APPENDIX C: Air Quality

12/15/2010 09:40:31 AM

Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\srjohnson\Desktop\700 K Urbemis\700 K AM 121510.urb924

Project Name: 700 K Test

Project Location: Sacramento County AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	3.90	23.48	24.33	0.02	11.00	1.26	12.18	2.30	1.16	3.38	3,461.21
2012 TOTALS (lbs/day unmitigated)	3.60	17.38	22.92	0.02	0.08	1.15	1.23	0.03	1.05	1.08	3,462.00
2013 TOTALS (lbs/day unmitigated)	191.90	16.18	21.62	0.02	0.08	1.03	1.11	0.03	0.95	0.97	3,462.70

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	21.98	4.52	126.83	0.41	20.59	19.82	6,101.50

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	8.88	14.74	99.27	0.09	17.62	3.40	8,947.47

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

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	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	30.86	19.26	226.10	0.50	38.21	23.22	15,048.97

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 6/15/2011-9/15/2011 Active Days: 67	1.41	11.94	7.22	0.01	6.16	0.74	6.90	1.29	0.68	1.96	1,627.99
Demolition 06/15/2011-09/15/2011	1.41	11.94	7.22	0.01	6.16	0.74	6.90	1.29	0.68	1.96	1,627.99
Fugitive Dust	0.00	0.00	0.00	0.00	6.13	0.00	6.13	1.27	0.00	1.27	0.00
Demo Off Road Diesel	1.05	7.22	4.58	0.00	0.00	0.55	0.55	0.00	0.50	0.50	700.30
Demo On Road Diesel	0.32	4.67	1.65	0.01	0.03	0.19	0.21	0.01	0.17	0.18	815.96
Demo Worker Trips	0.03	0.04	0.99	0.00	0.00	0.00	0.01	0.00	0.00	0.00	111.73
Time Slice 9/16/2011-10/14/2011 Active Days: 21	2.86	**23.48**	12.95	0.00	**11.00**	1.17	**12.18**	**2.30**	1.08	**3.38**	2,359.04
Fine Grading 09/16/2011-10/14/2011	2.86	23.48	12.95	0.00	11.00	1.17	12.18	2.30	1.08	3.38	2,359.04
Fine Grading Dust	0.00	0.00	0.00	0.00	11.00	0.00	11.00	2.30	0.00	2.30	0.00
Fine Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,247.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.04	0.99	0.00	0.00	0.00	0.01	0.00	0.00	0.00	111.73
Time Slice 10/17/2011-12/30/2011 Active Days: 55	3.90	18.56	**24.33**	**0.02**	0.08	**1.26**	1.34	0.03	**1.16**	1.18	3,461.21
Building 10/17/2011-04/19/2013	3.90	18.56	24.33	0.02	0.08	1.26	1.34	0.03	1.16	1.18	3,461.21
Building Off Road Diesel	3.39	15.67	10.85	0.00	0.00	1.14	1.14	0.00	1.05	1.05	1,621.20
Building Vendor Trips	0.21	2.41	2.37	0.01	0.02	0.10	0.12	0.01	0.09	0.10	583.86
Building Worker Trips	0.31	0.48	11.12	0.01	0.06	0.03	0.08	0.02	0.02	0.04	1,256.15
Time Slice 1/2/2012-12/31/2012 Active Days: 261	3.60	17.38	22.92	**0.02**	0.08	1.15	1.23	0.03	1.05	1.08	3,462.00

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Building 10/17/2011-04/19/2013	3.60	17.38	22.92	0.02	0.08	1.15	1.23	0.03	1.05	1.08	3,462.00
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95	1,621.20
Building Vendor Trips	0.19	2.14	2.20	0.01	0.02	0.09	0.11	0.01	0.08	0.09	583.95
Building Worker Trips	0.28	0.43	10.21	0.01	0.06	0.03	0.08	0.02	0.02	0.04	1,256.85
Time Slice 1/1/2013-4/19/2013 Active Days: 79	3.30	16.18	21.62	**0.02**	0.08	1.03	1.11	0.03	0.95	0.97	**3,462.70**
Building 10/17/2011-04/19/2013	3.30	16.18	21.62	0.02	0.08	1.03	1.11	0.03	0.95	0.97	3,462.70
Building Off Road Diesel	2.88	13.91	10.20	0.00	0.00	0.93	0.93	0.00	0.86	0.86	1,621.20
Building Vendor Trips	0.17	1.88	2.04	0.01	0.02	0.08	0.10	0.01	0.07	0.08	584.05
Building Worker Trips	0.25	0.39	9.38	0.01	0.06	0.03	0.08	0.02	0.02	0.04	1,257.45
Time Slice 4/22/2013-5/17/2013 Active Days: 20	**191.90**	0.08	1.87	0.00	0.01	0.01	0.02	0.00	0.00	0.01	250.41
Coating 04/22/2013-05/17/2013	191.90	0.08	1.87	0.00	0.01	0.01	0.02	0.00	0.00	0.01	250.41
Architectural Coating	191.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.05	0.08	1.87	0.00	0.01	0.01	0.02	0.00	0.00	0.01	250.41

Phase Assumptions

Phase: Demolition 6/15/2011 - 9/15/2011 - Type Your Description Here

Building Volume Total (cubic feet): 960000

Building Volume Daily (cubic feet): 14592.4

On Road Truck Travel (VMT): 202.67

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 9/16/2011 - 10/14/2011 - Default Fine Site Grading Description

Total Acres Disturbed: 0.55

Maximum Daily Acreage Disturbed: 0.55

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Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 10/17/2011 - 4/19/2013 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 4/22/2013 - 5/17/2013 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.12	1.50	0.65	0.00	0.00	0.00	1,906.60
Hearth	13.90	3.02	126.18	0.41	20.59	19.82	4,194.90

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Landscaping - No Winter Emissions							
Consumer Products	6.91						
Architectural Coatings	1.05						
TOTALS (lbs/day, unmitigated)	21.98	4.52	126.83	0.41	20.59	19.82	6,101.50

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	6.60	10.87	73.78	0.07	13.01	2.51	6,626.39
Supermarket	2.28	3.87	25.49	0.02	4.61	0.89	2,321.08
TOTALS (lbs/day, unmitigated)	8.88	14.74	99.27	0.09	17.62	3.40	8,947.47

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2012 Temperature (F): 50 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	4.03	5.77	dwelling units	153.00	882.81	7,547.76
Supermarket		102.24	1000 sq ft	3.55	362.95	2,674.96

			1,245.76	10,222.72

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	47.5	0.6	99.2	0.2
Light Truck < 3750 lbs	10.0	2.0	92.0	6.0
Light Truck 3751-5750 lbs	22.6	0.4	99.2	0.4
Med Truck 5751-8500 lbs	10.2	1.0	99.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.1	0.0	76.2	23.8
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	3.5	60.0	40.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.9	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	10.8	7.3	7.3
Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

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% of Trips - Commercial (by land use)

Supermarket	2.0	1.0	97.0

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Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\srjohnson\Desktop\700 K Urbemis\700 K AM 121510.urb924

Project Name: 700 K Test

Project Location: Sacramento County AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (tons/year unmitigated)	0.18	1.16	1.05	0.00	0.32	0.07	0.40	0.07	0.07	0.13	174.49
2012 TOTALS (tons/year unmitigated)	0.47	2.27	2.99	0.00	0.01	0.15	0.16	0.00	0.14	0.14	451.79
2013 TOTALS (tons/year unmitigated)	2.05	0.64	0.87	0.00	0.00	0.04	0.04	0.00	0.04	0.04	139.28

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	2.06	0.37	5.56	0.02	0.84	0.81	492.02

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	1.81	2.10	20.21	0.01	3.21	0.62	1,894.95

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	3.87	2.47	25.77	0.03	4.05	1.43	2,386.97

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011	0.18	1.16	1.05	0.00	0.32	0.07	0.40	0.07	0.07	0.13	174.49
Demolition 06/15/2011-09/15/2011	0.05	0.40	0.24	0.00	0.21	0.02	0.23	0.04	0.02	0.07	54.54
Fugitive Dust	0.00	0.00	0.00	0.00	0.86	0.00	0.86	0.18	0.00	0.18	0.00
Demo Off Road Diesel	0.04	0.24	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02	23.46
Demo On Road Diesel	0.01	0.16	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	27.33
Demo Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.74
Fine Grading 09/16/2011-10/14/2011	0.03	0.25	0.14	0.00	0.12	0.01	0.13	0.02	0.01	0.04	24.77
Fine Grading Dust	0.00	0.00	0.00	0.00	0.12	0.00	0.12	0.02	0.00	0.02	0.00
Fine Grading Off Road Diesel	0.03	0.25	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	23.60
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17
Building 10/17/2011-04/19/2013	0.11	0.51	0.67	0.00	0.00	0.03	0.04	0.00	0.03	0.03	95.18
Building Off Road Diesel	0.09	0.43	0.30	0.00	0.00	0.03	0.03	0.00	0.03	0.03	44.58
Building Vendor Trips	0.01	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.06
Building Worker Trips	0.01	0.01	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.54
2012	0.47	2.27	2.99	0.00	0.01	0.15	0.16	0.00	0.14	0.14	451.79
Building 10/17/2011-04/19/2013	0.47	2.27	2.99	0.00	0.01	0.15	0.16	0.00	0.14	0.14	451.79
Building Off Road Diesel	0.41	1.93	1.37	0.00	0.00	0.14	0.14	0.00	0.12	0.12	211.57
Building Vendor Trips	0.02	0.28	0.29	0.00	0.00	0.01	0.01	0.00	0.01	0.01	76.21
Building Worker Trips	0.04	0.06	1.33	0.00	0.01	0.00	0.01	0.00	0.00	0.01	164.02
2013	2.05	0.64	0.87	0.00	0.00	0.04	0.04	0.00	0.04	0.04	139.28
Building 10/17/2011-04/19/2013	0.13	0.64	0.85	0.00	0.00	0.04	0.04	0.00	0.04	0.04	136.78
Building Off Road Diesel	0.11	0.55	0.40	0.00	0.00	0.04	0.04	0.00	0.03	0.03	64.04

Building Vendor Trips	0.01	0.07	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.07
Building Worker Trips	0.01	0.02	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.67
Coating 04/22/2013-05/17/2013	1.92	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50
Architectural Coating	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50

Phase Assumptions

Phase: Demolition 6/15/2011 - 9/15/2011 - Type Your Description Here
Building Volume Total (cubic feet): 960000
Building Volume Daily (cubic feet): 14592.4
On Road Truck Travel (VMT): 202.67
Off-Road Equipment:
1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 9/16/2011 - 10/14/2011 - Default Fine Site Grading Description
Total Acres Disturbed: 0.55
Maximum Daily Acreage Disturbed: 0.55
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 10/17/2011 - 4/19/2013 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

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1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 4/22/2013 - 5/17/2013 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.27	0.12	0.00	0.00	0.00	347.95
Hearth	0.57	0.10	5.16	0.02	0.84	0.81	143.56
Landscape	0.02	0.00	0.28	0.00	0.00	0.00	0.51
Consumer Products	1.26						
Architectural Coatings	0.19						
TOTALS (tons/year, unmitigated)	2.06	0.37	5.56	0.02	0.84	0.81	492.02

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	1.41	1.55	15.07	0.01	2.37	0.46	1,402.79

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Supermarket	0.40	0.55	5.14	0.00	0.84	0.16	492.16
TOTALS (tons/year, unmitigated)	1.81	2.10	20.21	0.01	3.21	0.62	1,894.95

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2012 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	4.03	5.77	dwelling units	153.00	882.81	7,547.76
Supermarket		102.24	1000 sq ft	3.55	362.95	2,674.96
					1,245.76	10,222.72

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	47.5	0.6	99.2	0.2
Light Truck < 3750 lbs	10.0	2.0	92.0	6.0
Light Truck 3751-5750 lbs	22.6	0.4	99.2	0.4
Med Truck 5751-8500 lbs	10.2	1.0	99.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.1	0.0	76.2	23.8
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	3.5	60.0	40.0	0.0

School Bus	0.1	0.0	0.0	100.0
Motor Home	0.9	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	10.8	7.3	7.3
Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Supermarket				2.0	1.0	97.0

Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\srjohnson\Desktop\700 K Urbemis\700 K AM 121510.urb924

Project Name: 700 K Test

Project Location: Sacramento County AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	22.37	5.09	127.31	0.41	20.59	19.82	6,792.83

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	26.54	44.68	296.46	0.27	53.26	10.26	26,908.05

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	48.91	49.77	423.77	0.68	73.85	30.08	33,700.88

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

Phase Assumptions

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.16	2.07	1.13	0.00	0.00	0.00	2,597.93
Hearth	13.90	3.02	126.18	0.41	20.59	19.82	4,194.90
Landscaping - No Winter Emissions							
Consumer Products	6.91						
Architectural Coatings	1.40						
TOTALS (lbs/day, unmitigated)	22.37	5.09	127.31	0.41	20.59	19.82	6,792.83

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	6.60	10.87	73.78	0.07	13.01	2.51	6,626.39
Quality resturant	2.61	4.43	29.23	0.03	5.28	1.02	2,665.26
Strip mall	15.05	25.51	167.96	0.15	30.36	5.84	15,295.32
Supermarket	2.28	3.87	25.49	0.02	4.61	0.89	2,321.08
TOTALS (lbs/day, unmitigated)	26.54	44.68	296.46	0.27	53.26	10.26	26,908.05

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

12/15/2010 09:24:55 AM

Analysis Year: 2012 Temperature (F): 50 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	4.03	5.77	dwelling units	153.00	882.81	7,547.76
Quality resturant		89.95	1000 sq ft	4.50	404.77	3,068.19
Strip mall		42.94	1000 sq ft	55.70	2,391.76	17,627.26
Supermarket		102.24	1000 sq ft	3.55	362.95	2,674.96
					4,042.29	30,918.17

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	47.5	0.6	99.2	0.2
Light Truck < 3750 lbs	10.0	2.0	92.0	6.0
Light Truck 3751-5750 lbs	22.6	0.4	99.2	0.4
Med Truck 5751-8500 lbs	10.2	1.0	99.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.1	0.0	76.2	23.8
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	3.5	60.0	40.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.9	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	10.8	7.3	7.3

Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Quality resturant				8.0	4.0	88.0
Strip mall				2.0	1.0	97.0
Supermarket				2.0	1.0	97.0

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\srjohnson\Desktop\700 K Urbemis\700 K AM 121510.urb924

Project Name: 700 K Test

Project Location: Sacramento County AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

Phase Assumptions

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.03	0.38	0.21	0.00	0.00	0.00	474.12
Hearth	0.57	0.10	5.16	0.02	0.84	0.81	143.56
Landscape	0.04	0.01	0.56	0.00	0.00	0.00	1.01
Consumer Products	1.26						
Architectural Coatings	0.26						

TOTALS (tons/year, unmitigated)	2.16	0.49	5.93	0.02	0.84	0.81	618.69

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	1.41	1.55	15.07	0.01	2.37	0.46	1,402.79
Quality resturant	0.46	0.63	5.91	0.01	0.96	0.19	565.06
Strip mall	2.68	3.64	33.84	0.03	5.54	1.07	3,243.24
Supermarket	0.40	0.55	5.14	0.00	0.84	0.16	492.16
TOTALS (tons/year, unmitigated)	4.95	6.37	59.96	0.05	9.71	1.88	5,703.25

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2012 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	4.03	5.77	dwelling units	153.00	882.81	7,547.76
Quality resturant		89.95	1000 sq ft	4.50	404.77	3,068.19
Strip mall		42.94	1000 sq ft	55.70	2,391.76	17,627.26

Supermarket	102.24	1000 sq ft	3.55	362.95	2,674.96
				4,042.29	30,918.17

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	47.5	0.6	99.2	0.2
Light Truck < 3750 lbs	10.0	2.0	92.0	6.0
Light Truck 3751-5750 lbs	22.6	0.4	99.2	0.4
Med Truck 5751-8500 lbs	10.2	1.0	99.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.1	0.0	76.2	23.8
Lite-Heavy Truck 10,001-14,000 lbs	0.9	0.0	55.6	44.4
Med-Heavy Truck 14,001-33,000 lbs	1.6	0.0	18.8	81.2
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	3.5	60.0	40.0	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.9	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	10.8	7.3	7.3
Rural Trip Length (miles)	15.0	10.0	10.0	15.0	10.0	10.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

12/15/2010 09:25:19 AM
% of Trips - Commercial (by land use)

Quality resturant	8.0	4.0	88.0
Strip mall	2.0	1.0	97.0
Supermarket	2.0	1.0	97.0

APPENDIX D: Biological Resources

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	***Accipiter cooperii*** Cooper's hawk	ABNKC12040			G5	S3	
2	***Ardea herodias*** great blue heron	ABNGA04010			G5	S4	
3	***Athene cunicularia*** burrowing owl	ABNSB10010			G4	S2	SC
4	***Branchinecta lynchi*** vernal pool fairy shrimp	ICBRA03030	Threatened		G3	S2S3	
5	***Buteo swainsoni*** Swainson's hawk	ABNKC19070		Threatened	G5	S2	
6	***Desmocerus californicus dimorphus*** valley elderberry longhorn beetle	IICOL48011	Threatened		G3T2	S2	
7	***Elanus leucurus*** white-tailed kite	ABNKC06010			G5	S3	
8	***Elderberry Savanna***	CTT63440CA			G2	S2.1	
9	***Lepidurus packardi*** vernal pool tadpole shrimp	ICBRA10010	Endangered		G3	S2S3	
10	***Linderiella occidentalis*** California linderiella	ICBRA06010			G3	S2S3	
11	***Progne subis*** purple martin	ABPAU01010			G5	S3	SC
12	***Riparia riparia*** bank swallow	ABPAU08010		Threatened	G5	S2S3	
13	***Sagittaria sanfordii*** Sanford's arrowhead	PMALI040Q0			G3	S3.2	1B.2
14	***Taxidea taxus*** American badger	AMAJF04010			G5	S4	SC

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	***Accipiter cooperii*** Cooper's hawk	ABNKC12040			G5	S3	
2	***Actinemys marmorata*** western pond turtle	ARAAD02030			G3G4	S3	SC
3	***Agelaius tricolor*** tricolored blackbird	ABPBXB0020			G2G3	S2	SC
4	***Andrena subapasta*** A vernal pool andrenid bee	IIHYM35050			G1G3	S1S3	
5	***Aquila chrysaetos*** golden eagle	ABNKC22010			G5	S3	
6	***Archoplites interruptus*** Sacramento perch	AFCQB07010			G3	S1	SC
7	***Ardea alba*** great egret	ABNGA04040			G5	S4	
8	***Ardea herodias*** great blue heron	ABNGA04010			G5	S4	
9	***Athene cunicularia*** burrowing owl	ABNSB10010			G4	S2	SC
10	***Branchinecta lynchi*** vernal pool fairy shrimp	ICBRA03030	Threatened		G3	S2S3	
11	***Branchinecta mesovallensis*** midvalley fairy shrimp	ICBRA03150			G2	S2	
12	***Buteo regalis*** ferruginous hawk	ABNKC19120			G4	S3S4	
13	***Buteo swainsoni*** Swainson's hawk	ABNKC19070		Threatened	G5	S2	
14	***Coccyzus americanus occidentalis*** western yellow-billed cuckoo	ABNRB02022	Candidate	Endangered	G5T3Q	S1	
15	***Desmocerus californicus dimorphus*** valley elderberry longhorn beetle	IICOL48011	Threatened		G3T2	S2	
16	***Downingia pusilla*** dwarf downingia	PDCAM060C0			G3	S3.1	2.2
17	***Dumontia oregonensis*** hairy water flea	ICBRA23010			G1G3	S1	
18	***Egretta thula*** snowy egret	ABNGA06030			G5	S4	
19	***Elanus leucurus*** white-tailed kite	ABNKC06010			G5	S3	
20	***Elderberry Savanna***	CTT63440CA			G2	S2.1	
21	***Falco columbarius*** merlin	ABNKD06030			G5	S3	
22	***Fritillaria agrestis*** stinkbells	PMLIL0V010			G3	S3.2	4.2
23	***Gratiola heterosepala*** Boggs Lake hedge-hyssop	PDSCR0R060		Endangered	G3	S3.1	1B.2
24	***Great Valley Cottonwood Riparian Forest***	CTT61410CA			G2	S2.1	
25	***Great Valley Valley Oak Riparian Forest***	CTT61430CA			G1	S1.1	
26	***Hibiscus lasiocarpos var. occidentalis*** woolly rose-mallow	PDMAL0H0R3			G4	S2.2	2.2

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
27	***Hydrochara rickseckeri*** Ricksecker's water scavenger beetle	IICOL5V010			G1G2	S1S2	
28	***Juglans hindsii*** Northern California black walnut	PDJUG02040			G1	S1.1	1B.1
29	***Juncus leiospermus var. ahartii*** Ahart's dwarf rush	PMJUN011L1			G2T1	S1.2	1B.2
30	***Lasiurus cinereus*** hoary bat	AMACC05030			G5	S4?	
31	***Legenere limosa*** legenere	PDCAM0C010			G2	S2.2	1B.1
32	***Lepidurus packardi*** vernal pool tadpole shrimp	ICBRA10010	Endangered		G3	S2S3	
33	***Linderiella occidentalis*** California linderiella	ICBRA06010			G3	S2S3	
34	***Northern Claypan Vernal Pool***	CTT44120CA			G1	S1.1	
35	***Northern Hardpan Vernal Pool***	CTT44110CA			G3	S3.1	
36	***Northern Volcanic Mud Flow Vernal Pool***	CTT44132CA			G1	S1.1	
37	***Nycticorax nycticorax*** black-crowned night heron	ABNGA11010			G5	S3	
38	***Oncorhynchus tshawytscha*** chinook salmon - Central Valley spring-run ESU	AFCHA0205A	Threatened	Threatened	G5	S1	
39	***Oncorhynchus tshawytscha*** chinook salmon - Sacramento River winter-run ESU	AFCHA0205B	Endangered	Endangered	G5	S1	
40	***Orcuttia tenuis*** slender Orcutt grass	PMPOA4G050	Threatened	Endangered	G3	S3.1	1B.1
41	***Orcuttia viscida*** Sacramento Orcutt grass	PMPOA4G070	Endangered	Endangered	G1	S1.1	1B.1
42	***Phalacrocorax auritus*** double-crested cormorant	ABNFD01020			G5	S3	
43	***Pogonichthys macrolepidotus*** Sacramento splittail	AFCJB34020			G2	S2	SC
44	***Progne subis*** purple martin	ABPAU01010			G5	S3	SC
45	***Riparia riparia*** bank swallow	ABPAU08010		Threatened	G5	S2S3	
46	***Sagittaria sanfordii*** Sanford's arrowhead	PMALI040Q0			G3	S3.2	1B.2
47	***Spea hammondii*** western spadefoot	AAABF02020			G3	S3	SC
48	***Taxidea taxus*** American badger	AMAJF04010			G5	S4	SC
49	***Thamnophis gigas*** giant garter snake	ARADB36150	Threatened	Threatened	G2G3	S2S3	
50	***Xanthocephalus xanthocephalus*** yellow-headed blackbird	ABPBXB3010			G5	S3S4	SC

APPENDIX E: Hazards and Hazardous Materials

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants

HAZARDOUS BUILDING MATERIALS SURVEY
TEN PARCELS WITHIN THE K STREET CORRIDOR
SACRAMENTO, CALIFORNIA

PREPARED FOR:
City of Sacramento
Economic Development Department
915 I Street, Third Floor
Sacramento, California 95814

PREPARED BY:
Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
1956 Webster Street, Suite 400
Oakland, California 94612

December 31, 2010
Project No. 401683001

December 31, 2010
Project No. 401683001

Ms. Diana Sasser
Project Manager
Redevelopment Agency of the City of Sacramento
915 I Street, Third Floor
Sacramento, California 95814

Subject: Hazardous Building Materials Survey
Ten Parcels Within the 700 Block K Street Corridor
Sacramento, California

Dear Ms. Sasser:

Ninyo & Moore has performed a Hazardous Building Materials Survey (HBMS) at ten parcels located along the 700 block and associated commercial corridor of K Street (along the K Street Mall and 7th Street) in Sacramento, California. The attached report presents our methodology, findings, conclusions, and recommendations regarding our survey and assessment.

We appreciate the opportunity to be of service to you on this important project.

Sincerely,
NINYO & MOORE

William P. Larkin
Senior Project Environmental Scientist
Certified Asbestos Consultant (Cert. No. 99-2688)
Lead-Related Construction Services Inspector/Assessor
and Project Monitor (Cert. No. 5543)

Duane Blamer, P.G. 6913
Manager, Environmental Sciences

WPL/DWB/dhi

Distribution: (2) Addressee

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Tables

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Appendices

1. INTRODUCTION

On behalf of the Redevelopment Agency of the City of Sacramento (RACS), Ninyo & Moore has performed a Hazardous Building Material Survey (HBMS) for the RACS/700 Block K Street properties located at 700 through 730 K Street and 1111 7th Street, in Sacramento, California. The HBMS was performed in general accordance with the proposed methodology presented in Ninyo & Moore's proposal P-81583, dated September 24, 2010.

Ninyo & Moore conducted this Hazardous Building Material Survey (HBMS) at ten parcels along the 700 block of K Street located in downtown Sacramento, California (Figure 1). Ninyo & Moore performed the approved scope of work in general accordance with our proposal P-81583, dated September 24, 2010.

1.1. Site Description

The project site is located at 700 through 730 K Street and 1111 7th Street, in Sacramento, California. A Site Location Map is presented as Figure 1. The surrounding area is commercial and the site is generally located east of 7th Street, south of K Street, and west of 8th Street. The site consists of several parcels located in the 700 Block of K Street, including: 700-704 K Street (006-0096-002 and 003), 708 K Street (006-0096-004), 712 K Street (006-0096-005), 716 K Street (006-0096-006), 718 K Street (006-0096-007), 724 K Street (006-0096-008), 726 K Street (006-0096-009), and 730 K Street (006-0096-010), as well as 1111 7th Street (006-0096-019) . The buildings front onto the K Street Mall and the rear of the buildings open into an alleyway that provides bus access to the adjacent Greyhound bus terminal.

The existing buildings were reportedly built in the late 1800s, and were initially occupied by a variety of tenants over the years. The buildings are generally two-story with concrete slab-on-grade floors, and are composed of reinforced concrete and brick/mortar with interior wood and metal frame construction. Building finishes include exterior brick/mortar walls, exterior stucco, painted gypsum wallboard walls/ceilings, plaster walls, vinyl floor

tiles/mastic, resilient floor sheeting, linoleum, carpeted floors, bare and painted cement floors and walls, lay-in acoustic ceiling tiles, and built-up roof assemblies/mastic.

All of the buildings were vacant at the time of the HBMS, except for 724 K Street, which operates as a mobile phone sales/service store (PCS Mobile). The approximate square footages of each building is as follows: 700 K Street – 8,200 square feet; 704 K Street – 15,000 square feet; 708 K Street – 18,000 square feet; 712 K Street – 15,000 square feet; 716 K Street – 4,500 square feet; 718 K Street – 18,000 square feet; 724 K Street – 18,000 square feet; 726 K Street – 9,000 square feet; 730 K Street – 5,000 square feet; and 1108/1110 8th Street encompasses approximately 8,000 square feet on the 1st floor (along 8th Street and the alley). Square footage associated with 1107 7th Street is included in the calculations for 700 K Street (the adjacent parcel). 1111 7th Street is a vacant lot immediately south of 1107 7th Street (fronting along the alley). 724 K Street is divided into two storefronts, with the other (vacant) store addressed as 722 K Street. The basement beneath both 724 K Street and 1108/1110 8th Street is accessed from an area adjacent to 724 K Street.

1.2. Involved Parties

Mr. William Larkin and Mr. Blair Bridges conducted the HBMS from late November through early December 2010. Mr. Larkin provided project oversight and quality review. City of Sacramento personnel were interviewed regarding the current and historical uses of the site buildings, as needed. Relevant information obtained during these interviews is presented in the appropriate sections of this report.

1.3. User Reliance

This report may be relied upon and is intended exclusively for use by the RACS. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the RACS is undertaken at said parties' sole risk.

2. PURPOSE

Sampling was conducted during this HBMS to evaluate if potential hazards associated with the building materials, paint, or other miscellaneous hazardous building materials (potential mercury-containing thermostats, polychlorinated biphenyls [PCB]-containing items, fluorescent light tubes, exit signs with low-level radioactive sources, and Freon™-containing refrigeration systems) exist within the site buildings.

3. HAZARDOUS BUILDING MATERIALS SURVEY

Samples of building materials were collected to evaluate if asbestos, lead-based paint, and/or other miscellaneous hazardous building materials are present at the site building.

3.1. Scope of Work

Ninyo & Moore personnel performed the services listed below.

- A review of previous hazardous materials sampling surveys (asbestos, paint chip sampling/analysis, etc., if available) and other pertinent information related to the possible presence of hazardous building materials at the site buildings.
- Coordination with City staff related to the implementation of this HBMS at the site buildings.
- Visual assessment of accessible areas within the site buildings to evaluate the possible presence of asbestos-containing materials (ACMs) and lead-based paint (LBP).
- Collection of 441 building material samples and submittal of these samples to an independent laboratory for analysis of asbestos content. The asbestos survey associated with this HBMS was implemented in accordance with the Sacramento Metropolitan Air Quality Management District's (SMAQMD) guidance letter for asbestos surveys.
- Collection of 64 paint chip and ceramic tile samples and submittal of these samples to an independent laboratory for analysis of lead content.
- Visual assessment and quantification of potential mercury-containing thermostats/switches, PCB-containing items, fluorescent light tubes, exit signs, air conditioning units, and Freon™-containing refrigeration systems.

- Preparation of this HBMS report, which presents our data and summarizes the assessed materials. The report includes a site description, laboratory testing information, findings, conclusions, recommendations, sample location maps, tables summarizing the building materials assessed, and the estimated quantities of identified materials.

3.2. Physical Limitations

This assessment also did not include subsurface assessment of hazardous materials. As such, there may be Transite or tar-covered pipes beneath the project area.

3.3. Survey Activities and Sample Collection

From late November through early December 2010, Ninyo & Moore conducted asbestos and LBP surveys at the site buildings. The surveys followed United States Environmental Protection Agency (USEPA) guidelines, within the limitations of the scope of this assessment. The asbestos survey was performed by a California Certified Asbestos Consultant and consisted of collecting suspect ACMs from the site buildings. The LBP survey was conducted by a California Certified Lead Paint Inspector/Assessor and consisted of collecting paint chip samples from the interior and exterior of the site buildings. In addition, Ninyo & Moore performed a visual assessment and quantified miscellaneous items that may potentially present a hazard during building renovation/demolition activities. The locations from which the bulk asbestos and paint chip samples were collected are shown on Figures 2 through 5. Professional certifications are presented in Appendix A.

Building materials that were sampled and analyzed for the presence of asbestos and lead and a summary of miscellaneous hazardous building materials are presented in Tables 1 through 3. Laboratory test results for asbestos and lead are presented in Appendices B and C, respectively.

3.4. Asbestos Survey

A preliminary visual assessment and bulk-sampling survey of suspect ACMs were performed. Representative samples of suspect ACMs were collected after identification of homogeneous sampling areas (areas in which the materials are uniform in color, texture,

construction or application date, and general appearance). Each homogeneous area was observed for material type, location, condition, and friability. Representative samples were collected from each area. Samples were collected using USEPA-recommended sampling procedures. Future abatement related to this project will fall under the requirements of the federal National Emission Standard for Hazardous Air Pollutants (NESHAP) regulation as well as the Sacramento Metropolitan Air Quality Management District (SMAQMD). Suspect materials not tested as part of this survey must be tested prior to future additional renovation or demolition activities. Estimated amounts of identified ACMs are provided for the RACS to obtain bids from certified abatement contractors.

A total of 441 bulk asbestos samples were collected and analyzed. Building materials that were sampled and analyzed for the presence of asbestos are presented in Table 1.

3.5. Lead-Based Paint (LBP) Survey

Paint chip sampling was conducted to assess the painted surfaces for both waste characterization and future contractor/worker safety. The survey was conducted in general accordance with accepted environmental science and engineering practices. A total of 64 paint chip and ceramic tile samples were analyzed. Painted surfaces that were sampled and analyzed for the presence of lead are presented in Table 2.

3.6. Miscellaneous Hazardous Building Material Survey

A visual assessment and quantification was performed of potential mercury-containing thermostats/switches, PCB-containing items (transformers, light ballasts, etc.), fluorescent light tubes, exit signs, air conditioning units, and Freon™-containing refrigeration systems. Miscellaneous hazardous building materials observed at the site buildings are presented in Table 3. In accordance with the scope of work, positive identification of these materials (via analytical testing) was not performed.

4. LABORATORY ANALYSIS AND RESULTS

The following sections describe the laboratory analyses performed, laboratory results, and survey results regarding miscellaneous potentially-hazardous materials and equipment surveyed.

4.1. Asbestos

Suspect ACM samples were transferred to EMSL Analytical, Inc., (EMSL) of San Leandro, California for analysis. EMSL is laboratory accredited in the National Voluntary Laboratory Accreditation Program (NVLAP) for bulk asbestos fiber analysis. The samples were analyzed for the presence and quantification of asbestos fibers, using polarized light microscopy with dispersion staining (PLM/ds), in general accordance with USEPA Method 600/M4-82-020. The lower limit of reliable detection for asbestos using the PLM method is approximately 1 percent by volume. Materials in which no asbestos was detected are defined in the laboratory report as "ND" in the "Asbestos Detected" column. The analytical results are summarized in Table 1. Samples with reported asbestos concentrations of one percent (1%) or less than 1% were re-analyzed to confirm their asbestos content using PLM 400 and 1,000 point count methods with gravimetric reduction (as needed). Copies of the laboratory analytical report and chain-of-custody record are presented in Appendix B.

ACMs identified by Ninyo & Moore survey are listed in Section 5.1 below.

4.2. Lead-Based Paint

Suspect LBP samples were transferred to EMSL for analysis of total lead content, in accordance with USEPA Test Method 7420. EMSL is an American Industrial Hygiene Association accredited Environmental Lead Laboratory (AIHA ELLA). Currently, the USEPA stipulates what concentrations of lead in nonvolatile components of surface coatings or materials determine whether a material is considered to be LBP. The USEPA stipulates that materials containing an amount equal to or in excess of one milligram per square centimeter (1.0 mg/cm^2), or more than half of one percent (0.5%) by weight (or 5,000 milligrams per kilogram [mg/kg]), constitute a LBP. Coatings with reported lead concentrations less than 1.0 mg/cm^2 or 5,000 mg/kg would be considered lead-containing paint (LCP).

The U.S. Department of Housing and Urban Development (HUD)/USEPA guidelines for designating a painted surface as lead-containing is consistent with the Department of Health Services (DHS). Paint that is chipping or peeling, or that may be removed from surfaces, and has a lead content equal to or greater than 1,000 mg/kg, would require handling as a California Title 22 hazardous waste. The analytical results associated with paint chip samples collected from the site buildings are summarized in Table 2. Copies of the laboratory analytical report and chain-of-custody record are presented in Appendix C.

Fifty nine paint chip samples were collected and analyzed for this study. Nineteen of the 59 paint chip samples contained lead at reported concentrations greater than 5,000 mg/kg (or 0.5% by weight). The lead concentrations associated with three of the 59 paint chip samples are reported by the analytical laboratory (EMSL) to be less than the associated reporting limit (<100 mg/kg or <0.01% by weight). The reported lead concentrations of the remaining 37 chip samples range from <0.011 % by weight (or <110 mg/kg) to 0.49% by weight (or 4,900 mg/kg). These paint samples are considered lead-containing paint (LCP). Occupational Health and Safety Administration (OSHA) regulations apply whenever materials with any detectable amounts of lead are disturbed. Additionally, six ceramic tile samples (LBP-26, LBP-27, LBP-37, LBP-38, LBP-39, and LBP-42) were collected and sent to the laboratory for analysis of their lead content. The ceramic tile samples were reported to contain from <0.01% by weight (or <100 mg/kg) to 0.013% by weight (or 130 mg/kg).

4.3. Miscellaneous Hazardous Building Materials

As indicated above, confirmation of miscellaneous hazardous building materials, via analytical testing, was not performed for this survey. Potentially hazardous miscellaneous building materials observed and quantified at the site buildings are presented in Table 3.

5. FINDINGS

An HBMS was performed at the site buildings to evaluate if potential hazards associated with the building materials, paint, or other miscellaneous hazardous building materials (potential mer-

cury-containing thermostats, potential PCB-containing items, fluorescent light tubes, exit signs with radioactive sources, and Freon™-containing refrigeration systems) may exist.

ACMs, LBP/LCP, and miscellaneous hazardous building materials are located at the site buildings, based on the analytical results of bulk samples collected, and observations made, during this HBMS.

5.1. Asbestos

Materials that were confirmed to be asbestos-containing through Ninyo & Moore's sampling activities are as follows:

700 K Street

- Approximately 400 square feet of brown vinyl floor sheeting (VFS) located in the northeastern portion of the mezzanine area, containing 60% chrysotile asbestos.
- Approximately 100 square feet of brown vinyl floor tile (VFT)/flooring and associated mastic located in the backroom/kitchen, containing 7% and 0.5 chrysotile asbestos, respectively.
- Approximately 100 square feet of green VFT/flooring located in the backroom/kitchen beneath the brown VFT/flooring, containing 5% chrysotile asbestos.
- Approximately 50 square feet of roof penetration mastic located on the roof, containing 4-6% chrysotile asbestos.
- Approximately 10 square feet of mastic located on the roof HVAC duct seam, containing 5% chrysotile asbestos.
- Approximately 500 square feet of stucco on the southern 2nd floor exterior walls. This stucco is assumed to be an ACM.

704 K Street

- Approximately 1 square foot of green speckled 9" x 9" VFT located in the northwest portion of the basement, containing 8% chrysotile asbestos.
- Approximately 5 square feet of black mastic on particle board flooring located in the northeast portion of the basement, containing 5% chrysotile asbestos.

- Approximately 100 linear feet of roof penetration mastic located on the roof, containing 2% chrysotile asbestos.
- Approximately 40 linear feet of black-gray sealant located on the exterior wall area between buildings 700 and 704, containing 7% chrysotile asbestos.
- Approximately 500 square feet of stucco on the southern and southwestern 2nd floor exterior walls. This stucco is assumed to be an ACM.

708 K Street

- Approximately 320 linear feet of thermal system insulation (TSI) located on approximate 6-inch diameter hot water piping runs in basement, containing 17% amosite asbestos and 3% chrysotile asbestos.
- Approximately 10 linear feet of TSI located on approximate 6-inch diameter hot water piping elbows in basement, containing 17% amosite asbestos and 2% chrysotile asbestos.
- Approximately 1,500 square feet of grayish-brown 9" x 9" VFT and associated mastic located on the 1st floor, containing 3% and 7% chrysotile asbestos, respectively.
- Approximately 200 square feet of grayish-green 9" x 9" VFT and associated mastic located on the 1st floor, containing 5% and 15% chrysotile asbestos, respectively.
- Joint compound located on approximately 700 square feet of wallboard, containing 0.5% chrysotile asbestos (asbestos-containing construction material/ACCM).
- Approximately 50 square feet gray-brown mastic located on an exterior roof wall, containing 4% chrysotile asbestos.
- Approximately 50 square feet of red, green, and white VFT located on a 2nd floor shower room floor, containing 0.25% chrysotile asbestos (as a whole assembly) (ACCM).
- Approximately 260 square feet of light brown streaked 12" x 12" VFT located on a 2nd floor southwest room floor, containing <0.25% chrysotile asbestos (ACCM).
- Approximately 5 square feet of white speckled 12" x 12" VFT located on a 2nd floor southeast room floor, containing <0.25% chrysotile asbestos (ACCM).
- Approximately 7 square feet of white cobbled 12" x 12" VFT located on a 2nd floor southeast room floor, containing 0.4% chrysotile asbestos (ACCM).

- Approximately 15 square feet of white mottled 12" x 12" VFT located on a 2nd floor southeast room floor, containing 3% chrysotile asbestos.
- Approximately 30 square feet of white 12" x 12" VFT located on a 2nd floor southeast room floor, containing 0.3% chrysotile asbestos (ACCM).
- Approximately 20 square feet of gray cobbled 12" x 12" VFT located on a 2nd floor southeast room floor, containing 2% chrysotile asbestos.
- Approximately 10 square feet of white 12" x 12" VFT with a floral pattern located on a 2nd floor southeast room floor, containing 0.4% chrysotile asbestos (ACCM).
- Approximately 10 square feet of red speckled 12" x 12" VFT located on a 2nd floor southeast room floor, containing 4% chrysotile asbestos.
- Approximately 12 square feet of green 9" x 9" VFT located on a 2nd floor northeast room floor, containing 0.3% chrysotile asbestos (ACCM).
- Approximately 150 square feet of brown 12" x 12" VFT with white streaks located on a 2nd floor northwest room floor, containing 4% chrysotile asbestos.
- Approximately 12 square feet of green 9" x 9" VFT located on a 3rd floor west-central room floor, containing <0.25% chrysotile asbestos (ACCM).
- Approximately 40 square feet backing paper located under a counter-top in a3rd floor kitchen, containing 25% chrysotile asbestos.
- Approximately 6 square feet of yellow floral VFS located on a 3rd floor southeast room floor, containing 30% chrysotile asbestos.
- Approximately 30 square feet of green speckled 9" x 9" VFT located in a 3rd floor hallway floor, containing <0.25% chrysotile asbestos (ACCM).
- Approximately 50 square feet of beige 12" x 12" VFT with white streaks located on a 3rd floor southwest room floor, containing 4% chrysotile asbestos.
- Approximately 2,000 square feet of brown streaked 9" x 9" VFT and cream 12" x 12" VFT (one assembly) located in the 7th Street entryway, containing <1% and 2% chrysotile asbestos, respectively.
- Approximately 150 square feet of stucco located on exterior walls near the 7th Street entryway, containing 2% chrysotile asbestos.
- Approximately 500 square feet of stucco on the southern and southwestern 2nd and 3rd floor exterior walls. This stucco is assumed to be an ACM.

712 K Street

- Approximately 6 square feet of roof penetration mastic located on the 1st and 2nd floor roofs, containing 5% chrysotile asbestos.
- Approximately 6,000 square feet of roof assembly located on the roof, containing 6% chrysotile asbestos.

716 K Street

- Approximately 10 square feet of roof penetration mastic located on the roof, containing 2-5% chrysotile asbestos.

718 K Street

- Approximately 15 square feet of roof penetration mastic located on the roof, containing 3% chrysotile asbestos.
- Approximately 50 square feet of gray mastic located on the northwest parapet wall of the roof, containing 3% chrysotile asbestos.

724 K Street

- Approximately 20 square feet of gray mastic located on the southeast parapet wall of the roof, containing 6% chrysotile asbestos.
- Approximately 150 square feet of black mastic located on the south parapet wall of the roof, containing 6% chrysotile asbestos.
- Approximately 10 square feet of roof penetration mastic located on the roof, containing 6% chrysotile asbestos.
- Approximately 4 square feet of black/gray mastic patch on brick located south exterior wall, containing 8% chrysotile asbestos.
- Joint compound on approximately 5,500 square feet of wallboard throughout the building, containing <0.25% chrysotile asbestos (ACCM).
- Approximately 750 square feet of stucco located on exterior walls (along the K Street Mall side), containing 0.2% chrysotile asbestos (ACCM).

726 K Street

- Approximately 2,000 square feet of black mastic associated with black speckled 12" x 12" VFT containing 5% chrysotile asbestos, located below red speckled 12" x 12" VFT

with brown mastic on floor in showroom area, containing 2% chrysotile asbestos (one assembly).

- Approximately 12 square feet of black mottled 9" x 9" VFT located in southwest portion of the showroom area, containing 8% chrysotile asbestos.
- Approximately 6 square feet of roof penetration mastic located on the roof, containing 2% chrysotile asbestos.
- Approximately 3,000 square feet of roof assembly located on the roof, containing 2% chrysotile asbestos.
- Approximately 20 square feet of gray mastic located on the northeast parapet wall of the roof, containing 2% chrysotile asbestos.
- Approximately 75 linear feet of putty/sealant located above the front window display area on the northeast exterior, containing 10% chrysotile asbestos.
- Approximately 75 linear feet of sealant located beneath the metal flange above the front window display area on the northeast exterior, containing 12% chrysotile asbestos.

730 K Street

- Approximately 600 square feet of 12" x 12" white speckled VFT located in a southwest store room, containing <0.25% chrysotile asbestos (ACCM).
- Approximately 500 square feet of stucco located on exterior walls, containing <0.25% chrysotile asbestos (ACCM).
- Approximately 60 square feet of roofing material/felt located on the HVAC ducting on the north exterior, containing 15% chrysotile asbestos.
- Approximately 10 square feet of gray mastic located on the HVAC ducting on the north exterior, containing 12% chrysotile asbestos.
- Approximately 10 square feet of silver paint/mastic located on the HVAC ducting on the north exterior, containing 3% chrysotile asbestos.
- Approximately 10 square feet of black mastic located on the HVAC ducting on the north exterior, containing 13% chrysotile asbestos.

1108-1110 8th Street

- Approximately 300 square feet of 12" x 12" beige speckled VFT located in the 1st floor hallway, containing 5% chrysotile asbestos.

- Approximately 25 square feet of black mastic on drywall located in an office in the southwest portion of the 1st floor, containing 2% chrysotile asbestos.
- Approximately 10 square feet of roof penetration mastic located on the roof, containing 3% chrysotile asbestos.
- Joint compound on approximately 8,000 square feet of wallboard throughout the building, containing <0.25% chrysotile asbestos (ACCM).

All building materials with reported asbestos concentrations greater than 0.1% asbestos should be removed from the site buildings prior to any proposed demolition/renovation activities.

5.2. Lead-Based Paint

Fifty eight paint chip samples were collected and analyzed for this study. Nineteen of the 58 paint chip samples contained lead at reported concentrations greater than 5,000 mg/kg (or 0.5% by weight). The lead concentrations associated with seven of the 58 paint chip samples are reported by the analytical laboratory (EMSL) to be less than the associated reporting limit (<100 mg/kg or <0.01% by weight). The reported lead concentrations of the remaining 32 chip samples range from <0.011 % by weight (or <110 mg/kg) to 0.49% by weight (or 4,900 mg/kg). These paint samples are considered lead-containing paint (LCP). Occupational Health and Safety Administration (OSHA) regulations apply whenever materials with any detectable amounts of lead are disturbed. Additionally, six ceramic tile samples (LBP-26, LBP-27, LBP-37, LBP-38, LBP-39, and LBP-42) were collected and sent to the laboratory for analysis of their lead content. The ceramic tile samples were reported to contain from <0.01% by weight (or <100 mg/kg) to 0.013% by weight (or 130 mg/kg).

5.3. Miscellaneous Hazardous Building Material Survey

Miscellaneous hazardous building materials observed at the site buildings included potential PCB-containing light ballasts and transformers; potential mercury-containing thermostats, air-conditioning units; fluorescent light tubes; exit signs (potential low-level radioactive

sources), and refrigeration systems. No attempt was made to disassemble or sample any of the observed miscellaneous hazardous building materials.

6. CONCLUSIONS

ACMs, LBP/LCP, and miscellaneous hazardous building materials are present at the site buildings. This does not mean that the health of maintenance or City personnel is endangered. The materials are in good, undisturbed condition; therefore, exposure to building occupants is expected to be negligible. If these materials deteriorate over time, are damaged, or are disturbed, such as during renovation or demolition operations, then asbestos fibers or lead dust may be released, creating a potential health hazard for building occupants, maintenance personnel, and contractors.

The miscellaneous hazardous building materials observed at the site buildings were observed in good condition. No exposure issues related to maintenance or City personnel are expected under the current conditions of the identified hazardous building materials.

7. RECOMMENDATIONS

Since ACMs, LBP/LCP, and miscellaneous hazardous building materials have been reported at the site buildings, the following recommendations and precautions are provided:

- The reported ACMs/ACCMs at the site buildings should be incorporated into a building-specific Operations and Maintenance (O&M) Plan should any of the buildings become occupied or be used prior to any planned renovation of demolition. This O&M Plan should emphasize that these ACMs/ACCMs should not be disturbed. Any identified ACM in damaged condition should be promptly repaired or abated. Prior to renovation or demolition work that would disturb the identified ACMs/ACCMs, a licensed asbestos abatement removal contractor should remove the ACMs/ACCMs in compliance with the most recent applicable federal, state, and local laws, regulations, standards, and/or codes governing abatement, transport, and disposal of ACMs/ACCMs. The removal work scope and requirements should be included in a work plan/specification developed by a California Certified Asbestos Consultant (CAC). It is also recommended that all abatement activities should be conducted under the supervision of a CAC. It is the abatement contractor's responsibility to confirm ACM quantities present.

- The reported LBP/LCP at the site buildings should be incorporated into a building-specific Operations and Maintenance (O&M) Plan should any of the buildings become occupied or be

used prior to any planned renovation of demolition. This O&M Plan should emphasize that the LBP/LCP should not be disturbed. Any identified LBP/LCP in damaged condition should be promptly repaired or abated. Prior to renovation or demolition work that would disturb the identified LBP/LCP, a licensed LBP/LCP abatement/stabilization removal contractor should remove the LBP/LCP in compliance with the most recent applicable federal, state, and local laws, regulations, standards, and/or codes governing abatement, transport, and disposal of LBP/LCP. The removal work scope and requirements should be included in a work plan/specification developed by a DPH Lead-related Construction Services Project Designer, Inspector/Assessor or Project Monitor. It is also recommended that all abatement/stabilization activities should be conducted under the supervision of a DPH LBP Project Monitor. It is the abatement contractor's responsibility to confirm ACM quantities present.

- Prior to demolition or renovation activities, potential mercury-containing thermostats/switches, PCB-containing items (light ballasts, transformers, etc.), fluorescent light tubes, exit signs, air conditioning units, and Freon™-containing refrigeration systems should be removed and properly recycled or disposed of by a licensed contractor according to all applicable federal, state, and local laws/regulations. All light fixtures should be visually inspected, prior to disposal, to determine if they contain PCBs (checked for "No PCBs" or "PCB free" stickers). While Ninyo & Moore provided an estimate of the quantity of miscellaneous hazardous building materials present at t6he site buildings, it is the abatement contractor's responsibility to confirm the quantities of items present.

- There is a possibility that additional suspect ACMs, LBP, LCP, or other miscellaneous hazardous building materials may be discovered during building renovations or demolition. Therefore, Ninyo & Moore recommends that, should additional suspect materials not sampled or assessed in this report be uncovered during demolition/renovation activities, (a) samples of suspect materials should be collected for laboratory analysis and activities that may impact the materials should cease until laboratory analytical results are reviewed or (b) the materials should be assumed to be hazardous and handled as such.

8. LIMITATIONS

Ninyo & Moore's findings, conclusions, and recommendations regarding environmental conditions, as presented in this report, are based on limited sampling and chemical analysis, with the exception of the inventory for miscellaneous hazardous building materials. Further assessment of potential adverse environmental impacts may be accomplished by a more comprehensive assessment. The samples collected and used for testing, and the observations made, are believed to be representative of the area(s) evaluated. However, if additional suspect ACMs, miscellaneous hazardous building materials, or LBP/LCP are encountered during renovation or demolition activities, these materials should be sampled by qualified personnel, and analyzed for content prior

to further disturbance. In addition, please note that quantities of ACMs, miscellaneous hazardous building materials, and LBP/LCP are approximate. It is the contractor's responsibility to confirm ACM, miscellaneous hazardous building materials and LBP/LCP quantities present.

The environmental services described in this report have been conducted in general accordance with current regulatory guidelines and the standard of care exercised by environmental consultants performing similar work in the project area. No warranty, expressed or implied, is made regarding the professional opinions presented in this report. Variations in site conditions may exist and conditions not observed or described in this report may be encountered during subsequent activities. Please also note that this study did not include an evaluation of subsurface environmental, geotechnical conditions, or potential geologic hazards.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires any additional information, or has questions regarding content, interpretations presented, or completeness of this document.

The environmental findings, conclusions, and recommendations contained in this report are based on the results of laboratory tests and analyses intended to detect the presence and concentration of specific chemical or physical constituents in samples collected from the site. The testing and analyses have been conducted by an independent laboratory that is certified by the State of California to conduct such tests. Ninyo & Moore has no involvement in, or control over, such testing and analysis. Ninyo & Moore, therefore, disclaims responsibility for any inaccuracy in such laboratory results.

Our findings, conclusions, and recommendations are based on an analysis of the observed site conditions. It should be understood that the conditions of a site can change with time as a result of natural processes or the activities of man at the site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants

PHASE II ENVIRONMENTAL SITE ASSESSMENT
700 BLOCK OF K STREET PROPERTIES
SACRAMENTO, CALIFORNIA

PREPARED FOR:
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Project No. 401683003

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1. INTRODUCTION

On behalf of the Redevelopment Agency of the City of Sacramento (RACS), Ninyo & Moore has performed a Phase II Environmental Site Assessment (ESA) for the RACS/700 Block K Street properties located at 700 through 730 K Street and 1111 7th Street, in Sacramento, California. The Phase II ESA was performed in general accordance with the proposed methodology presented in Ninyo & Moore's proposal P-81583, dated September 24, 2010.

1.1. Site Description and Background

The project site is located at 700 through 730 K Street and 1111 7th Street, in Sacramento, California. A Site Location Map is presented as **Figure 1**. The surrounding area is commercial, and the site is generally located east of 7th Street, south of K Street, and west of 8th Street. A Site Vicinity map is presented on **Figure 2**. The site consists of several parcels located in the 700 Block of K Street, including: 700-704 K Street (006-0096-002 and 003), 708 K Street (006-0096-004), 712 K Street (006-0096-005), 716 K Street (006-0096-006), 718 K Street (006-0096-007), 724 K Street (006-0096-008), 726 K Street (006-0096-009), and 730 K Street (006-0096-010), as well as 1111 7th Street (006-0096-019). The site buildings were unoccupied at the time of the investigation. The buildings are generally two-story with concrete slab-on grade floors. The buildings front onto the K Street Mall and the rear of the buildings open into an alleyway that provides bus access to the adjacent Greyhound bus terminal. The existing buildings were reportedly built in the late 1800s, and were initially occupied by a variety of tenants over the years.

1.2. Previous Environmental Investigations

1.2.1. EEI Phase I Environmental Site Assessments

Two Phase I ESAs were prepared for the site by EEI, including a Phase I ESA on February 16 2006 (EEI, 2006a) and a Phase I ESA on March 16, 2006 (EEI, 2006b), on behalf of the City of Sacramento and other various stakeholders. Each Phase I addressed different parcels that are included in the overall block of properties that are the subject

One plume is associated with the Railyards, the southern boundary (of the Railyard property) of which is located approximately 1/3 mile north-northwest of the site. The boundary of the plume, as shown at the time of the investigation, appears to extend to northwest corner of 7th and K Streets, which a portion of the 700 Block site overlies. The plume contains various VOCs and is present in the lower sand zone.

Based on figures contained in ERM's report, the other plume appears to have been initiated from a source located south of the 700 Block site around 7th Street, and P and Q Streets; however the ERM report does not identify a specific source. The boundary of the plume, as shown at the time of the investigation, appears to extend beneath the entire 700 Block site and beyond to between J and I Streets. The plume contains primarily 1,4-Dioxane and is present in the lower sand zone.

1.3. Purpose

The purpose of this Phase II ESA was to assess the PECs identified in the Phase I ESAs completed by EEI in February and March 2006. In October of 2010, the RACS contracted with Ninyo & Moore to perform tasks associated with a Phase II ESA to address the PECs described above, including conducting a Hazardous Building Materials Survey (HBMS). Results of the HBMS are presented under separate cover to this Phase II report.

1.4. Site Topography

The site is relatively flat and gently slopes from the north to the south, and according to the Phase I ESAs and topographic maps, the surface elevation is approximately 25 feet above mean sea level.

1.5. Site Geology and Hydrogeology

Based on information provided in the Phase I ESAs and geologic maps of the Sacramento area, the site is underlain by Quaternary Deposits, The site is located within the Great Valley geomorphic province of California, a large, elongated, northwest-trending structural trough,

2.1.2. Permits

Ninyo & Moore contacted the Environmental Compliance Division of the County of Sacramento Environmental Management Department (SCEMD) with regards to an application to advance soil borings at the subject site. Unless soil borings are advanced to within 10 feet of groundwater, a permit for soil boring advancement is not required in Sacramento County. As the proposed total depth of the soil borings was 5 feet bgs, a drilling permit was not required.

2.1.3. Underground Services Alert

Ninyo & Moore contacted Underground Services Alert (USA) to mark the locations of subsurface utilities entering the property prior to the initiation of drilling activities.

2.1.4. Private Utility Location Survey

A private utility locator was not utilized during this investigation, as the boreholes for this investigation were advanced using hand auger equipment.

2.2. Field Activities

Field activities included the advancement of soil borings for the collection of soil samples, and the installation and sampling of soil vapor probes. Sampling activities were performed at the site in the area of the stored chemicals at 712-714 K Street, as well as within the basements of various site buildings located along the 700 Block of K Street in a manner that provided for representative distribution of sample locations throughout the property. A description of field activities performed is provided below.

2.2.1. Soil Boring Advancement

Ninyo & Moore advanced a total of six soil borings at selected locations within the 700 Block properties (700-A/SV-1, 708-A/SV-2, 712-A/SV-3, 712-B/SV-4, 724-A/SV-5 and 724-B/SV-6). Coring of surface concrete was required at four of the boring locations (700-A/SV-1, 708-A/SV-2, 724-A/SV-5 and 724-B/SV-6). The two remaining borings had dirt surfaces. One of the borings, 712-A/SV-3, was initially advanced to a depth of

boreholes were sealed with hydrated bentonite up to the ground surface. A Soil Vapor Sampling Probe Construction Schematic is presented in **Appendix B**.

Initially, it was proposed to install three vapor probes at the street level and three probes in basement areas below street level, and to install the probes at two depths, 3 and 5 feet bgs. At the time of our proposal we did not have access to the site interiors; therefore, we were uncertain whether enough basement area would be accessible to install all six probes in a manner that would be representative of the overall 700 Block properties. Upon gaining site access subsequent to project award, we determined that all six probes could be placed in basement areas, which provide a more conservative approach to assessing potential soil vapor risks, as these areas and areas directly above them represent interior spaces where people are expected to be present for extended periods of time. In addition, probes were installed to only the 5-foot depth, since all six probes were placed at the lowest elevation of the initially proposed two-elevation levels.

2.2.3.2. Sampling Manifold

A minimum of 30 minutes elapsed between soil vapor probe installation and purging/sample collection. The down hole tubing was connected to a stainless steel manifold consisting of stainless steel tubing, a moisture filter, a flow controller, pressure gauges, valves, and Swagelock® fittings. Soil vapor samples were collected using one-liter Summa® vacuum canisters. Pre-sample purging was performed using a six-liter Summa® vacuum canister. The manifolds, filters, gauges, flow controllers and Summa® canisters were supplied by McCampbell Analytical, Inc., a state-certified laboratory located in Pittsburg, California. A new manifold was used for each soil vapor sample. The flow controller was pre-set by the laboratory to allow a maximum of 200 milliliters per minute (mL/min) of air flow.

2.2.3.6. Purging

Prior to sample collection, purging of the vapor probe air was performed in order to collect samples representative of the subsurface soil vapor. The appropriate combined volume of tubing and sand pack sampling interval was purged using the six-liter Summa® canister prior to sampling. The purge volume was monitored by volume, not time. The purge beginning time, initial purge canister vacuum, ending time, and final vacuum were recorded on the soil vapor sampling field forms.

2.2.3.7. Sample Collection

Subsequent to purging, the purge canister valve was closed and the sample canister valve opened to begin sample collection. The sampling was monitored by volume, not time. The sampling beginning time, initial sample canister vacuum, ending time, and final vacuum were recorded on the soil vapor sampling field forms. Sample canister valves were closed when the remaining vacuum was below five inHg. Sample canisters were not allowed to reach zero inHg, which would indicate that no vacuum remains in the canister.

2.2.3.8. Sample Analysis

Soil vapor samples were delivered under chain-of-custody to McCampbell Analytical, Inc. for analysis of VOCs by EPA Method TO-15.

2.3. Decontamination Procedures

Equipment that came into contact with potentially contaminated soil or water was decontaminated consistently to assure the quality of samples collected. Disposable equipment intended for one-time use, such as telflon tubing, was not decontaminated. Decontamination occurred prior to and after each use of a piece of equipment. Drilling and sampling devices used were decontaminated using a three bucket wash consisting of a rinse and scrub in tap water, rinse and scrub in an appropriate non-phosphate based detergent solution, and final

Table 1 – Summary of Soil Vapor Analytical Results

Sample Number	Analyte	Concentration (ug/m^3)	Screening Levels (ug/m^3) ESLs
SV-1	1,1,1-Trichloroethane	18	4.6×10^5
SV-2	Toluene	16	63,000
	Benzene	11	84
	Carbon Disulfide	28	-- / --
	Chloroform	27	-- / 460
	Trichlorofluoromethane	12	-- / --
SV-3	Carbon Disulfide	10	-- / --
SV-4	-	ND – ALL	
SV-5	Tetrachloroethene	15	410
	Trichlorofluoromethane	36	-- / --
SV-6	Tetrachloroethene	21	410

Soil vapor analytical results revealed detectable concentrations of several VOCs, however none of the concentrations exceeded the shallow soil vapor ESLs for evaluation of potential vapor intrusion concerns for residential land use. Several of the VOCs detected do not have an ESL for comparison. To further support the findings of the soil vapor assessment, a Health Risk/Hazard Characterization was conducted, which is discussed in the following section.

3.2.1. Health Risk/Hazard Characterization

This section presents the results and conclusions of the risk assessment under the assumption of residential exposure. For carcinogens, risk is defined as "the theoretical probability of developing cancer from that chemical upon exposure to that medium" (Cal-EPA, 1994b). The Hazard Index (HI), calculated for both carcinogens and non-carcinogens, is a measure of the potential for the exposures to produce adverse non-carcinogenic health effects, and is expressed as a ratio of the estimated dose to a dose that is believed to produce no adverse health effects.

risk assessment guidance, the chemical-specific HQs are added together, to provide the HI. A total, multi-chemical, multi-pathway HI of less than or equal to 1 indicates that potential non-cancer health effects are not probable.

Table 3 presents the estimated non-cancer HI for future on-site occupants, both children and adults. As indicated, based on the EPCs of COPCs, the total HI for the on-site occupants is approximately 9.3 E -04, which is below the acceptable regulatory threshold of 1.

3.3. Uncertainty Analysis

Risk assessments include several uncertainties that need discussion. Many of the assumptions used in this risk assessment, regarding the representativeness of the sampling data, human exposures, and chemical toxicity, are conservative. The use of conservative exposure and toxicity assumptions can introduce considerable uncertainty into the risk assessment. By using conservative exposure or toxicity estimates, the assessment can develop a significant conservative bias that may result in the calculation of significantly higher cancer risk or non-cancer hazard index than is actually posed by the chemicals present in site soils.

Some of the assumptions made in the risk assessment which contribute to the overall uncertainty in the evaluation are briefly outlined below:

- Risks presented in this screening-level evaluation are based on the assumption that the occupant would be exposed to EPC for a lifetime exposure period. However, consistent with standard risk assessment guidance, exposures and risks should be based on an estimate of the average concentration to which an individual could be exposed over the given exposure period. The average concentration is used because: 1) carcinogenic and chronic noncarcinogenic toxicity criteria are based on lifetime average exposures; and 2) the average concentration is representative of the concentration that would be contacted over a lifetime (EPA, 1992). As the EPCs significantly overestimate an individual's average exposure, the actual risks posed by the chemicals present at the site would be expected to be lower than those presented here.

- Risks presented in this screening-level evaluation are based on residential land-use assumptions, under the assumption that a child is born on the site, resides at the site for a lifetime period, and is exposed to chemicals in soil on a daily basis.

activities. Please also note that this study did not include an evaluation of geotechnical conditions or potential geologic hazards.

Ninyo & Moore's opinions and recommendations regarding environmental conditions, as presented in this report, are based on limited subsurface assessment and chemical analysis. Further assessment of potential adverse environmental impacts from past on-site and/or nearby use of hazardous materials may be accomplished by a more comprehensive assessment. The samples collected and used for testing, and the observations made, are believed to be representative of the area(s) evaluated; however, conditions can vary significantly between sampling locations. Variations in soil and/or groundwater conditions will exist beyond the points explored in this evaluation.

The environmental interpretations and opinions contained in this report are based on the results of laboratory tests and analyses intended to detect the presence and concentration of specific chemical or physical constituents in samples collected from the subject site. The testing and analyses have been conducted by an independent laboratory which is certified by the State of California to conduct such tests. Ninyo & Moore has no involvement in, or control over, such testing and analysis. Ninyo & Moore, therefore, disclaims responsibility for any inaccuracy in such laboratory results.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires any additional information, or has questions regarding content, interpretations presented, or completeness of this document.

7. REFERENCES

EEI, Phase I Site Assessment, K Street Corridor 700, 704, 730, 731, 800, 802, & 816 K Street, 809 & 815 L Street, Sacramento, California, February 16, 2006.

EEI, Phase I Environmental Site Assessment, K Street Corridor 708, 712, 716, 718, 724, 726, 727, 806, 810 & 812 K Street, 1111 7th Street & 1109 8th Street, Sacramento, California, March 16, 2006.

Environmental Resources Management, Summary of Investigation Results for Ground Water and Soil Gas Characterization Near Monitoring Well W-06, South Plume Study Area, The Railyards, Sacramento, California, January 28, 2009.

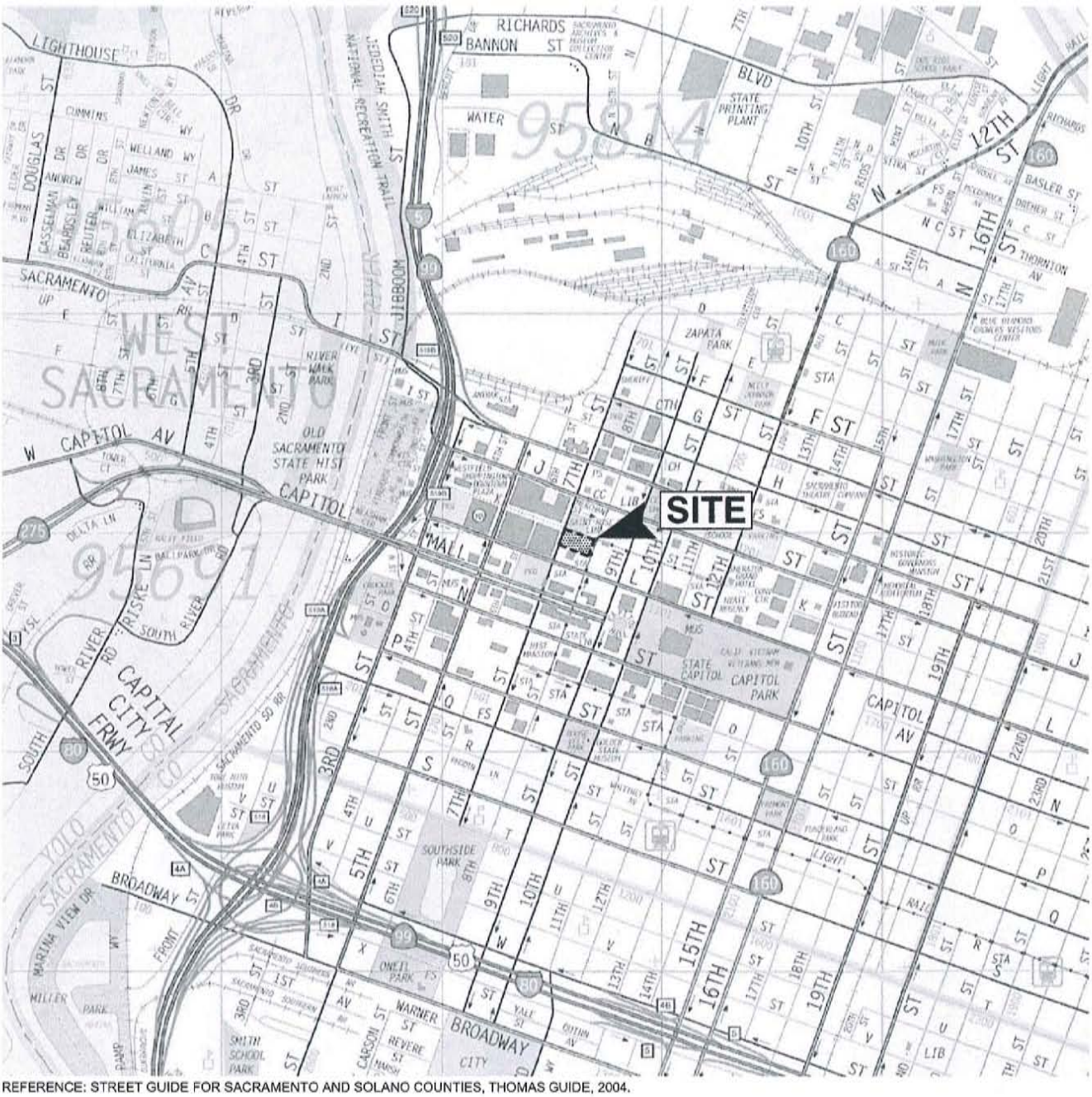
Ninyo & Moore, Proposal, Limited Phase II Environmental Site Assessment, 700 Block of K Street Properties, Sacramento, California, September 24, 2010.

Norris, R.M. and R.W. Webb, Geology of California, Second Edition, New York, NY, 1990.

SF Bay RWQCB, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, November 2007.

Table 2-Soil Vapor Analytical Data (ug/m^3)							
	Sample Number						
Parameter	SV-1	SV-2	SV-3	SV-4	SV-5	SV-6	ESLs
VOCs							
Hexachlorobutadiene	<22	<22	<22	<22	<22	<22	NA
2-Hexanone	<210	<210	<210	<210	<210	<210	NA
Nethyl-t-butyl ether (MTBE)	<7.3	<7.3	<7.3	<7.3	<7.3	<7.3	NA
Napthalene	<11	<11	<11	<11	<11	<11	NA
Styrene	<8.6	<8.6	<8.6	<8.6	<8.6	<8.6	NA
1,1,2,2-Tetrachloroethane	<14	<14	<14	<14	<14	<14	NA
Tetrahydrofuran	<6	<6	<6	<6	<6	<6	NA
1,2,4-Trichlorobenzene	<15	<15	<15	<15	<15	<15	NA
1,1,2-Trichloroethane	<11	<11	<11	<11	<11	<11	NA
Tirchlorofluoromethane	<11	**12**	<11	<11	**36**	<11	NE
1,3,5-Trimethylbenzene	<10	<10	<10	<10	<10	<10	NA
Vinyl Chloride	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	NA

Notes:
<=below laboratory reporting limit; analyte was not detected at or above the value presented
ug/m^3 = micrograms per cubic meter
ESLs = RWQCB Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrusion Concerns, Residential Exposure (Table E-2)
NA = ESL not applicable as the analyte was not detected
NE = ESL not established
VOCs=Volatile Organic Compounds-Analyzed Using EPA Method TO 15



REFERENCE: STREET GUIDE FOR SACRAMENTO AND SOLANO COUNTIES, THOMAS GUIDE, 2004.

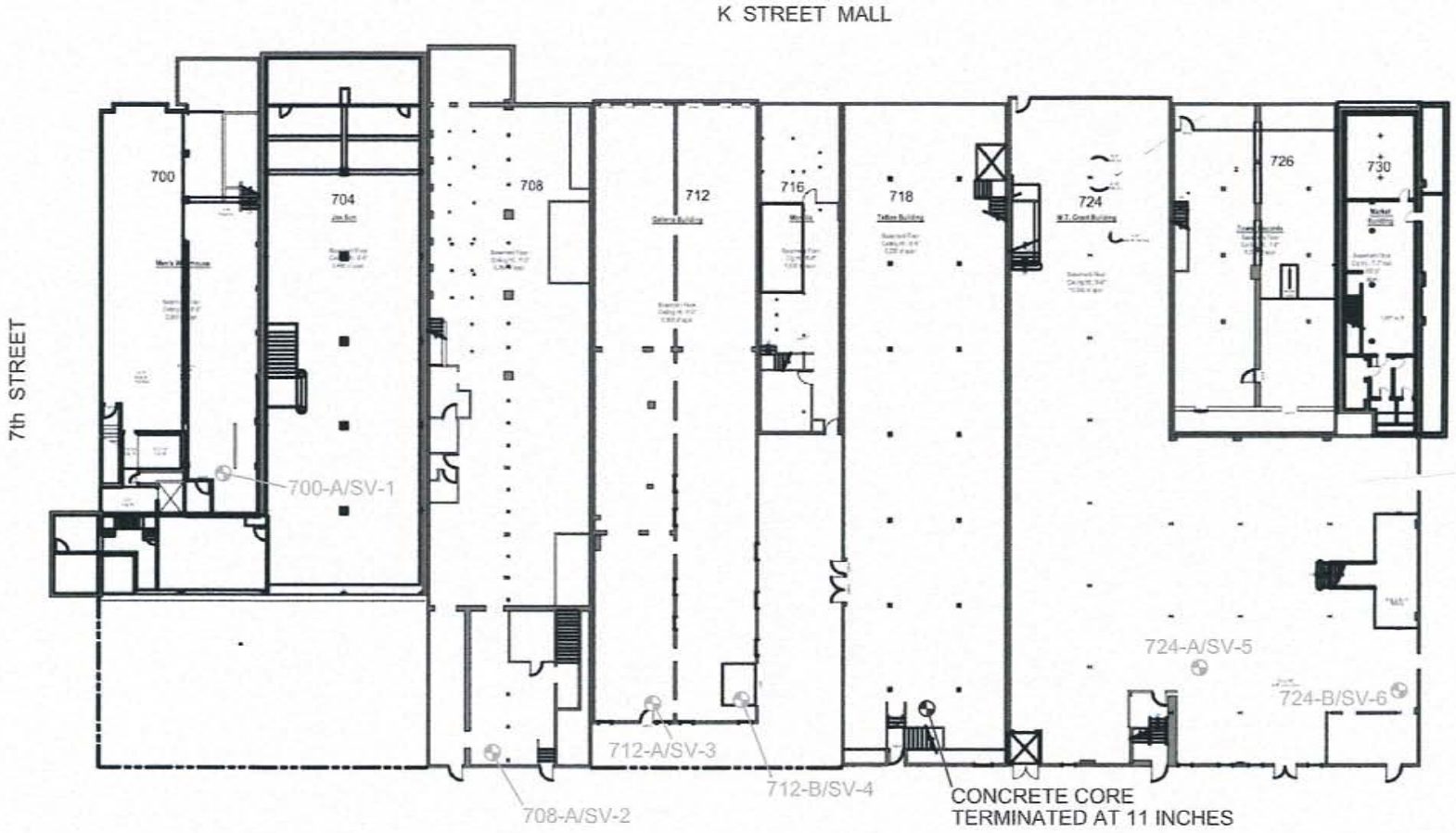
N

SCALE IN FEET

0 2000 4000

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	SITE LOCATION	FIGURE
PROJECT NO. 401683003 / DATE 12/10	700 BLOCK K STREET SACRAMENTO, CALIFORNIA	1



LEGEND	
724-B/SV-6	HAND AUGER BORING/ SOIL VAPOR SAMPLE

N

SCALE IN FEET

0 40 80

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

REFERENCE: KUCHMAN ARCHITECTS, SEPTEMBER 9, 2010, 700 K STREET.

Ninyo & Moore		SAMPLE LOCATIONS	FIGURE
PROJECT NO.	DATE	700 BLOCK K STREET SACRAMENTO, CALIFORNIA	3
401683003	12/10		

DATE DRILLED 12/7/10 BORING NO. 700-A/SV-1

GROUND ELEVATION _____ SHEET 1 OF 1

METHOD OF DRILLING HAND AUGER

DRIVE WEIGHT _____ DROP _____

SAMPLED BY RLW LOGGED BY RLW REVIEWED BY _____

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								ML	CONCRETE: Approximately 3 inches thick. Yellowish brown, moist, SILT with brick and rock fragments.
5									Total depth = 5 feet bgs. Groundwater was not encountered.
10									
15									
20									

Ninyo & Moore

BORING LOG

700 BLOCK K STREET
SACRAMENTO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401683003	12/10	A-1

DATE DRILLED 12/7/10 BORING NO. 712-A/SV-3

GROUND ELEVATION _____ SHEET 1 OF 1

METHOD OF DRILLING HAND AUGER

DRIVE WEIGHT _____ DROP _____

SAMPLED BY RLW LOGGED BY RLW REVIEWED BY _____

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0								SM	Dark brown, moist, fine silty SAND with some brick fragments.
		■							No brick, no odor and discoloration.
5									Total depth = 5 feet bgs.
									Groundwater was not encountered.
10									
15									
20									

Ninyo & Moore

BORING LOG

700 BLOCK K STREET
SACRAMENTO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401683003	12/10	A-3

DATE DRILLED 12/7/10 BORING NO. 724-A/SV-5

GROUND ELEVATION _____ SHEET 1 OF 1

METHOD OF DRILLING HAND AUGER

DRIVE WEIGHT _____ DROP _____

SAMPLED BY RLW LOGGED BY RLW REVIEWED BY _____

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	PID READING (PPM)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0									CONCRETE: Approximately 3 inches thick.
								SM	Dark brown, moist, fine silty SAND with some brick and cement fragments.
5									Dark brown, moist, silty SAND with cement fragments. Total depth = 5 feet bgs. Groundwater was not encountered.
10									
15									
20									

Ninyo & Moore

BORING LOG

700 BLOCK K STREET
SACRAMENTO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
401683003	12/10	A-5

APPENDIX B

SOIL VAPOR PROBE CONSTRUCTION SCHEMATIC

APPENDIX C

PURGE VOLUME CALCULATIONS

APPENDIX D

LABORATORY ANALYTICAL REPORTS

NMWS

10125569

McCAMPBELL ANALYTICAL INC.

1534 Willow Pass Road
Pittsburg, CA 94565-1701
www.main@mccampbell.com
Telephone: (925) 252-9262 Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ 5 DAY

EDF Required? Coelt (Normal) (No) Write On (DW) No

Report To: RANDY WHEELER	Bill To: RANDY WHEELER
Company: NINYO & MOORE	
1355 HOLYARD DR SUITE 120	
WEST SACRAMENTO, CA 95691	E-Mail: rlwheeler@ninyoandmoore.com
Tele: (916) 371-3284	Fax: ( )
Project #: 401693003	Project Name: 700 Block K St.
Project Location: 700 BLOCK K STREET	
Sampler Signature:	

Lab Use Only

Pressurized By	Date	Pressurization Gas	
		N2	He

Notes:

Field Sample ID (Location)	Collection Date	Collection Time	Canister SN#	Sampler Kit SN#	Analysis Requested	Indoor Air	Soil Gas	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
SV-1	12/15	11:04	5805-736		TO-15		✓	-27	-4		
SV-2	"	11:43	6413-800		"		"	-27	-4		
SV-3	"	12:10	6312-792		"		"	-27	-4		
SV-4	"	12:59	6422-853		"		"	-27	-4		
SV-5	"	1:04	6310-790		"		"	-27	-4		
SV-6	"	1:14	6421-852		"		✓	-27	-4		

Relinquished By:	Date:	Time:	Received By:
	12/15/15	2:30	
Relinquished By:	Date:	Time:	Received By:
	12/15/15	4:30	
Relinquished By:	Date:	Time:	Received By:
	12/16/15	7:20	

Temp (°C): _____ Work Order #: _____

Condition: _____

Custody Seals Intact?: Yes ____ No ____ None ____

Shipped Via: Courier

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Sample Receipt Checklist

Client Name: **Ninyo & Moore**
Date and Time Received: **12/15/2010 7:40:00 PM**
Project Name: **#401683003; 700 Block K St.**
Checklist completed and reviewed by: Maria Venegas
WorkOrder N°: **1012569** Matrix Soil Vapor
Carrier: EnviroTech (MTZ)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☐	No ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp:		NA ☑
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☐	No ☑	

** NOTE: If the "No" box is checked, see comments below.*

Client contacted: Date contacted: Contacted by:

Comments:

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Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Ninyo & Moore	Client Project ID: #401683003; 700 Block K St.	Date Sampled: 12/15/10
		Date Received: 12/16/10
1355 Halyard Dr., Suite 120	Client Contact: Randy Wheeler	Date Extracted: 12/20/10
West Sacramento, CA 95691	Client P.O.:	Date Analyzed: 12/20/10

Volatile Organic Compounds in µg/m³*

Extraction Method: TO15 Analytical Method: TO15 Work Order: 1012569

Lab ID	1012569-001A	Initial Pressure (psia)	13.11
Client ID	SV-1	Final Pressure (psia)	26.12
Matrix	Soil Vapor		

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	120	Acrylonitrile	ND	1.0	4.4
tert-Amyl methyl ether (TAME)	ND	1.0	8.5	Benzene	ND	1.0	6.5
Benzyl chloride	ND	1.0	11	Bromodichloromethane	ND	1.0	14
Bromoform	ND	1.0	21	Bromomethane	ND	1.0	7.9
1,3-Butadiene	ND	1.0	4.5	2-Butanone (MEK)	ND	1.0	150
t-Butyl alcohol (TBA)	ND	1.0	62	Carbon Disulfide	ND	1.0	6.3
Carbon Tetrachloride	ND	1.0	13	Chlorobenzene	ND	1.0	9.4
Chloroethane	ND	1.0	5.4	Chloroform	ND	1.0	9.9
Chloromethane	ND	1.0	4.2	Cyclohexane	ND	1.0	180
Dibromochloromethane	ND	1.0	17	1,2-Dibromo-3-chloropropane	ND	1.0	20
1,2-Dibromoethane (EDB)	ND	1.0	16	1,2-Dichlorobenzene	ND	1.0	12
1,3-Dichlorobenzene	ND	1.0	12	1,4-Dichlorobenzene	ND	1.0	12
Dichlorodifluoromethane	ND	1.0	10	1,1-Dichloroethane	ND	1.0	8.2
1,2-Dichloroethane (1,2-DCA)	ND	1.0	8.2	1,1-Dichloroethene	ND	1.0	8.1
cis-1,2-Dichloroethene	ND	1.0	8.1	trans-1,2-Dichloroethene	ND	1.0	8.1
1,2-Dichloropropane	ND	1.0	9.4	cis-1,3-Dichloropropene	ND	1.0	9.2
trans-1,3-Dichloropropene	ND	1.0	9.2	1,2-Dichloro-1,1,2,2-tetrafluoroethan	ND	1.0	14
Diisopropyl ether (DIPE)	ND	1.0	8.5	1,4-Dioxane	ND	1.0	7.3
Ethanol	ND	1.0	96	Ethyl acetate	ND	1.0	7.3
Ethyl tert-butyl ether (ETBE)	ND	1.0	8.5	Ethylbenzene	ND	1.0	8.8
4-Ethyltoluene	ND	1.0	10	Freon 113	ND	1.0	16
Heptane	ND	1.0	210	Hexachlorobutadiene	ND	1.0	22
Hexane	ND	1.0	180	2-Hexanone	ND	1.0	210
4-Methyl-2-pentanone (MIBK)	ND	1.0	8.3	Methyl-t-butyl ether (MTBE)	ND	1.0	7.3
Methylene chloride	ND	1.0	7.1	Naphthalene	ND	1.0	11
Propene	ND	1.0	88	Styrene	ND	1.0	8.6
1,1,1,2-Tetrachloroethane	ND	1.0	14	1,1,2,2-Tetrachloroethane	ND	1.0	14
Tetrachloroethene	ND	1.0	14	Tetrahydrofuran	ND	1.0	6.0
Toluene	ND	1.0	7.7	1,2,4-Trichlorobenzene	ND	1.0	15
1,1,1-Trichloroethane	18	1.0	11	1,1,2-Trichloroethane	ND	1.0	11
Trichloroethene	ND	1.0	11	Trichlorofluoromethane	ND	1.0	11
1,2,4-Trimethylbenzene	ND	1.0	10	1,3,5-Trimethylbenzene	ND	1.0	10
Vinyl Acetate	ND	1.0	180	Vinyl Chloride	ND	1.0	5.2
Xylenes	ND	1.0	27				

Surrogate Recoveries (%)

%SS1:	83	%SS2:	96
%SS3:	91		

Comments:

*vapor samples are reported in µg/m³.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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Telephone: 877-252-9262 Fax: 925-252-9269

Ninyo & Moore	Client Project ID: #401683003; 700 Block K St.	Date Sampled: 12/15/10
		Date Received: 12/16/10
1355 Halyard Dr., Suite 120	Client Contact: Randy Wheeler	Date Extracted: 12/20/10
West Sacramento, CA 95691	Client P.O.:	Date Analyzed: 12/20/10

Volatile Organic Compounds in µg/m³*

Extraction Method: TO15 Analytical Method: TO15 Work Order: 1012569

Lab ID	1012569-003A	Initial Pressure (psia)	14.23
Client ID	SV-3	Final Pressure (psia)	28.38
Matrix	Soil Vapor		

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	120	Acrylonitrile	ND	1.0	4.4
tert-Amyl methyl ether (TAME)	ND	1.0	8.5	Benzene	ND	1.0	6.5
Benzyl chloride	ND	1.0	11	Bromodichloromethane	ND	1.0	14
Bromoform	ND	1.0	21	Bromomethane	ND	1.0	7.9
1,3-Butadiene	ND	1.0	4.5	2-Butanone (MEK)	ND	1.0	150
t-Butyl alcohol (TBA)	ND	1.0	62	Carbon Disulfide	10	1.0	6.3
Carbon Tetrachloride	ND	1.0	13	Chlorobenzene	ND	1.0	9.4
Chloroethane	ND	1.0	5.4	Chloroform	ND	1.0	9.9
Chloromethane	ND	1.0	4.2	Cyclohexane	ND	1.0	180
Dibromochloromethane	ND	1.0	17	1,2-Dibromo-3-chloropropane	ND	1.0	20
1,2-Dibromoethane (EDB)	ND	1.0	16	1,2-Dichlorobenzene	ND	1.0	12
1,3-Dichlorobenzene	ND	1.0	12	1,4-Dichlorobenzene	ND	1.0	12
Dichlorodifluoromethane	ND	1.0	10	1,1-Dichloroethane	ND	1.0	8.2
1,2-Dichloroethane (1,2-DCA)	ND	1.0	8.2	1,1-Dichloroethene	ND	1.0	8.1
cis-1,2-Dichloroethene	ND	1.0	8.1	trans-1,2-Dichloroethene	ND	1.0	8.1
1,2-Dichloropropane	ND	1.0	9.4	cis-1,3-Dichloropropene	ND	1.0	9.2
trans-1,3-Dichloropropene	ND	1.0	9.2	1,2-Dichloro-1,1,2,2-tetrafluoroethan	ND	1.0	14
Diisopropyl ether (DIPE)	ND	1.0	8.5	1,4-Dioxane	ND	1.0	7.3
Ethanol	ND	1.0	96	Ethyl acetate	ND	1.0	7.3
Ethyl tert-butyl ether (ETBE)	ND	1.0	8.5	Ethylbenzene	ND	1.0	8.8
4-Ethyltoluene	ND	1.0	10	Freon 113	ND	1.0	16
Heptane	ND	1.0	210	Hexachlorobutadiene	ND	1.0	22
Hexane	ND	1.0	180	2-Hexanone	ND	1.0	210
4-Methyl-2-pentanone (MIBK)	ND	1.0	8.3	Methyl-t-butyl ether (MTBE)	ND	1.0	7.3
Methylene chloride	ND	1.0	7.1	Naphthalene	ND	1.0	11
Propene	ND	1.0	88	Styrene	ND	1.0	8.6
1,1,1,2-Tetrachloroethane	ND	1.0	14	1,1,2,2-Tetrachloroethane	ND	1.0	14
Tetrachloroethene	ND	1.0	14	Tetrahydrofuran	ND	1.0	6.0
Toluene	ND	1.0	7.7	1,2,4-Trichlorobenzene	ND	1.0	15
1,1,1-Trichloroethane	ND	1.0	11	1,1,2-Trichloroethane	ND	1.0	11
Trichloroethene	ND	1.0	11	Trichlorofluoromethane	ND	1.0	11
1,2,4-Trimethylbenzene	ND	1.0	10	1,3,5-Trimethylbenzene	ND	1.0	10
Vinyl Acetate	ND	1.0	180	Vinyl Chloride	ND	1.0	5.2
Xylenes	ND	1.0	27				

Surrogate Recoveries (%)

%SS1:	82	%SS2:	96
%SS3:	91		

Comments:

*vapor samples are reported in µg/m³.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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Ninyo & Moore	Client Project ID: #401683003; 700 Block K St.	Date Sampled: 12/15/10
		Date Received: 12/16/10
1355 Halyard Dr., Suite 120	Client Contact: Randy Wheeler	Date Extracted: 12/21/10
West Sacramento, CA 95691	Client P.O.:	Date Analyzed: 12/21/10

Volatile Organic Compounds in µg/m³*

Extraction Method: TO15 Analytical Method: TO15 Work Order: 1012569

Lab ID	1012569-005A	Initial Pressure (psia)	13.96
Client ID	SV-5	Final Pressure (psia)	27.82
Matrix	Soil Vapor		

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	120	Acrylonitrile	ND	1.0	4.4
tert-Amyl methyl ether (TAME)	ND	1.0	8.5	Benzene	ND	1.0	6.5
Benzyl chloride	ND	1.0	11	Bromodichloromethane	ND	1.0	14
Bromoform	ND	1.0	21	Bromomethane	ND	1.0	7.9
1,3-Butadiene	ND	1.0	4.5	2-Butanone (MEK)	ND	1.0	150
t-Butyl alcohol (TBA)	ND	1.0	62	Carbon Disulfide	ND	1.0	6.3
Carbon Tetrachloride	ND	1.0	13	Chlorobenzene	ND	1.0	9.4
Chloroethane	ND	1.0	5.4	Chloroform	ND	1.0	9.9
Chloromethane	ND	1.0	4.2	Cyclohexane	ND	1.0	180
Dibromochloromethane	ND	1.0	17	1,2-Dibromo-3-chloropropane	ND	1.0	20
1,2-Dibromoethane (EDB)	ND	1.0	16	1,2-Dichlorobenzene	ND	1.0	12
1,3-Dichlorobenzene	ND	1.0	12	1,4-Dichlorobenzene	ND	1.0	12
Dichlorodifluoromethane	ND	1.0	10	1,1-Dichloroethane	ND	1.0	8.2
1,2-Dichloroethane (1,2-DCA)	ND	1.0	8.2	1,1-Dichloroethene	ND	1.0	8.1
cis-1,2-Dichloroethene	ND	1.0	8.1	trans-1,2-Dichloroethene	ND	1.0	8.1
1,2-Dichloropropane	ND	1.0	9.4	cis-1,3-Dichloropropene	ND	1.0	9.2
trans-1,3-Dichloropropene	ND	1.0	9.2	1,2-Dichloro-1,1,2,2-tetrafluoroethan	ND	1.0	14
Diisopropyl ether (DIPE)	ND	1.0	8.5	1,4-Dioxane	ND	1.0	7.3
Ethanol	ND	1.0	96	Ethyl acetate	ND	1.0	7.3
Ethyl tert-butyl ether (ETBE)	ND	1.0	8.5	Ethylbenzene	ND	1.0	8.8
4-Ethyltoluene	ND	1.0	10	Freon 113	ND	1.0	16
Heptane	ND	1.0	210	Hexachlorobutadiene	ND	1.0	22
Hexane	ND	1.0	180	2-Hexanone	ND	1.0	210
4-Methyl-2-pentanone (MIBK)	ND	1.0	8.3	Methyl-t-butyl ether (MTBE)	ND	1.0	7.3
Methylene chloride	ND	1.0	7.1	Naphthalene	ND	1.0	11
Propene	ND	1.0	88	Styrene	ND	1.0	8.6
1,1,1,2-Tetrachloroethane	ND	1.0	14	1,1,2,2-Tetrachloroethane	ND	1.0	14
Tetrachloroethene	15	1.0	14	Tetrahydrofuran	ND	1.0	6.0
Toluene	ND	1.0	7.7	1,2,4-Trichlorobenzene	ND	1.0	15
1,1,1-Trichloroethane	ND	1.0	11	1,1,2-Trichloroethane	ND	1.0	11
Trichloroethene	ND	1.0	11	Trichlorofluoromethane	36	1.0	11
1,2,4-Trimethylbenzene	ND	1.0	10	1,3,5-Trimethylbenzene	ND	1.0	10
Vinyl Acetate	ND	1.0	180	Vinyl Chloride	ND	1.0	5.2
Xylenes	ND	1.0	27				

Surrogate Recoveries (%)

%SS1:	85	%SS2:	96
%SS3:	92		

Comments:

*vapor samples are reported in µg/m³.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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"When Quality Counts"

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QC SUMMARY REPORT FOR TO15

W.O. Sample Matrix: Soil Vapor QC Matrix: Soil Vapor BatchID: 55051 WorkOrder 1012569

EPA Method TO15	Extraction TO15								Spiked Sample ID: N/A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/m³	µg/m³	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Acrylonitrile	N/A	55.2	N/A	N/A	N/A	113	117	2.74	N/A	N/A	70 - 130	30
tert-Amyl methyl ether (TAME)	N/A	106.2	N/A	N/A	N/A	116	114	2.08	N/A	N/A	70 - 130	30
Benzene	N/A	81.2	N/A	N/A	N/A	108	109	0.740	N/A	N/A	70 - 130	30
Benzyl chloride	N/A	131.6	N/A	N/A	N/A	115	105	9.16	N/A	N/A	70 - 130	30
Bromodichloromethane	N/A	175.5	N/A	N/A	N/A	125	117	6.84	N/A	N/A	70 - 130	30
Bromoform	N/A	262.7	N/A	N/A	N/A	125	119	5.53	N/A	N/A	70 - 130	30
1,3-Butadiene	N/A	56.2	N/A	N/A	N/A	99.6	109	9.04	N/A	N/A	70 - 130	30
Carbon Disulfide	N/A	79.1	N/A	N/A	N/A	102	102	0	N/A	N/A	70 - 130	30
Carbon Tetrachloride	N/A	159.9	N/A	N/A	N/A	126	117	7.35	N/A	N/A	70 - 130	30
Chlorobenzene	N/A	117	N/A	N/A	N/A	105	105	0	N/A	N/A	70 - 130	30
Chloroethane	N/A	67.1	N/A	N/A	N/A	95.3	102	7.06	N/A	N/A	70 - 130	30
Chloroform	N/A	124.1	N/A	N/A	N/A	115	112	2.58	N/A	N/A	70 - 130	30
Chloromethane	N/A	52.5	N/A	N/A	N/A	95.4	98.3	2.97	N/A	N/A	70 - 130	30
Dibromochloromethane	N/A	216.5	N/A	N/A	N/A	121	119	1.96	N/A	N/A	70 - 130	30
1,2-Dibromo-3-chloropropane	N/A	245.6	N/A	N/A	N/A	97.8	90.9	7.27	N/A	N/A	70 - 130	30
1,2-Dibromoethane (EDB)	N/A	195.3	N/A	N/A	N/A	108	107	0.538	N/A	N/A	70 - 130	30
1,3-Dichlorobenzene	N/A	152.8	N/A	N/A	N/A	101	94.7	6.18	N/A	N/A	70 - 130	30
1,4-Dichlorobenzene	N/A	152.8	N/A	N/A	N/A	90.6	84.6	6.79	N/A	N/A	70 - 130	30
Dichlorodifluoromethane	N/A	125.7	N/A	N/A	N/A	114	114	0	N/A	N/A	70 - 130	30
1,1-Dichloroethane	N/A	102.9	N/A	N/A	N/A	113	111	1.78	N/A	N/A	70 - 130	30
1,2-Dichloroethane (1,2-DCA)	N/A	102.9	N/A	N/A	N/A	120	111	7.76	N/A	N/A	70 - 130	30
cis-1,2-Dichloroethene	N/A	100.8	N/A	N/A	N/A	105	108	2.61	N/A	N/A	70 - 130	30
trans-1,2-Dichloroethene	N/A	100.8	N/A	N/A	N/A	103	108	5.17	N/A	N/A	70 - 130	30
1,2-Dichloropropane	N/A	117.5	N/A	N/A	N/A	117	113	3.68	N/A	N/A	70 - 130	30
cis-1,3-Dichloropropene	N/A	115.3	N/A	N/A	N/A	113	113	0	N/A	N/A	70 - 130	30
trans-1,3-Dichloropropene	N/A	115.3	N/A	N/A	N/A	116	115	1.25	N/A	N/A	70 - 130	30
1,2-Dichloro-1,1,2,2-tetrafluoroetha	N/A	177.7	N/A	N/A	N/A	105	116	9.60	N/A	N/A	70 - 130	30
Diisopropyl ether (DIPE)	N/A	106.2	N/A	N/A	N/A	106	103	2.98	N/A	N/A	70 - 130	30
1,4-Dioxane	N/A	91.6	N/A	N/A	N/A	110	105	4.23	N/A	N/A	70 - 130	30
Ethyl acetate	N/A	91.6	N/A	N/A	N/A	112	108	3.53	N/A	N/A	70 - 130	30
Ethyl tert-butyl ether (ETBE)	N/A	106.2	N/A	N/A	N/A	116	113	2.51	N/A	N/A	70 - 130	30

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.
NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS ELAP Certification 1644

QA/QC Officer

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QC SUMMARY REPORT FOR TO15

W.O. Sample Matrix: Soil Vapor QC Matrix: Soil Vapor BatchID: 55051 WorkOrder 1012569

EPA Method TO15 **Extraction TO15** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/m³	µg/m³	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD

BATCH 55051 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1012569-001A	12/15/10 11:04 AM	12/20/10	12/20/10 9:18 PM	1012569-002A	12/15/10 11:43 AM	12/20/10	12/20/10 10:04 PM
1012569-003A	12/15/10 12:10 PM	12/20/10	12/20/10 10:47 PM	1012569-004A	12/15/10 12:19 PM	12/20/10	12/20/10 11:29 PM
1012569-005A	12/15/10 1:04 PM	12/21/10	12/21/10 12:10 AM	1012569-006A	12/15/10 1:14 PM	12/21/10	12/21/10 12:51 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.
NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

DHS ELAP Certification 1644

QA/QC Officer

KIFF Analytical LLC

Report Number : 75663
Date : 12/15/2010

Subject : 1 Soil Sample
Project Name : 700 BLOCK K ST.
Project Number : 401683003

Case Narrative

Matrix Spike/Matrix Spike Duplicate results associated with sample 712-A for the analytes 2,2-Dichloropropane and Trichlorofluoromethane were outside of control limits. This may indicate a bias for the sample that was spiked. Since the LCS recoveries were within control limits, no data are flagged.

KIFF Analytical LLC

Report Number : 75663
Date : 12/15/2010

Sample : **712-A**
Project Name : **700 BLOCK K ST.**
Project Number : **401683003** Lab Number : 75663-01
Matrix : Soil Sample Date :12/08/2010 Analysis Method: EPA 8260B

Parameter	Measured Value	Method Reporting Limit	Units	Date/Time Analyzed
P,M-Xylene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
O-Xylene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
Styrene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
Isopropyl benzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
Bromoform	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,1,2,2-Tetrachloroethane	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,2,3-Trichloropropane	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
n-Propylbenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
Bromobenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,3,5-Trimethylbenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
2+4-Chlorotoluene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
tert-Butylbenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,2,4-Trimethylbenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
sec-Butylbenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
p-Isopropyltoluene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,3-Dichlorobenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,4-Dichlorobenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
n-Butylbenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,2-Dichlorobenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,2-Dibromo-3-chloropropane	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,2,4-Trichlorobenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
Hexachlorobutadiene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
Naphthalene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,2,3-Trichlorobenzene	< 0.0050	0.0050	mg/Kg	12/11/10 01:48
1,2-Dichloroethane-d4 (Surr)	101		% Recovery	12/11/10 01:48
4-Bromofluorobenzene (Surr)	96.2		% Recovery	12/11/10 01:48
Toluene - d8 (Surr)	99.6		% Recovery	12/11/10 01:48

Report Number : 75663

QC Report : Matrix Spike/ Matrix Spike Duplicate

Date : 12/15/2010

Project Name : **700 BLOCK K ST.**

Project Number : **401683003**

Parameter	Spiked Sample	Sample Value	Spike Level	Spike Dup. Level	Spiked Sample Value	Duplicate Spiked Sample Value	Units	Analysis Method	Date Analyzed	Spiked Sample Percent Recov.	Duplicate Spiked Sample Percent Recov.	Relative Percent Diff.	Spiked Sample Percent Recov. Limit	Relative Percent Diff. Limit
1,1,1,2-Tetrachloroethane														
	75635-07	<0.0050	0.0396	0.0400	0.0322	0.0342	mg/Kg	EPA 8260B	12/9/10	81.3	85.6	5.18	70.0-130	25
1,1,1-Trichloroethane														
	75635-07	<0.0050	0.0396	0.0400	0.0292	0.0313	mg/Kg	EPA 8260B	12/9/10	73.8	78.2	5.82	70.0-130	25
1,1,2,2-Tetrachloroethane														
	75635-07	<0.0050	0.0396	0.0400	0.0410	0.0372	mg/Kg	EPA 8260B	12/9/10	103	93.1	10.6	60.7-133	25
1,1,2-Trichloroethane														
	75635-07	<0.0050	0.0396	0.0400	0.0367	0.0352	mg/Kg	EPA 8260B	12/9/10	92.7	88.0	5.20	70.0-130	25
1,1-Dichloroethane														
	75635-07	<0.0050	0.0396	0.0400	0.0309	0.0331	mg/Kg	EPA 8260B	12/9/10	78.1	82.8	5.78	66.1-120	25
1,1-Dichloroethene														
	75635-07	<0.0050	0.0396	0.0400	0.0301	0.0326	mg/Kg	EPA 8260B	12/9/10	76.0	81.4	6.87	65.9-122	25
1,1-Dichloropropene														
	75635-07	<0.0050	0.0396	0.0400	0.0306	0.0327	mg/Kg	EPA 8260B	12/9/10	77.2	81.8	5.76	70.0-130	25
1,2,3-Trichlorobenzene														
	75635-07	<0.0050	0.0396	0.0400	0.0308	0.0319	mg/Kg	EPA 8260B	12/9/10	77.8	79.8	2.44	70.0-130	25
1,2,3-Trichloropropane														
	75635-07	<0.0050	0.0396	0.0400	0.0400	0.0349	mg/Kg	EPA 8260B	12/9/10	101	87.2	14.6	70.0-130	25
1,2,4-Trichlorobenzene														
	75635-07	<0.0050	0.0396	0.0400	0.0297	0.0310	mg/Kg	EPA 8260B	12/9/10	74.9	77.6	3.48	70.0-130	25

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 75663

QC Report : Matrix Spike/ Matrix Spike Duplicate

Date : 12/15/2010

Project Name : **700 BLOCK K ST.**

Project Number : **401683003**

Parameter	Spiked Sample	Sample Value	Spike Level	Spike Dup. Level	Spiked Sample Value	Duplicate Spiked Sample Value	Units	Analysis Method	Date Analyzed	Spiked Sample Percent Recov.	Duplicate Spiked Sample Percent Recov.	Relative Percent Diff.	Spiked Sample Percent Recov. Limit	Relative Percent Diff. Limit
2+4-Chlorotoluene														
	75635-07	<0.0050	0.0792	0.0800	0.0648	0.0696	mg/Kg	EPA 8260B	12/9/10	81.8	87.0	6.25	70.0-130	25
2,2-Dichloropropane														
	75635-07	<0.0050	0.0396	0.0400	0.0268	0.0294	mg/Kg	EPA 8260B	12/9/10	**67.7**	73.5	8.25	70.0-130	25
Benzene														
	75635-07	<0.0050	0.0396	0.0400	0.0326	0.0344	mg/Kg	EPA 8260B	12/9/10	82.4	86.0	4.17	67.9-120	25
Bromobenzene														
	75635-07	<0.0050	0.0396	0.0400	0.0317	0.0341	mg/Kg	EPA 8260B	12/9/10	80.1	85.2	6.23	70.0-130	25
Bromochloromethane														
	75635-07	<0.0050	0.0396	0.0400	0.0338	0.0341	mg/Kg	EPA 8260B	12/9/10	85.5	85.2	0.269	70.0-130	25
Bromodichloromethane														
	75635-07	<0.0050	0.0396	0.0400	0.0334	0.0347	mg/Kg	EPA 8260B	12/9/10	84.3	86.8	2.98	70.0-130	25
Bromoform														
	75635-07	<0.0050	0.0396	0.0400	0.0325	0.0326	mg/Kg	EPA 8260B	12/9/10	82.0	81.6	0.494	58.2-146	25
Bromomethane														
	75635-07	<0.020	0.198	0.200	0.138	0.161	mg/Kg	EPA 8260B	12/9/10	69.5	80.6	14.8	45.5-139	25
Carbon Tetrachloride														
	75635-07	<0.0050	0.0396	0.0400	0.0290	0.0324	mg/Kg	EPA 8260B	12/9/10	73.1	81.1	10.4	70.0-130	25
Chlorobenzene														
	75635-07	<0.0050	0.0396	0.0400	0.0324	0.0340	mg/Kg	EPA 8260B	12/9/10	81.8	85.1	3.98	63.4-122	25

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 75663

QC Report : Matrix Spike/ Matrix Spike Duplicate

Date : 12/15/2010

Project Name : **700 BLOCK K ST.**

Project Number : **401683003**

Parameter	Spiked Sample	Sample Value	Spike Level	Spike Dup. Level	Spiked Sample Value	Duplicate Spiked Sample Value	Units	Analysis Method	Date Analyzed	Spiked Sample Percent Recov.	Duplicate Spiked Sample Percent Recov.	Relative Percent Diff.	Spiked Sample Percent Recov. Limit	Relative Percent Diff. Limit
Naphthalene														
	75635-07	<0.0050	0.0396	0.0400	0.0353	0.0329	mg/Kg	EPA 8260B	12/9/10	89.2	82.2	8.10	70.0-130	25
O-Xylene														
	75635-07	<0.0050	0.0396	0.0400	0.0315	0.0346	mg/Kg	EPA 8260B	12/9/10	79.4	86.6	8.65	62.3-124	25
P + M Xylene														
	75635-07	<0.0050	0.0396	0.0400	0.0310	0.0337	mg/Kg	EPA 8260B	12/9/10	78.3	84.3	7.41	62.5-124	25
Styrene														
	75635-07	<0.0050	0.0396	0.0400	0.0312	0.0346	mg/Kg	EPA 8260B	12/9/10	78.7	86.4	9.36	70.0-130	25
Tetrachloroethene														
	75635-07	<0.0050	0.0396	0.0400	0.0314	0.0331	mg/Kg	EPA 8260B	12/9/10	79.2	82.7	4.32	64.7-122	25
Toluene														
	75635-07	<0.0050	0.0396	0.0400	0.0318	0.0341	mg/Kg	EPA 8260B	12/9/10	80.2	85.3	6.10	65.7-120	25
Trichloroethene														
	75635-07	<0.0050	0.0396	0.0400	0.0301	0.0320	mg/Kg	EPA 8260B	12/9/10	76.1	79.9	4.87	63.9-121	25
Trichlorofluoromethane														
	75635-07	<0.0050	0.0396	0.0400	0.0277	0.0308	mg/Kg	EPA 8260B	12/9/10	**69.9**	77.0	9.68	70.0-130	25
Vinyl Chloride														
	75635-07	<0.0050	0.0396	0.0400	0.0330	0.0343	mg/Kg	EPA 8260B	12/9/10	83.3	85.8	2.90	45.9-127	25
c-1,3-Dichloropropene														
	75635-07	<0.0050	0.0396	0.0400	0.0330	0.0347	mg/Kg	EPA 8260B	12/9/10	83.5	86.8	3.96	70.0-130	25

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 75663

Date : 12/15/2010

QC Report : Laboratory Control Sample (LCS)

Project Name : **700 BLOCK K ST.**

Project Number : **401683003**

Parameter	Spike Level	Units	Analysis Method	Date Analyzed	LCS Percent Recov.	LCS Percent Recov. Limit
1,1,1,2-Tetrachloroethane	0.0394	mg/Kg	EPA 8260B	12/9/10	91.5	70.0-130
1,1,1-Trichloroethane	0.0394	mg/Kg	EPA 8260B	12/9/10	81.4	70.0-130
1,1,2,2-Tetrachloroethane	0.0394	mg/Kg	EPA 8260B	12/9/10	104	60.7-133
1,1,2-Trichloroethane	0.0394	mg/Kg	EPA 8260B	12/9/10	97.1	70.0-130
1,1-Dichloroethane	0.0394	mg/Kg	EPA 8260B	12/9/10	87.3	66.1-120
1,1-Dichloroethene	0.0394	mg/Kg	EPA 8260B	12/9/10	85.1	65.9-122
1,1-Dichloropropene	0.0394	mg/Kg	EPA 8260B	12/9/10	87.1	70.0-130
1,2,3-Trichlorobenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	86.6	70.0-130
1,2,3-Trichloropropane	0.0394	mg/Kg	EPA 8260B	12/9/10	97.6	70.0-130
1,2,4-Trichlorobenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	83.6	70.0-130
1,2,4-Trimethylbenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	89.4	70.0-130
1,2-Dibromoethane	0.0394	mg/Kg	EPA 8260B	12/9/10	117	67.2-121
1,2-Dichlorobenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	88.7	56.3-123
1,2-Dichloroethane	0.0394	mg/Kg	EPA 8260B	12/9/10	84.1	64.0-124
1,2-Dichloropropane	0.0394	mg/Kg	EPA 8260B	12/9/10	87.2	66.6-120
1,2-dibromo-3-chloropropane	0.0394	mg/Kg	EPA 8260B	12/9/10	88.5	59.4-138
1,3,5-Trimethylbenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	91.0	70.0-130
1,3-Dichlorobenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	93.4	52.5-132
1,3-Dichloropropane	0.0394	mg/Kg	EPA 8260B	12/9/10	93.8	70.0-130
1,4-Dichlorobenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	85.7	57.0-123
2+4-Chlorotoluene	0.0787	mg/Kg	EPA 8260B	12/9/10	93.2	70.0-130
2,2-Dichloropropane	0.0394	mg/Kg	EPA 8260B	12/9/10	79.6	70.0-130
Benzene	0.0394	mg/Kg	EPA 8260B	12/9/10	91.5	67.9-120

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

Report Number : 75663

QC Report : Laboratory Control Sample (LCS)

Date : 12/15/2010

Project Name : **700 BLOCK K ST.**

Project Number : **401683003**

Parameter	Spike Level	Units	Analysis Method	Date Analyzed	LCS Percent Recov.	LCS Percent Recov. Limit
Trichloroethene	0.0394	mg/Kg	EPA 8260B	12/9/10	85.3	63.9-121
Trichlorofluoromethane	0.0394	mg/Kg	EPA 8260B	12/9/10	83.6	70.0-130
Vinyl Chloride	0.0394	mg/Kg	EPA 8260B	12/9/10	89.3	45.9-127
c-1,3-Dichloropropene	0.0394	mg/Kg	EPA 8260B	12/9/10	94.0	70.0-130
cis-1,2-Dichloroethene	0.0394	mg/Kg	EPA 8260B	12/9/10	88.5	70.0-130
n-butylbenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	85.9	70.0-130
n-propylbenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	92.6	70.0-130
p-isopropyltoluene	0.0394	mg/Kg	EPA 8260B	12/9/10	92.9	70.0-130
sec-butylbenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	93.5	70.0-130
t-1,2-Dichloroethene	0.0394	mg/Kg	EPA 8260B	12/9/10	89.5	70.0-130
t-1,3-Dichloropropene	0.0394	mg/Kg	EPA 8260B	12/9/10	94.8	70.0-130
tert-butylbenzene	0.0394	mg/Kg	EPA 8260B	12/9/10	86.7	70.0-130

KIFF ANALYTICAL, LLC

2795 2nd Street, Suite 300 Davis, CA 95618 530-297-4800

KIFF Analytical LLC

SAMPLE RECEIPT CHECKLIST

RECEIVER: CIX (Initials)

SRG#: 75663 Date: 12-10-10

Project ID: 700 Block K St.

Method of Receipt: ☒ Courier ☐ Over-the-counter ☐ Shipper

COC Inspection

Is COC present?	☒ Yes	☐ No		
Custody seals on shipping container?	☐ Intact	☐ Broken	☐ Not present	☒ N/A
Is COC Signed by Relinquisher?	☒ Yes ☐ No	Dated?	☒ Yes	☐ No
Is sampler name legibly indicated on COC?	☒ Yes	☐ No		
Is analysis or hold requested for all samples	☒ Yes	☐ No		
Is the turnaround time indicated on COC?	☒ Yes	☐ No		
Is COC free of whiteout and uninitialed cross-outs?	☒ Yes	☐ No, Whiteout	☐ No, Cross-outs	

Sample Inspection

Coolant Present: ☐ Yes ☐ No (includes water)

Temperature °C 3.6 Therm. ID# IR5 Initial CIX Date/Time 12/10/10 15:13 ☐ N/A

Are there custody seals on sample containers?	☐ Intact	☐ Broken	☒ Not present	
Do containers match COC?	☒ Yes	☐ No	☐ No, COC lists absent sample(s)	☐ No, Extra sample(s) present
Are there samples matrices other than soil, water, air or carbon?	☐ Yes	☒ No		
Are any sample containers broken, leaking or damaged?	☐ Yes	☒ No		
Are preservatives indicated?	☒ Yes, on sample containers	☒ Yes, on COC	☐ Not indicated	☐ N/A
Are preservatives correct for analyses requested?	☒ Yes	☐ No	☐ N/A	
Are samples within holding time for analyses requested?	☒ Yes	☐ No		
Are the correct sample containers used for the analyses requested?	☒ Yes	☐ No		
Is there sufficient sample to perform testing?	☒ Yes	☐ No		

Does any sample contain product, have strong odor or are otherwise suspected to be hot? ☐ Yes ☒ No

Receipt Details

Matrix SO Container type Glass Jar # of containers received 1

Matrix _____ Container type _____ # of containers received _____

Matrix _____ Container type _____ # of containers received _____

Date and Time Sample Put into Temp Storage Date: 12/10/10 Time: 1515

Quicklog

Are the Sample ID's indicated:	☐ On COC	☐ On sample container(s)	☒ On Both	☐ Not indicated
If Sample ID's are listed on both COC and containers, do they all match?	☒ Yes	☐ No	☐ N/A	
Is the Project ID indicated:	☐ On COC	☐ On sample container(s)	☒ On Both	☐ Not indicated
If project ID is listed on both COC and containers, do they all match?	☒ Yes	☐ No	☐ N/A	
Are the sample collection dates indicated:	☐ On COC	☐ On sample container(s)	☒ On Both	☐ Not indicated
If collection dates are listed on both COC and containers, do they all match?	☒ Yes	☐ No	☐ N/A	
Are the sample collection times indicated:	☐ On COC	☐ On sample container(s)	☐ On Both	☒ Not indicated
If collection times are listed on both COC and containers, do they all match?	☐ Yes	☐ No	☒ N/A	

COMMENTS:

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71556	1.80E+01			1,1,1-Trichloroethane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152	24			1.00E-08

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.71131E-06

MESSAGE SUMMARY BELOW:

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
75150	2.80E+01			Carbon disulfide

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152	24			1.00E-08

MORE ↓

Lookup Soil Parameters

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^v (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^v (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.63022E-05

MESSAGE SUMMARY BELOW:

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (µg/m³)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	1.60E+01			Toluene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_s (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	152	24			1.00E-08

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, Pb^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.32111E-05

MESSAGE SUMMARY BELOW:

DATA ENTRY SHEET

SG-SCREEN
PA Version 2.0; 04/

Reset to Defaults

DTSC
Vapor Intrusion Guidance
Interim Final 12/04
(last modified 2/4/09)

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
127184	2.10E+01			Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152	24			1.00E-08

MORE ↓

Lookup Soil Parameters

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
CL	1.48	0.442	0.168	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.78453E-08	0.000427631

MESSAGE SUMMARY BELOW:

APPENDIX F: Noise and Vibration

P10-087
DEC 10, 2010

Environmental Noise Assessment

700 K Street

Sacramento County, California

Job # 2010-157

Prepared For:

Kuchman Architects

2203 13th street
Sacramento, California 95818

Attn: Bob Kuchman

Prepared By:

j.c. brennan & associates, Inc.

Jim Brennan
President
Member, Institute of Noise Control Engineering

November 30, 2010

j.c. brennan & associates
consultants in acoustics

P.O. Box 6748 - 263 Nevada Street - Auburn, California 95603 -p: (530) 823-0960 -f: (530) 823-0961

INTRODUCTION

The proposed 700 K Street Project is located on the south side of K Street, between 7th Street and 8th Street in the City of Sacramento, California. The project is a multi-use redevelopment project which includes commercial and residential uses, as well as entertainment uses. The project site plan is shown on Figure 1.

Traffic on 7th Street and 8th Street and light rail operations along 7th, 8th, and K Streets are potentially significant noise sources which may affect the project design. Therefore, the City of Sacramento requires that a noise study be conducted to determine compliance with the applicable residential noise level standards. j.c. brennan & associates, Inc. was contacted by the project applicant's architect to conduct this noise study in response to these requirements.

BACKGROUND INFORMATION ON NOISE

Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

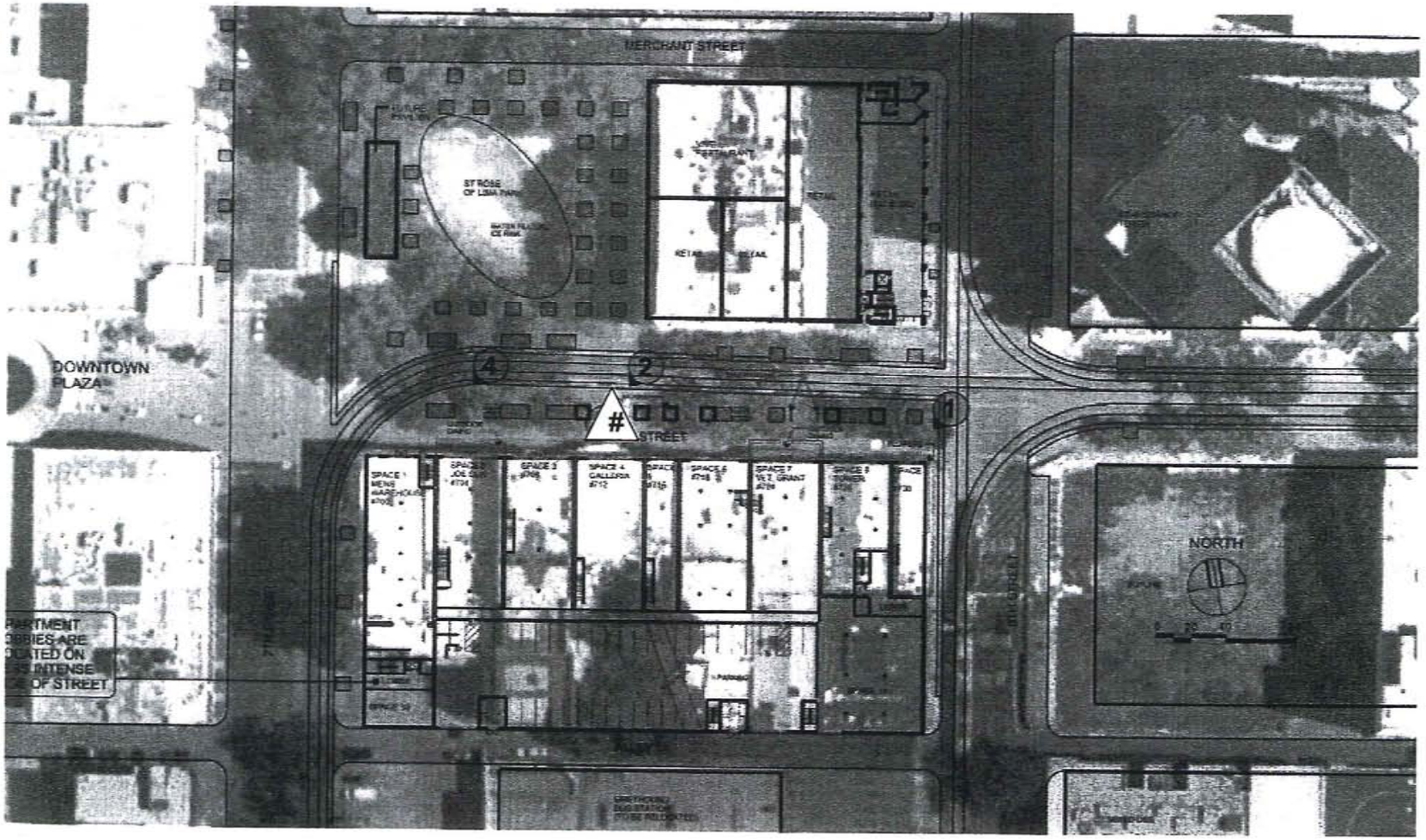
Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB[1]. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

[1] For an explanation of these terms, see Appendix A: "Acoustical Terminology"

Figure 1

700 K Street Project Site Plan



N

1 Light Rail Noise Measurement Site

j.c. brennan & associates
consultants in acoustics

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common noise sources. Appendix A provides a summary of acoustical terms used in this report.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise

level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

Table 1
Typical Nose Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source:Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. October 1998.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

CRITERIA FOR ACCEPTABLE NOISE EXPOSURE

State

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses and multi-family dwellings. Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room. Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept close, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment.

City of Sacramento

City of Sacramento Health and Safety Element

The City of Sacramento's noise policies and guidelines are contained in the General Plan Health and Safety Element. This Element establishes noise exposure standards for different land uses (**Table 2**). The normally acceptable exterior noise level for commercial land uses is 65 dB, L_{dn} or less, with a conditionally acceptable range up to 80 dB, L_{dn} or less. The normally acceptable exterior noise level for residential uses is 60 dB, L_{dn} or less, with a conditionally acceptable range up to 70 dB, L_{dn} or less. In instances where attainment of the normally acceptable exterior noise level is not possible with best available noise reduction measures, the Noise Element allows an exterior noise level exceeding the acceptable L_{dn}, up to the conditionally acceptable range, provided that noise level reduction measures have been implemented and that interior noise level standards are achieved.

The Element also contains specific goals and policies governing noise sources and receptors to provide for noise and land use compatibility. The goals and policies pertinent to activities in the City are summarized below.

Goal A: *Future development should be compatible with the projected year 2016 noise environment.*

Goal A Policy: Require an acoustical report for any project that would be exposed to noise levels in excess of those shown as normally acceptable (in Table 5.4-4).

Goal A Policy: Require mitigation measures to reduce noise exposure to normally acceptable levels, except where such measures are not feasible.

Goal A Policy: Eliminate or minimize the noise impacts of future developments on existing land uses in Sacramento.

Goal C Policy: Review projects that may have noise generation potential to determine what impact they may have on existing uses. Additional acoustical analysis may be necessary to mitigate identified impacts.

Goal C Policy: Enforce the City of Sacramento noise ordinance as the method to control noise from sources other than transportation sources.

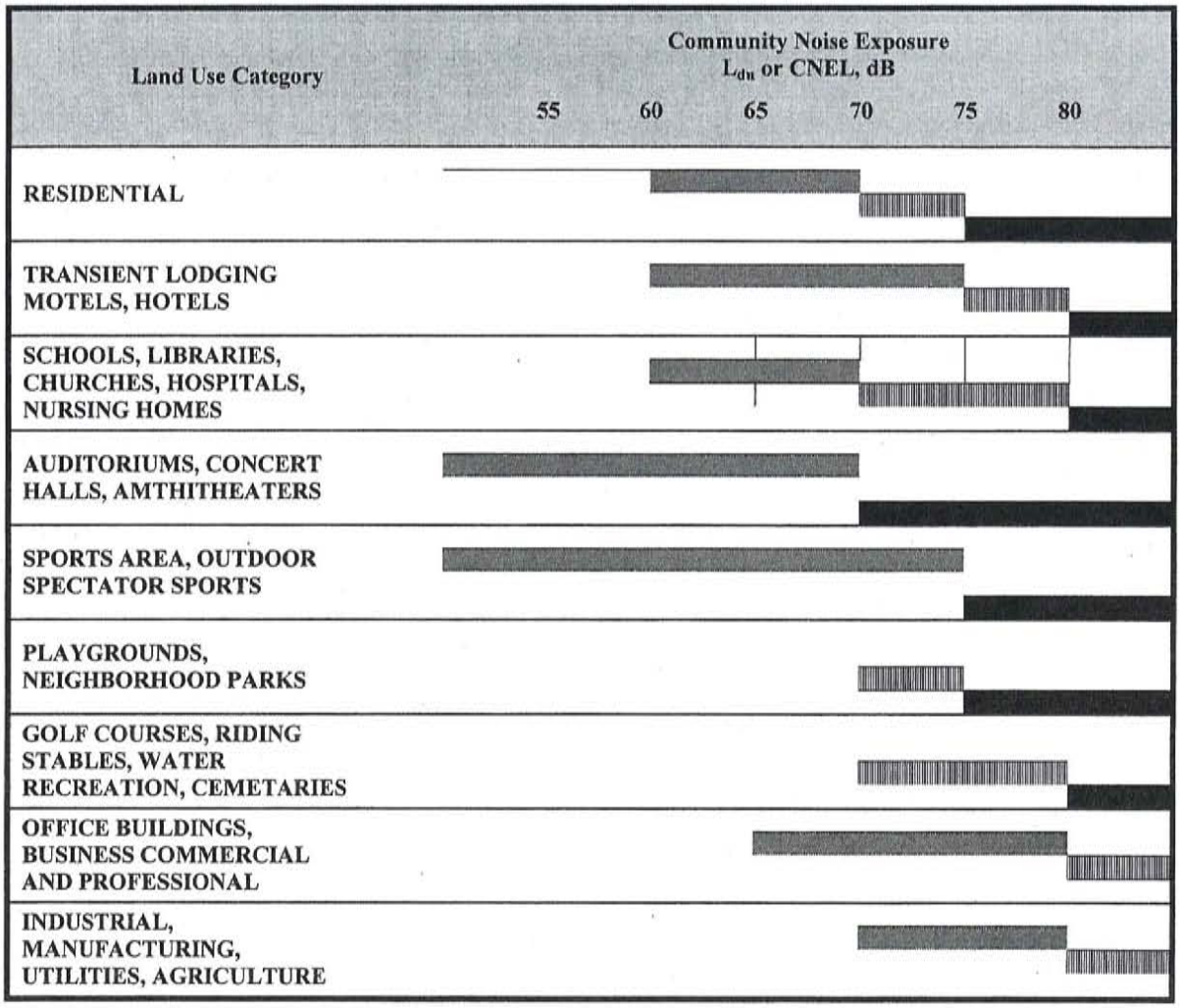
Goal D: *Reduce noise levels in areas where noise exposure presently exceeds the standards established.*

Goal D Policy: Enforce the provisions of Sections 27-150 and 27-151 of the State Motor Vehicle Code, which requires all vehicles to be equipped with a properly maintained muffler and that exhaust systems not be modified.

Goal D Policy: Encourage the incorporation of the latest noise control technology in all projects.

Table 2

Noise Exposure Standards



NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise requirements

NORMALLY UNACCEPTABLE

New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE

New construction or development clearly should not be undertaken.

Source: City of Sacramento General Plan, 1988

A listing of all policies, along with detailed descriptions of each policy, can be found in the Health and Safety Element.

Sacramento Central City Community Plan

In addition to the General Plan, the City of Sacramento has also developed plans that are more specific to the various communities in the City. The City's Central City Community Plan contains the following sub goal under its environmental goal:

Sub-goal: Provide an environment which is free of annoying noise and continue to reduce air pollution.

EVALUATION OF FUTURE TRAFFIC NOISE LEVELS AT THE PROJECT SITE

Traffic Noise Prediction Methodology:

j.c. brennan & associates, Inc. employs the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) for the prediction of traffic noise levels. The model is based upon the CALVENO noise emission factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

Future Exterior Traffic Noise Levels:

To predict the future traffic noise levels at the project site, j.c. brennan & associates, Inc. used future traffic volumes contained in the City of Sacramento 1012 K Street Project EIR, conducted in 2008. Table 3 shows the predicted future traffic noise levels at the noise-sensitive areas of the project site.

The predicted future (Year 2030) traffic noise levels at the project site are 67.5 dB Ldn due to 7th Street traffic, and 67.3 dB Ldn due to 8th Street traffic.

Future Exterior Light Rail Noise Levels:

Light Rail noise levels were calculated utilizing measured sound exposure (SEL) levels for light rail trains collected at the project site. The measurement location is shown on Figure 1. The results of the SEL measurements indicated that a typical light rail train generated an SEL of 89 dB at a distance of approximately 50 feet. Maximum noise levels were found to be 82 dB at a distance of approximately 50 feet.

In order to predict the Ldn noise level associated with Light Rails trains, the following formula is used.

$$Ldn = Mean\ SEL + 10*\log(Neq) - 49.4$$

Neq is defined as the number of daytime (7 am to 10 pm) train events and 10 times the number of nighttime (10 pm to 7 am) train events. 49.4 is 10 times the log of the number of seconds in a day.

Based upon the current Monday-Friday Light Rail train schedule, the approximate number of daytime and nighttime train operations was obtained. The Gold Line Route was found to carry approximately 107 daytime trains and 18 nighttime trains. The Blue Line Route was found to carry the same number of daytime and nighttime trains. Therefore, up to 214 daytime and 36 nighttime trains could operate along the K Street, 7th Street and 8th Street during a typical week day.

Based upon the equation above and the operation data for Light Rain, the existing light rail contours were calculated at the project site. The predicted light rail noise levels are 67 dB Ldn at the project site.

Future Cumulative Light Rail and Traffic Noise Levels:

The predicted cumulative light rail and traffic noise levels is 71 dB Ldn at the project site. This analysis assumes that the potential opening of K Street to traffic will occur, and that traffic volumes and resulting traffic noise along K Street will be similar to 7th Street and 8th Street.

Analysis of Compliance with the City of Sacramento Exterior Noise Level Standard:

The project does not indicate outdoor activity areas facing the street system. Therefore, the project will comply with the City of Sacramento exterior noise level standard of 60 dB Ldn.

Predicted Interior Noise Levels:

Standard construction practices, consistent with the uniform building code typically provide an exterior to interior noise level reduction of approximately 20 to 25 dB, assuming that air conditioning is included for each unit, which allows residents to close windows for the required acoustical isolation. Therefore, as long as exterior noise levels at the building facades will not are less than 70 dB Ldn, the interior noise levels will typically comply with the interior noise level standard of 45 dB Ldn.

Based upon the analysis, future cumulative exterior and interior noise levels are predicted to be 71 dB Ldn . Therefore, all residential units which have windows facing K Street, 7th Street and 8th Street will require STC 30 rated windows on those facades of the residential units.

CONCLUSIONS

The 700 K Street project is expected to comply with the City of Sacramento General Plan Noise Element criteria, and the State of California Title 24 criteria, provided that the following construction practices are included in the project design:

1. All residential facades facing K Street, 7th Street and 8th Street will require STC 30 rated windows and sliding glass doors.

Appendix A

Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

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January 21, 2011

Mr. Bob Kuchman, AIA
Kuchman Architects
2203 13th Street
Sacramento, CA 95818

Subject: Construction Vibration Analysis for the 700 K Street Project

Dear Mr. Kuchman:

At the request of Jennifer Hageman, with the City of Sacramento Planning Department, j.c. brennan & associates, Inc. has prepared an analysis of potential vibration impacts associated with construction activities at the 700 K Street Project. Of particular interest is the effects of construction vibration levels at historic structures such as the Grey Hound Station.

Criteria

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

It is important to note that the City of Sacramento does not contain specific policies in the General Plan pertaining to vibration levels. However, the City's Environmental Checklist does address potential vibration impacts and levels of significance. The following are from the City's Environmental Checklist:

> *Permit existing / or planned residential and commercial areas to be exposed to vibration peak particle velocities greater than 0.5 inches per second due to project construction.*

Permit historic buildings and archaeological sites to be exposed to vibration peak particle velocities greater than 0.2 inches per second due to project construction and highway traffic.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 1, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second.

Table 1 indicates that the threshold for damage to structures ranges from 2 to 6 in/sec. One-half this minimum threshold or 1 in/sec p.p.v. is considered a safe criterion that would protect against architectural or structural damage. The general threshold at which human annoyance could occur is notes as 0.1 in/sec p.p.v.

Table 1
Effects of Vibration on People and Buildings

Peak Particle Velocity inches/second	Peak Particle Velocity mm/second	Human Reaction	Effect on Buildings
0-.006	0.15	Imperceptible by people	Vibrations unlikely to cause damage of any type
.006-.02	0.5	Range of Threshold of perception	Vibrations unlikely to cause damage of any type
.08	2.0	Vibrations clearly perceptible	Recommended upper level of which ruins and ancient monuments should be subjected
0.1	2.54	Level at which continuous vibrations begin to annoy people	Virtually no risk of architectural damage to normal buildings
0.2	5.0	Vibrations annoying to people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
1.0	25.4		Architectural Damage
2.0	50.4		Structural Damage to Residential Buildings
6.0	151.0		Structural Damage to Commercial Buildings

Source: Survey of Earth-borne Vibrations due to Highway Construction and Highway Traffic, Caltrans 1976.

Typical Construction Vibration Impacts

The types of construction vibration impact include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural. Table 2 shows the typical vibration levels produced by construction equipment.

Table 2
Vibration Levels for Varying Construction Equipment

Type of Equipment	Peak Particle Velocity @ 25 feet	Approximate Velocity Level @ 25 feet
Large Bulldozer	0.089 (inches/second)	87 (VdB)
Loaded Trucks	0.076 (inches/second)	86 (VdB)
Small Bulldozer	0.003 (inches/second)	58 (VdB)
Auger/drill Rigs	0.089 (inches/second)	87 (VdB)
Jackhammer	0.035 (inches/second)	79 (VdB)
Vibratory Hammer	0.070 (inches/second)	85 (VdB)
Vibratory Compactor/roller	0.210 (inches/second)	94 (VdB)

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006

The City of Sacramento Planning staff have requested that pile driving is assumed to occur, and should be evaluated. Pile driving activities can be conducted using a hammer-type pile driver or a vibratory pile driver. The hammer-type of pile driving generally consists of drilling pilot holes and then lowering the piles into the pilot holes. The piles are driven using a hammer which impacts the top of the pile. A vibratory pile driver may or may not include drilling pilot holes. The piles are driven into the ground using a rapid vibratory action.

j.c. brennan & associates, Inc. staff have conducted noise and vibration measurements for both types of pile driving activities. Hammer-type pile driving measurements were conducted at the Shriners Pediatric Care construction site, adjacent to U.C. Davis Medical Center in Sacramento, California. At a distance of 100 feet, peak particle velocity levels ranged between 0.055 and 0.078 inches per second. Vibratory pile driving measurements were conducted at a construction site in the Rio Linda area of Sacramento County. At a distance of 50 feet, the peak particle velocity levels ranged between 0.07 and 0.08 inches pre second. Therefore, the vibration levels were somewhat similar, and are not expected to exceed the vibration criteria contained in the City of Sacramento Environmental Checklist, or the criteria for causing damage to buildings, as shown in Table 1.

Based upon Table 2, it is not expected that typical construction equipment would exceed the vibration criteria contained in the City of Sacramento Environmental Checklist, or the criteria for causing damage to buildings, as shown in Table 1.

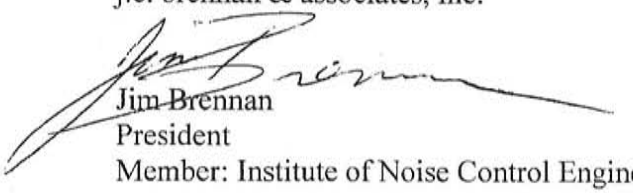
It is expected that some perceptibility of construction vibration will occur. The construction vibration levels may cause some rattling of windows within 100 feet of the construction site. However, no damage to buildings is expected.

It is recommended that if hammer-type pile driving occurs, that pilot holes are drilled for the piles prior to driving of the piles.

If you or the City of Sacramento staff have any questions, please contact me at (530) 823-0960, or email me at jbrennan@jcbrennanassoc.com.

Respectfully submitted,

j.c. brennan & associates, Inc.



Jim Brennan
President
Member: Institute of Noise Control Engineering

File: 2010-157A – 700 KStreet – Construction Vibration