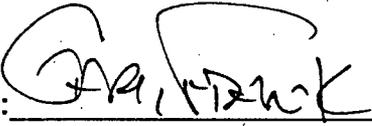


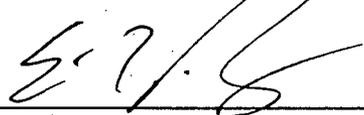
Rancho Seco
Final Status Survey Summary Report
November 2, 2007
Chlorine Building Exterior
Survey Unit F8220021

Prepared By:  Date: 11-2-2007

FSS Engineer

Reviewed By:  Date: 11/2/07

Lead FSS Engineer

Approved By:  Date: 11-13-07

Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8220021, Chlorine Building Exterior

Survey Unit Description:

Operating History: This small structure, located south of the cooling towers, was used to add chlorine to the cooling water. One interviewed employee reported this area may have been used for the storage of containerized radioactive material. Operating records and the HSA document no events with the potential for a release of radioactivity associated with this survey area.

Site Characterization: Direct measurements were made of the interior and exterior surfaces of the structure, which confirmed the absence of plant-derived radionuclides. Some measurements were adjusted for high exterior background levels caused by the handling and storage of radioactive components in the area. Direct measurements showed a mean gross activity level of 1,517 dpm/100 cm² and a maximum value of 3,832 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the area was determined to be a Class 3 area.

HSA Events: None

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 50 m² were scanned for approximately 11% 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:	F822	Chlorine Building Exterior Structure Surface LTP Table 5-4
Survey Unit:	0021	
Class:	3	
SU Area (m ²):	457	
Evaluator:	Frank	
DCGL (dpm/100 cm ²):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL _{emc} (dpm/100 cm ²):	N/A	Class 3
LBGR (dpm/100 cm ²):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm ²):	1032	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m ²):	N/A	Class 3
Scan Area (m ²):	50	
Scan Coverage (%):	11%	Class 3
Z _{1-α} :	1.645	
Z _{1-β} :	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	20.8	
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 F8220021. 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 3332 to 12933 dpm/100 cm², 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 cm²)
F8220021-Q0001BD	1873
F8220021-Q0002BD	2090
F8220021-Q0003BD	2039
F8220021-Q0004BD	1982
F8220021-Q0005BD	1976
F8220021-Q0006BD	2044
F8220021-Q0007BD	2205
F8220021-C0008BD	2246
F8220021-C0009BD	3273
F8220021-C0010BD	3678
F8220021-C0011BD	5265
F8220021-C0012BD	2412
F8220021-C0013BD	2256
F8220021-C0014BD	5913
Mean:	2804
Median:	2225
Standard Deviation:	1293
Range:	1873 - 5913

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8220021C0001SM	2.29
F8220021C0002SM	7.42
F8220021C0003SM	6.14
F8220021C0004SM	3.58
F8220021C0005SM	12.55
F8220021C0006SM	-0.27
F8220021C0007SM	1.01
F8220021C0008SM	3.58
F8220021C0009SM	6.14
F8220021C0010SM	4.86
F8220021C0011SM	2.29
F8220021C0012SM	2.29
F8220021C0013SM	8.7
F8220021C0014SM	8.7
Mean:	4.95
Median:	4.22
Standard Deviation:	3.54
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 was greater than the design standard deviation. Since both values of sigma resulted in a relative shift greater than three (3), no additional samples were required.

Table 4. Data Assessment Results

Survey Results Parameter	Value	Comment	
Material Background Used (dpm/100 cm ²):	N/A	Average Ambient BKG = 0	
Ambient Background Used (dpm/100 cm ²):	N/A		
Actual Direct Measurements (N):	14		
Median (dpm/100 cm ²):	2225		
Mean (dpm/100 cm ²):	2804		
Direct Measurement Standard Deviation (dpm/100 cm ²):	1293		
Total Standard Deviation (dpm/100 cm ²):	1293		Based on samples and backgrounds.
Maximum (dpm/100 cm ²):	5913		
Material Type:	N/A		Background Subtract Not Applied
Sign Test Final N Value:	14		
S+ Value:	14		
Critical Value:	10		
Sufficient Samples Collected:	Yes		
Maximum Value < DCGL:	Yes		
Median Value < DCGL:	Yes		
Mean Value < DCGL:	Yes		
Maximum Value < DCGL_{emc}:	N/A	Class 3	
Total Standard Deviation <= Sigma:	Investigate	No additional samples required	
Pass the Sign Test?	Yes	No additional samples required	
Reject the Null Hypothesis?	Yes		
Does the Survey Unit Pass All Criteria?	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 was greater than the characterization data used for survey design. However, no additional samples were required. 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 cm² 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.

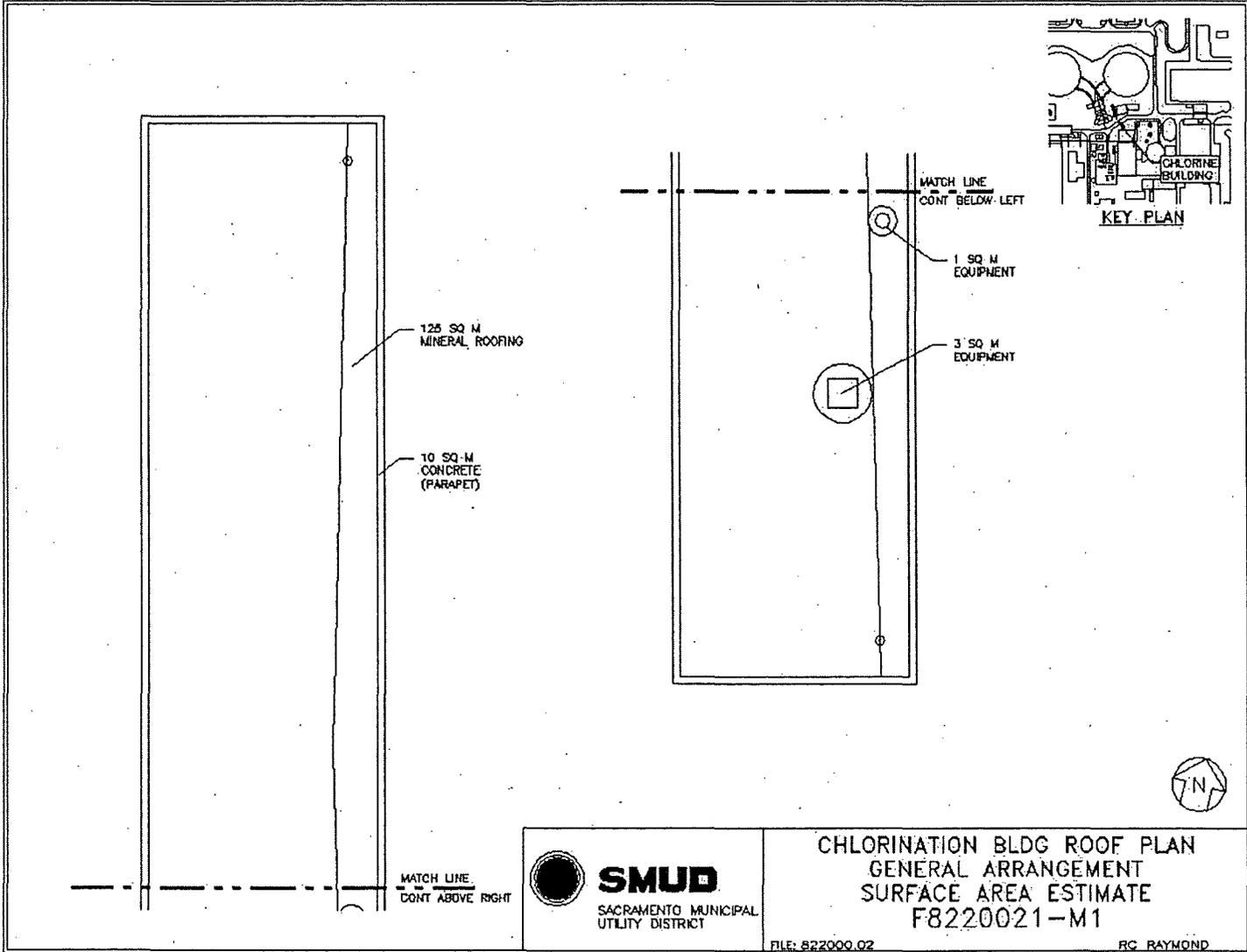
It is concluded that survey unit F8220021 meets the release criteria of 10CFR20.1402.

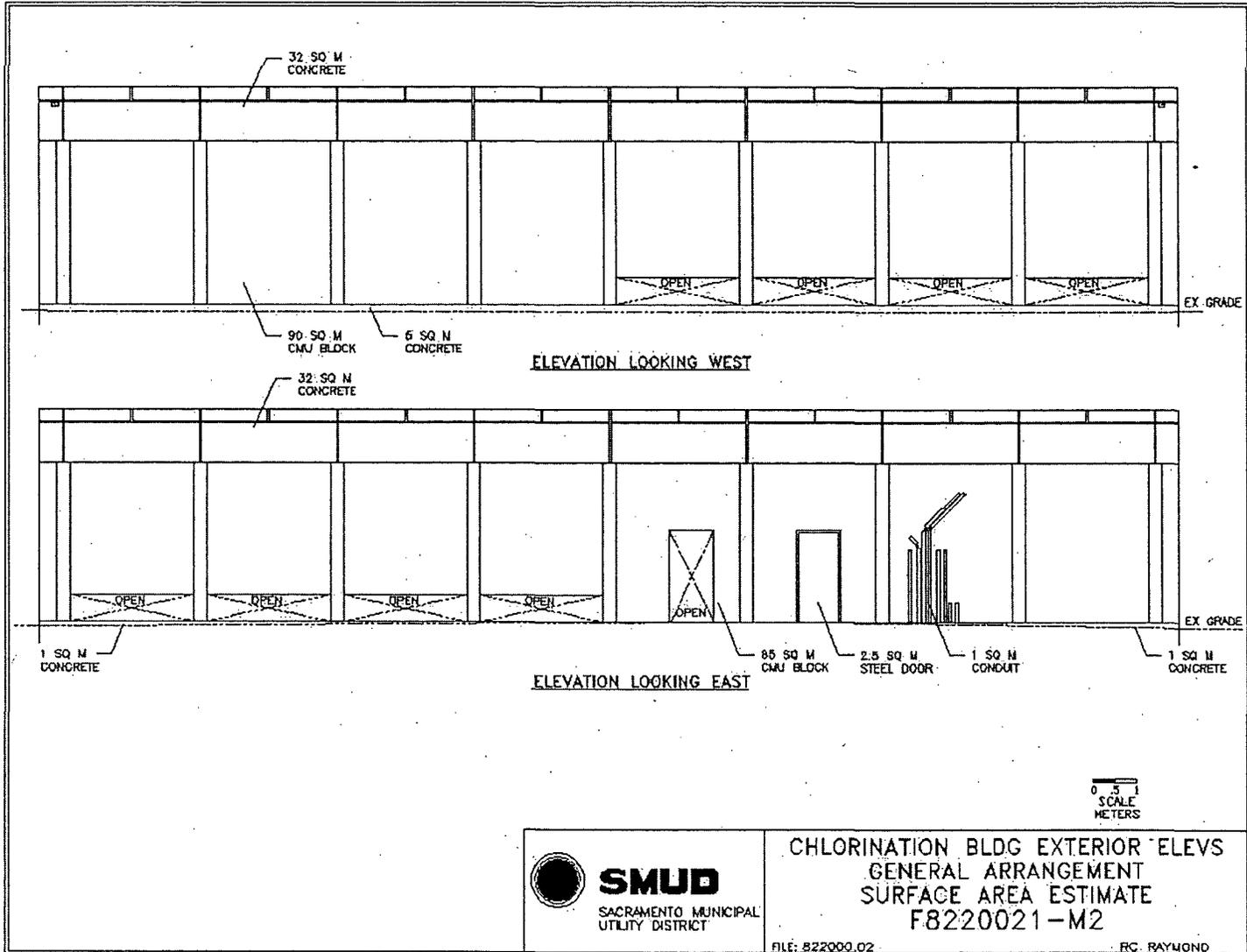
Attachment 1

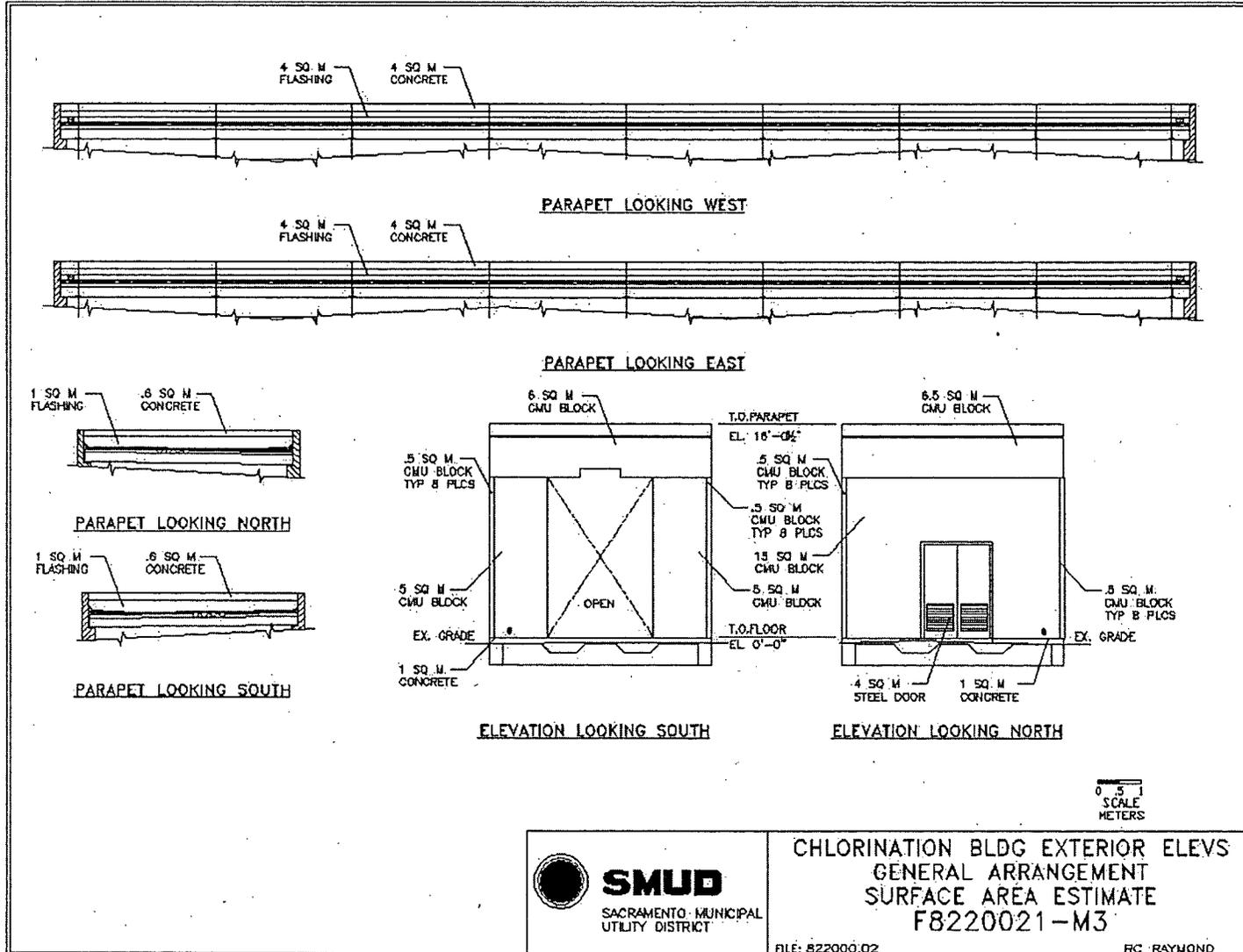
Maps

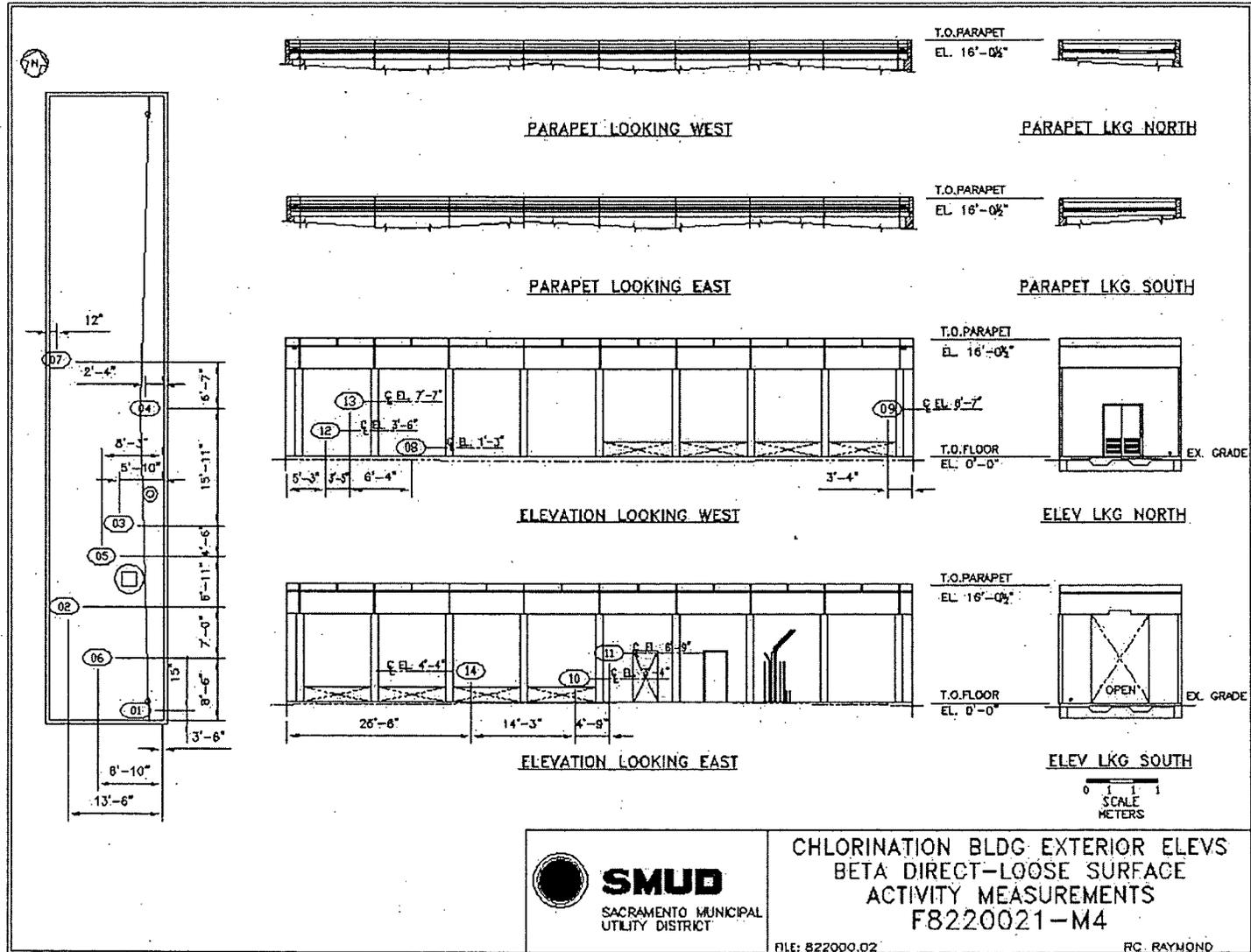
November 2, 2007

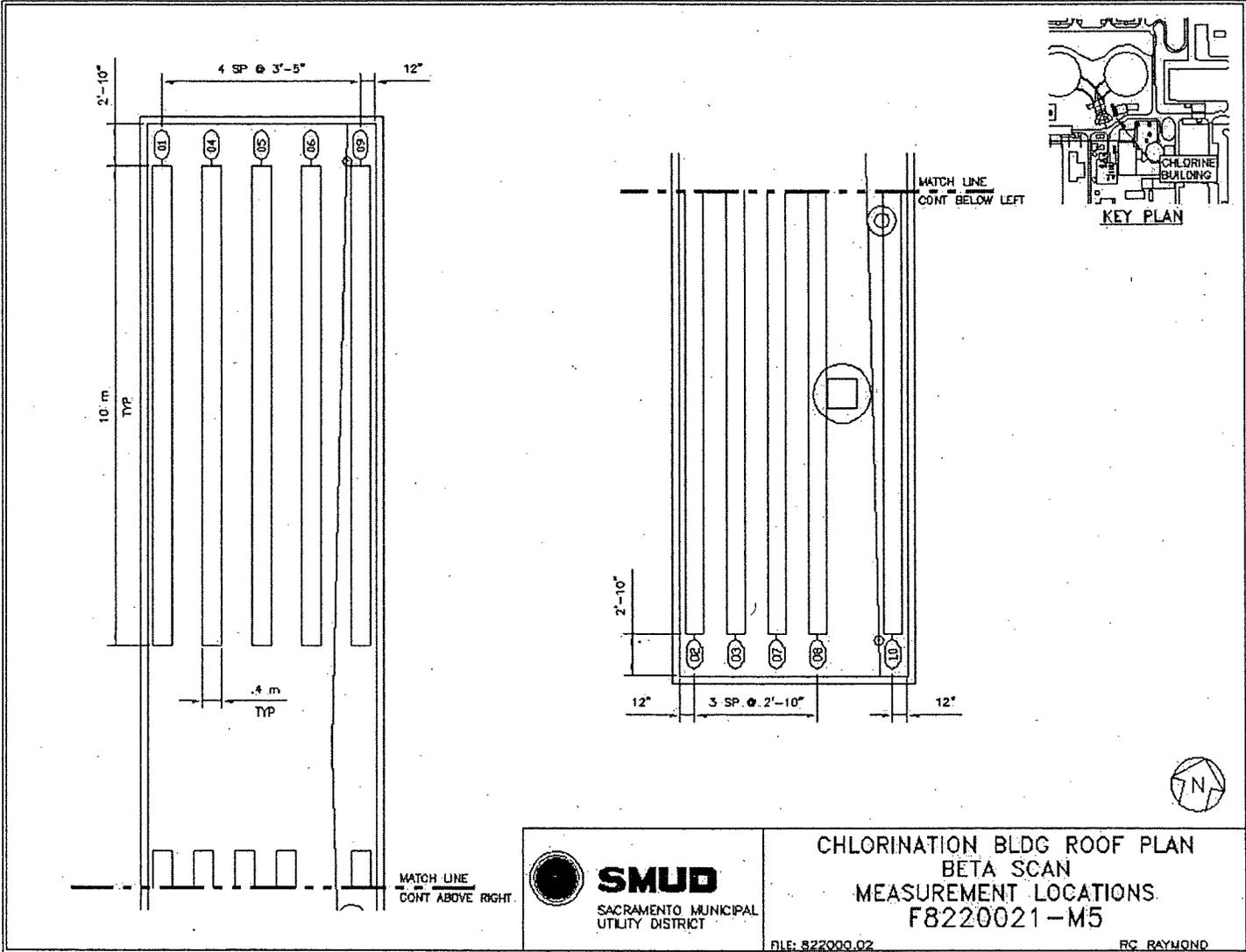
Survey Unit F8220021

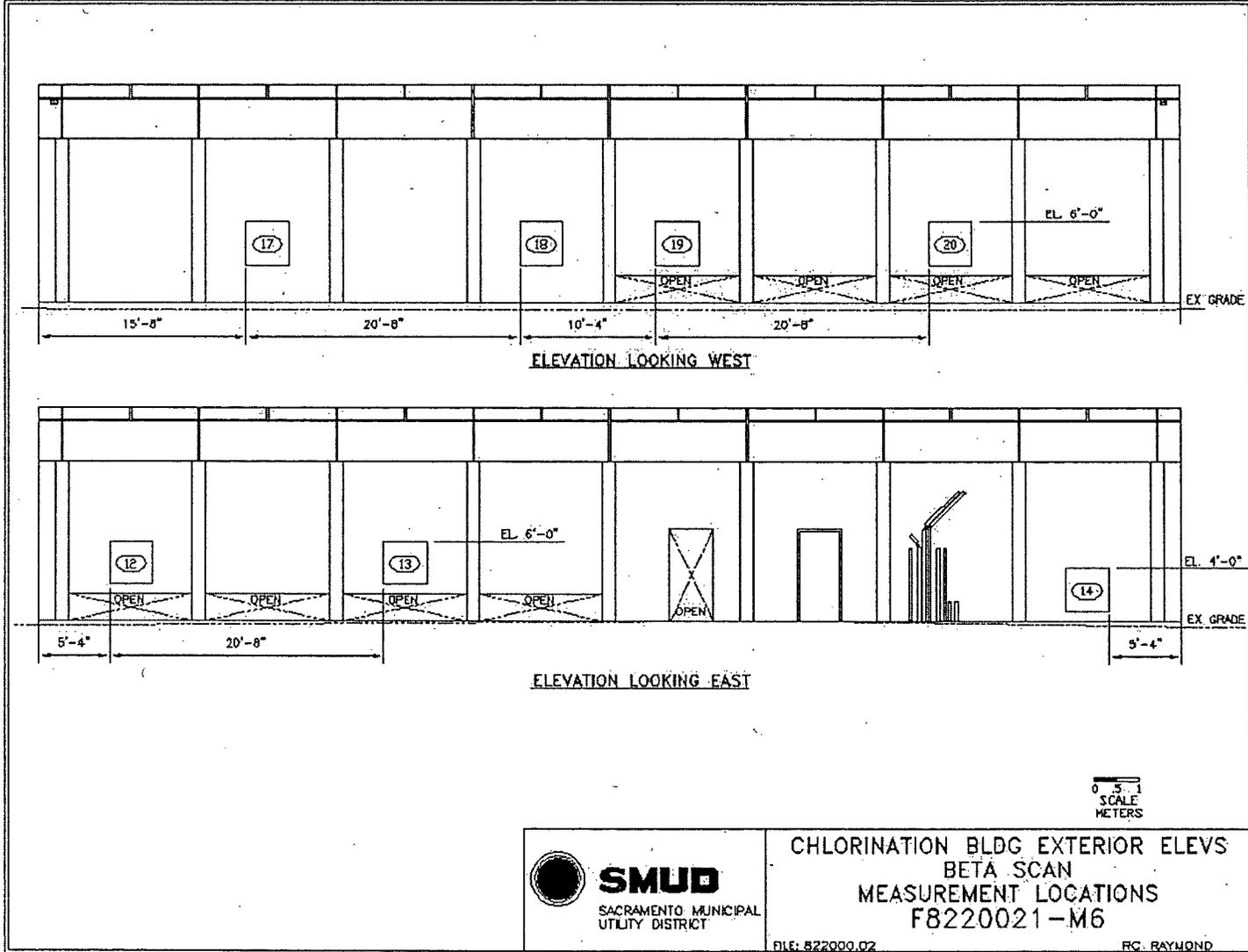


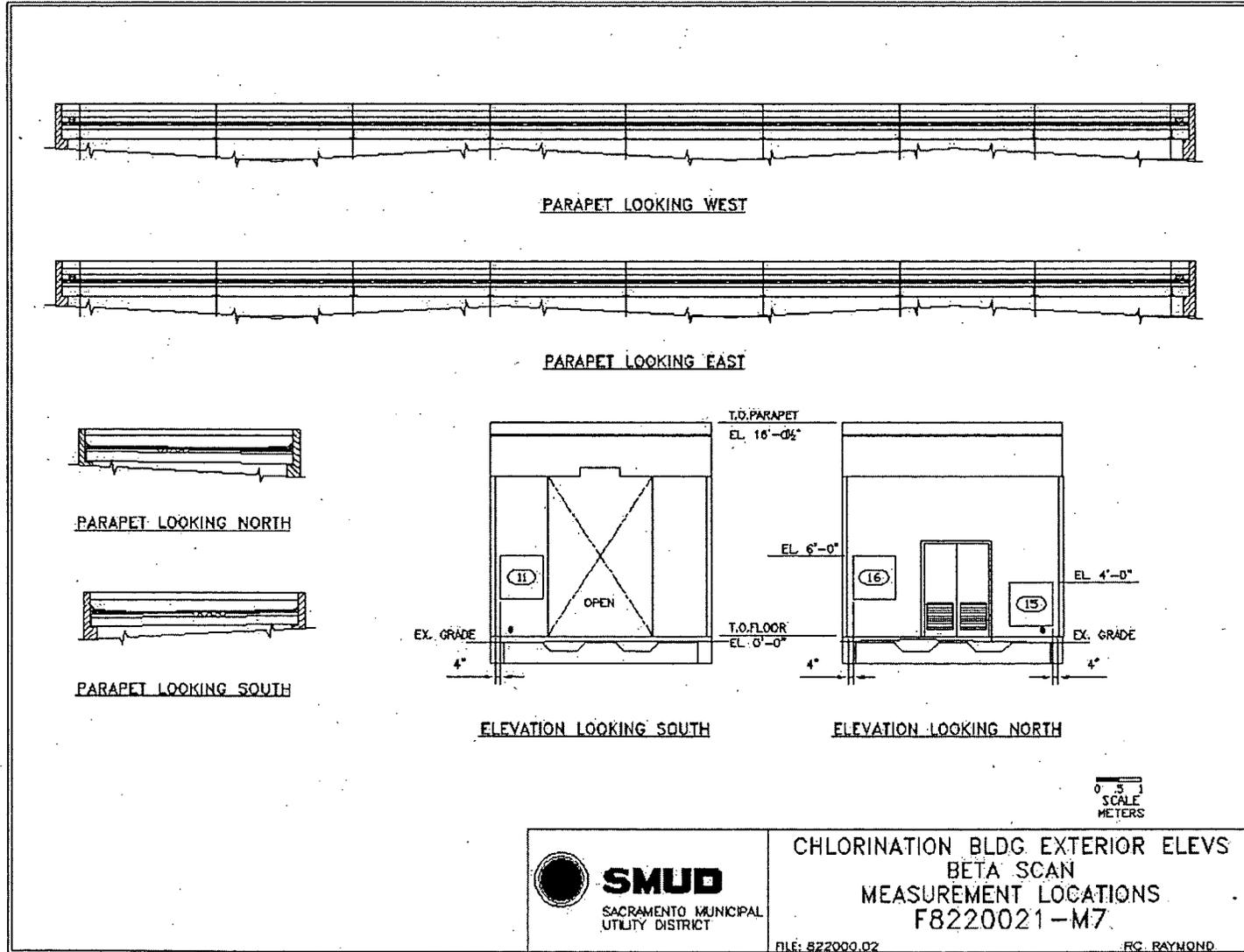












Attachment 2

Instrumentation

November 2, 2007

Survey Unit F8220021

Table 2-1. Survey Unit Instrumentation

Instrument Model; Serial No.	Detector Model; Serial No.	MDC Static (dpm/100 cm²)	MDC Scan (dpm/100 cm²)
M2350; 175834	43-68B; 148634	433	1033
M2350; 142499	43-37; 148502	198	616
Tennelec; 0401171	N/A	5 dpm α , 11 dpm β	N/A

Table 2-2. Investigation Criteria and DCGL

Parameter	Value (dpm/100 cm²)
Investigation Criteria - Direct	21500
Investigation Criteria – Scan	21500
DCGL _w	43000
DCGL _{EMC}	N/A

Attachment 3

Investigation

November 2, 2007

Survey Unit F8220021

(none required)

Attachment 4
Data Assessment
November 2, 2007
Survey Unit F8220021

