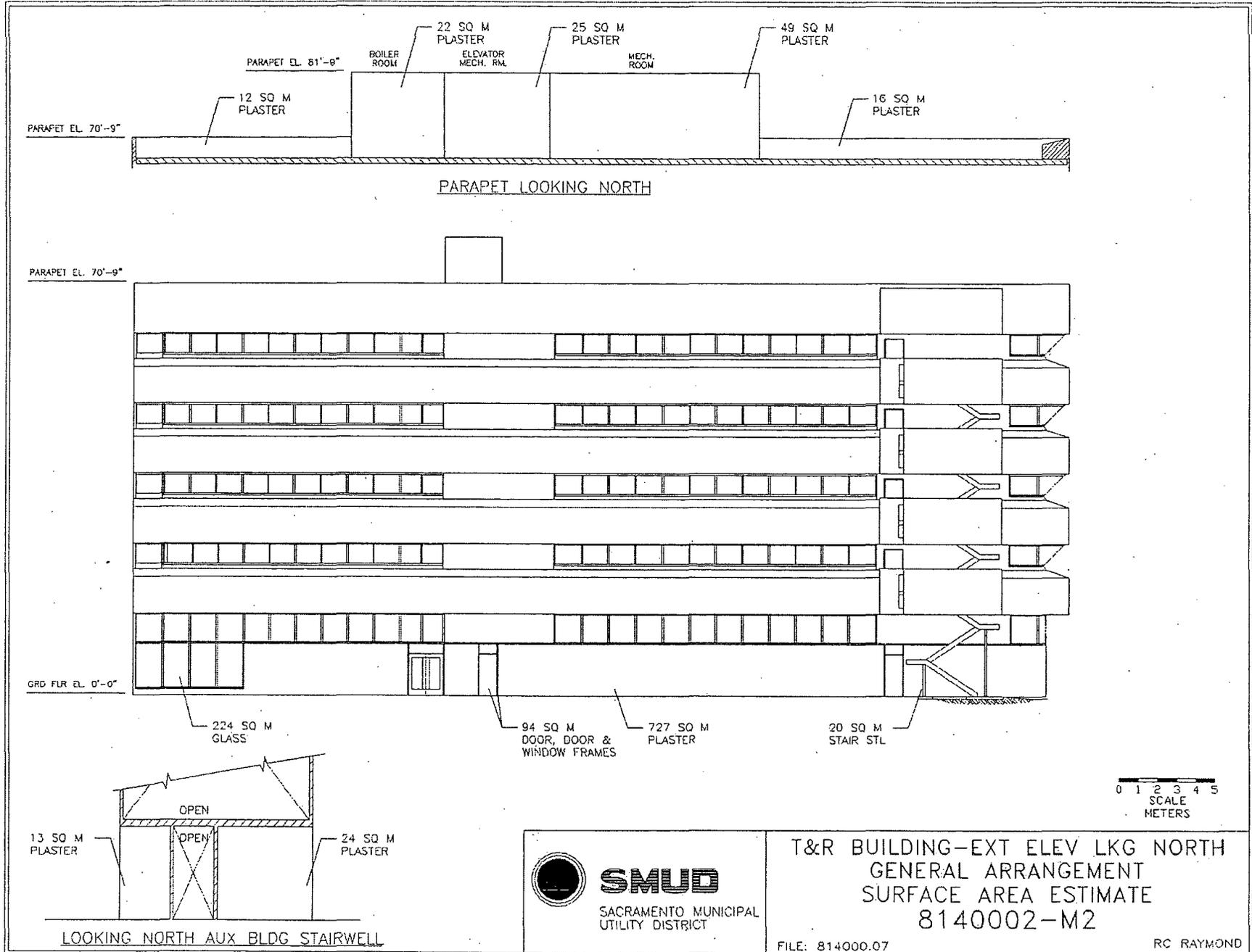
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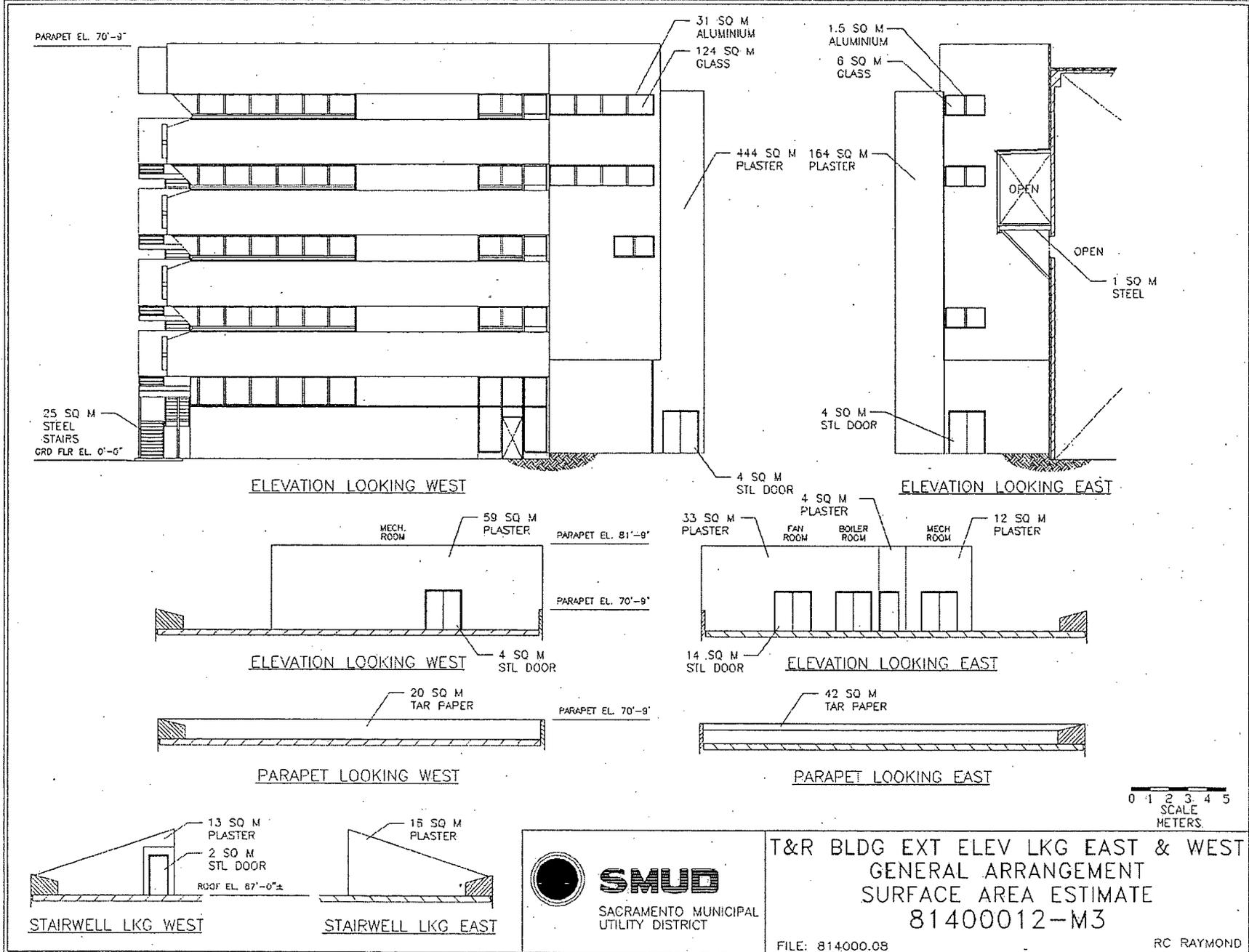
**Maps**

**October 30, 2007**

**Survey Unit F8140002**







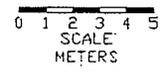
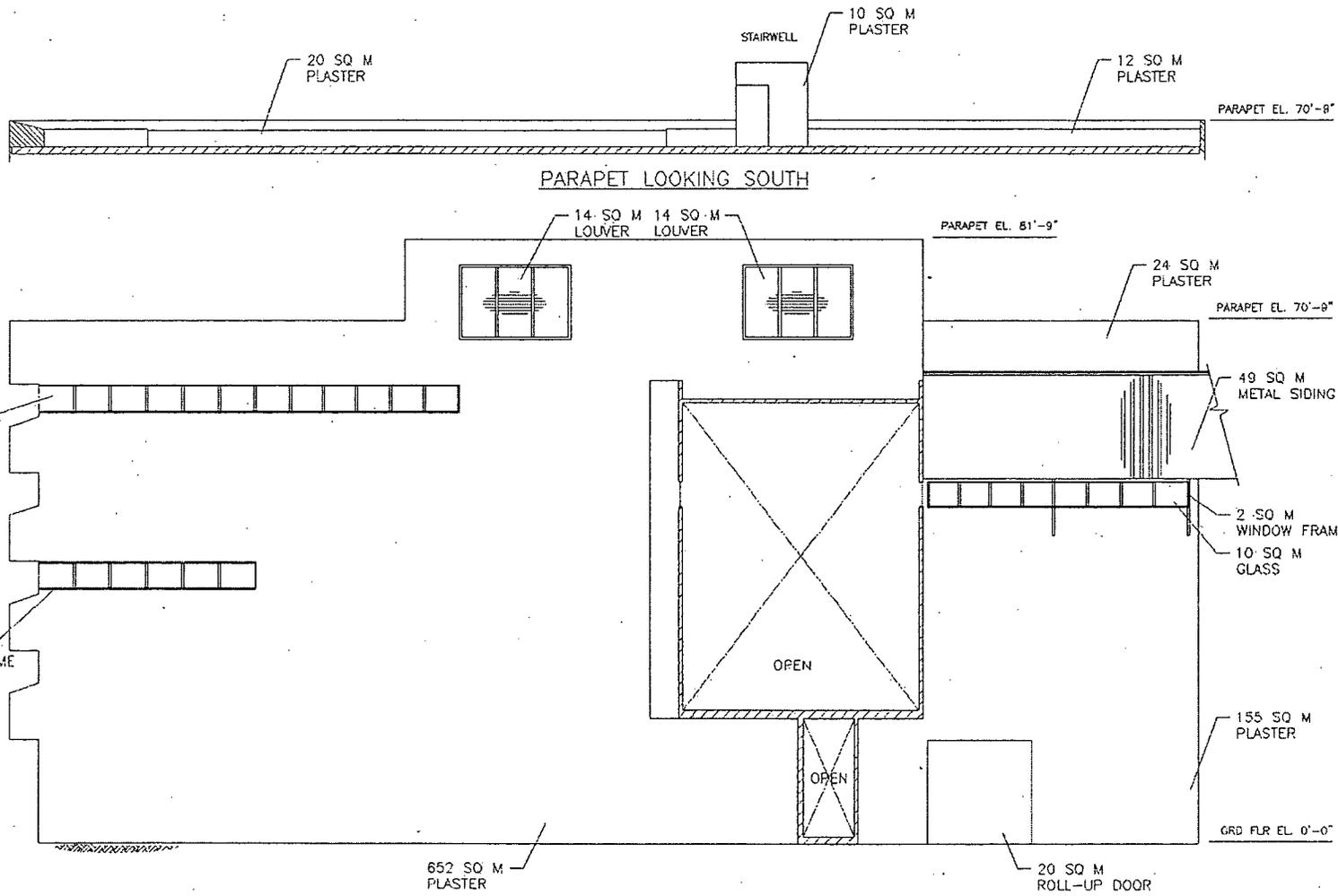
0 1 2 3 4 5  
SCALE  
METERS



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GENERAL ARRANGEMENT  
SURFACE AREA ESTIMATE  
81400012-M3

FILE: 814000.08

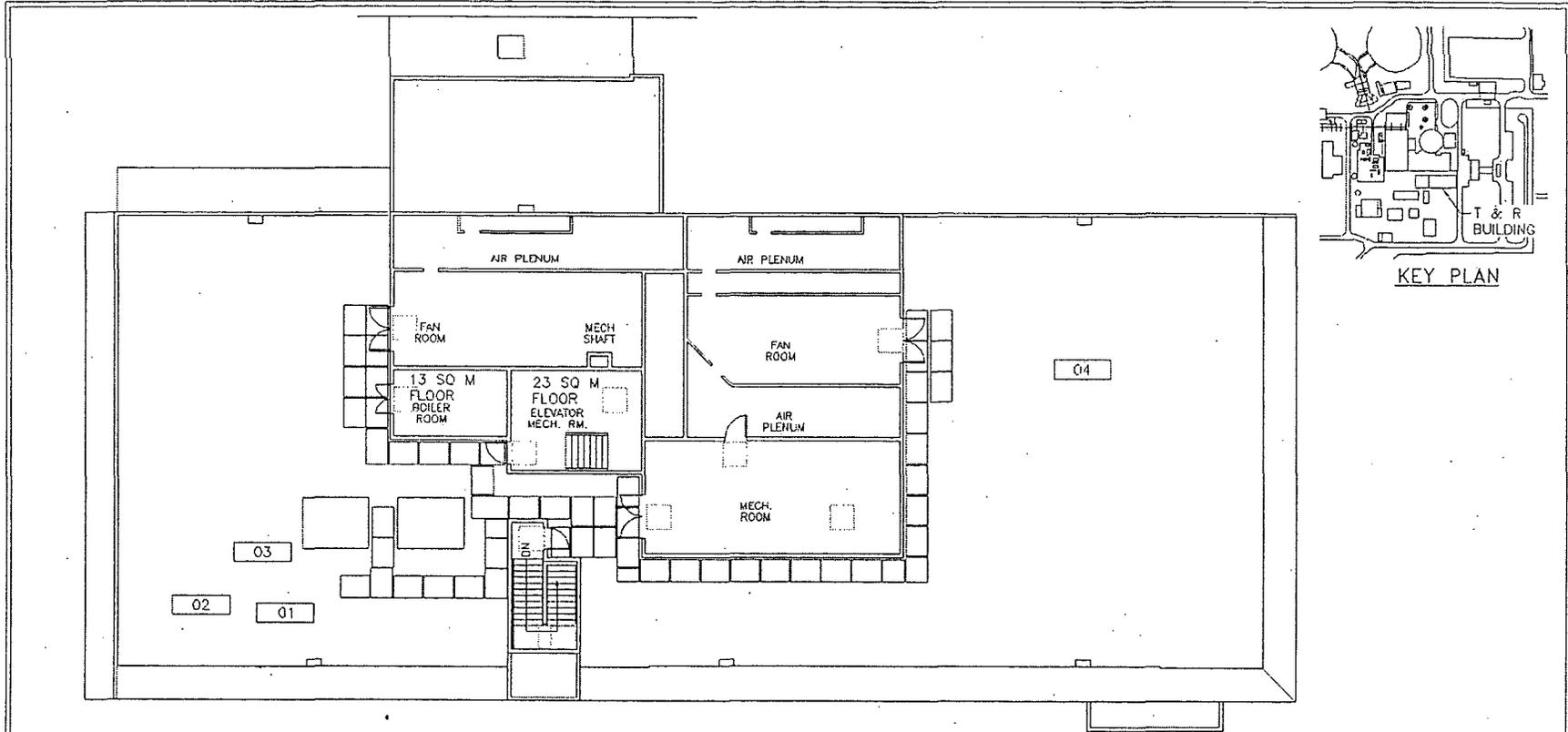
RC RAYMOND



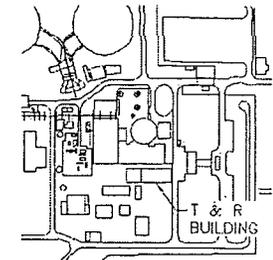
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GENERAL ARRANGEMENT  
SURFACE AREA ESTIMATE  
81400012-M4

FILE: 814000.07

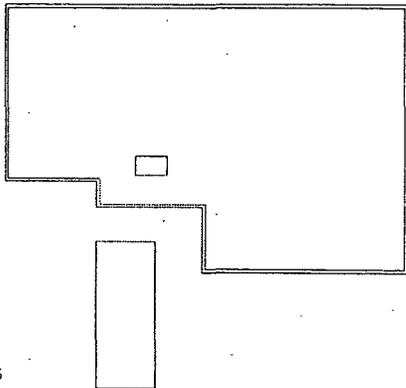
RC RAYMOND



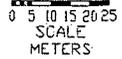
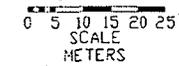
PENTHOUSE & LOWER ROOF PLAN



KEY PLAN



UPPER ROOF PLAN



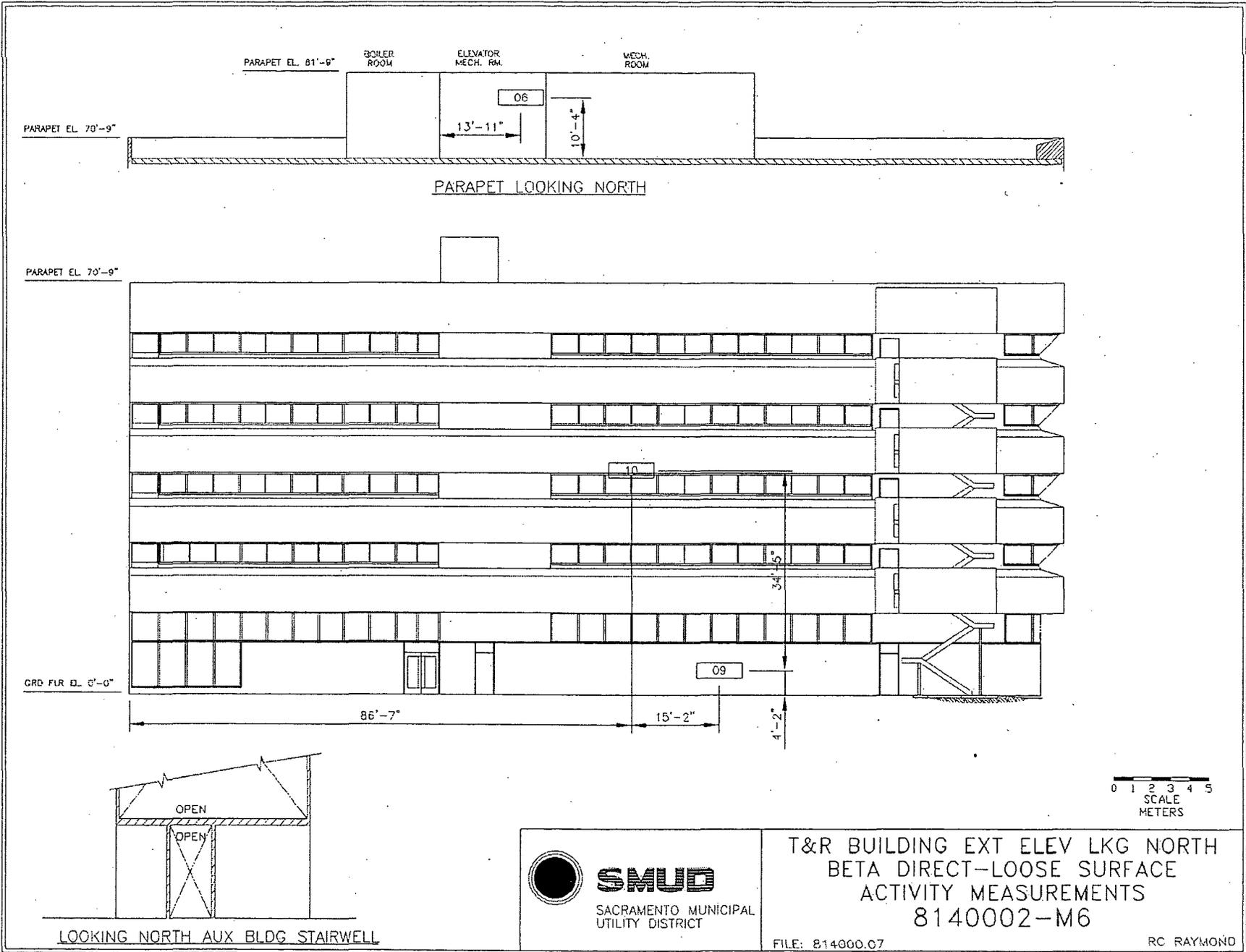
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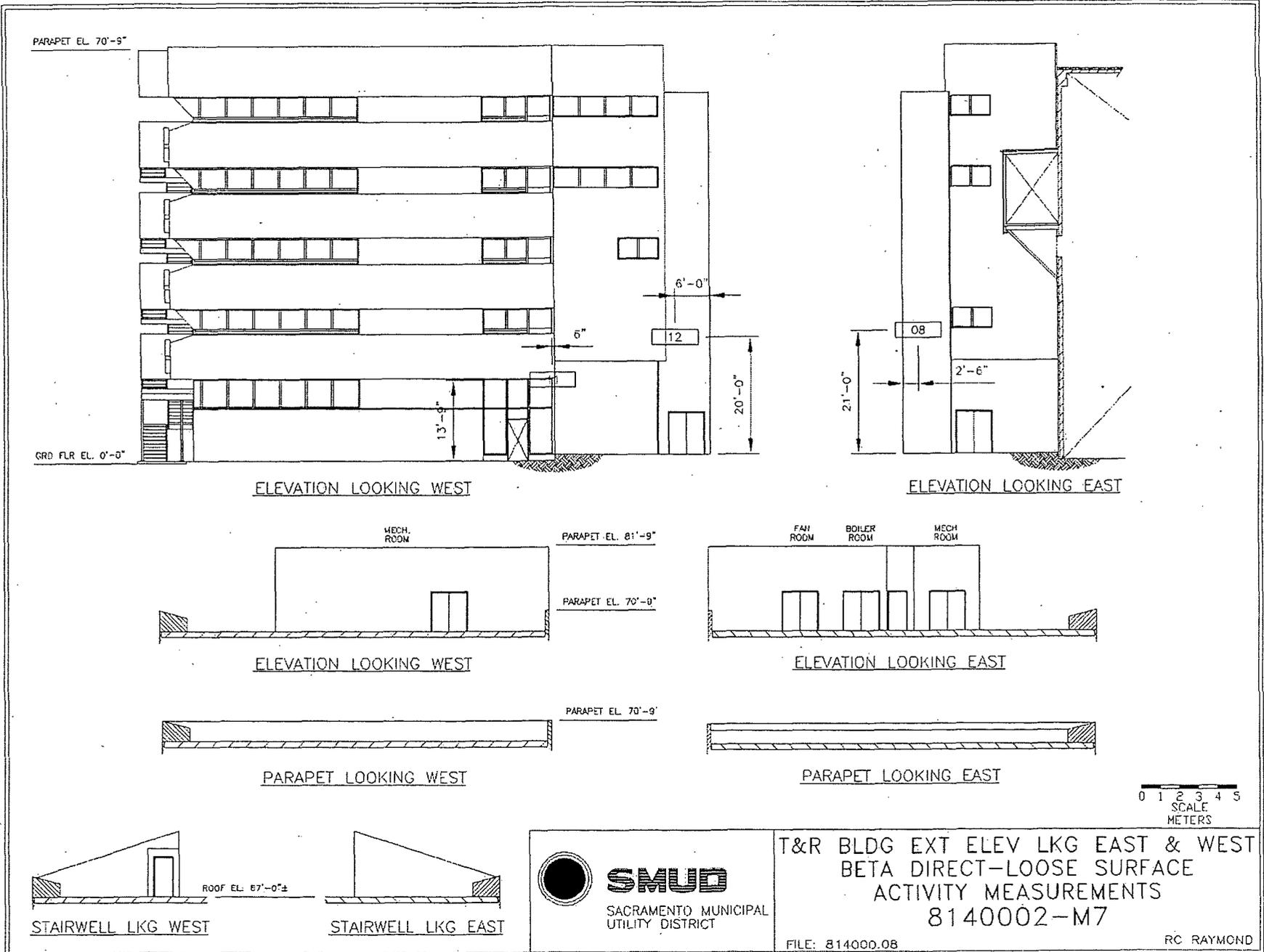
SACRAMENTO MUNICIPAL  
UTILITY DISTRICT

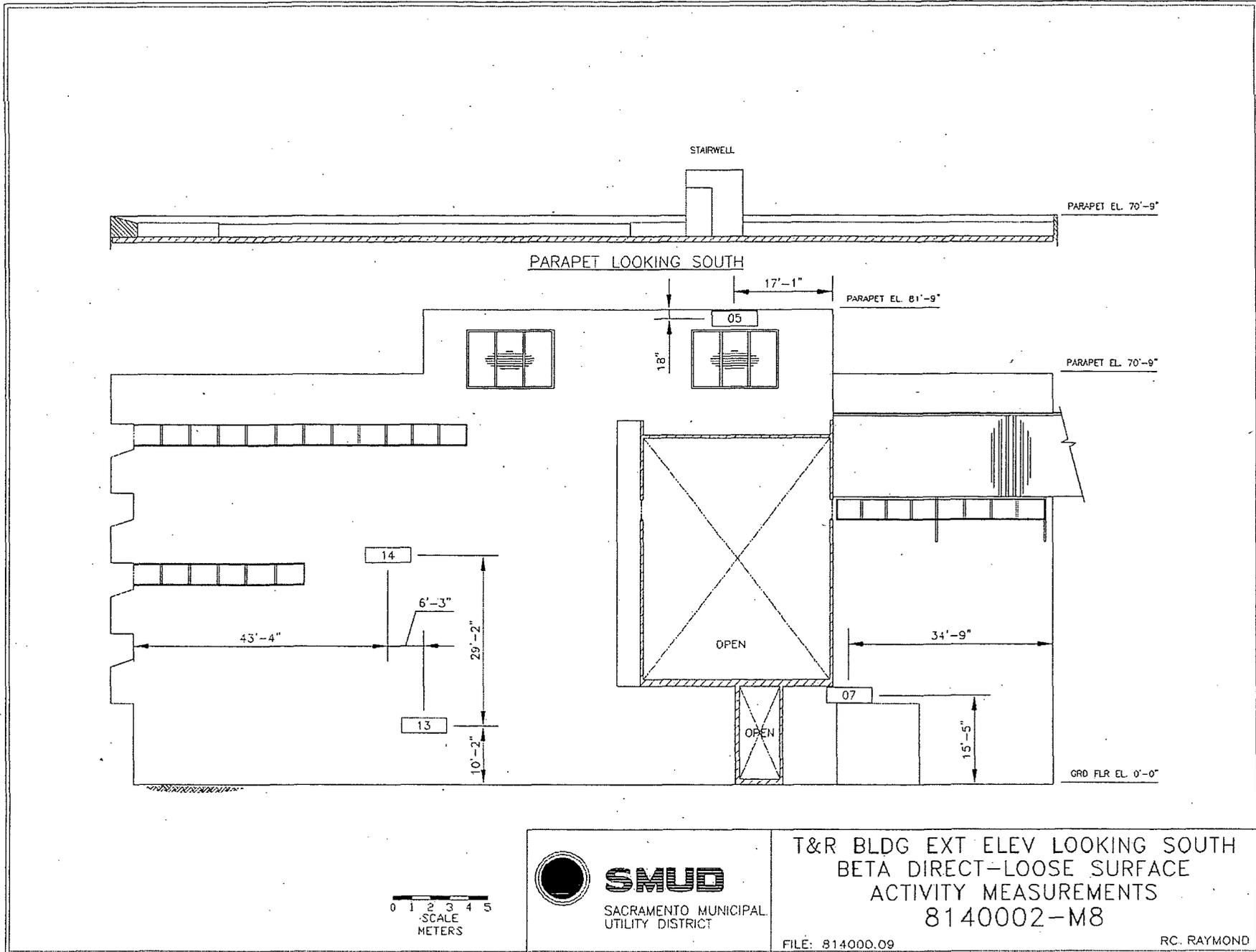
T&R BLDG PENTHOUSE & ROOF PLANS  
BETA DIRECT-LOOSE SURFACE  
ACTIVITY MEASUREMENTS  
8140002-M5

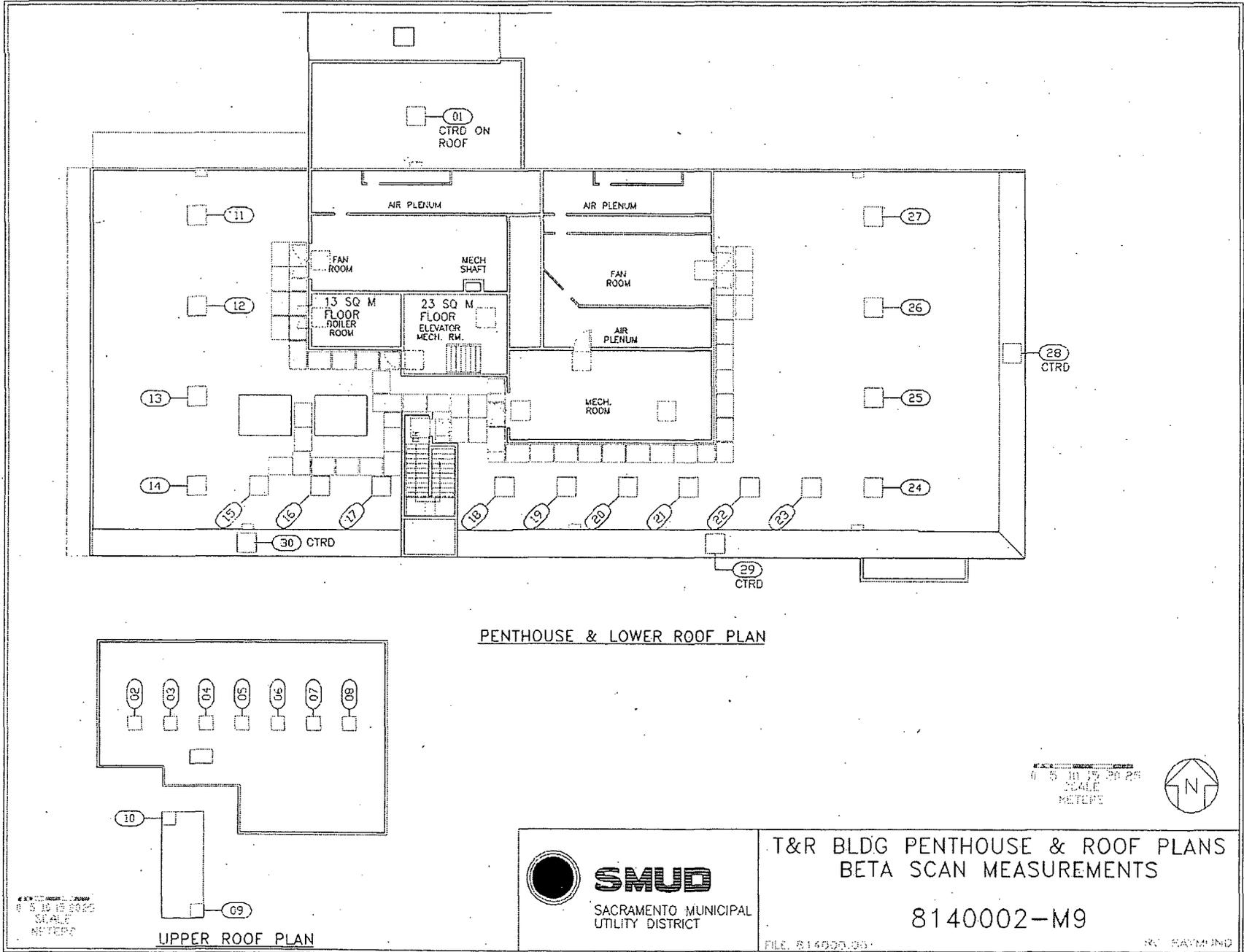
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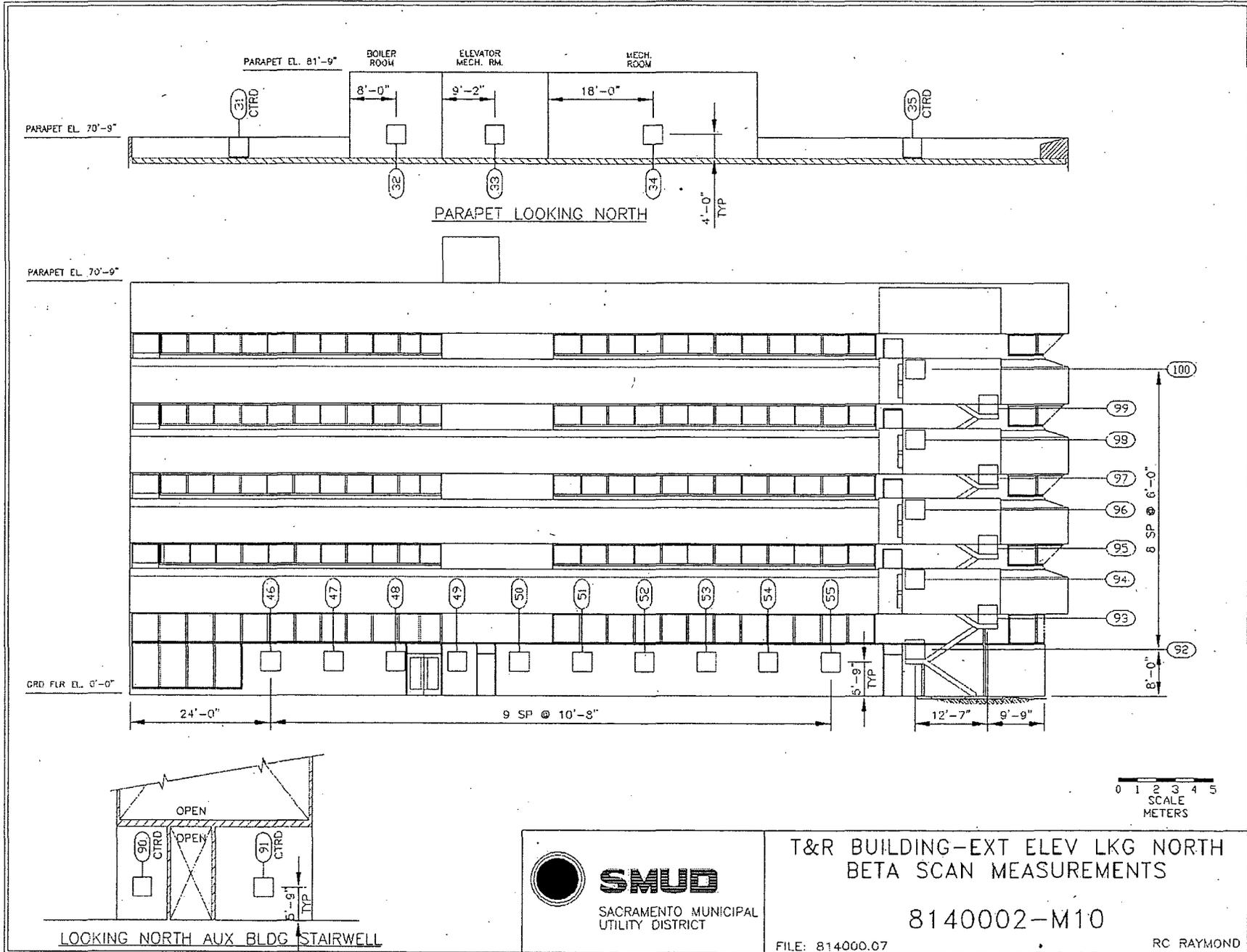
RC RAYMOND

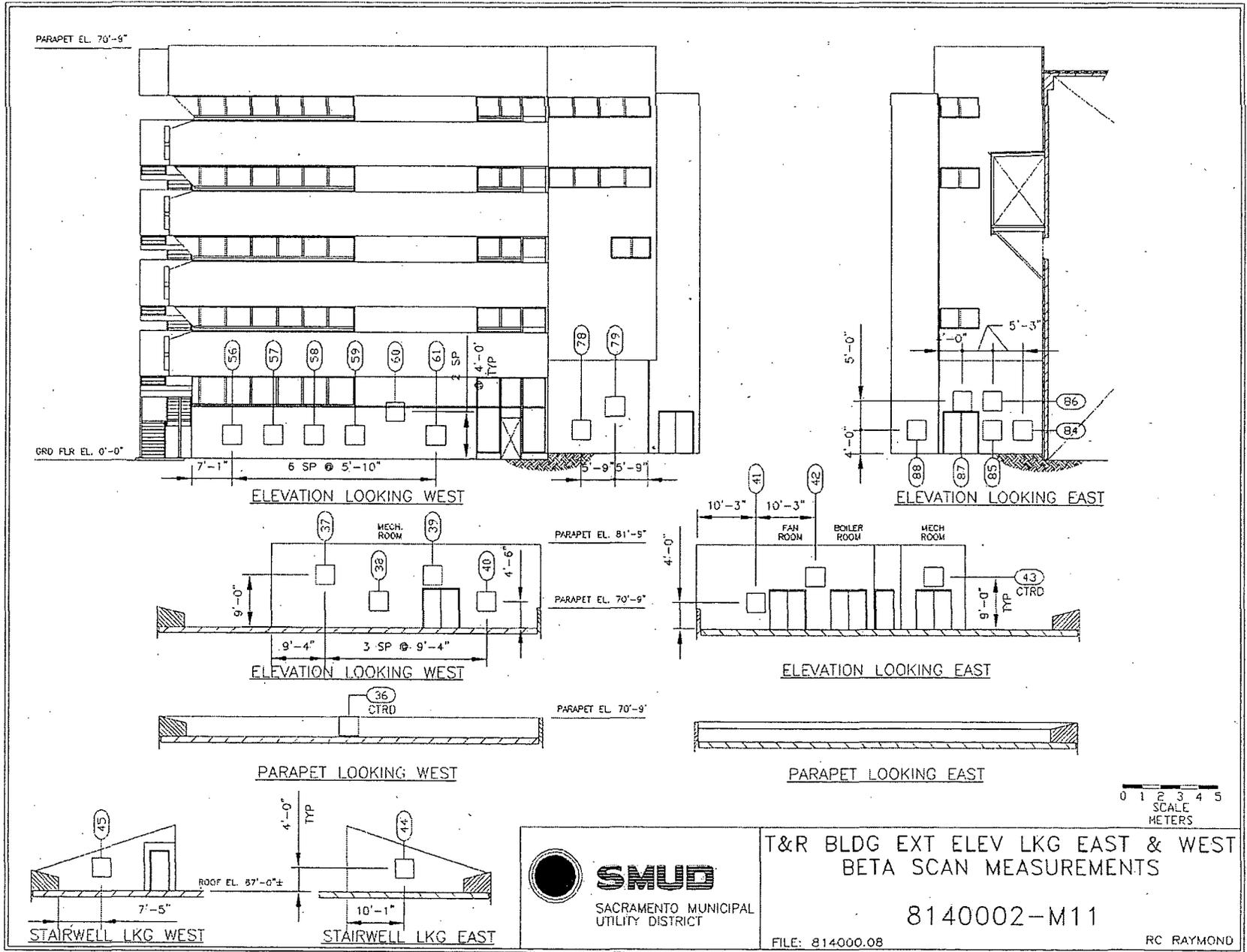


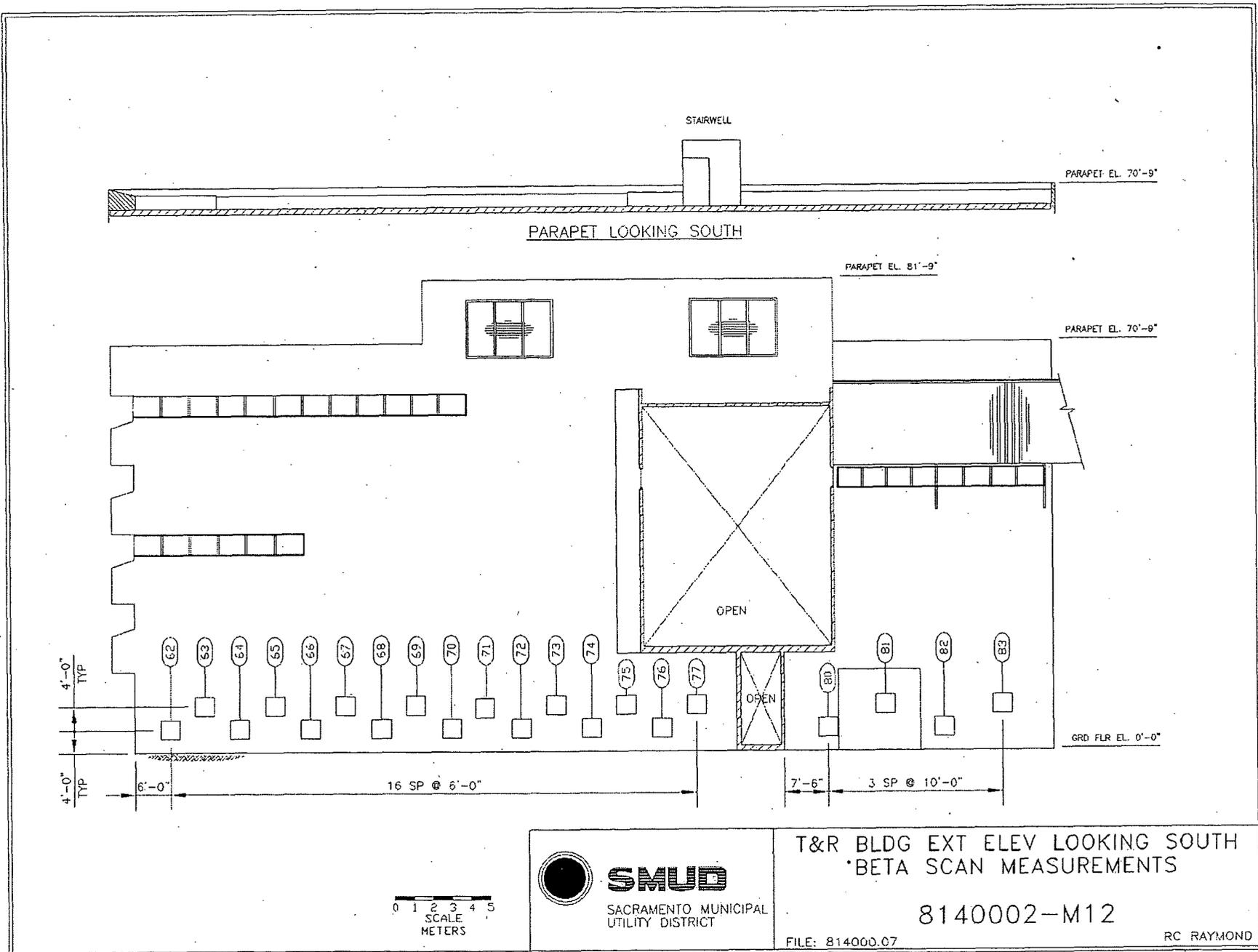












T&R BLDG EXT ELEV LOOKING SOUTH  
BETA SCAN MEASUREMENTS

8140002-M12

FILE: 814000.07

RC RAYMOND

**Attachment 2**

**Instrumentation**

**October 30, 2007**

**Survey Unit F8140002**

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

<b>Instrument Model; Serial No.</b>	<b>Detector Model; Serial No.</b>	<b>MDC Static</b>	<b>MDC Scan</b>
M2350; 175834	43-68B; 190482	433	1033
M2350; 203484	43-68B; 161410	433	1033
M2350; 189089	43-68B; 161406	433	1033
M2350; 180738	43-68B; 160051	433	1033
M2350; 175834	43-68B; 148634	433	1033
M2350; 203481	43-68B; 148629	433	1033
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	21500
Investigation Criteria - Scan	43000
DCGL <sub>w</sub>	43000
DCGL <sub>EMC</sub>	N/A

**Attachment 3**  
**Investigation**  
**October 30, 2007**  
**Survey Unit F8140002**

**(none required)**

**Attachment 4**

**Data Assessment**

**October 30, 2007**

**Survey Unit F8140002**

