
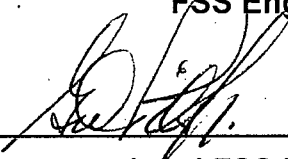
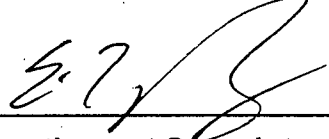


Rancho Seco
Final Status Survey Summary Report
October 30, 2007
"A" Warehouse (exterior)
Survey Unit F8400002

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

Reviewed By:  Date: 10/30/07
Lead FSS Engineer

Approved By:  Date: 11-13-07
Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8400002, "A" Warehouse (exterior)

Survey Unit Description:

Operating History: This structure was used as a primary site warehouse with attached office space. This area was not reported to have been used for the storage of radioactive material. Operating records and the HSA document no occurrences of radioactive material 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. Direct measurements exterior showed a mean gross activity level of 2,310 dpm/100 cm² and a maximum value of 3,838 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 231.5 m² were scanned for approximately 12% 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:	F840	"A" Warehouse (exterior) Structure Surface LTP Table 5-4
Survey Unit:	0002	
Class:	3	
SU Area (m²):	1972	
Evaluator:	DA Tallman	
DCGL (dpm/100 cm²):	43000	Gross Activity DCGL
Area Factor:	N/A	Class 3
Design DCGL_{mc}	N/A	Class 3
(dpm/100 cm²):		
LBGR (dpm/100 cm²):	21500	Default = 50% DCGL
Design Sigma (dpm/100 cm²):	511	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m²):	N/A	Class 3
Scan Area (m²):	231.5	
Scan Coverage (%):	12%	Class 3
Z_{1-α} :	1.645	
Z_{1-β} :	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	42	
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 F8400002. 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 = 2,780 dpm/100 cm² to 30,070 dpm/100 cm²). 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 ²)
F8400002-Q0001BD	2609
F8400002-Q0002BD	2599
F8400002-Q0003BD	2350
F8400002-Q0004BD	2557
F8400002-Q0005BD	2033
F8400002-Q0006BD	2220
F8400002-Z0007BD	1841
F8400002-C0008BD	3673
F8400002-C0009BD	1577
F8400002-C0010BD	1582
F8400002-C0011BD	3424
F8400002-M0012BD	1575
F8400002-M0013BD	1150
F8400002-C0014BD	3221
Mean:	2315
Median:	2285
Standard Deviation:	755
Range:	1150 - 3673

Table 3. Removable Surface Activity Results

Measurement ID	Surface Beta Activity (dpm/100 cm²)
F8400002Q0001SM	4.86
F8400002Q0002SM	3.58
F8400002Q0003SM	3.58
F8400002Q0004SM	2.29
F8400002Q0005SM	3.58
F8400002Q0006SM	1.01
F8400002Z0007SM	4.86
F8400002C0008SM	11.27
F8400002Q0009SM	2.29
F8400002Q0010SM	2.29
F8400002C0011SM	13.83
F8400002M0012SM	6.14
F8400002M0013SM	2.29
F8400002M0014SM	11.27
Mean:	5.22
Median:	3.58
Standard Deviation:	4
Range:	1.01 to 13.83

Note: F8400002M0014SM should be identified as F8400002C0014SM, consistent with F8400002C0014BD.

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 not less than 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

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):	2285	
Mean (dpm/100 cm ²):	2315	
Direct Measurement Standard Deviation	755	Based on samples and backgrounds.
(dpm/100 cm ²):		
Total Standard Deviation (dpm/100 cm ²):	755	
Maximum (dpm/100 cm ²):	3673	Background Subtract Not Applied
Material Type:	N/A	
Sign Test Final N Value:	14	
S+ Value:	14	
Critical Value:	10	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	Class 3 No additional samples required
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{emc}:	N/A	
Total Standard Deviation <= Sigma:	Investigate	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	The survey unit passes all conditions: no additional samples required
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. While the variability of the survey results was not less than the characterization data used for survey, no additional sample 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.

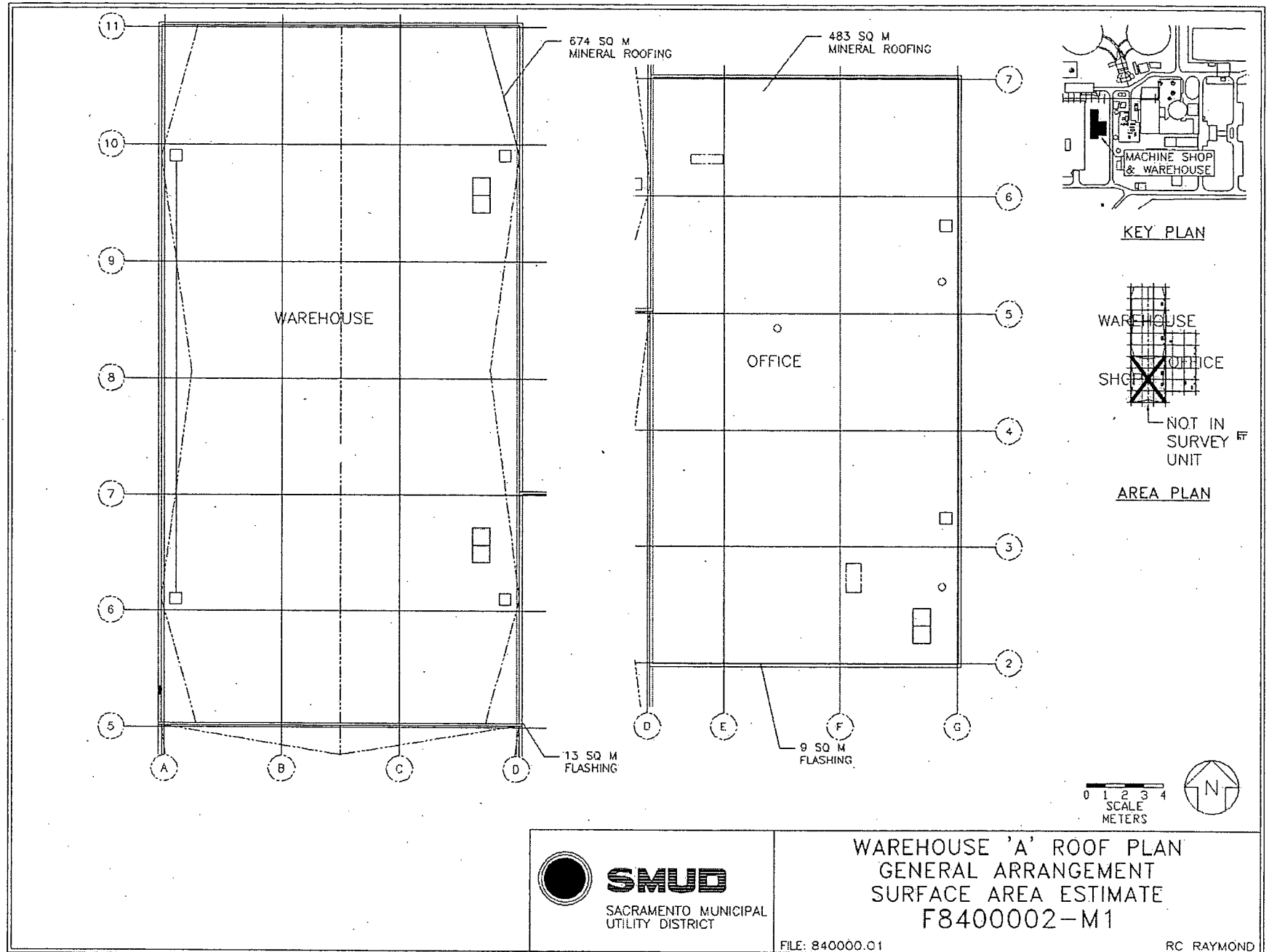
It is concluded that survey unit F8400002 meets the release criteria of 10CFR20.1402.

Attachment 1

Maps

October 30, 2007

Survey Unit F8400002



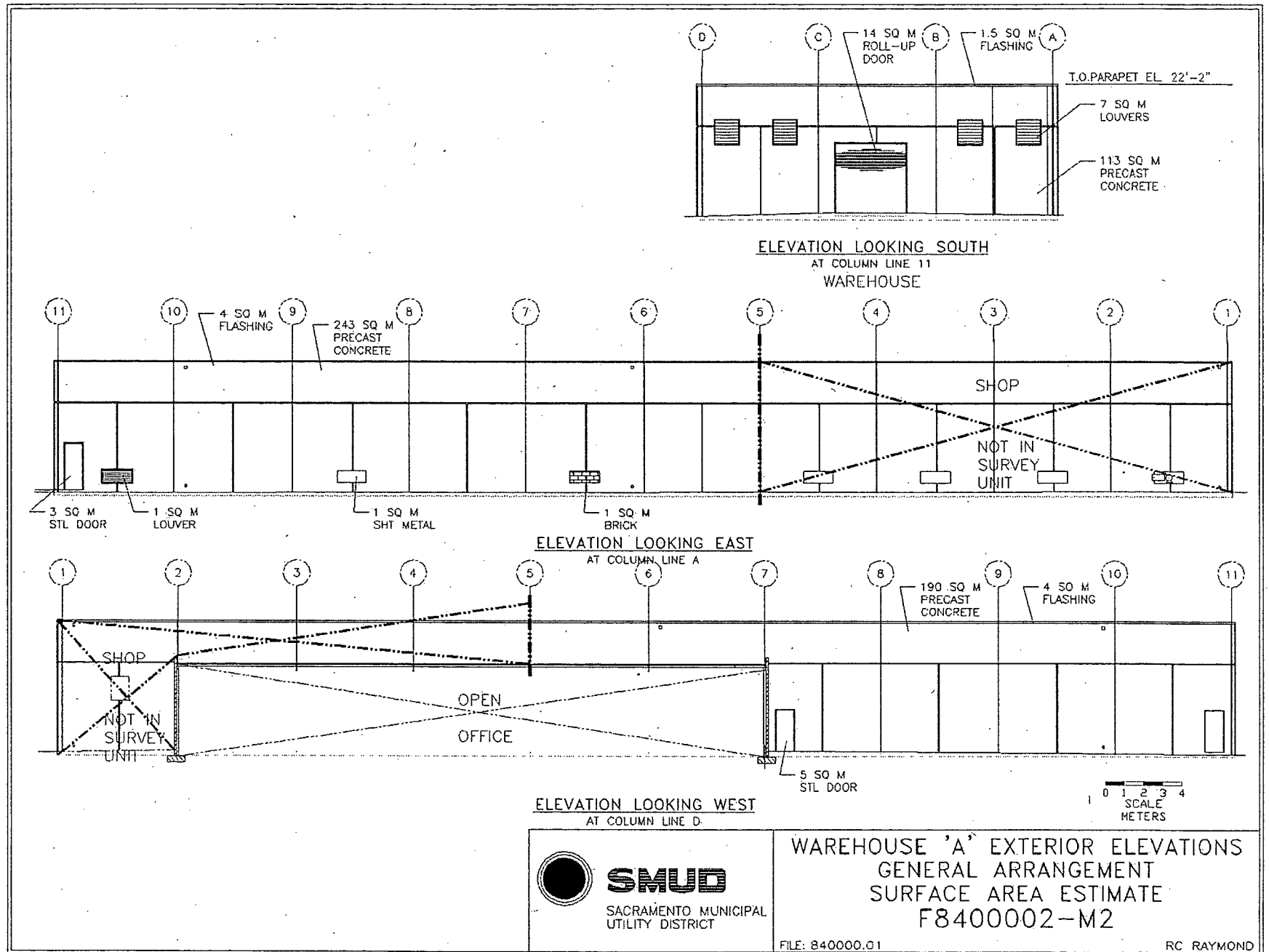
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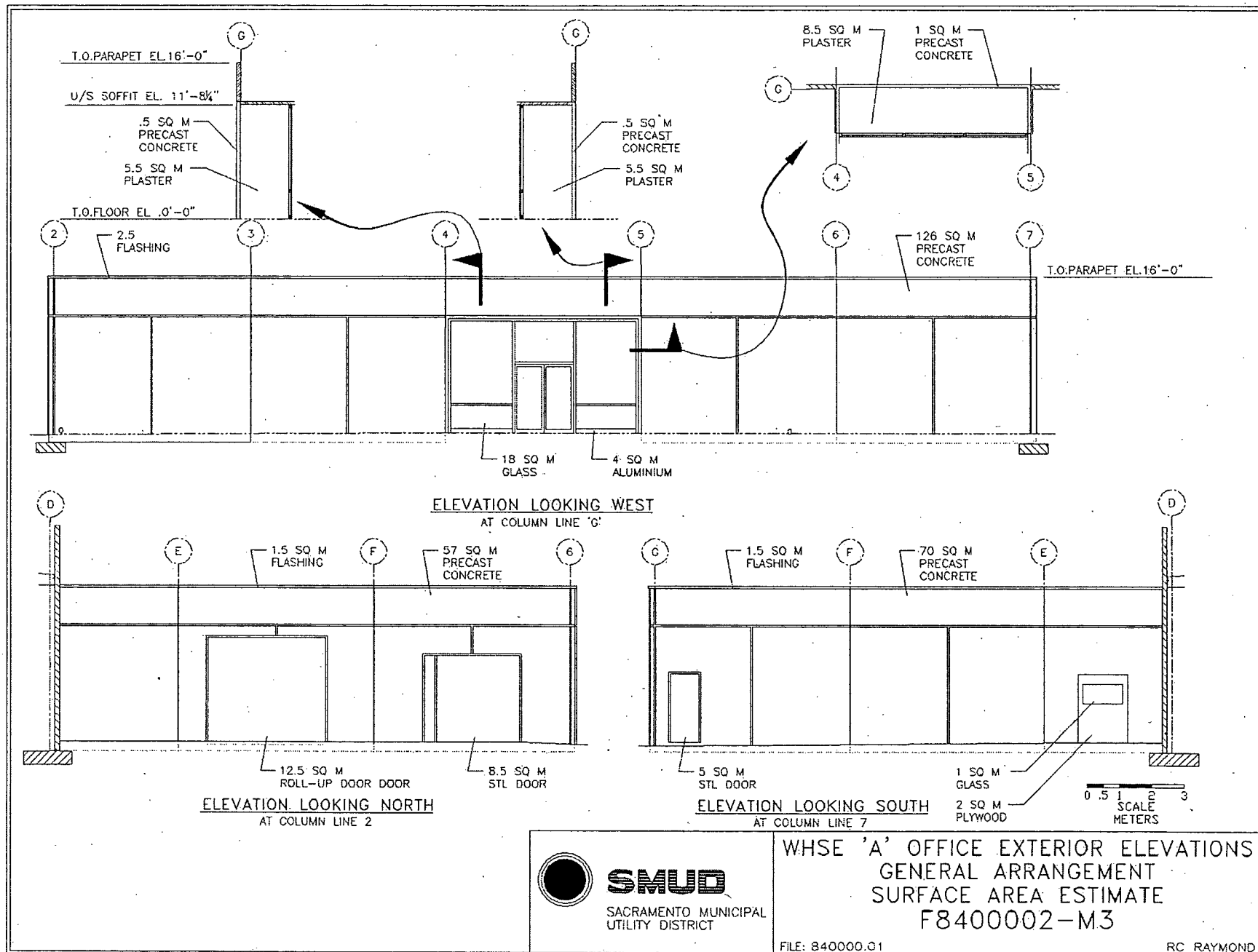
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UTILITY DISTRICT

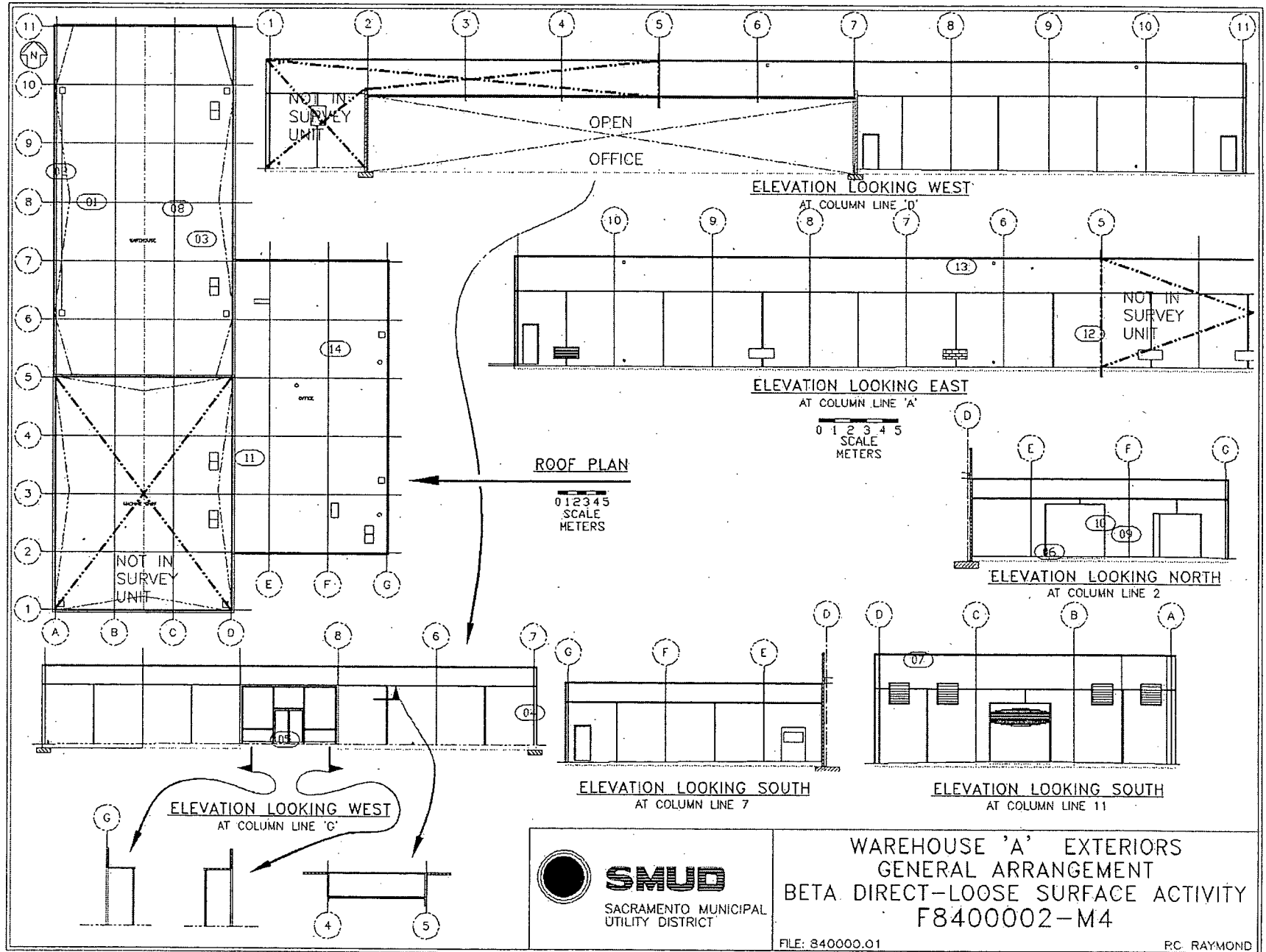
WAREHOUSE 'A' ROOF PLAN
GENERAL ARRANGEMENT
SURFACE AREA ESTIMATE
F8400002-M1

FILE: 840000.Q1

RC RAYMOND







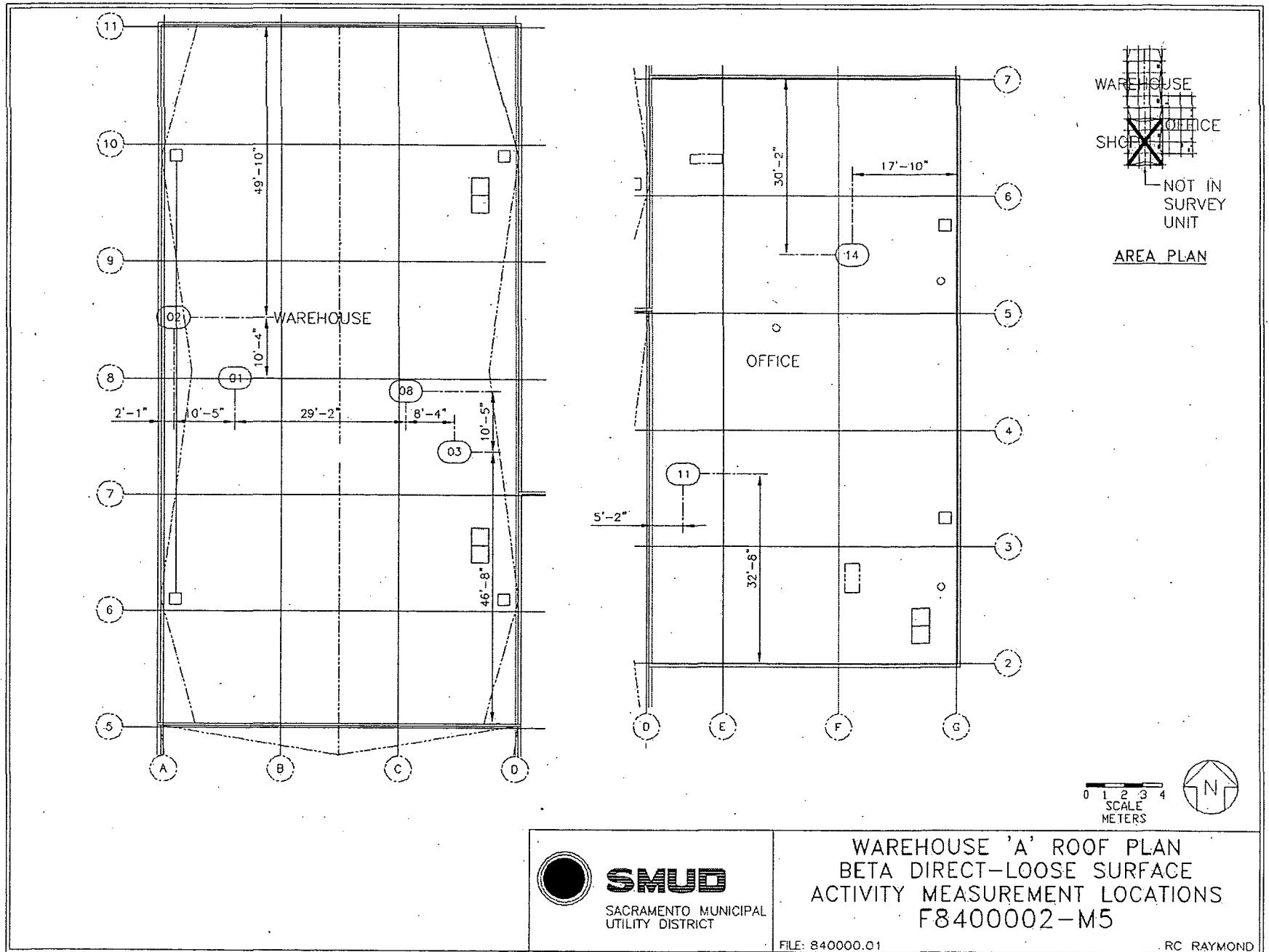
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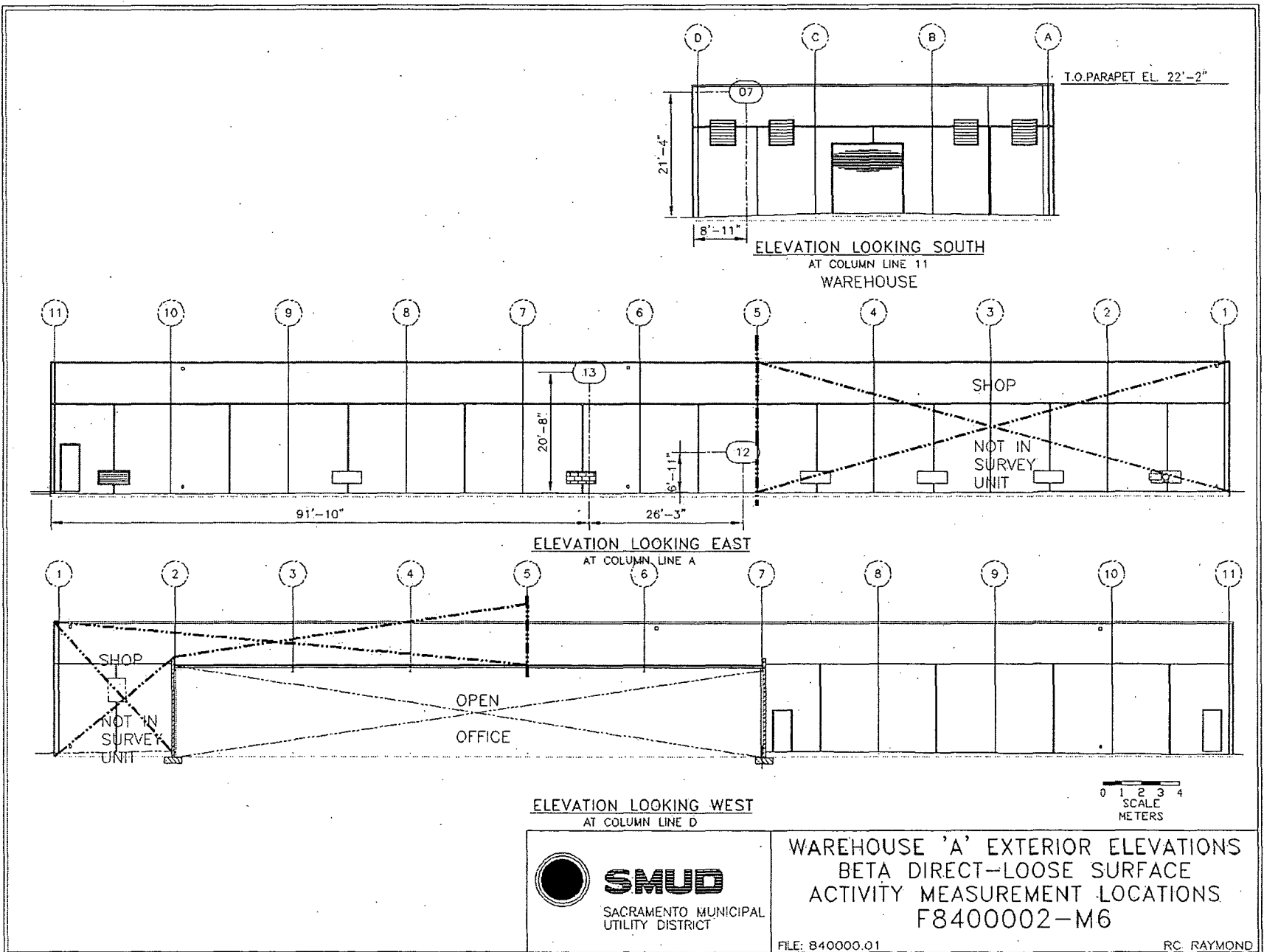
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UTILITY DISTRICT

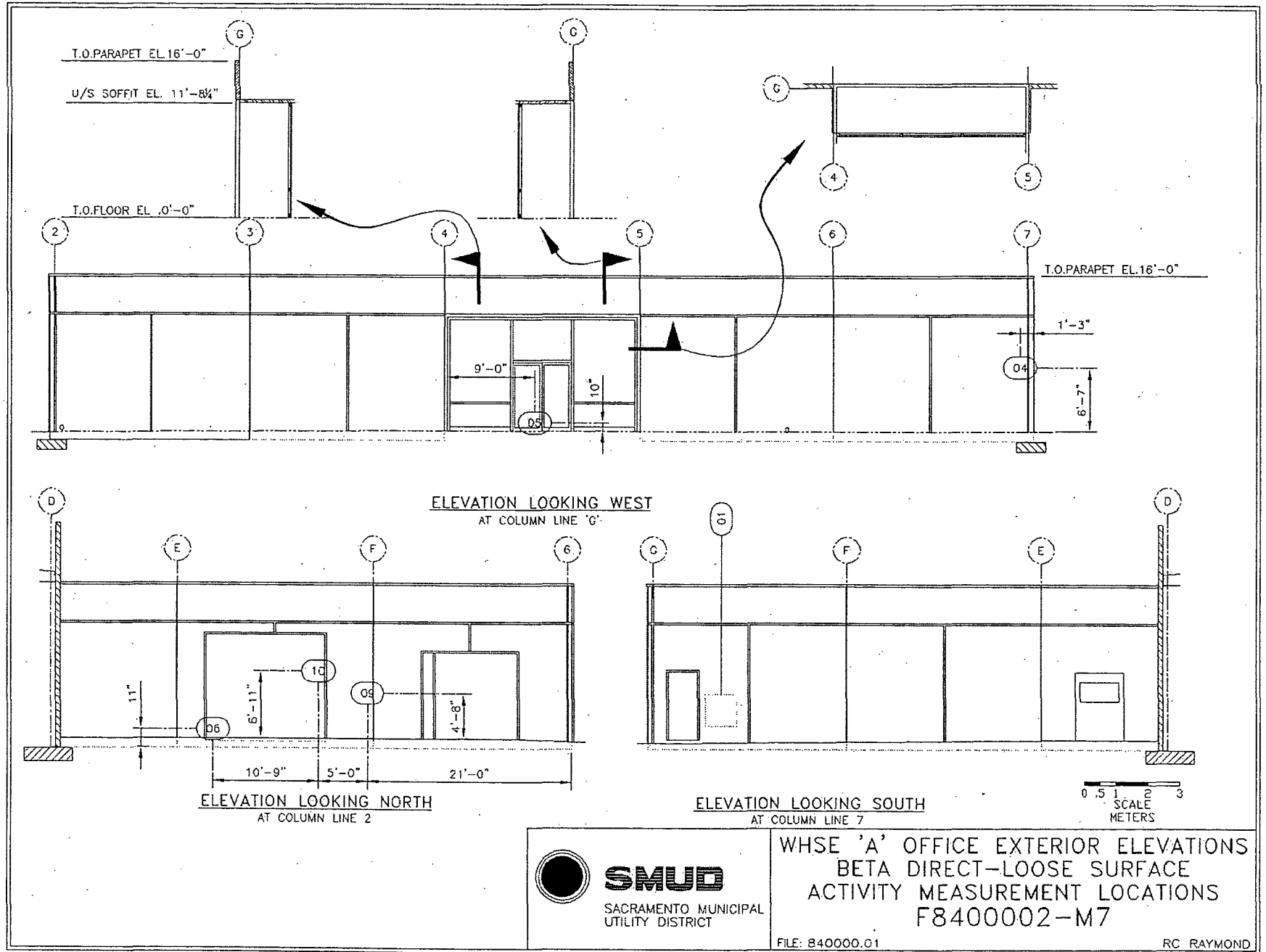
WAREHOUSE 'A' EXTERIORS
GENERAL ARRANGEMENT
BETA DIRECT-LOOSE SURFACE ACTIVITY
F8400002-M4

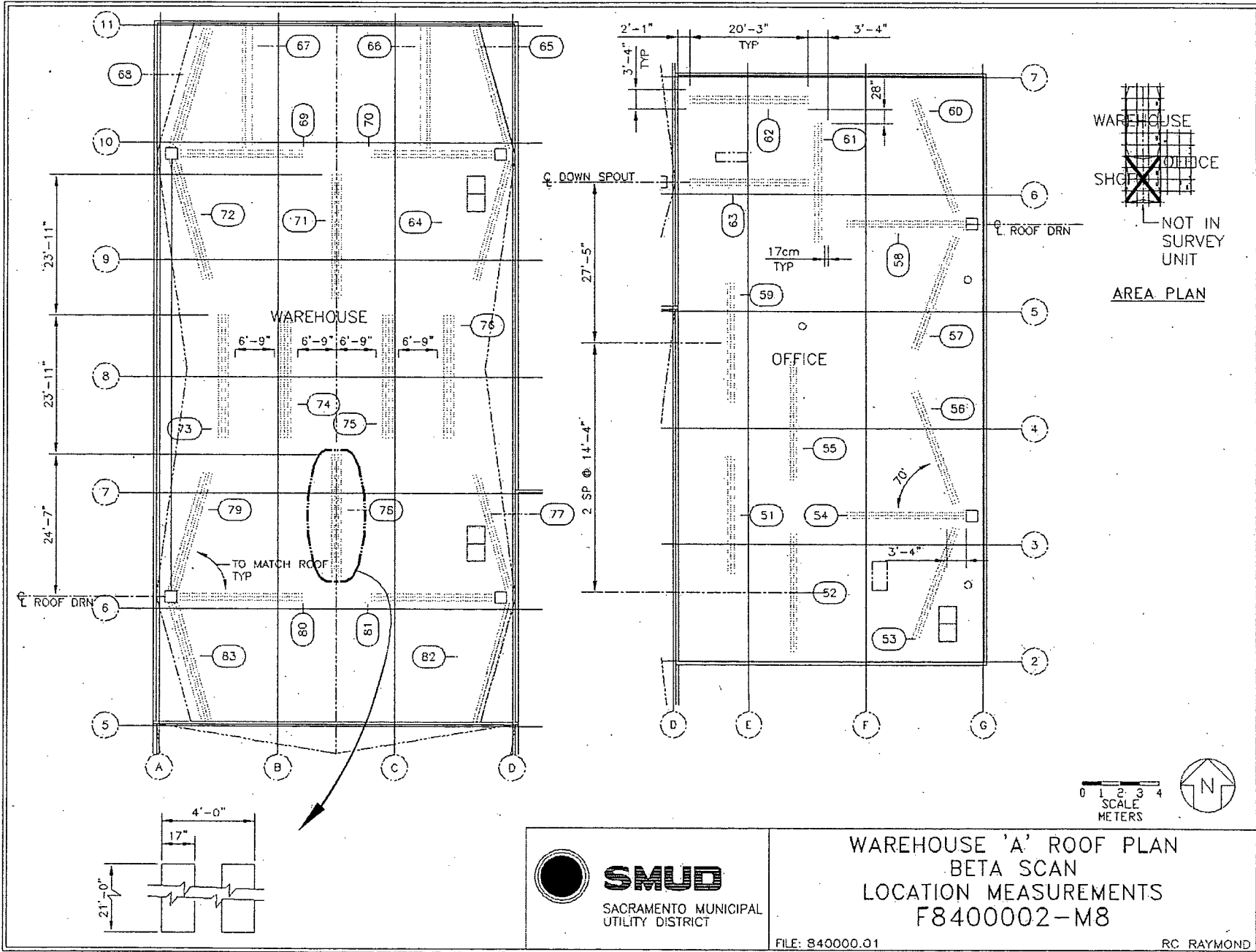
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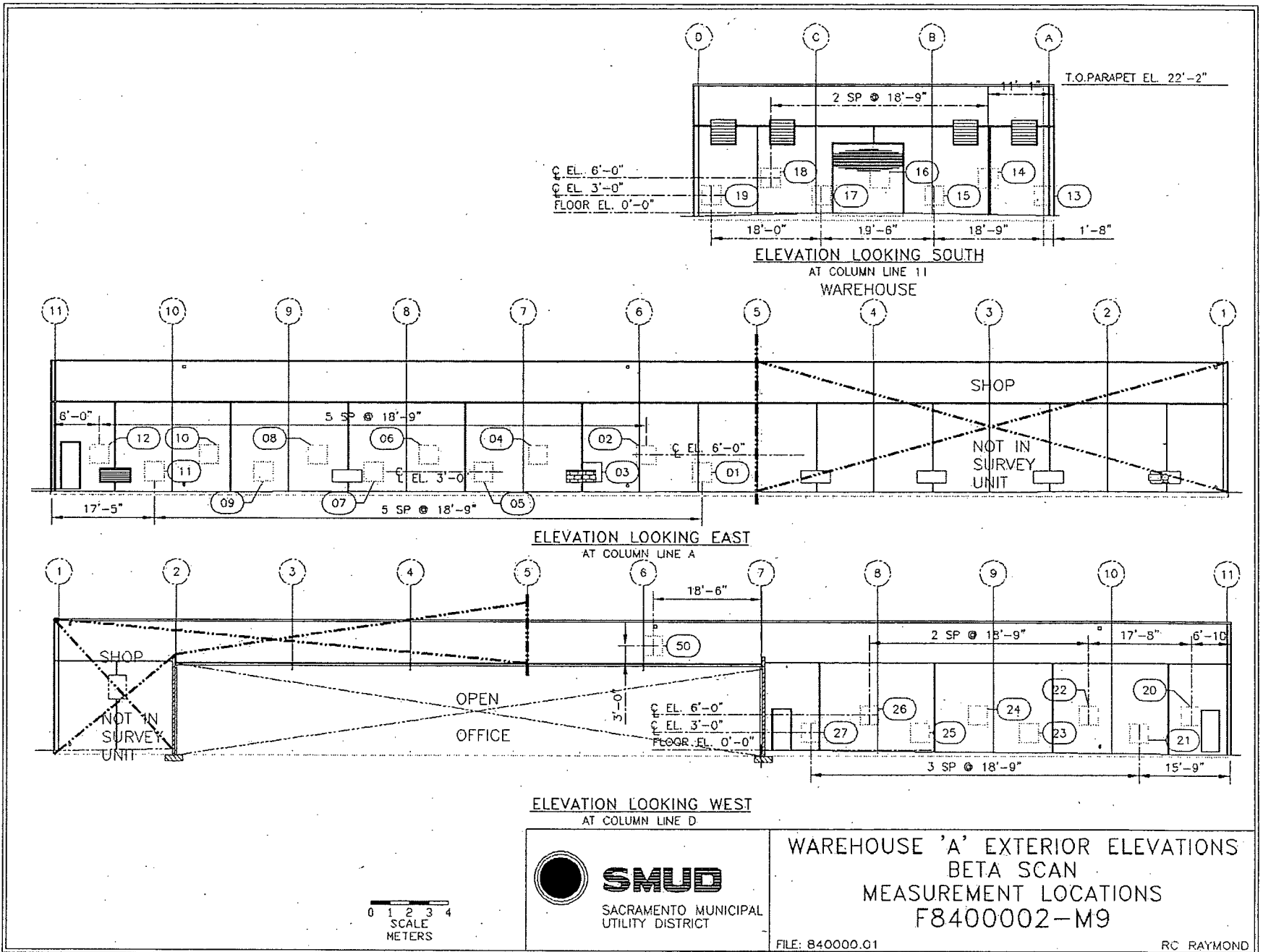
P.C. RAYMOND

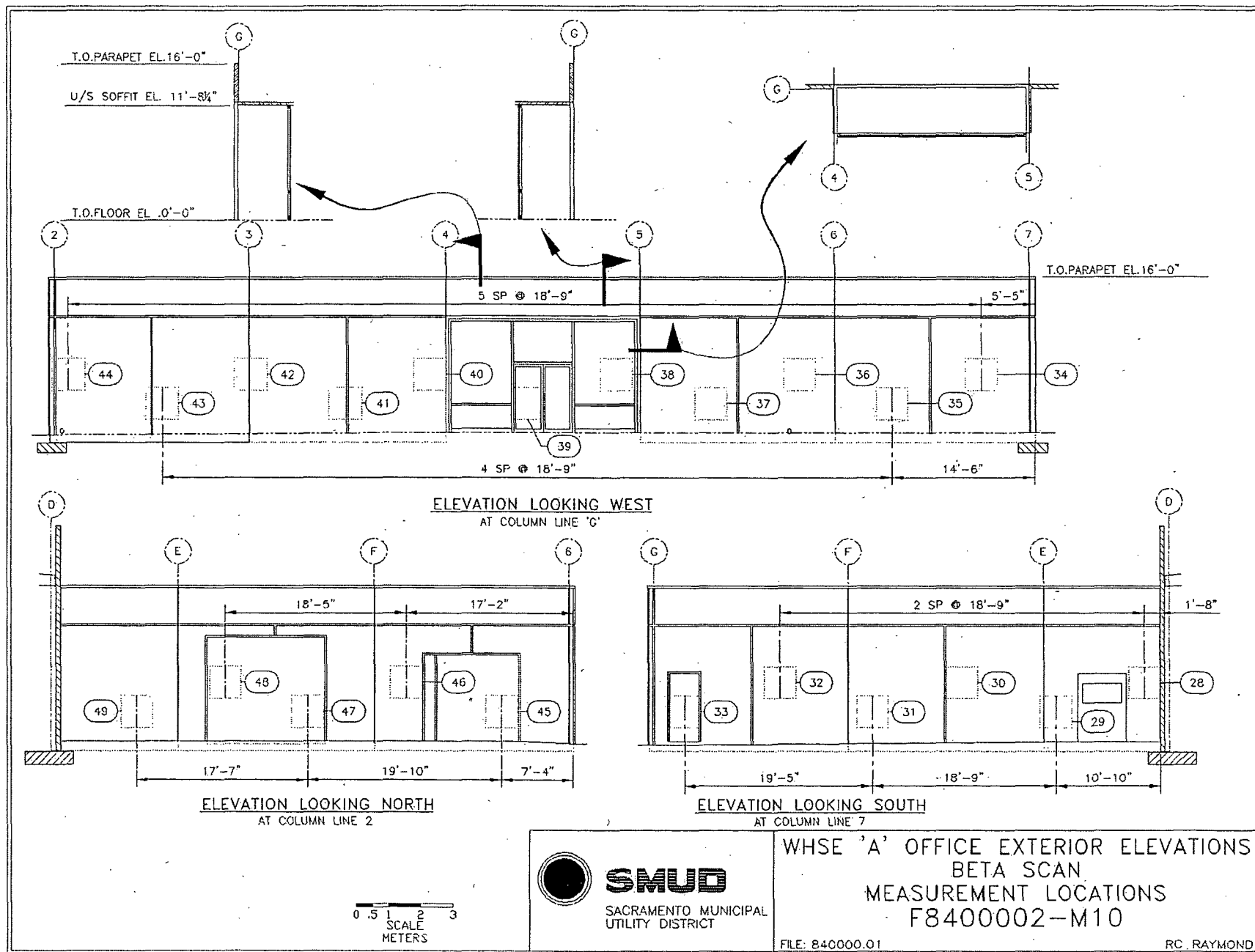












Attachment 2

Instrumentation

October 30, 2007

Survey Unit F8400002

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; 203486	43-68B; 161400	433	1033
M2350; 203486	43-68B; 161400	256 ¹	611 ¹
M2350; 180738	43-68B; 160051	433	1033
M2350; 175834	43-68B; 148634	433	1033
M2350; 175834	43-68B; 148634	256 ¹	611 ¹
M2350; 189089	43-68B; 148460	433	1033
M2350; 203465	43-68B; 148458	433	1033
M2350; 142499	43-37; 148502	198	616
Tennelec; 0401171	N/A	5 dpm α , 11 dpm β	N/A

1- metal

Table 2-2. Investigation Criteria and DCGL

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

Attachment 3
Investigation
October 30, 2007
Survey Unit F8400002

(none required)

Attachment 4
Data Assessment
October 30, 2007
Survey Unit F8400002

