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Appendix A

Air Quality Report

Appendix AQ1

Emissions Support Data

Table AQ1-1 Emissions Estimates for Emergency Standby Generators

Engine Mfg:	**Cummins**	# of Units:	36	Max # of Engines Tested per Day:	6
Model #:	**QSK95-G9**			*(engines are not tested concurrently)*	
Fuel:	ULSD	**Engine OPs Data**			

METRIC UNITs

		SO2, lbs/hr	BHP	kWe	Load %	RPM	Fuel, gph	Stk Ht, ft	Stk Diam, in	Stk Temp, F	mmbtu/hr	Stk ACFM	Stack Vel, f/s	Stk Diam, m	Stk Temp, Kelvins	Stk Vel, m/s
Fuel S, %wt:	0.0015															
Fuel wt, lb/gal:	7.05	0.046953	4631	3250	100	1800	222	TBD	20	865	30.86	24336	185.9133	0.5080	735.93	56.6664
Btu/gal:	139000	0.036167	3501	2438	75	1800	171	TBD	20	735	23.77	20454	156.2570	0.5080	663.71	47.6271
Lbs S/1000 gal:	0.10575	0.026649	2371	1625	50	1800	126	TBD	20	672	17.51	16885	128.9919	0.5080	628.71	39.3167
Lbs SO2/1000 gal:	0.2115	0.015228	1240	813	25	1800	72	TBD	20	643	10.01	10587	80.8787	0.5080	612.59	24.6518
EPA Tier:	2	0.008883	562	325	10	1800	42	TBD	20	541	5.84	7187	54.9046	0.5080	555.93	16.7349
Turbocharged:	Yes	0.005499	155	33	1	1800	26	TBD	20	428	3.61	5492	41.9558	0.5080	493.15	12.7881
Aftercooled:	Yes						Stack Exit Area (sq.ft) =		2.181662							

Emissions Factor Scenarios (all values in g/bhp-hr)

Scenarios	**Nox**	**CO**	**VOC**	**SO2**	**PM10**	**PM2.5**	**CO2e lb/mmbtu**
Declared Emergency Ops, 100 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Maint/Readiness Testing, 20 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Declared Emergency Ops, 100 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	4.37	0.50	0.23	0.005	0.110	0.110	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	4.37	0.50	0.23	0.005	0.110	0.110	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 10% Load	4.37	0.50	0.23	0.005	0.110	0.110	163.052
Maint/Readiness Testing, 20 hrs/yr, Nominal Perf Data, 1% Load	11.80	7.20	2.80	0.005	0.520	0.520	163.052

Nominal *__Screening__* Emissions (g/hp-hr)

Load %	**NOx**	**CO**	**PM**	**SO2**
100	5.70	0.30	0.040	4.599E-3
75	4.50	0.20	0.050	4.686E-3
50	3.30	0.20	0.090	5.098E-3
25	3.40	0.40	0.200	5.570E-3
10	4.60	1.30	0.300	7.169E-3
1	11.80	7.20	0.520	1.609E-2

In the Screening/Refined Modeling Analyses:
Used NSPS Tier 2 EFs for CO when > Nominal
Used Cycle-weighted EFs for PM when > Nominal

40 CFR 89 Emissions Factors are derived from the cycle weighted load point testing per Subpart E, Appendix A for constant speed engines.
Protocol D2, ref ISO 8178-1 and ISO 8178-4.
Nominal performance data from Cummins memo dated 9-17-19, Standby rating, per ISO 8178-1.

APC Installed: No Diesel Particulate Filters (DPF)

Controlled Emissions Factor Scenarios (all values in g/bhp-hr)

	Nox	**CO**	**VOC**	**SO2**	**PM10**	**PM2.5**	**CO2e lb/mmbtu**
Declared Emergency Ops, 100 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Maint/Readiness Testing, 20 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Declared Emergency Ops, 100 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	4.37	0.50	0.23	0.005	0.110	0.110	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	4.37	0.50	0.23	0.005	0.110	0.110	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 10% Load	4.37	0.50	0.23	0.005	0.110	0.110	163.052
Maint/Readiness Testing, 20 hrs/yr, Nominal Perf Data, 1% Load	11.80	7.20	2.80	0.005	0.520	0.520	163.052

Scenario 1: **Declared Emergency Ops, 100 hrs/yr, Tier 2 EFs, 100% Load**

Max Hourly Runtime:	1
Max Daily Runtime:	24
Max Annual Runtime:	100

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	45.943	26.545	3.063	0.051	1.531	1.531	na
lbs/day	1102.643	637.083	73.510	1.225	36.755	36.755	na
TPY	2.297	1.327	0.153	0.003	0.077	0.077	251.6

All Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	1653.97	955.62	110.26	1.84	55.13	55.13	na
lbs/day	39695.16	22934.98	2646.34	44.11	1323.17	1323.17	na
TPY	82.70	47.78	5.51	0.09	2.76	2.76	9056.6

Scenario 2: **Maint/Readiness Testing, 20 hrs/yr, Tier 2 EFs, 100% Load**

Max Hourly Runtime:	1
Max Daily Runtime:	1
Max Annual Runtime:	20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	45.943	26.545	3.063	0.051	1.531	1.531	na
lbs/day	45.943	26.545	3.063	0.051	1.531	1.531	na
TPY	0.459	0.265	0.031	0.001	0.015	0.015	50.3

6 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	45.943	26.545	3.063	0.051	1.531	1.531	na
lbs/day	275.661	159.271	18.377	0.306	9.189	9.189	na

All Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
TPY	16.54	9.56	1.10	0.02	0.55	0.55	1811.3

Scenario 3: **Declared Emergency Ops, 100 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load**

Max Hourly Runtime:	1
Max Daily Runtime:	1
Max Annual Runtime:	100

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	44.616	5.105	2.348	0.051	1.123	1.123	na
lbs/day	44.616	5.105	2.348	0.051	1.123	1.123	na
TPY	2.231	0.255	0.117	0.003	0.056	0.056	251.6

6 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	44.616	5.105	2.348	0.051	1.123	1.123	na
lbs/day	267.697	30.629	14.089	0.306	6.738	6.738	na

All Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
TPY	80.31	9.19	4.23	0.09	2.02	2.02	9056.6

Scenario 4: **Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	44.616	5.105	2.348	0.051	1.123	1.123	na
lbs/day	44.616	5.105	2.348	0.051	1.123	1.123	na
TPY	0.446	0.051	0.023	0.001	0.011	0.011	50.315

6 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	44.616	5.105	2.348	0.051	1.123	1.123	na
lbs/day	267.697	30.629	14.089	0.306	6.738	6.738	na
All Engines							
TPY	16.06	1.84	0.85	0.02	0.404	0.404	1811.3

BAAQMD 150 Hrs/Yr Emissions Totals, TPY:	**Nox**	**CO**	**VOC**	**SO2**	**PM10**	**PM2.5**	**CO2e**
(based on 40 CFR 89 D2 Cycle Efs)	96.371	11.026	5.072	0.110	2.426	2.426	10867.951

OPTIONAL RUN SCENARIOS

Scenario 5: **Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 10% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	5.414	0.620	0.285	0.006	0.136	0.136	na
lbs/day	5.414	0.620	0.285	0.006	0.136	0.136	na
TPY	0.054	0.006	0.003	0.0001	0.0014	0.0014	9.519

6 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	5.414	0.620	0.285	0.006	0.136	0.136	na
lbs/day	32.487	3.717	1.710	0.037	0.818	0.818	na
All Engines							
TPY	1.95	0.22	0.10	0.00	0.049	0.049	342.7

Scenario 6: **Maint/Readiness Testing, 20 hrs/yr, Nominal Perf Data, 1% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	4.032	2.460	0.957	0.002	0.178	0.178	na
lbs/day	4.032	2.460	0.957	0.002	0.178	0.178	na
TPY	0.040	0.025	0.010	0.0000	0.0018	0.0018	5.893

6 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	4.032	2.460	0.957	0.002	0.178	0.178	na
lbs/day	24.194	14.762	5.741	0.010	1.066	1.066	na
All Engines							
TPY	1.45	0.89	0.34	0.001	0.064	0.064	212.1

Table AQ1-2 Emissions Estimates for Emergency Standby Generators

Engine Mfg:	**Cummins**	# of Units:	3	Max # of Engines Tested per Day:	3
Model #:	**QSX15-G9**			*(engines are not tested concurrently)*	
Fuel:	ULSD	**Engine OPs Data**			

METRIC UNITs

Fuel S, %wt:	0.0015	**SO2, lbs/hr**	**BHP**	**kWe**	**Load %**	**RPM**	**Fuel, gph**	**Stk Ht, ft**	**Stk Diam, in**	**Stk Temp, F**	**mmbtu/hr**	**Stk ACFM**	**Stack Vel, f/s**	**Stk Diam, m**	**Stk Temp, Kelvins**	**Stk Vel, m/s**
Fuel wt, lb/gal:	7.05	0.007191	731	500	100	1800	34	TBD	12	894	4.73	3442	73.0415	0.3048	752.04	22.2631
Btu/gal:	139000	0.005351	554	375	75	1800	25.3	TBD	12	852	3.52	2771	58.8025	0.3048	728.71	17.9230
Lbs S/1000 gal:	0.10575	0.003892	378	250	50	1800	18.4	TBD	12	828	2.56	2245	47.6404	0.3048	715.37	14.5208
Lbs SO2/1000 gal:	0.2115	0.002200	201	125	25	1800	10.4	TBD	12	719	1.45	1418	30.0909	0.3048	654.82	9.1717
EPA Tier:	2	0.001248	96	50	10	1800	5.9	TBD	12	541	0.82	955	20.2657	0.3048	555.93	6.1770
Turbocharged:	Yes	0.000677	19	0	1	1800	3.2	TBD	12	418	0.44	765	16.2338	0.3048	487.59	4.9481
Aftercooled:	Yes							Stack Exit Area (sq.ft) =	0.785398							

Scenarios	**NOx**	**CO**	**VOC**	**SO2**	**PM10**	**PM2.5**	**CO2e lb/mmbtu**
	Emissions Factor Scenarios (all values in g/bhp-hr)						
Declared Emergency Ops, 100 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Maint/Readiness Testing, 20 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Declared Emergency Ops, 100 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	3.71	0.40	0.19	0.005	0.080	0.080	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	3.71	0.40	0.19	0.005	0.080	0.080	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 10% Load	3.71	0.40	0.19	0.005	0.080	0.080	163.052
Maint/Readiness Testing, 20 hrs/yr, Nominal Perf Data, 1% Load	8.50	10.30	4.02	0.005	0.190	0.190	163.052

Nominal *__Screening__* Emissions (g/hp-hr)

Load %	**NOx**	**CO**	**PM**	**SO2**
100	4.80	0.20	0.020	4.462E-3
75	4.80	0.20	0.040	4.381E-3
50	3.60	0.20	0.050	4.670E-3
25	3.80	0.70	0.150	4.964E-3
10	4.70	6.20	0.110	5.896E-3
1	8.50	10.30	0.190	1.616E-2

In the Screening/Refined Modeling Analyses:
Used NSPS Tier 2 EFs for CO when > Nominal
Used Cycle-weighted EFs for PM when > Nominal

40 CFR 89 Emissions Factors are derived from the cycle weighted load point testing per Subpart E, Appendix A for constant speed engines.
Protocol D2, ref ISO 8178-1 and ISO 8178-4.
Nominal performance data from Cummins memo dated 9-17-19, Standby rating, per ISO 8178-1.

APC Installed: No Diesel Particulate Filters (DPF)

	NOx	**CO**	**VOC**	**SO2**	**PM10**	**PM2.5**	**CO2e lb/mmbtu**
	Controlled Emissions Factor Scenarios (all values in g/bhp-hr)						
Declared Emergency Ops, 100 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Maint/Readiness Testing, 20 hrs/yr, Tier 2 EFs, 100% Load	4.50	2.60	0.30	0.005	0.150	0.150	163.052
Declared Emergency Ops, 100 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	3.71	0.40	0.19	0.005	0.080	0.080	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load	3.71	0.40	0.19	0.005	0.080	0.080	163.052
Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 10% Load	3.71	0.40	0.19	0.005	0.080	0.080	163.052
Maint/Readiness Testing, 20 hrs/yr, Nominal Perf Data, 1% Load	8.50	10.30	4.02	0.005	0.190	0.190	163.052

Scenario 1: **Declared Emergency Ops, 100 hrs/yr, Tier 2 EFs, 100% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 24
Max Annual Runtime: 100

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	7.252	4.190	0.483	0.008	0.242	0.242	na
lbs/day	174.051	100.563	11.603	0.193	5.802	5.802	na
TPY	0.363	0.210	0.024	0.000	0.012	0.012	38.5

All Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	21.76	12.57	1.45	0.02	0.73	0.73	na
lbs/day	522.15	301.69	34.81	0.58	17.41	17.41	na
TPY	1.09	0.63	0.07	0.00	0.04	0.04	115.6

Scenario 2: **Maint/Readiness Testing, 20 hrs/yr, Tier 2 EFs, 100% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	7.252	4.190	0.483	0.008	0.242	0.242	na
lbs/day	7.252	4.190	0.483	0.008	0.242	0.242	na
TPY	0.073	0.042	0.005	0.000	0.002	0.002	7.7

3 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	7.252	4.190	0.483	0.008	0.242	0.242	na
lbs/day	21.756	12.570	1.450	0.024	0.725	0.725	na

All Engines

TPY	0.22	0.13	0.01	0.00	0.01	0.01	23.1

Scenario 3: **Declared Emergency Ops, 100 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 100

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	5.979	0.645	0.306	0.008	0.129	0.129	na
lbs/day	5.979	0.645	0.306	0.008	0.129	0.129	na
TPY	0.299	0.032	0.015	0.000	0.006	0.006	38.5

3 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	5.979	0.645	0.306	0.008	0.129	0.129	na
lbs/day	17.937	1.934	0.919	0.024	0.387	0.387	na

All Engines

TPY	0.90	0.10	0.05	0.00	0.02	0.02	115.6

Scenario 4: **Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 100% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	5.979	0.645	0.306	0.008	0.129	0.129	na
lbs/day	5.979	0.645	0.306	0.008	0.129	0.129	na
TPY	0.060	0.006	0.003	0.000	0.001	0.001	7.706

3 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	5.979	0.645	0.306	0.008	0.129	0.129	na
lbs/day	17.937	1.934	0.919	0.024	0.387	0.387	na

All Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
TPY	0.18	0.02	0.01	0.00	0.004	0.004	23.1

BAAQMD 150 Hrs/Yr Emissions Totals, TPY:	**Nox**	**CO**	**VOC**	**SO2**	**PM10**	**PM2.5**	**CO2e**
(based on 40 CFR 89 D2 Cycle Efs)	1.076	0.116	0.055	0.001	0.023	0.023	138.705

OPTIONAL RUN SCENARIOS

Scenario 5: **Maint/Readiness Testing, 20 hrs/yr, 40CFR89 D2 Cycle EFs, 10% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	0.785	0.085	0.040	0.001	0.017	0.017	na
lbs/day	0.785	0.085	0.040	0.001	0.017	0.017	na
TPY	0.008	0.001	0.000	0.000	0.000	0.000	1.337

3 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	0.785	0.085	0.040	0.001	0.017	0.017	na
lbs/day	2.356	0.254	0.121	0.003	0.051	0.051	na

All Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
TPY	0.02	0.00	0.00	0.00	0.001	0.001	4.0

Scenario 6: **Maint/Readiness Testing, 20 hrs/yr, Nominal Perf Data, 1% Load**

Max Hourly Runtime: 1
Max Daily Runtime: 1
Max Annual Runtime: 20

Single Engine

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	0.356	0.431	0.168	0.000	0.008	0.008	na
lbs/day	0.356	0.431	0.168	0.000	0.008	0.008	na
TPY	0.004	0.004	0.002	0.000	0.000	0.000	0.725

3 Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
lbs/hr	0.356	0.431	0.168	0.000	0.008	0.008	na
lbs/day	1.068	1.294	0.505	0.001	0.024	0.024	na

All Engines

	Nox	CO	VOC	SO2	PM10	PM2.5	CO2e
TPY	0.01	0.01	0.01	0.00	0.000	0.000	2.2

Table AQ1-3 Cooling Towers-Wet Surface Condensers PM10/PM2.5 Based on Makeup Water TDS and Cycles of Concentration

Project ID:	Equinix	Scenario:	Normal Ops (Annual Emissions)		
Cooling Tower/Wet SAC Particulate Emissions			**Tower Physical Data (optional)**		
# of Identical Towers:	3		# of Fans:		
# of Cells in each Tower:	9		Fan ACFM:		
Operational Schedule: Hrs/day	24		Fan Diam (ft):		0 m
Days/Year	365		Exit Vel (ft/sec)		0.000 m/s
Hrs/Year	8760		Length (ft)		0.00 m
Total tower circulation rate, gpm:	14148.0		Width (ft)		0.00 m
Flow of cooling water (lbs/hr)	7074565.9		Deck Ht (ft)		0.00 m
Avg TDS in Makeup Water: (mg/l or ppmw)	369.0		Fan Ht (ft)		0.00 m
Cycles of Concentration:	5.0				
Avg TDS of circ water (mg/l or ppmw)	1845.0	annual avg value after concentration cycles			
Flow of dissolved solids (lbs/hr)	13052.57				
Fraction of flow producing drift*	1.00	1= worst case			
Control efficiency of drift eliminators, %	0.001	0.000010			
Calculated drift rate (lbs water/hr)		70.75	1697.895821	Calc lbs/day	

	Per Tower	Per Cell	All Towers
PM10 emissions (lbs/hr)	**0.131**	**0.015**	**0.392**
PM10 emissions (lbs/day)	**3.133**	**0.348**	**9.398**
PM10 emissions (tpy)	**0.572**	**0.064**	**1.715**
PM2.5 fraction of PM10	1.00	1= worst case	
PM2.5 emissions (lbs/hr)	**0.131**	**0.015**	**0.392**
PM2.5 emissions (lbs/day)	**3.133**	**0.348**	**9.398**
PM2.5 emissions (tpy)	**0.572**	**0.064**	**1.715**

Notes:
Based on Method AP 42, Section 13.4, Jan 1995
*Technical Report EPA-600-7-79-251a, Page 63
Effects of Pathogenic and Toxic Materials Transported Via Cooling Device Drift - Volume 1.

Table AQ1-4 Cooling Towers-Wet Surface Condensers PM10/PM2.5 Based on Makeup Water TDS and Cycles of Concentration

Project ID:	Equinix		Scenario:	Maximum Ops (hour and day)	
Cooling Tower/Wet SAC Particulate Emissions			**Tower Physical Data (optional)**		
# of Identical Towers:	3		# of Fans:		
# of Cells in each Tower:	9		Fan ACFM:		
Operational Schedule: Hrs/day	24		Fan Diam (ft):		0 m
Days/Year	365		Exit Vel (ft/sec)		0.000 m/s
Hrs/Year	8760		Length (ft)		0.00 m
Total tower circulation rate, gpm:	23580.0		Width (ft)		0.00 m
Flow of cooling water (lbs/hr)	11790943.2		Deck Ht (ft)		0.00 m
Avg TDS in Makeup Water: (mg/l or ppmw)	369.0		Fan Ht (ft)		0.00 m
Cycles of Concentration:	5.0				
Avg TDS of circ water (mg/l or ppmw)	1845.0	annual avg value after concentration cycles			
Flow of dissolved solids (lbs/hr)	21754.29				
Fraction of flow producing drift*	1.00	1= worst case			
Control efficiency of drift eliminators, %	0.001	0.000010			
Calculated drift rate (lbs water/hr)		117.91	2829.826368	Calc lbs/day	

	Per Tower	Per Cell	All Towers
PM10 emissions (lbs/hr)	**0.218**	**0.024**	**0.653**
PM10 emissions (lbs/day)	**5.221**	**0.580**	**15.663**
PM10 emissions (tpy)	**0.953**	**0.106**	**2.859**
PM2.5 fraction of PM10	1.00	1= worst case	
PM2.5 emissions (lbs/hr)	**0.218**	**0.024**	**0.653**
PM2.5 emissions (lbs/day)	**5.221**	**0.580**	**15.663**
PM2.5 emissions (tpy)	**0.953**	**0.106**	**2.859**

Notes:

Based on Method AP 42, Section 13.4, Jan 1995

*Technical Report EPA-600-7-79-251a, Page 63

Effects of Pathogenic and Toxic Materials Transported Via Cooling Device Drift - Volume 1.

Appendix AQ2

Engine Specifications

Generator set data sheet

Model: C3250 D6e
Frequency: 60 Hz
Fuel type: Diesel
kW rating: 3250 Standby
3000 Prime
2500 Continuous
Emissions level: EPA NSPS Stationary Emergency Tier 2

Fuel consumption

	Standby				Prime				Continuous			
	kW (kVA)				**kW (kVA)**				**kW (kVA)**			
Ratings	3250 (4063)				3000 (3750)				2500 (3125)			
Ratings without fan[1]	3356 (4195)				3107 (3884)				2607 (3259)			
Load	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**	**1/4**	**1/2**	**3/4**	**Full**
US gph	73	122	171	221	68	114	159	204	61	98	136	174
L/hr	276	462	647	836	257	431	602	772	231	371	515	659

[1]Ratings for reference with the optional remote radiator cooling configuration. See note 1 under "Alternator data" section.

Engine

Engine	Standby rating	Prime rating	Continuous rating
Engine model	QSK95-G9		
Configuration	Cast iron, vee, 16 cylinder		
Aspiration	Turbocharged and after-cooled		
Gross engine power output, kWm (bhp)	3507 (4701)	3215 (4309)	2698 (3616)
BMEP at set rated load, kPa (psi)	2448 (355)	2248 (326)	1889 (274)
Bore, mm (in)	190.0 (7.48)		
Stroke, mm (in)	210.1 (8.27)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	12.6 (2480)		
Compression ratio	15.5:1		
Lube oil capacity, L (qt)	647 (684)		
Overspeed limit, rpm	2070		
Regenerative power, kW	321		

Fuel flow

Maximum fuel flow, L/hr	1601.1 (423)
Maximum fuel inlet restriction with clean filter, kPa (in Hg)	13.5 (4)
Maximum fuel return line restriction, kPa (in Hg)	34 (10)
Maximum fuel inlet temperature, °C (°F)	71.1 (160)
Maximum fuel outlet temperature, °C (°F)	92.2 (198)

Air

Combustion air, m^3/min (scfm)	276 (9750)	270 (9550)	260 (9190)
Maximum air cleaner restriction with clean filter, mm H_2O (in H_2O)	457 (18)		
Alternator cooling air, m^3/min (cfm)	255 (9005)		

2019 EPA Tier 2 Exhaust Emission Compliance Statement
C3250 D6e
Stationary Emergency
60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with Tier 2 emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO8178 D2.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	KCEXL95.0AAA-015
Effective Date:	10/01/2018
Date Issued:	10/01/2018
EPA Engine Family (Cummins Emissions Family):	KCEXL95.0AAA

Engine Information:

Model:	QSK95-G9	Bore:	7.48 in. (190 mm)
Engine Nameplate HP:	5051	Stroke:	8.27 in. (210 mm)
Type:	4 cycle, Vee, 16 Cylinder Diesel	Displacement:	5816 cu. in. (95.3 liters)
Aspiration:	Turbocharged and Aftercooled	Compression Ratio:	15.5:1
Emission Control Device:	Turbocharged and Aftercooled	Exhaust Stack Diameter:	14 in.

Diesel Fuel Emissions Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kW_m-hr		
	NO_X + NMHC	CO	PM	NO_X + NMHC	CO	PM
Test Results	4.6	0.5	0.11	6.2	0.7	0.15
EPA Emissions Limit	4.8	2.6	0.15	6.4	3.5	0.20

Test methods: EPA nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for constant speed engines (ref. ISO8178-4, D2)

Diesel fuel specifications: Cetane number: 40-48. Reference: ASTM D975 No. 2-D, <15 ppm Sulfur

Reference conditions: Air inlet temperature: 25°C (77°F), Fuel inlet temperature: 40°C (104°F). Barometric pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NOx correction, Restrictions: Intake restriction set to a maximum allowable limit for clean filter; Exhaust back pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Specification sheet

Diesel Generator set QSK95 series engine

2500 kW-3500 kW 60 Hz

EPA Tier 2 emissions regulated

Description

Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, fuel economy, reliability and versatility for stationary Standby, Prime and Continuous power applications.

Features

Cummins heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Control system - The PowerCommand® digital control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protective relay, output metering and auto-shutdown.

Cooling system - Standard and enhanced integral set-mounted radiator systems, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat. Also optional remote cooled configuration for non-factory supplied cooling systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

NFPA - The generator set accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

	Standby rating	Prime rating	Continuous rating	Emissions compliance	Data sheets
Model	**60 Hz kW (kVA)**	**60 Hz kW (kVA)**	**60 Hz kW (kVA)**	**EPA**	**60 Hz**
C3000 D6e	3000 (3750)	2750 (3438)	2500 (3125)	EPA Tier 2	NAD-5942-EN
C3250 D6e	3250 (4063)	3000 (3750)	2500 (3125)	EPA Tier 2	NAD-3527-EN
C3500 D6e	3500 (4375)	3000 (3750)	2750 (3438)	EPA Tier 2	NAD-5917-EN

Note: All ratings include radiator fan losses.

Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio Frequency (RF) emission compliance	47 CFR FCC PART 15 Subpart B (Class A for industrial)

Engine specifications

Bore	190 mm (7.48 in)
Stroke	210 mm (8.27 in)
Displacement	95.3 litres (5815 in^3)
Configuration	Cast iron, V 16 cylinder
Battery capacity	6 x 1400 amps minimum at ambient temperature of -18 °C (0 °F)
Battery charging alternator	145 amps
Starting voltage	24 volt, negative ground
Fuel system	Cummins modular common rail system
Fuel filter	On engine triple element, 5 micron primary filtration with water separators, 3 micron/2 micron (filter in filter design) secondary filtration.
Fuel transfer pump	Electronic variable speed priming and lift pump
Breather	Cummins impactor breather system
Air cleaner type	Unhoused dry replaceable element
Lube oil filter type(s)	Spin-on combination full flow filter and bypass filters
Standard cooling system	High ambient cooling system (ship loose)

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	Optimal
Rotor	Two bearing, flexible coupling
Insulation system	Class H on low and medium voltage, Class F on high voltage
Standard temperature rise	125 ºC Standby/105 ºC Prime
Exciter type	Optimal
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone Influence Factor (TIF)	< 50 per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	< 3
Anti-condensation heater	1400 watt

Available voltages

60 Hz Line – Neutral/Line – Line

- 220/380
- 240/416
- 255/440
- 7200/12470
- 277/480
- 347/600
- 2400/4160
- 7620/13200
- 7970/13800

Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- 480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40 °F)
- Heavy duty air cleaner
- Redundant fuel filter
- Air starter
- Redundant electric starting
- Eliminator oil filter system
- Lube oil make up
- Coalescing breather filter

Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise
- 150 °C rise
- Differential current transformers

Cooling system

- Enhanced high ambient cooling system (ship loose)
- Remote cooled configuration

Generator set options and accessories (continued)

Control panel

- Multiple language support
- Ground fault indication
- Remote annunciator panel
- Paralleling and shutdown alarm relay package
- Floor mounted pedestal installed control panel

Generator set

- Battery
- Battery charger
- LV and MV entrance box
- Spring isolators
- Factory witness tests
- IBC, OSHPD, IEEE seismic certification

Warranty

- 3, 5, or 10 years for Standby including parts (labor and travel optional)
- 2 or 3 years for Prime including parts, labor and travel

Note: Some options may not be available on all models - consult factory for availability.

PowerCommand 3.3 – control system

An integrated microprocessor based generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing. Refer to document S-1570 for more detailed information on the control.

AmpSentry – Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.

Power management – Control function provides battery monitoring and testing features and smart starting control system.

Advanced control methodology – Three phase sensing, full wave rectified voltage regulation, with a PWM output for stable operation with all load types.

Communications interface – Control comes standard with PCCNet and Modbus interface.

Regulation compliant – Prototype tested: UL, CSA and CE compliant.

Service - InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

Easily upgradeable – PowerCommand controls are designed with common control interfaces.

Reliable design – The control system is designed for reliable operation in harsh environment.

Multi-language support

Operator panel features

Operator/display functions

- Displays paralleling breaker status
- Provides direct control of the paralleling breaker
- 320 x 240 pixels graphic LED backlight LCD
- Auto, manual, start, stop, fault reset and lamp test/panel lamp switches
- Alpha-numeric display with pushbuttons
- LED lamps indicating genset running, remote start, not in auto, common shutdown, common warning, manual run mode, auto mode and stop

Paralleling control functions

- First Start Sensor™ system selects first genset to close to bus
- Phase lock loop synchronizer with voltage matching
- Sync check relay
- Isochronous kW and kVar load sharing
- Load govern control for utility paralleling
- Extended paralleling (base load/peak shave) mode
- Digital power transfer control, for use with a breaker pair to provide open transition, closed transition, ramping closed transition, peaking and base load functions.

Other control features

- 150 watt anti-condensation heater
- DC distribution panel
- AC auxiliary distribution panel

Alternator data

- Line-to-Neutral and Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kW, kVar, power factor kVA (three phase and total)
- Winding temperature
- Bearing temperature

Engine data

- DC voltage
- Engine speed
- Lube oil pressure and temperature
- Coolant temperature
- Comprehensive FAE data (where applicable)

Other data

- Genset model data
- Start attempts, starts, running hours, kW hours
- Load profile (operating hours at % load in 5% increments)
- Fault history
- Data logging and fault simulation (requires InPower)
- Air cleaner restriction indication
- Exhaust temperature in each cylinder

Standard control functions

Digital governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Standard control functions (continued)

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 3-phase, 4-wire Line-to-Line sensing
- Configurable torque matching

AmpSentry AC protection

- AmpSentry protective relay
- Over current and short circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field overload shutdown

Engine protection

- Battery voltage monitoring, protection and testing
- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown
- Full authority electronic engine protection

Control functions

- Time delay start and cool down
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop
- Data logging
- Cycle cranking
- Load shed
- Configurable inputs and outputs (20)
- Remote emergency stop

Ratings definitions

Emergency Standby Power (ESP):

Applicable for supplying power to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):

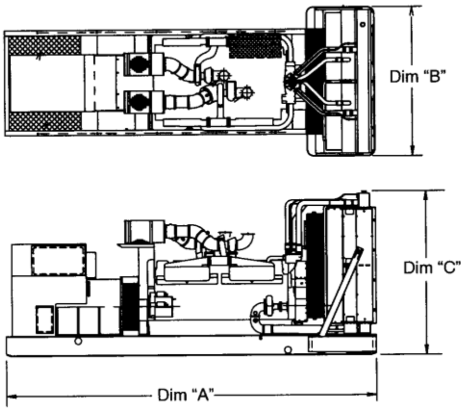
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):

Applicable for supplying power to varying electrical loads for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See PowerSuite library for specific model outline drawing number.

Do not use for installation design

Model	Dim "A"* mm (in.)	Dim "B"* mm (in.)	Dim "C"* mm (in.)	Set weight* dry kg (lbs)	Set weight* wet kg (lbs)
C3000 D6e	7902 (311)	3028 (119)	3663 (144)	29526 (65092)	31194 (68771)
C3250 D6e	7902 (311)	3028 (119)	3663 (144)	29526 (65092)	31194 (68771)
C3500 D6e	7902 (311)	3028 (119)	3663 (144)	29526 (65092)	31194 (68771)

* Weights and dimensions represent a set with standard features and alternator frame P80X.
See outline drawing for weights and dimensions of other configurations.

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	**U.S. EPA**	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
	All models are CSA certified to product class 4215-01.		

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™

NAS-5849-EN (09/17)

Exhaust

Exhaust	Standby rating	Prime rating	Continuous rating
Exhaust flow at rated load, m^3/min (cfm)	677 (23910)	641 (22640)	578 (20400)
Exhaust temperature at set rated load, °C (°F)	467 (872)	441 (825)	394 (742)
Maximum back pressure, kPa (in H_2O)	7 (28)		

Standard set-mounted radiator cooling

Ambient design, °C (°F)	47 (117)
Fan load, kWm (HP)	78.3 (105)
Coolant capacity (with radiator), L (US gal)	1120 (296)
Cooling system air flow, m^3/min (scfm)	3135 (110700)
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)

Optional set-mounted radiator cooling

Ambient design, °C (°F)	50 (122)
Fan load, kWm (HP)	78 (105)
Coolant capacity (with radiator), L (US gal)	1120 (296)
Cooling system air flow, m^3/min (scfm)	4097 (144700)
Maximum cooling air flow static restriction, kPa (in H_2O)	0.12 (0.5)

Optional remote radiator cooling

Engine coolant capacity, L (US gal)	379 (100)		
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)	3081 (814)		
Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min)	651 (172)		
Heat rejected, jacket water circuit, MJ/min (Btu/min)	98.50 (93350)	90 (85320)	75 (71130)
Heat rejected, aftercooler circuit, MJ/min (Btu/min)	22.50 (21280)	21.30 (20200)	19.30 (18270)
Heat rejected, fuel circuit, MJ/min (Btu/min)	0.29 (275)	0.26 (248)	0.21 (202)
Total heat radiated to room, MJ/min (Btu/min)	26.80 (25390)	24.70 (23390)	20.80 (19740)
Maximum friction head, jacket water circuit, kPa (psi)	83 (12)		
Maximum friction head, aftercooler circuit, kPa (psi)	83 (12)		
Maximum static head above engine crank centerline, jacket water circuit, m (ft)	18 (60)		
Maximum static head above engine crank centerline, aftercooler circuit, m (ft)	18 (60)		
Maximum jacket water outlet temp, °C (°F)	104.4 (220)	100 (212)	100 (212)
Maximum aftercooler inlet temp, °C (°F)	71.1 (160)	68 (155)	68 (155)
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)	46.1 (115)		

Note: For non-standard remote installations contact your local Cummins representative.

Weights

Unit dry weight kg (lbs)	29526 (65092)
Unit wet weight kg (lbs)	31195 (68771)

Note: Weights represent a set with standard features and alternator frame P80X. See outline drawing for weights of other configurations.

Derating factors

Standby	Full genset power available up to 864 m (2835 ft) at ambient temperatures up to 40 °C (104 °F) and 496 m (1627 ft) at ambient temperatures up to 50 °C (122 °F). Above these conditions, derate at 5.9% per 305 m (1000 ft) and 8% per 10 °C (18 °F).
Prime	Full genset power available up to 1024 m (3360 ft) at ambient temperatures up to 40 °C (104 °F) and 535 m (1755 ft) at ambient temperatures up to 50 °C (122 °F). Above these conditions, derate at 4.7% per 305 m (1000 ft) and 10.5% per 10 °C (18 °F).
Continuous	Full genset power available up to 1300 m (4265 ft) at ambient temperatures up to 40 °C (104 °F) and 905 m (2969 ft) at ambient temperatures up to 50 °C (122 °F). Above these conditions, derate at 6.1% per 305 m (1000 ft) and 10% per 10 °C (18 °F).

Ratings definitions

Emergency Standby Power (ESP):	Limited-Time Running Power (LTP):	Prime Power (PRP):	Base Load (Continuous) Power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

Alternator data[1]

Voltage	Connection[1]	Temp rise °C	Duty[2]	Max surge kVA[3]	Winding No.	Alternator	Feature code
380	Wye, 3-phase	105	C	N/A	13	ADS-531	B597-2
416	Wye, 3-phase	150	S	15093	12	ADS-532	BA53-2
416	Wye, 3-phase	125	P	15093	12	ADS-532	B982-2
416	Wye, 3-phase	80	C	15093	12	ADS-532	BB06-2
416	Wye, 3-phase	105	C	13283	12	ADS-531	BA54-2
440	Wye, 3-phase	125	S	14781	12	ADS 532	B535-2
440	Wye, 3-phase	150	S	14781	12	ADS 532	B701-2
440	Wye, 3-phase	105	P	38163	12	ADS-532	B981-2
440	Wye, 3-phase	125	P	13024	12	ADS-531	B692-2
440	Wye, 3-phase	80	C	14781	12	ADS-532	BA55-2
440	Wye, 3-phase	105	C	13024	12	ADS-531	B913-2
480	Wye, 3-phase	105	S	14781	12	ADS-532	B280-2
480	Wye, 3-phase	125/105/80	S/P/C	13024	12	ADS-531	B801-2
480	Wye, 3-phase	150/125	S/P	13024	12	ADS-531	B717-2
600	Wye, 3-phase	105	S	N/A	7	ADS-532	BB07-2
600	Wye, 3-phase	125/105/80	S/P/C	12426	7	ADS-531	B465-2
600	Wye, 3-phase	150/125/105	S/P/C	12426	7	ADS-531	B451-2
4160	Wye, 3-phase	80	S	15662	51	ADS-587	B935-2
4160	Wye, 3-phase	105	S	11185	51	ADS-545	B933-2
4160	Wye, 3-phase	125/105/80	S/P/C	11185	51	ADS-545	B467-2
4160	Wye, 3-phase	150	S	8752	51	ADS-520	BB77-2
4160	Wye, 3-phase	80	P	15662	51	ADS-587	B939-2
4160	Wye, 3-phase	125	P	8752	51	ADS-520	B936-2
4160	Wye, 3-phase	80	C	8752	51	ADS-520	B590-2
4160	Wye, 3-phase	105	C	7295	51	ADS-519	B834-2
12470	Wye, 3-phase	80	S	16841	8031	ADS-591	B607-2
12470	Wye, 3-phase	105/80	S/P	N/A	8030	ADS-590	B567-2
12470	Wye, 3-phase	125	S	15883	8029	ADS-589	B822-2
12470	Wye, 3-phase	105	P	13438	91	ADS-534	B823-2
12470	Wye, 3-phase	80	C	13438	91	ADS-534	B570-2
12470	Wye, 3-phase	105	C	11213	91	ADS-533	B569-2
13.2-13.8k	Wye, 3-phase	80	S	N/A	8030	ADS-590	B628-2
13200	Wye, 3-phase	105	S	16389	8029	ADS-589	B501-2
13.2-13.8k	Wye, 3-phase	125/105	S/P	13438	91	ADS-534	B803-2
13200	Wye, 3-phase	80	P	16389	8029	ADS-589	B566-2
13200	Wye, 3-phase	80	C	13438	91	ADS-534	B808-2
13.2-13.8k	Wye, 3-phase	105	C	7993	91	ADS-523	B657-2
13800	Wye, 3-phase	105	S	13438	91	ADS-534	B895-2
13800	Wye, 3-phase	80	P	16688	8029	ADS-589	B809-2
13800	Wye, 3-phase	80	C	11213	91	ADS-533	B565-2

Notes:

[1] Alternator data is configured for a set with ratings including engine cooling fan losses and standard features at 40 °C ambient temperature. For non-standard configurations, including remote radiator applications, check appropriate alternator data sheets or contact your local Cummins representative.

[2] Standby (S), Prime (P) and Continuous ratings (C).

[3] Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™

NAD-3527-EN (05/18)

September 17th, 2019

To Whom It May Concern:

With regards to Cummins Power Systems (CPS) manufactured diesel generator set model **C3250D6e** rated for 60 Hz operation and equipped with Cummins **QSK95-G9** engine:

When tested under the following conditions:

Table 1	
Fuel Specification:	ASTM D975 No. 2-D S15 diesel fuel with 0.0015% sulfur content (by weight), and 42-48 cetane number.
Air Inlet Temperature:	77 °F
Fuel Inlet Temperature:	104 °F (at fuel pump inlet)
Barometric Pressure:	29.53 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb. dry air

Based on engine emissions validation testing, the table below represents the nominal performance and exhaust emissions data for the generator set listed above:

	Standby					
PERFORMANCE DATA	**1%**	**10%**	**25%**	**50%**	**75%**	**100%**
BHP @ 1800 RPM (60 Hz)	155	562	1240	2371	3501	4631
Power Output (KWe)	33	325	813	1625	2438	3250
Fuel Consumption (US Gal/Hr.)	26	42	72	126	171	222
Exhaust Gas Flow (CFM)	5492	7187	10587	16885	20454	24336
Exhaust Gas Temperature (°F)	428	541	643	672	735	865
NMHC (Nonmethane Hydrocarbons)	2.80	0.59	0.28	0.17	0.09	0.06
NOx (Oxides of Nitrogen)	11.8	4.6	3.4	3.3	4.5	5.7
CO (Carbon Monoxide)	7.2	1.3	0.4	0.2	0.2	0.3
PM (Particulate Matter)	0.52	0.30	0.20	0.09	0.05	0.04
All emissions values are cited as g/BHP-hr						

Steady-State emissions recorded per ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

The NOx, HC, CO, and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. This data is subject to instrumentation and engine-to-engine variability. Field emissions test data is not guaranteed to these levels. Actual field test results may vary due to test ambient, site conditions, installation, fuel specification, test procedures, instrumentation and ambient correction factors. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Cummins Power Systems
1400 73rd Avenue NE
Minneapolis, MN 55432 USA
cumminspower.com

Values provided in the table below are representative of "Potential Site Variation" for the Equinix SV11 site in Santa Clara, CA. These values account for variances as indicated above without consideration of improper generator set maintenance.

	Standby					
PERFORMANCE DATA	**1%**	**10%**	**25%**	**50%**	**75%**	**100%**
BHP @ 1800 RPM (60 Hz)	155	562	1240	2371	3501	4631
Power Output (KWe)	33	325	813	1625	2438	3250
NMHC (Nonmethane Hydrocarbons)	4.76	1.00	0.48	0.29	0.15	0.10
NOx (Oxides of Nitrogen)	15.3	6.00	4.4	4.3	5.9	7.4
CO (Carbon Monoxide)	14.4	2.6	0.8	0.4	0.4	0.6
PM (Particulate Matter)	1.30	0.75	0.50	0.23	0.13	0.10
All emissions values are cited as g/BHP-hr						
Potential Site variation values provided above account for Engine, Ambient and Measurement variation with no correction factors.						

This letter does not supersede any of the commercial terms of sale, including, but not limited to, warranty coverage and compliance with law obligations. THE INFORMATION IN THIS LETTER IS PROVIDED "AS IS" AND WITH ALL FAULTS AND DEFECTS. CUMMINS DOES NOT WARRANT THE ACCURACY OF THE INFORMATION PROVIDED AND THIS LETTER SHOULD NOT BE SHARED WITH THIRD PARTIES WITHOUT CUMMINS PRIOR WRITTEN CONSENT. For further questions on this product or application, please contact the local Cummins Sales and Service representative.

Best Regards,

Tochukwu Duru

Application Engineer – Strategic Accounts (Data Center)

Office: +1 (651) 787-6252

Power Generation

Diesel Generator Set

Model DFEK 60 Hz
EPA Emissions

500 kW, 625 kVA Standby
455 kW, 569 kVA Prime

Description

The Cummins Power Generation DF-series commercial generator set is a fully integrated power generation system providing optimum performance, reliability, and versatility for stationary standby or prime power applications.

A primary feature of the DF GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty Cummins 4-cycle diesel engine, an AC alternator with high motor-starting kVA capacity, and an electronic voltage regulator with three-phase sensing for precise regulation under steady-state or transient loads. The DF GenSet accepts 100% of the nameplate standby rating in one step, in compliance with NFPA 110 requirements.

The standard PowerCommand® digital electronic control is an integrated system that combines engine and alternator controls for high reliability and optimum GenSet performance.

Optional weather-protective enclosures and coolant heaters shield the generator set from extreme operating conditions. Environmental concerns are addressed by low exhaust emission engines, sound-attenuated enclosures, exhaust silencers, and dual-wall fuel tanks. A wide range of options, accessories, and services are available, allowing configuration to your specific power generation needs.

Every production unit is factory tested at rated load and power factor. This testing includes demonstration of rated power and single-step rated load pickup. Cummins Power Generation manufacturing facilities are registered to ISO9001 quality standards, emphasizing our commitment to high quality in the design, manufacture, and support of our products. The generator set is CSA certified and is available as UL2200 Listed. The PowerCommand control is UL508 Listed.

All Cummins Power Generation systems are backed by a comprehensive warranty program and supported by a worldwide network of 170 distributors and service branches to assist with warranty, service, parts, and planned maintenance support.

Features

UL Listed Generator Set - The complete generator set assembly is available Listed to UL 2200.

Low Exhaust Emissions - Engine certified to U.S. EPA Nonroad Source Emission Standards, 40 CFR 89, Tier 2.

Cummins Heavy-Duty Engine - Rugged 4-cycle industrial diesel delivers reliable power, low emissions, and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings; low waveform distortion with non-linear loads, fault clearing short-circuit capability, and class H insulation. The alternator electrical insulation system is UL1446 Recognized.

Permanent Magnet Generator (PMG) - Offers enhanced motor starting and fault clearing short circuit capability.

Control System - The PowerCommand electronic control is standard equipment and provides total genset system integration, including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection, and NFPA 110 compliance. PowerCommand control is Listed to UL508.

Cooling System - Provides reliable running at the rated power level, at up to 50°C ambient temperature.

Integral Vibration Isolation - Robust skid base supports the engine, alternator, and radiator on isolators, minimizing transmitted vibration.

E-Coat Finish - Dual electro-deposition paint system provides high resistance to scratches, corrosion, or fading.

Enclosures - Optional weather-protective and sound-attenuated enclosures are available.

Fuel Tanks - Dual wall sub-base fuel tanks are also offered.

Certifications - Generator sets are designed, manufactured, tested, and certified to relevant UL, NFPA, ISO, IEC, and CSA standards.

Warranty and Service - Backed by a comprehensive warranty and worldwide distributor network.

Generator Set

The general specifications provide representative configuration details. Consult the outline drawing for installation design.

Specifications – General

See outline drawing 500-3326 for installation design specifications.

Unit Width, in (mm)	60.0 (1524)
Unit Height, in (mm)	71.3 (1812)
Unit Length, in (mm)	152.1 (3864)
Unit Dry Weight, lb (kg)	9500 (4309)
Unit Wet Weight, lb (kg)	9800 (4445)
Rated Speed, rpm	1800
Voltage Regulation, No Load to Full Load	±0.5%
Random Voltage Variation	±0.25%
Frequency Regulation	Isochronous
Random Frequency Variation	±0.25%
Radio Frequency Interference	IEC 801.2, Level 4 Electrostatic Discharge IEC 801.3, Level 3 Radiated Susceptibility

Cooling	**Standby**	**Prime**
Standard Set-Mounted Radiator Cooling (Dwg. 500-3326)		
Set Coolant Capacity, US Gal (L)	15.3 (57.9)	15.3 (57.9)
Total Heat Rejected from Cooling System, BTU/min (MJ/min)	18010.0 (19.1)	14950.0 (15.8)
Heat Radiated to Room, BTU/min (MJ/min)	3625.0 (3.8)	3750.0 (4.0)

Air		
Combustion Air, scfm (m^3/min)	1470.0 (41.6)	1370.0 (38.8)
Alternator Cooling Air, scfm (m^3/min)	2190.0 (62.0)	2190.0 (62.0)
Radiator Cooling Air, scfm (m^3/min)	25000.0 (707.5)	25000.0 (707.5)
Max. Static Restriction, in H_2O (Pa)	0.5 (124.5)	0.5 (124.5)

Rating Definitions

Standby Rating based on: Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

Prime (Unlimited Running Time) Rating based on: Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimited number of hours. A 10% overload capability is available for limited time. (Equivalent to Prime Power in accordance with ISO8528 and Overload Power in accordance with ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Site Derating Factors

Genset may be operated up to 640 m (2100 ft) and 40°C (104°F) without power deration. For sustained operation above these conditions up to 1150 m (3770 ft), derate by 3.8% per 305 m (1000 ft), and 6.1% per 10°C (3.4% per 10°F). Above 1150 m (3770 ft) up to 1680 m (5510 ft), derate 6.3% total for 1150 m (3770 ft) plus 1.6% per 305 m (1000 ft) over 1150 m (3770 ft) and 3.8% per 10°C (2.2% per 10°F). Above 1680 m (5510 ft) up to 3000 m (9840 ft), derate 9% total for 1680 m (5510 ft) plus 3.7% per 305 m (1000 ft) and 5.7% per 10°C (3.2% per 10°F). Above 3000 m (9840 ft), derate 24.8% total for 3000 m (9840 ft) plus 1.8% per 305 m (1000 ft) above 3000 m (9840 ft) and 10% per 10°C (5.6% per 10°F).

Engine

Cummins heavy duty diesel engines use advanced combustion technology for reliable and stable power, low emissions, and fast response to sudden load changes.

Electronic governing provides precise speed regulation, especially useful for applications requiring constant (isochronous) frequency regulation such as Uninterruptible Power Supply (UPS) systems, non-linear loads, or sensitive electronic loads. Optional coolant heaters are recommended for all emergency standby installations or for any application requiring fast load acceptance after start-up.

Note: Features included with the engine: battery charging alternator, fuel/water separator, shutdown low coolant and bypass oil filtration.

Specifications – Engine

Base Engine	Cummins Model QSX15-G9 Nonroad 2, Turbo-charged with air-to-air charge air cooling, diesel-fueled
Displacement in^3 (L)	912.0 (14.9)
Overspeed Limit, rpm	2150 ±50
Regenerative Power, kW	52.00
Cylinder Block Configuration	Cast iron with replaceable wet liners, In-Line 6 cylinder
Battery Capacity	900 amps minimum at ambient temperature of 32°F (0°C)
Battery Charging Alternator	35 amps
Starting Voltage	24-volt, negative ground
Lube Oil Filter Types	Single spin-on combination element with full flow and bypass filtration
Standard Cooling System	104^o F (40^o C) ambient radiator

Power Output	**Standby**	**Prime**
Gross Engine Power Output, bhp (kWm)	755.0 (563.0)	680.0 (507.3)
BMEP at Rated Load, psi (kPa)	353.0 (2433.9)	321.0 (2213.2)
Bore, in. (mm)	5.39 (136.9)	5.39 (136.9)
Stroke, in. (mm)	6.65 (168.9)	6.65 (168.9)
Piston Speed, ft/min (m/s)	1995.0 (10.1)	1995.0 (10.1)
Compression Ratio	17.0:1	17.0:1
Lube Oil Capacity, qt. (L)	88.0 (83.3)	88.0 (83.3)
Fuel Flow		
Fuel Flow at Rated Load, US Gal/hr (L/hr)	112.0 (423.9)	112.0 (423.9)
Maximum Inlet Restriction, in. Hg (mm Hg)	5.0 (127.0)	5.0 (127.0)
Maximum Return Restriction, in. Hg (mm Hg)	6.5 (165.1)	6.5 (165.1)
Air Cleaner		
Maximum Air Cleaner Restriction, in. H_2O (kPa)	25.0 (6.2)	25.0 (6.2)
Exhaust		
Exhaust Flow at Rated Load, cfm (m^3/min)	3625.0 (102.6)	3135.0 (88.7)
Exhaust Temperature,^{o}F (^{o}C)	901.0 (482.8)	872.0 (466.7)
Max Back Pressure, in. H_2O (kPa)	41.0 (10.2)	41.0 (10.2)

Fuel System	Full Authority Electronic (FAE) Cummins HPI-TP								
Fuel Consumption		**Standby**				**Prime**			
60 Hz Ratings, kW (kVA)		**500 (625)**				**455 (569)**			
	Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full
	US Gal/hr	11.6	18.8	25.7	34.4	10.9	17.6	23.7	30.4
	L/hr	44	71	97	130	41	67	90	115

Alternator

Single-bearing alternators couple directly to the engine flywheel with flexible discs for drivetrain reliability and durability. No gear reducers or speed changers are used. Two-thirds pitch windings eliminate third-order harmonic content of the AC voltage waveform and provide the standardization desired for paralleling of generator sets.

A Permanent Magnet Generator (PMG) excitation system limits voltage dip during transient load application, sustains 3-phase short circuit current at approximately three times rated for up to 10 seconds, and is resistant to harmful effects of harmonics generated by non-linear loads. The alternator delivers excellent performance in applications containing large motors or sensitive electronics.

Various alternator sizes are available to meet individual application needs. Alternator sizes are differentiated by maximum winding temperature rise at the generator set standby or prime rating when operated in a 40^{o}C ambient environment. Available temperature rises range from 80^{o}C to 150^{o}C. Not all temperature rise selections are available on all models. Lower temperature rise is accomplished using larger alternators at lower current density. Lower temperature rise alternators have high motor starting kVA, lower voltage dip upon load application, and they are generally recommended to limit voltage distortion and heating due to harmonics induced by non-linear loads.

Alternator Application Notes

Alternator Space Heater - is recommended to inhibit condensation.

Available Output Voltages

<u>Three Phase</u>

[ ] 110/190

[ ] 110/220

[ ] 115/200

[ ] 115/230

[ ] 120/208

[ ] 127/220

[ ] 139/240

[ ] 220/380

[ ] 230/400

[ ] 240/416

[ ] 255/440

[ ] 277/480

[ ] 347/600

Specifications – Alternator

Design	Brushless, 4-pole, drip-proof revolving field
Stator	2/3 pitch
Rotor	Direct-coupled by flexible disc
Insulation System	Class H per NEMA MG1-1.65 and BS2757
Standard Temperature Rise	125°C standby
Exciter Type	Permanent Magnet Generator (PMG)
Phase Rotation	A (U), B (V), C (W)
Alternator Cooling	Direct-drive centrifugal blower
AC Waveform Total Harmonic Distortion	<5% total no load to full linear load <3% for any single harmonic
Telephone Influence Factor (TIF)	<50 per NEMA MG1-22.43.
Telephone Harmonic Factor (THF)	<3

Three Phase Table[1]		**105° C**	**105° C**	**105° C**	**125° C**	**125° C**	**125° C**	**125° C**	**125° C**	**150° C**	**150° C**	**150° C**	**150° C**
Feature Code		B301	B262	B252	B258	B252	B414	B246	B300	B426	B413	B424	B419
Alternator Data Sheet Number		307	308	307	308	307	308	306	306	307	307	305	306
Voltage Ranges		347/600	110/190 Thru 139/240 220/380 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	110/190 Thru 139/240 220/380 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	277/480	347/600	110/190 Thru 139/240 220/380 Thru 277/480	120/208 Thru 139/240 240/416 Thru 277/480	277/480	347/600
Surge kW		517	514	514	514	514	516	515	515	512	514	512	515
Motor Starting kVA (at 90% sustained voltage)	PMG	2208	2429	2208	2429	2208	2429	1896	1896	2208	2208	1749	1896

Full Load Current - Amps at Standby Rating	110/190	120/208	110/220	115/230	139/240	220/380	230/400	240/416	255/440	277/480	347/600
	1901	1737	1642	1571	1505	951	903	868	821	753	602

Notes:

1. Single Phase Capability: Single phase power can be taken from a three phase generator set at up to 40% of the generator set nameplate kW rating at unity power factor.

Control System

PowerCommand (2100) Control

PowerCommand (3200) Control

PowerCommand Control with AmpSentry™ Protection

- The PowerCommand Control is an integrated generator set control system providing governing, voltage regulation, engine protection, and operator interface functions.
- PowerCommand Controls include integral AmpSentry protection. AmpSentry provides a full range of alternator protection functions that are matched to the alternator provided.
- Controls provided include Battery monitoring and testing features, and Smart-Starting control system.
- InPower PC-based service tool available for detailed diagnostics
- Standard PCCNet interface. Available with Echelon LonWorks network interface
- NEMA 3R enclosure (2100 only)
- Suitable for operation in ambient temperatures from –40C to +70C, and altitudes to 13,000 feet (5000 meters)
- Prototype tested; UL, CSA, and CE compliant

AmpSentry AC Protection

- Overcurrent and short circuit shutdown
- Overcurrent warning
- Single & 3-phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var
- Excitation fault (2100 only)

Engine Protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- High oil temperature warning
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High and low battery voltage
- Weak battery
- Dead battery
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

Operator Interface

- OFF/MANUAL/AUTO mode switch
- MANUAL RUN/STOP switch
- Panel lamp/reset switch
- Emergency Stop switch
- Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls, and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- (5) configurable LED lamps (2100 only)
- LED Bargraph AC data display
- Panel Lighting with switch and timer

Alternator Data

- Line to Line and Line to Neutral AC volts
- 3-phase AC current
- Frequency
- Total and individual phase kW and kVA

Engine Data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature
- FAE engine data (varies with engine)

Other Data

- Genset model data
- Start attempts, Starts, running hours
- KW hours (total and since reset)
- Fault history
- Load Profile (Hours less than 30% and hours more than 90% load)
- System Data Display (optional with network and other PowerCommand gensets or transfer switches)

Governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

Voltage Regulation

- Integrated digital electronic voltage regulator
- 3-phase line to neutral sensing
- PMG Control Interface
- Single and three phase fault regulation
- Configurable Torque Matching

Control Functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- PCCNet Interface
- (4) Configurable inputs
- (4) Configurable outputs (2100 only)

Options

- ❑ Fast Closed Transition Power Transfer Control (3200 Control)
- ❑ Ramping Closed Transition Power Transfer (3200 Control)
- ❑ Paralleling (3200 Control)
- ❑ Key-type mode switch
- ❑ Ground fault module
- ❑ Exhaust Temperature Monitor
- ❑ Echelon LonWorks interface
- ❑ Digital input and output module(s) (loose)
- ❑ Remote Annunciator (loose)
- ❑ (8) configurable network inputs and (16) outputs

Generator Set Options

Engine

[ ] 208/240/480 V thermostatically controlled coolant heater for ambient above 40°F (4.5°C)
[ ] 208/240/480 V thermostatically controlled coolant heater for ambient below 40°F (4.5°C)
[ ] 120 V 300 W lube oil heater
[ ] Heavy-duty air cleaner with safety element

Cooling System

[ ] 125°F (50°C) ambient radiator

Fuel System

[ ] 300 Gal (1136 L) Sub-base tank
[ ] 400 Gal (1514 L) Sub-base tank
[ ] 500 Gal (1893 L) Sub-base tank
[ ] 600 Gal (2271 L) Sub-base tank
[ ] 660 Gal (2498 L) Sub-base tank
[ ] 850 Gal (3218 L) Sub-base tank
[ ] 1700 Gal (6435 L) Sub-base tank

Alternator

[ ] 80°C rise alternator
[ ] 105°C rise alternator
[ ] 150°C rise alternator
[ ] 120/240 V, 300 W anti-condensation heater

Control Panel

[ ] 120/240 V, 150 W control anti-condensation space heater
[ ] Ground fault alarm
[ ] Paralleling configuration
[ ] Power transfer control
[ ] Remote fault signal package
[ ] Run relay package

Exhaust System

[ ] Critical grade exhaust silencer
[ ] Exhaust packages
[ ] Industrial grade exhaust silencer
[ ] Residential grade exhaust silencer

Generator Set

[ ] AC entrance box
[ ] Batteries
[ ] Battery charger
[ ] Export box packaging
[ ] UL2200 Listed
[ ] Main line circuit breaker
[ ] Paralleling accessories
[ ] Remote annunciator panel
[ ] Sound-attenuated enclosure (2 levels) with internal silencers
[ ] Spring isolators
[ ] Weather-protective enclosure with internal silencer
[ ] 2 year prime power warranty
[ ] 2 year standby warranty
[ ] 5 year basic power warranty
[ ] 10 year major components warranty

Available Products and Services

A wide range of products and services is available to match your power generation system requirements. Cummins Power Generation products and services include:

Diesel and Spark-Ignited Generator Sets

Transfer Switches

Bypass Switches

Parallel Load Transfer Equipment

Digital Paralleling Switchgear

PowerCommand Network and Software

Distributor Application Support

Planned Maintenance Agreements

Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available. Contact your distributor/dealer for more information.

Certifications

ISO9001 - This generator set was designed and manufactured in facilities certified to ISO9001.

CSA - This generator set is CSA certified to product class 4215-01.

PTS - The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Products bearing the PTS symbol have been subjected to demanding tests in accordance to NFPA 110 to verify the design integrity and performance under both normal and abnormal operating conditions including short circuit, endurance, temperature rise, torsional vibration, and transient response, including full load pickup.

UL - The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

See your distributor for more information

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Important: Backfeed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.

September 23rd, 2019

To Whom It May Concern:

With regards to Cummins Power Systems (CPS) manufactured diesel generator set model **DFEK** rated for 60 Hz operation and equipped with Cummins **QSX15-G9** engine:

When tested under the following conditions:

Table 1	
Fuel Specification:	ASTM D975 No. 2-D S15 diesel fuel with 0.0015% sulfur content (by weight), and 42-48 cetane number.
Air Inlet Temperature:	77 °F
Fuel Inlet Temperature:	104 °F (at fuel pump inlet)
Barometric Pressure:	29.53 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb. dry air

Based on engine emissions validation testing, the table below represents the nominal performance and exhaust emissions data for the generator set listed above:

	Standby					
PERFORMANCE DATA	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**
BHP @ 1800 RPM (60 Hz)	19	96	201	378	554	731
Power Output (KWe)	0	50	125	250	375	500
Fuel Consumption (US Gal/Hr.)	3.2	5.9	10.4	18.4	25.3	34.0
Exhaust Gas Flow (CFM)	765	955	1418	2245	2771	3442
Exhaust Gas Temperature (°F)	418	541	719	828	852	894
NMHC (Nonmethane Hydrocarbons)	4.02	0.67	0.21	0.13	0.07	0.06
NOx (Oxides of Nitrogen)	8.5	4.7	3.8	3.6	4.8	4.8
CO (Carbon Monoxide)	10.3	6.2	0.7	0.2	0.2	0.2
PM (Particulate Matter)	0.19	0.11	0.15	0.05	0.04	0.02
All emissions values are cited as g/BHP-hr						

Steady-State emissions recorded per ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

The NOx, HC, CO, and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. This data is subject to instrumentation and engine-to-engine variability. Field emissions test data is not guaranteed to these levels. Actual field test results may vary due to test ambient, site conditions, installation, fuel specification, test procedures, instrumentation and ambient correction factors. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

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Minneapolis, MN 55432 USA
cumminspower.com

Values provided in the table below are representative of "Potential Site Variation" for the Equinix SV11 site in Santa Clara, CA. These values account for variances as indicated above without consideration of improper generator set maintenance.

	Standby					
PERFORMANCE DATA	**0%**	**10%**	**25%**	**50%**	**75%**	**100%**
BHP @ 1800 RPM (60 Hz)	19	96	201	378	554	731
Power Output (KWe)	0	50	125	250	375	500
NMHC (Nonmethane Hydrocarbons)	6.83	1.13	0.36	0.22	0.12	0.10
NOx (Oxides of Nitrogen)	11.1	6.1	4.9	4.7	6.2	6.3
CO (Carbon Monoxide)	20.6	12.4	1.4	0.5	0.5	0.3
PM (Particulate Matter)	0.48	0.28	0.37	0.12	0.09	0.05
All emissions values are cited as g/BHP-hr						
Potential Site variation values provided above account for Engine, Ambient and Measurement variation with no correction factors.						

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Best Regards,

Tochukwu Duru

Application Engineer – Strategic Accounts (Data Center)

Office: +1 (651) 787-6252

2018 EPA Tier 2 Exhaust Emission Compliance Statement 500DFEK Stationary Emergency

60 Hz Diesel Generator Set

Compliance Information:

The Engine used in this generator set complies with Tier 2 emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO8178 D2.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	JCEXL015.AAJ-004
Effective Date:	06/26/2017
Date Issued:	06/26/2017
EPA Engine Family (Cummins emissions family):	JCEXL015.AAJ

Engine Information:

Model:	QSX / QSX15 / QSX15-G / QSX15-G9	Bore:	5.39 in. (137 mm)
Engine Nameplate HP:	755	Stroke:	6.65 in. (169 mm)
Type:	4 cycle, in-line, 6 cylinder diesel	Displacement:	912 cu. in. (15 liters)
Aspiration:	Turbocharged and CAC	Compression Ratio:	17.0:1
Emission Control Device:	Electronic Control	Exhaust Stack Diameter:	8 in.

Diesel Fuel Emissions Limits

D2 Cycle Exhaust Emissions	Grams per BHP-hr			Grams per kW_m-hr		
	NO_X + NMHC	CO	PM	NO_X + NMHC	CO	PM
Test results - diesel fuel (300-4000 ppm sulfur)	4.3	0.4	0.10	5.7	0.6	0.13
EPA emissions limit	4.8	2.6	0.15	6.4	3.5	0.20
Test results - CARB diesel fuel (<15 ppm sulfur)	3.9	0.4	0.08	5.2	0.06	0.11
CARB emissions limit	4.8	2.6	0.15	6.4	3.5	0.20

The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.
Test methods: EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2)

Diesel fuel specifications: Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.
Reference conditions: Air Inlet Temperature: 25 °C (77 °F), Fuel Inlet Temperature: 40 °C (104 °F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H2O/lb) of dry air; required for NO_X correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Appendix AQ3
Modeling Support Data

Table AQ3-1 | **Equinix Large Engine Screening Analysis - NOMINAL <u>Screening</u> Emissions**
QSK95 Engines (36)

Emergency Generator	**SV1201**	**SV1202**	**EG1203**	**EG1204**	**EG1205**	**EG1206**	**EG1207**	**EG1208**	**EG1209**
Load %	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
kWe	3250	3250	3250	3250	3250	3250	3250	3250	3250
bhp	4631	4631	4631	4631	4631	4631	4631	4631	4631
Stack Height (feet)	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	865	865	865	865	865	865	865	865	865
Volumetric Flowrate ACFM	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336
Stack Velocity (ft/sec)	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93
Stack Exit Velocity (m/s)	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	Load Emissions (g/hp-hr)								
NOx (g/hp-hr/engine)	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM	**Short-term Screening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**								
NOx (lb/hr/engine)	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195
CO (lb/hr/engine)	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545
SO2 (lb/hr/engine)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
PM (lb/hr/engine)	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1-Hr Unitized Conc (ug/m3)	106.20473	87.84569	88.47119	87.29857	98.15514	118.81583	139.42632	104.04036	102.01824
X(m)	608020.0	608160.0	608140.0	608004.0	608020.0	608000.0	608100.0	608080.0	608085.7
Y(m)	4121360.0	4121540.0	4121360.0	4121405.5	4121380.0	4121380.0	4121560.0	4121520.0	4121500.7
Z(m)	62.5	63.5	62.9	62.3	62.5	62.3	63.2	62.5	62.6
YYMMDDHH	13010117	13042209	15120708	15051416	15051416	17111808	13112017	17091313	16031115
3-Hr Unitized Conc (ug/m3)	66.77267	63.00316	60.85349	52.43543	55.84700	63.74486	107.14166	95.65559	96.85380
X(m)	608154.6	608154.6	608140.0	607996.5	608001.4	608085.7	608080.0	608070.1	608085.7
Y(m)	4121397.9	4121397.9	4121360.0	4121542.4	4121549.1	4121500.7	4121560.0	4121512.1	4121500.7
Z(m)	63.1	63.1	62.9	62.1	62.2	62.6	63.2	62.5	62.6
YYMMDDHH	13091312	13041412	13112115	16031012	14120412	17010812	16031115	16031115	16031115
8-Hr Unitized Conc (ug/m3)	48.95307	49.02675	48.28915	45.68509	49.18333	49.13961	58.75169	58.20903	56.66320
X(m)	608143.5	608160.0	608154.6	608005.4	608120.0	608070.1	608154.6	608154.6	608040.0
Y(m)	4121382.6	4121400.0	4121397.9	4121535.9	4121560.0	4121512.1	4121397.9	4121397.9	4121580.0
Z(m)	63.2	63.1	63.1	62.2	63.2	62.5	63.1	63.1	62.8
YYMMDDHH	16083116	14062416	16083116	14112916	17052516	14112916	17072816	17072816	13061016
24-Hr Unitized Conc (ug/m3)	20.56677	19.82532	19.52479	18.82452	18.45194	18.05209	24.26520	23.96371	22.48644
X(m)	608143.5	608154.6	608154.6	608005.4	608120.0	608070.1	608160.0	608160.0	608120.0
Y(m)	4121382.6	4121397.9	4121397.9	4121535.9	4121560.0	4121512.1	4121400.0	4121400.0	4121480.0
Z(m)	63.2	63.1	63.1	62.2	63.2	62.5	63.1	63.1	63.0
YYMMDDHH	16083124	16083124	16083124	14112924	17052524	14112924	14073124	14073124	16052024
	Short-term Pollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)								
NOx (g/s/engine)	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333
CO (g/s/engine)	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345
SO2 (g/s/engine)	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059
PM (g/s/engine)	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415
1-Hour NOx (ug/m3)***	778.799	644.172	648.759	640.160	719.772	871.276	1022.413	762.928	748.100
1-Hour CO (ug/m3)	355.255	293.844	295.936	292.014	328.329	397.439	466.381	348.015	341.251
8-Hour CO (ug/m3)**	122.811	122.996	121.145	114.612	123.389	123.279	147.393	146.032	142.154
1-Hour SO2 (ug/m3)	0.627	0.518	0.522	0.515	0.579	0.701	0.823	0.614	0.602
3-Hour SO2 (ug/m3)	0.394	0.372	0.359	0.309	0.329	0.376	**0.632**	0.564	0.571
24-Hour SO2 (ug/m3)**	0.073	0.070	0.069	0.067	0.065	0.064	0.086	0.085	0.080
24-Hour PM (ug/m3)**	1.746	1.683	1.658	1.598	1.567	1.533	2.060	2.035	1.909
	Annual Unitized Impacts (ug/m3 for 1.0 g/s/engine)								
	2013	**2014**	**2015**	**2016**	**2017**	**5-Year**			
Ann. Unitized Conc (ug/m3)	124.09532	111.07750	117.64675	104.73900	109.97852	113.50742		Modeled Hours/Day:	
X(m)	608154.61	608154.61	608154.61	608154.61	608154.61	608154.61			
Y(m)	4121397.89	4121397.89	4121397.89	4121397.89	4121397.89	4121397.89			
Z(m)	63.05	63.05	63.05	63.05	63.05	63.05			

Worst-Case Engine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent

Emergency Generator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the buildi

NOx impacts shown do ***<u>NOT</u> reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-1

Emergency Generator	EG1210	EG1211	EG1212	EG1801	EG1802	EG1803	EG1804	EG1805	EG1806	EG1807
Load %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
kWe	3250	3250	3250	3250	3250	3250	3250	3250	3250	3250
bhp	4631	4631	4631	4631	4631	4631	4631	4631	4631	4631
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	865	865	865	865	865	865	865	865	865	865
Volumetric Flowrate ACFM	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336
Stack Velocity (ft/sec)	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93
Stack Exit Velocity (m/s)	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
										Short-term S
NOx (g/hp-hr/engine)	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM										**Short-term S**
NOx (lb/hr/engine)	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195
CO (lb/hr/engine)	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545
SO2 (lb/hr/engine)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
PM (lb/hr/engine)	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1-Hr Unitized Conc (ug/m3)	100.36910	103.29644	122.38762	102.23404	94.49483	80.88902	82.37364	86.48457	91.29965	110.08969
X(m)	608120.0	608116.9	608160.0	607828.3	607828.3	607800.0	608014.3	608014.3	607947.3	607980.0
Y(m)	4121500.0	4121478.0	4121500.0	4121635.6	4121635.6	4121620.0	4121529.5	4121529.5	4121601.5	4121660.0
Z(m)	62.8	63.0	63.2	62.0	62.0	61.4	62.2	62.2	62.2	63.5
YYMMDDHH	16031114	15040513	15040513	16011008	16011008	16010508	16121108	16121108	15122211	17020508
3-Hr Unitized Conc (ug/m3)	97.95473	97.32185	95.97099	69.99424	64.74773	55.73658	60.53627	62.76820	86.36357	61.71649
X(m)	608101.3	608140.0	608160.0	607960.0	607828.3	607799.1	608014.3	607962.9	607947.3	607960.0
Y(m)	4121489.3	4121500.0	4121500.0	4121680.0	4121635.6	4121590.4	4121529.5	4121590.1	4121601.5	4121680.0
Z(m)	62.9	63.0	63.2	63.0	62.0	61.7	62.2	62.3	62.2	63.0
YYMMDDHH	16031115	16031115	16031115	17051015	15120612	15061312	15091112	17070715	17062315	15031512
8-Hr Unitized Conc (ug/m3)	59.25722	57.37613	53.83783	51.81399	52.26458	52.71494	54.33448	50.81065	66.00752	55.42602
X(m)	608132.5	608080.0	608100.0	607817.1	607828.3	607828.3	608014.3	608014.3	607947.3	607940.0
Y(m)	4121466.6	4121540.0	4121580.0	4121620.3	4121635.6	4121635.6	4121529.5	4121529.5	4121601.5	4121640.0
Z(m)	63.3	62.9	63.3	61.9	62.0	62.0	62.2	62.2	62.2	62.6
YYMMDDHH	16052016	17052616	13061016	15122116	14121916	14121916	17072816	17072816	16071016	17052616
24-Hr Unitized Conc (ug/m3)	23.76113	22.46516	21.63016	21.31084	21.46592	21.04838	20.47986	19.47413	26.55115	20.85643
X(m)	608132.5	608101.3	608140.0	607817.1	607817.1	607828.3	608014.3	607962.9	607947.3	607940.0
Y(m)	4121466.6	4121489.3	4121540.0	4121620.3	4121620.3	4121635.6	4121529.5	4121590.1	4121601.5	4121640.0
Z(m)	63.3	62.9	63.5	61.9	61.9	62.0	62.2	62.3	62.2	62.6
YYMMDDHH	16052024	13050624	13050624	15122124	15122124	14121924	17072824	16071024	17072824	17052624
										Short-term P
NOx (g/s/engine)	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333
CO (g/s/engine)	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345
SO2 (g/s/engine)	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059
PM (g/s/engine)	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415
1-Hour NOx (ug/m3)***	736.007	757.473	897.468	749.682	692.931	593.159	604.046	634.191	669.500	807.288
1-Hour CO (ug/m3)	335.735	345.527	409.387	341.973	316.085	270.574	275.540	289.291	305.397	368.250
8-Hour CO (ug/m3)**	148.662	143.942	135.066	129.988	131.119	132.249	136.312	127.471	165.596	139.050
1-Hour SO2 (ug/m3)	0.592	0.609	0.722	0.603	0.558	0.477	0.486	0.510	0.539	0.650
3-Hour SO2 (ug/m3)	0.578	0.574	0.566	0.413	0.382	0.329	0.357	0.370	0.510	0.364
24-Hour SO2 (ug/m3)**	0.084	0.080	0.077	0.075	0.076	0.075	0.072	0.069	**0.094**	0.074
24-Hour PM (ug/m3)**	2.017	1.907	1.836	1.809	1.822	1.787	1.739	1.653	**2.254**	1.771

			Annual Emissions & Pollutant Impacts (ug/m3)			
			(TPY/eng)	**(lb/hr/eng)**	**(g/s/eng)**	**(ug/m3)**
Ann. Unitized Conc (ug/m3)	10	NOx***	4.594E-1	2.517E-1	3.172E-2	**3.936E+0**
X(m)	(7AM-5PM)	SO2	5.105E-4	2.797E-4	3.524E-5	**4.374E-3**
Y(m)		PM	1.531E-2	8.392E-3	1.057E-3	**1.312E-1**
Z(m)		5-Yr PM2.5	1.531E-2	8.392E-3	1.057E-3	**1.200E-1**

: 6 engines operating during the 7AM-5PM 10-hour period modeled/day.

ng, followed by 07-12 in the same direction on the other side of the building, and ending with 13 for the small engine stack.

Worst-Case Eng

Emergency Ger

***NOx impacts

Table AQ3-1

Emergency Generator	EG1808	EG1809	EG1810	EG1811	EG1812	EG1901	EG1902	EG1903	EG1904	EG1905	EG1906
Load %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
kWe	3250	3250	3250	3250	3250	3250	3250	3250	3250	3250	3250
bhp	4631	4631	4631	4631	4631	4631	4631	4631	4631	4631	4631
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	865	865	865	865	865	865	865	865	865	865	865
Volumetric Flowrate ACFM	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336	24,336
Stack Velocity (ft/sec)	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91	185.91
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93	735.93
Stack Exit Velocity (m/s)	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	creening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)										
NOx (g/hp-hr/engine)	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM	**creening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**										
NOx (lb/hr/engine)	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195	58.195
CO (lb/hr/engine)	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545	26.545
SO2 (lb/hr/engine)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
PM (lb/hr/engine)	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123	1.123
1-Hr Unitized Conc (ug/m3)	96.74709	101.98432	108.40702	102.16862	142.11881	97.87804	89.89943	85.72100	90.64495	100.06066	97.38339
X(m)	607880.0	607860.0	607880.0	607980.0	607960.0	607799.1	607768.6	607800.0	607940.0	607940.0	607940.0
Y(m)	4121380.0	4121380.0	4121380.0	4121640.0	4121660.0	4121590.4	4121553.7	4121600.0	4121420.0	4121420.0	4121420.0
Z(m)	61.7	61.6	61.7	62.9	63.2	61.7	61.4	61.8	62.1	62.1	62.1
YYMMDDHH	15021808	13010117	13010108	16102714	15113017	17123108	15120908	15021908	16122017	16122017	15011017
3-Hr Unitized Conc (ug/m3)	62.35235	67.73867	72.66520	74.19192	81.75205	75.46553	59.38182	57.74335	70.39113	73.42335	78.67827
X(m)	607900.0	607980.0	607962.9	607960.0	607960.0	607820.7	607768.6	607800.0	607940.0	607940.0	607835.9
Y(m)	4121660.0	4121580.0	4121590.1	4121620.0	4121660.0	4121464.9	4121553.7	4121600.0	4121420.0	4121420.0	4121453.9
Z(m)	62.3	62.4	62.3	62.3	63.2	61.4	61.4	61.8	62.1	62.1	61.4
YYMMDDHH	16102912	16052015	14111612	14111612	16120512	17020212	13010512	16032015	14051612	14051612	17042315
8-Hr Unitized Conc (ug/m3)	53.16966	57.21573	53.14502	52.47333	53.42754	57.56872	52.68245	49.03176	57.00692	58.69978	68.36999
X(m)	607828.3	607978.5	607962.9	608019.2	608019.2	607820.7	607768.6	607780.0	607940.0	607940.0	607835.9
Y(m)	4121635.6	4121578.8	4121590.1	4121536.1	4121536.1	4121464.9	4121553.7	4121580.0	4121420.0	4121420.0	4121453.9
Z(m)	62.0	62.3	62.3	62.2	62.2	61.4	61.4	61.5	62.1	62.1	61.4
YYMMDDHH	13010516	16052016	16052016	15031216	15082516	17020216	13010516	17020616	17072816	16081416	17042316
24-Hr Unitized Conc (ug/m3)	20.51567	22.20814	21.20560	22.37019	22.22798	22.37292	20.73946	20.30371	22.99159	23.80531	26.52514
X(m)	607828.3	607978.5	607962.9	608019.2	608019.2	607820.7	607768.6	607790.8	607961.4	607940.0	607835.9
Y(m)	4121635.6	4121578.8	4121590.1	4121536.1	4121536.1	4121464.9	4121553.7	4121584.2	4121436.6	4121420.0	4121453.9
Z(m)	62.0	62.3	62.3	62.2	62.2	61.4	61.4	61.8	62.0	62.1	61.4
YYMMDDHH	13010524	16052024	16052024	15031224	15031224	17020224	13010524	17020624	15031224	17062424	17042324
	ollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)										
NOx (g/s/engine)	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333	7.333
CO (g/s/engine)	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345	3.345
SO2 (g/s/engine)	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059
PM (g/s/engine)	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415
1-Hour NOx (ug/m3)***	709.446	747.851	794.949	749.202	**1042.157**	717.740	659.233	628.592	664.699	733.745	714.112
1-Hour CO (ug/m3)	323.619	341.138	362.621	341.754	**475.387**	327.402	300.714	286.737	303.207	334.703	325.747
8-Hour CO (ug/m3)**	133.389	143.540	133.328	131.642	134.036	144.426	132.167	123.008	143.016	147.263	**171.523**
1-Hour SO2 (ug/m3)	0.571	0.602	0.640	0.603	**0.839**	0.577	0.530	0.506	0.535	0.590	0.575
3-Hour SO2 (ug/m3)	0.368	0.400	0.429	0.438	0.482	0.445	0.350	0.341	0.415	0.433	0.464
24-Hour SO2 (ug/m3)**	0.073	0.079	0.075	0.079	0.079	0.079	0.073	0.072	0.081	0.084	0.094
24-Hour PM (ug/m3)**	1.742	1.885	1.800	1.899	1.887	1.899	1.761	1.724	1.952	2.021	2.252
Ann. Unitized Conc (ug/m3)											
X(m)											
Y(m)											
Z(m)											

;ine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent 6 engines operating during the 7AM-5PM 10-h

erator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the building, followed by 07-12 in the same direction on tl

shown do ***NOT*** reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-1

Emergency Generator	EG1907	EG1908	EG1909	EG1910	EG1911	EG1912
Load %	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
kWe	3250	3250	3250	3250	3250	3250
bhp	4631	4631	4631	4631	4631	4631
Stack Height (feet)	24	24	24	24	24	24
Stack Exit Temp (deg.F)	865	865	865	865	865	865
Volumetric Flowrate ACFM	24,336	24,336	24,336	24,336	24,336	24,336
Stack Velocity (ft/sec)	185.91	185.91	185.91	185.91	185.91	185.91
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	735.93	735.93	735.93	735.93	735.93	735.93
Stack Exit Velocity (m/s)	56.6664	56.6664	56.6664	56.6664	56.6664	56.6664
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
NOx (g/hp-hr/engine)	5.70	5.70	5.70	5.70	5.70	5.70
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3	4.599E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM						
NOx (lb/hr/engine)	58.195	58.195	58.195	58.195	58.195	58.195
CO (lb/hr/engine)	26.545	26.545	26.545	26.545	26.545	26.545
SO2 (lb/hr/engine)	0.047	0.047	0.047	0.047	0.047	0.047
PM (lb/hr/engine)	1.123	1.123	1.123	1.123	1.123	1.123
1-Hr Unitized Conc (ug/m3)	104.83454	114.54491	110.41535	105.77070	100.21060	134.66053
X(m)	607740.0	608020.0	608020.0	608020.0	608040.0	607780.0
Y(m)	4121440.0	4121580.0	4121600.0	4121600.0	4121560.0	4121420.0
Z(m)	61.2	62.5	62.7	62.7	62.3	61.2
YYMMDDHH	17011608	15113017	13121908	13121908	16120717	15021808
3-Hr Unitized Conc (ug/m3)	65.40281	70.45501	85.91821	72.57840	65.52113	65.42625
X(m)	607768.6	607978.5	607980.0	608020.0	607940.0	607940.0
Y(m)	4121553.7	4121578.8	4121600.0	4121600.0	4121420.0	4121420.0
Z(m)	61.4	62.3	62.3	62.7	62.1	62.1
YYMMDDHH	15021712	16120512	16120512	14111612	15092612	17080412
8-Hr Unitized Conc (ug/m3)	42.97743	50.43126	51.78133	48.92487	55.90567	58.34391
X(m)	607768.6	607768.6	607768.6	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.1	62.1	62.1
YYMMDDHH	17021516	14121716	14121916	17082816	17080416	17080416
24-Hr Unitized Conc (ug/m3)	18.20714	22.29258	20.99160	19.04775	20.88388	21.13382
X(m)	607768.6	607768.6	607768.6	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.1	62.1	62.1
YYMMDDHH	15122024	14121724	14121924	13053124	17080424	17080424
NOx (g/s/engine)	7.333	7.333	7.333	7.333	7.333	7.333
CO (g/s/engine)	3.345	3.345	3.345	3.345	3.345	3.345
SO2 (g/s/engine)	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059
PM (g/s/engine)	0.1415	0.1415	0.1415	0.1415	0.1415	0.1415
1-Hour NOx (ug/m3)***	768.752	839.958	809.676	775.617	734.844	987.466
1-Hour CO (ug/m3)	350.672	383.153	369.339	353.803	335.204	450.439
8-Hour CO (ug/m3)**	107.820	126.519	129.906	122.740	140.253	146.370
1-Hour SO2 (ug/m3)	0.619	0.676	0.651	0.624	0.591	0.794
3-Hour SO2 (ug/m3)	0.386	0.416	0.507	0.428	0.387	0.386
24-Hour SO2 (ug/m3)**	0.064	0.079	0.074	0.067	0.074	0.075
24-Hour PM (ug/m3)**	1.546	1.893	1.782	1.617	1.773	1.794

Ann. Unitized Conc (ug/m3)	
X(m)	
Y(m)	
Z(m)	

ur period modeled/day.

e other side of the building, and ending with 13 for the small engine stack.

Table AQ3-2 **Equinix Large Engine Screening Analysis - NOMINAL Screening Emissions**
QSK95 Engines (36)

Emergency Generator	SV1201	SV1202	EG1203	EG1204	EG1205	EG1206	EG1207	EG1208	EG1209
Load %	75%	75%	75%	75%	75%	75%	75%	75%	75%
kWe	2438	2438	2438	2438	2438	2438	2438	2438	2438
bhp	3501	3501	3501	3501	3501	3501	3501	3501	3501
Stack Height (feet)	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	735	735	735	735	735	735	735	735	735
Volumetric Flowrate ACFM	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454
Stack Velocity (ft/sec)	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71
Stack Exit Velocity (m/s)	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	Load Emissions (g/hp-hr)								
NOx (g/hp-hr/engine)	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO									
Cycle-weighted > Nominal for PM	**Short-term Screening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**								
NOx (lb/hr/engine)	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733
CO (lb/hr/engine)	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068
SO2 (lb/hr/engine)	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036
PM (lb/hr/engine)	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849
1-Hr Unitized Conc (ug/m3)	116.53265	105.05285	98.01652	97.76390	109.23163	141.02587	156.08756	118.28262	110.51320
X(m)	608020.0	608046.6	608060.0	608004.0	607980.0	608020.0	608100.0	608085.7	608120.0
Y(m)	4121360.0	4121374.5	4121360.0	4121405.5	4121400.0	4121380.0	4121560.0	4121500.7	4121500.0
Z(m)	62.5	62.6	62.5	62.3	62.2	62.5	63.2	62.6	62.8
YYMMDDHH	13010117	14090708	14090708	15051416	15020208	17120508	13112017	17021210	16102714
3-Hr Unitized Conc (ug/m3)	72.80111	67.81341	64.11066	56.53304	60.43715	71.17125	112.89471	102.26936	101.66896
X(m)	608154.6	608143.5	608154.6	608040.0	608070.1	608085.7	608080.0	608070.1	608085.7
Y(m)	4121397.9	4121382.6	4121397.9	4121580.0	4121512.1	4121500.7	4121560.0	4121512.1	4121500.7
Z(m)	63.1	63.2	63.1	62.8	62.5	62.6	63.2	62.5	62.6
YYMMDDHH	13091312	16062312	15073112	17020315	17010812	17010812	16031115	16031115	16031115
8-Hr Unitized Conc (ug/m3)	51.67589	51.30224	55.07354	49.15374	50.87832	57.90951	65.47888	62.23506	61.24595
X(m)	608143.5	608160.0	608165.7	608005.4	608120.0	608085.7	608154.6	608154.6	608038.8
Y(m)	4121382.6	4121400.0	4121413.2	4121535.9	4121560.0	4121500.7	4121397.9	4121397.9	4121534.8
Z(m)	63.2	63.1	63.1	62.2	63.2	62.6	63.1	63.1	62.4
YYMMDDHH	16083116	14062416	17070916	14112916	17052516	14112916	14041116	14041116	17051016
24-Hr Unitized Conc (ug/m3)	21.74526	20.96976	21.35298	20.17585	19.12983	20.65142	25.75205	25.42808	24.23022
X(m)	608143.5	608154.6	608154.6	608005.4	608120.0	608070.1	608160.0	608160.0	608160.0
Y(m)	4121382.6	4121397.9	4121397.9	4121535.9	4121560.0	4121512.1	4121400.0	4121400.0	4121400.0
Z(m)	63.2	63.1	63.1	62.2	63.2	62.5	63.1	63.1	63.1
YYMMDDHH	16083124	16083124	15073124	14112924	17052524	14112924	14073124	14073124	14073124
	Short-term Pollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)								
NOx (g/s/engine)	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376
CO (g/s/engine)	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529
SO2 (g/s/engine)	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
PM (g/s/engine)	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070
1-Hour NOx (ug/m3)***	509.947	459.711	428.920	427.815	477.998	617.129	683.039	517.605	483.606
1-Hour CO (ug/m3)	294.711	265.679	247.884	247.245	276.247	356.654	394.745	299.137	279.488
8-Hour CO (ug/m3)**	98.016	97.308	104.461	93.232	96.503	109.840	124.197	118.044	116.168
1-Hour SO2 (ug/m3)	0.536	0.483	0.451	0.450	0.502	0.649	0.718	0.544	0.508
3-Hour SO2 (ug/m3)	0.335	0.312	0.295	0.260	0.278	0.327	**0.519**	0.470	0.468
24-Hour SO2 (ug/m3)**	0.060	0.058	0.059	0.056	0.053	0.057	0.071	0.070	0.067
24-Hour PM (ug/m3)**	1.396	1.346	1.371	1.295	1.228	1.326	1.653	1.632	1.556

Worst-Case Engine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represe

Emergency Generator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the buil

NOx impacts shown do ***NOT reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing

Table AQ3-2

Emergency Generator	EG1210	EG1211	EG1212	EG1801	EG1802	EG1803	EG1804	EG1805	EG1806	EG1807
Load %	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**
kWe	2438	2438	2438	2438	2438	2438	2438	2438	2438	2438
bhp	3501	3501	3501	3501	3501	3501	3501	3501	3501	3501
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	735	735	735	735	735	735	735	735	735	735
Volumetric Flowrate ACFM	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454
Stack Velocity (ft/sec)	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71
Stack Exit Velocity (m/s)	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
										Load Emissi
NOx (g/hp-hr/engine)	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM										**Short-term S**
NOx (lb/hr/engine)	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733
CO (lb/hr/engine)	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068
SO2 (lb/hr/engine)	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036
PM (lb/hr/engine)	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849
1-Hr Unitized Conc (ug/m3)	108.69724	111.61551	136.33980	110.41204	102.89882	90.09132	91.14777	94.97893	100.60522	118.80704
X(m)	608100.0	608116.9	608140.0	607828.3	607828.3	607800.0	608014.3	608014.3	607947.3	607980.0
Y(m)	4121540.0	4121478.0	4121540.0	4121635.6	4121635.6	4121600.0	4121529.5	4121529.5	4121601.5	4121660.0
Z(m)	62.9	63.0	63.5	62.0	62.0	61.8	62.2	62.2	62.2	63.5
YYMMDDHH	16102716	15040513	16011108	16011008	16011008	13012208	16121108	16121108	17103117	17020508
3-Hr Unitized Conc (ug/m3)	105.07484	104.56702	105.05547	72.14864	67.84438	59.07842	65.97492	71.15950	97.22919	64.09599
X(m)	608101.3	608140.0	608160.0	607828.3	607828.3	607828.3	608014.3	607947.3	607931.6	607960.0
Y(m)	4121489.3	4121500.0	4121500.0	4121635.6	4121635.6	4121635.6	4121529.5	4121601.5	4121612.9	4121680.0
Z(m)	62.9	63.0	63.2	62.0	62.0	62.0	62.2	62.2	62.1	63.0
YYMMDDHH	16031115	16031115	16031115	15021712	15120612	15042312	15091112	17070715	17080515	15031512
8-Hr Unitized Conc (ug/m3)	65.02321	60.06707	56.63252	56.84903	57.43198	55.43527	58.51486	55.29580	75.34015	58.17866
X(m)	608060.0	608080.0	608100.0	607960.0	607960.0	607828.3	608014.3	607962.9	607947.3	607940.0
Y(m)	4121520.0	4121540.0	4121580.0	4121680.0	4121680.0	4121635.6	4121529.5	4121590.1	4121601.5	4121640.0
Z(m)	62.5	62.9	63.3	63.0	63.0	62.0	62.2	62.3	62.2	62.6
YYMMDDHH	17052616	17052616	13061016	17051016	17052516	14121916	17072816	16071016	17072816	17052616
24-Hr Unitized Conc (ug/m3)	24.80992	23.70661	22.61554	22.01636	22.30409	22.21238	23.78467	22.26166	30.37082	21.93780
X(m)	608132.5	608101.3	608140.0	607817.1	607828.3	607828.3	608014.3	607962.9	607947.3	607940.0
Y(m)	4121466.6	4121489.3	4121540.0	4121620.3	4121635.6	4121635.6	4121529.5	4121590.1	4121601.5	4121640.0
Z(m)	63.3	62.9	63.5	61.9	62.0	62.0	62.2	62.3	62.2	62.6
YYMMDDHH	16052024	13050624	13050624	15122124	17032024	14121924	17072824	15072124	17072824	17052624
										Short-term F
NOx (g/s/engine)	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376
CO (g/s/engine)	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529
SO2 (g/s/engine)	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
PM (g/s/engine)	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070
1-Hour NOx (ug/m3)***	475.659	488.429	596.623	483.163	450.285	394.240	398.863	415.628	440.248	519.900
1-Hour CO (ug/m3)	274.895	282.276	344.803	279.232	260.231	227.841	230.513	240.202	254.431	300.463
8-Hour CO (ug/m3)**	123.333	113.932	107.418	107.828	108.934	105.147	110.988	104.882	142.901	110.350
1-Hour SO2 (ug/m3)	0.500	0.513	0.627	0.508	0.473	0.414	0.419	0.437	0.463	0.547
3-Hour SO2 (ug/m3)	0.483	0.481	0.483	0.332	0.312	0.272	0.303	0.327	0.447	0.295
24-Hour SO2 (ug/m3)**	0.068	0.065	0.062	0.061	0.062	0.061	0.066	0.061	0.084	0.061
24-Hour PM (ug/m3)**	1.593	1.522	1.452	1.413	1.432	1.426	1.527	1.429	1.950	1.408

nt 6 engines operating during the 7AM-5PM 10-hour period modeled/day.

ding, followed by 07-12 in the same direction on the other side of the building, and ending with 13 for the small engine stack

g.

Worst-Case En

Emergency Ger

***NOx impacts

Table AQ3-2

Emergency Generator	EG1808	EG1809	EG1810	EG1811	EG1812	EG1901	EG1902	EG1903	EG1904	EG1905	EG1906
Load %	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
kWe	2438	2438	2438	2438	2438	2438	2438	2438	2438	2438	2438
bhp	3501	3501	3501	3501	3501	3501	3501	3501	3501	3501	3501
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	735	735	735	735	735	735	735	735	735	735	735
Volumetric Flowrate ACFM	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454	20,454
Stack Velocity (ft/sec)	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26	156.26
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71	663.71
Stack Exit Velocity (m/s)	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	ons (g/hp-hr)										
NOx (g/hp-hr/engine)	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM	**creening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**										
NOx (lb/hr/engine)	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733	34.733
CO (lb/hr/engine)	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068	20.068
SO2 (lb/hr/engine)	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036
PM (lb/hr/engine)	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849	0.849
1-Hr Unitized Conc (ug/m3)	107.21945	111.09487	124.13382	113.10846	156.21937	106.46237	98.22415	95.59629	98.53941	108.24832	106.88387
X(m)	607880.0	607860.0	607880.0	607931.6	607960.0	607799.1	607768.6	607800.0	607940.0	607940.0	607940.0
Y(m)	4121380.0	4121380.0	4121380.0	4121612.9	4121660.0	4121590.4	4121553.7	4121600.0	4121420.0	4121420.0	4121420.0
Z(m)	61.7	61.6	61.7	62.1	63.2	61.7	61.4	61.8	62.1	62.1	62.1
YYMMDDHH	15021808	13010117	13010108	17021210	15113017	17123108	15120908	15021908	16122017	16122017	15011017
3-Hr Unitized Conc (ug/m3)	66.01278	70.35106	79.78058	78.91995	89.64412	83.57548	62.71070	66.40429	75.78199	77.22176	88.78669
X(m)	607900.0	608020.0	607962.9	607980.0	607960.0	607820.7	607768.6	607800.0	607940.0	607940.0	607820.7
Y(m)	4121660.0	4121600.0	4121590.1	4121620.0	4121660.0	4121464.9	4121553.7	4121600.0	4121420.0	4121420.0	4121464.9
Z(m)	62.3	62.7	62.3	62.7	63.2	61.4	61.4	61.8	62.1	62.1	61.4
YYMMDDHH	16102912	14111612	14111612	14111612	16120512	17020212	13010512	14061112	14051612	14051612	16083115
8-Hr Unitized Conc (ug/m3)	57.07204	58.78298	54.87155	55.19148	57.15635	64.38667	57.02007	53.71230	61.21248	63.55350	77.14672
X(m)	607828.3	607978.5	607962.9	608019.2	608019.2	607820.7	607768.6	607940.0	607940.0	607940.0	607820.7
Y(m)	4121635.6	4121578.8	4121590.1	4121536.1	4121536.1	4121464.9	4121553.7	4121420.0	4121420.0	4121420.0	4121464.9
Z(m)	62.0	62.3	62.3	62.2	62.2	61.4	61.4	62.1	62.1	62.1	61.4
YYMMDDHH	13010516	16052016	16052016	15031216	15082516	17020216	13010516	17072816	14041116	14041116	16083116
24-Hr Unitized Conc (ug/m3)	21.96170	23.69946	22.05598	23.64006	23.21527	24.94427	22.33507	22.10387	24.90264	25.51914	31.17532
X(m)	607828.3	607978.5	608014.3	608019.2	608019.2	607820.7	607768.6	607940.0	607961.4	607940.0	607820.7
Y(m)	4121635.6	4121578.8	4121529.5	4121536.1	4121536.1	4121464.9	4121553.7	4121420.0	4121436.6	4121420.0	4121464.9
Z(m)	62.0	62.3	62.2	62.2	62.2	61.4	61.4	62.1	62.0	62.1	61.4
YYMMDDHH	13010524	16052024	17072824	15031224	15031224	17020224	13010524	17072824	15031224	17062424	16083124
	ollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)										
NOx (g/s/engine)	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376	4.376
CO (g/s/engine)	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529	2.529
SO2 (g/s/engine)	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
PM (g/s/engine)	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070
1-Hour NOx (ug/m3)***	469.192	486.151	543.210	494.963	**683.616**	465.879	429.829	418.329	431.208	473.695	467.724
1-Hour CO (ug/m3)	271.158	280.959	313.934	286.051	**395.079**	269.243	248.409	241.763	249.206	273.760	270.309
8-Hour CO (ug/m3)**	108.251	111.497	104.078	104.684	108.411	122.125	108.153	101.879	116.105	120.545	**146.328**
1-Hour SO2 (ug/m3)	0.493	0.511	0.571	0.520	**0.719**	0.490	0.452	0.440	0.453	0.498	0.492
3-Hour SO2 (ug/m3)	0.304	0.324	0.367	0.363	0.412	0.384	0.288	0.305	0.349	0.355	0.408
24-Hour SO2 (ug/m3)**	0.061	0.065	0.061	0.065	0.064	0.069	0.062	0.061	0.069	0.070	**0.086**
24-Hour PM (ug/m3)**	1.410	1.522	1.416	1.518	1.490	1.601	1.434	1.419	1.599	1.638	**2.001**

gine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent 6 engines operating during the 7AM-5PM 10-

ierator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the building, followed by 07-12 in the same direction on

; shown do ***NOT*** reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-2

Emergency Generator	EG1907	EG1908	EG1909	EG1910	EG1911	EG1912
Load %	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**
kWe	2438	2438	2438	2438	2438	2438
bhp	3501	3501	3501	3501	3501	3501
Stack Height (feet)	24	24	24	24	24	24
Stack Exit Temp (deg.F)	735	735	735	735	735	735
Volumetric Flowrate ACFM	20,454	20,454	20,454	20,454	20,454	20,454
Stack Velocity (ft/sec)	156.26	156.26	156.26	156.26	156.26	156.26
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	663.71	663.71	663.71	663.71	663.71	663.71
Stack Exit Velocity (m/s)	47.6271	47.6271	47.6271	47.6271	47.6271	47.6271
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
NOx (g/hp-hr/engine)	4.50	4.50	4.50	4.50	4.50	4.50
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3	4.686E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM						
NOx (lb/hr/engine)	34.733	34.733	34.733	34.733	34.733	34.733
CO (lb/hr/engine)	20.068	20.068	20.068	20.068	20.068	20.068
SO2 (lb/hr/engine)	0.036	0.036	0.036	0.036	0.036	0.036
PM (lb/hr/engine)	0.849	0.849	0.849	0.849	0.849	0.849
1-Hr Unitized Conc (ug/m3)	115.64447	124.72849	124.33869	119.54779	110.45047	149.69223
X(m)	607740.0	608020.0	608020.0	608020.0	608040.0	607780.0
Y(m)	4121440.0	4121580.0	4121600.0	4121600.0	4121560.0	4121420.0
Z(m)	61.2	62.5	62.7	62.7	62.3	61.2
YYMMDDHH	15012408	15113017	13121908	13121908	16120717	15021808
3-Hr Unitized Conc (ug/m3)	69.18866	74.43426	85.18442	79.02230	71.07911	71.07657
X(m)	607768.6	608020.0	607980.0	608020.0	607980.0	607940.0
Y(m)	4121553.7	4121600.0	4121600.0	4121600.0	4121600.0	4121420.0
Z(m)	61.4	62.7	62.3	62.7	62.3	62.1
YYMMDDHH	15021712	16120512	16120512	14111612	14111612	16040312
8-Hr Unitized Conc (ug/m3)	45.66947	54.83871	53.59630	53.54350	61.03754	61.89170
X(m)	607768.6	607768.6	607768.6	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.1	62.1	62.1
YYMMDDHH	17021516	14121716	14121916	17082816	17080416	17080416
24-Hr Unitized Conc (ug/m3)	19.36656	24.02318	21.86689	20.35746	22.68438	23.50531
X(m)	607768.6	607768.6	607768.6	607947.2	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121446.9	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.0	62.1	62.1
YYMMDDHH	15122024	14121724	14121924	16062824	17080424	13022024
NOx (g/s/engine)	4.376	4.376	4.376	4.376	4.376	4.376
CO (g/s/engine)	2.529	2.529	2.529	2.529	2.529	2.529
SO2 (g/s/engine)	0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
PM (g/s/engine)	0.1070	0.1070	0.1070	0.1070	0.1070	0.1070
1-Hour NOx (ug/m3)***	506.060	545.812	544.106	523.141	483.331	655.053
1-Hour CO (ug/m3)	292.465	315.438	314.453	302.336	279.329	378.572
8-Hour CO (ug/m3)**	86.624	104.015	101.659	101.559	115.773	117.393
1-Hour SO2 (ug/m3)	0.532	0.574	0.572	0.550	0.508	0.689
3-Hour SO2 (ug/m3)	0.318	0.342	0.392	0.364	0.327	0.327
24-Hour SO2 (ug/m3)**	0.053	0.066	0.060	0.056	0.063	0.065
24-Hour PM (ug/m3)**	1.243	1.542	1.404	1.307	1.456	1.509

hour period modeled/day.

the other side of the building, and ending with 13 for the small engine stack.

Table AQ3-3 **Equinix Large Engine Screening Analysis - NOMINAL Screening Emissions**
QSK95 Engines (36)

Emergency Generator	**SV1201**	**SV1202**	**EG1203**	**EG1204**	**EG1205**	**EG1206**	**EG1207**	**EG1208**	**EG1209**
Load %	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**
kWe	1625	1625	1625	1625	1625	1625	1625	1625	1625
bhp	2371	2371	2371	2371	2371	2371	2371	2371	2371
Stack Height (feet)	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	672	672	672	672	672	672	672	672	672
Volumetric Flowrate ACFM	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885
Stack Velocity (ft/sec)	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71
Stack Exit Velocity (m/s)	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	Load Emissions (g/hp-hr)								
NOx (g/hp-hr/engine)	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM	**Short-term Screening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**								
NOx (lb/hr/engine)	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250
CO (lb/hr/engine)	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591
SO2 (lb/hr/engine)	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
PM (lb/hr/engine)	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575
1-Hr Unitized Conc (ug/m3)	128.53394	114.93668	109.37910	114.75339	120.74328	159.55883	172.23719	130.52381	133.83680
X(m)	608020.0	608046.6	608060.0	608018.2	608058.3	608020.0	608100.0	608085.7	608120.0
Y(m)	4121360.0	4121374.5	4121360.0	4121395.2	4121390.4	4121380.0	4121560.0	4121500.7	4121500.0
Z(m)	62.5	62.6	62.5	62.4	62.6	62.5	63.2	62.6	62.8
YYMMDDHH	17121417	14090708	14090708	15120709	17020111	17120508	15011008	17021210	17021210
3-Hr Unitized Conc (ug/m3)	78.09519	73.27484	71.69142	64.64001	67.76674	82.58006	118.14182	105.54434	107.57367
X(m)	608154.6	608154.6	608154.6	608154.6	608070.1	608085.7	608080.0	608070.1	608085.7
Y(m)	4121397.9	4121397.9	4121397.9	4121397.9	4121512.1	4121500.7	4121560.0	4121512.1	4121500.7
Z(m)	63.1	63.1	63.1	63.1	62.5	62.6	63.2	62.5	62.6
YYMMDDHH	13091312	13091312	15073112	17052212	17010812	14112915	16031115	16031115	16031115
8-Hr Unitized Conc (ug/m3)	54.25254	53.17760	60.83937	54.83883	54.55630	67.71483	69.61032	66.28306	65.04382
X(m)	608143.5	608154.6	608165.7	608100.0	608100.0	608085.7	608154.6	608154.6	608040.0
Y(m)	4121382.6	4121397.9	4121413.2	4121580.0	4121580.0	4121500.7	4121397.9	4121397.9	4121580.0
Z(m)	63.2	63.1	63.1	63.3	63.3	62.6	63.1	63.1	62.8
YYMMDDHH	16083116	16083116	17070916	17052516	17051016	14112916	14041116	14041116	13061016
24-Hr Unitized Conc (ug/m3)	22.88196	22.13131	25.65398	21.18377	19.91904	24.03017	27.69476	26.69424	26.11495
X(m)	608143.5	608154.6	608165.7	608005.4	608120.0	608085.7	608154.6	608160.0	608160.0
Y(m)	4121382.6	4121397.9	4121413.2	4121535.9	4121560.0	4121500.7	4121397.9	4121400.0	4121400.0
Z(m)	63.2	63.1	63.1	62.2	63.2	62.6	63.1	63.1	63.1
YYMMDDHH	16083124	16083124	17070924	14112924	17052524	14112924	13022024	14073124	14073124
	Short-term Pollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)								
NOx (g/s/engine)	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173
CO (g/s/engine)	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712
SO2 (g/s/engine)	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034
PM (g/s/engine)	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724
1-Hour NOx (ug/m3)***	279.304	249.757	237.681	249.359	262.375	346.721	**374.271**	283.628	290.827
1-Hour CO (ug/m3)	220.050	196.772	187.257	196.458	206.712	273.165	**294.870**	223.457	229.129
8-Hour CO (ug/m3)**	69.660	68.280	78.118	70.413	70.050	86.946	89.380	85.107	83.516
1-Hour SO2 (ug/m3)	0.437	0.391	0.372	0.390	0.411	0.543	**0.586**	0.444	0.455
3-Hour SO2 (ug/m3)	0.266	0.249	0.244	0.220	0.230	0.281	**0.402**	0.359	0.366
24-Hour SO2 (ug/m3)**	0.047	0.045	0.052	0.043	0.041	0.049	0.056	0.054	0.053
24-Hour PM (ug/m3)**	0.994	0.961	1.114	0.920	0.865	1.044	1.203	1.160	1.134

Worst-Case Engine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represer

Emergency Generator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the builc

NOx impacts shown do ***NOT reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing

Table AQ3-3

Emergency Generator	EG1210	EG1211	EG1212	EG1801	EG1802	EG1803	EG1804	EG1805	EG1806	EG1807
Load %	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
kWe	1625	1625	1625	1625	1625	1625	1625	1625	1625	1625
bhp	2371	2371	2371	2371	2371	2371	2371	2371	2371	2371
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	672	672	672	672	672	672	672	672	672	672
Volumetric Flowrate ACFM	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885
Stack Velocity (ft/sec)	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71
Stack Exit Velocity (m/s)	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
										Load Emissi
NOx (g/hp-hr/engine)	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM										**Short-term S**
NOx (lb/hr/engine)	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250
CO (lb/hr/engine)	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591
SO2 (lb/hr/engine)	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
PM (lb/hr/engine)	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575
1-Hr Unitized Conc (ug/m3)	119.32550	128.51658	149.79777	118.23656	110.84531	101.91661	99.37338	102.96332	114.17727	125.91053
X(m)	608100.0	608120.0	608140.0	607828.3	607828.3	607800.0	608014.3	608014.3	607931.6	607980.0
Y(m)	4121500.0	4121520.0	4121540.0	4121635.6	4121635.6	4121600.0	4121529.5	4121529.5	4121612.9	4121660.0
Z(m)	63.1	62.9	63.5	62.0	62.0	61.8	62.2	62.2	62.1	63.5
YYMMDDHH	13032108	13111917	16011108	14011508	16011008	13012208	16121108	16121108	17071813	14120208
3-Hr Unitized Conc (ug/m3)	111.46340	111.25708	112.50783	75.61667	73.30417	66.67380	70.90585	83.17896	110.55712	67.08459
X(m)	608101.3	608140.0	608160.0	607828.3	607828.3	607799.1	608014.3	607947.3	607931.6	607940.0
Y(m)	4121489.3	4121500.0	4121500.0	4121635.6	4121635.6	4121590.4	4121529.5	4121601.5	4121612.9	4121640.0
Z(m)	62.9	63.0	63.2	62.0	62.0	61.7	62.2	62.2	62.1	62.6
YYMMDDHH	16031115	16031115	16031115	15021712	15021712	15061312	15091112	16070215	17080515	15031512
8-Hr Unitized Conc (ug/m3)	68.33655	62.44090	59.39800	60.83926	60.19602	57.48860	61.44421	63.06836	88.97602	60.87997
X(m)	608060.0	608080.0	608100.0	607960.0	607960.0	607828.3	608014.3	607947.3	607931.6	607940.0
Y(m)	4121520.0	4121540.0	4121580.0	4121680.0	4121680.0	4121635.6	4121529.5	4121601.5	4121612.9	4121640.0
Z(m)	62.5	62.9	63.3	63.0	63.0	62.0	62.2	62.2	62.1	62.6
YYMMDDHH	17052616	17052616	13061016	13061016	17052516	14121916	17072816	16071016	17072816	17052616
24-Hr Unitized Conc (ug/m3)	26.12367	24.87880	23.54429	22.80923	23.14103	23.14144	24.95400	25.13288	36.08931	23.01212
X(m)	608085.7	608101.3	608140.0	607960.0	607828.3	607828.3	608014.3	607947.3	607931.6	607940.0
Y(m)	4121500.7	4121489.3	4121540.0	4121680.0	4121635.6	4121635.6	4121529.5	4121601.5	4121612.9	4121640.0
Z(m)	62.6	62.9	63.5	63.0	62.0	62.0	62.2	62.2	62.1	62.6
YYMMDDHH	13050624	13050624	13050624	13061024	17032024	14121924	17070924	15072124	17072824	17052624
										Short-term F
NOx (g/s/engine)	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173
CO (g/s/engine)	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712
SO2 (g/s/engine)	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034
PM (g/s/engine)	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724
1-Hour NOx (ug/m3)***	259.294	279.267	325.511	256.928	240.867	221.465	215.938	223.739	248.107	273.604
1-Hour CO (ug/m3)	204.285	220.020	256.454	202.421	189.767	174.481	170.127	176.273	195.471	215.559
8-Hour CO (ug/m3)**	87.744	80.174	76.267	78.118	77.292	73.815	78.894	80.980	114.245	78.170
1-Hour SO2 (ug/m3)	0.406	0.437	0.509	0.402	0.377	0.347	0.338	0.350	0.388	0.428
3-Hour SO2 (ug/m3)	0.379	0.378	0.383	0.257	0.249	0.227	0.241	0.283	0.376	0.228
24-Hour SO2 (ug/m3)**	0.053	0.051	0.048	0.047	0.047	0.047	0.051	0.051	0.074	0.047
24-Hour PM (ug/m3)**	1.135	1.081	1.023	0.991	1.005	1.005	1.084	1.092	1.568	1.000

ıt 6 engines operating during the 7AM-5PM 10-hour period modeled/day.

ling, followed by 07-12 in the same direction on the other side of the building, and ending with 13 for the small engine stack

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Worst-Case En

Emergency Ger

***NOx impacts

Table AQ3-3

Emergency Generator	EG1808	EG1809	EG1810	EG1811	EG1812	EG1901	EG1902	EG1903	EG1904	EG1905	EG1906
Load %	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
kWe	1625	1625	1625	1625	1625	1625	1625	1625	1625	1625	1625
bhp	2371	2371	2371	2371	2371	2371	2371	2371	2371	2371	2371
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	672	672	672	672	672	672	672	672	672	672	672
Volumetric Flowrate ACFM	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885	16,885
Stack Velocity (ft/sec)	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99	128.99
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71	628.71
Stack Exit Velocity (m/s)	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	ons (g/hp-hr)										
NOx (g/hp-hr/engine)	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM	**creening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**										
NOx (lb/hr/engine)	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250	17.250
CO (lb/hr/engine)	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591	13.591
SO2 (lb/hr/engine)	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
PM (lb/hr/engine)	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575	0.575
1-Hr Unitized Conc (ug/m3)	117.72110	125.55584	137.02882	124.94078	170.88608	115.80671	106.31845	103.82917	106.41472	116.11028	115.23923
X(m)	607880.0	607980.0	607880.0	607931.6	607960.0	607799.1	607768.6	607800.0	607961.4	607940.0	607940.0
Y(m)	4121380.0	4121600.0	4121380.0	4121612.9	4121660.0	4121590.4	4121553.7	4121600.0	4121436.6	4121420.0	4121420.0
Z(m)	61.7	62.3	61.7	62.1	63.2	61.7	61.4	61.8	62.0	62.1	62.1
YYMMDDHH	15021808	17021210	13010108	17021210	15113017	17123108	15120908	15021908	15011108	16122017	15011017
3-Hr Unitized Conc (ug/m3)	70.60392	77.43553	87.71220	89.27764	96.75412	91.07133	69.20606	72.04813	79.91078	81.62138	101.79112
X(m)	608020.0	608020.0	607962.9	607980.0	607960.0	607820.7	607805.5	607961.4	607940.0	607851.1	607820.7
Y(m)	4121580.0	4121600.0	4121590.1	4121620.0	4121660.0	4121464.9	4121476.0	4121436.6	4121420.0	4121442.8	4121464.9
Z(m)	62.5	62.7	62.3	62.7	63.2	61.4	61.3	62.0	62.1	61.4	61.4
YYMMDDHH	16052015	14111612	14111612	14111612	16120512	17020212	17020212	14060515	14021215	13091515	16083115
8-Hr Unitized Conc (ug/m3)	60.10708	60.55944	56.99979	58.46381	60.55732	71.25054	60.89251	57.93910	65.79881	69.77413	90.40890
X(m)	607828.3	607978.5	607962.9	608014.3	608019.2	607820.7	607768.6	607940.0	607940.0	607851.1	607820.7
Y(m)	4121635.6	4121578.8	4121590.1	4121529.5	4121536.1	4121464.9	4121553.7	4121420.0	4121420.0	4121442.8	4121464.9
Z(m)	62.0	62.3	62.3	62.2	62.2	61.4	61.4	62.1	62.1	61.4	61.4
YYMMDDHH	13010516	16052016	16052016	14091516	15082516	17020216	13010516	17072816	14041116	14050416	16083116
24-Hr Unitized Conc (ug/m3)	23.09554	24.40876	23.66368	24.77851	24.27045	27.54087	23.76921	23.97170	27.91527	27.81243	37.04026
X(m)	607828.3	607978.5	608014.3	608019.2	608014.3	607820.7	607768.6	607940.0	607940.0	607940.0	607820.7
Y(m)	4121635.6	4121578.8	4121529.5	4121536.1	4121529.5	4121464.9	4121553.7	4121420.0	4121420.0	4121420.0	4121464.9
Z(m)	62.0	62.3	62.2	62.2	62.2	61.4	61.4	62.1	62.1	62.1	61.4
YYMMDDHH	13010524	16052024	17070924	15011924	17062424	17020224	13010524	13022024	13022024	13022024	16083124
	ollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)										
NOx (g/s/engine)	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173
CO (g/s/engine)	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712	1.712
SO2 (g/s/engine)	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034
PM (g/s/engine)	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724
1-Hour NOx (ug/m3)***	255.808	272.833	297.764	271.496	371.335	251.648	231.030	225.621	231.239	252.308	250.415
1-Hour CO (ug/m3)	201.539	214.952	234.593	213.899	292.557	198.261	182.017	177.756	182.182	198.781	197.290
8-Hour CO (ug/m3)**	77.177	77.758	73.188	75.068	77.756	91.486	78.186	74.394	84.486	89.590	**116.085**
1-Hour SO2 (ug/m3)	0.400	0.427	0.466	0.425	0.581	0.394	0.361	0.353	0.362	0.395	0.392
3-Hour SO2 (ug/m3)	0.240	0.263	0.298	0.304	0.329	0.310	0.235	0.245	0.272	0.278	0.346
24-Hour SO2 (ug/m3)**	0.047	0.050	0.048	0.051	0.050	0.056	0.048	0.049	0.057	0.057	**0.076**
24-Hour PM (ug/m3)**	1.003	1.060	1.028	1.076	1.054	1.196	1.033	1.041	1.213	1.208	**1.609**

gine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent 6 engines operating during the 7AM-5PM 10-

ierator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the building, followed by 07-12 in the same direction on

shown do ***NOT*** reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-3

Emergency Generator	EG1907	EG1908	EG1909	EG1910	EG1911	EG1912
Load %	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**
kWe	1625	1625	1625	1625	1625	1625
bhp	2371	2371	2371	2371	2371	2371
Stack Height (feet)	24	24	24	24	24	24
Stack Exit Temp (deg.F)	672	672	672	672	672	672
Volumetric Flowrate ACFM	16,885	16,885	16,885	16,885	16,885	16,885
Stack Velocity (ft/sec)	128.99	128.99	128.99	128.99	128.99	128.99
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	628.71	628.71	628.71	628.71	628.71	628.71
Stack Exit Velocity (m/s)	39.3167	39.3167	39.3167	39.3167	39.3167	39.3167
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
NOx (g/hp-hr/engine)	3.30	3.30	3.30	3.30	3.30	3.30
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3	5.098E-3
PM (g/hp-hr/engine)*	0.110	0.110	0.110	0.110	0.110	0.110
*NSPS > Nominal for CO Cycle-weighted > Nominal for PM						
NOx (lb/hr/engine)	17.250	17.250	17.250	17.250	17.250	17.250
CO (lb/hr/engine)	13.591	13.591	13.591	13.591	13.591	13.591
SO2 (lb/hr/engine)	0.027	0.027	0.027	0.027	0.027	0.027
PM (lb/hr/engine)	0.575	0.575	0.575	0.575	0.575	0.575
1-Hr Unitized Conc (ug/m3)	126.97998	137.38738	135.45291	132.06063	121.53457	161.61899
X(m)	607740.0	608020.0	608020.0	608020.0	608040.0	607780.0
Y(m)	4121440.0	4121580.0	4121600.0	4121600.0	4121560.0	4121420.0
Z(m)	61.2	62.5	62.7	62.7	62.3	61.2
YYMMDDHH	15012408	15113017	13121908	16020408	16120717	15021808
3-Hr Unitized Conc (ug/m3)	71.96726	82.04026	89.65429	85.64662	76.76762	76.05299
X(m)	607768.6	607978.5	607980.0	608020.0	607980.0	607940.0
Y(m)	4121553.7	4121578.8	4121580.0	4121600.0	4121600.0	4121420.0
Z(m)	61.4	62.3	62.4	62.7	62.3	62.1
YYMMDDHH	15021712	16120512	16120512	14111612	14111612	16040312
8-Hr Unitized Conc (ug/m3)	47.91656	58.53761	54.47305	57.82245	65.64323	65.29264
X(m)	607768.6	607768.6	607768.6	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.1	62.1	62.1
YYMMDDHH	17021516	14121716	14121916	17082816	17080416	17080416
24-Hr Unitized Conc (ug/m3)	20.55583	25.43966	22.59034	23.00821	24.32385	24.66941
X(m)	607768.6	607768.6	607768.6	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.1	62.1	62.1
YYMMDDHH	15122024	14121724	14121724	13022024	17080424	13022024
NOx (g/s/engine)	2.173	2.173	2.173	2.173	2.173	2.173
CO (g/s/engine)	1.712	1.712	1.712	1.712	1.712	1.712
SO2 (g/s/engine)	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034
PM (g/s/engine)	0.0724	0.0724	0.0724	0.0724	0.0724	0.0724
1-Hour NOx (ug/m3)***	275.927	298.543	294.339	286.968	264.095	351.198
1-Hour CO (ug/m3)	217.390	235.207	231.895	226.088	208.067	276.692
8-Hour CO (ug/m3)**	61.525	75.162	69.943	74.244	84.286	83.836
1-Hour SO2 (ug/m3)	0.432	0.467	0.461	0.449	0.413	0.550
3-Hour SO2 (ug/m3)	0.245	0.279	0.305	0.291	0.261	0.259
24-Hour SO2 (ug/m3)**	0.042	0.052	0.046	0.047	0.050	0.050
24-Hour PM (ug/m3)**	0.893	1.105	0.981	0.999	1.057	1.072

hour period modeled/day.

the other side of the building, and ending with 13 for the small engine stack.

Table AQ3-4 — Equinix Large Engine Screening Analysis - NOMINAL Screening Emissions

QSK95 Engines (36)

Emergency Generator	SV1201	SV1202	EG1203	EG1204	EG1205	EG1206	EG1207	EG1208	EG1209
Load %	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**
kWe	813	813	813	813	813	813	813	813	813
bhp	1240	1240	1240	1240	1240	1240	1240	1240	1240
Stack Height (feet)	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	643	643	643	643	643	643	643	643	643
Volumetric Flowrate ACFM	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587
Stack Velocity (ft/sec)	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59
Stack Exit Velocity (m/s)	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	Load Emissions (g/hp-hr)								
NOx (g/hp-hr/engine)	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3
PM (g/hp-hr/engine)	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
*NSPS > Nominal for CO	**Short-term Screening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**								
NOx (lb/hr/engine)	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295
CO (lb/hr/engine)	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108
SO2 (lb/hr/engine)	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
PM (lb/hr/engine)	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547
1-Hr Unitized Conc (ug/m3)	166.07472	146.11601	155.90433	148.35682	151.57092	198.48592	208.05728	155.00825	162.72720
X(m)	608000.0	608004.0	608004.0	608032.4	608000.0	608020.0	608100.0	608100.0	608080.0
Y(m)	4121380.0	4121405.5	4121405.5	4121384.8	4121380.0	4121380.0	4121560.0	4121540.0	4121520.0
Z(m)	62.3	62.3	62.3	62.4	62.3	62.5	63.2	62.9	62.5
YYMMDDHH	15021808	17012709	17020111	17020111	17111808	17120508	15011008	17120513	14021310
3-Hr Unitized Conc (ug/m3)	87.58531	85.56446	89.16740	73.35633	87.33530	119.08213	131.29969	128.18590	135.69968
X(m)	608154.6	608154.6	608172.4	608080.0	608070.1	608085.7	608080.0	608100.0	608101.3
Y(m)	4121397.9	4121397.9	4121422.9	4121580.0	4121512.1	4121500.7	4121560.0	4121520.0	4121489.3
Z(m)	63.1	63.1	63.2	63.3	62.5	62.6	63.2	62.7	62.9
YYMMDDHH	13091312	13091312	16060412	17090415	14120412	14120412	16031115	16120512	16120512
8-Hr Unitized Conc (ug/m3)	59.11791	58.43534	69.66494	62.10464	69.60073	90.93841	77.11583	74.87017	73.24221
X(m)	608143.5	608154.6	608165.7	608100.0	608085.7	608085.7	608154.6	608154.6	608154.6
Y(m)	4121382.6	4121397.9	4121413.2	4121580.0	4121500.7	4121500.7	4121397.9	4121397.9	4121397.9
Z(m)	63.2	63.1	63.1	63.3	62.6	62.6	63.1	63.1	63.1
YYMMDDHH	16083116	16083116	17070916	17052516	14112916	14112916	14041116	14041116	16060416
24-Hr Unitized Conc (ug/m3)	25.05545	24.40556	29.90193	23.38364	24.59445	32.14724	30.97484	29.43356	29.20568
X(m)	608143.5	608154.6	608165.7	608100.0	608085.7	608085.7	608154.6	608160.0	608154.6
Y(m)	4121382.6	4121397.9	4121413.2	4121580.0	4121500.7	4121500.7	4121397.9	4121400.0	4121397.9
Z(m)	63.2	63.1	63.1	63.3	62.6	62.6	63.1	63.1	63.1
YYMMDDHH	16083124	16083124	17070924	17052524	14112924	14112924	13022024	14073124	16060424
	Short-term Pollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)								
NOx (g/s/engine)	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171
CO (g/s/engine)	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896
SO2 (g/s/engine)	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
PM (g/s/engine)	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689
1-Hour NOx (ug/m3)***	194.473	171.102	182.564	173.726	177.490	232.427	**243.635**	181.515	190.554
1-Hour CO (ug/m3)	148.803	130.920	139.690	132.928	135.808	177.843	**186.419**	138.887	145.804
8-Hour CO (ug/m3)**	39.727	39.269	46.815	41.734	46.772	61.111	51.822	50.313	49.219
1-Hour SO2 (ug/m3)	0.316	0.278	0.296	0.282	0.288	0.377	**0.395**	0.295	0.309
3-Hour SO2 (ug/m3)	0.166	0.163	0.169	0.139	0.166	0.226	0.249	0.244	0.258
24-Hour SO2 (ug/m3)**	0.029	0.028	0.034	0.027	0.028	0.037	0.035	0.034	0.033
24-Hour PM (ug/m3)**	1.036	1.009	1.236	0.967	1.017	1.329	1.280	1.217	1.207

Worst-Case Engine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent

Emergency Generator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the buildin

NOx impacts shown do ***NOT reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-4

Emergency Generator	EG1210	EG1211	EG1212	EG1801	EG1802	EG1803	EG1804	EG1805	EG1806	EG1807
Load %	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
kWe	813	813	813	813	813	813	813	813	813	813
bhp	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	643	643	643	643	643	643	643	643	643	643
Volumetric Flowrate ACFM	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587
Stack Velocity (ft/sec)	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59
Stack Exit Velocity (m/s)	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
										Load Emissi
NOx (g/hp-hr/engine)	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3
PM (g/hp-hr/engine)	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
*NSPS > Nominal for CO										**Short-term S**
NOx (lb/hr/engine)	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295
CO (lb/hr/engine)	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108
SO2 (lb/hr/engine)	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
PM (lb/hr/engine)	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547
1-Hr Unitized Conc (ug/m3)	166.76976	150.14250	180.50689	140.00077	128.82073	124.48755	121.86491	120.73749	150.62249	157.51310
X(m)	608100.0	608120.0	608140.0	607828.3	607828.3	607800.0	607800.0	608000.0	607931.6	607960.0
Y(m)	4121500.0	4121500.0	4121540.0	4121635.6	4121635.6	4121600.0	4121600.0	4121660.0	4121612.9	4121680.0
Z(m)	63.1	62.8	63.5	62.0	62.0	61.8	61.8	63.1	62.1	63.0
YYMMDDHH	14021310	14021310	16011108	14011308	14011508	13012208	16081608	13042209	15062612	16010509
3-Hr Unitized Conc (ug/m3)	119.63016	123.78426	125.30409	80.18345	84.29629	82.61741	85.50508	113.71263	144.22776	80.89757
X(m)	608101.3	608140.0	608160.0	607960.0	607828.3	608014.3	607962.9	607947.3	607931.6	607828.3
Y(m)	4121489.3	4121500.0	4121500.0	4121680.0	4121635.6	4121529.5	4121590.1	4121601.5	4121612.9	4121635.6
Z(m)	62.9	63.0	63.2	63.0	62.0	62.2	62.3	62.2	62.1	62.0
YYMMDDHH	16031115	16031115	16031115	17051015	15021712	13081712	17070715	17062315	16051115	17021512
8-Hr Unitized Conc (ug/m3)	73.49971	71.42868	65.20539	71.54522	65.13737	67.36533	68.56205	86.70089	121.34272	67.17892
X(m)	608060.0	608080.0	608100.0	607960.0	607960.0	608014.3	608014.3	607947.3	607931.6	607940.0
Y(m)	4121520.0	4121540.0	4121580.0	4121680.0	4121680.0	4121529.5	4121529.5	4121601.5	4121612.9	4121640.0
Z(m)	62.5	62.9	63.3	63.0	63.0	62.2	62.2	62.2	62.1	62.6
YYMMDDHH	17052616	17052616	13061016	13061016	17052516	13081716	13081716	17101216	17072816	17052616
24-Hr Unitized Conc (ug/m3)	29.63437	28.09340	26.33470	26.63992	25.65388	26.37855	27.44282	34.86850	49.49245	25.51536
X(m)	608085.7	608101.3	608140.0	607960.0	607828.3	608014.3	608014.3	607947.3	607931.6	607940.0
Y(m)	4121500.7	4121489.3	4121540.0	4121680.0	4121635.6	4121529.5	4121529.5	4121601.5	4121612.9	4121640.0
Z(m)	62.6	62.9	63.5	63.0	62.0	62.2	62.2	62.2	62.1	62.6
YYMMDDHH	13050624	13050624	13050624	13061024	14121724	17070924	13022024	15072124	17072824	17052624
										Short-term P
NOx (g/s/engine)	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171
CO (g/s/engine)	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896
SO2 (g/s/engine)	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
PM (g/s/engine)	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689
1-Hour NOx (ug/m3)***	195.287	175.817	211.374	163.941	150.849	145.775	142.704	141.384	176.379	184.448
1-Hour CO (ug/m3)	149.426	134.528	161.734	125.441	115.423	111.541	109.191	108.181	134.958	141.132
8-Hour CO (ug/m3)**	49.392	48.000	43.818	48.078	43.772	45.270	46.074	58.263	81.542	45.144
1-Hour SO2 (ug/m3)	0.317	0.285	0.343	0.266	0.245	0.237	0.232	0.229	0.286	0.299
3-Hour SO2 (ug/m3)	0.227	0.235	0.238	0.152	0.160	0.157	0.162	0.216	0.274	0.154
24-Hour SO2 (ug/m3)**	0.034	0.032	0.030	0.030	0.029	0.030	0.031	0.040	0.056	0.029
24-Hour PM (ug/m3)**	1.225	1.161	1.089	1.101	1.061	1.090	1.134	1.441	2.046	1.055

6 engines operating during the 7AM-5PM 10-hour period modeled/day.

ıg, followed by 07-12 in the same direction on the other side of the building, and ending with 13 for the small engine stack.

Worst-Case Eng

Emergency Gen

***NOx impacts

Table AQ3-4

Emergency Generator	EG1808	EG1809	EG1810	EG1811	EG1812	EG1901	EG1902	EG1903	EG1904	EG1905	EG1906
Load %	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**
kWe	813	813	813	813	813	813	813	813	813	813	813
bhp	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240	1240
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	643	643	643	643	643	643	643	643	643	643	643
Volumetric Flowrate ACFM	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587	10,587
Stack Velocity (ft/sec)	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88	80.88
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59	612.59
Stack Exit Velocity (m/s)	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	ons (g/hp-hr)										
NOx (g/hp-hr/engine)	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3
PM (g/hp-hr/engine)	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
*NSPS > Nominal for CO	**creening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**										
NOx (lb/hr/engine)	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295	9.295
CO (lb/hr/engine)	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108	7.108
SO2 (lb/hr/engine)	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
PM (lb/hr/engine)	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547	0.547
1-Hr Unitized Conc (ug/m3)	141.13478	153.64796	168.40106	148.01696	200.28964	136.38152	126.60291	126.53807	128.70058	131.07069	152.32444
X(m)	608020.0	607980.0	607880.0	607960.0	607960.0	607799.1	607779.7	607800.0	607961.4	607935.4	607820.7
Y(m)	4121600.0	4121600.0	4121380.0	4121640.0	4121660.0	4121590.4	4121568.9	4121600.0	4121436.6	4121430.8	4121464.9
Z(m)	62.7	62.3	61.7	62.6	63.2	61.7	61.5	61.8	62.0	62.0	61.4
YYMMDDHH	17021210	17021210	13010108	16120511	15113017	16011508	15010808	15021908	15011108	15011908	17082810
3-Hr Unitized Conc (ug/m3)	80.71296	127.25686	133.82140	125.95626	110.81243	112.50747	87.20521	84.81423	89.65589	114.56204	145.17165
X(m)	608020.0	607962.9	607947.3	607940.0	607960.0	607820.7	607820.7	607800.0	607940.0	607835.9	607820.7
Y(m)	4121580.0	4121590.1	4121601.5	4121620.0	4121660.0	4121464.9	4121464.9	4121600.0	4121420.0	4121453.9	4121464.9
Z(m)	62.5	62.3	62.2	62.2	63.2	61.4	61.4	61.8	62.1	61.4	61.4
YYMMDDHH	14111612	16120512	16120512	16120512	16120512	16121012	17020212	16102912	16072912	16083112	14062512
8-Hr Unitized Conc (ug/m3)	65.59333	65.02434	62.94064	65.21239	72.63474	86.53377	71.81537	69.48914	74.50907	90.38788	121.92172
X(m)	607828.3	607978.5	608001.4	608014.3	607853.6	607820.7	607805.5	607940.0	607940.0	607835.9	607820.7
Y(m)	4121635.6	4121578.8	4121549.1	4121529.5	4121669.7	4121464.9	4121476.0	4121420.0	4121420.0	4121453.9	4121464.9
Z(m)	62.0	62.3	62.2	62.2	62.3	61.4	61.3	62.1	62.1	61.4	61.4
YYMMDDHH	13010516	16052016	16010316	14091516	17052516	17020216	17020216	13081716	14041116	14050416	16083116
24-Hr Unitized Conc (ug/m3)	25.26677	26.11120	27.40931	27.41341	27.12293	33.34747	27.75006	28.76526	31.00287	33.57681	51.12721
X(m)	607828.3	607978.5	608001.4	608019.2	608014.3	607820.7	607805.5	607940.0	607940.0	607835.9	607820.7
Y(m)	4121635.6	4121578.8	4121549.1	4121536.1	4121529.5	4121464.9	4121476.0	4121420.0	4121420.0	4121453.9	4121464.9
Z(m)	62.0	62.3	62.2	62.2	62.2	61.4	61.3	62.1	62.1	61.4	61.4
YYMMDDHH	13010524	16052024	15011924	15011924	17062424	17020224	17020224	13022024	13022024	14050424	16083124
	ollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)										
NOx (g/s/engine)	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171	1.171
CO (g/s/engine)	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896
SO2 (g/s/engine)	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
PM (g/s/engine)	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689
1-Hour NOx (ug/m3)***	165.269	179.922	197.198	173.328	234.539	159.703	148.252	148.176	150.708	153.484	178.372
1-Hour CO (ug/m3)	126.457	137.669	150.887	132.623	179.460	122.198	113.436	113.378	115.316	117.439	136.483
8-Hour CO (ug/m3)**	44.079	43.696	42.296	43.823	48.811	58.151	48.260	46.697	50.070	60.741	**81.931**
1-Hour SO2 (ug/m3)	0.268	0.292	0.320	0.281	0.381	0.259	0.241	0.240	0.245	0.249	0.289
3-Hour SO2 (ug/m3)	0.153	0.242	0.254	0.239	0.211	0.214	0.166	0.161	0.170	0.218	**0.276**
24-Hour SO2 (ug/m3)**	0.029	0.030	0.031	0.031	0.031	0.038	0.032	0.033	0.035	0.038	**0.058**
24-Hour PM (ug/m3)**	1.045	1.079	1.133	1.133	1.121	1.379	1.147	1.189	1.282	1.388	**2.114**

gine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent 6 engines operating during the 7AM-5PM 10-hou

erator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the building, followed by 07-12 in the same direction on the

shown do ***NOT*** reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-4

Emergency Generator	**EG1907**	**EG1908**	**EG1909**	**EG1910**	**EG1911**	**EG1912**
Load %	**25%**	**25%**	**25%**	**25%**	**25%**	**25%**
kWe	813	813	813	813	813	813
bhp	1240	1240	1240	1240	1240	1240
Stack Height (feet)	24	24	24	24	24	24
Stack Exit Temp (deg.F)	643	643	643	643	643	643
Volumetric Flowrate ACFM	10,587	10,587	10,587	10,587	10,587	10,587
Stack Velocity (ft/sec)	80.88	80.88	80.88	80.88	80.88	80.88
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	612.59	612.59	612.59	612.59	612.59	612.59
Stack Exit Velocity (m/s)	24.6518	24.6518	24.6518	24.6518	24.6518	24.6518
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
NOx (g/hp-hr/engine)	3.40	3.40	3.40	3.40	3.40	3.40
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3	5.570E-3
PM (g/hp-hr/engine)	0.200	0.200	0.200	0.200	0.200	0.200
*NSPS > Nominal for CO						
NOx (lb/hr/engine)	9.295	9.295	9.295	9.295	9.295	9.295
CO (lb/hr/engine)	7.108	7.108	7.108	7.108	7.108	7.108
SO2 (lb/hr/engine)	0.015	0.015	0.015	0.015	0.015	0.015
PM (lb/hr/engine)	0.547	0.547	0.547	0.547	0.547	0.547
1-Hr Unitized Conc (ug/m3)	148.87483	166.15818	168.03748	160.73577	147.68696	193.73391
X(m)	607740.0	608020.0	608020.0	608020.0	607760.0	607780.0
Y(m)	4121440.0	4121580.0	4121600.0	4121600.0	4121460.0	4121420.0
Z(m)	61.2	62.5	62.7	62.7	61.3	61.2
YYMMDDHH	15012408	15113017	13121908	16020408	17020111	15021808
3-Hr Unitized Conc (ug/m3)	87.72578	96.96944	108.09080	97.44891	88.55187	84.66206
X(m)	607779.7	607978.5	607962.9	608020.0	607980.0	607940.0
Y(m)	4121568.9	4121578.8	4121590.1	4121600.0	4121600.0	4121420.0
Z(m)	61.5	62.3	62.3	62.7	62.3	62.1
YYMMDDHH	17021512	16120512	16120512	14111612	14111612	13102415
8-Hr Unitized Conc (ug/m3)	62.13525	62.42603	59.77660	65.08509	73.08832	70.52458
X(m)	607768.6	607768.6	607768.6	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.1	62.1	62.1
YYMMDDHH	17021516	14121716	14121716	17082816	17080416	17080416
24-Hr Unitized Conc (ug/m3)	23.22905	26.96756	26.24197	26.11500	28.41928	27.18039
X(m)	607768.6	607768.6	607768.6	607947.2	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121446.9	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.0	62.1	62.1
YYMMDDHH	15122024	14121724	14121724	15092824	17080424	17080424
NOx (g/s/engine)	1.171	1.171	1.171	1.171	1.171	1.171
CO (g/s/engine)	0.896	0.896	0.896	0.896	0.896	0.896
SO2 (g/s/engine)	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
PM (g/s/engine)	0.0689	0.0689	0.0689	0.0689	0.0689	0.0689
1-Hour NOx (ug/m3)***	174.332	194.571	196.772	188.222	172.941	226.862
1-Hour CO (ug/m3)	133.392	148.878	150.562	144.019	132.328	173.586
8-Hour CO (ug/m3)**	41.755	41.950	40.170	43.737	49.115	47.393
1-Hour SO2 (ug/m3)	0.283	0.316	0.319	0.305	0.281	0.368
3-Hour SO2 (ug/m3)	0.167	0.184	0.205	0.185	0.168	0.161
24-Hour SO2 (ug/m3)**	0.026	0.031	0.030	0.030	0.032	0.031
24-Hour PM (ug/m3)**	0.960	1.115	1.085	1.080	1.175	1.124

ır period modeled/day.

other side of the building, and ending with 13 for the small engine stack

Table AQ3-5 **Equinix Large Engine Screening Analysis - NOMINAL Screening Emissions**
QSK95 Engines (36)

Emergency Generator	SV1201	SV1202	EG1203	EG1204	EG1205	EG1206	EG1207	EG1208	EG1209
Load %	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**
kWe	325	325	325	325	325	325	325	325	325
bhp	562	562	562	562	562	562	562	562	562
Stack Height (feet)	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	541	541	541	541	541	541	541	541	541
Volumetric Flowrate ACFM	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187
Stack Velocity (ft/sec)	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93
Stack Exit Velocity (m/s)	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	Load Emissions (g/hp-hr)								
NOx (g/hp-hr/engine)	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3
PM (g/hp-hr/engine)	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
*NSPS > Nominal for CO	**Short-term Screening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**								
NOx (lb/hr/engine)	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699
CO (lb/hr/engine)	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221
SO2 (lb/hr/engine)	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
PM (lb/hr/engine)	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372
1-Hr Unitized Conc (ug/m3)	200.87056	186.14200	180.86203	172.52005	177.84567	243.06607	255.31200	233.02918	224.91882
X(m)	607980.0	608018.2	608004.0	608032.4	607980.0	608020.0	608080.0	608070.1	608085.7
Y(m)	4121420.0	4121395.2	4121405.5	4121384.8	4121400.0	4121380.0	4121560.0	4121512.1	4121500.7
Z(m)	62.2	62.4	62.3	62.4	62.2	62.5	63.2	62.5	62.6
YYMMDDHH	17061211	16041312	17020111	17020111	15020208	17120508	17121310	14082511	14082511
3-Hr Unitized Conc (ug/m3)	104.39694	96.78847	101.13048	98.91574	124.27987	156.51748	146.01291	151.62451	158.17373
X(m)	608154.6	608143.5	608172.4	608160.0	608085.7	608101.3	608080.0	608100.0	608101.3
Y(m)	4121397.9	4121382.6	4121422.9	4121400.0	4121500.7	4121489.3	4121560.0	4121520.0	4121489.3
Z(m)	63.1	63.2	63.2	63.1	62.6	62.9	63.2	62.7	62.9
YYMMDDHH	13091312	15120815	16060412	14091212	14120412	13091012	16031115	16120512	16120512
8-Hr Unitized Conc (ug/m3)	70.11255	68.37681	78.56937	70.70949	93.07942	107.62182	94.58561	84.87624	83.63732
X(m)	608154.6	608160.0	608165.7	608100.0	608085.7	608085.7	608154.6	608154.6	608054.5
Y(m)	4121397.9	4121480.0	4121413.2	4121580.0	4121500.7	4121500.7	4121397.9	4121397.9	4121523.4
Z(m)	63.1	63.2	63.1	63.3	62.6	62.6	63.1	63.1	62.5
YYMMDDHH	14092316	15111516	14041116	17051016	14112916	14112916	14041116	14041116	17052616
24-Hr Unitized Conc (ug/m3)	30.37670	27.70850	33.21090	25.71438	32.85255	40.89187	38.27650	33.86194	34.69713
X(m)	608143.5	608143.5	608165.7	608165.7	608085.7	608085.7	608154.6	608160.0	608154.6
Y(m)	4121382.6	4121382.6	4121413.2	4121413.2	4121500.7	4121500.7	4121397.9	4121400.0	4121397.9
Z(m)	63.2	63.2	63.1	63.1	62.6	62.6	63.1	63.1	63.1
YYMMDDHH	13111124	13111124	17070924	14091224	14112924	14120424	13022024	14073124	14091224
	Short-term Pollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)								
NOx (g/s/engine)	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718
CO (g/s/engine)	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406
SO2 (g/s/engine)	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
PM (g/s/engine)	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468
1-Hour NOx (ug/m3)***	144.225	133.650	129.859	123.869	127.693	174.521	**183.314**	167.315	161.492
1-Hour CO (ug/m3)	81.553	75.574	73.430	70.043	72.205	98.685	**103.657**	94.610	91.317
8-Hour CO (ug/m3)**	21.349	20.821	23.924	21.531	28.343	32.771	28.801	25.845	25.468
1-Hour SO2 (ug/m3)	0.221	0.205	0.199	0.190	0.196	0.267	**0.281**	0.256	0.247
3-Hour SO2 (ug/m3)	0.115	0.106	0.111	0.109	0.137	0.172	0.161	0.167	0.174
24-Hour SO2 (ug/m3)**	0.020	0.018	0.022	0.017	0.022	0.027	0.025	0.022	0.023
24-Hour PM (ug/m3)**	0.853	0.778	0.933	0.722	0.922	1.148	1.075	0.951	0.974
	Annual Unitized Impacts (ug/m3 for 1.0 g/s/engine)								
	2013	**2014**	**2015**	**2016**	**2017**	**5-Year**			
Ann. Unitized Conc (ug/m3)	211.44116	193.30481	201.68821	183.93242	190.00763	192.91010		Modeled Hours/Day:	
X(m)	608154.61	608014.33	608154.61	608014.33	608014.33	608154.61			
Y(m)	4121397.89	4121529.46	4121397.89	4121529.46	4121529.46	4121397.89			
Z(m)	63.05	62.17	63.05	62.17	62.17	63.05			

Worst-Case Engine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent

Emergency Generator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the buildi

NOx impacts shown do ***NOT reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-5

Emergency Generator	EG1210	EG1211	EG1212	EG1801	EG1802	EG1803	EG1804	EG1805	EG1806	EG1807
Load %	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**
kWe	325	325	325	325	325	325	325	325	325	325
bhp	562	562	562	562	562	562	562	562	562	562
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	541	541	541	541	541	541	541	541	541	541
Volumetric Flowrate ACFM	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187
Stack Velocity (ft/sec)	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93
Stack Exit Velocity (m/s)	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
										Load Emissi
NOx (g/hp-hr/engine)	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3
PM (g/hp-hr/engine)	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
*NSPS > Nominal for CO										**Short-term S**
NOx (lb/hr/engine)	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699
CO (lb/hr/engine)	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221
SO2 (lb/hr/engine)	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
PM (lb/hr/engine)	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372
1-Hr Unitized Conc (ug/m3)	186.01061	202.30372	217.42742	169.25335	152.38092	151.02459	143.64258	145.95744	193.83287	199.70877
X(m)	608140.0	608120.0	608160.0	607828.3	607828.3	607800.0	607800.0	607947.3	607916.0	607960.0
Y(m)	4121500.0	4121500.0	4121500.0	4121635.6	4121635.6	4121600.0	4121600.0	4121601.5	4121624.2	4121680.0
Z(m)	63.0	62.8	63.2	62.0	62.0	61.8	61.8	62.2	62.2	63.0
YYMMDDHH	16120511	17082012	15121408	13122208	14011308	13012208	14120110	15062612	13032311	13013108
3-Hr Unitized Conc (ug/m3)	153.77574	136.35535	133.07106	95.45095	89.32968	99.94849	108.71219	136.11206	171.23481	105.90975
X(m)	608116.9	608120.0	608160.0	607828.3	607828.3	608019.2	607962.9	607947.3	607931.6	607828.3
Y(m)	4121478.0	4121500.0	4121500.0	4121635.6	4121635.6	4121536.1	4121590.1	4121601.5	4121612.9	4121635.6
Z(m)	63.0	62.8	63.2	62.0	62.0	62.2	62.3	62.2	62.1	62.0
YYMMDDHH	16120512	13030612	16031115	15021712	15021712	16060412	17062315	17062315	16051115	17021512
8-Hr Unitized Conc (ug/m3)	87.37029	84.31327	78.58360	77.69291	78.49833	75.97794	83.87576	112.08486	143.74408	81.97187
X(m)	608060.0	608080.0	608100.0	607960.0	607960.0	608014.3	607962.9	607947.3	607931.6	607940.0
Y(m)	4121520.0	4121540.0	4121540.0	4121680.0	4121680.0	4121529.5	4121590.1	4121601.5	4121612.9	4121640.0
Z(m)	62.5	62.9	62.9	63.0	63.0	62.2	62.3	62.2	62.1	62.6
YYMMDDHH	17052616	17052616	17052616	13061016	13061016	13081716	15072116	17101216	17062416	17052616
24-Hr Unitized Conc (ug/m3)	33.41577	32.21603	30.42925	30.99239	29.52811	30.90406	34.84707	43.26560	59.65564	31.03561
X(m)	608085.7	608101.3	608140.0	607828.3	607960.0	608014.3	607962.9	607947.3	607931.6	607940.0
Y(m)	4121500.7	4121489.3	4121540.0	4121635.6	4121680.0	4121529.5	4121590.1	4121601.5	4121612.9	4121640.0
Z(m)	62.6	62.9	63.5	62.0	63.0	62.2	62.3	62.2	62.1	62.6
YYMMDDHH	13050624	13050624	13050624	17010224	13061024	17070924	15072124	13060524	17072824	17052624
										Short-term P
NOx (g/s/engine)	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718
CO (g/s/engine)	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406
SO2 (g/s/engine)	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
PM (g/s/engine)	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468
1-Hour NOx (ug/m3)***	133.556	145.254	156.113	121.524	109.410	108.436	103.135	104.797	139.172	143.391
1-Hour CO (ug/m3)	75.520	82.135	88.276	68.717	61.867	61.316	58.319	59.259	78.696	81.082
8-Hour CO (ug/m3)**	26.604	25.673	23.929	23.657	23.903	23.135	25.540	34.130	43.770	24.960
1-Hour SO2 (ug/m3)	0.205	0.223	0.239	0.186	0.168	0.166	0.158	0.161	0.213	0.220
3-Hour SO2 (ug/m3)	0.169	0.150	0.146	0.105	0.098	0.110	0.120	0.150	0.188	0.117
24-Hour SO2 (ug/m3)**	0.022	0.021	0.020	0.020	0.019	0.020	0.023	0.029	0.039	0.020
24-Hour PM (ug/m3)**	0.938	0.905	0.854	0.870	0.829	0.868	0.979	1.215	1.675	0.871

			Annual Emissions & Pollutant Impacts (ug/m3)			
			(TPY/eng)	**(lb/hr/eng)**	**(g/s/eng)**	**(ug/m3)**
Ann. Unitized Conc (ug/m3)	10	NOx***	5.414E-2	2.967E-2	3.738E-3	**7.904E-1**
X(m)	(7AM-5PM)	SO2	6.195E-5	3.395E-5	4.277E-6	**9.044E-4**
Y(m)		PM	1.363E-3	7.468E-4	9.410E-5	**1.990E-2**
Z(m)		5-Yr PM2.5	1.363E-3	7.468E-4	9.410E-5	**1.815E-2**

t 6 engines operating during the 7AM-5PM 10-hour period modeled/day.

ıg, followed by 07-12 in the same direction on the other side of the building, and ending with 13 for the small engine stack.

Worst-Case En

Emergency Ger

***NOx impacts

Table AQ3-5

Emergency Generator	EG1808	EG1809	EG1810	EG1811	EG1812	EG1901	EG1902	EG1903	EG1904	EG1905	EG1906
Load %	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**
kWe	325	325	325	325	325	325	325	325	325	325	325
bhp	562	562	562	562	562	562	562	562	562	562	562
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	541	541	541	541	541	541	541	541	541	541	541
Volumetric Flowrate ACFM	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187	7,187
Stack Velocity (ft/sec)	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90	54.90
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93	555.93
Stack Exit Velocity (m/s)	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	ons (g/hp-hr)										
NOx (g/hp-hr/engine)	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3
PM (g/hp-hr/engine)	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
*NSPS > Nominal for CO	**creening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**										
NOx (lb/hr/engine)	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699	5.699
CO (lb/hr/engine)	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221
SO2 (lb/hr/engine)	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
PM (lb/hr/engine)	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372
1-Hr Unitized Conc (ug/m3)	165.72057	182.80584	207.67217	181.73650	226.14972	168.10274	151.59215	149.81652	149.11611	159.40764	196.24674
X(m)	607880.0	607962.9	607880.0	607920.0	607960.0	607799.1	607779.7	607800.0	607961.4	607835.9	607805.5
Y(m)	4121380.0	4121590.1	4121380.0	4121380.0	4121660.0	4121590.4	4121568.9	4121600.0	4121436.6	4121453.9	4121476.0
Z(m)	61.7	62.3	61.7	62.1	63.2	61.7	61.5	61.8	62.0	61.4	61.3
YYMMDDHH	15021808	16120511	13010108	13121317	15113017	16011508	15010808	15021908	15011108	13062211	16062311
3-Hr Unitized Conc (ug/m3)	128.11118	150.85537	157.85085	147.02449	133.78156	136.28243	103.89478	96.03534	100.95847	146.61532	175.04192
X(m)	607978.5	607962.9	607947.3	607940.0	607960.0	607820.7	607820.7	607940.0	607851.1	607835.9	607820.7
Y(m)	4121578.8	4121590.1	4121601.5	4121620.0	4121660.0	4121464.9	4121464.9	4121420.0	4121442.8	4121453.9	4121464.9
Z(m)	62.3	62.3	62.2	62.2	63.2	61.4	61.4	62.1	61.4	61.4	61.4
YYMMDDHH	16120512	16120512	16120512	16120512	16120512	16121012	17020212	16072912	14050412	16083112	13081412
8-Hr Unitized Conc (ug/m3)	74.46404	71.86307	73.70034	75.58171	89.95058	95.17604	81.49767	80.09607	87.18875	108.63076	147.57362
X(m)	607839.4	607828.3	608001.4	607996.5	607853.6	607820.7	607805.5	607940.0	607851.1	607835.9	607820.7
Y(m)	4121650.9	4121635.6	4121549.1	4121542.4	4121669.7	4121464.9	4121476.0	4121420.0	4121442.8	4121453.9	4121464.9
Z(m)	62.0	62.0	62.2	62.1	62.3	61.4	61.3	62.1	61.4	61.4	61.4
YYMMDDHH	13010516	13010516	15011916	17011516	17052516	17020216	17020216	14091216	14050416	14050416	16083116
24-Hr Unitized Conc (ug/m3)	28.51116	27.77943	32.35416	32.70909	34.13711	37.79668	32.24890	33.98300	34.31895	40.19556	62.62156
X(m)	607828.3	607978.5	608001.4	608019.2	608014.3	607820.7	607805.5	607940.0	607940.0	607835.9	607820.7
Y(m)	4121635.6	4121578.8	4121549.1	4121536.1	4121529.5	4121464.9	4121476.0	4121420.0	4121420.0	4121453.9	4121464.9
Z(m)	62.0	62.3	62.2	62.2	62.2	61.4	61.3	62.1	62.1	61.4	61.4
YYMMDDHH	13010524	16052024	15011924	15011924	17062424	16120824	16120824	14091224	13022024	14050424	16083124
	ollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)										
NOx (g/s/engine)	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718	0.718
CO (g/s/engine)	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406	0.406
SO2 (g/s/engine)	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
PM (g/s/engine)	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468
1-Hour NOx (ug/m3)***	118.987	131.255	149.109	130.487	162.375	120.698	108.843	107.568	107.065	114.455	140.905
1-Hour CO (ug/m3)	67.283	74.219	84.315	73.785	91.817	68.250	61.546	60.826	60.541	64.720	79.676
8-Hour CO (ug/m3)**	22.674	21.882	22.442	23.015	27.390	28.981	24.816	24.389	26.549	33.078	**44.936**
1-Hour SO2 (ug/m3)	0.182	0.201	0.228	0.200	0.249	0.185	0.167	0.165	0.164	0.175	0.216
3-Hour SO2 (ug/m3)	0.141	0.166	0.174	0.162	0.147	0.150	0.114	0.106	0.111	0.161	**0.193**
24-Hour SO2 (ug/m3)**	0.019	0.018	0.021	0.022	0.023	0.025	0.021	0.022	0.023	0.027	**0.041**
24-Hour PM (ug/m3)**	0.801	0.780	0.909	0.918	0.959	1.061	0.906	0.954	0.964	1.129	**1.758**
Ann. Unitized Conc (ug/m3)											
X(m)											
Y(m)											
Z(m)											

gine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent 6 engines operating during the 7AM-5PM 10-h

erator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the building, followed by 07-12 in the same direction on th

shown do ***NOT*** reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-5

Emergency Generator	EG1907	EG1908	EG1909	EG1910	EG1911	EG1912
Load %	**10%**	**10%**	**10%**	**10%**	**10%**	**10%**
kWe	325	325	325	325	325	325
bhp	562	562	562	562	562	562
Stack Height (feet)	24	24	24	24	24	24
Stack Exit Temp (deg.F)	541	541	541	541	541	541
Volumetric Flowrate ACFM	7,187	7,187	7,187	7,187	7,187	7,187
Stack Velocity (ft/sec)	54.90	54.90	54.90	54.90	54.90	54.90
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	555.93	555.93	555.93	555.93	555.93	555.93
Stack Exit Velocity (m/s)	16.7349	16.7349	16.7349	16.7349	16.7349	16.7349
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
NOx (g/hp-hr/engine)	4.60	4.60	4.60	4.60	4.60	4.60
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60
SO2 (g/hp-hr/engine)	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3	7.169E-3
PM (g/hp-hr/engine)	0.300	0.300	0.300	0.300	0.300	0.300
*NSPS > Nominal for CO						
NOx (lb/hr/engine)	5.699	5.699	5.699	5.699	5.699	5.699
CO (lb/hr/engine)	3.221	3.221	3.221	3.221	3.221	3.221
SO2 (lb/hr/engine)	0.009	0.009	0.009	0.009	0.009	0.009
PM (lb/hr/engine)	0.372	0.372	0.372	0.372	0.372	0.372
1-Hr Unitized Conc (ug/m3)	199.68738	218.33060	208.56933	198.55312	196.74790	222.52706
X(m)	607866.3	607851.1	608020.0	608020.0	607800.0	607780.0
Y(m)	4121431.7	4121442.8	4121600.0	4121600.0	4121460.0	4121420.0
Z(m)	61.6	61.4	62.7	62.7	61.3	61.2
YYMMDDHH	16090412	16090412	16020408	16020408	17061211	15021808
3-Hr Unitized Conc (ug/m3)	109.29498	112.83273	125.85784	112.57699	100.27523	104.30309
X(m)	607779.7	607978.5	607980.0	608020.0	607980.0	607940.0
Y(m)	4121568.9	4121578.8	4121580.0	4121600.0	4121600.0	4121420.0
Z(m)	61.5	62.3	62.4	62.7	62.3	62.1
YYMMDDHH	17021512	16120512	16120512	14111612	14111612	13102415
8-Hr Unitized Conc (ug/m3)	76.07338	70.70790	69.51659	75.56408	82.36516	86.05284
X(m)	607768.6	607768.6	608020.0	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121600.0	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	62.7	62.1	62.1	62.1
YYMMDDHH	17021516	17010216	15121016	15063016	17080416	17080416
24-Hr Unitized Conc (ug/m3)	28.84868	29.55586	29.73102	30.45320	32.42277	33.38167
X(m)	607768.6	607768.6	607768.6	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.1	62.1	62.1
YYMMDDHH	15122024	14121724	14121724	15063024	17080424	16121124
NOx (g/s/engine)	0.718	0.718	0.718	0.718	0.718	0.718
CO (g/s/engine)	0.406	0.406	0.406	0.406	0.406	0.406
SO2 (g/s/engine)	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
PM (g/s/engine)	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468
1-Hour NOx (ug/m3)***	143.376	156.761	149.753	142.561	141.265	159.774
1-Hour CO (ug/m3)	81.073	88.642	84.679	80.613	79.880	90.346
8-Hour CO (ug/m3)**	23.164	21.531	21.168	23.009	25.080	26.203
1-Hour SO2 (ug/m3)	0.220	0.240	0.229	0.218	0.216	0.245
3-Hour SO2 (ug/m3)	0.120	0.124	0.138	0.124	0.110	0.115
24-Hour SO2 (ug/m3)**	0.019	0.020	0.020	0.020	0.021	0.022
24-Hour PM (ug/m3)**	0.810	0.830	0.835	0.855	0.910	0.937

Ann. Unitized Conc (ug/m3)
X(m)
Y(m)
Z(m)

ɔur period modeled/day.

e other side of the building, and ending with 13 for the small engine stack.

Table AQ3-6 **Equinix Large Engine Screening Analysis - NOMINAL Screening Emissions**
QSK95 Engines (36)

Emergency Generator	**SV1201**	**SV1202**	**EG1203**	**EG1204**	**EG1205**	**EG1206**	**EG1207**	**EG1208**	**EG1209**
Load %	1%	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**
kWe	33	33	33	33	33	33	33	33	33
bhp	155	155	155	155	155	155	155	155	155
Stack Height (feet)	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	428	428	428	428	428	428	428	428	428
Volumetric Flowrate ACFM	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492
Stack Velocity (ft/sec)	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15
Stack Exit Velocity (m/s)	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	Load Emissions (g/hp-hr)								
NOx (g/hp-hr/engine)	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80
CO (g/hp-hr/engine)	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20
SO2 (g/hp-hr/engine)	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2
PM (g/hp-hr/engine)	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520
	Short-term Screening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)								
NOx (lb/hr/engine)	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032
CO (lb/hr/engine)	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460
SO2 (lb/hr/engine)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
PM (lb/hr/engine)	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178
1-Hr Unitized Conc (ug/m3)	230.01929	235.12403	253.17121	244.22052	245.24374	290.65591	305.81247	282.23815	290.95633
X(m)	607980.0	608004.0	608004.0	608032.4	608058.3	608020.0	608080.0	608070.1	608085.7
Y(m)	4121420.0	4121405.5	4121405.5	4121384.8	4121390.4	4121380.0	4121540.0	4121512.1	4121500.7
Z(m)	62.2	62.3	62.3	62.4	62.6	62.5	62.9	62.5	62.6
YYMMDDHH	17061211	17061211	16090412	16090412	16090412	17120508	17031209	17091212	17091212
3-Hr Unitized Conc (ug/m3)	146.48382	121.30880	114.03639	113.63244	149.46064	181.19991	180.38226	182.09540	183.15577
X(m)	608154.6	608116.9	608172.4	608172.4	608085.7	608101.3	608100.0	608100.0	608101.3
Y(m)	4121397.9	4121478.0	4121422.9	4121422.9	4121500.7	4121489.3	4121560.0	4121520.0	4121489.3
Z(m)	63.1	63.0	63.2	63.2	62.6	62.9	63.2	62.7	62.9
YYMMDDHH	17102715	15111615	16060412	16060412	14120412	13091012	16120512	16120512	16120512
8-Hr Unitized Conc (ug/m3)	109.19933	83.64044	87.83341	86.42873	105.73694	123.58830	132.58086	108.47795	102.64326
X(m)	608154.6	608160.0	608165.7	608100.0	608085.7	608101.3	608154.6	608160.0	608085.7
Y(m)	4121397.9	4121480.0	4121413.2	4121580.0	4121500.7	4121489.3	4121397.9	4121400.0	4121500.7
Z(m)	63.1	63.2	63.1	63.3	62.6	62.9	63.1	63.1	62.6
YYMMDDHH	13092016	17021816	14041116	13061016	14112916	14120416	16050316	15082516	13030616
24-Hr Unitized Conc (ug/m3)	44.39215	33.42739	37.05082	31.70306	39.41295	47.05344	54.58518	43.53905	38.47712
X(m)	608154.6	608143.5	608165.7	608100.0	608070.1	608085.7	608154.6	608154.6	608154.6
Y(m)	4121397.9	4121382.6	4121413.2	4121580.0	4121512.1	4121500.7	4121397.9	4121397.9	4121397.9
Z(m)	63.1	63.2	63.1	63.3	62.5	62.6	63.1	63.1	63.1
YYMMDDHH	13052824	13111124	17070924	13061024	14120424	14120424	13022024	14073024	14091224
	Short-term Pollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)								
NOx (g/s/engine)	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508
CO (g/s/engine)	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310
SO2 (g/s/engine)	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
PM (g/s/engine)	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224
1-Hour NOx (ug/m3)***	116.850	119.443	128.611	124.064	124.584	147.653	155.353	143.377	147.806
1-Hour CO (ug/m3)	71.306	72.888	78.483	75.708	76.026	90.103	94.802	87.494	90.196
8-Hour CO (ug/m3)**	25.389	19.446	20.421	20.095	24.584	28.734	30.825	25.221	23.865
1-Hour SO2 (ug/m3)	0.161	0.165	0.177	0.171	0.172	0.203	0.214	0.198	0.204
3-Hour SO2 (ug/m3)	0.103	0.085	0.080	0.080	0.105	0.127	0.126	0.127	0.128
24-Hour SO2 (ug/m3)**	0.019	0.014	0.016	0.013	0.017	0.020	0.023	0.018	0.016
24-Hour PM (ug/m3)**	0.597	0.449	0.498	0.426	0.530	0.632	0.734	0.585	0.517
	Annual Unitized Impacts (ug/m3 for 1.0 g/s/engine)								
	2013	**2014**	**2015**	**2016**	**2017**	**5-Year**			
Ann. Unitized Conc (ug/m3)	254.29997	248.74403	255.51981	236.07392	242.27706	245.20616			Modeled Hours/Day:
X(m)	608154.61	608014.33	608014.33	608014.33	608014.33	608014.33			
Y(m)	4121397.89	4121529.46	4121529.46	4121529.46	4121529.46	4121529.46			
Z(m)	63.05	62.17	62.17	62.17	62.17	62.17			

Worst-Case Engine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent

Emergency Generator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the buildi

NOx impacts shown do ***NOT reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-6

Emergency Generator	EG1210	EG1211	EG1212	EG1801	EG1802	EG1803	EG1804	EG1805	EG1806	EG1807
Load %	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**
kWe	33	33	33	33	33	33	33	33	33	33
bhp	155	155	155	155	155	155	155	155	155	155
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	428	428	428	428	428	428	428	428	428	428
Volumetric Flowrate ACFM	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492
Stack Velocity (ft/sec)	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15
Stack Exit Velocity (m/s)	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
										Load Emissi
NOx (g/hp-hr/engine)	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80
CO (g/hp-hr/engine)	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20
SO2 (g/hp-hr/engine)	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2
PM (g/hp-hr/engine)	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520
										Short-term S
NOx (lb/hr/engine)	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032
CO (lb/hr/engine)	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460
SO2 (lb/hr/engine)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
PM (lb/hr/engine)	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178
1-Hr Unitized Conc (ug/m3)	261.15343	260.04071	309.57241	219.11859	182.74267	179.16055	161.83676	184.25812	236.90594	245.87028
X(m)	608101.3	608140.0	608160.0	607828.3	607828.3	607800.0	607799.1	608014.3	607916.0	607960.0
Y(m)	4121489.3	4121500.0	4121500.0	4121635.6	4121635.6	4121600.0	4121590.4	4121529.5	4121624.2	4121680.0
Z(m)	62.9	63.0	63.2	62.0	62.0	61.8	61.7	62.2	62.2	63.0
YYMMDDHH	14082511	14082511	15081509	13122208	13122208	13012208	16092908	16010817	17092311	13013108
3-Hr Unitized Conc (ug/m3)	178.35810	173.32274	163.82653	146.81961	102.62463	114.95124	125.91594	153.58291	205.30902	145.00251
X(m)	608116.9	608120.0	608140.0	607828.3	607828.3	608019.2	607962.9	607947.3	607916.0	607920.0
Y(m)	4121478.0	4121500.0	4121500.0	4121635.6	4121635.6	4121536.1	4121590.1	4121601.5	4121624.2	4121700.0
Z(m)	63.0	62.8	63.0	62.0	62.0	62.2	62.3	62.2	62.2	63.6
YYMMDDHH	16120512	13030612	13030612	15120612	15021712	16060412	17062315	17070512	17070912	16102912
8-Hr Unitized Conc (ug/m3)	99.31447	98.89955	124.62010	117.91934	91.09443	89.17016	102.13372	122.47573	161.52842	125.44601
X(m)	608101.3	608000.0	608000.0	607828.3	607960.0	608014.3	607962.9	607947.3	607931.6	607828.3
Y(m)	4121489.3	4121560.0	4121540.0	4121635.6	4121680.0	4121529.5	4121590.1	4121601.5	4121612.9	4121635.6
Z(m)	62.9	62.2	62.2	62.0	63.0	62.2	62.3	62.2	62.1	62.0
YYMMDDHH	13030616	17020616	13010516	14121416	13061016	13081716	17101216	17070516	17062416	13010516
24-Hr Unitized Conc (ug/m3)	36.99027	41.30840	47.46939	48.10559	34.01755	34.12436	40.73162	47.62529	65.57333	47.30445
X(m)	608085.7	608000.0	608000.0	607828.3	607960.0	608014.3	607962.9	607947.3	607931.6	607828.3
Y(m)	4121500.7	4121560.0	4121560.0	4121635.6	4121680.0	4121529.5	4121590.1	4121601.5	4121612.9	4121635.6
Z(m)	62.6	62.2	62.2	62.0	63.0	62.2	62.3	62.2	62.1	62.0
YYMMDDHH	13050624	17020624	17020624	17032024	13061024	17070924	15072124	13060524	17062424	13010524
										Short-term P
NOx (g/s/engine)	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508
CO (g/s/engine)	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310
SO2 (g/s/engine)	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
PM (g/s/engine)	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224
1-Hour NOx (ug/m3)***	132.666	132.101	**157.263**	111.312	92.833	91.014	82.213	93.603	120.348	124.902
1-Hour CO (ug/m3)	80.958	80.613	**95.967**	67.927	56.650	55.540	50.169	57.120	73.441	76.220
8-Hour CO (ug/m3)**	23.091	22.994	28.974	27.416	21.179	20.732	23.746	28.476	37.555	29.166
1-Hour SO2 (ug/m3)	0.183	0.182	**0.217**	0.153	0.128	0.125	0.113	0.129	0.166	0.172
3-Hour SO2 (ug/m3)	0.125	0.121	0.115	0.103	0.072	0.080	0.088	0.108	0.144	0.102
24-Hour SO2 (ug/m3)**	0.016	0.017	0.020	0.020	0.014	0.014	0.017	0.020	0.028	0.020
24-Hour PM (ug/m3)**	0.497	0.555	0.638	0.647	0.457	0.459	0.547	0.640	0.881	0.636

			Annual Emissions & Pollutant Impacts (ug/m3)			
			(TPY/eng)	**(lb/hr/eng)**	**(g/s/eng)**	**(ug/m3)**
Ann. Unitized Conc (ug/m3)	10	NOx***	4.032E-2	2.209E-2	2.784E-3	**7.113E-1**
X(m)	(7AM-5PM)	SO2	1.709E-5	9.362E-6	1.180E-6	**3.014E-4**
Y(m)		PM	1.777E-3	9.737E-4	1.227E-4	**3.135E-2**
Z(m)		5-Yr PM2.5	1.777E-3	9.737E-4	1.227E-4	**3.008E-2**

t 6 engines operating during the 7AM-5PM 10-hour period modeled/day.

ng, followed by 07-12 in the same direction on the other side of the building, and ending with 13 for the small engine stack.

Worst-Case En

Emergency Ger

***NOx impacts

Table AQ3-6

Emergency Generator	EG1808	EG1809	EG1810	EG1811	EG1812	EG1901	EG1902	EG1903	EG1904	EG1905	EG1906
Load %	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**
kWe	33	33	33	33	33	33	33	33	33	33	33
bhp	155	155	155	155	155	155	155	155	155	155	155
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	428	428	428	428	428	428	428	428	428	428	428
Volumetric Flowrate ACFM	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492	5,492
Stack Velocity (ft/sec)	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96	41.96
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15	493.15
Stack Exit Velocity (m/s)	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
	ons (g/hp-hr)										
NOx (g/hp-hr/engine)	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80
CO (g/hp-hr/engine)	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20
SO2 (g/hp-hr/engine)	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2
PM (g/hp-hr/engine)	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520
	creening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)										
NOx (lb/hr/engine)	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032	4.032
CO (lb/hr/engine)	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460	2.460
SO2 (lb/hr/engine)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
PM (lb/hr/engine)	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178	0.178
1-Hr Unitized Conc (ug/m3)	200.04344	216.36864	251.92209	224.99422	268.80454	212.51112	181.79689	180.12785	178.02203	197.25087	250.11469
X(m)	607900.0	607900.0	607880.0	607920.0	607980.0	607799.1	607779.7	607800.0	607961.4	607935.4	607805.5
Y(m)	4121380.0	4121380.0	4121380.0	4121380.0	4121660.0	4121590.4	4121568.9	4121600.0	4121436.6	4121430.8	4121476.0
Z(m)	61.9	61.9	61.7	62.1	63.5	61.7	61.5	61.8	62.0	62.0	61.3
YYMMDDHH	14122017	14122017	14122017	13121317	13020808	16011508	15010808	14122108	14020308	15011908	16062311
3-Hr Unitized Conc (ug/m3)	145.77699	176.16822	180.32059	176.84507	168.00057	147.46407	123.37413	110.15171	119.67709	162.10402	219.10219
X(m)	607978.5	607962.9	607947.3	607940.0	607960.0	607835.9	607820.7	607800.0	607851.1	607835.9	607805.5
Y(m)	4121578.8	4121590.1	4121601.5	4121620.0	4121660.0	4121453.9	4121464.9	4121600.0	4121442.8	4121453.9	4121476.0
Z(m)	62.3	62.3	62.2	62.2	63.2	61.4	61.4	61.8	61.4	61.4	61.3
YYMMDDHH	16120512	16120512	16120512	16120512	16120512	15042312	15042312	16102912	14050412	16083112	16062312
8-Hr Unitized Conc (ug/m3)	92.55858	81.29939	86.98690	106.11708	127.70058	118.79498	88.51700	94.17311	101.70743	127.31746	163.19502
X(m)	607828.3	607828.3	607947.3	608014.3	607846.7	607768.6	607768.6	607940.0	607851.1	607940.0	607820.7
Y(m)	4121635.6	4121635.6	4121601.5	4121529.5	4121660.2	4121553.7	4121553.7	4121420.0	4121442.8	4121420.0	4121464.9
Z(m)	62.0	62.0	62.2	62.2	62.1	61.4	61.4	62.1	61.4	62.1	61.4
YYMMDDHH	13010516	13010516	16120516	17062416	17051016	13010516	13010516	15063016	14050416	15082616	16083116
24-Hr Unitized Conc (ug/m3)	35.22560	31.10420	36.60943	44.50000	49.88139	45.48898	35.22285	38.45285	39.66543	52.50810	69.19114
X(m)	607828.3	607828.3	608001.4	608019.2	608014.3	607768.6	607805.5	607940.0	607940.0	607940.0	607820.7
Y(m)	4121635.6	4121635.6	4121549.1	4121536.1	4121529.5	4121553.7	4121476.0	4121420.0	4121420.0	4121420.0	4121464.9
Z(m)	62.0	62.0	62.2	62.2	62.2	61.4	61.3	62.1	62.1	62.1	61.4
YYMMDDHH	13010524	13010524	15011924	15031224	14112424	13010524	16120824	15063024	13022024	15082624	16083124
	ollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)										
NOx (g/s/engine)	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508	0.508
CO (g/s/engine)	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310	0.310
SO2 (g/s/engine)	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
PM (g/s/engine)	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224
1-Hour NOx (ug/m3)***	101.622	109.915	127.976	114.297	136.553	107.956	92.353	91.505	90.435	100.203	127.058
1-Hour CO (ug/m3)	62.013	67.074	78.096	69.748	83.329	65.878	56.357	55.840	55.187	61.148	77.536
8-Hour CO (ug/m3)**	21.520	18.902	20.224	24.672	29.690	27.620	20.580	21.895	23.647	29.601	**37.943**
1-Hour SO2 (ug/m3)	0.140	0.151	0.176	0.157	0.188	0.149	0.127	0.126	0.125	0.138	0.175
3-Hour SO2 (ug/m3)	0.102	0.123	0.126	0.124	0.118	0.103	0.086	0.077	0.084	0.113	**0.153**
24-Hour SO2 (ug/m3)**	0.015	0.013	0.015	0.019	0.021	0.019	0.015	0.016	0.017	0.022	**0.029**
24-Hour PM (ug/m3)**	0.473	0.418	0.492	0.598	0.670	0.611	0.473	0.517	0.533	0.706	**0.930**
Ann. Unitized Conc (ug/m3)											
X(m)											
Y(m)											
Z(m)											

gine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (6/8) and (6/10), respectively, to represent 6 engines operating during the 7AM-5PM 10-h

erator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the building, followed by 07-12 in the same direction on th

shown do ***NOT*** reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

Table AQ3-6

Emergency Generator	EG1907	EG1908	EG1909	EG1910	EG1911	EG1912
Load %	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**
kWe	33	33	33	33	33	33
bhp	155	155	155	155	155	155
Stack Height (feet)	24	24	24	24	24	24
Stack Exit Temp (deg.F)	428	428	428	428	428	428
Volumetric Flowrate ACFM	5,492	5,492	5,492	5,492	5,492	5,492
Stack Velocity (ft/sec)	41.96	41.96	41.96	41.96	41.96	41.96
Stack Diameter (feet)	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12	1 8/12
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	493.15	493.15	493.15	493.15	493.15	493.15
Stack Exit Velocity (m/s)	12.7881	12.7881	12.7881	12.7881	12.7881	12.7881
Stack Inside Diameter (m)	0.5080	0.5080	0.5080	0.5080	0.5080	0.5080
NOx (g/hp-hr/engine)	11.80	11.80	11.80	11.80	11.80	11.80
CO (g/hp-hr/engine)	7.20	7.20	7.20	7.20	7.20	7.20
SO2 (g/hp-hr/engine)	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2	1.609E-2
PM (g/hp-hr/engine)	0.520	0.520	0.520	0.520	0.520	0.520
NOx (lb/hr/engine)	4.032	4.032	4.032	4.032	4.032	4.032
CO (lb/hr/engine)	2.460	2.460	2.460	2.460	2.460	2.460
SO2 (lb/hr/engine)	0.005	0.005	0.005	0.005	0.005	0.005
PM (lb/hr/engine)	0.178	0.178	0.178	0.178	0.178	0.178
1-Hr Unitized Conc (ug/m3)	292.17513	246.80524	249.46537	244.13705	246.16578	247.78756
X(m)	607860.0	607851.1	608020.0	607820.7	607800.0	607780.0
Y(m)	4121420.0	4121442.8	4121600.0	4121464.9	4121480.0	4121420.0
Z(m)	61.6	61.4	62.7	61.4	61.3	61.2
YYMMDDHH	15062108	16052612	16020408	16090412	16090412	15021808
3-Hr Unitized Conc (ug/m3)	153.22110	129.63470	141.37198	130.35616	126.55672	162.18463
X(m)	607768.6	607978.5	607978.5	608020.0	607940.0	607940.0
Y(m)	4121553.7	4121578.8	4121578.8	4121600.0	4121420.0	4121420.0
Z(m)	61.4	62.3	62.3	62.7	62.1	62.1
YYMMDDHH	15021712	16120512	16120512	14111612	16040312	16041015
8-Hr Unitized Conc (ug/m3)	112.98237	89.06803	86.80196	84.56731	106.03423	121.95843
X(m)	607768.6	607768.6	608020.0	607940.0	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121600.0	4121420.0	4121420.0	4121420.0
Z(m)	61.4	61.4	62.7	62.1	62.1	62.1
YYMMDDHH	17021516	17010216	15121016	17080416	17080416	17080416
24-Hr Unitized Conc (ug/m3)	46.95872	37.57687	33.31502	34.13005	41.97856	51.97166
X(m)	607768.6	607768.6	607768.6	607947.2	607940.0	607940.0
Y(m)	4121553.7	4121553.7	4121553.7	4121446.9	4121420.0	4121420.0
Z(m)	61.4	61.4	61.4	62.0	62.1	62.1
YYMMDDHH	15122024	14121724	14121724	14091224	13091524	13022024
NOx (g/s/engine)	0.508	0.508	0.508	0.508	0.508	0.508
CO (g/s/engine)	0.310	0.310	0.310	0.310	0.310	0.310
SO2 (g/s/engine)	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
PM (g/s/engine)	0.0224	0.0224	0.0224	0.0224	0.0224	0.0224
1-Hour NOx (ug/m3)***	148.425	125.377	126.728	124.022	125.052	125.876
1-Hour CO (ug/m3)	90.574	76.510	77.334	75.682	76.311	76.814
8-Hour CO (ug/m3)**	26.268	20.708	20.181	19.662	24.653	28.355
1-Hour SO2 (ug/m3)	0.205	0.173	0.175	0.171	0.172	0.173
3-Hour SO2 (ug/m3)	0.107	0.091	0.099	0.091	0.089	0.114
24-Hour SO2 (ug/m3)**	0.020	0.016	0.014	0.014	0.018	0.022
24-Hour PM (ug/m3)**	0.631	0.505	0.448	0.459	0.564	0.698
Ann. Unitized Conc (ug/m3)						
X(m)						
Y(m)						
Z(m)						

our period modeled/day.

e other side of the building, and ending with 13 for the small engine stack.

Table AQ3-7 **Equinix Small Engine Screening Analysis - NOMINAL Screening Emissions**
QSX15 Engines (3)

Emergency Generator	SV1213	SV1813	SV1913	SV1213	SV1813	SV1913	SV1213	SV1813	SV1913	SV1213	SV1813	SV1913	SV1213	SV1813	SV1913	SV1213	SV1813	SV1913
Load %	100%	100%	100%	75%	75%	75%	50%	50%	50%	25%	25%	25%	10%	10%	10%	1%	1%	1%
kWe	500	500	500	375	375	375	250	250	250	125	125	125	50	50	50	0	0	0
bhp	731	731	731	554	554	554	378	378	378	201	201	201	96	96	96	19	19	19
Stack Height (feet)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Stack Exit Temp (deg.F)	894	894	894	852	852	852	828	828	828	719	719	719	541	541	541	418	418	418
Volumetric Flowrate ACFM	3,442	3,442	3,442	2,771	2,771	2,771	2,245	2,245	2,245	1,418	1,418	1,418	955	955	955	765	765	765
Stack Velocity (ft/sec)	73.04	73.04	73.04	58.80	58.80	58.80	47.64	47.64	47.64	30.09	30.09	30.09	20.27	20.27	20.27	16.23	16.23	16.23
Stack Diameter (feet)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Stack Height (m)	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32	7.32
Stack Exit Temp (deg.K)	752.04	752.04	752.04	728.71	728.71	728.71	715.37	715.37	715.37	654.82	654.82	654.82	555.93	555.93	555.93	487.59	487.59	487.59
Stack Exit Velocity (m/s)	22.2631	22.2631	22.2631	17.9230	17.9230	17.9230	14.5208	14.5208	14.5208	9.1717	9.1717	9.1717	6.1770	6.1770	6.1770	4.9481	4.9481	4.9481
Stack Inside Diameter (m)	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048	0.3048
	Load Emissions (g/hp-hr)																	
NOx (g/hp-hr/engine)	4.80	4.80	4.80	4.80	4.80	4.80	3.60	3.60	3.60	3.80	3.80	3.80	4.70	4.70	4.70	8.50	8.50	8.50
CO (g/hp-hr/engine)*	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	6.20	6.20	6.20	10.30	10.30	10.30
SO2 (g/hp-hr/engine)	4.462E-3	4.462E-3	4.462E-3	4.381E-3	4.381E-3	4.381E-3	4.670E-3	4.670E-3	4.670E-3	4.964E-3	4.964E-3	4.964E-3	5.896E-3	5.896E-3	5.896E-3	1.616E-2	1.616E-2	1.616E-2
PM (g/hp-hr/engine)*	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.150	0.150	0.150	0.110	0.110	0.110	0.190	0.190	0.190
*NSPS > Nominal CO at 25-100% Cycle-wgt > Nominal PM at 50-100%	**Short-term Screening Emissions (lb/hr/engine) and Unitized Screening Impacts (ug/m3 for 1.0 g/s/engine)**																	
NOx (lb/hr/engine)	7.736	7.736	7.736	5.863	5.863	5.863	3.000	3.000	3.000	1.684	1.684	1.684	0.995	0.995	0.995	0.356	0.356	0.356
CO (lb/hr/engine)	4.190	4.190	4.190	3.176	3.176	3.176	2.167	2.167	2.167	1.152	1.152	1.152	1.312	1.312	1.312	0.431	0.431	0.431
SO2 (lb/hr/engine)	7.19E-3	7.19E-3	7.19E-3	5.35E-3	5.35E-3	5.35E-3	3.89E-3	3.89E-3	3.89E-3	2.20E-3	2.20E-3	2.20E-3	1.25E-3	1.25E-3	1.25E-3	6.77E-4	6.77E-4	6.77E-4
PM (lb/hr/engine)	1.29E-1	1.29E-1	1.29E-1	9.77E-2	9.77E-2	9.77E-2	6.67E-2	6.67E-2	6.67E-2	6.65E-2	6.65E-2	6.65E-2	2.33E-2	2.33E-2	2.33E-2	7.96E-3	7.96E-3	7.96E-3
1-Hr Unitized Conc (ug/m3)	316.66658	290.16585	291.56116	362.65828	323.56523	321.62951	392.77971	352.93089	347.89114	499.75529	446.21586	416.17579	903.23820	569.57680	495.79702	1312.35247	633.47278	565.49626
X(m)	608180.0	607940.0	607940.0	608180.0	607940.0	607940.0	608180.0	607940.0	607940.0	608180.0	607960.0	607760.0	608180.0	607960.0	607760.0	608180.0	607960.0	607760.0
Y(m)	4121460.0	4121660.0	4121680.0	4121460.0	4121660.0	4121680.0	4121460.0	4121660.0	4121680.0	4121460.0	4121660.0	4121420.0	4121460.0	4121660.0	4121440.0	4121460.0	4121660.0	4121440.0
Z(m)	62.9	62.6	63.0	62.9	62.6	63.0	62.9	62.6	63.0	62.9	63.2	61.2	62.9	63.2	61.2	62.9	63.2	61.2
YYMMDDHH	17012410	14121310	13120808	17120513	14121310	15012009	17120513	14121310	15012009	15122808	14122009	14021008	16052508	16121208	13012409	15120916	16121208	15100708
3-Hr Unitized Conc (ug/m3)	173.78708	169.09593	170.75136	190.09366	206.68762	174.52037	212.82568	225.35596	193.37464	266.51578	238.55486	240.04059	399.75118	291.10371	284.82464	562.27588	348.14994	349.52097
X(m)	608180.0	607806.0	607940.0	608180.0	607817.1	607790.8	608180.0	607817.1	607790.8	608160.0	607806.0	607790.8	608180.0	607806.0	607790.8	608180.0	607806.0	607790.8
Y(m)	4121440.0	4121605.1	4121420.0	4121440.0	4121620.3	4121584.2	4121460.0	4121620.3	4121584.2	4121500.0	4121605.1	4121584.2	4121460.0	4121605.1	4121584.2	4121440.0	4121605.1	4121584.2
Z(m)	63.1	61.8	62.1	63.1	61.9	61.8	62.9	61.9	61.8	63.2	61.8	61.8	62.9	61.8	61.8	63.1	61.8	61.8
YYMMDDHH	16120512	14030115	17120815	16120512	16032015	16030515	13102812	15091415	16030515	17120309	15122112	17011015	14030218	14102512	14022715	16120512	14102512	14022715
8-Hr Unitized Conc (ug/m3)	121.83638	138.91017	132.18326	142.64898	160.71244	149.22655	163.94480	169.24966	160.61594	212.00119	193.82030	206.58117	265.73785	244.16575	265.84546	302.38636	297.20314	312.04377
X(m)	607996.5	607806.0	607803.5	608132.4	607828.3	607803.5	608132.4	607806.0	607803.5	608132.4	607806.0	607803.5	608132.4	607806.0	607790.8	608132.4	607806.0	607790.8
Y(m)	4121542.4	4121605.1	4121596.4	4121367.4	4121635.6	4121596.4	4121367.4	4121605.1	4121596.4	4121367.4	4121605.1	4121596.4	4121367.4	4121605.1	4121584.2	4121367.4	4121605.1	4121584.2
Z(m)	62.1	61.8	61.7	63.3	62.0	61.7	63.3	61.8	61.7	63.3	61.8	61.7	63.3	61.8	61.8	63.3	61.8	61.8
YYMMDDHH	13010516	14020216	17052516	17121716	17052516	17052516	17121716	14020216	17052516	17121716	14020216	17051016	17121716	15122116	17020616	17121716	15122116	17020616
24-Hr Unitized Conc (ug/m3)	42.75064	52.82359	49.56438	48.40267	59.96109	55.62768	55.54206	65.01490	59.78172	71.70532	75.50786	81.63358	89.94645	93.63146	109.67630	105.12984	113.85989	130.32703
X(m)	607996.5	607806.0	607803.5	608132.4	607806.0	607803.5	608132.4	607806.0	607803.5	608132.4	607806.0	607803.5	608132.4	607806.0	607790.8	608200.0	607806.0	607790.8
Y(m)	4121542.4	4121605.1	4121596.4	4121367.4	4121605.1	4121596.4	4121367.4	4121605.1	4121596.4	4121367.4	4121605.1	4121596.4	4121367.4	4121605.1	4121584.2	4121440.0	4121605.1	4121584.2
Z(m)	62.1	61.8	61.7	63.3	61.8	61.7	63.3	61.8	61.7	63.3	61.8	61.7	63.3	61.8	61.8	63.1	61.8	61.8
YYMMDDHH	13010524	14020224	17052524	17121724	14020224	17052524	17121724	14020224	17052524	17121724	14020224	17051024	17121724	15122124	17020624	16120524	15122124	17020624
	Short-term Pollutant Emissions (g/s/engine) and Pollutant Screening Impacts (ug/m3/engine)																	
NOx (g/s/engine)	0.975	0.975	0.975	0.739	0.739	0.739	0.378	0.378	0.378	0.212	0.212	0.212	0.125	0.125	0.125	0.045	0.045	0.045
CO (g/s/engine)	0.528	0.528	0.528	0.400	0.400	0.400	0.273	0.273	0.273	0.145	0.145	0.145	0.165	0.165	0.165	0.054	0.054	0.054
SO2 (g/s/engine)	0.0009	0.0009	0.0009	0.0007	0.0007	0.0007	0.0005	0.0005	0.0005	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001
PM (g/s/engine)	0.0162	0.0162	0.0162	0.0123	0.0123	0.0123	0.0084	0.0084	0.0084	0.0084	0.0084	0.0084	0.0029	0.0029	0.0029	0.0010	0.0010	0.0010
1-Hour NOx (ug/m3)***	**308.750**	282.912	284.272	268.004	239.115	237.684	148.471	133.408	131.503	105.948	94.598	88.229	112.905	71.197	61.975	59.056	28.506	25.447
1-Hour CO (ug/m3)	**167.200**	153.208	153.944	145.063	129.426	128.652	107.229	96.350	94.974	72.465	64.701	60.345	149.034	93.980	81.807	70.867	34.208	30.537
8-Hour CO (ug/m3)**	24.124	**27.504**	26.172	21.397	24.107	22.384	16.784	17.327	16.443	11.528	10.539	11.233	16.443	15.108	16.449	6.123	6.018	6.319
1-Hour SO2 (ug/m3)	**0.285**	0.261	0.262	0.254	0.226	0.225	0.196	0.176	0.174	0.150	0.134	0.125	0.181	0.114	0.099	0.131	0.063	0.057
3-Hour SO2 (ug/m3)	**0.156**	0.152	0.154	0.133	0.145	0.122	0.106	0.113	0.097	0.080	0.072	0.072	0.080	0.058	0.057	0.056	0.035	0.035
24-Hour SO2 (ug/m3)**	0.012	**0.014**	0.013	0.010	0.013	0.012	0.008	0.010	0.009	0.006	0.007	0.007	0.005	0.006	0.007	0.003	0.003	0.004
24-Hour PM (ug/m3)**	0.208	**0.257**	0.241	0.179	0.221	0.205	0.140	0.164	0.151	0.181	0.190	0.206	0.078	0.081	0.095	0.032	0.034	0.039
	Annual Unitized Impacts (ug/m3 for 1.0 g/s/engine) - 100% Load						**Annual Unitized Impacts (ug/m3 for 1.0 g/s/engine) - 10% Load**						**Annual Unitized Impacts (ug/m3 for 1.0 g/s/engine) - 1% Load**					
	2013	**2014**	**2015**	**2016**	**2017**	**5-Year**	**2013**	**2014**	**2015**	**2016**	**2017**	**5-Year**	**2013**	**2014**	**2015**	**2016**	**2017**	**5-Year**
Ann. Unitized Conc (ug/m3)	26.91524	27.95280	29.76970	26.89550	28.29652	27.96595	38.70877	36.67738	38.73039	33.55428	34.66780	36.46772	46.81320	42.95391	45.55664	39.23786	40.73738	42.77553
X(m)	608014.33	608014.33	608014.33	608014.33	608014.33	608014.33	608180.00	608180.00	608180.00	608180.00	608180.00	608180.00	608160.00	608180.00	608180.00	608160.00	608180.00	608160.00
Y(m)	4121529.46	4121529.46	4121529.46	4121529.46	4121529.46	4121529.46	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00	4121360.00
Z(m)	62.17	62.17	62.17	62.17	62.17	62.17	62.67	62.67	62.67	62.67	62.67	62.67	62.61	62.67	62.67	62.61	62.67	62.61
Modeled Hours/Day:	10	**Annual Emissions & Pollutant Impacts (ug/m3)**					10	**Annual Emissions & Pollutant Impacts (ug/m3)**					10	**Annual Emissions & Pollutant Impacts (ug/m3)**				
	(7AM-5PM)	**(TPY/eng)**	**(lb/hr/eng)**	**(g/s/eng)**	**(ug/m3)**		(7AM-5PM)	**(TPY/eng)**	**(lb/hr/eng)**	**(g/s/eng)**	**(ug/m3)**		(7AM-5PM)	**(TPY/eng)**	**(lb/hr/eng)**	**(g/s/eng)**	**(ug/m3)**	
	NOx***	7.252E-2	3.974E-2	5.007E-3	**1.491E-1**		NOx***	7.852E-3	4.302E-3	5.421E-4	2.100E-2		NOx***	3.560E-3	1.951E-3	2.458E-4	1.151E-2	
	SO2	8.058E-5	4.415E-5	5.563E-6	**1.656E-4**		SO2	1.058E-5	5.798E-6	7.306E-7	2.830E-5		SO2	2.094E-6	1.148E-6	1.446E-7	6.769E-6	
	PM	2.417E-3	1.325E-3	1.669E-4	**4.969E-3**		PM	1.693E-4	9.278E-5	1.169E-5	4.527E-4		PM	7.959E-5	4.361E-5	5.495E-6	2.572E-4	
	5-Yr PM2.5	2.417E-3	1.325E-3	1.669E-4	**4.667E-3**		5-Yr PM2.5	1.693E-4	9.278E-5	1.169E-5	4.263E-4		5-Yr PM2.5	7.959E-5	4.361E-5	5.495E-6	2.350E-4	

Worst-Case Engine bolded **8-hour CO emissions and 24-hour SO2 and PM emissions ratioed by (3/8) and (3/10), respectively, to represent 3 engines operating during the 7AM-5PM 10-hour period modeled/day.

Emergency Generator stacks are numbered from the large engine stack diagonally opposite the small engine, then 01-06 on that side of the building, followed by 07-12 in the same direction on the other side of the building, and ending with 13 for the small engine stack.

NOx impacts shown do ***NOT reflect any NO2 Plume Volume Molar Ratio Method (PVMRM) or Ambient Ratio Method 2 (ARM2) processing.

FIGURE AQ3-1
PROJECT SITE, FENCELINE, NEARBY RECEPTORS, and BPIP STRUCTURES/STACKS

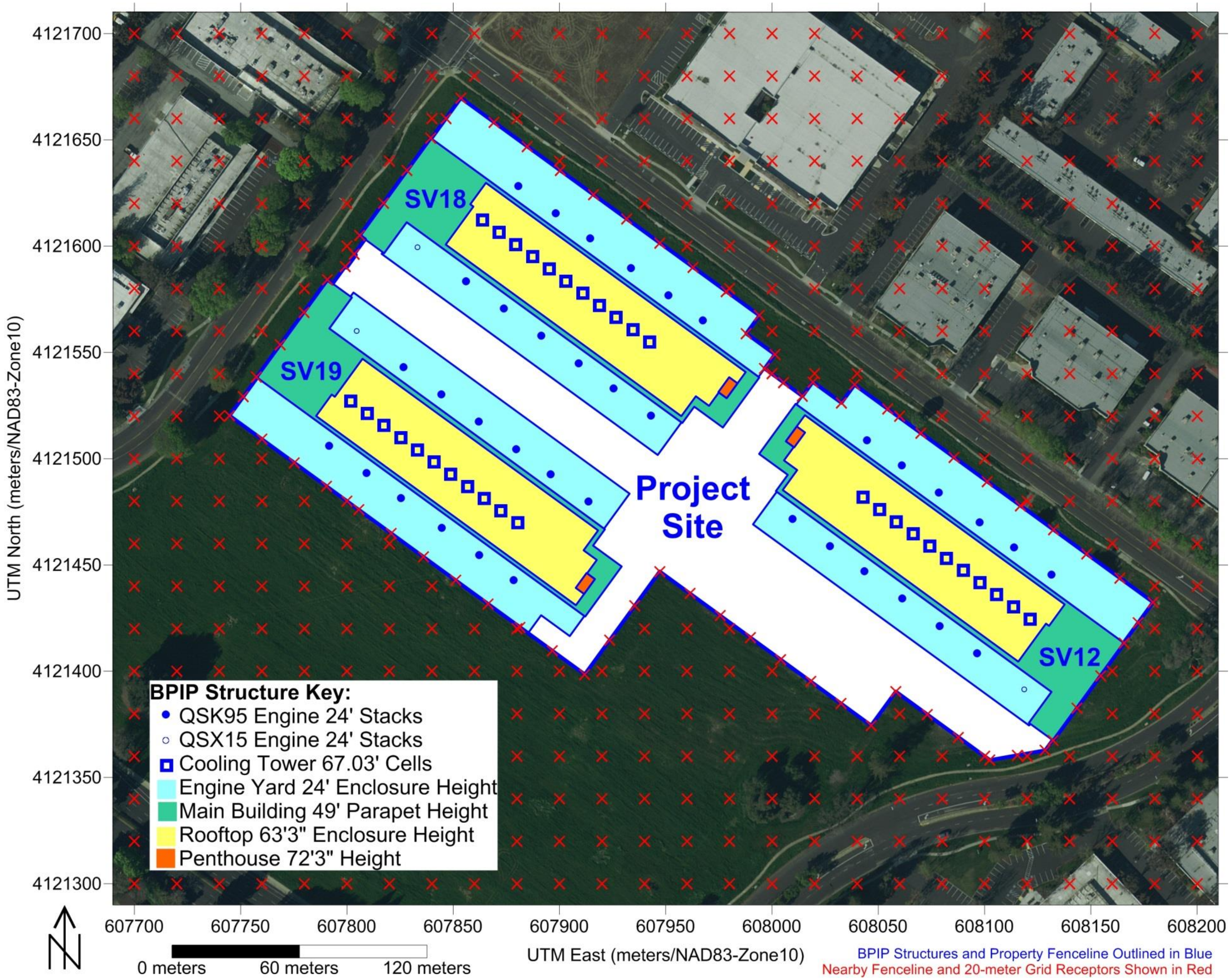


FIGURE AQ3-2
MODELED RECEPTOR GRIDS

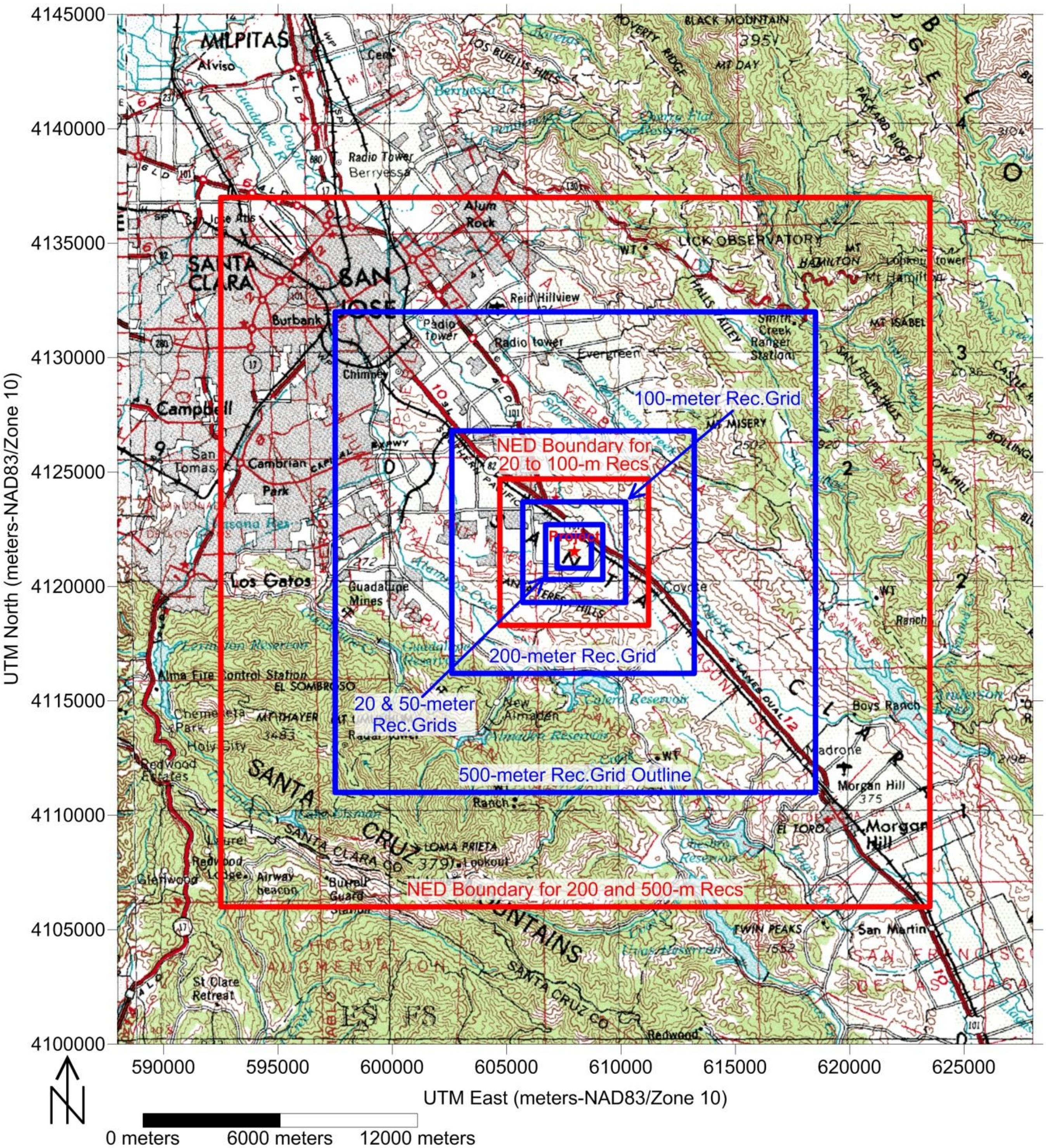


FIGURE AQ3-3
MAXIMUM IMPACT LOCATIONS

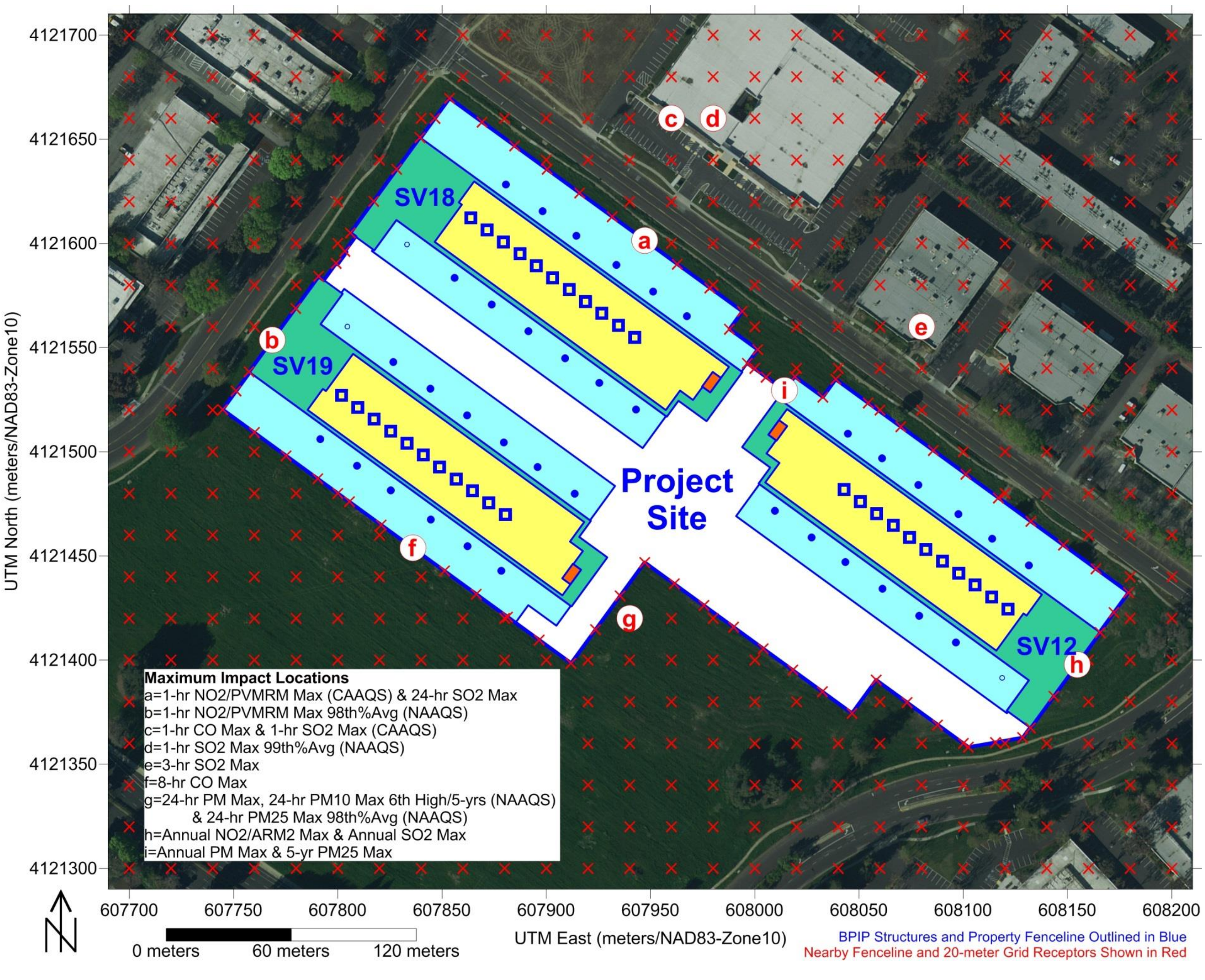
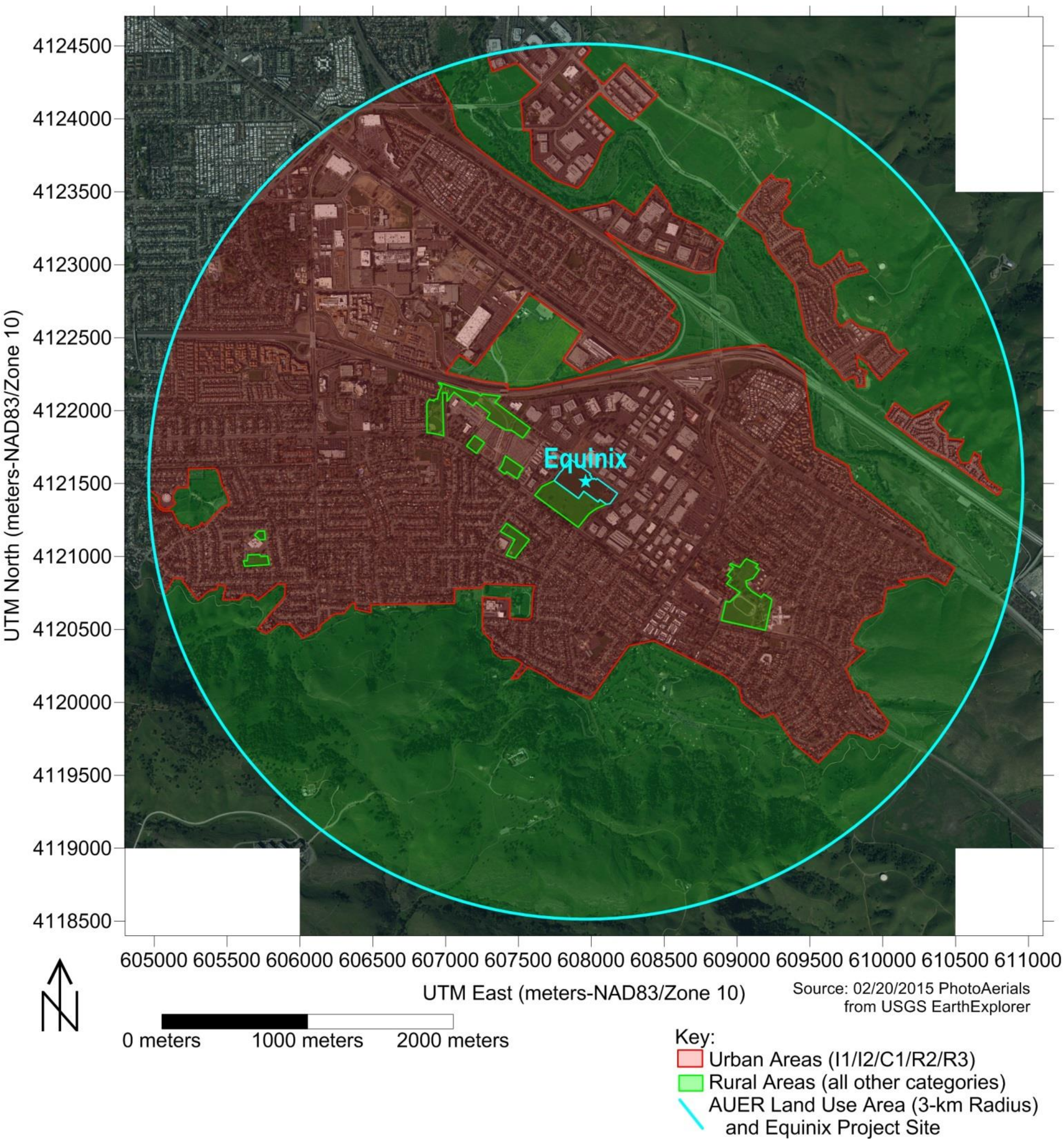


Figure AQ3-4 Auer Land Use Analysis



An Auer Land Use study shows 51.2% of the area within 3-km of the Equinix Project Site is urban in nature, consisting mainly of C1 and R2 land use types. As can be seen on the attached table of land use types from the Auer paper (August H. Auer, Jr., "Correlation of Land Use and Cover with Meteorological Anomalies, Journal of Applied Meteorology, Volume 17, pp. 636-643, 1978), urban areas are land use categories with less than 35% vegetation, while rural areas are land use categories with greater than 70% vegetation. A detailed review of the 2015 photoaerials shows the vast majority of residential areas are R2/R3 compact residential, with less than 50% vegetation (more than 50% impervious surfaces such as roads/streets, buildings, etc.). Rural areas are mainly undeveloped areas, or parks and yards/athletic fields around schools. For this reason, urban dispersion curves were used for the modeling analyses.

TABLE 1. Identification and classification of land use types found in Metropolitan St. Louis

Type	Description: Use and structures	Description: Vegetation
I1	Heavy industrial Major chemical, steel and fabrication industries; generally 3–5 story buildings, flat roofs	Grass and tree growth extremely rare; <5% vegetation
I2	Light-moderate industrial Rail yards, truck depots, warehouses, industrial parks, minor fabrications; generally 1–3 story buildings, flat roofs	Very limited grass, trees almost total absent; <5% vegetation
C1	Commercial Office and apartment buildings, hotels; >10 story heights, flat roofs	Limited grass and trees; <15% vegetation
R1	Common residential Single family dwelling with normal easements; generally one story, pitched roof structures; frequent driveways	Abundant grass lawns and light-moderately wooded; >70% vegetation
R2	Compact residential Single, some multiple, family dwelling with close spacing; generally <2 story, pitched roof structures; garages (via alley), no driveways	Limited lawn sizes and shade trees; <30% vegetation
R3	Compact residential Old multi-family dwellings with close (<2 m) lateral separation; generally 2 story, flat roof structures; garages (via alley) and ashpits, no driveways	Limited lawn sizes, old established shade trees; <35% vegetation
R4	Estate residential Expansive family dwelling on multi-acre tracts	Abundant grass lawns and lightly wooded; >80% vegetation
A1	Metropolitan natural Major municipal, state, or federal parks, golf courses, cemeteries, campuses; occasional single story structures	Nearly total grass and lightly wooded; >95% vegetation
A2	Agricultural rural	Local crops (e.g., corn, soybean); >95% vegetation
A3	Undeveloped Uncultivated; wasteland	Mostly wild grasses and weeds, lightly wooded; >90% vegetation
A4	Undeveloped rural	Heavily wooded; >95% vegetation
A5	Water surfaces Rivers, lakes	

Urban land use categories outlined in red.

Appendix AQ4
Construction Emissions

Equinix Data Center

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	547.05	1000sqft	18.00	784,080.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project setup information

Land Use - Project design area is smaller than the project site.

Construction Phase - Data supplied by Applicant

Off-road Equipment - Best estimates from Applicant

Off-road Equipment - Best estimates from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best Estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Off-road Equipment - Best estimate from Applicant

Trips and VMT - Build trip rate based on avg 150 workers on site per day, and coating trips assumed same value as paving. Vendor trips assumed to be avg of 20 deliveries per const day. Vendor trip miles assumed at 15.

On-road Fugitive Dust - Defaults used

Grading - Data from Applicant and defaults

Architectural Coating - Defaults used due to low VOC coating use.

Vehicle Trips - Trip rates based on actual employees per shift from Applicant.

Road Dust - Defaults

Consumer Products - Defaults

Area Coating - Defaults

Energy Use -

Solid Waste - Based on 1 ton/week/bldg.

Construction Off-road Equipment Mitigation - Tier 3 engines assumed for the const period 2020-2024.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	16.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
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tblConstructionPhase	NumDays	300.00	261.00
tblConstructionPhase	NumDays	20.00	34.00
tblConstructionPhase	NumDays	20.00	34.00
tblConstructionPhase	NumDays	30.00	43.00
tblConstructionPhase	NumDays	300.00	261.00
tblConstructionPhase	NumDays	20.00	35.00
tblConstructionPhase	NumDays	20.00	35.00
tblConstructionPhase	NumDays	30.00	44.00
tblConstructionPhase	NumDays	300.00	261.00
tblConstructionPhase	NumDays	20.00	33.00
tblConstructionPhase	NumDays	20.00	33.00
tblGrading	AcresOfGrading	110.00	3.29
tblGrading	AcresOfGrading	102.50	2.93
tblGrading	AcresOfGrading	107.50	2.93
tblGrading	AcresOfGrading	154.69	18.00
tblGrading	MaterialExported	0.00	17,000.00
tblGrading	MaterialImported	0.00	10,000.00
tblLandUse	LandUseSquareFeet	547,050.00	784,080.00
tblLandUse	LotAcreage	12.56	18.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
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tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50

tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
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tblOffRoadEquipment	UsageHours	8.00	7.00
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tblTripsAndVMT	VendorTripLength	7.30	15.00
tblTripsAndVMT	VendorTripLength	7.30	15.00
tblTripsAndVMT	VendorTripLength	7.30	15.00
tblTripsAndVMT	VendorTripLength	7.30	15.00
tblTripsAndVMT	VendorTripLength	7.30	15.00
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tblTripsAndVMT	VendorTripLength	7.30	15.00
tblTripsAndVMT	VendorTripLength	7.30	15.00
tblTripsAndVMT	VendorTripLength	7.30	15.00
tblTripsAndVMT	VendorTripLength	7.30	15.00

tblTripsAndVMT	VendorTripLength	7.30	15.00
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tblTripsAndVMT	WorkerTripNumber	66.00	13.00
tblVehicleTrips	ST_TR	2.49	0.08
tblVehicleTrips	SU_TR	0.73	0.28
tblVehicleTrips	WD_TR	6.83	0.03

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.2542	3.0593	1.6230	4.4300e-003	0.6072	0.1181	0.7254	0.3187	0.1087	0.4274						403.7887
2021	0.4860	4.3288	4.0450	8.5800e-003	0.2872	0.1824	0.4696	0.1118	0.1716	0.2834						754.2329
2022	4.5182	3.7948	3.8823	8.4000e-003	0.2778	0.1540	0.4318	0.1110	0.1447	0.2557						738.7129
2023	4.4878	3.4556	3.8271	8.3800e-003	0.2812	0.1356	0.4168	0.1127	0.1274	0.2401						736.8191
2024	4.3605	2.2813	2.8622	6.1300e-003	0.1311	0.0835	0.2146	0.0354	0.0789	0.1143						537.3549
Maximum	**4.5182**	**4.3288**	**4.0450**	**8.5800e-003**	**0.6072**	**0.1824**	**0.7254**	**0.3187**	**0.1716**	**0.4274**						**754.2329**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1682	2.5808	1.8044	4.4300e-003	0.2937	0.0949	0.3886	0.1490	0.0906	0.2396						403.7884
2021	0.2603	3.9290	4.4050	8.5800e-003	0.2184	0.2045	0.4229	0.0744	0.2027	0.2771						754.2322
2022	4.3349	3.8018	4.3655	8.4000e-003	0.2057	0.1981	0.4038	0.0717	0.1965	0.2683						738.7122
2023	4.3282	3.6954	4.3455	8.3800e-003	0.2073	0.1967	0.4040	0.0725	0.1953	0.2678						736.8185
2024	4.2477	2.5827	3.2066	6.1300e-003	0.1311	0.1469	0.2780	0.0354	0.1468	0.1822						537.3545
Maximum	**4.3349**	**3.9290**	**4.4050**	**8.5800e-003**	**0.2937**	**0.2045**	**0.4229**	**0.1490**	**0.2027**	**0.2771**						**754.2322**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**5.44**	**1.95**	**-11.62**	**0.00**	**33.33**	**-24.84**	**15.98**	**41.55**	**-31.79**	**6.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
3	**7-8-2020**	**10-7-2020**	0.2512	0.2085
4	**10-8-2020**	**1-7-2021**	3.1710	2.6353
5	**1-8-2021**	**4-7-2021**	1.3672	1.1848
6	**4-8-2021**	**7-7-2021**	1.1287	0.9836
7	**7-8-2021**	**10-7-2021**	1.1415	0.9948
8	**10-8-2021**	**1-7-2022**	1.1386	0.9993

9	**1-8-2022**	**4-7-2022**	4.8469	4.8153
10	**4-8-2022**	**7-7-2022**	1.2760	1.2297
11	**7-8-2022**	**10-7-2022**	1.0359	0.9861
12	**10-8-2022**	**1-7-2023**	1.0335	0.9886
13	**1-8-2023**	**4-7-2023**	0.9263	0.9398
14	**4-8-2023**	**7-7-2023**	4.7597	4.7853
15	**7-8-2023**	**10-7-2023**	1.1592	1.1862
16	**10-8-2023**	**1-7-2024**	0.9433	0.9608
17	**1-8-2024**	**4-7-2024**	0.8868	0.9475
18	**4-8-2024**	**7-7-2024**	0.8833	0.9441
19	**7-8-2024**	**9-30-2024**	4.8677	4.9298
		Highest	4.8677	4.9298

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.4715	5.0000e-005	5.0100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005						0.0104
Energy	0.0692	0.6292	0.5285	3.7800e-003		0.0478	0.0478		0.0478	0.0478						4,771.936 1
Mobile	7.8800e-003	0.0315	0.0964	3.8000e-004	0.0389	2.9000e-004	0.0392	0.0104	2.7000e-004	0.0107						34.6160
Waste						0.0000	0.0000		0.0000	0.0000						78.4526
Water						0.0000	0.0000		0.0000	0.0000						372.1092
Total	**3.5486**	**0.6607**	**0.6299**	**4.1600e-003**	**0.0389**	**0.0481**	**0.0870**	**0.0104**	**0.0481**	**0.0585**						**5,257.124 4**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.4715	5.0000e-005	5.0100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005						0.0104
Energy	0.0692	0.6292	0.5285	3.7800e-003		0.0478	0.0478		0.0478	0.0478						4,771.9361
Mobile	7.8800e-003	0.0315	0.0964	3.8000e-004	0.0389	2.9000e-004	0.0392	0.0104	2.7000e-004	0.0107						34.6160
Waste						0.0000	0.0000		0.0000	0.0000						78.4526
Water						0.0000	0.0000		0.0000	0.0000						372.1092
Total	**3.5486**	**0.6607**	**0.6299**	**4.1600e-003**	**0.0389**	**0.0481**	**0.0870**	**0.0104**	**0.0481**	**0.0585**						**5,257.1244**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2020	12/31/2020	5	66	18 acre site prep
2	SV12 Fine Grade	Grading	1/1/2021	2/28/2021	5	41	
3	SV12 Build	Building Construction	3/1/2021	2/28/2022	5	261	
4	SV12 Pave	Paving	2/14/2022	3/31/2022	5	34	
5	SV12 Coat	Architectural Coating	2/14/2022	3/31/2022	5	34	
6	SV18 Fine Grade	Grading	4/1/2022	5/31/2022	5	43	
7	SV18 Build	Building Construction	6/1/2022	5/31/2023	5	261	
8	SV18 Pave	Paving	5/15/2023	6/30/2023	5	35	
9	SV18 Coat	Architectural Coating	5/15/2023	6/30/2023	5	35	
10	SV19 Fine Grade	Grading	7/1/2023	8/31/2023	5	44	
11	SV19 Build	Building Construction	9/1/2023	8/31/2024	5	261	
12	SV19 Pave	Paving	8/15/2024	9/30/2024	5	33	
13	SV19 Coat	Architectural Coating	8/15/2024	9/30/2024	5	33	

Acres of Grading (Site Preparation Phase): 18

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,176,120; Non-Residential Outdoor: 392,040; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Excavators	2	7.50	158	0.38
Site Preparation	Graders	1	7.50	187	0.41
Site Preparation	Off-Highway Trucks	1	7.00	402	0.38

Site Preparation	Rubber Tired Dozers	3	7.50	247	0.40
Site Preparation	Scrapers	2	7.50	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	4	7.50	97	0.37
SV12 Fine Grade	Excavators	2	7.50	158	0.38
SV12 Fine Grade	Graders	1	8.00	187	0.41
SV12 Fine Grade	Off-Highway Trucks	1		402	0.38
SV12 Fine Grade	Rubber Tired Dozers	1	8.00	247	0.40
SV12 Fine Grade	Scrapers	2	8.00	367	0.48
SV12 Fine Grade	Tractors/Loaders/Backhoes	1	7.50	97	0.37
SV12 Build	Aerial Lifts	6	7.00	63	0.31
SV12 Build	Cranes	2	7.50	231	0.29
SV12 Build	Forklifts	2	6.00	89	0.20
SV12 Build	Generator Sets	1	8.00	84	0.74
SV12 Build	Tractors/Loaders/Backhoes	3	7.50	97	0.37
SV12 Build	Welders	4	7.00	46	0.45
SV12 Pave	Pavers	1	7.50	130	0.42
SV12 Pave	Paving Equipment	2	7.50	132	0.36
SV12 Pave	Rollers	2	7.50	80	0.38
SV12 Coat	Aerial Lifts	2	6.00	63	0.31
SV12 Coat	Air Compressors	1	6.00	78	0.48
SV18 Fine Grade	Excavators	2	7.50	158	0.38
SV18 Fine Grade	Graders	1	8.00	187	0.41
SV18 Fine Grade	Off-Highway Trucks	1	7.50	402	0.38
SV18 Fine Grade	Rubber Tired Dozers	1	8.00	247	0.40
SV18 Fine Grade	Scrapers	2	8.00	367	0.48
SV18 Fine Grade	Tractors/Loaders/Backhoes	1	7.50	97	0.37
SV18 Build	Aerial Lifts	6	7.00	63	0.31

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SV18 Build	Cranes	2	7.50	231	0.29
SV18 Build	Forklifts	2	6.00	89	0.20
SV18 Build	Generator Sets	1	8.00	84	0.74
SV18 Build	Tractors/Loaders/Backhoes	3	7.50	97	0.37
SV18 Build	Welders	4	7.00	46	0.45
SV18 Pave	Pavers	1	7.50	130	0.42
SV18 Pave	Paving Equipment	2	7.50	132	0.36
SV18 Pave	Rollers	2	7.50	80	0.38
SV18 Coat	Aerial Lifts	2	6.00	63	0.31
SV18 Coat	Air Compressors	1	6.00	78	0.48
SV19 Fine Grade	Excavators	2	7.50	158	0.38
SV19 Fine Grade	Graders	1	8.00	187	0.41
SV19 Fine Grade	Off-Highway Trucks	1	7.50	402	0.38
SV19 Fine Grade	Rubber Tired Dozers	1	8.00	247	0.40
SV19 Fine Grade	Scrapers	2	8.00	367	0.48
SV19 Fine Grade	Tractors/Loaders/Backhoes	1	7.50	97	0.37
SV19 Build	Aerial Lifts	6	7.00	63	0.31
SV19 Build	Cranes	2	7.50	231	0.29
SV19 Build	Forklifts	2	6.00	89	0.20
SV19 Build	Generator Sets	1	8.00	84	0.74
SV19 Build	Tractors/Loaders/Backhoes	3	7.50	97	0.37
SV19 Build	Welders	4	7.00	46	0.45
SV19 Pave	Pavers	1	7.50	130	0.42
SV19 Pave	Paving Equipment	2	7.50	132	0.36
SV19 Pave	Rollers	2	7.50	80	0.38
SV19 Coat	Aerial Lifts	2	6.00	63	0.31
SV19 Coat	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	13	33.00	0.00	3,375.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV12 Fine Grade	8	10.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV12 Build	18	150.00	20.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV12 Pave	5	13.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV12 Coat	3	13.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV18 Fine Grade	8	10.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV18 Build	18	150.00	20.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV18 Pave	5	13.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV18 Coat	3	13.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV19 Fine Grade	8	10.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV19 Build	18	150.00	20.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV19 Pave	5	13.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT
SV19 Coat	3	13.00	0.00	0.00	10.80	15.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5700	0.0000	0.5700	0.3085	0.0000	0.3085						0.0000
Off-Road	0.2366	2.5670	1.4954	3.0200e-003		0.1165	0.1165		0.1072	0.1072						267.5231
Total	**0.2366**	**2.5670**	**1.4954**	**3.0200e-003**	**0.5700**	**0.1165**	**0.6865**	**0.3085**	**0.1072**	**0.4157**						**267.5231**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0140	0.4897	0.1003	1.3300e-003	0.0286	1.5900e-003	0.0302	7.8700e-003	1.5200e-003	9.3900e-003						128.8542
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.6200e-003	2.6000e-003	0.0273	8.0000e-005	8.6400e-003	6.0000e-005	8.6900e-003	2.3000e-003	5.0000e-005	2.3500e-003						7.4114
Total	**0.0176**	**0.4923**	**0.1275**	**1.4100e-003**	**0.0373**	**1.6500e-003**	**0.0389**	**0.0102**	**1.5700e-003**	**0.0117**						**136.2655**

3.2 Site Preparation - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2565	0.0000	0.2565	0.1388	0.0000	0.1388						0.0000
Off-Road	0.1505	2.0885	1.6769	3.0200e-003		0.0932	0.0932		0.0891	0.0891						267.5228
Total	**0.1505**	**2.0885**	**1.6769**	**3.0200e-003**	**0.2565**	**0.0932**	**0.3497**	**0.1388**	**0.0891**	**0.2279**						**267.5228**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0140	0.4897	0.1003	1.3300e-003	0.0286	1.5900e-003	0.0302	7.8700e-003	1.5200e-003	9.3900e-003						128.8542
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.6200e-003	2.6000e-003	0.0273	8.0000e-005	8.6400e-003	6.0000e-005	8.6900e-003	2.3000e-003	5.0000e-005	2.3500e-003						7.4114
Total	**0.0176**	**0.4923**	**0.1275**	**1.4100e-003**	**0.0373**	**1.6500e-003**	**0.0389**	**0.0102**	**1.5700e-003**	**0.0117**						**136.2655**

3.3 SV12 Fine Grade - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1250	0.0000	0.1250	0.0680	0.0000	0.0680						0.0000
Off-Road	0.0813	0.9044	0.5754	1.1900e-003		0.0380	0.0380		0.0350	0.0350						105.4521
Total	**0.0813**	**0.9044**	**0.5754**	**1.1900e-003**	**0.1250**	**0.0380**	**0.1630**	**0.0680**	**0.0350**	**0.1030**						**105.4521**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.3000e-004	4.4000e-004	4.6900e-003	1.0000e-005	1.6300e-003	1.0000e-005	1.6400e-003	4.3000e-004	1.0000e-005	4.4000e-004						1.3467
Total	**6.3000e-004**	**4.4000e-004**	**4.6900e-003**	**1.0000e-005**	**1.6300e-003**	**1.0000e-005**	**1.6400e-003**	**4.3000e-004**	**1.0000e-005**	**4.4000e-004**						**1.3467**

3.3 SV12 Fine Grade - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0563	0.0000	0.0563	0.0306	0.0000	0.0306						0.0000
Off-Road	0.0594	0.7918	0.6268	1.1900e-003		0.0330	0.0330		0.0313	0.0313						105.4519
Total	**0.0594**	**0.7918**	**0.6268**	**1.1900e-003**	**0.0563**	**0.0330**	**0.0893**	**0.0306**	**0.0313**	**0.0619**						**105.4519**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.3000e-004	4.4000e-004	4.6900e-003	1.0000e-005	1.6300e-003	1.0000e-005	1.6400e-003	4.3000e-004	1.0000e-005	4.4000e-004						1.3467
Total	**6.3000e-004**	**4.4000e-004**	**4.6900e-003**	**1.0000e-005**	**1.6300e-003**	**1.0000e-005**	**1.6400e-003**	**4.3000e-004**	**1.0000e-005**	**4.4000e-004**						**1.3467**

3.4 SV12 Build - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3419	3.0573	2.9998	5.0800e-003		0.1426	0.1426		0.1350	0.1350						433.6981
Total	**0.3419**	**3.0573**	**2.9998**	**5.0800e-003**		**0.1426**	**0.1426**		**0.1350**	**0.1350**						**433.6981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0114	0.3314	0.0877	1.1000e-003	0.0297	9.7000e-004	0.0307	8.5700e-003	9.3000e-004	9.5000e-003						105.3450
Worker	0.0508	0.0352	0.3775	1.2000e-003	0.1309	8.2000e-004	0.1317	0.0348	7.6000e-004	0.0356						108.3910
Total	**0.0622**	**0.3666**	**0.4651**	**2.3000e-003**	**0.1605**	**1.7900e-003**	**0.1623**	**0.0434**	**1.6900e-003**	**0.0451**						**213.7360**

3.4 SV12 Build - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1381	2.7701	3.3083	5.0800e-003		0.1697	0.1697		0.1697	0.1697						433.6976
Total	**0.1381**	**2.7701**	**3.3083**	**5.0800e-003**		**0.1697**	**0.1697**		**0.1697**	**0.1697**						**433.6976**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0114	0.3314	0.0877	1.1000e-003	0.0297	9.7000e-004	0.0307	8.5700e-003	9.3000e-004	9.5000e-003						105.3450
Worker	0.0508	0.0352	0.3775	1.2000e-003	0.1309	8.2000e-004	0.1317	0.0348	7.6000e-004	0.0356						108.3910
Total	**0.0622**	**0.3666**	**0.4651**	**2.3000e-003**	**0.1605**	**1.7900e-003**	**0.1623**	**0.0434**	**1.6900e-003**	**0.0451**						**213.7360**

3.4 SV12 Build - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0578	0.5152	0.5520	9.5000e-004		0.0227	0.0227		0.0215	0.0215						80.8421
Total	**0.0578**	**0.5152**	**0.5520**	**9.5000e-004**		**0.0227**	**0.0227**		**0.0215**	**0.0215**						**80.8421**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	1.9900e-003	0.0577	0.0155	2.0000e-004	5.5300e-003	1.6000e-004	5.6900e-003	1.6000e-003	1.5000e-004	1.7500e-003						19.4422
Worker	8.8400e-003	5.8800e-003	0.0647	2.2000e-004	0.0244	1.5000e-004	0.0245	6.4900e-003	1.4000e-004	6.6200e-003						19.4656
Total	**0.0108**	**0.0636**	**0.0801**	**4.2000e-004**	**0.0299**	**3.1000e-004**	**0.0302**	**8.0900e-003**	**2.9000e-004**	**8.3700e-003**						**38.9078**

3.4 SV12 Build - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0257	0.5163	0.6166	9.5000e-004		0.0316	0.0316		0.0316	0.0316						80.8420
Total	**0.0257**	**0.5163**	**0.6166**	**9.5000e-004**		**0.0316**	**0.0316**		**0.0316**	**0.0316**						**80.8420**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	1.9900e-003	0.0577	0.0155	2.0000e-004	5.5300e-003	1.6000e-004	5.6900e-003	1.6000e-003	1.5000e-004	1.7500e-003						19.4422
Worker	8.8400e-003	5.8800e-003	0.0647	2.2000e-004	0.0244	1.5000e-004	0.0245	6.4900e-003	1.4000e-004	6.6200e-003						19.4656
Total	**0.0108**	**0.0636**	**0.0801**	**4.2000e-004**	**0.0299**	**3.1000e-004**	**0.0302**	**8.0900e-003**	**2.9000e-004**	**8.3700e-003**						**38.9078**

3.5 SV12 Pave - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0143	0.1439	0.1864	2.9000e-004		7.4600e-003	7.4600e-003		6.8600e-003	6.8600e-003						25.5415
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0143**	**0.1439**	**0.1864**	**2.9000e-004**		**7.4600e-003**	**7.4600e-003**		**6.8600e-003**	**6.8600e-003**						**25.5415**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.4000e-004	4.2000e-004	4.6500e-003	2.0000e-005	1.7500e-003	1.0000e-005	1.7600e-003	4.7000e-004	1.0000e-005	4.8000e-004						1.3990
Total	**6.4000e-004**	**4.2000e-004**	**4.6500e-003**	**2.0000e-005**	**1.7500e-003**	**1.0000e-005**	**1.7600e-003**	**4.7000e-004**	**1.0000e-005**	**4.8000e-004**						**1.3990**

3.5 SV12 Pave - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.1000e-003	0.1444	0.2189	2.9000e-004		7.9900e-003	7.9900e-003		7.9900e-003	7.9900e-003						25.5415
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**7.1000e-003**	**0.1444**	**0.2189**	**2.9000e-004**		**7.9900e-003**	**7.9900e-003**		**7.9900e-003**	**7.9900e-003**						**25.5415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.4000e-004	4.2000e-004	4.6500e-003	2.0000e-005	1.7500e-003	1.0000e-005	1.7600e-003	4.7000e-004	1.0000e-005	4.8000e-004						1.3990
Total	**6.4000e-004**	**4.2000e-004**	**4.6500e-003**	**2.0000e-005**	**1.7500e-003**	**1.0000e-005**	**1.7600e-003**	**4.7000e-004**	**1.0000e-005**	**4.8000e-004**						**1.3990**

3.6 SV12 Coat - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.0885					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	4.4000e-003	0.0382	0.0587	9.0000e-005		1.6500e-003	1.6500e-003		1.6300e-003	1.6300e-003						8.1399
Total	**4.0929**	**0.0382**	**0.0587**	**9.0000e-005**		**1.6500e-003**	**1.6500e-003**		**1.6300e-003**	**1.6300e-003**						**8.1399**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.4000e-004	4.2000e-004	4.6500e-003	2.0000e-005	1.7500e-003	1.0000e-005	1.7600e-003	4.7000e-004	1.0000e-005	4.8000e-004						1.3990
Total	**6.4000e-004**	**4.2000e-004**	**4.6500e-003**	**2.0000e-005**	**1.7500e-003**	**1.0000e-005**	**1.7600e-003**	**4.7000e-004**	**1.0000e-005**	**4.8000e-004**						**1.3990**

3.6 SV12 Coat - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.0885					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	2.0600e-003	0.0471	0.0637	9.0000e-005		3.3000e-003	3.3000e-003		3.3000e-003	3.3000e-003						8.1399
Total	**4.0906**	**0.0471**	**0.0637**	**9.0000e-005**		**3.3000e-003**	**3.3000e-003**		**3.3000e-003**	**3.3000e-003**						**8.1399**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.4000e-004	4.2000e-004	4.6500e-003	2.0000e-005	1.7500e-003	1.0000e-005	1.7600e-003	4.7000e-004	1.0000e-005	4.8000e-004						1.3990
Total	**6.4000e-004**	**4.2000e-004**	**4.6500e-003**	**2.0000e-005**	**1.7500e-003**	**1.0000e-005**	**1.7600e-003**	**4.7000e-004**	**1.0000e-005**	**4.8000e-004**						**1.3990**

3.7 SV18 Fine Grade - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1310	0.0000	0.1310	0.0713	0.0000	0.0713						0.0000
Off-Road	0.0843	0.8730	0.6322	1.5200e-003		0.0358	0.0358		0.0329	0.0329						134.2512
Total	**0.0843**	**0.8730**	**0.6322**	**1.5200e-003**	**0.1310**	**0.0358**	**0.1668**	**0.0713**	**0.0329**	**0.1043**						**134.2512**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.2000e-004	4.1000e-004	4.5200e-003	2.0000e-005	1.7100e-003	1.0000e-005	1.7200e-003	4.5000e-004	1.0000e-005	4.6000e-004						1.3610
Total	**6.2000e-004**	**4.1000e-004**	**4.5200e-003**	**2.0000e-005**	**1.7100e-003**	**1.0000e-005**	**1.7200e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**						**1.3610**

3.7 SV18 Fine Grade - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0590	0.0000	0.0590	0.0321	0.0000	0.0321						0.0000
Off-Road	0.0624	0.8655	0.7727	1.5200e-003		0.0357	0.0357		0.0342	0.0342						134.2510
Total	**0.0624**	**0.8655**	**0.7727**	**1.5200e-003**	**0.0590**	**0.0357**	**0.0946**	**0.0321**	**0.0342**	**0.0663**						**134.2510**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.2000e-004	4.1000e-004	4.5200e-003	2.0000e-005	1.7100e-003	1.0000e-005	1.7200e-003	4.5000e-004	1.0000e-005	4.6000e-004						1.3610
Total	**6.2000e-004**	**4.1000e-004**	**4.5200e-003**	**2.0000e-005**	**1.7100e-003**	**1.0000e-005**	**1.7200e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**						**1.3610**

3.8 SV18 Build - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2158	1.9225	2.0600	3.5300e-003		0.0849	0.0849		0.0803	0.0803						301.6789
Total	**0.2158**	**1.9225**	**2.0600**	**3.5300e-003**		**0.0849**	**0.0849**		**0.0803**	**0.0803**						**301.6789**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	7.4300e-003	0.2153	0.0577	7.6000e-004	0.0206	5.9000e-004	0.0212	5.9600e-003	5.6000e-004	6.5300e-003						72.5524
Worker	0.0330	0.0220	0.2413	8.0000e-004	0.0910	5.6000e-004	0.0916	0.0242	5.2000e-004	0.0247						72.6400
Total	**0.0404**	**0.2372**	**0.2990**	**1.5600e-003**	**0.1117**	**1.1500e-003**	**0.1128**	**0.0302**	**1.0800e-003**	**0.0313**						**145.1924**

3.8 SV18 Build - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0960	1.9265	2.3008	3.5300e-003		0.1180	0.1180		0.1180	0.1180						301.6786
Total	**0.0960**	**1.9265**	**2.3008**	**3.5300e-003**		**0.1180**	**0.1180**		**0.1180**	**0.1180**						**301.6786**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	7.4300e-003	0.2153	0.0577	7.6000e-004	0.0206	5.9000e-004	0.0212	5.9600e-003	5.6000e-004	6.5300e-003						72.5524
Worker	0.0330	0.0220	0.2413	8.0000e-004	0.0910	5.6000e-004	0.0916	0.0242	5.2000e-004	0.0247						72.6400
Total	**0.0404**	**0.2372**	**0.2990**	**1.5600e-003**	**0.1117**	**1.1500e-003**	**0.1128**	**0.0302**	**1.0800e-003**	**0.0313**						**145.1924**

3.8 SV18 Build - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1413	1.2636	1.4422	2.5000e-003		0.0524	0.0524		0.0496	0.0496						212.9836
Total	**0.1413**	**1.2636**	**1.4422**	**2.5000e-003**		**0.0524**	**0.0524**		**0.0496**	**0.0496**						**212.9836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	3.8900e-003	0.1078	0.0366	5.2000e-004	0.0146	1.8000e-004	0.0148	4.2100e-003	1.7000e-004	4.3800e-003						49.8069
Worker	0.0218	0.0139	0.1567	5.4000e-004	0.0642	3.9000e-004	0.0646	0.0171	3.6000e-004	0.0174						49.3258
Total	**0.0257**	**0.1218**	**0.1933**	**1.0600e-003**	**0.0788**	**5.7000e-004**	**0.0794**	**0.0213**	**5.3000e-004**	**0.0218**						**99.1327**

3.8 SV18 Build - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0678	1.3599	1.6241	2.5000e-003		0.0833	0.0833		0.0833	0.0833						212.9834
Total	**0.0678**	**1.3599**	**1.6241**	**2.5000e-003**		**0.0833**	**0.0833**		**0.0833**	**0.0833**						**212.9834**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	3.8900e-003	0.1078	0.0366	5.2000e-004	0.0146	1.8000e-004	0.0148	4.2100e-003	1.7000e-004	4.3800e-003						49.8069
Worker	0.0218	0.0139	0.1567	5.4000e-004	0.0642	3.9000e-004	0.0646	0.0171	3.6000e-004	0.0174						49.3258
Total	**0.0257**	**0.1218**	**0.1933**	**1.0600e-003**	**0.0788**	**5.7000e-004**	**0.0794**	**0.0213**	**5.3000e-004**	**0.0218**						**99.1327**

3.9 SV18 Pave - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0138	0.1363	0.1920	3.0000e-004		6.9200e-003	6.9200e-003		6.3600e-003	6.3600e-003						26.2922
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0138**	**0.1363**	**0.1920**	**3.0000e-004**		**6.9200e-003**	**6.9200e-003**		**6.3600e-003**	**6.3600e-003**						**26.2922**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	3.9000e-004	4.4000e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8200e-003	4.8000e-004	1.0000e-005	4.9000e-004						1.3854
Total	**6.1000e-004**	**3.9000e-004**	**4.4000e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8200e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**						**1.3854**

3.9 SV18 Pave - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.3100e-003	0.1487	0.2253	3.0000e-004		8.2300e-003	8.2300e-003		8.2300e-003	8.2300e-003						26.2922
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**7.3100e-003**	**0.1487**	**0.2253**	**3.0000e-004**		**8.2300e-003**	**8.2300e-003**		**8.2300e-003**	**8.2300e-003**						**26.2922**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	3.9000e-004	4.4000e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8200e-003	4.8000e-004	1.0000e-005	4.9000e-004						1.3854
Total	**6.1000e-004**	**3.9000e-004**	**4.4000e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8200e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**						**1.3854**

3.10 SV18 Coat - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.0885					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	4.2600e-003	0.0368	0.0604	1.0000e-004		1.4800e-003	1.4800e-003		1.4600e-003	1.4600e-003						8.3788
Total	**4.0928**	**0.0368**	**0.0604**	**1.0000e-004**		**1.4800e-003**	**1.4800e-003**		**1.4600e-003**	**1.4600e-003**						**8.3788**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	3.9000e-004	4.4000e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8200e-003	4.8000e-004	1.0000e-005	4.9000e-004						1.3854
Total	**6.1000e-004**	**3.9000e-004**	**4.4000e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8200e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**						**1.3854**

3.10 SV18 Coat - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.0885					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	2.1300e-003	0.0485	0.0655	1.0000e-004		3.4000e-003	3.4000e-003		3.4000e-003	3.4000e-003						8.3787
Total	**4.0906**	**0.0485**	**0.0655**	**1.0000e-004**		**3.4000e-003**	**3.4000e-003**		**3.4000e-003**	**3.4000e-003**						**8.3787**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	3.9000e-004	4.4000e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8200e-003	4.8000e-004	1.0000e-005	4.9000e-004						1.3854
Total	**6.1000e-004**	**3.9000e-004**	**4.4000e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8200e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**						**1.3854**

3.11 SV19 Fine Grade - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1342	0.0000	0.1342	0.0730	0.0000	0.0730						0.0000
Off-Road	0.0794	0.7928	0.6238	1.5500e-003		0.0320	0.0320		0.0295	0.0295						137.3843
Total	**0.0794**	**0.7928**	**0.6238**	**1.5500e-003**	**0.1342**	**0.0320**	**0.1663**	**0.0730**	**0.0295**	**0.1025**						**137.3843**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	5.9000e-004	3.8000e-004	4.2600e-003	1.0000e-005	1.7400e-003	1.0000e-005	1.7600e-003	4.6000e-004	1.0000e-005	4.7000e-004						1.3397
Total	**5.9000e-004**	**3.8000e-004**	**4.2600e-003**	**1.0000e-005**	**1.7400e-003**	**1.0000e-005**	**1.7600e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**						**1.3397**

3.11 SV19 Fine Grade - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0604	0.0000	0.0604	0.0329	0.0000	0.0329						0.0000
Off-Road	0.0606	0.8356	0.7771	1.5500e-003		0.0344	0.0344		0.0330	0.0330						137.3841
Total	**0.0606**	**0.8356**	**0.7771**	**1.5500e-003**	**0.0604**	**0.0344**	**0.0948**	**0.0329**	**0.0330**	**0.0659**						**137.3841**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	5.9000e-004	3.8000e-004	4.2600e-003	1.0000e-005	1.7400e-003	1.0000e-005	1.7600e-003	4.6000e-004	1.0000e-005	4.7000e-004						1.3397
Total	**5.9000e-004**	**3.8000e-004**	**4.2600e-003**	**1.0000e-005**	**1.7400e-003**	**1.0000e-005**	**1.7600e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**						**1.3397**

3.12 SV19 Build - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1125	1.0062	1.1484	1.9900e-003		0.0417	0.0417		0.0395	0.0395						169.5981
Total	**0.1125**	**1.0062**	**1.1484**	**1.9900e-003**		**0.0417**	**0.0417**		**0.0395**	**0.0395**						**169.5981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	3.1000e-003	0.0859	0.0292	4.1000e-004	0.0116	1.4000e-004	0.0118	3.3500e-003	1.4000e-004	3.4900e-003						39.6610
Worker	0.0174	0.0111	0.1248	4.3000e-004	0.0512	3.1000e-004	0.0515	0.0136	2.8000e-004	0.0139						39.2780
Total	**0.0205**	**0.0970**	**0.1539**	**8.4000e-004**	**0.0628**	**4.5000e-004**	**0.0632**	**0.0170**	**4.2000e-004**	**0.0174**						**78.9390**

3.12 SV19 Build - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0540	1.0829	1.2933	1.9900e-003		0.0663	0.0663		0.0663	0.0663						169.5979
Total	**0.0540**	**1.0829**	**1.2933**	**1.9900e-003**		**0.0663**	**0.0663**		**0.0663**	**0.0663**						**169.5979**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	3.1000e-003	0.0859	0.0292	4.1000e-004	0.0116	1.4000e-004	0.0118	3.3500e-003	1.4000e-004	3.4900e-003						39.6610
Worker	0.0174	0.0111	0.1248	4.3000e-004	0.0512	3.1000e-004	0.0515	0.0136	2.8000e-004	0.0139						39.2780
Total	**0.0205**	**0.0970**	**0.1539**	**8.4000e-004**	**0.0628**	**4.5000e-004**	**0.0632**	**0.0170**	**4.2000e-004**	**0.0174**						**78.9390**

3.12 SV19 Build - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2153	1.9346	2.3230	4.0400e-003		0.0754	0.0754		0.0713	0.0713						345.1389
Total	**0.2153**	**1.9346**	**2.3230**	**4.0400e-003**		**0.0754**	**0.0754**		**0.0713**	**0.0713**						**345.1389**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	6.1500e-003	0.1722	0.0577	8.3000e-004	0.0236	2.9000e-004	0.0239	6.8200e-003	2.7000e-004	7.1000e-003						80.2323
Worker	0.0333	0.0204	0.2354	8.5000e-004	0.1041	6.2000e-004	0.1047	0.0277	5.7000e-004	0.0283						76.7843
Total	**0.0394**	**0.1926**	**0.2931**	**1.6800e-003**	**0.1277**	**9.1000e-004**	**0.1286**	**0.0345**	**8.4000e-004**	**0.0354**						**157.0167**

3.12 SV19 Build - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1098	2.2035	2.6316	4.0400e-003		0.1350	0.1350		0.1350	0.1350						345.1385
Total	**0.1098**	**2.2035**	**2.6316**	**4.0400e-003**		**0.1350**	**0.1350**		**0.1350**	**0.1350**						**345.1385**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	6.1500e-003	0.1722	0.0577	8.3000e-004	0.0236	2.9000e-004	0.0239	6.8200e-003	2.7000e-004	7.1000e-003						80.2323
Worker	0.0333	0.0204	0.2354	8.5000e-004	0.1041	6.2000e-004	0.1047	0.0277	5.7000e-004	0.0283						76.7843
Total	**0.0394**	**0.1926**	**0.2931**	**1.6800e-003**	**0.1277**	**9.1000e-004**	**0.1286**	**0.0345**	**8.4000e-004**	**0.0354**						**157.0167**

3.13 SV19 Pave - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0125	0.1204	0.1815	2.8000e-004		5.9900e-003	5.9900e-003		5.5100e-003	5.5100e-003						24.7901
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0125**	**0.1204**	**0.1815**	**2.8000e-004**		**5.9900e-003**	**5.9900e-003**		**5.5100e-003**	**5.5100e-003**						**24.7901**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	5.4000e-004	3.3000e-004	3.8500e-003	1.0000e-005	1.7000e-003	1.0000e-005	1.7100e-003	4.5000e-004	1.0000e-005	4.6000e-004						1.2549
Total	**5.4000e-004**	**3.3000e-004**	**3.8500e-003**	**1.0000e-005**	**1.7000e-003**	**1.0000e-005**	**1.7100e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**						**1.2549**

3.13 SV19 Pave - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.8900e-003	0.1402	0.2124	2.8000e-004		7.7600e-003	7.7600e-003		7.7600e-003	7.7600e-003						24.7901
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**6.8900e-003**	**0.1402**	**0.2124**	**2.8000e-004**		**7.7600e-003**	**7.7600e-003**		**7.7600e-003**	**7.7600e-003**						**24.7901**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	5.4000e-004	3.3000e-004	3.8500e-003	1.0000e-005	1.7000e-003	1.0000e-005	1.7100e-003	4.5000e-004	1.0000e-005	4.6000e-004						1.2549
Total	**5.4000e-004**	**3.3000e-004**	**3.8500e-003**	**1.0000e-005**	**1.7000e-003**	**1.0000e-005**	**1.7100e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**						**1.2549**

3.14 SV19 Coat - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.0885					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	3.8400e-003	0.0331	0.0569	9.0000e-005		1.2300e-003	1.2300e-003		1.2100e-003	1.2100e-003						7.8996
Total	**4.0923**	**0.0331**	**0.0569**	**9.0000e-005**		**1.2300e-003**	**1.2300e-003**		**1.2100e-003**	**1.2100e-003**						**7.8996**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	5.4000e-004	3.3000e-004	3.8500e-003	1.0000e-005	1.7000e-003	1.0000e-005	1.7100e-003	4.5000e-004	1.0000e-005	4.6000e-004						1.2549
Total	**5.4000e-004**	**3.3000e-004**	**3.8500e-003**	**1.0000e-005**	**1.7000e-003**	**1.0000e-005**	**1.7100e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**						**1.2549**

3.14 SV19 Coat - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.0885					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	2.0000e-003	0.0458	0.0618	9.0000e-005		3.2100e-003	3.2100e-003		3.2100e-003	3.2100e-003						7.8996
Total	**4.0905**	**0.0458**	**0.0618**	**9.0000e-005**		**3.2100e-003**	**3.2100e-003**		**3.2100e-003**	**3.2100e-003**						**7.8996**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	5.4000e-004	3.3000e-004	3.8500e-003	1.0000e-005	1.7000e-003	1.0000e-005	1.7100e-003	4.5000e-004	1.0000e-005	4.6000e-004						1.2549
Total	**5.4000e-004**	**3.3000e-004**	**3.8500e-003**	**1.0000e-005**	**1.7000e-003**	**1.0000e-005**	**1.7100e-003**	**4.5000e-004**	**1.0000e-005**	**4.6000e-004**						**1.2549**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	7.8800e-003	0.0315	0.0964	3.8000e-004	0.0389	2.9000e-004	0.0392	0.0104	2.7000e-004	0.0107						34.6160
Unmitigated	7.8800e-003	0.0315	0.0964	3.8000e-004	0.0389	2.9000e-004	0.0392	0.0104	2.7000e-004	0.0107						34.6160

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	16.41	43.76	153.17	104,497	104,497
Total	16.41	43.76	153.17	104,497	104,497

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	9.50	7.30	7.30	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.616749	0.035330	0.181430	0.103378	0.013121	0.005016	0.012828	0.021913	0.002183	0.001508	0.005219	0.000634	0.000691

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						4,082.920 6
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						4,082.920 6
NaturalGas Mitigated	0.0692	0.6292	0.5285	3.7800e-003		0.0478	0.0478		0.0478	0.0478						689.0156
NaturalGas Unmitigated	0.0692	0.6292	0.5285	3.7800e-003		0.0478	0.0478		0.0478	0.0478						689.0156

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	1.28354e+007	0.0692	0.6292	0.5285	3.7800e-003		0.0478	0.0478		0.0478	0.0478						689.0156
Total		**0.0692**	**0.6292**	**0.5285**	**3.7800e-003**		**0.0478**	**0.0478**		**0.0478**	**0.0478**						**689.0156**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	1.28354e+007	0.0692	0.6292	0.5285	3.7800e-003		0.0478	0.0478		0.0478	0.0478						689.0156
Total		**0.0692**	**0.6292**	**0.5285**	**3.7800e-003**		**0.0478**	**0.0478**		**0.0478**	**0.0478**						**689.0156**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	1.39801e +007				4,082.920 6
Total					**4,082.920 6**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	1.39801e +007				4,082.920 6
Total					**4,082.920 6**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.4715	5.0000e-005	5.0100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005						0.0104
Unmitigated	3.4715	5.0000e-005	5.0100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005						0.0104

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4089					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	3.0622					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	4.6000e-004	5.0000e-005	5.0100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005						0.0104
Total	**3.4715**	**5.0000e-005**	**5.0100e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**						**0.0104**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4089					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	3.0622					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	4.6000e-004	5.0000e-005	5.0100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005						0.0104
Total	**3.4715**	**5.0000e-005**	**5.0100e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**						**0.0104**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				372.1092
Unmitigated				372.1092

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	126.505 / 0				372.1092
Total					**372.1092**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	126.505 / 0				372.1092
Total					**372.1092**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				78.4526
Unmitigated				78.4526

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	156				78.4526
Total					**78.4526**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	156				78.4526
Total					**78.4526**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix AQ5

Risk Assessment Support Data

Table AQ5-1 Sensitive Receptors and Distances from Site
(all sites and coordinates from Google Earth unless otherwise noted) Image Date: 8/19/2018
Equinix Data Center

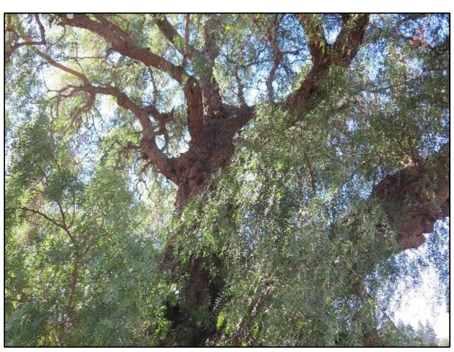
Receptor ID	UTM Em	UTM Nm	Distance from Stack Mid-point meters	feet	miles	Modeling Receptor #
Site (approx. mid-point)	**607974.00**	**4121531.00**	na	na		
Hospital (Kaiser)	606410.00	4122146.00	1680.6	5513.7	1.04	
Daycare	606647.00	4122198.00	1485.2	4872.7	0.92	
School	607561.00	4121110.00	589.8	1934.9	0.37	
School	606868.00	4121601.00	1108.2	3635.9	0.69	
School (pre-school)	606374.00	4121612.00	1602.0	5256.1	1.00	
School	607591.00	4120778.00	844.8	2771.7	0.52	
School	607962.00	4120464.00	1067.1	3500.9	0.66	
School	609037.00	4120914.00	1229.1	4032.4	0.76	
Residences (East)	608965.00	4121329.00	1011.4	3318.2	0.63	
Residences	607873.00	4121162.00	382.6	1255.2	0.24	
Residences	607714.00	4121199.00	421.7	1383.5	0.26	
Residences	607759.00	4121241.00	361.0	1184.4	0.22	
Residences	607709.00	4121274.00	369.2	1211.1	0.23	
Residences	607671.00	4121305.00	378.0	1240.2	0.23	
Residences	607631.00	4121334.00	395.5	1297.7	0.25	
Residences	607590.00	4121368.00	417.2	1368.6	0.26	
Residences	607545.00	4121389.00	451.9	1482.6	0.28	
Residences	607483.00	4121439.00	499.5	1638.9	0.31	
Residences	607437.00	4121473.00	540.1	1772.1	0.34	
Residences	607393.00	4121502.00	581.7	1908.5	0.36	
Worker (school dist office)	607562.00	4121579.00	414.8	1360.8	0.26	
Worker	608017.00	4121672.00	147.4	483.6	0.09	
Worker	608082.00	4121576.00	117.0	383.9	0.07	
Worker	608143.00	4121541.00	169.3	555.4	0.11	
Worker	608208.00	4121492.00	237.2	778.3	0.15	
Worker	608335.00	4121411.00	380.4	1248.1	0.24	
Worker	608231.00	4121317.00	334.4	1097.2	0.21	
Worker	608141.00	4121260.00	318.3	1044.4	0.20	
Worker	608017.00	4121196.00	337.7	1108.1	0.21	
Worker	608074.00	4121162.00	382.3	1254.3	0.24	
Worker	607597.00	4121496.00	378.6	1242.2	0.24	
Worker	607676.00	4121576.00	301.4	988.8	0.19	
Worker	607721.00	4121628.00	271.0	889.0	0.17	
Worker	607760.00	4121687.00	264.8	868.8	0.16	

Appendix B

Tree Survey Report







H. T. HARVEY & ASSOCIATES
Ecological Consultants

Equinix Data Center Project
Tree Survey Report

Project # 3804-01

Prepared for:

John Schwarz
David J. Powers & Associates
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November 17, 2015

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Figures

List of Contributors

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Ginger Bolen, Ph.D., Senior Wildlife Ecologist, Project Manager
Maya Goklany, M.S., Plant Ecologist

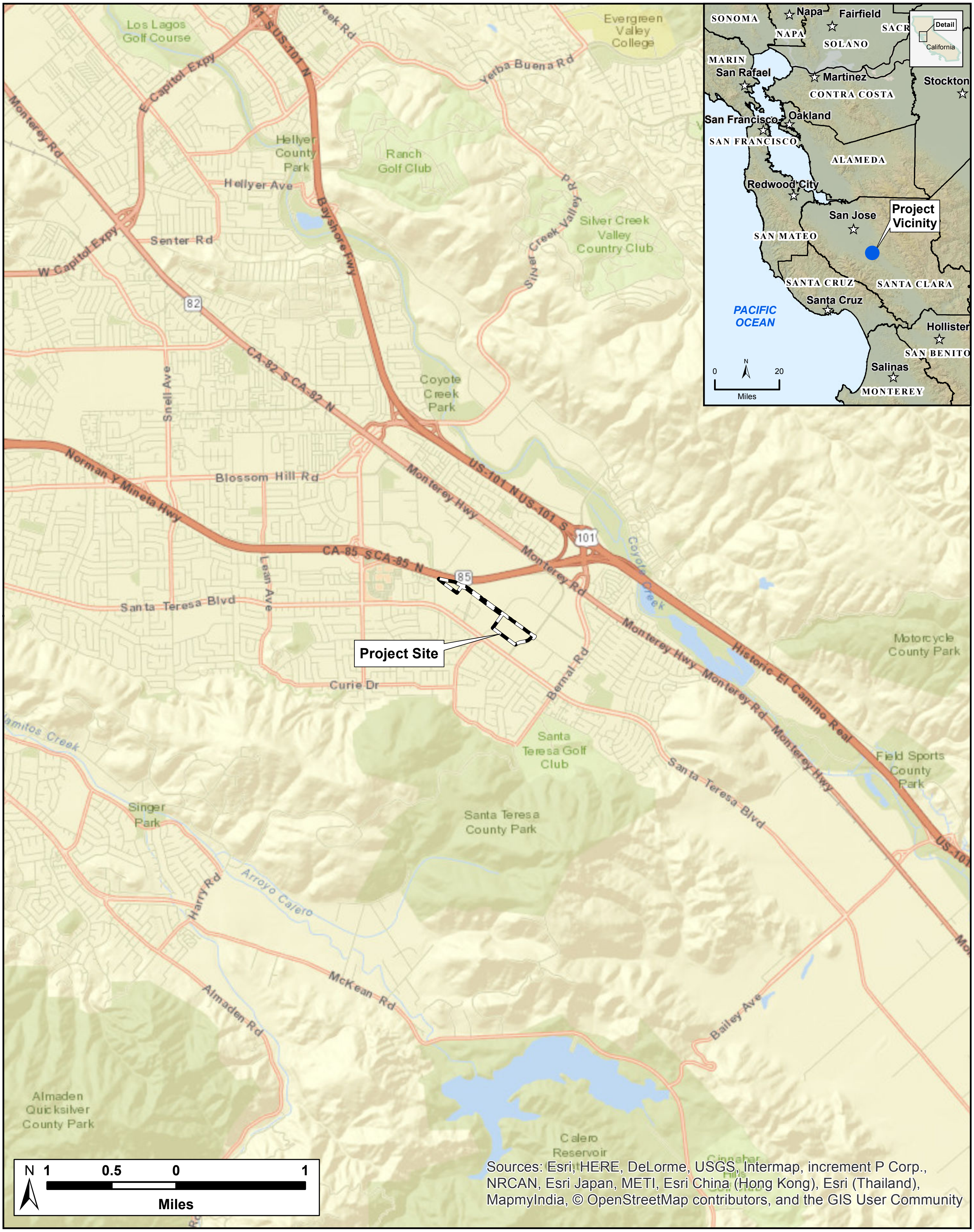
Section 1.0 Introduction

H. T. Harvey & Associates conducted a tree survey for the Equinix Data Center Project. The project entails the construction of the Equinix Data Center, the Santa Teresa Pacific Gas and Electric (PG&E) Substation, and a new PG&E distribution route, which will connect the new substation to the Equinix Data Center.

1.1 General Project Area Description

The 31.27-acre (ac) project site is located in the City of San Jose (City) in Santa Clara County, California. It is located in the *Santa Teresa Hills*, *California* U.S. Geological Survey (USGS) 7.5-minute quadrangle (Figure 1). The Project region experiences a Mediterranean climate, characterized by dry, hot summers and wet, mild winters with the majority of annual precipitation falling between the months of October and April.

The project is embedded in an urban matrix in the Edenvale area of the City and is surrounded by commercial development, residential neighborhoods, and roadways. The Equinix Data Center portion of the project, which will consist of three data center buildings, each approximately 180,000 square feet (sq ft) in size, is proposed to be constructed on a vacant lot bound by Via Del Oro, San Ignacio Avenue, Santa Teresa Boulevard, and Great Oaks Boulevard. The Santa Teresa Substation portion of the project is located immediately south of California State Route 85 (SR 85) within the existing PG&E Edenvale Service Center, approximately 2,200 feet (ft) to the northwest of the proposed Equinix Data Center. The new PG&E distribution route, which will originate from the new PG&E substation, will pass under the Santa Clara Valley Transportation Authority (VTA) light rail tracks and run down the center of Via Del Oro for approximately 0.35 mile (mi).



N:\Projects3800\3804-01\Reports\Tree Survey Report\Fig 1 Vicinity Map.mxd

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Vicinity Map
Equinix Data Center and Santa Teresa Substation Project
Tree Survey Report (3804-01)
November 2015

Section 2.0 Methodology

H. T. Harvey & Associates plant ecologist Maya Goklany, M.S., conducted the tree survey on October 30, 2015 and November 4, 2015 in the 31.27-ac project site. Prior to conducting fieldwork, H. T. Harvey & Associates ecologists reviewed project plans and the project description provided by David J. Powers & Associates, and conducted an impact assessment to determine areas of the site that would be temporarily and permanently impacted by the proposed activities (Figure 2).

In areas of the project site that would be permanently impacted (23.74 ac), all trees with diameter-at-breast-height (DBH) measurements of 2 inches or larger were mapped using a sub-meter Global Positioning System (Trimble GeoXT™ GPS unit). "Breast-height" is assumed to be 4.5 ft above the ground surface under the City's Municipal Code. Each tree was identified to species using *The Jepson Manual, Vascular Plants of California, Second Edition* (Baldwin et al. 2012) and tagged with a unique identification number, either with new or existing aluminum labels on the tree trunks. Methodologies described in the *Guidelines for Developing and Evaluating Tree Surveys* (Bernhardt & Swiecki 1991) were utilized to measure DBH with a 28-inch Biltmore stick to the nearest 1-inch. While standing squarely in front of each tree, the Biltmore stick was held in a horizontal position 25-inches from the observer's eye. Measurements of DBH were recorded on the upslope side of the tree trunk; however, there were a number of circumstances in which complications arose with measuring DBH in this straightforward manner. Common complications included (1) leaning trees, (2) trees forking below or near DBH, and (3) multi-stemmed trees. For each of these situations, standard procedures as outlined in Bernhardt & Swiecki (1991) were followed. For multi-stemmed trees, the total DBH was determined by squaring the DBH of each stem, summing those values, and taking the square root of the sum to arrive at a single additive value. Trees were considered multi-stemmed when a fork in the main stem was observed aboveground, but below breast height.

Tree health was also scored for each tree rooted in areas that would be permanently impacted by project activities. Health was scored by visual inspection using a four-tiered scoring system:

1. Trees with *excellent* health, as indicated from evidence of substantial annual canopy growth and a lack of thinning of the canopy, branch or twig dieback, epicormic growth[1], and other signs of disease.

2. Trees with *good* health, as indicated from evidence of a small to moderate amount of annual canopy growth and a lack of epicormic growth and other signs of disease. Some trees with a small amount of canopy or dieback of branches and twigs were placed in this tier, but not individuals that displayed both of these qualities.

[1] Epicormic sprouts are known as "suckers" and emerge from dormant buds beneath the bark of a tree. Under normal, "healthy" conditions their growth is suppressed by hormones from active shoots located higher up in the tree canopy. Under stressful conditions, epicormic sprouts develop in response to increased light levels or other stressful conditions or events (such as storm damage, fire, or improper pruning) that decrease the total leaf surface of the tree.

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 2. Tree Survey Results
Equinix Data Center and Santa Teresa Substation Project
Tree Survey Report (3804-01)
September 2016

3. Trees with *fair* health, as indicated from evidence of little to no annual canopy growth and a lack of epicormic growth and other signs of disease. Trees in this tier exhibited a *small* amount of canopy thinning *and* dieback of branches and twigs, but did not include individuals that displayed just one of these qualities.

4. Trees with *poor* health, as indicated from evidence of little to no annual canopy growth and little to no epicormic growth and other signs of disease. Trees in this tier exhibited a *moderate* amount of canopy thinning *and* dieback of branches and twigs.

Per the request of the project proponent, in areas of the project site that would be temporarily impacted (i.e., trees lining Via Del Oro along the new PG&E distribution route and the area north of the proposed substation), tree species and the number of individuals rooted within the boundaries of the site were documented; however, DBH and tree health were not recorded and these trees were not tagged.

Section 3.0 Results

A total of 22 trees with a DBH of 2 inches or greater were recorded in the areas of the project site where permanent impacts are proposed (Figure 2). Twelve trees had a DBH greater than or equal to 18 inches, and meet the size criteria of ordinance-sized trees under the City's Municipal Code. Figure 2 shows the location and species of each individual tree documented in the permanent impacts areas of the project site, and indicates which trees are ordinance-sized.

Trees in the permanent impact area occurred within ruderal grassland. This area had been mowed during the weeks prior to the October 30, 2015 site visit (Photo 1, Appendix A); however, the plant community appeared to have been dominated by non-native grasses, primarily wild oats (*Avena* sp.), and non-native forbs such as stinkwort (*Dittrichia graveolens*), mustard (*Brassica* sp.) and horehound (*Marrubium vulgare*). In addition, several scattered cotoneaster (*Cotoneaster* sp.) shrubs were observed. Trees in the permanent impact area of the project site were scattered and did not form a dense overstory. Species that are native to the Santa Clara Valley include valley oak (*Quercus lobata*), coast live oak (*Quercus agrifolia*), and blue elderberry (*Sambucus nigra* ssp. *caerulea*). Tree species that are native to California, but do not occur naturally in the Santa Clara Valley, include coast redwood (*Sequoia sempervirens*) and Northern California black walnut (*Juglans hindsii*). One non-native tree, Peruvian pepper tree (*Schinus mollis*), was also recorded on the site. Table 1 on the following page summarizes all the trees within the permanent impact areas of the project site, and includes their tag number, species, DBH measurement, and health rating.

Coast live oak trees were the most common species documented in the tree survey (nine individuals) (Photo 1, Appendix A). All were in excellent health; they displayed no evidence of physiological stress, exhibited substantial annual vegetative growth, and in addition, many coast live oaks had produced a large annual crop of acorns. One exceptionally large valley oak with a DBH measurement of 66 inches is located near the corner of Great Oaks Boulevard and Via Del Oro (Figure 2). This tree has a large canopy spread and a moderate amount of annual canopy growth, but was considered to be in good health due to the loss of a large limb (Photo 2, Appendix A). Several other exceptionally large Northern California black walnuts and Peruvian pepper trees with DBH measurements ranging from 60 inches to 81 inches,and large, spreading canopies were documented (Table 1; Photos 3-6, Appendix A). Owing to the presence of Peruvian pepper trees amongst these individuals, the largest trees recorded in the tree survey were likely planted, but are potentially more than 150 years old. The Peruvian pepper trees were all in excellent health. In contrast, the Northern California black walnuts received lower health ratings (fair) due to some evidence of both canopy thinning, loss of large limbs, and twig die-off. Smaller, blue elderberry trees were all in fair health; although a small amount of both canopy thinning and twig die-off was recorded, these trees still had produced a substantial annual crop of fruit. One coast redwood tree in the permanent impact area of the project site was rated as having poor health, and exhibited signs of drought stress, such as dead needles and a very sparse canopy.

Table 1. Summary of Tree Survey Results

Tag #	Scientific Name	Common Name	Total DBH (inches)	Ordinance -size	Health and Vigor Rating
130	*Quercus agrifolia*	coast live oak	22	Yes	1
131	*Quercus agrifolia*	coast live oak	23	Yes	1
132	*Quercus agrifolia*	coast live oak	15	No	1
133	*Quercus agrifolia*	coast live oak	32	Yes	1
134	*Quercus agrifolia*	coast live oak	10	No	1
135	*Quercus agrifolia*	coast live oak	8	No	1
138	*Quercus agrifolia*	coast live oak	27	Yes	1
139	*Quercus lobata*	valley oak	66	Yes	2
141	*Quercus agrifolia*	coast live oak	13	No	1
142	*Juglans hindsii*	Northern California black walnut	16	No	3
143	*Sequoia sempervirens*	coast redwood	65	Yes	4
144	*Juglans hindsii*	Northern California black walnut	72	Yes	3
145	*Juglans hindsii*	Northern California black walnut	60	Yes	3
146	*Sambucus nigra* ssp. *caerulea*	blue elderberry	9	No	3
147	*Sambucus nigra* ssp. *caerulea*	blue elderberry	8	No	3
148	*Sambucus nigra* ssp. *caerulea*	blue elderberry	13	No	3
149	*Schinus mollis*	Peruvian pepper tree	74	Yes	1
150	*Schinus mollis*	Peruvian pepper tree	81	Yes	1
151	*Schinus mollis*	Peruvian pepper tree	18	Yes	1
401	*Sambucus nigra* ssp. *caerulea*	blue elderberry	12	No	3
402	*Quercus agrifolia*	coast live oak	10	No	1
403	*Schinus mollis*	Peruvian pepper tree	74	Yes	1

As mentioned above under Section 2.0, tree species and the number of individuals rooted within the boundaries of the site were recorded in areas that would be temporarily impacted by project activities (Figure 2). Temporary impact areas include some ruderal grassland, but are generally composed of developed/landscaped habitat. Developed areas of the site are devoid of vegetation and include hardscape (asphalt and concrete surfaces) along Via Del Oro, the VTA light rail tracks, and a PG&E maintenance and storage yard. In addition, the northernmost portion of the site (to the west of the PG&E Edenvale Center) was graded prior to the November 4, 2015 site visit, and thus, was overlain by bare soil and mapped as developed/landscaped habitat. At the time of the survey, three trees remained in the northernmost parcel: Mexican fan palm (*Washingtonia robusta*), elm (*Ulmus* sp.), and European olive (*Olea europa*). Landscaped areas on the project site are located in the right-of-way of Via Del Oro. These vegetated strips lining the road are composed of irrigated lawn and 59 planted trees, including 44 London plane trees (*Platanus hybrida*), eight shamel ash trees (*Fraxinus uhdei*), two coast redwoods, and five sweet gum trees (*Liquidambar styraciflua*) (Photo 7, Appendix A).

Literature Cited

Baldwin, B., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken. 2012. The Jepson Manual: Vascular Plants of California. 2nd Edition. University of California Press, Berkeley.

Bernhardt, E. and T.J. Swiecki. 1991. Guidelines for developing and evaluating tree ordinances. Prepared for: Urban Forestry Program, California Department of Forestry and Fire Protection, Sacramento, CA.

Appendix A. Photos

Photo 1. Coast live oak tree in ruderal grassland habitat.

Photo 2. Large valley oak at the corner of Great Oaks Boulevard and Via Del Oro.

Photo 3. Large Northern California black walnut.

Photo 4. The base of a large Northern California black walnut with a Biltmore stick for reference.

Photo 5. The base of a large Peruvian pepper tree with a Biltmore stick for reference.

Photo 6. View into the canopy of a large Peruvian pepper tree.

Photo 7. Sweet gum trees along the right-of-way of Via Del Oro in developed/landscaped habitat.

Table 1. Summary of Tree Survey Results
October 2016

Tag #	Scientific Name	Common Name	Total DBH (inches)	Ordinance-size	Health and Vigor Rating	Removal
130	*Quercus agrifolia*	coast live oak	22	Yes	1	Yes
131	*Quercus agrifolia*	coast live oak	23	Yes	1	Yes
132	*Quercus agrifolia*	coast live oak	15	No	1	Yes
133	*Quercus agrifolia*	coast live oak	32	Yes	1	Yes
134	*Quercus agrifolia*	coast live oak	10	No	1	Yes
135	*Quercus agrifolia*	coast live oak	8	No	1	Yes
138	*Quercus agrifolia*	coast live oak	27	Yes	1	Yes
139	*Quercus lobata*	valley oak	66	Yes	2	No
141	*Quercus agrifolia*	coast live oak	13	No	1	Yes
142	*Juglans hindsii*	Northern California black walnut	16	No	3	No
143	*Sequoia sempervirens*	coast redwood	65	Yes	4	No
144	*Juglans hindsii*	Northern California black walnut	72	Yes	3	No
145	*Juglans hindsii*	Northern California black walnut	60	Yes	3	No
146	*Sambucus nigra* ssp. *caerulea*	blue elderberry	9	No	3	No
147	*Sambucus nigra* ssp. *caerulea*	blue elderberry	8	No	3	No
148	*Sambucus nigra* ssp. *caerulea*	blue elderberry	13	No	3	No
149	*Schinus mollis*	Peruvian pepper tree	74	Yes	1	No
150	*Schinus mollis*	Peruvian pepper tree	81	Yes	1	No
151	*Schinus mollis*	Peruvian pepper tree	18	Yes	1	No
401	*Sambucus nigra* ssp. *caerulea*	blue elderberry	12	No	3	Yes
402	*Quercus agrifolia*	coast live oak	10	No	1	Yes
403	*Schinus mollis*	Peruvian pepper tree	74	Yes	1	Yes

Appendix C

Mitigation and Monitoring Memorandum

To: David Keyon, Supervising Planner – Environmental Review
City of San José, Planning Division
Environmental Team
200 E. Santa Clara Street, Tower 3
San José, CA 95113

From: Akoni Danielsen
Principal Project Manager

Date: October 15, 2018

Subject: **Mitigation and Monitoring Documentation for Equinix Data Center Grading Permit [Project SP15-031, Grading Reference Number: 18-120758 GR (3-05857)]**

Dear Mr. Keyon:

This letter documents the subject project's compliance with mitigation monitoring actions applicable prior to issuance of a grading permit. Also in conjunction with this letter, and saved on the accompanying CD, are copies of the required reports, the 2017 Equinix Data Centers (SV-12, SV-13, SV-14) and Santa Teresa Substation Development Project Initial Study/Mitigated Negative Declaration. The attachments are labeled as follows:

Attachment A	2017 Equinix Data Centers (SV-12, SV-13, SV-14) SP15-031 Initial Study
Attachment B	Mitigation Monitoring and Reporting Program (MMRP)
Attachment C	Grading and Drainage Plan Set
Attachment D	Construction Plan Set Notes
Attachment E	Tree Preservation Plan
Attachment F	Cultural Resources Assessment
Attachment G	Noise Logistics Plan

To determine the measures required prior to issuance of a grading permit, *David J. Powers & Associates, Inc.* (DJP&A) staff reviewed the project Initial Study/Mitigated Negative Declaration, and the Mitigation Monitoring and Reporting Program (MMRP). It is important to note that the following mitigation monitoring compliance memo is exclusively for site development at the proposed data center site and does not include development of the proposed Santa Teresa Substation site. The Santa Teresa Substation site is undergoing separate environmental review for mitigation compliance documentation.

The requirements and the project's compliance with the mitigation measures are discussed below.

PROJECT DESCRIPTION

The proposed project would construct three data center buildings (SV-12, SV-13, and SV-14), each approximately 188,000 square feet in size, on an approximately 18-acre site in south San José comprised on four parcels (Assessor Parcel Numbers: 706-02-053, -054, and portions of 706-02-055, -056). The site is bounded by Via Del Oro to the north and San Ignacio Avenue to the west.

The following mitigation compliance document pertains to all phases of development on-site.

2017 EQUINIX DATA CENTER (SV-12, SV-13, SV-14) SITE INITIAL STUDY/MITIGATED NEGATIVE DECLARATION MITIGATION

The following mitigation measures were included in the 2017 Equinix Data Center (SV-12, SV-13, SV-14) Initial Study/Mitigated Negative Declaration and MMRP to reduce environmental impacts from the proposed development. Documentation of each measure's implementation is required prior to issuance of a grading permit. The applicability of the measures and the project's compliance with them are discussed following each measure.

Air Quality

MM AIR-1: Generator operation for maintenance and testing purposes shall be limited so that the combined operation of all 21 generators does not exceed 356 hours in any consecutive 12-month period.

The maximum number of hours of operation of the generators for maintenance and testing is regulated by the Bay Area Air Quality Management District (BAAQMD), which will issue individual Permits to Operate for each data center building (or groups of generators) as they are constructed. The conditions in each Permit to Operate will be enforceable by BAAQMD. Prior to issuance of an occupancy permit for each building, the applicant shall provide a letter to the Director of Building, Planning and Code Enforcement from BAAQMD and/or a qualified consultant that documents that the sum of the hours of operation permitted and regulated by BAAQMD for the three data centers combined does not exceed 356 hours in any consecutive 12-month period. This letter shall include a copy of the BAAQMD approved Permit to Operate.

If, subsequent to issuance of occupancy permits, there is a change to the number of generators, a change to the model of generators, or a change in the number of hours the generators will be tested, documentation shall be provided to the City of San José Department of Building, Planning and Code Enforcement that total emissions from maintenance and testing for the three data centers would not exceed the significance thresholds for Nitrogen Oxide (NOx) on both an average daily (54 pounds per day) and annual averaging (10 tons/year) period. This documentation shall be reviewed and approved by a Supervising Planner of the Environmental Review Division of the Department of Planning, Building, and Code Enforcement prior to the issuance of any Planning Permits approving changes to the generators.

Compliance: Prior to occupancy of each proposed data center building, the applicant shall provide a letter to the Director of Building, Planning and Code Enforcement from BAAQMD and/or a qualified consultant, as described in MM AIR-1 above. The letter will be submitted after issuance of the grading permit and construction of the data center buildings.

Biological Resources

Nesting Birds

MM BIO-1.1: If possible, construction should be scheduled between September and January (inclusive) to avoid the nesting season. If this is not possible, pre-construction surveys for nesting raptors and other migratory breeding birds shall be conducted by a qualified ornithologist to identify active nests that may be disturbed during project implementation onsite and within 250 feet of the site. Between February and April (inclusive) pre-construction surveys shall be conducted no more than 14 days prior to the initiation of construction activities or tree relocation or removal. Between May and August (inclusive), pre-construction surveys shall be conducted no more than thirty (30) days prior to the initiation of these activities. The surveying ornithologist shall inspect all trees in and immediately adjacent to the construction area for nests.

MM BIO-1.2: If an active nest is found in or close enough to the construction area to be disturbed by these activities, the ornithologist shall, in consultation with the California Department of Fish and Wildlife (CDFW), designate a construction-free buffer zone (typically 250 feet for raptors and 100 feet for other birds) around the nest, which shall be maintained until after the breeding season has ended and/or a qualified ornithologist has determined that the young birds have fledged.

MM BIO-1.3: The applicant shall submit a report indicating the results of the survey and any designated buffer zones to the satisfaction of the Director of Planning, Building and Code Enforcement prior to the issuance of any grading or building permit.

Compliance: Initiation of project construction would occur outside of the nesting bird season (February 1st to August 15th), therefore, a nesting bird survey is not required prior to issuance of the project grading permit.

Should the project begin construction during the nesting bird season (February 1st to August 15th), the project would be required to prepare a nesting bird survey and provide to the City prior to project construction activities.

Trees Preservation

MM BIO-2.1: A Tree Preservation Plan shall be prepared by a certified arborist prior to initiation of construction to describe how the Heritage Tree will be protected. The construction-phase Tree Preservation Plan shall include the following tree protection measures, which are based on guidelines established by the International Society for Arboriculture:

a) Establish an area surrounding the Heritage Tree to be protected during construction as defined by a circle concentric with each tree with a radius 1-1/2 times the diameter of the tree canopy drip line. This "tree protection zone" is established to protect the tree trunk, canopy and root system from damage during construction activities and to ensure the long-term survival of the protected trees. The tree protection zone shall: (1) ensure that no structures or buildings, that might restrict sunlight relative to the existing condition, will be constructed in close proximity to the trees; and (2) that no improvements are constructed on the ground around the tree within the tree protection zone, thus ensuring that there is sufficient undisturbed native soil surrounding the tree to provide adequate moisture, soil nutrients and oxygen for healthy root growth.
b) Protect tree root systems from damage caused by (a) runoff or spillage of noxious materials while mixing, placing, or storing construction materials and (b) ponding, eroding, or excessive wetting caused by incident rainfall through use of the following measures during excavation and grading:

   i. Excavation: Do not trench inside tree protection zones. Hand excavate under or around tree roots to a depth of three feet. Do not cut main lateral tree roots or taproots. Protect exposed roots from drying out before placing permanent backfill.

ii. Grading: Maintain existing grades within tree protection zones. Where existing grade is two inches or less below elevation of finish grade, backfill with topsoil or native soil from the project site. Place fill soil in a single un-compacted layer and hand grade to required finish elevation.

iii. Apply six-inch average thickness of wood bark mulch inside tree protection zones. Keep mulch six inches from tree trunks.

c) Provide 48-inch tall orange plastic construction fencing fastened to steel T-posts, minimum six feet in length, using heavyweight plastic ratchet ties. Install fence along edges of tree protection zones before materials or equipment are brought on site and construction operations begin. Maintain fence in place until construction operations are complete and equipment has been removed from site.

d) Provide temporary irrigation to all trees in protection zones using a temporary on-grade drip or bubbler irrigation system sufficient to wet the soil within tree protection zones to a depth of 30 inches per bi-weekly irrigation event.

Compliance: HortScience, Inc. has prepared a project-specific tree preservation plan, to be implemented for all phases of project construction. A copy of the Tree Preservation Plan is included as Attachment E.

Habitat Plan

Standard Project Conditions: The project is subject to the Habitat Plan and required to pay all applicable Habitat Plan fees prior to issuance of grading permits.

Compliance: The completed Habitat Conservation Plan Application has been provided directly under separate cover by Equinix to David Keyon in the Planning Division. Applicable fees will be paid directly by Equinix.

Tree Removal and Replacement

Standard Project Conditions: In accordance with current City policies and Municipal Code regulations, trees removed would be replaced at the ratios identified in Table 4.4-1 (pg. 54 of IS/MND). In the event replacement/mitigation trees cannot be accommodated on the site, tree removal shall be mitigated through a donation of $300 per mitigation tree to Our City Forest for in-lieu off-site tree planting in the community.

Cultural Resources

MM CUL-1.1: An archaeologist qualified in local historical and prehistory archaeology shall complete a subsurface presence/absence program to determine whether any intact archaeological deposits are present on-site. Preparation of that work shall include aligning pertinent historic-period maps to the project area to identify specific sensitive areas that could be impacted by the proposed development. Should any archaeological features or deposits be identified, a focused research design and treatment plan shall be prepared to address any potential resources exposed during construction activities followed by archaeological excavation of these features.

MM CUL-1.2: In the event of the discovery of prehistoric or historic archaeological deposits or paleontological deposits, work shall be halted within 50 feet of the discovery and a qualified professional archaeologist (or paleontologist, as applicable) shall examine the find and make appropriate recommendations regarding the significance of the find and the appropriate mitigation. The recommendation shall be implemented and could include collection, recordation, and analysis of any significant cultural materials.

MM CUL-1.3: Pursuant to Section 7050.5 of the Health and Safety Code and Section 5097.94 of the Public Resources Code of the State of California, in the event of the discovery of human remains during construction, there shall be no further excavation or disturbance of the site within a 50-foot radius of the remains or any nearby area reasonably suspected to overlie adjacent remains. The Santa Clara County Coroner shall be notified and shall make a determination as to whether the remains are Native American. If the Coroner determines that the remains are not subject to his authority, he shall notify the Native American Heritage Commission who shall attempt to identify descendants of the deceased Native American. If no satisfactory agreement can be reached as to the disposition of the remains pursuant to this State law, then the land owner shall re-inter the human remains and items associated with Native American burials on the property in a location not subject to further subsurface disturbance.

MM CUL-1.4: A final report summarizing the discovery of cultural materials shall be submitted to the City's Environmental Senior Planner prior to issuance of building permits. This report shall contain a description of the mitigation program that was implemented and its results, including a description of the monitoring and testing program, a list of the resources found, a summary of the resources analysis methodology and conclusion, and a description of the disposition/curation of the resources. The report shall verify completion of the mitigation program to the satisfaction of the Environmental Senior Planner.

<u>Compliance:</u> A subsurface presence/absence program and a Cultural Resources Assessment were prepared by *Albion Environmental* in October 2018. Results of the visual inspection and subsurface testing on-site indicated that there is no evidence of intact prehistoric or historic-era archaeological deposits.

Hydrology & Water Quality

Standard Permit Conditions: Consistent with the General Plan, standard permit conditions that shall be implemented to prevent stormwater pollution and minimize potential sedimentation during construction include, but are not limited to the following:

- Utilize on-site sediment control BMPs to retain sediment on the project site;
- Utilize stabilized construction entrances and/or wash racks;
- Implement damp street sweeping;
- Provide temporary cover of disturbed surfaces to help control erosion during construction; and
- Provide permanent cover to stabilize the disturbed surfaces after construction has been completed.

<u>Compliance:</u> These measures can be found printed on the project's construction plans, which is provided as Attachment D to this memo.

Noise

MM NOI-1: The project applicant shall prepare a noise logistics plan, which shall be submitted for review and approval by the Supervising Planner of the Environmental Review Division of the Department of Planning, Building, and Code Enforcement prior to issuance of grading and building permits. This plan shall include, at a minimum, the following measures to reduce the exposure of adjacent office buildings to construction noise:

1) Construction hours within 200 feet of commercial uses shall be limited to the hours of 7:00 a.m. and 7:00 p.m. weekdays, with no construction on weekends or holidays. Pile driving shall be limited to the hours of 8:00 a.m. to 5:00 p.m. Monday through Friday.
2) Utilize 'quiet' models of air compressors and other stationary noise sources where technology exists. A letter from a qualified acoustic specialist shall be attached to the noise

logistics plan along with a list of proposed construction equipment, including air compressors and other stationary noise sources, certifying that the proposed construction equipment includes the best available noise attenuating technologies.

3) All internal combustion engine-driven equipment shall use best available noise control practices and equipment (including mufflers, intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds). A letter from a qualified acoustic specialist shall be attached to the noise logistics plan along with a list of proposed construction equipment, certifying that the proposed construction equipment includes the best available noise attenuating technologies.

4) Locate all stationary noise-generating equipment, such as air compressors and portable power generators, at least 200 feet from adjacent office and commercial land uses.

5) Locate staging areas and construction material areas at least 200 feet from adjacent office and commercial land uses to the greatest extent feasible.

6) Prohibit all unnecessary idling of internal combustion engines. Equipment shall be shut off when not in use and the maximum idling time shall be limited to five minutes.

7) The contractor will prepare a detailed construction plan identifying a schedule of major noise generating construction activities. This plan shall identify a noise control 'disturbance coordinator' and procedure for coordination with the adjacent noise sensitive facilities so that construction activities can be scheduled to minimize noise disturbance. This plan shall be made publicly available for interested community members. The disturbance coordinator will be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the case of the noise complaint (e.g. starting too early, bad muffler, etc.) and will require that reasonable measures warranted to correct the problem be implemented. The telephone number for the disturbance coordinator construction site shall be posted on the construction site and included in a notice sent to adjacent commercial businesses regarding the construction schedule.

8) All measures in the approved noise logistics plan shall be printed on all approved plans for grading and building permits.

Compliance: These measures can be found in the Noise Logistics Plan prepared for the project, included as Attachment G to this memo.

CONCLUSIONS

Based on our review of the project mitigation measures and permit conditions, as well as the documentation provided by the applicant in compliance with these measures, the proposed grading permit application [Project SP15-031, Grading Reference Number: 18-120758 GR (3-05857)] is compliant with the environmental conditions set forth in the project's approved Special Use Permit (SP15-031).

Sincerely,

Akoni Danielsen

Akoni Danielsen
Principal Project Manager

Appendix D

Tree Protection Plan

September 7, 2018

Ms. Julie Wright
David J. Powers & Associates, Inc.
1871 The Alameda, Suite 200
San José, CA 95126

Subject: Equinix SV12

Dear Ms. Wright:

You requested that I update the tree assessment for the subject property located at the corner of Via del Oro and Great Oaks Blvd. in San Jose CA. Trees were previously evaluated by HT Harvey & Associates in September 2016. I visited the site earlier today. This letter summarizes my observations and assessment.

Description of the Trees

In September 2016 HT Harvey & Associates identified 22 trees, representing six species (see enclosed ***Tree Assessment Form***). I observed nine trees, of four species. Thirteen trees had been removed. I measured the trunk diameter at a point 54-inches above the ground, then assessed tree condition. Trees present at the site were:

Calif. black walnuts (*Juglans hindsii*) #144 and 145 (Photo 1) were mature trees with trunk diameters of 56- and 42-inches respectively. Both trees were in poor condition.

Photo 1. Looking south at walnuts #144 (left) and 145 (right).

Valley oak (*Quercus lobata*) #139 was a very large tree with a trunk diameter of 57-inches (Photo 2). A small plaque on the trunk noted that the tree was San Jose Heritage tree #96. Tree condition was fair based on excellent health and poor structure. While the canopy was full and dense, decay was present in the scaffold limbs and at the base. A large stem in the center of the crown failed many years ago. Old cables had broken. Scaffold branches were horizontal in orientation.

Photo 2. Looking west at valley oak #139. Note wide crown.

Blue elderberries (*Sambucus caerula*) #146, 147 and 148 (Photo 3). These three mature trees formed a small group. Elderberry #148 was the largest tree and was in fair condition. The other two had poor form and structure.

Photo 3. The crowns of blue elderberries #146, 147 and 148 were touching and were in competition for growing space.

Calif. peppers (*Schinus molle*) #149, 150 and 151. Peppers #149 and 150 were very large mature trees. Tree #149 had a very large trunk but the crown was small. The tree had been damaged by fire. Tree #150 was a typical mature pepper in good health but with poor structure (Photo 4). Tree #151 was in poor condition due to poor form and structure.

Photo 4. Looking west at Calif. pepper #150.

Valley oak and blue elderberry are native to the San Jose area. It is likely that all four trees are indigenous to the site.

Evaluation of Impacts
You provided grading and drainage plans prepared by Ruth and Going Inc., project engineers (plans dated August 2018). Plans depicted a large structure with associated parking and landscape. The plan also depicts removal of all trees except for valley oak #139. The elderberries, peppers and black walnuts are located near the project entry off Great Oaks Blvd.

A **TREE PROTECTION ZONE** was depicted surrounding valley oak #139. It extended beyond the dripline on the west and south; to the project limits on the north and east. The edge of grading was beyond the **TREE PROTECTION ZONE**. Based on my assessment of the plans, impacts to valley oak #139 should be minimal. I recommend that it be preserved.

The remaining eight trees would be removed. Each of the trees to be removed meets the City of San Jose's criterion as an Ordinance size tree.

Tree Mitigation
The City of San Jose requires mitigation of trees removed on development sites. The species and exact number of trees to be planted on the site will be determined in consultation with the City Arborist and the Department of Planning, Building, and Code Enforcement.

Mitigation is based on two factors: tree type (native, non-native, orchard) and diameter class. Among the eight trees to be removed were three natives and five non-natives. All trees to be removed had trunk diameters larger than 12-inches. Based on my assessment, 35 15-gallon container trees will be the required mitigation (Table 1).

Table 1. Mitigation calculations. Equinix SV12. San Jose CA.

Diameter Class (in.)	**Species category** Native	Non-native	Orchard	**Nursery Stock Size**
Mitigation ratios				
≥12	5:01	4:01	3:01	15-gallon container
6 to <12	3:01	2:01	none	15-gallon container
<6	1:01	1:01	none	15-gallon container
Trees to be removed				
≥12	3	5	--	8
6 to <12	--	--	--	--
<6	--	--	--	--
Mitigation calculation				
≥12	15	20	--	35
6 to <12	--	--	--	--
<6	--	--	--	--
Total	**15**	**20**	**--**	**35**

In the event the project site does not have sufficient area to accommodate the required tree mitigation, one or more of the following measures may be implemented, to the satisfaction of the City's Environmental Principal Planner, at the development permit stage:

- The size of a 15-gallon replacement tree can be increased to 24-inch box and count as two replacement trees.
- An alternative site(s) will be identified for additional tree planting. Alternative sites may include local parks or schools or installation of trees on adjacent properties for screening

- A donation of $300 per mitigation tree to Our City Forest or San Jose Beautiful for in-lieu off-site tree planting in the community. These funds will be used for tree planting and maintenance of planted trees for approximately three years. A donation receipt for off-site tree planting will be provided to the Planning Project Manager prior to issuance of a development permit.

Tree Preservation Guidelines

The following are recommendations for design and construction phases that will assist in successful tree preservation.

Design recommendations

1. Establish the horizontal and vertical elevation of valley oak #139. Include the trunk location and tag number on all plans.

2. Design finish grades so that no water accumulates around the base of the trunk of valley oak #139.

3. Allow the Consulting Arborist to review all future project submittals including grading, utility, drainage, irrigation, and landscape plans.

4. Maintain the **TREE PROTECTION ZONE** around valley oak #139 as depicted on the Grading and Drainage Plan prepared by Ruth and Going. The **TREE PROTECTION ZONE** shall be the limit of work.

5. Route underground services including utilities, sub-drains, water or sewer around the **TREE PROTECTION ZONE**. Where encroachment cannot be avoided, special construction techniques such as hand digging or tunneling under roots shall be employed where necessary to minimize root injury.

6. Use only herbicides safe for use around trees and labeled for that use, even below pavement.

7. Design the landscape around valley oak #139 to be compatible with the cultural requirements of native oak trees.

8. Any irrigation system must be designed so that no trenching will occur within the dripline of valley oak #139.

Pre-construction and demolition treatments and recommendations

1. The demolition contractor shall meet with the Consulting Arborist before beginning work to discuss work procedures and tree protection.

2. Install protection at the **TREE PROTECTION ZONE** prior to demolition, grubbing, or grading.

3. No entry is permitted into a **TREE PROTECTION ZONE** without permission of the project superintendent.

4. Valley oak #139 should be pruned to reduce the length and weight of long, horizontal branches. Remove stubs only when there is well-developed woundwood present at the attachment. Do not remove the large stub in the center of the crown. All pruning shall be completed by an ISA Certified Arborist or Tree Worker and adhere to the latest editions of the American National Standards for tree work (Z133 and A300) and International Society of Arboriculture Best Management Practices, Pruning.

5. Valley oak #139 should also be evaluated for installation of new cables to support heavy horizontal limbs.

Tree protection during construction

1. Any grading, construction, demolition or other work that is occur within the **TREE PROTECTION ZONE** should be monitored by the Consulting Arborist.

2. If injury occurs to any tree during construction, it should be evaluated as soon as possible by the Consulting Arborist so that appropriate treatments can be applied.

3. Fences are to remain until all site work has been completed. Fences may not be relocated or removed without permission of the project superintendent.

4. Construction trailers, traffic and storage areas must remain outside fenced areas at all times.

5. No materials, equipment, soil, waste or wash-out water may be deposited, stored, or parked within the **TREE PROTECTION ZONE** (fenced area).

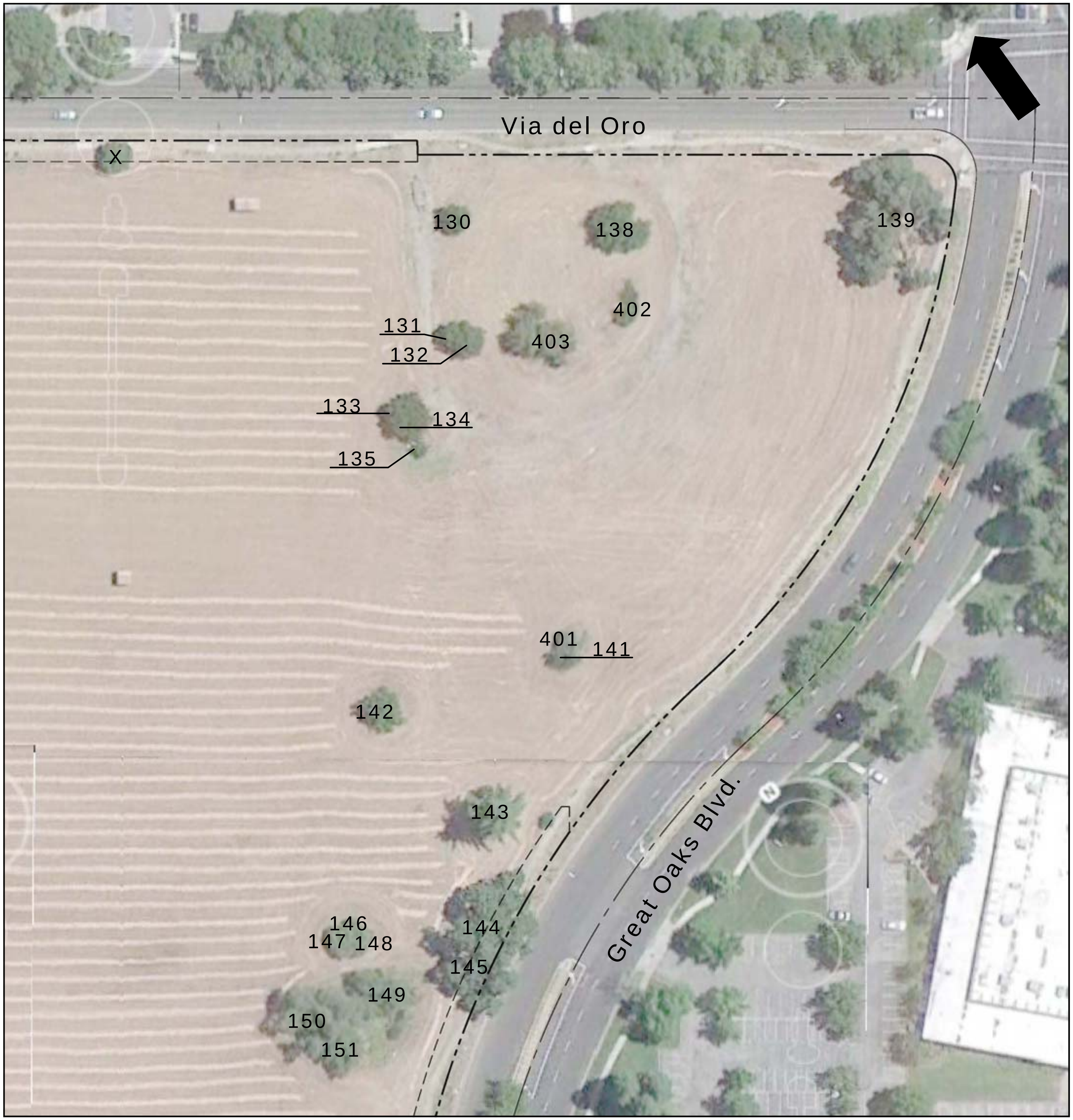
6. Any tree pruning needed for clearance during construction must be performed by a qualified arborist and not by construction personnel.

7. Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw.

HortScience | Bartlett Consulting

James R. Clark, Ph.D.
Certified Arborist WE-0846A
Registered Consulting Arborist #357

Encl. ***Tree Assessment Form***



Tree Assessment Map

Equinix SV12 Site
San Jose, CA

Prepared for:
David J. Powers & Associates
San Jose, CA

September 2018

No Scale

Notes:

- Base map provided by: Charles W. Davidson Co. Consulting Civil Engineers
- Numbered tree locations are approximate.

HORT SCIENCE
BARTLETT CONSULTING
A Division of The F.A. Bartlett Tree Expert Company

325 Ray Street
Pleasanton, California 94566
Phone 925.484.0211
Fax 925.484.0596

Appendix E

Letters to Native American Tribes

DAVID J. POWERS
& ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS & PLANNERS

November 15, 2019

Monica Arellano
Muwekma Ohlone Indian Tribe of the SF Bay Area
20885 Redwood Road, Suite 232
Castro Valley, CA 94546
VIA Email to: marellano@muwekma.org

RE: Equinix SV12, SV18 and SV19 Small Power Plant Project, City of San Jose; Santa Teresa Hills USGS Quadrangle, Santa Clara County

Dear Ms. Arellano:

David J, Powers & Associates, Inc. (DJP&A) has been contracted by Equinix Data Centers for the SV12, SV18 and SV19 Small Power Plant Exemption Project, located in the City of San Jose.

Albion Environmental, under contract with DJP&A, completed a Records Search with the Northwest Information Center (NWIC) of the proposed project area and a 1/4-mile radius to identify known cultural resource sites and previous surveys in or near the project area. A pedestrian survey and a limited subsurface testing were also completed with negative results. The project is located in Township 8 South, Range 2 East of the Santa Teresa Hills 7.5' Topographic Map.

DJP&A contacted the Native American Heritage Commission (NAHC) on October 25, 2019 with a request that they search their Sacred Lands File (SLF) for the project vicinity. On November 5, 2019 a response from Nancy Gonzales-Lopez of the NAHC stated, a record search of the NAHC SLF was completed for the information submitted for the above referenced project. The results were negative.

We would appreciate receiving any comments, concerns, or information you wish to share regarding cultural resources or sacred sites within the immediate project area. If you could provide your response in writing, at your earliest convenience, to the address below, we will make sure the relevant information is considered in preparing our report. Should you have any questions, I can be reached by e-mail at jwright@davidjpowers.com or by telephone at (408) 454-3434. Thank you again for your assistance.

Sincerely,

Julie Wright

Julie Wright
Senior Project Manager
Attachment: Map

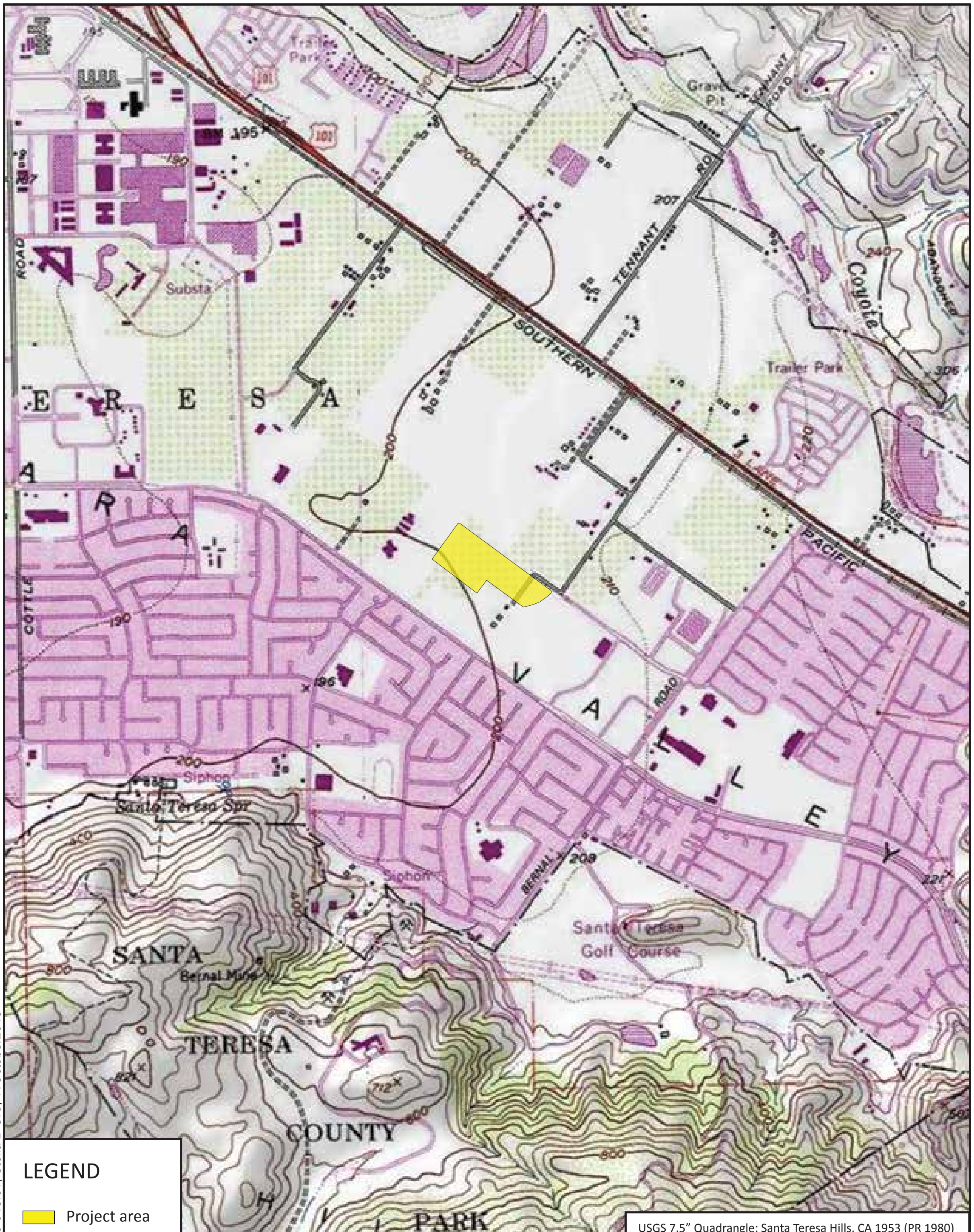


Figure 1. Project location,
Equinix Data Centers,
San Jose, California.

0 250 500 750 1,000
Meters

0 1,000 2,000 3,000 4,000
Feet

N

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AERIAL PHOTOGRAPH AND SURROUNDING LAND USES

FIGURE 3

DAVID J. POWERS
& ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS & PLANNERS

November 15, 2019

Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3388
Fremont, CA 94539
VIA Email to: chochenyo@aol.com

RE: Equinix SV12, SV18 and SV19 Small Power Plant Project, City of San Jose; Santa Teresa Hills USGS Quadrangle, Santa Clara County

Dear Mr. Galvan:

David J, Powers & Associates, Inc. (DJP&A) has been contracted by Equinix Data Centers for the SV12, SV18 and SV19 Small Power Plant Exemption Project, located in the City of San Jose.

Albion Environmental, under contract with DJP&A, completed a Records Search with the Northwest Information Center (NWIC) of the proposed project area and a 1/4-mile radius to identify known cultural resource sites and previous surveys in or near the project area. A pedestrian survey and a limited subsurface testing were also completed with negative results. The project is located in Township 8 South, Range 2 East of the Santa Teresa Hills 7.5' Topographic Map.

DJP&A contacted the Native American Heritage Commission (NAHC) on October 25, 2019 with a request that they search their Sacred Lands File (SLF) for the project vicinity. On November 5, 2019 a response from Nancy Gonzales-Lopez of the NAHC stated, a record search of the NAHC SLF was completed for the information submitted for the above referenced project. The results were negative.

We would appreciate receiving any comments, concerns, or information you wish to share regarding cultural resources or sacred sites within the immediate project area. If you could provide your response in writing, at your earliest convenience, to the address below, we will make sure the relevant information is considered in preparing our report. Should you have any questions, I can be reached by e-mail at jwright@davidjpowers.com or by telephone at (408) 454-3434. Thank you again for your assistance.

Sincerely,

Julie Wright

Julie Wright
Senior Project Manager
Attachment: Map

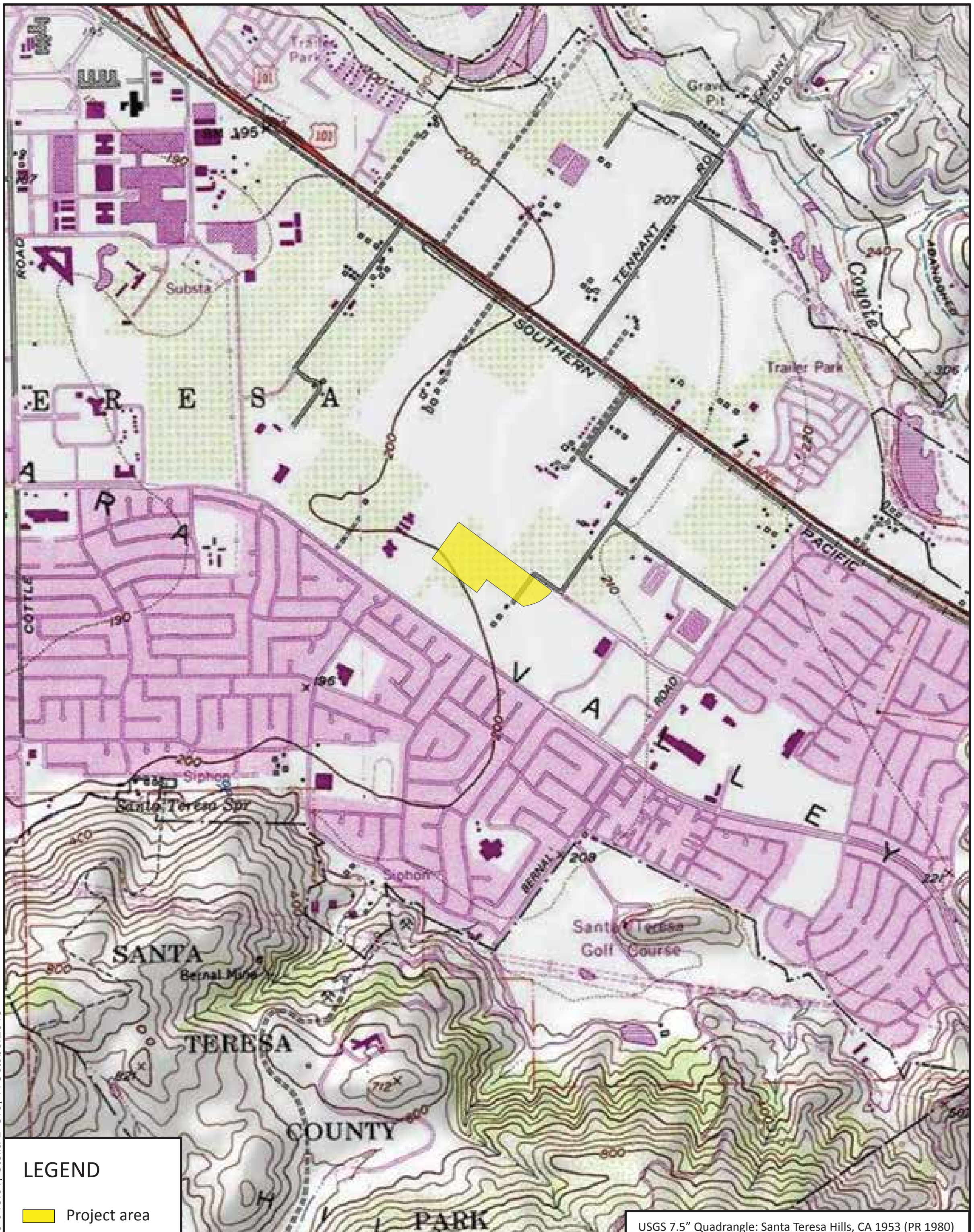
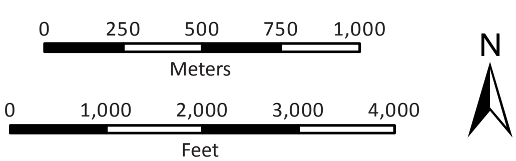


Figure 1. Project location,
Equinix Data Centers,
San Jose, California.



File name: Figure_1.ai, J2018-048.01, Stella D'Oro, 11October2018

AERIAL PHOTOGRAPH AND SURROUNDING LAND USES

FIGURE 3

November 15, 2019

Valentin Lopez
Amah Mutsun Tribal Band
P.O. Box 5272
Galt, CA 95632
VIA Email to: vlopez@amahmutsun.org

RE: Equinix SV12, SV18 and SV19 Small Power Plant Project, City of San Jose; Santa Teresa Hills USGS Quadrangle, Santa Clara County

Dear Mr. Lopez:

David J, Powers & Associates, Inc. (DJP&A) has been contracted by Equinix Data Centers for the SV12, SV18 and SV19 Small Power Plant Exemption Project, located in the City of San Jose.

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Julie Wright
Senior Project Manager
Attachment: Map

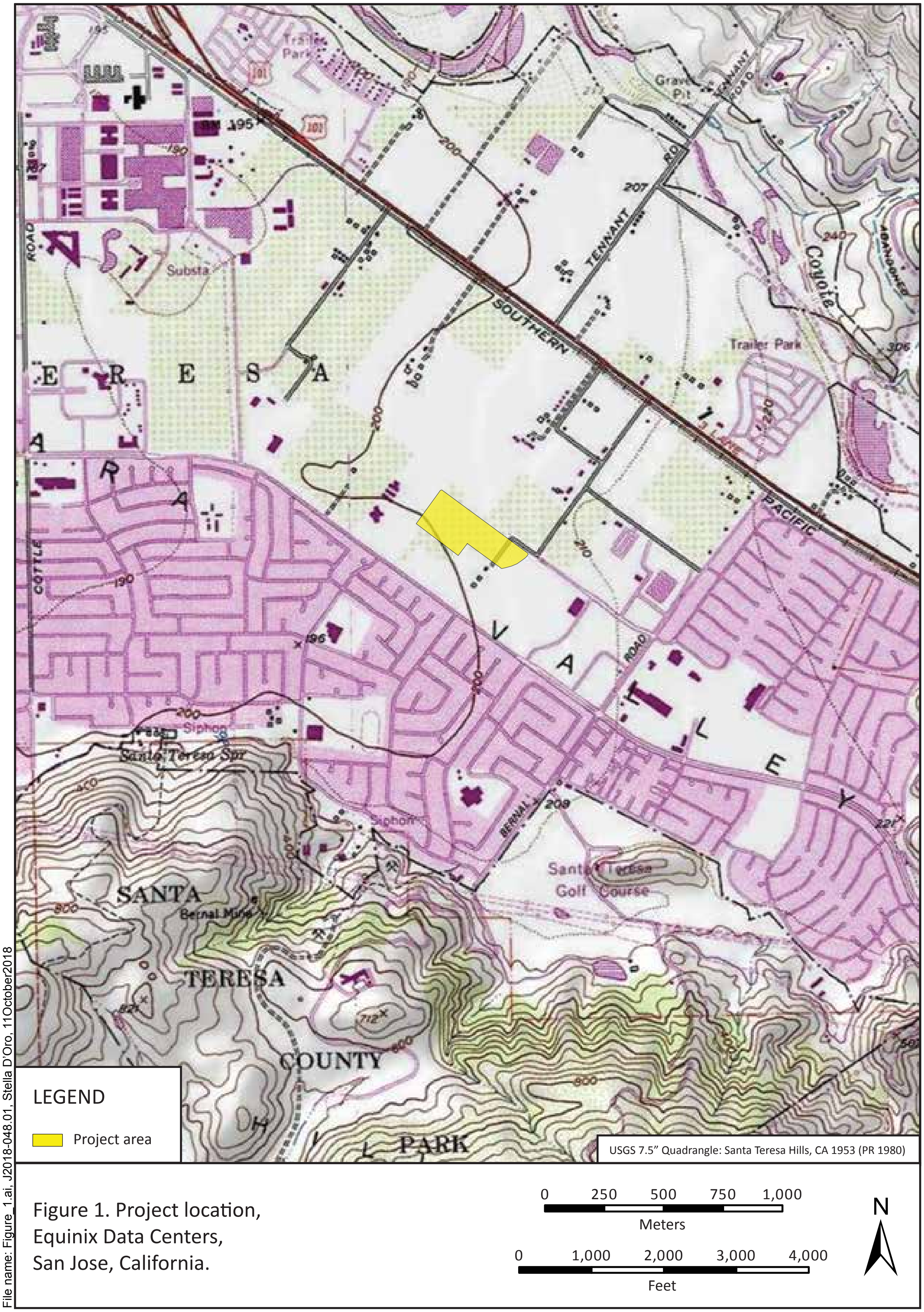

Figure 1. Project location, Equinix Data Centers, San Jose, California.

File name: Figure_1.ai, J2018-048.01, Stella D'Oro, 11October2018

AERIAL PHOTOGRAPH AND SURROUNDING LAND USES | FIGURE 3

DAVID J. POWERS & ASSOCIATES, INC. ENVIRONMENTAL CONSULTANTS & PLANNERS

November 15, 2019

Katherine Perez
North Valley Yokuts Tribe
P.O. Box 717
Linden, CA 95236
VIA Email to: canutes@verizon.net

RE: Equinix SV12, SV18 and SV19 Small Power Plant Project, City of San Jose; Santa Teresa Hills USGS Quadrangle, Santa Clara County

Dear Ms. Perez:

David J, Powers & Associates, Inc. (DJP&A) has been contracted by Equinix Data Centers for the SV12, SV18 and SV19 Small Power Plant Exemption Project, located in the City of San Jose.

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Sincerely,

Julie Wright
Senior Project Manager
Attachment: Map

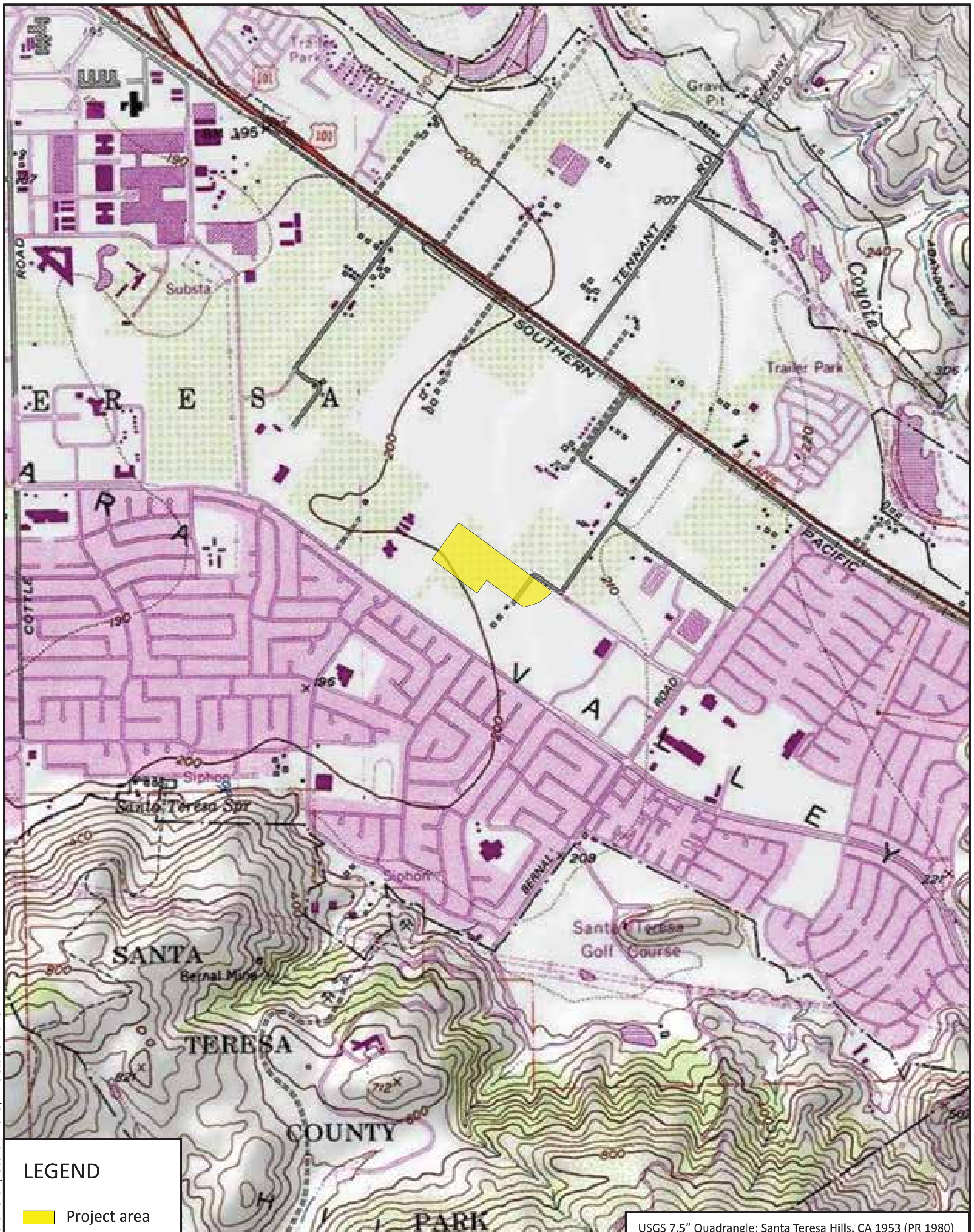

Figure 1. Project location,
Equinix Data Centers,
San Jose, California.

0 250 500 750 1,000
Meters

0 1,000 2,000 3,000 4,000
Feet

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File name: Figure_1.ai, J2018-048.01, Stella D'Oro, 11October2018

AERIAL PHOTOGRAPH AND SURROUNDING LAND USES

FIGURE 3

DAVID J. POWERS & ASSOCIATES, INC. ENVIRONMENTAL CONSULTANTS & PLANNERS

November 15, 2019

Ann Marie Sayers
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024
VIA Email to: ams@indiancanyon.org

RE: Equinix SV12, SV18 and SV19 Small Power Plant Project, City of San Jose; Santa Teresa Hills USGS Quadrangle, Santa Clara County

Dear Ms. Sayers:

David J, Powers & Associates, Inc. (DJP&A) has been contracted by Equinix Data Centers for the SV12, SV18 and SV19 Small Power Plant Exemption Project, located in the City of San Jose.

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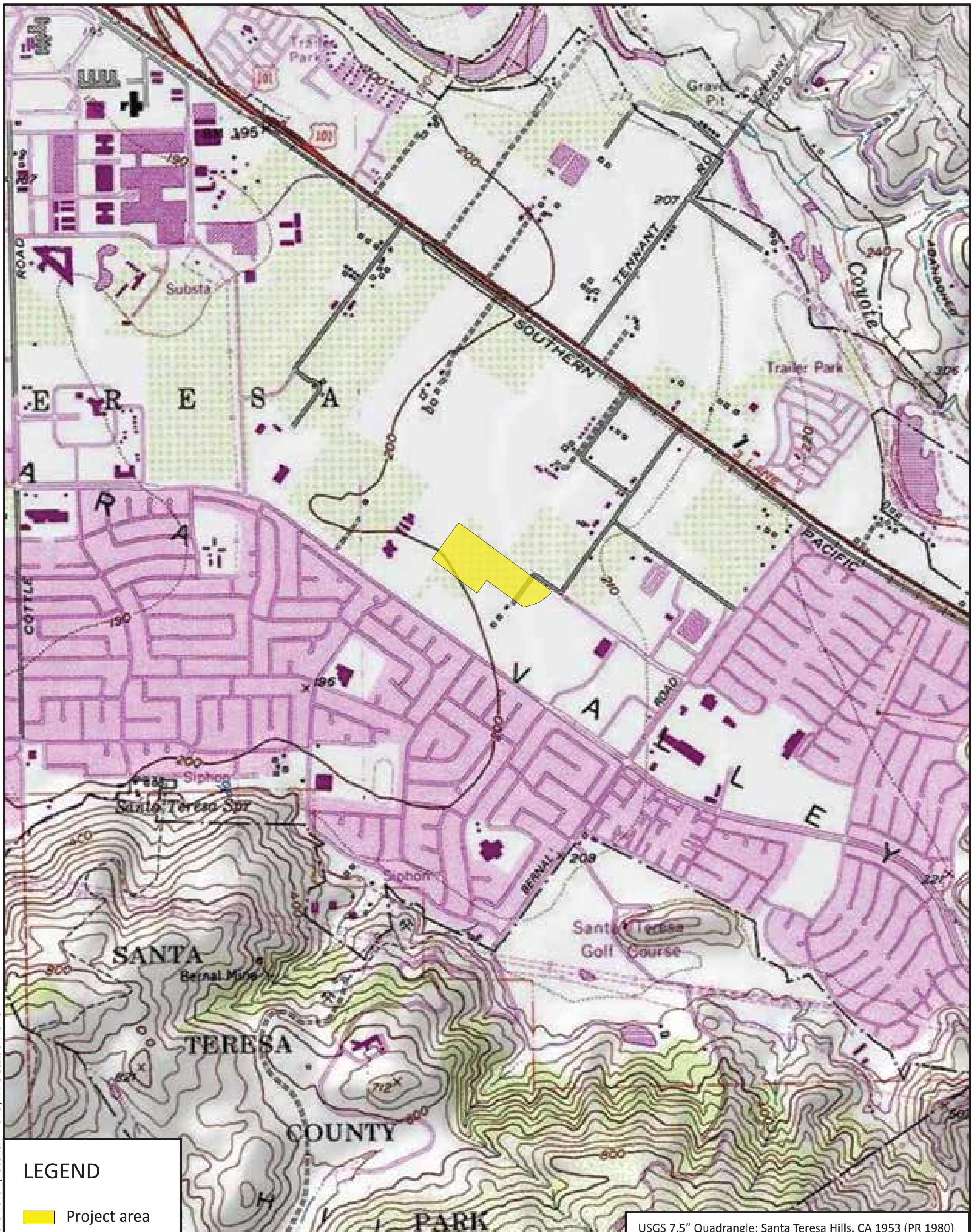

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Equinix Data Centers,
San Jose, California.

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Meters

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Feet

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File name: Figure_1.ai, J2018-048.01, Stella D'Oro, 11October2018

AERIAL PHOTOGRAPH AND SURROUNDING LAND USES

FIGURE 3

November 15, 2019

Irenne Zwierlein
Amah Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94062
VIA Email to: amahmutsuntribal@gmail.com

RE: Equinix SV12, SV18 and SV19 Small Power Plant Project, City of San Jose; Santa Teresa Hills USGS Quadrangle, Santa Clara County

Dear Ms. Zwierlein:

David J, Powers & Associates, Inc. (DJP&A) has been contracted by Equinix Data Centers for the SV12, SV18 and SV19 Small Power Plant Exemption Project, located in the City of San Jose.

Albion Environmental, under contract with DJP&A, completed a Records Search with the Northwest Information Center (NWIC) of the proposed project area and a 1/4-mile radius to identify known cultural resource sites and previous surveys in or near the project area. A pedestrian survey and a limited subsurface testing were also completed with negative results. The project is located in Township 8 South, Range 2 East of the Santa Teresa Hills 7.5' Topographic Map.

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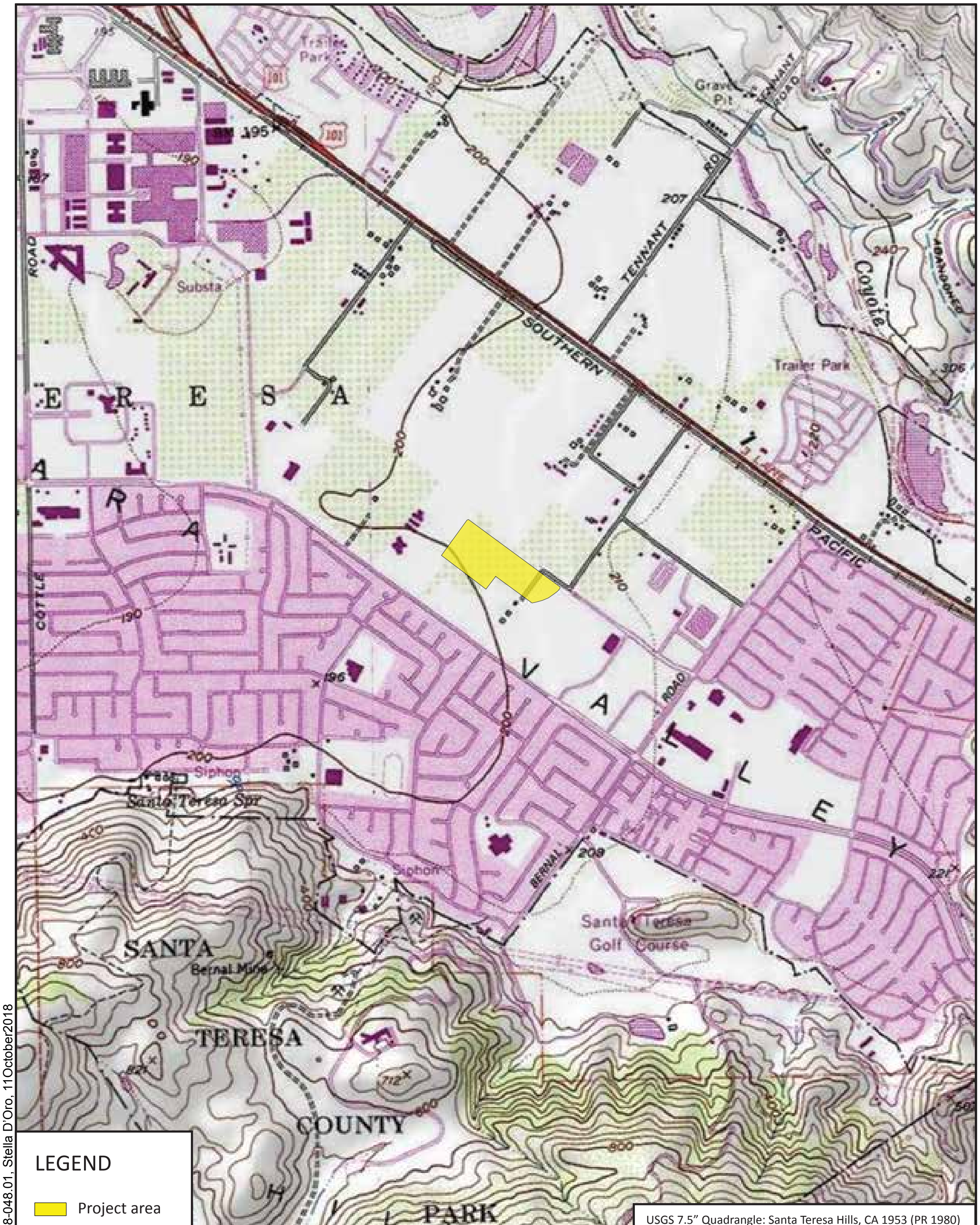


Figure 1. Project location, Equinix Data Centers, San Jose, California.

File name: Figure_1.ai, J2018-048.01, Stella D'Oro, 11October2018

AERIAL PHOTOGRAPH AND SURROUNDING LAND USES

FIGURE 3

Appendix F

Geotechnical Investigation

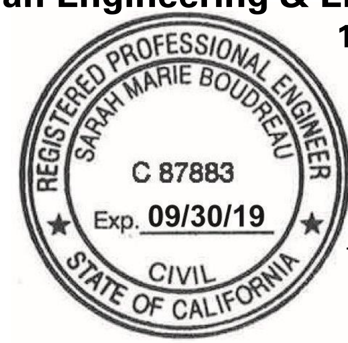
UPDATED GEOTECHNICAL INVESTIGATION
SV12
Great Oaks Boulevard and Via Del Oro
San Jose, California

Prepared For:

Equinix
11 Great Oaks Boulevard
San Jose, California 95119

Prepared By:

Langan Engineering & Environmental Services, Inc.
1 Almaden Boulevard, Suite 590
San Jose, California 95113



Sarah M. Boudreau, PE
Senior Staff Engineer

Serena T. Jang, PE, GE
Senior Associate/Vice President

8 June 2018
770620902

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UPDATED GEOTECHNICAL INVESTIGATION
EQUINIX SV12
Great Oaks Blvd and Via Del Oro
San Jose, California

1.0 INTRODUCTION

This updated report presents the results of the geotechnical investigation performed by Langan Engineering and Environmental Services Inc. (Langan) for the proposed Equinix SV12 development at Great Oaks Boulevard and Via Del Oro in San Jose, California. This report has been updated to reflect the new site limits and proposed construction. We previously prepared a report (dated 17 July 2015[1]) for the site for Equinix for a different site configuration; however, the project was not constructed.

The project site is located west of the intersection of Great Oaks Boulevard and Via Del Oro, as shown on Figure 1. It is bound by Via Del Oro to the northeast, Great Oaks Boulevard to the south/southwest and three vacant parcels to the west. The parcel located west of the project site, noted as "Future Phase" on Figure 1, will be developed in the future. The site is currently unpaved and vacant. The site is relatively level, with a ground surface elevation ranging from approximately Elevation 202 to 208 feet[2] (Ruth & Going, 2018).

Based on the current grading and drainage drawings (Ruth & Going, 2018), the proposed development will include constructing one two-story data center, designated as SV12. The proposed building will be at-grade and will be surrounded by paved parking lots.

Based on previous correspondences during the preparation of our 2015 report with Paradigm Structural Engineers, Inc. (Paradigm), the project structural engineer, the anticipated dead plus live loads for the interior and exterior columns are 615 kips and 550 kips, respectively. In preparation of this revised report, we have assumed the current plans for SV12 will have similar column loads.

2.0 SCOPE OF SERVICES

Our scope of services for the original geotechnical investigation was outlined in our proposal dated 24 March 2015 and included drilling borings, advancing Cone Penetration Tests (CPTs) and performing laboratory tests. Our scope of services was updated in our proposal dated

---

1 The project limits of Langan's 2015 report included the entire city block, bound by Great Oaks Boulevard, Via Del Oro, Great Oaks Boulevard and Santa Teresa Boulevard.

2 All elevations reference NAVD88 datum.

19 April 2018 to update the report to address the current layout of building SV12 and the current 2016 California Building Code (CBC). We evaluated the results of the field exploration and laboratory testing to develop conclusions and recommendations regarding:

- anticipated subsurface conditions including groundwater levels
- 2016 CBC site classification, mapped values S_S and S_1, modification factors F_a and F_v and S_{MS} and S_{M1}
- site seismicity and potential for seismic hazards including liquefaction, lateral spreading, fault rupture
- appropriate foundation type(s) including shallow foundations and alternatives for deep foundations, as necessary
- design parameters for the recommended foundation type(s), including vertical and lateral capacities and associated estimated settlements
- subgrade preparation for slab-on-grade floors and exterior slabs and flatwork, including sidewalks
- site preparation, grading, and excavation, including criteria for fill quality and compaction
- soil corrosivity with a brief evaluation
- construction considerations

We understand additional data center buildings may be developed by Equinix in the "Future Phase" parcel located east of the SV12 building in another phase; however, the development of the "Future Phase" parcel is not included in our current scope of services.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

We began our investigation by reviewing previous geotechnical investigations performed at or in the vicinity of the site. To further investigate the subsurface conditions at the site we drilled eight test borings and performed seventeen Cone Penetration Tests (CPTs). Prior to performing our field exploration, we obtained a soil boring permit from the Santa Clara Valley Water District (SCVWD), notified Underground Service Alert (USA) and checked the boring locations for buried utilities using an independent private utility locator. Details of the field exploration activities and laboratory testing are described in the remainder of this section.

3.1 Previous Investigation

Previously, we performed a preliminary geotechnical investigation at this site, the results of which were presented in a report titled *Preliminary Geotechnical Investigation, SVGO – XILINX, Great Oaks Blvd and Santa Teresa Blvd, San Jose, California* dated 9 January 2015, by Langan. As part of our preliminary investigation, we advanced three CPTs, designated CPT-1 through CPT-3. The location of the CPT-1 is shown on Figure 2 (CPT-2 and CPT-3 are outside the current project site limits) and the results of CPT-1 are presented on Figure A-1 in Appendix A. Soil types were estimated using the classification chart shown on Figure A-2.

3.2 Soil Borings

Test borings, designated B-1 through B-8, were drilled at the site as part of this investigation; the approximate locations of borings B-1 through B-4 are shown on Figure 2 (B-5 through B-8 are outside the current project site limits). The borings were drilled between 28 April and 1 May 2015 by Exploration Geoservices, Inc. of San Jose, California with a truck-mounted hollow-stem auger drill rig. These borings were drilled to depths of approximately 50 feet below the ground surface (bgs). During drilling, our field engineer logged the borings and obtained representative samples of soil encountered for classification and laboratory testing. The boring logs for B-1 through B-4 are presented in Appendix B on Figures B-1 through B-4. The soil was logged in accordance with the soil classification system described on Figure B-5.

Samples were obtained using the following sampler types:

- Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch-outside diameter and a 1.5-inch-inside diameter, without liners
- Sprague and Henwood (S&H) split-barrel sampler with a 3.0-inch-outside diameter, 2.5 inch-inside diameter, lined with 2.43-inch inside diameter steel or brass tubes
- Shelby tube (ST) thin wall sampler with 3.0-inch-outside diameter and 2.875-inch-inside diameter

The sampler types were chosen on the basis of soil type and desired sample quality for laboratory testing. In general, the S&H sampler was used to obtain samples in medium stiff to very stiff cohesive soil and the SPT sampler was used to evaluate the relative density of sandy soil. The ST sampler was used to obtain relatively undisturbed samples of soft to medium stiff cohesive soil.

The SPT and S&H samplers were driven with a 140-pound, downhole wireline safety hammer falling 30 inches. The samplers were driven up to 18 inches and the hammer blows required to drive the samplers every six inches of penetration were recorded and are presented on the boring logs. A "blow count" is defined as the number of hammer blows per six inches of penetration. The blow counts required to drive the S&H and SPT samplers were converted to approximate SPT N-values using factors of 0.6 and 1.0, respectively, to account for sampler type and hammer energy and are shown on the boring logs. The blow counts used for this conversion were the last two blow counts, if the sampler was driven more than 12 inches.

The ST sampler was advanced using hydraulic pressure from the drill rig; the pressure required to advance the tube is also presented on the boring logs, measured in pounds per square inch (psi).

Upon completion, all borings were backfilled with grout consisting of cement, bentonite, and water in accordance with the requirements of the Santa Clara Valley Water District (SCVWD). The soil cuttings and drilling fluid were placed in 55-gallon drums stored temporarily at the site, tested, and eventually transported off-site for proper disposal.

3.3 Cone Penetration Tests

To supplement the soil boring information, seventeen CPTs (designated CPT-4 through CPT-20) were performed between 29 April and 1 May 2015 by Middle Earth Geo Testing; the approximate locations of CPT-4 through CPT-12 are shown on Figure 2 (CPT-13 through CPT-20 are outside the current project site limits). The CPTs were advanced to depths ranging from about 52 to 90 feet bgs.

The CPTs were performed by hydraulically pushing a 1.4-inch-diameter, cone-tipped probe, with a projected area of 10 square centimeters, into the ground. The cone tip measures tip resistance, and the friction sleeve behind the cone tip measures frictional resistance. Electrical strain gauges or load cells within the cone continuously measured the cone tip resistance and frictional resistance during the entire depth of each probing. Accumulated data was processed by computer to provide engineering information, such as the types and approximate strength characteristics of the soil encountered. The CPT logs, showing tip resistance and friction ratio by depth, as well as interpreted SPT N-Values, friction angle, soil strength parameters, and interpreted soil classification, are presented in Appendix C on Figures C-1 through C-9. Soil types were estimated using the classification chart shown on Figure C-10.

Pore pressure dissipation tests were performed at CPT-5, CPT-7, CPT-8, CPT-9, CPT-11 and CPT-15. The test results at CPT-5, CPT-7, CPT-8, CPT-9 and CPT-11 are presented in Appendix C on Figures C-11 through C-15.

After completion, the CPTs were backfilled with grout consisting of cement, bentonite, and water as required by the SCVWD.

3.4 Laboratory Testing

The samples recovered from the field exploration program were re-examined by an engineer for soil classification, and representative samples were selected for laboratory testing. Samples were tested to measure moisture content, dry density, fines contents, shear strength, plasticity (Atterberg Limits), particle size analysis, compressibility and R-value, where appropriate. Results of the laboratory tests are included on the boring logs and in Appendix D.

3.5 Soil Corrosivity Testing

To evaluate the corrosivity of the soil near the foundation subgrade, we performed corrosivity tests on samples obtained between 0 and 6 feet bgs. The corrosivity of the soil samples was evaluated by CERCO Analytical using ASTM Test Methods. The laboratory corrosion test results and a brief corrosivity evaluation are presented in Appendix E.

Based on a letter dated 14 May 2015 from Jacobs, we understand the evaluation of the electrical and thermal soil characteristics are needed for the design of the underground feeder and grounding calculations for the site.

To evaluate the electrical and soil characteristics for the project, we retained JDH Corrosion Consultants who performed field electrical resistivity testing and thermal conductivity testing at three test pits, designated TP-1 through TP-3; The locations of TP-1 and TP-2 are shown on Figure 1 (TP-3 is outside the current project site limits). The results of the electrical resistivity and thermal conductivity testing are presented in Appendix F.

3.6 Percolation Tests

During the preliminary investigation of the site, two percolation tests, designated as PC-1 and PC-2 were performed by our field engineer; the approximate location of PC-1 is shown on Figure 2 (PC-2 outside the current project site limits). The shallow test pit was hand excavated and a 12-inch-diameter casing was installed to perform the test. Approximately six inches of native sandy clay surface material was removed and the casing was set with a seal thickness of approximately three inches. The soil within the casing was pre-soaked for approximately 24 hours to reach a stabilized percolation rate. Following the presoak period, a stabilized percolation rate was recorded within 2½ hours and the tests were discontinued.

4.0 SITE AND SUBSURFACE CONDITIONS

The site is relatively level, with a ground surface elevation ranging from approximately Elevations 202 to 208 feet (Ruth and Going, 2018). The site is currently unpaved and vacant.

The borings and CPTs at the site indicate the site is underlain by alluvial deposits. The alluvial deposits generally consist of clay and silt with varying amounts of sand; the clay and silt have interbedded layers of medium dense to very dense sand with varying amounts of silt, clay and gravel.

The clay and silt layers are medium stiff to very stiff. Atterberg Limit tests on the near-surface clay soils indicate it is low to moderately expansive[3] with plasticity indices ranging from 7 to 18. Percolation tests of the near-surface soil indicate stabilized percolation rates of 0.2 inch per hour (in/hr) at PC-1 and PC-2. Consolidation tests indicate the clay and silt are overconsolidated[4] and moderately compressible with overconsolidation ratios (OCRs) of approximately 5 and 7.

Two medium dense to very dense sand layers were encountered throughout the project site. The upper sand layer was encountered at a depth of approximately 25 to 35 feet bgs and varied in thickness from approximately 3 to 5 feet along the northern portion of the site to 30 feet on the southern portion of the site. The lower sand layer was encountered at a depth of approximately 60 to 80 feet bgs and extended to the maximum depth explored.

During the investigation, groundwater was measured at approximate depths of 50 to 70 feet bgs. Historic groundwater levels have been recorded at approximately 20 to 30 feet bgs (California Division of Mines and Geology (2003); these depths correspond to approximately Elevations 175 and 185 feet. Seasonal fluctuations in rainfall influence groundwater levels and may cause several feet of variation.

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3 Moderately expansive soil undergoes moderate volume changes with changes in moisture content.

4 An underconsolidated clay has not yet achieved equilibrium under the existing load; a normally consolidated clay has completed consolidation under the existing load; and an overconsolidated clay has experienced a pressure greater than its current load.

5.0 REGIONAL SEISMICITY

The major active faults in the area are the San Andreas, Hayward, Calaveras, and San Gregorio Faults. These and other faults of the region are shown on Figure 3. For each of the active faults within about 50 kilometers of the site, the distance from the site and estimated mean characteristic Moment magnitude[5] [2007 Working Group on California Earthquake Probabilities (WGCEP) (2008) and Cao et al. (2003)] are summarized in Table 1.

TABLE 1
Regional Faults and Seismicity

Fault Segment	Approximate Distance from Site (km)	Direction from Site	Mean Characteristic Moment Magnitude
Monte Vista-Shannon	5	West	6.50
Total Calaveras	11	East	7.03
N. San Andreas - Santa Cruz	18	Southwest	7.12
N. San Andreas (1906 event)	18	Southwest	8.05
N. San Andreas – Peninsula	21	West	7.23
Zayante-Vergeles	23	Southwest	7.00
Total Hayward	25	North	7.00
Total Hayward-Rodgers Creek	25	North	7.33
Greenville Connected	37	Northeast	7.00
Ortigalita	45	East	7.10
Monterey Bay-Tularcitos	46	Southwest	7.30
San Gregorio Connected	47	West	7.50
Quien Sabe	51	Southeast	6.60

Figure 3 also shows the earthquake epicenters for events with magnitude greater than 5.0 from January 1800 through August 2014. Since 1800, four major earthquakes have been recorded on the San Andreas Fault. In 1836 an earthquake with an estimated maximum intensity of VII on the Modified Mercalli (MM) scale (Figure 4) occurred east of Monterey Bay on the San Andreas Fault (Toppozada and Borchardt 1998). The estimated Moment magnitude, $M_{w,}$ for this earthquake is about 6.25. In 1838, an earthquake occurred with an estimated intensity of about VIII-IX (MM), corresponding to a M_w of about 7.5. The San Francisco Earthquake of

5 Moment magnitude is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

1906 caused the most significant damage in the history of the Bay Area in terms of loss of lives and property damage. This earthquake created a surface rupture along the San Andreas Fault from Shelter Cove to San Juan Bautista approximately 470 kilometers in length. It had a maximum intensity of XI (MM), a M_w of about 7.9, and was felt 560 kilometers away in Oregon, Nevada, and Los Angeles. The Loma Prieta Earthquake occurred on 17 October 1989, in the Santa Cruz Mountains with a M_w of 6.9, approximately 24 km from the site.

In 1868 an earthquake with an estimated maximum intensity of X on the MM scale occurred on the southern segment (between San Leandro and Fremont) of the Hayward Fault. The estimated M_w for the earthquake is 7.0. In 1861, an earthquake of unknown magnitude (probably a M_w of about 6.5) was reported on the Calaveras Fault. The most recent significant earthquake on this fault was the 1984 Morgan Hill earthquake (M_w = 6.2).

The most recent earthquake to affect the Bay Area occurred on 24 August 2014 and was located on the West Napa fault, approximately 119 kilometers north of the site, with a M_W of 6.0.

The 2014 Working Group for California Earthquake Probabilities (WGCEP) at the U.S. Geologic Survey (USGS) predicted a 72 percent chance of a magnitude 6.7 or greater earthquake occurring in the San Francisco Bay Area in 30 years (WGCEP 2015). More specific estimates of the probabilities for different faults in the Bay Area are presented in Table 2.

TABLE 2
WGCEP (2015) Estimates of 30-Year Probability (2014 to 2043) of a Magnitude 6.7 or Greater Earthquake

Fault	Probability (percent)
Hayward-Rodgers Creek	32
N. San Andreas	33
Calaveras	25
San Gregorio	6

6.0 SEISMIC HAZARDS

During a major earthquake, strong to violent ground shaking is expected to occur at the project site. Strong ground shaking during an earthquake can result in ground failure such as that associated with soil liquefaction,[6] lateral spreading,[7] and cyclic densification[8]. Each of these conditions has been evaluated based on our literature review, field investigation and analysis, and are discussed in this section.

6.1 Liquefaction and Liquefaction-Induced Settlement

The site is an area designated by the California Geological Survey (formerly California Division of Mines and Geology) as a zone of potential liquefaction (CDMG 2003). Specifically, the map shows the site is in an area "where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693 (c) would be required."

Flow failure, lateral spreading, differential settlement, loss of bearing strength, ground fissures, and sand boils are evidence of excess pore pressure generation and liquefaction.

We performed our liquefaction analysis in accordance with the State of California Special Publication 117A, Guidelines for Evaluation and Mitigation of Seismic Hazards in California and following the procedures presented in the 1996 NCEER and the 1998 NCEER/NSF workshops on the Evaluation of Liquefaction Resistance of Soils (Youd et.al, 2001). The NCEER methods are updates of the simplified procedures developed by Seed et al. (1971). To estimate volumetric strain and associated liquefaction-induced settlement, we used the CLiq[9] software program (GeoLogismiki Geotechnical Software, 2015).

These methods are used to estimate a factor of safety against liquefaction triggering by taking the ratio of soil strength (resistance of the soil to cyclic shaking) to the seismic demand that can

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6 Liquefaction is a transformation of soil from a solid to a liquefied state during which saturated soil temporarily loses strength resulting from the buildup of excess pore water pressure, especially during earthquake-induced cyclic loading. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits.

7 Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.

8 Cyclic densification is a phenomenon in which non-saturated, cohesionless soil is densified by earthquake vibrations, causing ground-surface settlement.

9 CLiq is software for the assessment of soil liquefaction using CPT/CPTU data. CLiq was developed in collaboration with Gregg Drilling & Testing Inc. and Professor Peter Robertson. CLiq addresses issues such as cyclic softening in clay-like soils and thin layer/layer transition zone detection. CLiq provides output results by applying the state-of-the-art methods (e.g. Youd et al, 2001) along with the calibrated procedures for post-earthquake displacements (e.g. Zhang et al 2002 & 2004).

be expected from a design level seismic event. Specifically, two distinct terms are used in the liquefaction triggering analyses:

- Cyclic Resistance Ratio (CRR), which quantifies the soil's resistance to cyclic shaking; a function of soil depth, density, depth of groundwater, earthquake magnitude, and overall soil behavior

- Cyclic Stress Ratio (CSR), which quantifies the stresses that may develop during cyclic shaking.

The factor of safety (FS) against liquefaction triggering can be expressed as the ratio of CRR over CSR. For our analyses, if the FS for a soil layer is less than 1.3, it is considered possible that the soil layer may liquefy during a large seismic event. For our calculations of estimated liquefaction-induced settlement, we assumed layers with a FS equal to or greater than 1.3 will not experience liquefaction-induced settlement.

CRR calculations are based on SPT blow counts and/or CPT tip resistance. The CPT tip pressures were normalized/corrected for overburden pressure, fines content, and thin layers, where appropriate. The CPT method also utilizes the soil behavior type index (I_C) and the exponential factor "n" applied to the Normalized Cone Resistance "q" to evaluate the cohesive nature of the soil. All of these are included in our analyses.

The CSR is obtained using the equations presented in the NCEER paper and is based on the density of the soil, the depth to design groundwater, the estimated peak horizontal acceleration at the ground surface (a_{max}), and a stress reduction coefficient (r_d).

For the liquefaction study for this project site, the data from the borings and CPTs were used for the liquefaction settlement analyses. The primary design parameters used in our liquefaction triggering calculations are partially based on the recommended values presented in the "Seismic Hazard Zone Report and Map for the Santa Teresa Hills 7.5-Minute Quadrangle, Santa Clara County, California; Seismic Hazards Zone Report 097" and are summarized in Table 3.

TABLE 3
Values Used in Liquefaction Evaluation

Parameter	Value
Depth to estimated high groundwater	Approximately 25 feet below Ground surface
Peak Ground Acceleration (PGA_M)	0.574g*
Predominant Earthquake Moment Magnitude (M_w)	6.36*
Factor of Safety for Liquefaction Triggering	1.3
CPT conversion factor for tip resistance to SPT N-value	4 to 5

* PGA_w obtained from USGS website for USGS Hazard Data from 2010 ASCE 7-10 and corresponds to a Maximum Considered Earthquake (MCE). The M_w was obtained from the USGS Interactive Deaggregations website (USGS, 2015).

In our analyses soil that has significant amount of plastic fines, I_c greater than 2.6 were considered too cohesive to liquefy; a corrected cone tip resistance q_{c1N} greater 160 tons per square foot (tsf) were considered too dense to liquefy. Because the predominant earthquake is a moment magnitude 6.36, the cyclic resistance ratio (CRR) has been scaled to a moment magnitude of 7.5 using magnitude scaling factors developed by Idriss (Youd and Idriss, 2001).

We understand State guidelines (SCEC, 1999) recommend a minimum depth of 50 feet below lowest proposed finished grade for evaluation of liquefaction potential.

We evaluated the potential for liquefaction and lateral spreading using the data from the borings and CPTs. Layers of loose to medium dense sand with varying amounts of clay and silt, were encountered from the highest recorded groundwater level to approximately 50 feet bgs.

On the basis of the results of our analyses, we conclude these layers could potentially liquefy during a major earthquake and may experience liquefaction-induced settlement. A summary of our boring and CPT data, as well as other pertinent parameters regarding liquefaction triggering and associated settlement, are presented in Tables 4 and 5.

TABLE 4
Summary of Liquefaction Potential and Estimated Settlement from CPT Results

CPT Number	Approx. Depth (feet)	Layer Thickness (feet)	$Q_{tn,cs}$ (tsf)	I_c	CSR*	$CRR_{7.5}$	Factor of Safety	Volumetric Strain ε_v (%)	Estimated Settlement (in)
CPT-1	32.2	0.2	139.0	2.5	0.28	0.33	1.18	0.33	0.01
	33.5	0.6	132.8	2.5	0.28	0.30	1.05	0.67	0.05
Total Estimated Settlement at CPT-1									**0.06**
CPT-2	28.0	0.7	120.3	2.6	0.26	0.24	0.92	1.16	0.10
Total Estimated Settlement at CPT-2									**0.10**
CPT-3	27.1	0.3	129.0	2.6	0.26	0.28	1.08	0.47	0.02
	28.5	0.1	127.2	2.6	0.27	0.27	1.02	0.71	0.01
	31.0	1.1	127.2	2.5	0.28	0.27	0.99	0.90	0.11
	35.3	0.1	102.1	2.2	0.29	0.18	0.62	2.30	0.02
Total Estimated Settlement at CPT-3									**0.16**
CPT-5	30.5	0.7	118.0	2.5	0.27	0.23	0.86	1.43	0.11
Total Estimated Settlement at CPT-5									**0.11**
CPT-6	25.4	0.2	135.3	2.3	0.25	0.31	1.24	0.33	0.01
	26.6	0.5	116.2	2.5	0.26	0.23	0.88	1.26	0.07
	28.1	0.2	96.3	2.6	0.26	0.16	0.62	2.41	0.05
Total Estimated Settlement at CPT-6									**0.13**
CPT-7	27.6	1.5	118.2	2.5	0.26	0.23	0.89	1.32	0.23
	32.2	0.2	98.9	2.3	0.28	0.17	0.61	2.36	0.05
Total Estimated Settlement at CPT-7									**0.28**
CPT-8	28.7	0.5	114.8	2.4	0.27	0.22	0.83	1.54	0.09
	29.9	0.5	126.5	2.5	0.27	0.27	0.99	0.71	0.04
Total Estimated Settlement at CPT-8									**0.14**
CPT-9	27.4	2.1	111.8	2.4	0.26	0.21	0.80	1.70	0.43
	29.9	0.3	104.9	2.5	0.27	0.19	0.70	2.25	0.09
Total Estimated Settlement at CPT-9									**0.52**
CPT-10	31.2	0.2	116.1	2.2	0.27	0.23	0.82	1.63	0.03
	32.0	0.3	105.6	2.3	0.28	0.19	0.69	2.23	0.09
Total Estimated Settlement at CPT-10									**0.12**
CPT-11	25.3	2.0	112.6	2.3	0.25	0.21	0.84	1.52	0.36
	28.5	0.2	112.9	2.4	0.26	0.21	0.81	1.70	0.03
	30.7	0.6	115.7	2.5	0.27	0.22	0.82	1.55	0.12
Total Estimated Settlement at CPT-11									**0.51**

TABLE 4
Summary of Liquefaction Potential and Estimated Settlement from CPT Results (Continued)

CPT Number	Approx. Depth (feet)	Layer Thickness (feet)	$Q_{tn,cs}$ (tsf)	I_c	CSR*	$CRR_{7.5}$	Factor of Safety	Volumetric Strain ε_v (%)	Estimated Settlement (in)
CPT-12	25.1	1.6	96.1	2.3	0.25	0.16	0.65	2.38	0.47
	27.4	0.3	105.6	2.6	0.26	0.19	0.73	2.23	0.09
	28.7	1.3	92.9	2.5	0.27	0.15	0.58	2.48	0.39
	30.8	0.5	100.2	2.4	0.27	0.17	0.63	2.34	0.14
								Total Estimated Settlement at CPT-12	**1.09**
CPT-13	25.3	2.1	119.2	2.0	0.25	0.24	0.95	1.06	0.27
	34.0	2.3	126.5	2.2	0.29	0.27	0.94	1.01	0.28
								Total Estimated Settlement at CPT-13	**0.55**
CPT-14	29.4	0.8	122.5	1.8	0.27	0.26	0.95	1.17	0.11
	35.6	0.3	114.7	2.0	0.29	0.22	0.76	1.66	0.07
								Total Estimated Settlement at CPT-14	**0.18**
CPT-15	25.1	1.3	109.5	1.8	0.25	0.21	0.84	1.68	0.26
	27.4	0.7	136.1	1.9	0.26	0.32	1.21	0.31	0.02
	30.2	1.1	124.3	2.2	0.27	0.26	0.96	0.94	0.13
								Total Estimated Settlement at CPT-15	**0.42**
CPT-16	28.1	1.0	99.8	2.1	0.26	0.18	0.66	2.15	0.25
	33.3	0.2	105.0	2.6	0.28	0.19	0.66	2.25	0.04
	36.3	0.5	141.1	1.8	0.29	0.34	1.18	0.36	0.02
								Total Estimated Settlement at CPT-16	**0.32**
CPT-17	25.1	1.0	77.0	2.3	0.25	0.12	0.49	2.90	0.34
	28.1	0.2	141.8	1.7	0.26	0.35	1.32	0.23	0.00
								Total Estimated Settlement at CPT-17	**0.34**
CPT-18	28.4	0.7	109.8	2.1	0.26	0.20	0.77	1.86	0.15
	33.3	1.3	113.9	2.2	0.28	0.23	0.80	1.69	0.27
	41.0	0.5	147.0	1.8	0.30	0.38	1.27	0.25	0.01
	44.6	1.2	130.9	1.9	0.30	0.29	0.98	0.83	0.11
								Total Estimated Settlement at CPT-18	**0.54**
CPT-19	27.2	1.0	119.3	2.0	0.26	0.24	0.92	1.17	0.14
	30.2	0.3	95.3	2.6	0.27	0.16	0.59	2.43	0.10
	34.3	0.2	101.5	2.0	0.28	0.18	0.62	2.31	0.05
								Total Estimated Settlement at CPT-19	**0.28**
CPT-20	26.1	0.7	92.1	2.5	0.25	0.15	0.60	2.50	0.20
	32.0	0.3	121.0	2.3	0.28	0.26	0.92	1.30	0.05
	34.3	0.3	108.1	2.2	0.28	0.21	0.74	1.65	0.07
	46.3	1.2	132.0	2.0	0.30	0.30	1.00	0.80	0.11
								Total Estimated Settlement at CPT-20	**0.42**

TABLE 5

Summary of Liquefaction Potential and Estimated Settlement from Logs of Boring Data

Boring Number	Approx. Depth (feet)	Elevation of top of layer (feet)	Layer Thickness (feet)	$(N_1)_{60\text{-}CS}$	CSR_{EQ}	$CRR_{7.5}$	Factor of Safety	Volumetric Strain e_v (%)	Estimated Vertical Settlement (in)
B-1	28	176.1	2	11	0.37	0.12	0.50	2.5	0.6
	41	163.1	2.5	15	0.39	0.16	0.65	1.9	0.6
	48	156.1	1.5	14	0.38	0.15	0.61	2.0	0.4
								Total Estimated Settlement at B-1	1.5
B-2	25	178.4	3.5	20	0.35	0.22	0.95	1.6	0.7
	28.5	174.9	1.5	18	0.37	0.19	0.80	1.7	0.3
	33	170.4	2	16	0.38	0.17	0.67	1.9	0.4
								Total Estimated Settlement at B-2	1.4
B-3	28.5	179.2	4.5	20	0.37	0.22	0.90	1.5	0.8
	33	174.7	1.5	17	0.38	0.18	0.72	1.79	0.3
	34.5	173.2	0.5	11	0.39	0.12	0.49	2.46	0.1
								Total Estimated Settlement at B-3	1.3
B-4	25	176.7	2.5	16	0.35	0.17	0.75	1.9	0.6
	27.5	174.2	2.5	12	0.36	0.13	0.56	2.3	0.7
	30	171.7	3	13	0.37	0.14	0.58	2.2	0.8
								Total Estimated Settlement at B-4	2.0
B-5	27	176.7	2.5	19	0.36	0.21	0.87	1.6	0.5
								Total Estimated Settlement at B-5	0.5
B-6	38.5	162	4.5	23	0.39	0.25	0.98	1.4	0.7
								Total Estimated Settlement at B-6	0.7
B-7	25	176.8	2.5	26	0.35	0.30	1.29	1.0	0.3
	49	152.8	1	16	0.37	0.17	0.69	1.9	0.2
								Total Estimated Settlement at B-7	0.5
B-8	25	178.6	3.5	16	0.35	0.18	0.77	1.9	0.8
								Total Estimated Settlement at B-8	0.8

We conclude the potential for soil liquefaction is likely during a major earthquake, and estimate up to approximately 2-inches of liquefaction-induced settlement could occur at the site. Because the potentially liquefiable layers vary in thickness, we estimate that up to one-inch of differential settlement could occur during an earthquake over a horizontal distance of 50 feet.

6.2 Lateral Spreading

Lateral spreading is a phenomenon in which a surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. The surficial blocks are transported downslope or in the direction of a free face, such as a channel, by earthquake and gravitational forces. Lateral spreading is generally the most pervasive and damaging type of liquefaction-induced ground failure generated by earthquakes.

The site is relatively flat, the potentially liquefiable soils are relatively deep and there is no open face slope, hence, we conclude widespread shear zones should not develop for significant lateral displacements to occur during liquefaction. Furthermore, lateral spreading was not reported to have occurred at the site during the 1906 or 1989 earthquakes. Therefore, lateral spreading is not likely to affect the site.

6.3 Cyclic Densification

Cyclic densification refers to seismically-induced differential compaction of non-saturated granular material (sand and gravel above the groundwater table) caused by earthquake vibrations. The borings and CPTs indicate that the materials above the design water table are predominantly composed of stiff to very stiff clayey soils, and therefore the potential for cyclic densification at the site is low.

6.4 Ground Rupture

Historically, ground surface ruptures closely follow the traces of geologically young faults. The site is not within an Earthquake Fault Zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Act and no known active or potentially active faults exist on the site. Therefore, we conclude the risk of fault offset at the site from a known active fault is low. In a seismically active area, the remote possibility exists for future faulting in areas where no faults previously existed; however, we conclude the risk of surface faulting and consequent secondary ground failure is low.

7.0 DISCUSSION AND CONCLUSIONS

From a geotechnical standpoint, we conclude it is feasible to develop the site provided our recommendations are incorporated into the design. The main geotechnical issues which should be addressed during design are the potential detrimental effects of the moderately expansive surficial soil on foundations and slab-on-grade, and static and liquefaction-induced settlements. Our conclusions regarding these and other issues are discussed in the following sections.

7.1 Foundations and Settlement

The primary geotechnical consideration regarding foundation types is the presence of the moderately compressible clay at depth and the potential for liquefaction-induced settlements. Using the dead plus live column loads provided by Paradigm, we estimate that settlements for a shallow foundation system from static loads would range from about 1 to 2 inches. In addition, as discussed in Section 6.1, we estimate that up to 2 inches of liquefaction-induced settlement may occur during a major earthquake. After discussing these settlements with the project structural engineer, we understand that they were not tolerable. Therefore, we conclude that the building will need to be supported on a deep foundation system.

We considered both drilled cast-in-place concrete pier and driven piles as potential foundation systems; however, because of the relatively high groundwater table and cohesionless layer, which may require casing and/or drilling slurry, and cost associated with drilled piers and the noise and vibrations associated with driven piles, we conclude these foundations are not appropriate for this site. Drilled, displacement-type pile systems, such as auger-cast piles, which are low-vibration, low-noise, deep foundation options, are suitable alternatives for the site. These pile types are designed and installed by specialty contractors. If these pile types are used they will need to be tested to confirm the design values.

Auger-cast piles are installed by drilling to the required depth with a hollow-stem, continuous-flight auger. When the auger reaches the required depth, cement grout or concrete is injected through the bottom port of the hollow stem auger. Grout or concrete is injected continuously as the augers, still rotating in a forward direction, are slowly withdrawn, replacing the soil removed by the drilling operation. While the grout is still fluid, a steel reinforcing cage is inserted into the shaft. Auger-cast piles can range in diameter; however, 16-inch diameter auger-cast displacement piles are typical.

Auger-cast displacement piles are similar in type and installation method to the non-displacement piles except that they have a reverse tread on the auger which results in displacement and densification of the surrounding soil.

7.2 Expansive Soil Considerations

The near-surface soil has a moderate expansion potential. Moisture fluctuations in expansive soil could cause the soil to expand or contract resulting in movement and potential damage to improvements that overlie them. Potential causes of moisture fluctuations include drying during construction, and subsequent wetting from rain, capillary rise, landscape irrigation, and type of plant selection.

For improvements at-grade, the volume changes from expansive soils can cause cracking of foundations, floor slabs and exterior flatwork. Therefore, foundations, slabs and concrete flatwork should be designed and constructed to resist the effects of the expansive soil. These effects can be mitigated by moisture conditioning the expansive soil and providing select, non-expansive fill below interior and exterior slabs and supporting foundations below the zone of severe moisture change.

7.3 Floor Slabs

The most significant geotechnical issues for the floor slabs are the presence of the near-surface moderately expansive clay and the potential for seismically induced settlement. Provided the seismically induced settlements discussed in Section 6.1 are tolerable, a slab on grade floor may be used; increasing the slab stiffness and additional reinforcing may be required to span localized areas that may settle during an earthquake. Alternatively, if the slab cannot tolerate settlement then the slab should be designed as a structural slab spanning between pile caps. The type of structural performance of the slab and associated costs will determine the slab type.

As previously discussed in Section 7.2, the near-surface soils are moderately expansive. Because historic groundwater has been documented at depths of approximately 20 to 30 feet bgs, seasonal groundwater fluctuations are unlikely to significantly affect moisture content in the moderately expansive clay at shallow depths. However, surficial water from rainfall and/or irrigation could increase moisture content in the near-surface soil. These effects can be mitigated by moisture conditioning the expansive soil and providing a sufficient thickness of select, non-expansive fill below interior and exterior slabs. Water should be drained away from foundations and slabs to reduce infiltration of water. Furthermore a continuous perimeter grade would help reduce moisture changes in the soil beneath the building.

7.4 Percolation Tests

We understand the site or a portion of the site may be used for detention and discharge. The surface soil consists of primarily of clay. The two percolation tests indicate percolation rates of less than ½-inch per hour. On the basis of these results, we estimate the surface clay has very low permeability. Low permeability soil is not suitable for a detention system;

therefore, if a detention/discharge system is needed, engineering methods such as drain pipes and gravel blankets will need to be utilized for water drainage and underground storage.

7.5 Construction Considerations

The near-surface soil is fine grained. The shear strength and overall stability of the fine-grained soil is related to the moisture content of the soil; this type of soil loses strength when wet. Therefore, site preparation and grading may be difficult if performed during the rainy season. The grading contractor should be prepared to repair weak and wet subgrade, if required.

Some spoils will be generated during installation of auger-cast piles and excavation of footings, pile caps or grade beams. Since the site appears to have been an orchard, the upper few feet of soil could potentially contain pesticides. An environmental consultant should be retained to evaluate the land use and presence of any hazardous substances. If the soil is determined to be hazardous, then special procedures for handling and disposal of the soil may be required.

8.0 RECOMMENDATIONS

From a geotechnical standpoint, the project may be constructed as planned, provided the recommendations presented in this section of the report are incorporated into the design and contract documents. Recommendations for site preparation, grading, foundation design, floor slabs, fill placement and seismic design are presented in this section of the report.

8.1 Pile Foundations

The proposed building may be supported on a deep foundation system consisting of drilled or displacement-type auger-cast piles. The piles will primarily gain capacity from friction in clayey soil and end bearing in the dense sand and gravel layers beneath a depth of about 50 to 65 feet. Preliminary recommendations for the design of drilled piles are provided in the following subsections.

8.1.1 Axial Capacity

The proprietary drilled displacement pile types discussed in Section 7.1 are installed by design-build or specialty contractors and we cannot provide specific recommendations for their design. These pile types should be spaced at least three pile diameters center-to-center, to prevent vertical capacity reductions due to pile interaction effects; the outer auger-tip diameter should be used when determining the pile spacing.

In 2009, 16-inch diameter auger pressure grouted displacement (APGD) piles for the Equinix SV5 ibx Data Center (Equinix SV5) located ½ mile north of the project site were installed. Based on the results of the pile load test[10] for the Equinix SV5 site, the 16-inch diameter APGDs (56 to 58 feet in length) were tipped in a dense sand and tested with ultimate capacities of 540 kips.

Typically the lengths of APGDs are about 60 feet. Greater lengths may be used, but it may slow down production and limit the number of capable contractors. Based on the subsurface data from our borings and CPTs, we estimate piles approximately 60 feet in length within the majority of the site (Zone 1 on Figure 5) will gain capacity primarily in skin friction and the piles in Zone 2 on Figure 5 will gain capacity primarily in end bearing in the lower dense sands approximately 50 to greater than 60 feet bgs. Table 6 presents our preliminary pile capacities for the piles in the various zones. If practical the piles in Zone 1 can be lengthened to gain embedment in the lower sand layer estimated to be 60 to 75 feet deep, and designed for the end bearing capacity in Zone 2. Final design axial pile capacities for APGDs should be determined by the specialty/design building contractors.

TABLE 6
Preliminary Pile Capacities

Pile Type	Pile Zone[1]	Approximate Pile Length (feet)	Ultimate Capacity (kips)	Allowable Dead Plus Live Load Capacity[2] (kips)	Allowable Uplift Capacity (kips)[3]
16-inch-diameter ACDPs	Zone 1 (skin friction)	60[4]	220[4]	110[4]	145
	Zone 2 (end bearing)	50 to 60	540	270	120

Notes:
1. The locations of the Pile Zones are presented on Figure 5
2. The allowable dead plus live load axial capacities include a factor of safety (FS) of at least 2. The allowable dead plus live load capacities may be increased by one-third for total loads, including wind or seismic forces.
3. Allowable Uplift Capacity includes a FS of 1.5 for temporary load. A FS of 2 should be applied for permanent loads.
4. The capacity of the Zone 1 piles may be increased to Zone 2 capacity if the piles are lengthened and embedded in a bearing layer.

10 "Auger Pressure Grouted Displacement (APGD) Piles Load Test Report with Design and Construction Recommendations, EQUINIX SV5 ibx DATA CENTER," 9 Great Oaks Blvd., San Jose, CA 95119, dated 21 December 2009 (Berkel, 2009)

Piles should be spaced at least three pile diameters center-to-center, to prevent vertical capacity reductions due to pile interaction effects; the outer auger-tip diameter should be used when determining the pile spacing for APGD piles. The piles should also be designed to account for the presence of moderately corrosive soil (see Appendix E); a corrosion consultant should be retained to provide specific recommendations regarding the long term corrosion protection of pile elements.

Final design capacities should be verified by a test program. We recommend at least two compression and one tension pile load tests should be performed per 2016 CBC Section 1810.3.3.1.2. One compression load test should be performed in Zone 1 and one in Zone 2. The tension load test should be performed on the pile in Zone 1.

8.1.2 Lateral Load Resistance

The piles should develop lateral resistance from the passive pressure acting on the upper portion of the piles and their structural rigidity. The allowable lateral capacity of the piles depends on:

- the pile stiffness
- the strength of the surrounding soil
- axial load on the pile
- the allowable deflection at the pile top and the ground surface
- the allowable moment capacity of the pile.

We have evaluated the lateral capacity of a 16-inch-diameter APGD pile for 1/2-inch deflection at the pile head. For a free-head condition, the pile top is free to move laterally and rotate. For a fixed-head condition, the pile top is restrained from rotating but free to move laterally. Preliminary deflection and moment profiles for a single 16-inch-diameter APGD pile are presented on Figures 6 and 7, respectively. Final design lateral pile capacities for APGD piles should be determined by the specialty/design building contractors after the pile type has been chosen.

The lateral capacities are for single piles only. To account for group effects, the lateral load capacity of a single pile should be multiplied by the appropriate reduction factors shown in Table 7. However, the maximum moment for a single pile with an unfactored load should be used to check the design of individual piles in a group. The reduction factors are based on a minimum center-to-center spacing of three pile widths. Where piles are spaced at least eight pile diameters in all directions, no group reduction factors need to be applied. Reduction for other pile group spacing can be provided once the number and arrangement of piles are known.

TABLE 7
Lateral Group Reduction Factors

Number of Piles within Pile Cap	Lateral Group Reduction Factor
2	0.9
3 to 5	0.8
$\geq$6	0.7

Additional lateral load resistance can be developed by passive resistance acting against the faces of the pile caps and grade beams. We estimate passive resistance may be calculated using an equivalent fluid weight of 270 pounds per cubic foot (pcf). The upper foot should be ignored unless it is confined by a slab. If there is insufficient lateral capacity from the piles, pile caps, and grade beams, the lateral capacity of the system can be increased by adding piles or deepening grade beams.

If increased lateral resistance is needed pile caps and grade beams could be deepened and/or additional "short piles" or intermediate grade beams could be added for lateral resistance.

8.1.3 APGD Construction Considerations

We recommend that before production APGD pile lengths are selected, indicator piles be installed to: 1) evaluate predrilling requirements, if any, and 2) estimate production pile lengths. We recommend a minimum of eight indicator piles be installed within the footprint of the SV12 building to help evaluate the installation and depth of potential end bearing layers. We expect the indicator piles can be used as production piles if installed in the proper location and are not damaged during installation or testing. If indicator piles are to be abandoned following the indicator program, then the indicator piles should be located at least seven pile diameters (center-to-center) from production pile locations. Indicator piles should be installed with the same equipment and using the same procedure, including predrilling depth and predrill auger diameter, that will be used for production piles.

8.1.3.1 Pile Load Test Program

We recommend load tests of the APGD piles be performed to confirm the axial compression and tensile pile capacities. We recommend a minimum of one compression test be performed in each zone (Zone 1 and Zone 2) and one tension test in Zone 1 for each proposed production pile installation methodology (i.e. rig type, predrilling depth and diameter, pile length, etc.). The test pile locations should be selected by the geotechnical engineer and approved by the structural engineer. The compression load tests should be performed in accordance with ASTM D1143-07, Standard Test Method for Piles Under Static Axial Compressive Load, "Quick Load Test Procedure" and the tension tests should be performed in accordance with ASTM D3689-07. Equipment used for the test (load frame, jacks, and reaction piles) should be capable of applying at least 2 times the allowable dead plus live design load and at least 1.5 times the total load. The Davisson Method or other accepted criteria per the 2016 California Building Code should be used to interpret the ultimate capacities of the piles.

8.1.3.2 Pile Installation Work Plan

A work plan describing the proposed APGD installation equipment and methodology, including, but not limited to, predrilling depth, diameter of auger used for predrilling, pile diameter and pile length, as well as the proposed pile load test set-up and procedure should be submitted to the Geotechnical Engineer for review and approval at least five working days prior to the indicator pile and pile load test programs. The work plan should include a site plan showing the locations of indicator test and reaction piles relative to permanent foundation elements and a drawing showing the layout of the load test set up. Following the completion of pile load tests, the Geotechnical Engineer will require at least three working days to review and evaluate the load test results and propose recommendations for production pile installation.

Additional pile load tests will be required if, during production pile installation, the equipment or installation procedure deviates from the approved work plan and indicator pile load test program.

8.2 Site Preparation

Site demolition should include the removal of pavements, utility lines, wells, and other below-grade improvements, if any, that will interfere with the proposed construction. Where the proposed building is to be pile supported, it will be necessary to remove any obstructions that will interfere with installation of the piles and construction of the pile caps. It may be possible to leave some obstructions in place; however, this should be determined on a case-by-case basis. Excavations resulting from demolition activities should be backfilled according to the recommendations provided in Section 8.3.

We anticipate excavations for this project can be made using conventional earth-moving equipment. Any previous structures which may have occupied the site may have buried foundations and other obstructions, which may be encountered during excavations and/or predrilling. Hoe rams or jack hammers may be required to break up large pieces of concrete, if present.

Where utilities to be removed extend off site, they should be capped or plugged with grout at the property line. It may be feasible to abandon utilities in-place, provided they will not impact future utilities or building foundations. If utilities are abandoned in-place, they should be completely filled with flowable cement grout over their entire length. Existing utility lines encountered during construction should be addressed on a case-by-case basis.

8.3 Earthwork

Building pads for the at-grade building and exterior concrete slab areas outside the existing building pad should be excavated, if necessary, to provide a minimum of 12 inches of select fill. The excavations should extend at least five feet beyond the building footprint and two feet beyond the edge of exterior slabs. Prior to placing fill, the subgrade exposed after stripping and site clearing, as well as other portions of the site that will receive new fill or site improvements, should be scarified to a depth of at least eight inches. If moderately expansive soil is exposed, it should be moisture-conditioned to at least three percent above the optimum moisture content, and compacted to at least 88 percent relative compaction[11]. Otherwise, if the soil has low expansion potential it should be moisture conditioned to near optimum and compacted to at least 90 percent relative compaction. An exception to this general procedure occurs within the proposed pavement areas, where the upper six inches of the pavement subgrade should be moisture conditioned to near optimum and compacted to at least 95 percent relative compaction. If areas of weak soil are encountered during subgrade preparation, we recommend the proposed building pads and pavement areas be repaired by using one of the subgrade repair options presented later in this section.

The soil subgrade should be kept moist to prevent desiccation cracks until it is covered by select fill. After an area is exposed by stripping and/or excavation, it should be evaluated for

[11] Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the ASTM D1557-07 laboratory compaction procedure.

stability. Stable soils, when properly prepared, should be smooth and non-yielding under the weight of typical grading equipment such as a full water truck.

Any select fill placed during grading should meet the following criteria:

- be free of organic matter
- contain no rocks or lumps larger than three inches in greatest dimension
- have a low expansion potential (defined by a liquid limit of less than 40 and plasticity index lower than 12)
- have a low corrosion potential[12]
- be approved by the geotechnical engineer.

All fill placed beneath building pads and other improvements should meet the criteria for select fill listed above. All fill should be moisture-conditioned to above optimum moisture content, placed in horizontal lifts not exceeding eight inches in loose thickness, and be compacted to at least 90 percent relative compaction, except fill that is placed within the proposed pavement areas. In pavement areas or beneath slabs-on-grade, the upper six inches of the soil subgrade, any select fill and aggregate baserock materials should be compacted to at least 95 percent relative compaction. Where used, sand containing less than 10 percent fines (particles passing the No. 200 sieve) should also be compacted to at least 95 percent relative compaction. Samples of on-site and proposed import fill materials should be submitted to the geotechnical engineer for approval at least three business days prior to use at the site.

If weak soft subgrade is encountered during grading, it should be repaired using one of the following options:

Subgrade Repair Option 1 – Moisture-Conditioning and Compaction

Scarifying the exposed subgrade to a depth of 8 to 12 inches, moisture-conditioning (wetting or drying) the soil to near the optimum moisture content, and compacting the soil to at least 90 percent relative compaction in areas where nonexpansive soil is present or at least 88 percent relative compaction, if expansive soil is present. Typically, this option is the least expensive to implement, but it requires several days to weeks of dry, warm weather to facilitate the moisture-conditioning process.

12 Low corrosion potential is defined as a minimum resistivity of 2,000 ohms-cm and maximum sulfate and chloride concentrations of 250 parts per million.

Subgrade Repair Option 2 – Lime or Cement Admixture

Thoroughly mixing a lime-based admixture into the subgrade at a concentration of 4 to 5 percent of the dry weight of the soil being treated; allowing the lime admixture to react with the wet soil for at least 12 hours, re-mixing and moisture-conditioning the soil to above the optimum moisture content, and compacting the lime-treated material to at least 90 percent relative compaction.

Subgrade Repair Option 3 – Overexcavation and Filling

Weak wet soil can be excavated and removed to expose firm subgrade or excavated to a depth of 12 to 24 inches bgs (or as recommended by our field engineer). A layer of geotextile tensile fabric (Mirafi 500X or equivalent) can then be placed over the sides and bottom of the excavation and the excavation backfilled with Caltrans Class 2 AB or other suitable granular material, if approved by the geotechnical engineer. The upper 12 inches of the Class 2 AB should be compacted to at least 95 percent relative compaction. Alternatively, the excavation can be backfilled with Controlled Density Fill (CDF), sand-cement slurry, or lean cement with a 28-day unconfined compressive strength of at least 50 pounds per square inch (psi).

The most appropriate subgrade repair option will depend on the time of year site grading commences and the time available to allow drying of the soil. We will provide recommendations for subgrade stabilization on a case-by-case basis. We recommend a non-vibratory roller be used to compact weak and/or wet subgrade soil and any fill placed over wet subgrades.

8.4 Utilities

Utilities should be designed to accommodate the estimated settlement. Flexible connections which allow for up to three inches of differential movement (static and earthquake-induced settlement) should be used as needed.

The corrosivity results provided in Appendices E and F of this report should be reviewed and corrosion protection measures used if needed. We recommend a corrosion engineer be retained when detailed corrosion protection recommendations are needed.

Utility trenches should be excavated a minimum of four inches below the bottom of pipes or conduits and have clearances of at least four inches on both sides. Where necessary, trench excavations should be shored and braced, in accordance with all safety regulations, to prevent cave-ins. Where sheet piling is used as shoring, and is to be removed after backfilling, it should be placed a minimum of two feet away from the pipes or conduits to prevent disturbance to them as the sheet piles are extracted. It may be difficult to drive sheet piles through rubble in the fill. Where trenches extend below the groundwater level, it will be necessary to dewater to keep the trench base from softening and to allow for placement of the pipe utilities and backfill.

Backfill for utility trenches should be compacted according to the recommendations presented for the general site fill. Jetting of trench backfill is not permitted. To provide uniform support, pipes or conduits should be bedded on a minimum of four inches of sand or fine gravel. After pipes and conduits are tested, inspected (if required), and approved, they should be covered to a depth of six inches with sand or fine gravel, which should then be mechanically tamped. Backfill should be placed in lifts of eight inches or less, moisture-conditioned, and compacted to at least 90 percent relative compaction. If sand or gravel with less than 10 percent fines (particles passing the No. 200 sieve) is used, it should be compacted to 95 percent relative compaction.

Where utility trenches backfilled with sand or gravel enter the building pads, an impermeable plug consisting of native clay or lean concrete, at least five feet in length, should be installed at the building line. Further, where sand- or gravel-backfilled trenches cross planter areas and pass below asphalt or concrete pavements, a similar plug should be placed at the edge of the pavement. The purpose of these plugs is to reduce the potential for water to become trapped in trenches beneath the building or pavements. This trapped water can cause heaving of soils beneath slabs and softening of subgrade soil beneath pavements.

Special care should be taken in controlling utility backfilling in pavement areas. Poor compaction may cause excessive settlements, resulting in damage to exterior improvements.

8.5 Floor Slabs

Slabs-on-grade may be considered for the at-grade portion for building floors where deep foundations will be used. Where slabs-on-grade are used, we recommend a minimum of 12 inches of select fill be placed beneath the slabs-on-grade because of the highly expansive near-surface soil. During an earthquake, up to 1¼ inches of seismically induced settlement is estimated. The settlement is expected to be erratic and may cause the slab to crack and settle unevenly. If this is not tolerable, then a structural slab should be used that spans between pile caps and grade beams. If a structural slab is selected then the select fill may be neglected.

Where slab-on-grade floors are to be cast, the soil subgrade should be scarified to a depth of six inches, moisture conditioned to near optimum moisture content, and rolled to provide a firm, unyielding surface compacted to at least 95 percent relative compaction. If the subgrade is disturbed during excavation for foundation elements or utilities, it should be re-rolled. Soft, disturbed materials should be excavated and removed during final subgrade preparation.

Moisture is likely to condense on the underside of the ground floor slabs, even though it will be above the groundwater table. Consequently, a moisture barrier should be considered if movement of water vapor through the slab would be detrimental to its intended use such as commercial or storage space.

A typical moisture barrier consists of a capillary moisture break and a water vapor retarder. A capillary moisture break consists of at least four inches of clean, free-draining gravel or crushed rock. The vapor retarder should meet the requirements for Class C vapor retarders stated in ASTM E1745-97. The vapor retarder should be placed in accordance with the requirements of ASTM E1643-98. These requirements include overlapping seams by six inches, taping seams, and sealing penetrations in the vapor retarder. The vapor retarder should be covered with two inches of sand to aid in curing the concrete and to protect the vapor retarder during slab construction. The particle size of the gravel/crushed rock and sand should meet the gradation requirements presented in Table 8.

TABLE 8
Gradation Requirements for Capillary Moisture Break

Sieve Size	Percentage Passing Sieve
Gravel or Crushed Rock	
1 inch	90 – 100
3/4 inch	30 – 100
1/2 inch	5 – 25
3/8 inch	0 – 6
Sand	
No. 4	100
No. 200	0 – 5

The sand overlying the membrane should be dry at the time concrete is cast. Excess water trapped in the sand could eventually be transmitted as vapor through the slab. If rain is forecast prior to pouring the slab, the sand should be covered with plastic sheeting to avoid wetting.

If the sand becomes wet, concrete should not be placed until the sand has been dried or replaced.

Concrete mixes with high water/cement (w/c) ratios result in excess water in the concrete, which increases the cure time and results in excessive vapor transmission through the slab. Therefore, concrete for the floor slab should have a low w/c ratio - less than 0.50. If approved by the project structural engineer, the sand can be eliminated and the concrete can be placed directly over the vapor retarder, provided the w/c ratio of the concrete does not exceed 0.45 and water is not added in the field. If necessary, workability should be increased by adding plasticizers. In addition, the slab should be properly cured. Before the floor covering is placed, the contractor should check that the concrete surface and the moisture emission levels (if emission testing is required) meet the manufacturer's requirements.

8.6 2016 California Building Code (CBC) Mapped Values

For seismic design in accordance with the provisions of 2016 California Building Code (CBC) we recommend the following:

- Risk-Targeted Maximum Considered Earthquake (MCE_R) S_s and S_1 of 1.529g and 0.600g, respectively.
- Site Class D
- Site Coefficients F_a and F_v of 1.0 and 1.5
- MCE_R spectral response acceleration parameters at short periods, S_{MS}, and at one-second period, S_{M1}, of 1.529g and 0.900g, respectively
- Design Earthquake (DE) spectral response acceleration parameters at short period, S_{DS}, and at one-second period, S_{D1}, of 1.020g and 0.600g, respectively
- PGA_M is 0.574g.

8.7 Retaining Walls

The site is in a seismically active area. As outlined in Section 1803.5.12 of the 2016 California Building Code (CBC), if the Seismic Design Category of the retaining wall structure is D, E or F and the retaining wall is supporting more than 6 feet of backfill, the retaining wall design should also be checked for seismic conditions under the design earthquake motions. Under seismic loading conditions, there will be an added seismic increment that should be added to active earth pressures (Sitar et al. 2012). We used the procedures outlined in Sitar et al. (2012) and the peak ground acceleration based on the DE ground motion level to compute the seismic pressure increment. We recommend the walls be designed for the more critical of at-rest pressures or total pressure (active plus seismic pressure increment). Cantilever retaining walls backfilled with fill meeting the requirements discussed in Section 8.3 should be designed for the equivalent fluid weights and pressures presented in Table 9.

TABLE 9
Cantilever Retaining Wall Design Earth Pressures
(Drained Conditions)

	Static Conditions		**Seismic Conditions[1]**
	Unrestrained Walls – Active (pcf[3])	**Restrained Walls – At-rest (pcf)**	**Total Pressure – Active Plus Seismic Pressure Increment (pcf)**
Drained Condition[2]	35	55	55
Undrained Condition	80	90	90

Notes: 1. For seismic conditions, the more critical condition of either at-rest pressure or active pressure plus a seismic pressure increment should be checked.
2. Applicable to walls that are backdrained to prevent the buildup of hydrostatic pressure.
3. pcf = pounds per cubic foot

If surcharge loads occur above an imaginary 45-degree line projected up from the bottom of a retaining wall, a surcharge pressure should be included in the wall design. If this condition exists, we should be consulted to estimate the added pressure on a case-by-case basis.

Where truck traffic will pass within 10 feet of retaining walls, temporary traffic loads should be considered in the design of the walls. Traffic loads may be modeled by a uniform pressure of 100 pounds per square foot applied in the upper 10 feet of the walls.

The lateral earth pressures recommended for the drained condition are applicable to walls that are backdrained to prevent the buildup of hydrostatic pressure. One acceptable method for backdraining the walls is to place a prefabricated drainage panel against the back side of the wall. The drainage panel should extend down to the base of the wall to a perforated PVC collector pipe. The pipe should be surrounded on all sides by at least four inches of Caltrans Class 2 permeable material (Caltrans Standard Specifications Section 68-2.02F(3)). We should check the manufacturer's specifications regarding the proposed prefabricated drainage panel material to verify that it is appropriate for the intended use. An acceptable alternative is to backdrain the wall with Caltrans Class 2 permeable material at least one foot wide, extending down to the base of the wall. A perforated PVC pipe should be placed at the bottom of the gravel, as described for the first alternative. The pipe in either alternative should be sloped to drain into an appropriate outlet. We should check the manufacturer's specifications for the proposed drainage panel material to verify it is appropriate for its intended use.

Wall backfill should be compacted to at least 90 percent relative compaction using light compaction equipment. Wall backfill with less than 10 percent fines, or deeper than five feet, should be compacted to at least 95 percent relative compaction for its entirety. If heavy equipment is used, the wall should be appropriately designed to withstand loads exerted by the equipment and/or temporarily braced.

8.8 Flexible Pavement Design

The State of California flexible pavement design method was used to develop the recommended asphalt concrete pavement sections. We expect the final soil subgrade in asphalt-paved areas will generally consist of the on-site clay soil. On the basis of the laboratory test results on this soil, we selected an R-value of 5 for design.

Traffic data were not available at the time of this report. Therefore, we are presenting design pavement sections for three traffic indices (TIs) of 4, 5 and 6. For comparison, TIs of 4 and 5 assumes passenger car traffic with occasional trucks and a TI of 6 assumes moderate truck traffic. Recommended pavement sections for these traffic indices are presented in Table 10.

TABLE 10
Pavement Section Design

Traffic Index	Asphalt Concrete Thickness (inches)	Class 2 Aggregate Base, R = 78 (inches)
4	3.5	6
5	3.5	9
6	4	12

8.9 Concrete Pavements and Exterior Slabs

Differential ground movement due to expansive soil and settlement will tend to distort and crack the pavements and exterior improvements such as courtyards and sidewalks. Periodic repairs and replacement of exterior improvements should be expected during the life of the project. Mastic joints or other positive separations should be provided to permit any differential movements between exterior slabs and the building.

We recommend exterior concrete flatwork be underlain by at least 4-inches of Class 2 AB and 12 inches of select fill. Where select fill will need to be placed, the subgrade should be scarified 12-inches, moisture conditioned to at least three percent above optimum, compacted to at least 88 percent relative compaction to provide a smooth, non-yielding surface. The Class 2 AB should be compacted to at least 95 percent relative compaction. Aggregate base should conform to the current State of California Department of Transportation (Caltrans) Standard Specifications.

Where rigid pavement is required, for loading and service areas, we recommend a minimum of six inches of concrete for medium traffic and a minimum of eight inches of concrete for heavy traffic. The upper six inches of subgrade should be compacted to at least 95 percent relative compaction and should provide a smooth, non-yielding surface. Loading and service areas should be underlain by at least six inches of Class 2 aggregate base compacted to 95 percent relative compaction and provide a smooth, non-yielding surface. Aggregate base material should conform to the current State of California Department of Transportation (Caltrans) Standard Specifications.

8.10 Bioretention Systems

Bioretention areas are landscaping features used to treat stormwater runoff within a development site. They are commonly located in parking lot islands and landscape areas. Surface runoff is directed into shallow, landscaped depressions, which usually include mulch and a prepared soil mix. Typically, the filtered runoff is collected in a perforated underdrain beneath the bioretention system and returned to the storm drain system. For larger storms, runoff is generally diverted past the bioretention areas to the storm drain system.

The soil within a bioretention system should typically have an infiltration rate sufficient to draw down any pooled water within 48 hours after a storm event. Based on the "Bioretention Manual" prepared by The Prince George's County (2007), the infiltration rate of the bioretention soil is recommended to exceed ½ inch per hour; cohesionless soils like sand meet this criterion. Cohesive soils like clay and silts do not meet the infiltration rate requirement and are considered unsuitable in a bioretention system, particularly when they are expansive. For areas where there are unsuitable in-situ soils, the bioretention system can be created by importing a suitable soil mix and providing an underdrain. Based on the results of the percolation tests and our observation of the soil at the site, the in-situ clays are relatively impervious and do not meet the infiltration rate requirements. The bioretention system will need to be constructed with suitable imported soil and include an underdrain system.

Underdrains are typically at the invert of the bioretention system to intercept water that does not infiltrate into the surrounding soils. Underdrains consist of a perforated PVC pipe surrounded by two to three inches of Class 2 Permeable material (Caltrans Standard Specifications Section 68-2.02F(3)). The perforated PVC pipe cross-section area should be determined based on the desired hydraulic conductivity of the underdrain. The PVC pipe should be bedded on two to three inches of the Class 2 Permeable material.

Because of the presence of near surface expansive soil, bioretention systems should be set back a minimum of five feet from building and retaining wall foundations (pile caps and footings), slabs, concrete flatwork or pavements. If bioretention systems are closer than five feet from foundations, slabs, concrete or pavement, we recommend the sides and bottoms of the bioretention basins should be lined. We recommend subdrains be placed at the bottom of the basins and the subdrains should be connected to discharge water into the storm drain system. Overflow from bioretention areas should be directed to the storm drain system away from building foundations and slabs.

Typically, the bottom of the bioretention system is recommended to be a minimum of two feet or more above the groundwater table.

8.11 Site Drainage

Positive surface drainage should be provided around the building to direct surface water away from the existing building foundations. To reduce the potential for water ponding adjacent to the building, we recommend the ground surface within a horizontal distance of five feet from the building be designed to slope down and away from the building with a surface gradient of at least two percent in unpaved areas and one percent in paved areas. In addition, roof downspouts should be discharged into controlled drainage facilities to keep the water away from the foundations.

9.0 ADDITIONAL GEOTECHNICAL SERVICES

During final design we should be retained to consult with the design team as geotechnical questions arise. Where a proprietary pile system is selected to support the proposed building we should be consulted regarding finalized design capacities, indicator pile program, and pile testing schedule. Prior to construction, we should review the project plans and specifications to check their conformance with the intent of our recommendations. During construction, we should observe site preparation, compaction of fill and backfill, and installation and testing of the building foundations. These observations will allow us to compare the actual with the anticipated soil conditions and to check that the contractors' work conforms to the geotechnical aspects of the plans and specifications.

10.0 LIMITATIONS

The conclusions and recommendations presented in this report result from limited engineering studies based on our interpretation of the geotechnical conditions existing at the site at the time of this investigation. Actual subsurface conditions may vary. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that described in this report, Langan Treadwell Rollo should be notified to make supplemental recommendations, as necessary.

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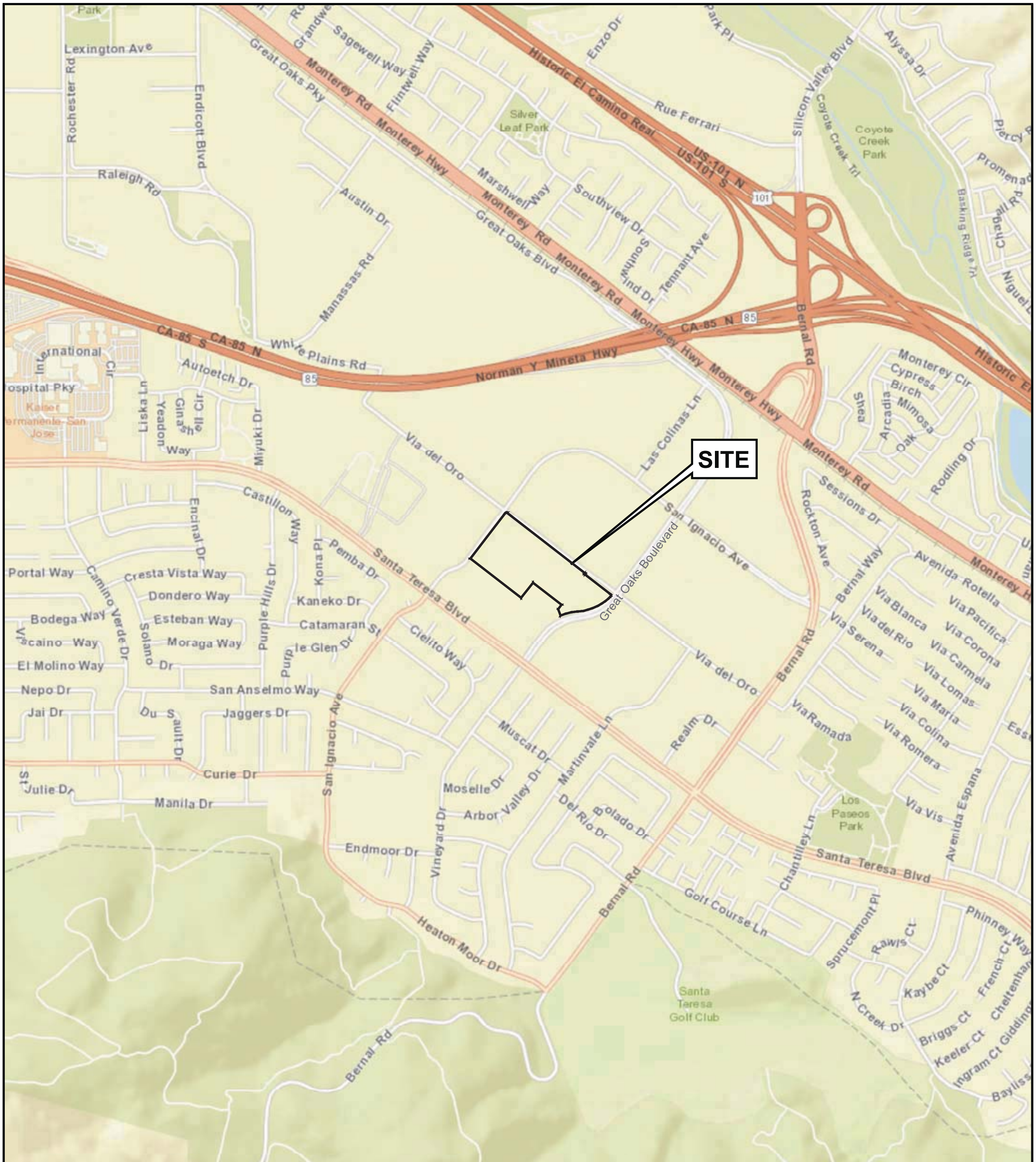
FIGURES



Notes:

1. World street basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN.
2. Map displayed in California State Plane Coordinate System, Zone III, North American Datum of 1983 (NAD83), US Survey Feet.

0 1,000 2,000
Feet

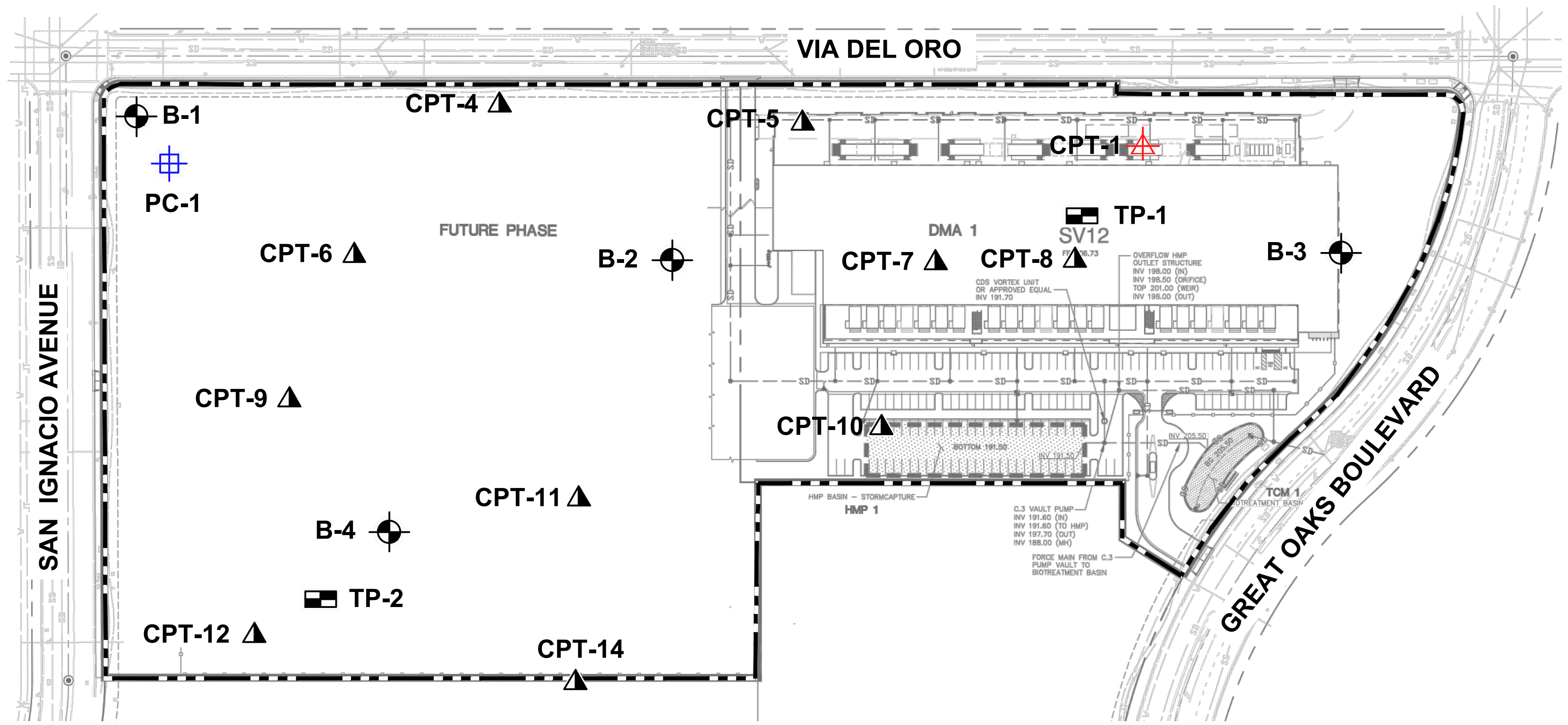
N W E S

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

LANGAN

SITE LOCATION MAP

Date 06/06/18	Project No. 770620902	Figure 1



EXPLANATION

TP-1	Approximate location of test pit for field resistivity and thermal conductivity testing by Langan, July 2015
B-1	Approximate location of boring by Langan, April and May 2015
CPT-4	Approximate location of Cone Penetration Test (CPT) by Langan, April and May 2015
PC-1	Approximate location of percolation test by Langan Treadwell Rollo, December 2014
CPT-1	Approximate location of Cone Penetration Test (CPT), by Langan Treadwell Rollo, December 2014
	Approximate site boundary

Note: Exploration borings B-5 to B-8, cone penetration tests CPT-2 and CPT-3, and CPT-13 to CPT-20 by Langan Treadwell Rollo were performed as part of the same investigations in 2014 and 2015 as the explorations shown but are outside of the existing site limits and are not included on this plan.

0 200 Feet

Approximate scale

SV12
GREAT OAKS BLVD AND SANTA TERESA BLVD
San Jose, California

SITE PLAN

Date 06/06/18	Project No. 770620902	Figure 2

LANGAN

Reference: Base map from a drawing titled "Grading and Drainage Plan, Equinix SV12 Stormwater Control and Hydromodification Plan," Sheet 4, by Ruth and Going, Inc., 06/11/18.

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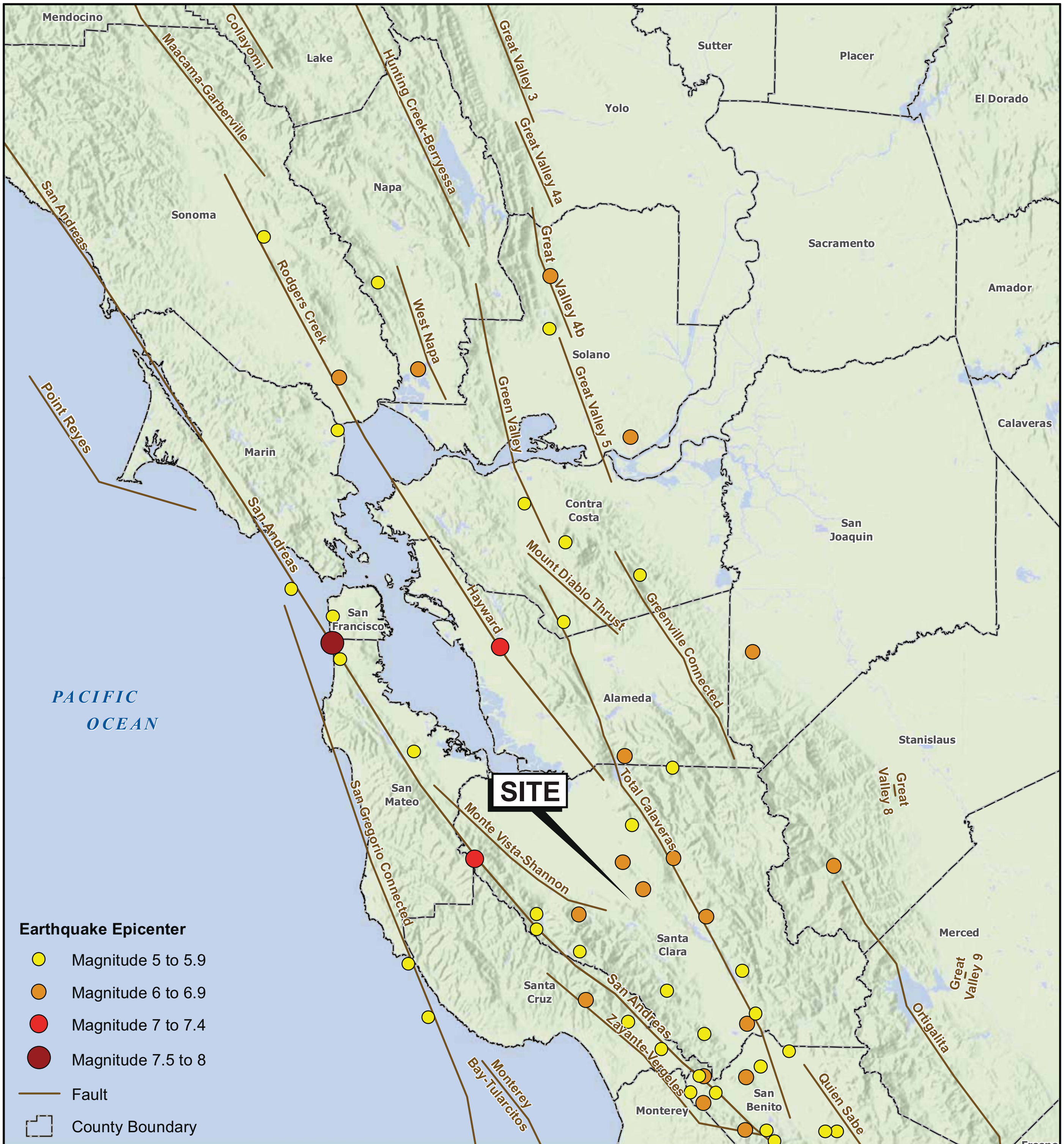
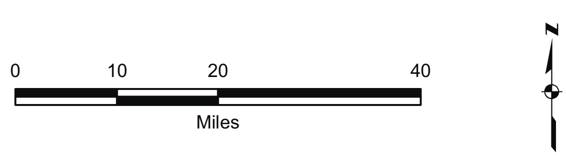


Notes:

1. Quaternary fault data displayed are based on a generalized version of USGS Quaternary Fault and fold database, 2010. For cartographic purposes only.
2. The Earthquake Epicenter (Magnitude) data is provided by the U.S Geological Survey (USGS) and is current through 08/24/2014.
3. Basemap hillshade and County boundaries provided by USGS and California Department of Transportation.
4. Map displayed in California State Coordinate System, California (Teale) Albers, North American Datum of 1983 (NAD83), Meters.



EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

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MAP OF MAJOR FAULTS AND EARTHQUAKE EPICENTERS IN THE SAN FRANCISCO BAY AREA

Date 06/06/18	Project No. 770620902	Figure 3

I **Not felt by people, except under especially favorable circumstances. However, dizziness or nausea may be experienced.**
Sometimes birds and animals are uneasy or disturbed. Trees, structures, liquids, bodies of water may sway gently, and doors may swing very slowly.

II **Felt indoors by a few people, especially on upper floors of multi-story buildings, and by sensitive or nervous persons.**
As in Grade I, birds and animals are disturbed, and trees, structures, liquids and bodies of water may sway. Hanging objects swing, especially if they are delicately suspended.

III **Felt indoors by several people, usually as a rapid vibration that may not be recognized as an earthquake at first. Vibration is similar to that of a light, or lightly loaded trucks, or heavy trucks some distance away. Duration may be estimated in some cases.**
Movements may be appreciable on upper levels of tall structures. Standing motor cars may rock slightly.

IV **Felt indoors by many, outdoors by a few. Awakens a few individuals, particularly light sleepers, but frightens no one except those apprehensive from previous experience. Vibration like that due to passing of heavy, or heavily loaded trucks. Sensation like a heavy body striking building, or the falling of heavy objects inside.**
Dishes, windows and doors rattle; glassware and crockery clink and clash. Walls and house frames creak, especially if intensity is in the upper range of this grade. Hanging objects often swing. Liquids in open vessels are disturbed slightly. Stationary automobiles rock noticeably.

V **Felt indoors by practically everyone, outdoors by most people. Direction can often be estimated by those outdoors. Awakens many, or most sleepers. Frightens a few people, with slight excitement; some persons run outdoors.**
Buildings tremble throughout. Dishes and glassware break to some extent. Windows crack in some cases, but not generally. Vases and small or unstable objects overturn in many instances, and a few fall. Hanging objects and doors swing generally or considerably. Pictures knock against walls, or swing out of place. Doors and shutters open or close abruptly. Pendulum clocks stop, or run fast or slow. Small objects move, and furnishings may shift to a slight extent. Small amounts of liquids spill from well-filled open containers. Trees and bushes shake slightly.

VI **Felt by everyone, indoors and outdoors. Awakens all sleepers. Frightens many people; general excitement, and some persons run outdoors.**
Persons move unsteadily. Trees and bushes shake slightly to moderately. Liquids are set in strong motion. Small bells in churches and schools ring. Poorly built buildings may be damaged. Plaster falls in small amounts. Other plaster cracks somewhat. Many dishes and glasses, and a few windows break. Knickknacks, books and pictures fall. Furniture overturns in many instances. Heavy furnishings move.

VII **Frightens everyone. General alarm, and everyone runs outdoors.**
People find it difficult to stand. Persons driving cars notice shaking. Trees and bushes shake moderately to strongly. Waves form on ponds, lakes and streams. Water is muddied. Gravel or sand stream banks cave in. Large church bells ring. Suspended objects quiver. Damage is negligible in buildings of good design and construction; slight to moderate in well-built ordinary buildings; considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Plaster and some stucco fall. Many windows and some furniture break. Loosened brickwork and tiles shake down. Weak chimneys break at the roofline. Cornices fall from towers and high buildings. Bricks and stones are dislodged. Heavy furniture overturns. Concrete irrigation ditches are considerably damaged.

VIII **General fright, and alarm approaches panic.**
Persons driving cars are disturbed. Trees shake strongly, and branches and trunks break off (especially palm trees). Sand and mud erupts in small amounts. Flow of springs and wells is temporarily and sometimes permanently changed. Dry wells renew flow. Temperatures of spring and well waters varies. Damage slight in brick structures built especially to withstand earthquakes; considerable in ordinary substantial buildings, with some partial collapse; heavy in some wooden houses, with some tumbling down. Panel walls break away in frame structures. Decayed pilings break off. Walls fall. Solid stone walls crack and break seriously. Wet grounds and steep slopes crack to some extent. Chimneys, columns, monuments and factory stacks and towers twist and fall. Very heavy furniture moves conspicuously or overturns.

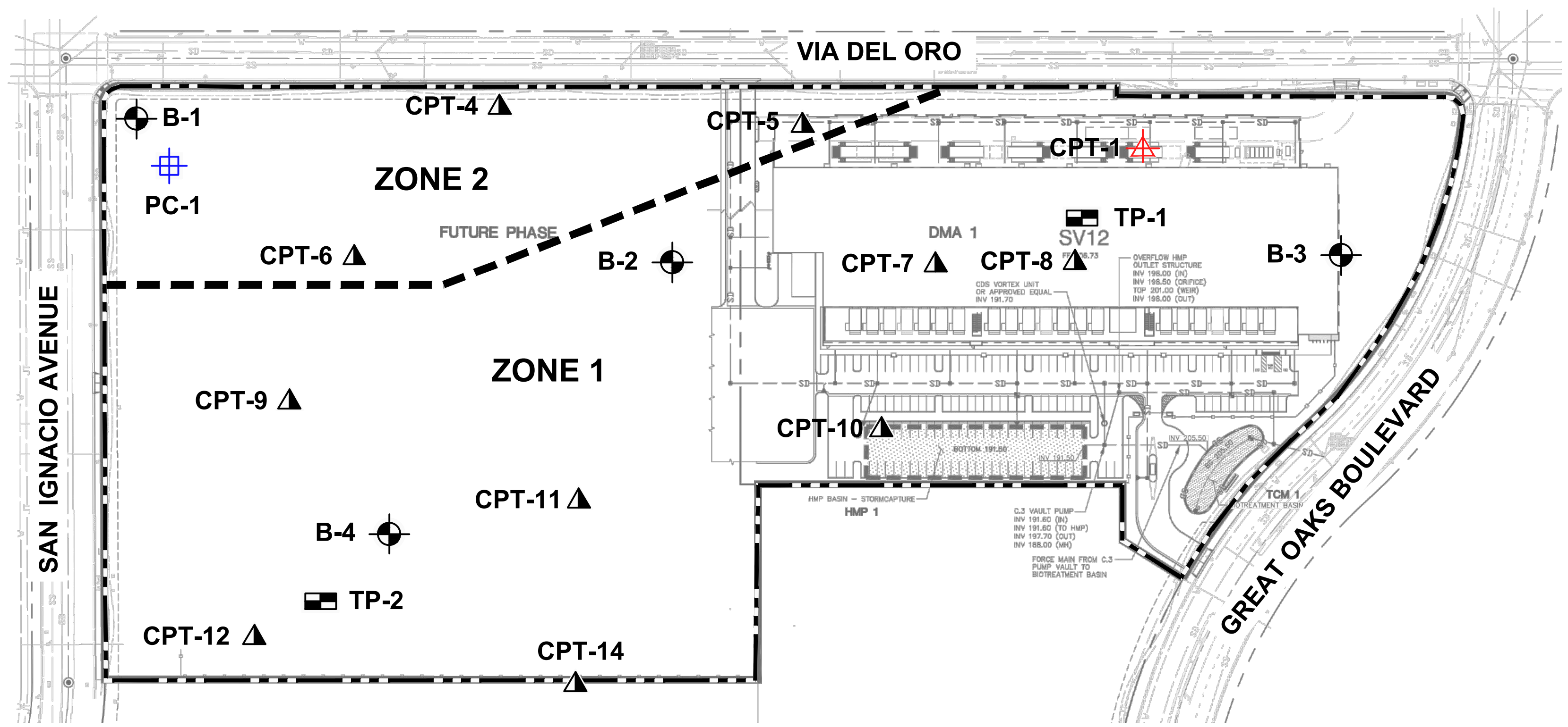
IX **Panic is general.**
Ground cracks conspicuously. Damage is considerable in masonry structures built especially to withstand earthquakes; great in other masonry buildings - some collapse in large part. Some wood frame houses built especially to withstand earthquakes are thrown out of plumb, others are shifted wholly off foundations. Reservoirs are seriously damaged and underground pipes sometimes break.

X **Panic is general.**
Ground, especially when loose and wet, cracks up to widths of several inches; fissures up to a yard in width run parallel to canal and stream banks. Landsliding is considerable from river banks and steep coasts. Sand and mud shifts horizontally on beaches and flat land. Water level changes in wells. Water is thrown on banks of canals, lakes, rivers, etc. Dams, dikes, embankments are seriously damaged. Well-built wooden structures and bridges are severely damaged, and some collapse. Dangerous cracks develop in excellent brick walls. Most masonry and frame structures, and their foundations are destroyed. Railroad rails bend slightly. Pipe lines buried in earth tear apart or are crushed endwise. Open cracks and broad wavy folds open in cement pavements and asphalt road surfaces.

XI **Panic is general.**
Disturbances in ground are many and widespread, varying with the ground material. Broad fissures, earth slumps, and land slips develop in soft, wet ground. Water charged with sand and mud is ejected in large amounts. Sea waves of significant magnitude may develop. Damage is severe to wood frame structures, especially near shock centers, great to dams, dikes and embankments, even at long distances. Few if any masonry structures remain standing. Supporting piers or pillars of large, well-built bridges are wrecked. Wooden bridges that "give" are less affected. Railroad rails bend greatly and some thrust endwise. Pipe lines buried in earth are put completely out of service.

XII **Panic is general.**
Damage is total, and practically all works of construction are damaged greatly or destroyed. Disturbances in the ground are great and varied, and numerous shearing cracks develop. Landslides, rock falls, and slumps in river banks are numerous and extensive. Large rock masses are wrenched loose and torn off. Fault slips develop in firm rock, and horizontal and vertical offset displacements are notable. Water channels, both surface and underground, are disturbed and modified greatly. Lakes are dammed, new waterfalls are produced, rivers are deflected, etc. Surface waves are seen on ground surfaces. Lines of sight and level are distorted. Objects are thrown upward into the air.

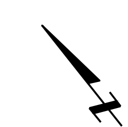
EQUINIX SV12 **GREAT OAKS BLVD & VIA DEL ORO** San Jose, California	**MODIFIED MERCALLI INTENSITY SCALE**		
LANGAN	Date 06/06/18	Project No. 770620902	Figure 4



EXPLANATION

TP-1	Approximate location of test pit for field resistivity and thermal conductivity testing by Langan, July 2015
B-1	Approximate location of boring by Langan, April and May 2015
CPT-4	Approximate location of Cone Penetration Test (CPT) by Langan, April and May 2015
PC-1	Approximate location of percolation test by Langan Treadwell Rollo, December 2014
CPT-1	Approximate location of Cone Penetration Test (CPT), by Langan Treadwell Rollo, December 2014
— - - —	Approximate site boundary
— — —	Approximate delineation zone 1 and zone 2

Notes:
1. See discussion in Section 8.1. Piles in Zone 1 will gain capacity in skin friction unless lengthened beyond 60 feet and Piles in Zone 2 will gain strength in end bearing.
2. Exploration borings B-5 to B-8, cone penetration tests CPT-2 and CPT-3, and CPT-13 to CPT-20 by Langan Treadwell Rollo were performed as part of the same investigations in 2014 and 2015 as the explorations shown but are outside of the existing site limits and are not included on this plan.



0 200 Feet
Approximate scale

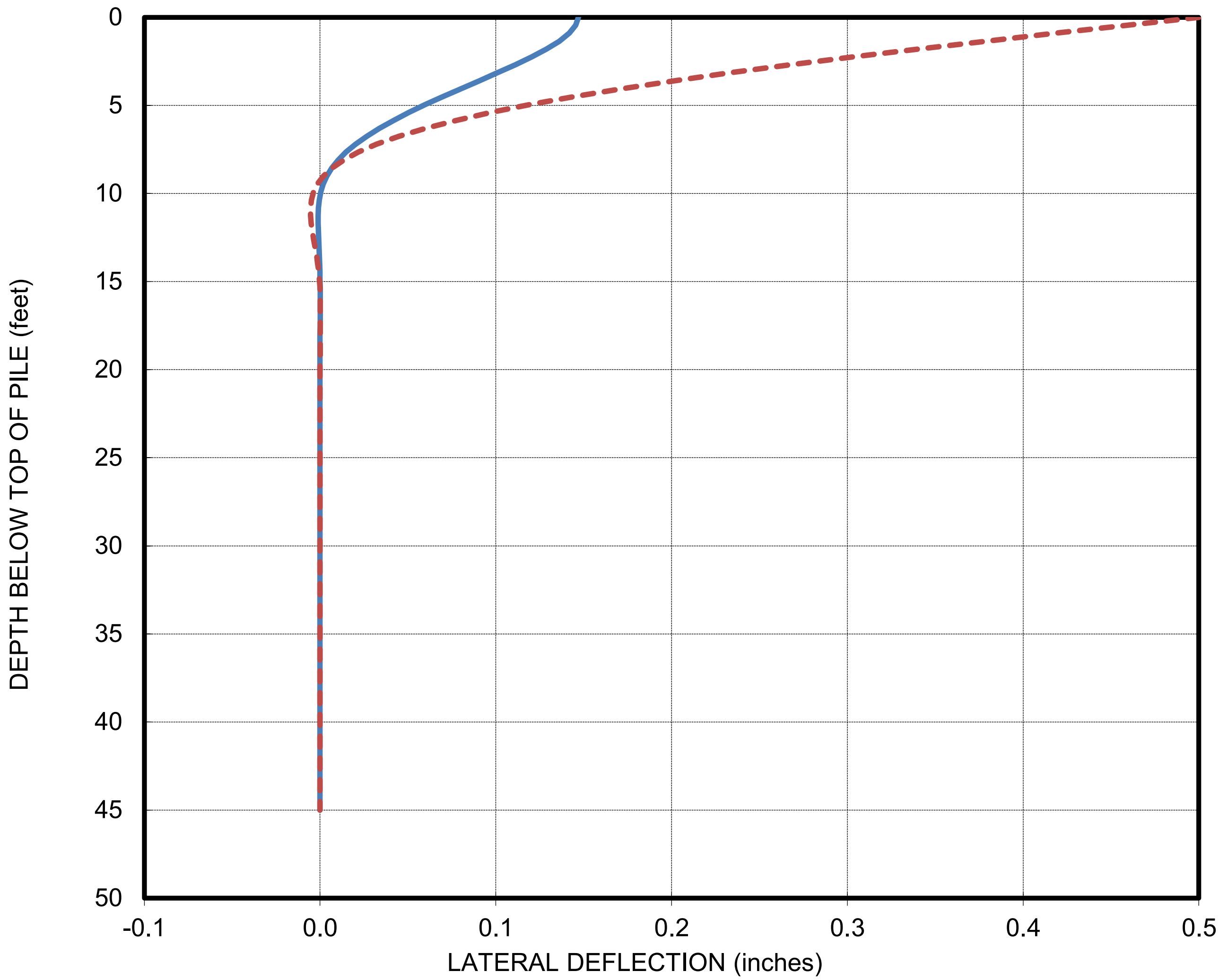
EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

PILE ZONE PLAN

Date 06/06/18 | Project No. 770620902 | Figure 5

LANGAN

Reference: Base map from a drawing titled "Grading and Drainage Plan, Equinix SV12 Stormwater Control and Hydromodification Plan," Sheet 4, by Ruth and Going, Inc., 06/11/18.



Symbol	Pile-Head Connection	Lateral Load (kips)	Maximum Deflection (inches)
solid line	FIXED	28	0.2
dashed line	FREE	25	0.5

Notes:
1. The profiles shown are for a single 16-inch auger pressure grouted displacement pile (APGD) with an axial compressive load of 270 kips.
2. Assumes there is no additionally applied moment at the pile head.
3. Passive resistance of pile caps has not been included.
4. To account for group effect, the lateral capacity of the piles should be multiplied by the factors shown on Table 7; however, the moment profile used to check individual piles in a group should be for the unfactored load.
5. Deflection of fixed head condition limited by moment capacity of pile of about 1,000 kip-inches.

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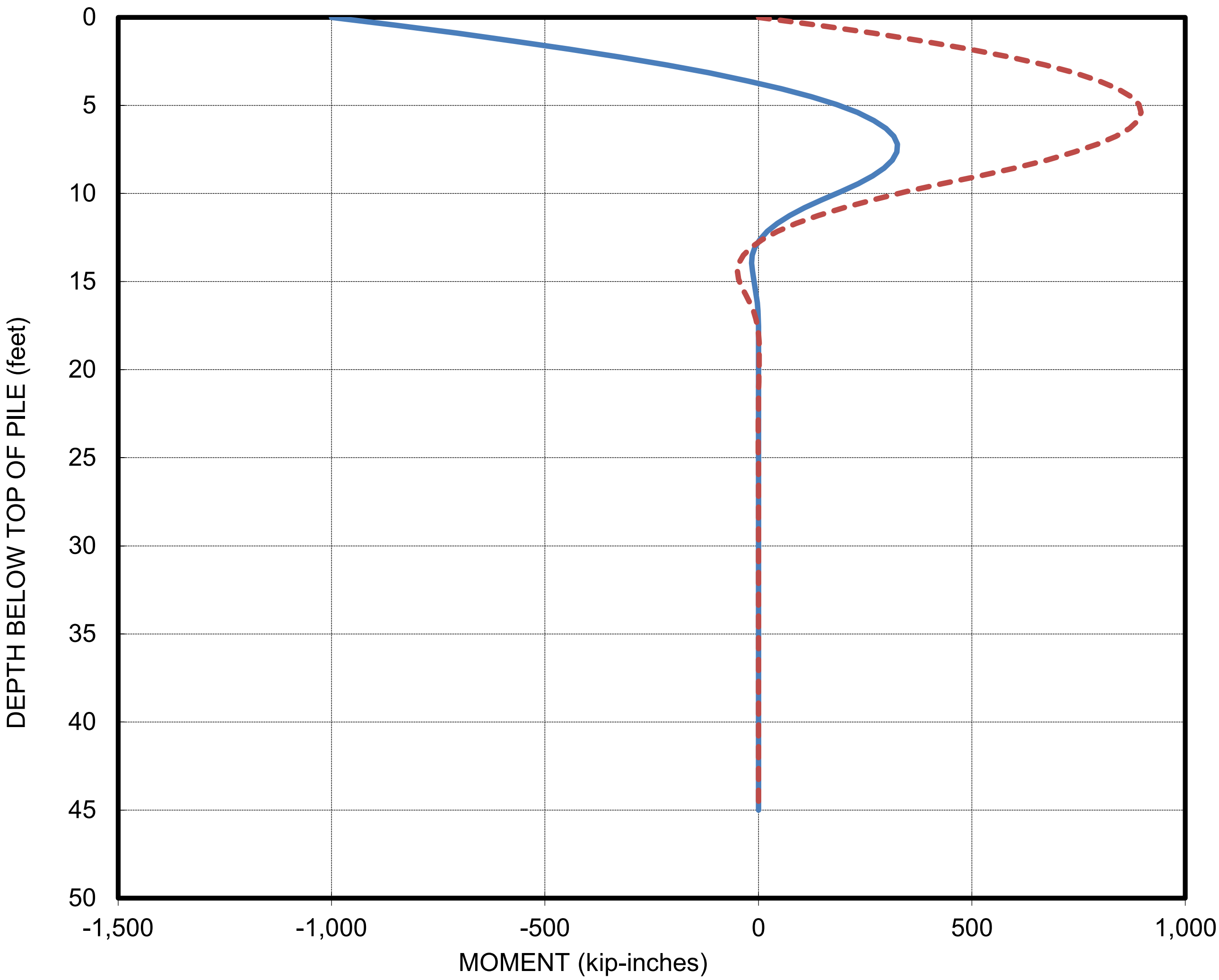
PRELIMINARY DEFLECTION PROFILES FOR 16-INCH DIAMETER APGD PILES

Date 06/06/18 | Project No. 770620902 | Figure 6



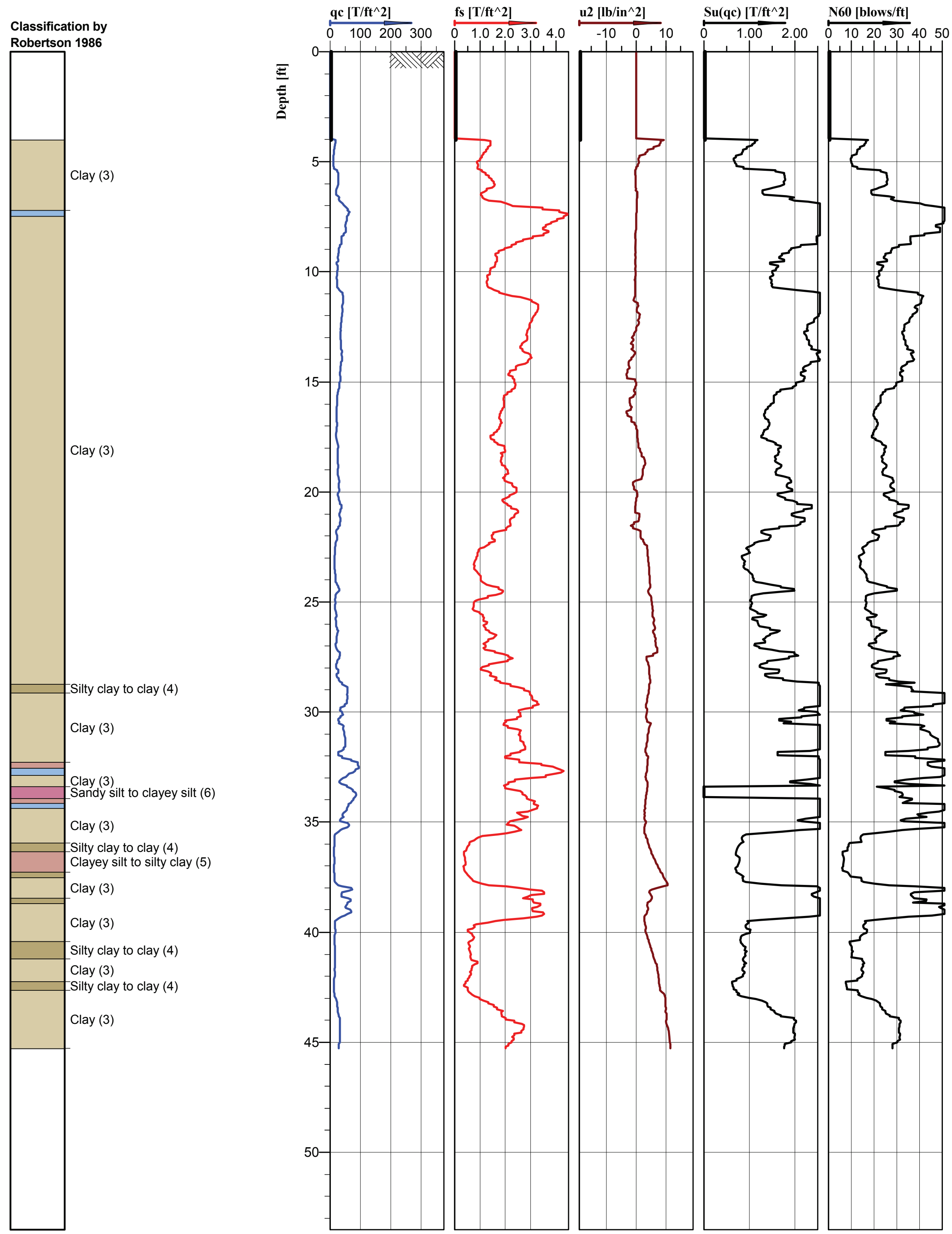
Symbol	Pile-Head Connection	Lateral Load (kips)	Maximum Deflection (inches)
solid line	FIXED	28	0.2
dashed line	FREE	25	0.5

Notes:
1. The profiles shown are for a single 16-inch auger pressure grouted displacement pile (APGD) with an axial compressive load of 270 kips.
2. Assumes there is no additionally applied moment at the pile head.
3. Passive resistance of pile caps has not been included.
4. To account for group effect, the lateral capacity of the piles should be multiplied by the factors shown on Table 7; however, the moment profile used to check individual piles in a group should be for the unfactored load.

EQUINIX SV12 GREAT OAKS BLVD & VIA DEL ORO San Jose, California	PRELIMINARY MOMENT PROFILES FOR 16-INCH DIAMETER APGD PILES		
LANGAN	Date 06/06/18	Project No. 770620902	Figure 7

APPENDIX A

LOGS OF CONE PENETRATION TESTS FROM PREVIOUS INVESTIGATION



Terminated at 45 feet below ground surface (bgs)
Groundwater not measured
Date performed: 12/22/2014 by CPT Inc.
Ground surface elevation: Approximately 205 feet, NGVD29 datum.

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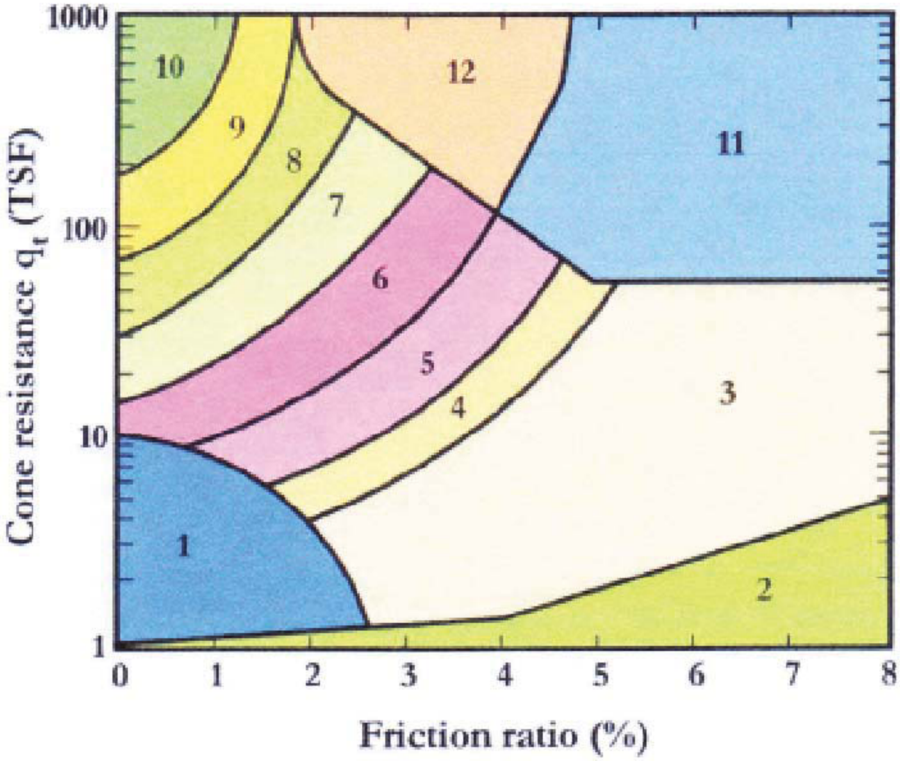
CONE PENETRATION TEST RESULTS
CPT-1

Date 06/06/18 | Project No. 770620901 | Figure A-1



Zone	Soil Behavior Type
1	sensitive fine grained
2	organic material
3	clay
4	silty clay to clay
5	clayey silt to silty clay
6	sandy silt to clayey silt
7	silty sand to sandy silt
8	sand to silty sand
9	sand
10	gravelly sand to sand
11	very stiff fine grained (overconsolidated or cemented)
12	sand to clayey sand (overconsolidated or cemented)

Source: Robertson, P.K., Campanella, R.G., Gillespie, D., and Greig, J., 1986, Use of Piezometer Cone Data. Proceedings of the ASCE Specialty Conference In Situ 86: Use of In Situ Tests in Geotechnical Engineering.

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SOIL BEHAVIOR TYPE (SBT) MODEL

Date 06/06/18	Project No. 770620901	Figure A-2

APPENDIX B

LOGS OF BORINGS

PROJECT:	EQUINIX SV12 GREAT OAKS BLVD & VIA DEL ORO San Jose, California	Log of Boring B-1 PAGE 1 OF 2

Boring location: See Site Plan, Figure 2

Logged by: S. Wolfe

Date started: 4/28/15 | Date finished: 4/28/15

Drilling method: Hollow Stem Auger (B61)

Hammer weight/drop: 140 lbs./30 inches | Hammer type: Downhole Wireline Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

MATERIAL DESCRIPTION

Ground Surface Elevation: 204.1 feet[2]

LABORATORY TEST DATA

DEPTH (feet)	Sampler Type	Blows/ 6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0–2	GRAB			CL	CLAY (CL) brown, very stiff, moist, some fine sand, trace organics LL = 33, PI = 16, see Figure D-7						
3	S&H	9 10 16	16								
4	GRAB				brown to yellow-brown, increase in sand content					14.0	97
5–6	S&H	7 11 14	15	CL	CLAY with SAND (CL) yellow-brown, stiff, moist, fine sand					10.9	106
8	S&H	6 8 10	11	ML	SANDY SILT (ML) yellow-brown, stiff, moist, fine sand						
10–11	S&H	8 9 11	12								
14	S&H	5 6 8	8		medium stiff						
15				CL	CLAY with SAND (CL) yellow-brown to olive-brown, medium stiff, moist, fine-grained sand, trace silt						
19–20	S&H	7 8 12	13		stiff					20.3	106
23–25	S&H	7 9 11	12	CL	CLAY (CL) light brown, stiff, moist Triaxial Test, see Figure D-2	TxUU	3,200	1,310		28.7	91
28–30	S&H	7 9 10	11	SM	SILTY SAND (SM) yellow-brown with olive-gray mottling, medium dense, moist, fine-grained					16.8	92

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Project No.: 770620902 | Figure: B-1a

DEPTH (feet)	Sampler Type	Sample	Blows/ 6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31–33					CL	SANDY CLAY (CL) yellow-brown with olive-gray mottling, stiff, moist, fine sand						
33–34	SPT		16 19 21	40	SP	SAND with GRAVEL (SP) brown, dense, moist, fine- to medium-grained, with subrounded gravel up to 1 inch in diameter						
39	SPT		5 5 7	12								
40	S&H		6 16 19	21	CL	SANDY CLAY with GRAVEL (CL) light brown with gray-brown mottling, stiff, moist, fine sand, with subangular gravel up to 1/2 inch in diameter						
42					SP-SM	SAND with SILT (SP-SM) yellow-brown with gray-brown mottling, medium dense, moist, fine-grained						
43–44	SPT		7 9 12	21	CL	CLAY with SAND (CL) light brown with light gray and yellow-brown mottling, very stiff, moist, fine sand						
48–49	SPT		5 7 9	16	SC	CLAYEY SAND with GRAVEL (SC) brown to light brown, medium dense, moist, fine- to coarse-grained, with subrounded gravel up to 1/2 inch in diameter						
50					CL	CLAY (CL) light brown with light gray and yellow-brown mottling, very stiff, moist						
51–60												

Boring terminated at a depth of 50 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.6 and 1.0, respectively to account for sampler type and hammer energy.
[2] Elevations based on NAVD 88.

PROJECT:	EQUINIX SV12 GREAT OAKS BLVD & VIA DEL ORO San Jose, California	**Log of Boring B-2** PAGE 1 OF 2

Boring location: See Site Plan, Figure 2
Date started: 4/28/15 | Date finished: 4/28/15
Drilling method: Hollow Stem Auger (B61)
Hammer weight/drop: 140 lbs./30 inches | Hammer type: Downhole Wireline Safety
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT), Shelby Tube (ST)

Logged by: S. Wolfe

DEPTH (feet)	Sampler Type	Blows/6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION (Ground Surface Elevation: 203.4 feet[2])	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0–5	S&H (3)	12, 16, 18	20	CL	CLAY with SAND (CL) brown, very stiff, moist, with fine sand, trace organics						
5–7.5	S&H (6)	9, 11, 12	14	CL	CLAY with SILT and SAND (CL) yellow-brown, stiff, moist, fine-grained sand Corrosion Test, see Appendix E						
7.5–10	S&H (8)	5, 7, 8	9	CL-ML	SANDY SILTY CLAY (CL-ML) yellow-brown, stiff, moist, fine sand LL = 27, PI = 7, see Figure D-7						
10–13	S&H (11)	6, 7, 10	10	CL	CLAY with SAND (CL) yellow-brown, stiff, moist, with fine sand and silt					13.4	104
13–18	S&H (14)	12, 13, 15	17	CL	CLAY with SAND (CL) brown to yellow-brown, very stiff, moist, fine sand						
18–22	S&H (19)	7, 9, 12	13	CL	SANDY CLAY (CL) yellow-brown with gray-brown mottling, stiff, moist, fine sand						
					Triaxial Test, see Figure D-3	TxUU	2,400	1,290		27.9	95
	ST (21)		125 psi			PP		2,500			
22–25	S&H (24)	11, 17, 27	26	CL	CLAY with SAND (CL) light brown with gray-brown mottling, very stiff, moist, fine sand						
25–28.5	SPT (26)	16, 13, 9	22	SP	SAND (SP) yellow-brown, medium dense, moist, fine- to coarse-grained						
28.5–30	SPT (29)	6, 9, 11	20	SP-SM	SAND with SILT (SP-SM) brown, medium dense, moist, fine-grained						

TEST GEOTECH LOG 770620902.GPJ TR.GDT 6/2/15

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Project No.: 770620902 | Figure: B-2a

DEPTH (feet)	Sampler Type	Sample	Blows/ 6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31–32					CL	SANDY CLAY (CL) brown to yellow-brown, very stiff, moist, fine sand						
33–35	SPT		5 7 9	16	SM	SILTY SAND (SM) brown, medium dense, moist, fine- to medium-grained						
35–43	S&H		6 9 12	13	CL	CLAY (CL) brown to yellow-brown with light gray mottling, stiff, moist, trace fine sand						
43–48	S&H		10 11 14	15	CL	CLAY with SAND (CL) dark olive-gray, stiff to very stiff, moist, with fine sand						
48–50	S&H		16 19 22	25	CL	CLAY with SAND (CL) gray-brown with orange-brown mottling, very stiff, moist, with fine sand						
51–60												

Boring terminated at a depth of 50 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.
PP = pocket penetrometer.

[1] S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.6 and 1.0, respectively to account for sampler type and hammer energy.
[2] Elevations based on NAVD 88.

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Project No.: 770620902 | Figure: B-2b

PROJECT:	EQUINIX SV12 GREAT OAKS BLVD & VIA DEL ORO San Jose, California	Log of Boring B-3 PAGE 1 OF 2

Boring location: See Site Plan, Figure 2		Logged by: S. Wolfe
Date started: 4/28/15	Date finished: 4/28/15	
Drilling method: Hollow Stem Auger (B61)		
Hammer weight/drop: 140 lbs./30 inches	Hammer type: Downhole Wireline Safety	
Sampler: Sprague & Henwood (S&H), Shelby Tube (ST)		

Ground Surface Elevation: 207.7 feet[2]

DEPTH (feet)	SAMPLES: Sampler Type	Blows/6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0–1				CL	CLAY with SAND (CL) brown, very stiff, moist, trace fine gravel, trace organics						
2–3	S&H	11 16 19	21							12.1	104
4					grades to yellow-brown						
5–6	S&H	6 11 12	14	CL	SANDY CLAY (CL) yellow-brown, very stiff, dry to moist, fine sand, trace organics						
8–9	S&H	7 9 10	11		Triaxial Test, see Figure D-4	TxUU	1,050	2,190		10.8	100
10–11	S&H	10 12 13	15	CL	CLAY with SAND (CL) yellow-brown, stiff, moist, with fine sand LL = 29, PI = 9, see Figure D-7						
14	S&H	7 9 12	13								
19	S&H	7 11 15	16		very stiff, increase in sand content						
23–24	S&H	7 9 11	12	CL	CLAY with SAND (CL) light brown, stiff, moist, with fine sand						
29–30	S&H	7 11 15	16	ML	SANDY SILT (ML)				59.3	15.0	

TEST GEOTECH LOG 770620902.GPJ TR.GDT 6/2/15

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Project No.: 770620902	Figure: B-3a

PROJECT: **EQUINIX SV12**
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

Log of Boring B-3

DEPTH (feet)	Sampler Type	Blows/ 6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31–33				ML	SANDY SILT (ML) (continued) yellow-brown with gray-brown mottling, very stiff, moist, fine sand						
34	S&H	7 12 13	15	SM	SILTY SAND (SM) brown to yellow-brown, medium dense, moist, fine- to medium-grained				22.7	9.5	
35				SP	SAND with GRAVEL (SP) brown, medium dense, moist, fine- to coarse-grained, subrounded gravel						
36–38				CL	SANDY CLAY (CL) yellow-brown with olive-gray mottling, stiff, fine sand, trace fine gravel						
39	S&H	8 11 12	14	CL	CLAY with SAND (CL) yellow-brown, stiff, with fine sand, trace subrounded gravel						
41	ST		80 psi		Triaxial Test, see Figure D-5 stiff	TxUU	6,000	1,670		19.5	109
44	S&H	9 19 27	28		very stiff, increasing sand content, no gravel						
48–50											
49	S&H	10 12 13	15	CL	CLAY (CL) light brown, stiff to very stiff, moist, some silt and sand						

Boring terminated at a depth of 50 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.
PP = pocket penetrometer.

[1] S&H blow counts for the last two increments were converted to SPT N-Values using a factor of 0.6, to account for sampler type and hammer energy.
[2] Elevations based on NAVD 88.

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Project No.: 770620902
Figure: B-3b

PROJECT: **EQUINIX SV12**
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

Log of Boring B-4

Boring location: See Site Plan, Figure 2
Logged by: S. Wolfe
Date started: 4/29/15 Date finished: 4/29/15
Drilling method: Hollow Stem Auger (B61)
Hammer weight/drop: 140 lbs./30 inches Hammer type: Downhole Wireline Safety
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT), Shelby Tube (ST)

DEPTH (feet)	Sampler Type	Blows/6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION (Ground Surface Elevation: 201.7 feet[2])	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0–2	GRAB			CL	CLAY (CL) brown, stiff, moist, some fine-grained sand, trace organics. R-Value Test, see Figure D-6						
3	S&H	10, 11, 12	14	CL	LL = 37, PI = 18, see Figure D-7						
4	GRAB			CL	grades to yellow-brown						
6	S&H	7, 9, 11	12	CL	CLAY with SAND (CL) yellow-brown, stiff, moist, with fine sand, trace fine gravel						
8	S&H	9, 11, 12	14	CL	SANDY CLAY (CL) yellow-brown, stiff, moist, fine sand						
11	S&H	10, 12, 14	16	CL	with some gravel					20.9	104
11–12.5				SP-SC	SAND with CLAY (SP-SC) yellow-brown, medium dense, moist, fine- to coarse-grained						
14	S&H	8, 9, 11	12	CL	CLAY with SAND (CL) yellow-brown, very stiff, moist, with fine sand, trace fine gravel; gray-brown mottling, stiff						
19	S&H	6, 7, 9	10	CL	CLAY (CL) yellow-brown with dark brown and olive-gray mottling, stiff, moist, trace fine- to coarse sand						
24	S&H	8, 10, 11	13	SM	SILTY SAND (SM) brown, medium dense, moist, fine-grained				24.0	8.7	
25–27.5				SC	CLAYEY SAND (SC) yellow-brown, medium dense, moist, fine- to medium-grained						
29	S&H	9, 7, 12	11	SP	SAND (SP) yellow-brown, medium dense, moist, fine- to medium-grained						

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Project No.: 770620902 Figure: B-4a

PROJECT: EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

Log of Boring B-4

DEPTH (feet)	Sampler Type	Sample	Blows/ 6"	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		5 5 5	10	SM	SILTY SAND (SM) yellow-brown, medium dense, moist, fine-grained				19.9	7.3	
32					SC	CLAYEY SAND (SC) yellow-brown with olive-gray mottling, medium dense, moist, fine-grained						
33					SP	SAND (SP) yellow-brown, medium dense, moist, fine-grained						
34	SPT		5 3 4	7								
35						CLAY (CL) yellow-brown with olive-gray and dark brown mottling, medium stiff, moist, some fine sand Consolidation Test, see Figure D-1						
36	ST			75 psi							22.5	104
37												
38												
39	S&H		9 11 14	15	CL	brown, stiff						
40												
41												
42												
43												
44	S&H		12 15 17	19								
45					CL	SANDY CLAY (CL) yellow-brown, very stiff, moist, fine sand					16.5	112
46												
47					CL	CLAY with SAND (CL) yellow-brown with light gray mottling, stiff, moist, with fine sand						
48												
49	S&H		7 9 11	12								
50												
51												
52												
53												
54												
55												
56												
57												
58												
59												
60												

Boring terminated at a depth of 50 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.
PP = pocket penetrometer.

[1] S&H and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.6 and 1.0, respectively to account for sampler type and hammer energy.
[2] Elevations based on NAVD 88.

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Project No.: 770620902
Figure: B-4b

UNIFIED SOIL CLASSIFICATION SYSTEM			
Major Divisions		**Symbols**	**Typical Names**
Coarse-Grained Soils (more than half of soil > no. 200 sieve size	**Gravels** (More than half of coarse fraction > no. 4 sieve size)	**GW**	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)	**SW**	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine -Grained Soils (more than half of soil < no. 200 sieve size)	**Silts and Clays** LL = < 50	**ML**	Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL = > 50	**MH**	Inorganic silts of high plasticity
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic silts and clays of high plasticity
Highly Organic Soils		**PT**	Peat and other highly organic soils

GRAIN SIZE CHART		
	Range of Grain Sizes	
Classification	**U.S. Standard Sieve Size**	**Grain Size in Millimeters**
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.075
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.075
Silt and Clay	Below No. 200	Below 0.075

Unstabilized groundwater level

Stabilized groundwater level

SAMPLE DESIGNATIONS/SYMBOLS

Sample taken with Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter. Darkened area indicates soil recovered

Classification sample taken with Standard Penetration Test sampler

Undisturbed sample taken with thin-walled tube

Disturbed sample

Sampling attempted with no recovery

Core sample

Analytical laboratory sample

Sample taken with Direct Push or Drive sampler

SAMPLER TYPE

C	Core barrel
CA	California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter
D&M	Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube
O	Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube
PT	Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube
S&H	Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter
SPT	Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.5-inch inside diameter
ST	Shelby Tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure

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GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

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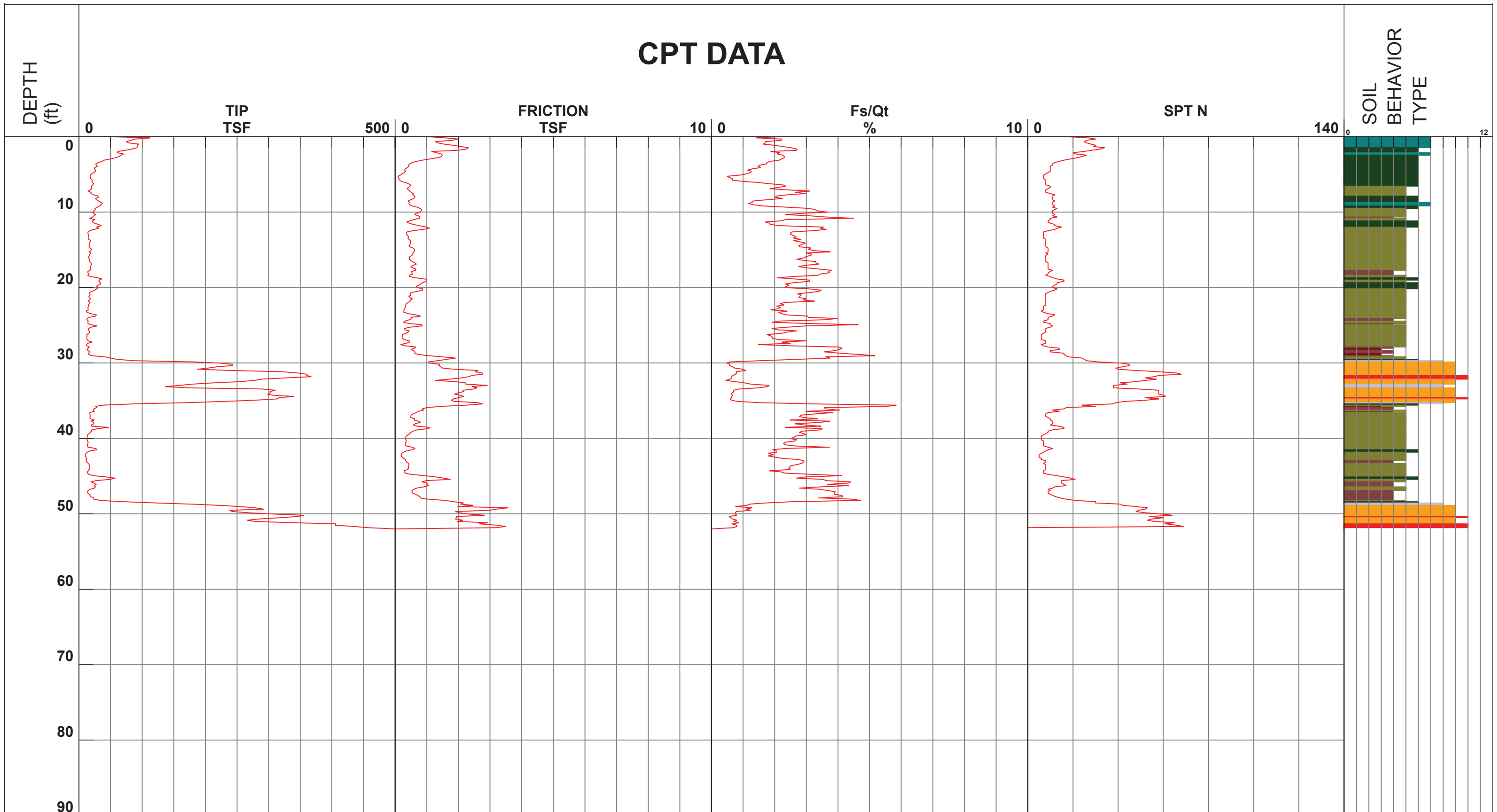
CLASSIFICATION CHART

Date 05/14/15 | Project No. 770620902 | Figure B-9

APPENDIX C

LOGS OF CONE PENETRATION TESTS



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-4

Date 06/06/18	Project No. 770620902	Figure C-1

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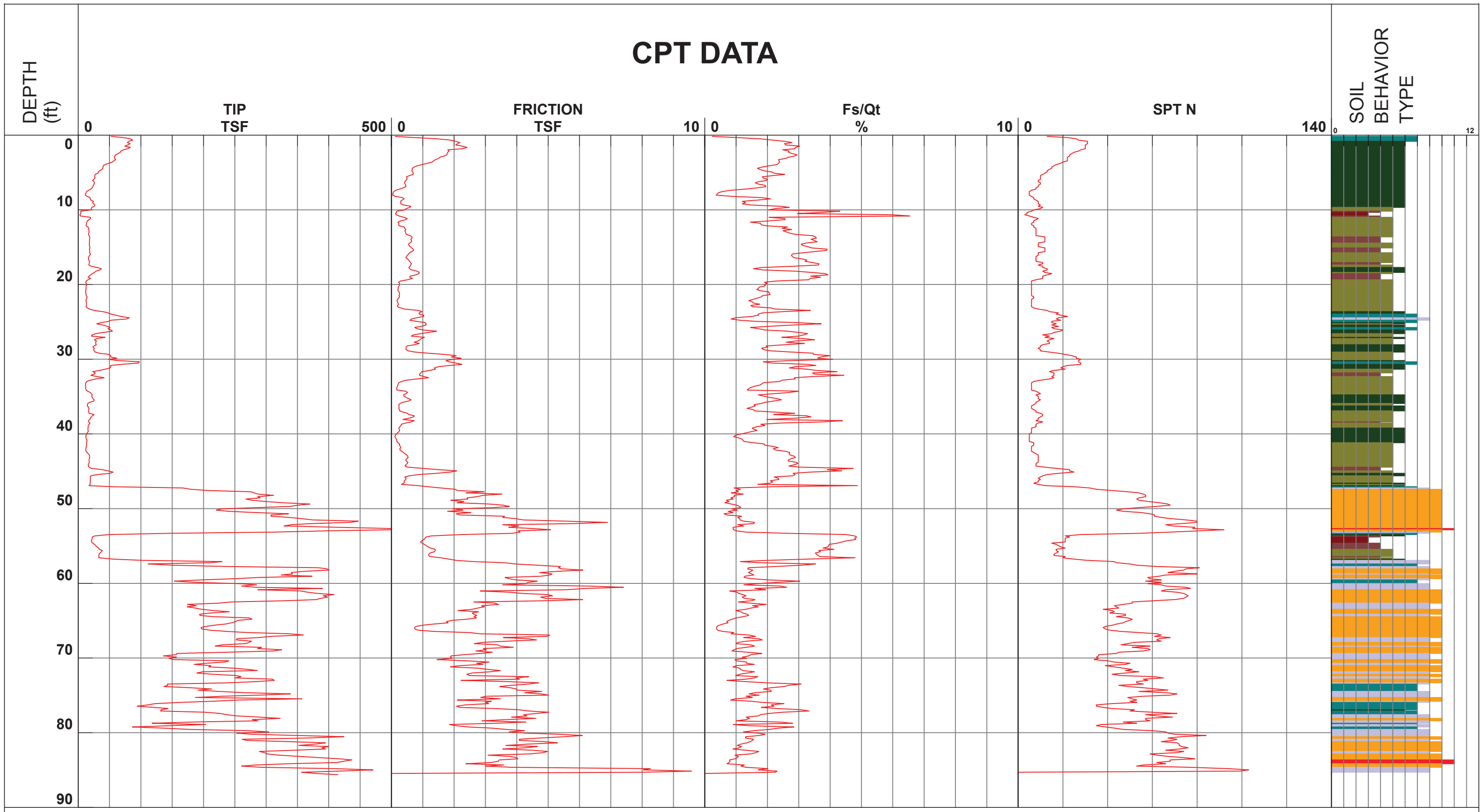
Terminated at 52.2 feet.
Groundwater not encountered.
Date performed 04/29/15.
Ground surface elevation: 203.8 feet, NAVD 88.



■ 1 - sensitive fine grained ■ 4 - silty clay to clay ■ 7 - silty sand to sandy silt ■ 10 - gravelly sand to sand
■ 2 - organic material ■ 5 - clayey silt to silty clay ■ 8 - sand to silty sand ■ 11 - very stiff fine grained (*)
■ 3 - clay ■ 6 - sandy silt to clayey silt ■ 9 - sand ■ 12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

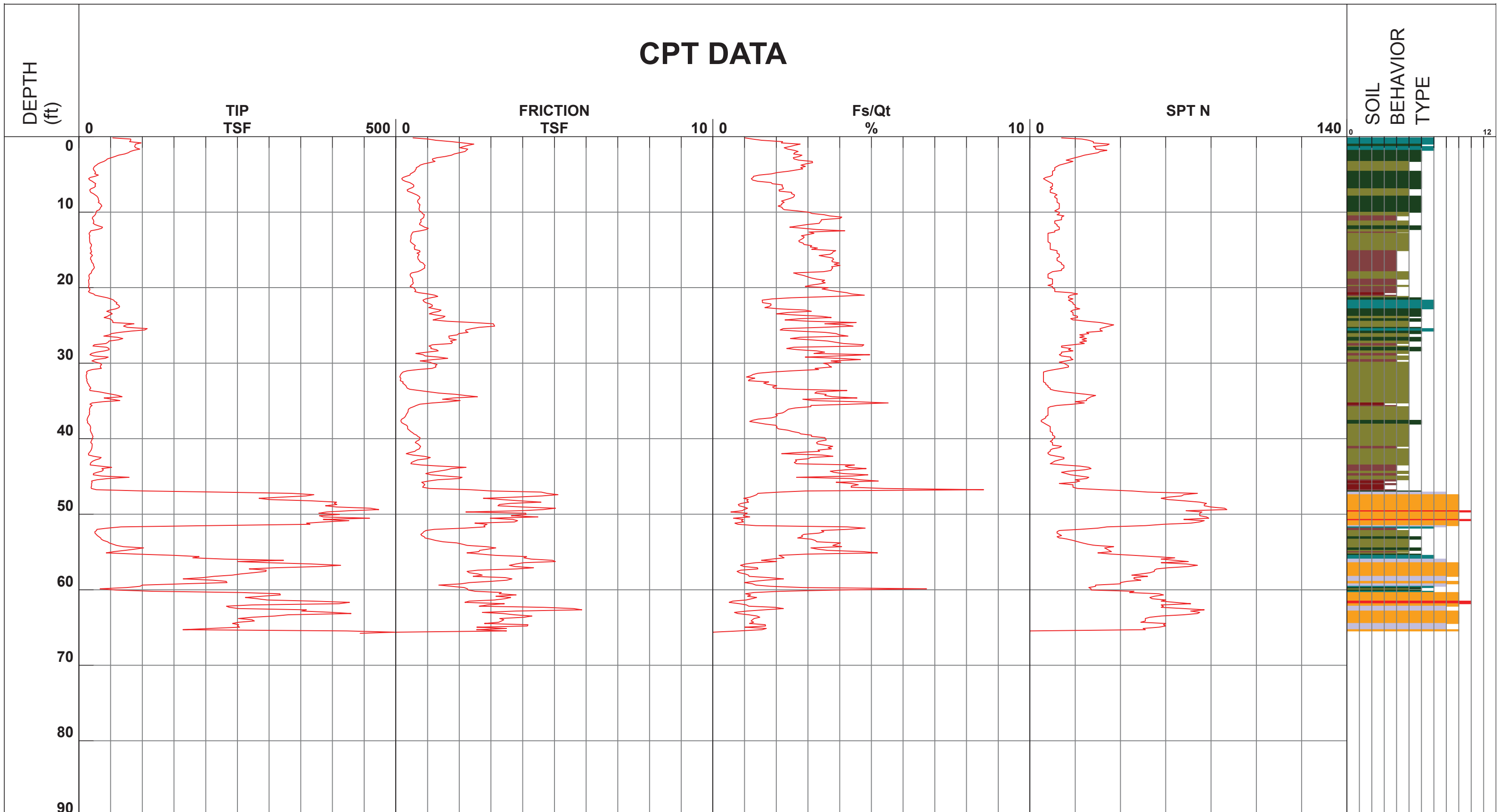
Terminated at 85.6 feet.
Groundwater measured at 64.1 feet (PPDT, see Figure C-19).
Date performed 04/29/15.
Ground surface elevation: 204.4 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-5

Date 06/06/18	Project No. 770620902	Figure C-2

LANGAN



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

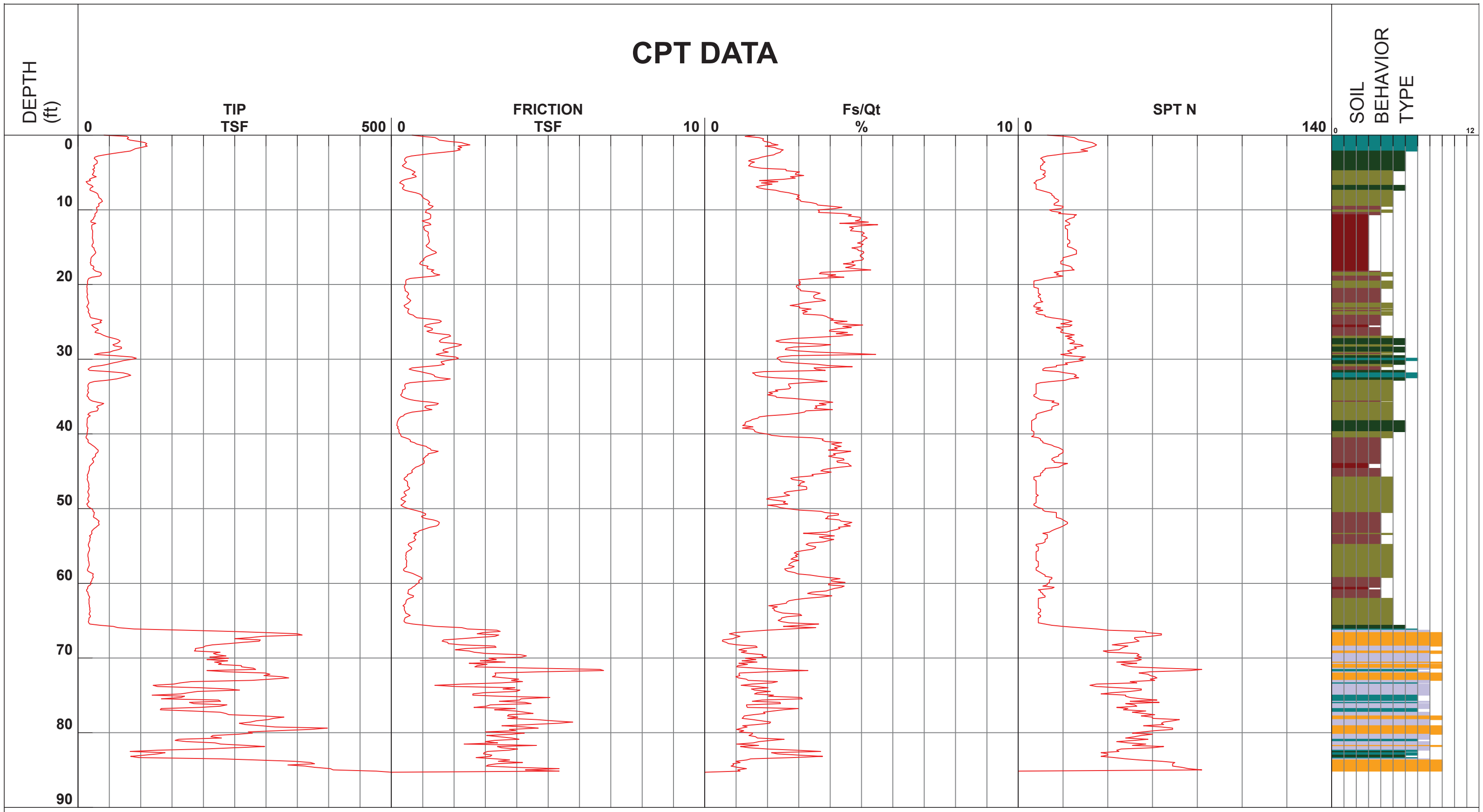
Terminated at 65.8 feet.
Groundwater estimated at 63 feet.
Date performed 04/29/15.
Ground surface elevation: 202.8 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-6

Date 06/06/18	Project No. 770620902	Figure C-3

LANGAN



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

EQUINIX SV12
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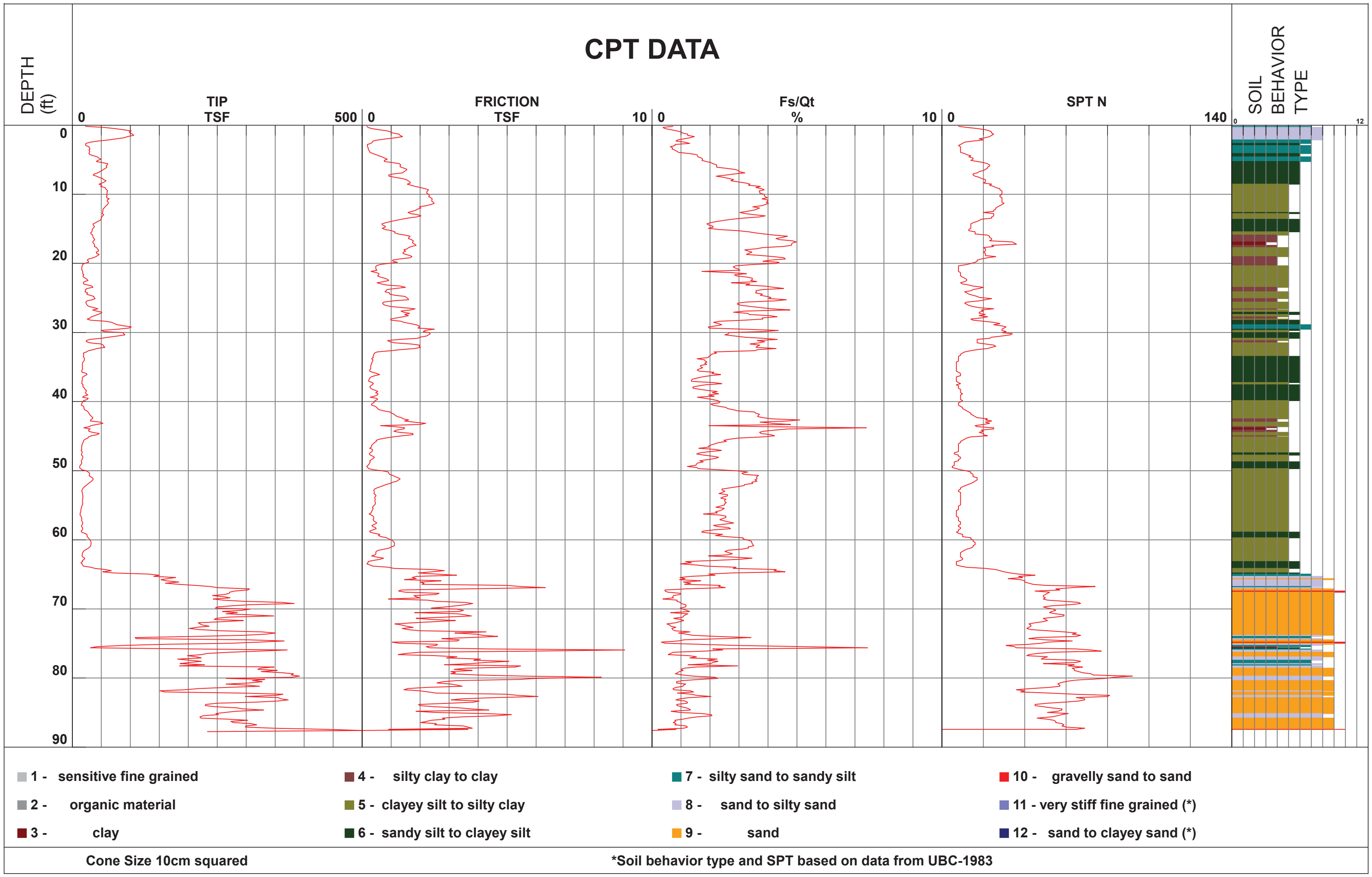
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-7

Date 06/06/18	Project No. 770620902	Figure C-4

LANGAN

Terminated at 85.4 feet.
Groundwater measured at 63.2 feet (PPDT, see Figure C-20).
Date performed 04/29/15.
Ground surface elevation: 204.6 feet, NAVD 88.



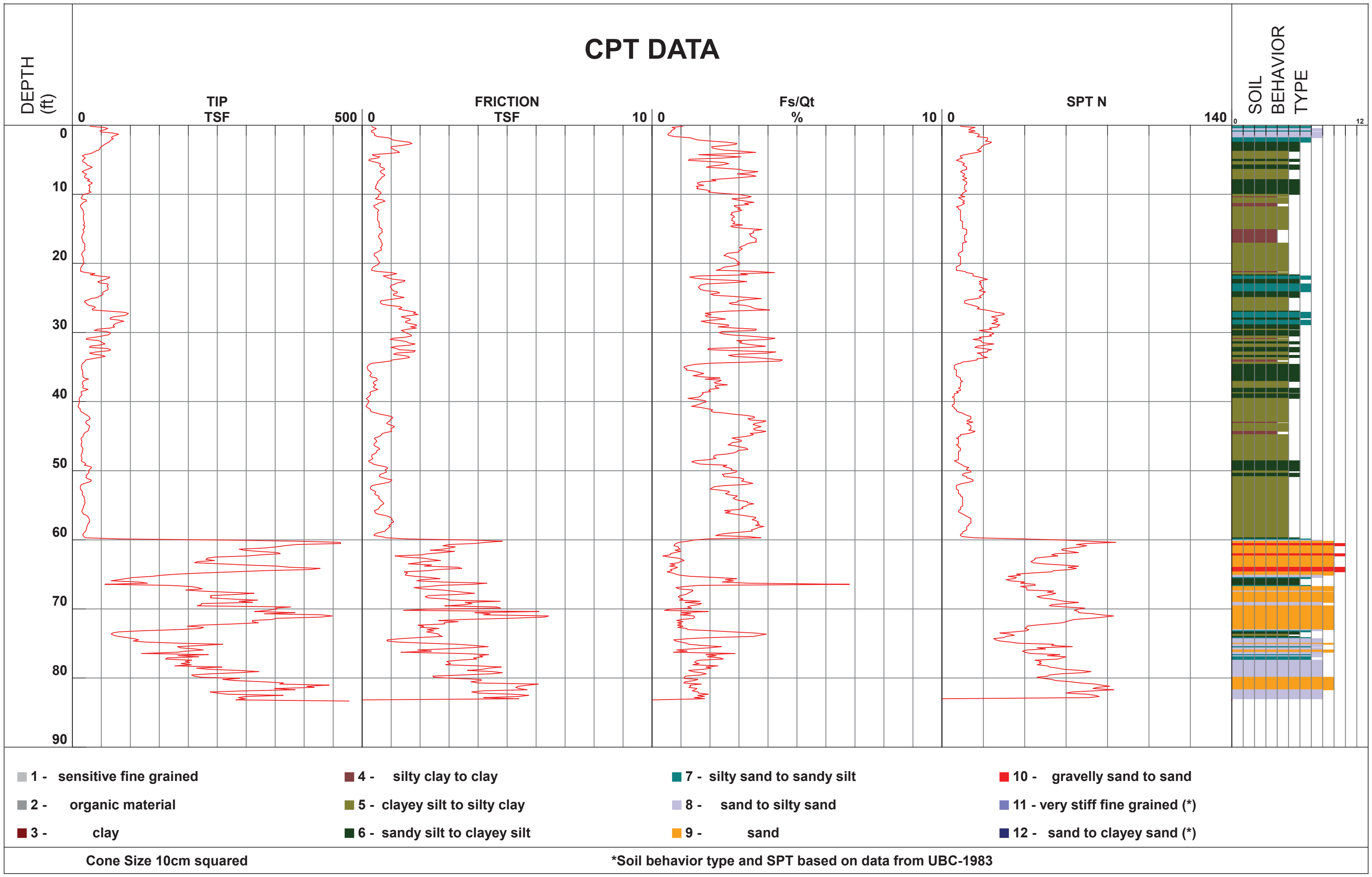
Terminated at 87.8 feet.
Groundwater measured at 66.5 feet (PPDT, see Figure C-21)
Date performed 04/29/15.
Ground surface elevation: 205.3 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-8

Date 06/06/18	Project No. 770620902	Figure C-5

LANGAN



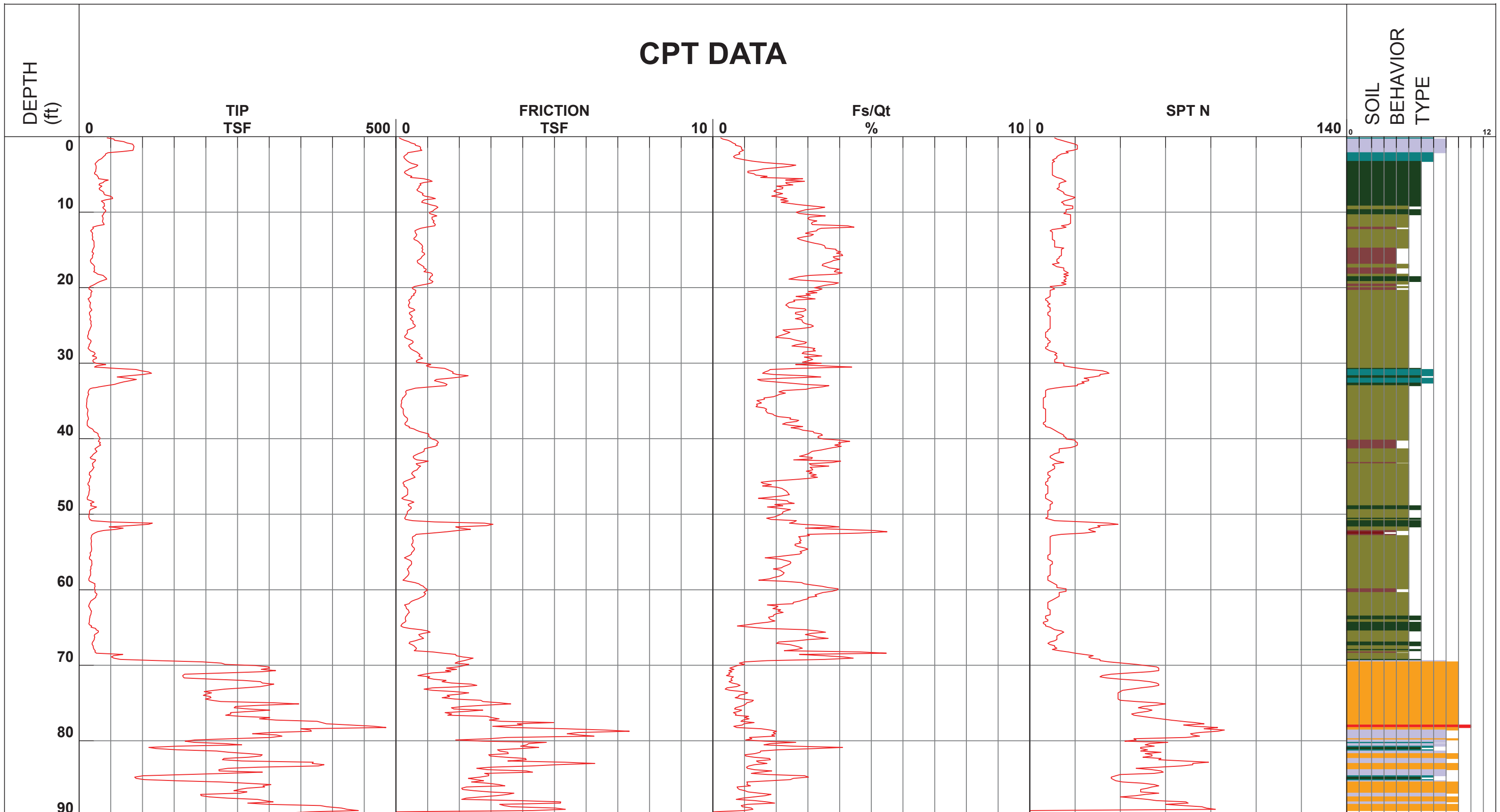
Terminated at 83.3 feet.
Groundwater measured at 69.3 feet (PPDT, see Figure C-22).
Date performed 05/01/15.
Ground surface elevation: 202.1 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-9

Date 06/06/18	Project No. 770620902	Figure C-6

LANGAN



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

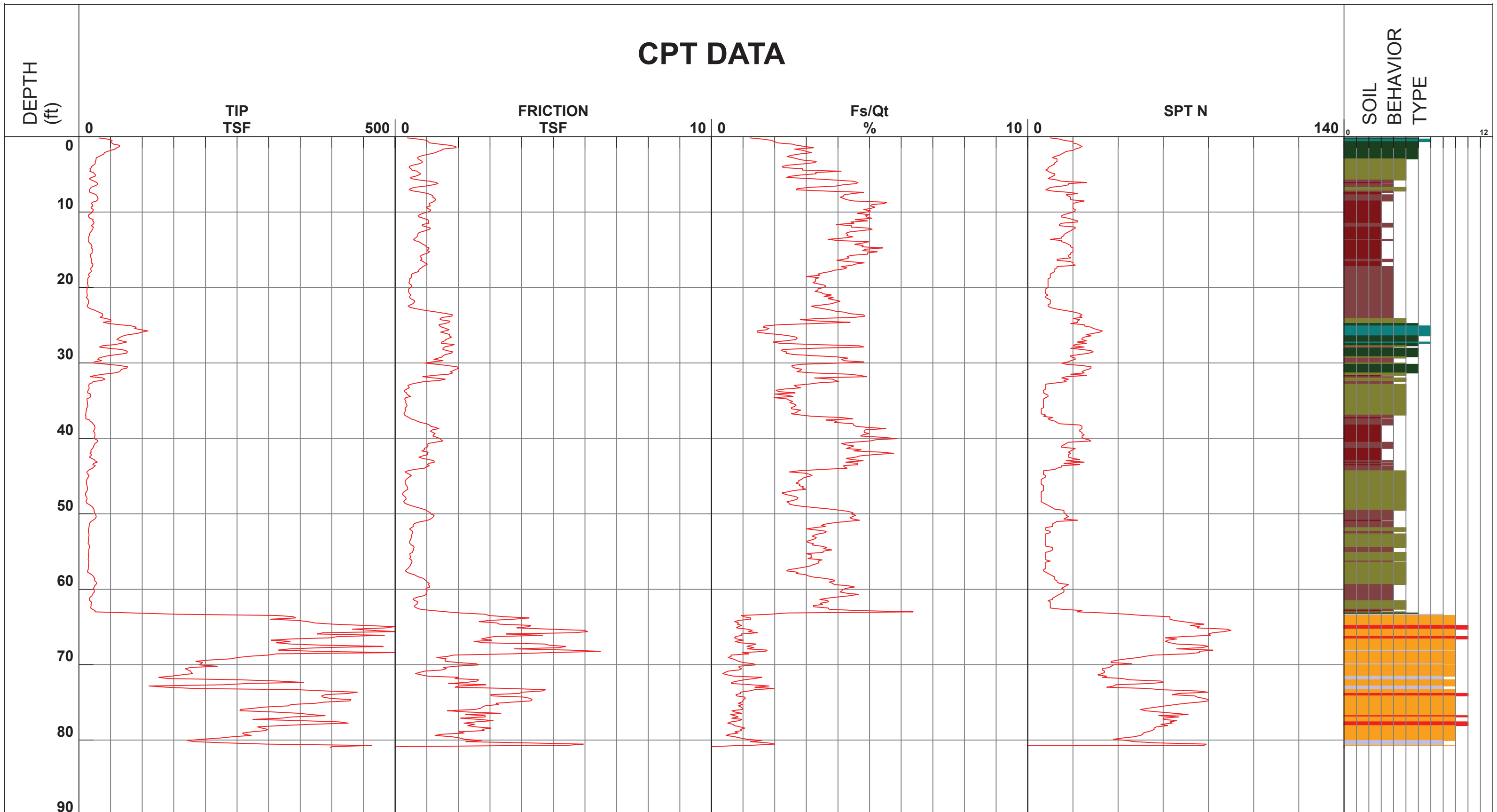
Terminated at 89.5 feet.
Groundwater estimated at 63 feet
Date performed 04/30/15.
Ground surface elevation: 204.3 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-10

Date 06/06/18	Project No. 770620902	Figure C-7

LANGAN



■ 1 - sensitive fine grained
■ 2 - organic material
■ 3 - clay
■ 4 - silty clay to clay
■ 5 - clayey silt to silty clay
■ 6 - sandy silt to clayey silt
■ 7 - silty sand to sandy silt
■ 8 - sand to silty sand
■ 9 - sand
■ 10 - gravelly sand to sand
■ 11 - very stiff fine grained (*)
■ 12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Terminated at 81 feet.
Groundwater measured at 64 feet (PPDT, see Figure C-23)
Date performed 05/01/15.
Ground surface elevation: 202.5 feet, NAVD 88.

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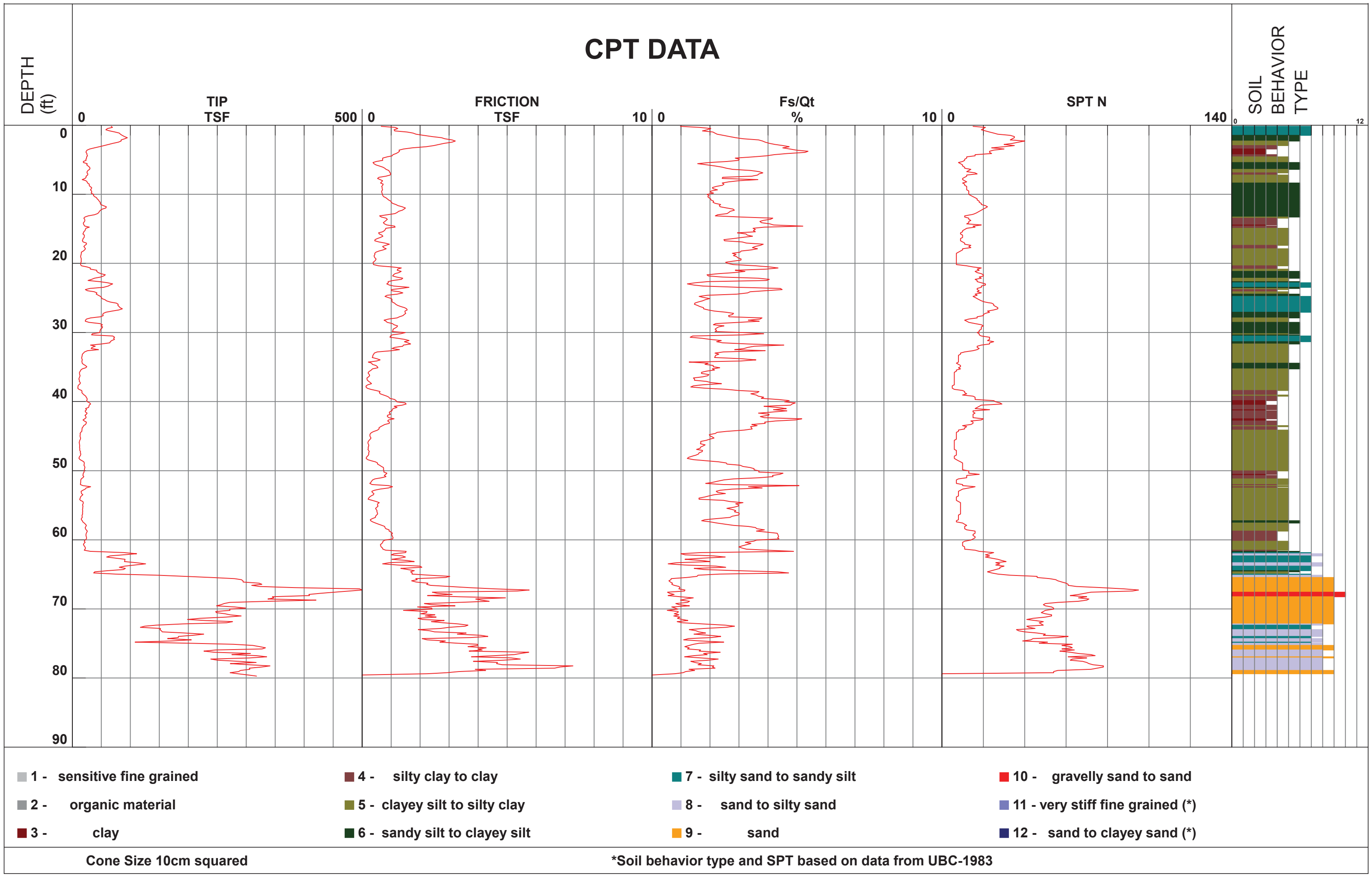
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-11

Date 06/06/18	Project No. 770620902	Figure C-8

LANGAN



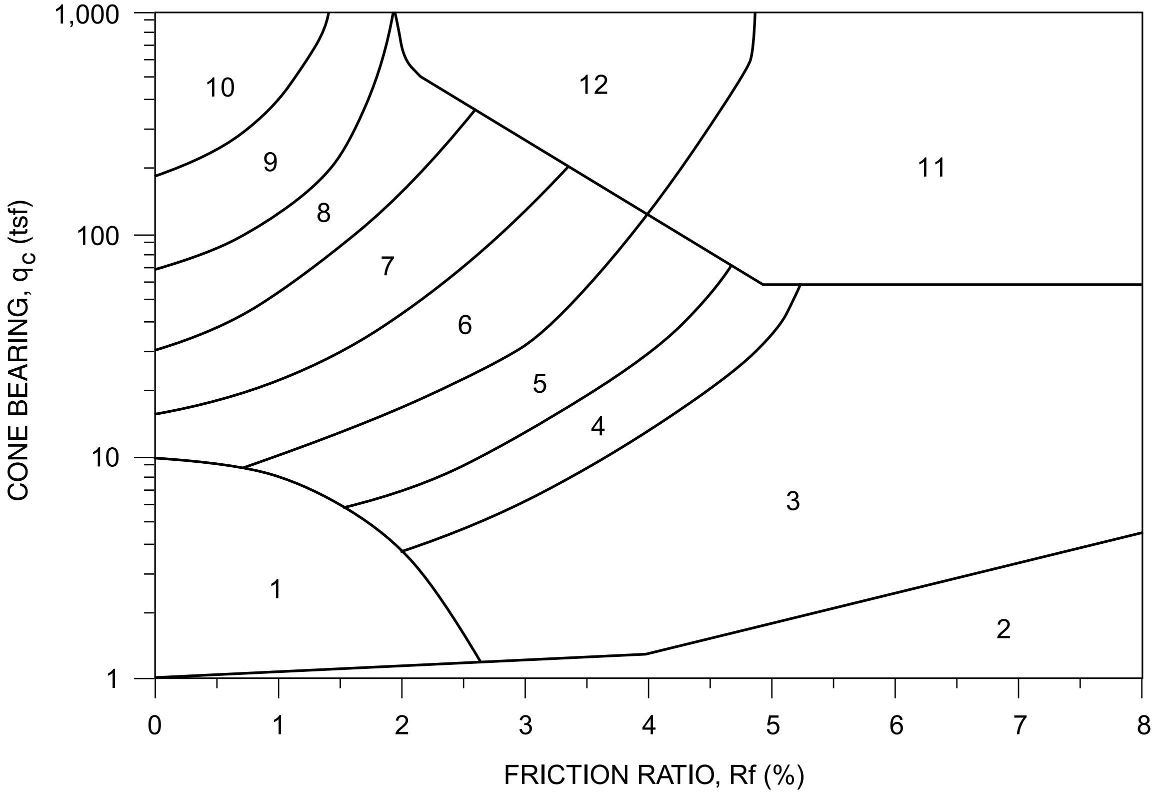
Terminated at 79.7 feet.
Groundwater estimated at 63 feet
Date performed 04/30/15.
Ground surface elevation: 201.3 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

CONE PENETRATION TEST RESULTS
CPT-12

Date 06/06/18	Project No. 770620902	Figure C-9

LANGAN



ZONE	q_c/N[1]	Su Factor (Nk)[2]	SOIL BEHAVIOR TYPE[1]
1	2	15 (10 for $q_c \leq 9$ tsf)	Sensitive Fine-Grained
2	1	15 (10 for $q_c \leq 9$ tsf)	Organic Material
3	1	15 (10 for $q_c \leq 9$ tsf)	CLAY
4	1.5	15	SILTY CLAY to CLAY
5	2	15	CLAYEY SILT to SILTY CLAY
6	2.5	15	SANDY SILT to CLAYEY SILT
7	3	---	SILTY SAND to SANDY SILT
8	4	---	SAND to SILTY SAND
9	5	---	SAND
10	6	---	GRAVELLY SAND to SAND
11	1	15	Very Stiff Fine-Grained (*)
12	2	---	SAND to CLAYEY SAND (*)

(*) Overconsolidated or Cemented
q_c = Tip Bearing
f_s = Sleeve Friction
$Rf = f_s/q_c \times 100$ = Friction Ratio

Note: Testing performed in accordance with ASTM D3441.

References: 1. Robertson, 1986, Olsen, 1988.
2. Bonaparte & Mitchell, 1979 (young Bay Mud $q_c \leq 9$).
Estimated from local experience (fine-grained soils $q_c > 9$).

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

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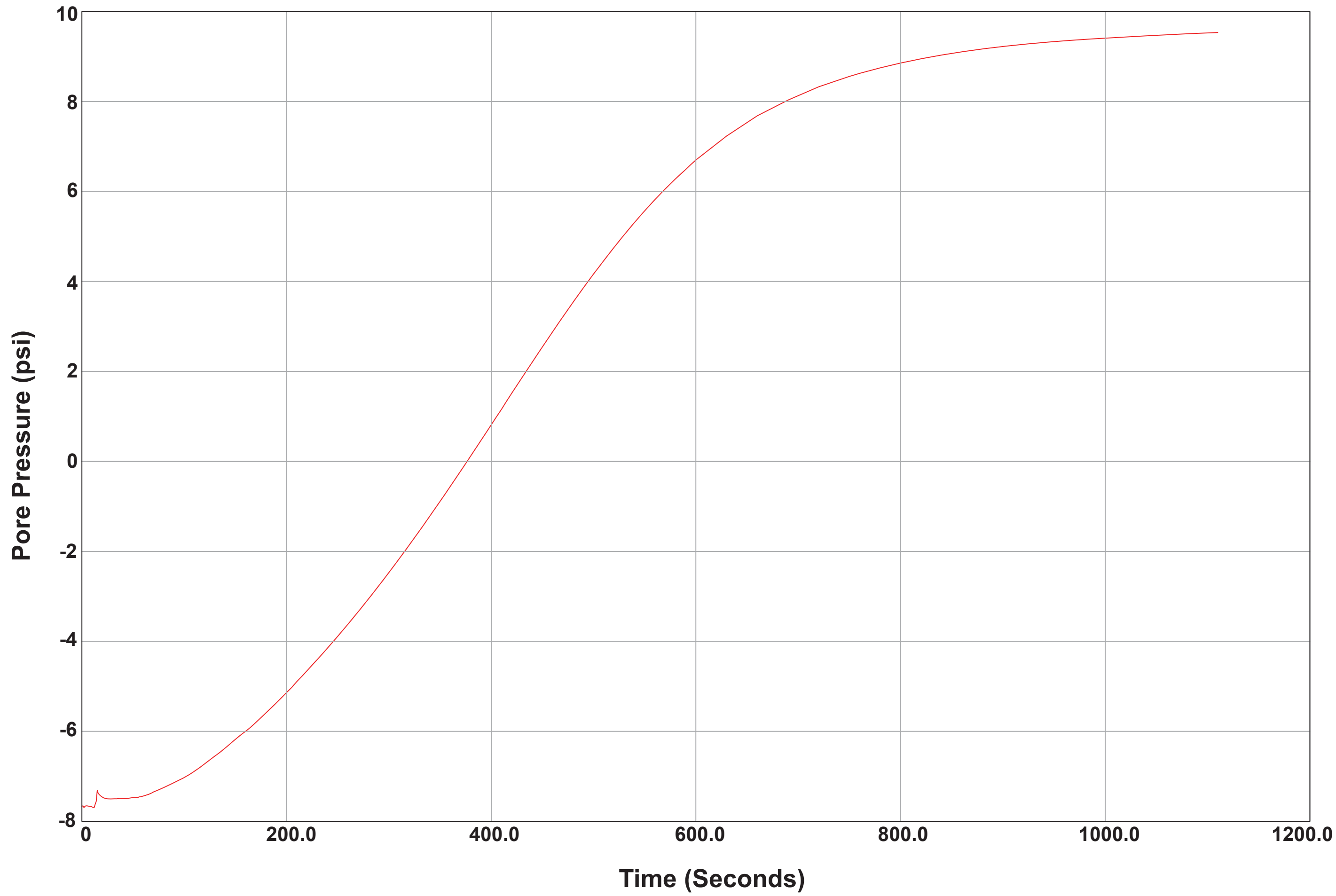
CLASSIFICATION CHART FOR CONE PENETRATION TESTS

Date 06/06/18	Project No. 770620902	Figure C-10



CPT (no.)	Approximate Depth (feet)	End Point (psi)	Calculated Head (feet)	Calculated GW Depth (feet)	Calculated GW Elevation (feet)
CPT-5	85.8	9.4	21.7	64.1	140.3

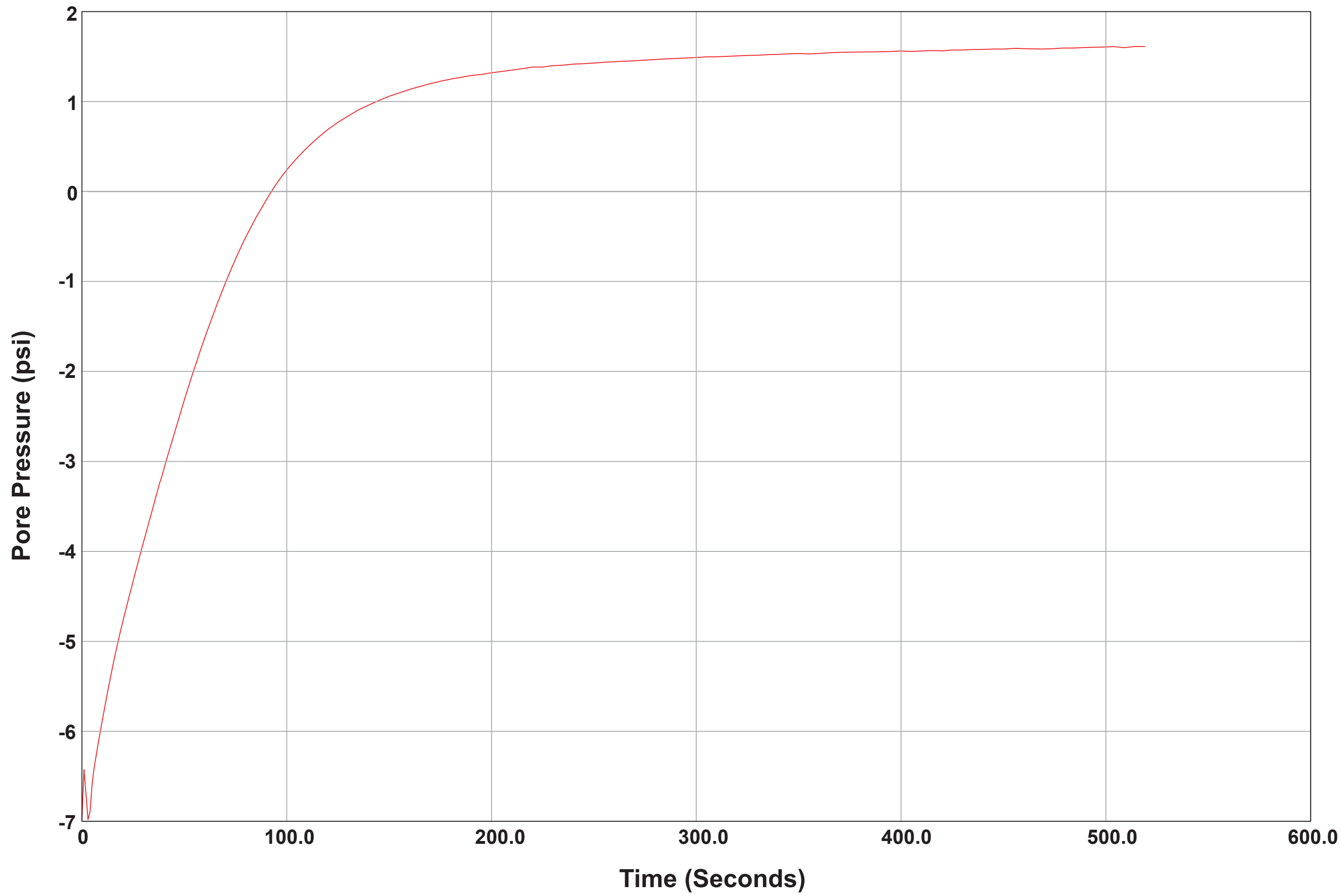
Note:
1. Ground Surface Elevation: 204.4 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

PORE PRESSURE DISSIPATION TEST
CPT-5

Date 06/06/18 | Project No. 770620902 | Figure C-11

LANGAN



CPT (no.)	Approximate Depth (feet)	End Point (psi)	Calculated Head (feet)	Calculated GW Depth (feet)	Calculated GW Elevation (feet)
CPT-7	66.9	1.6	3.7	63.2	141.4

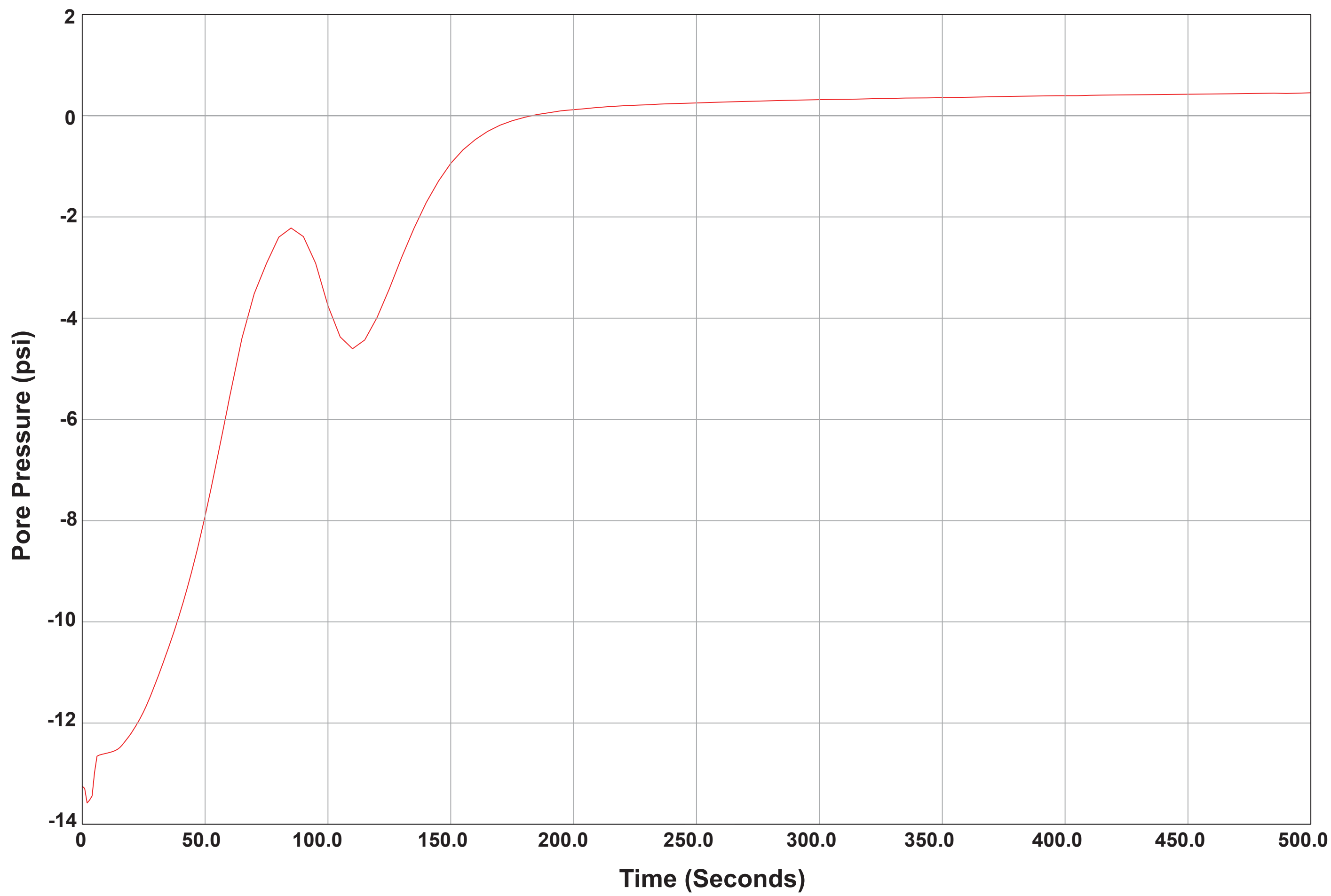
Note:
1. Ground Surface Elevation: 204.6 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

PORE PRESSURE DISSIPATION TEST
CPT-7

Date 06/06/18	Project No. 770620902	Figure C-12

LANGAN



CPT (no.)	Approximate Depth (feet)	End Point (psi)	Calculated Head (feet)	Calculated GW Depth (feet)	Calculated GW Elevation (feet)
CPT-8	67.4	0.4	0.9	66.5	138.8

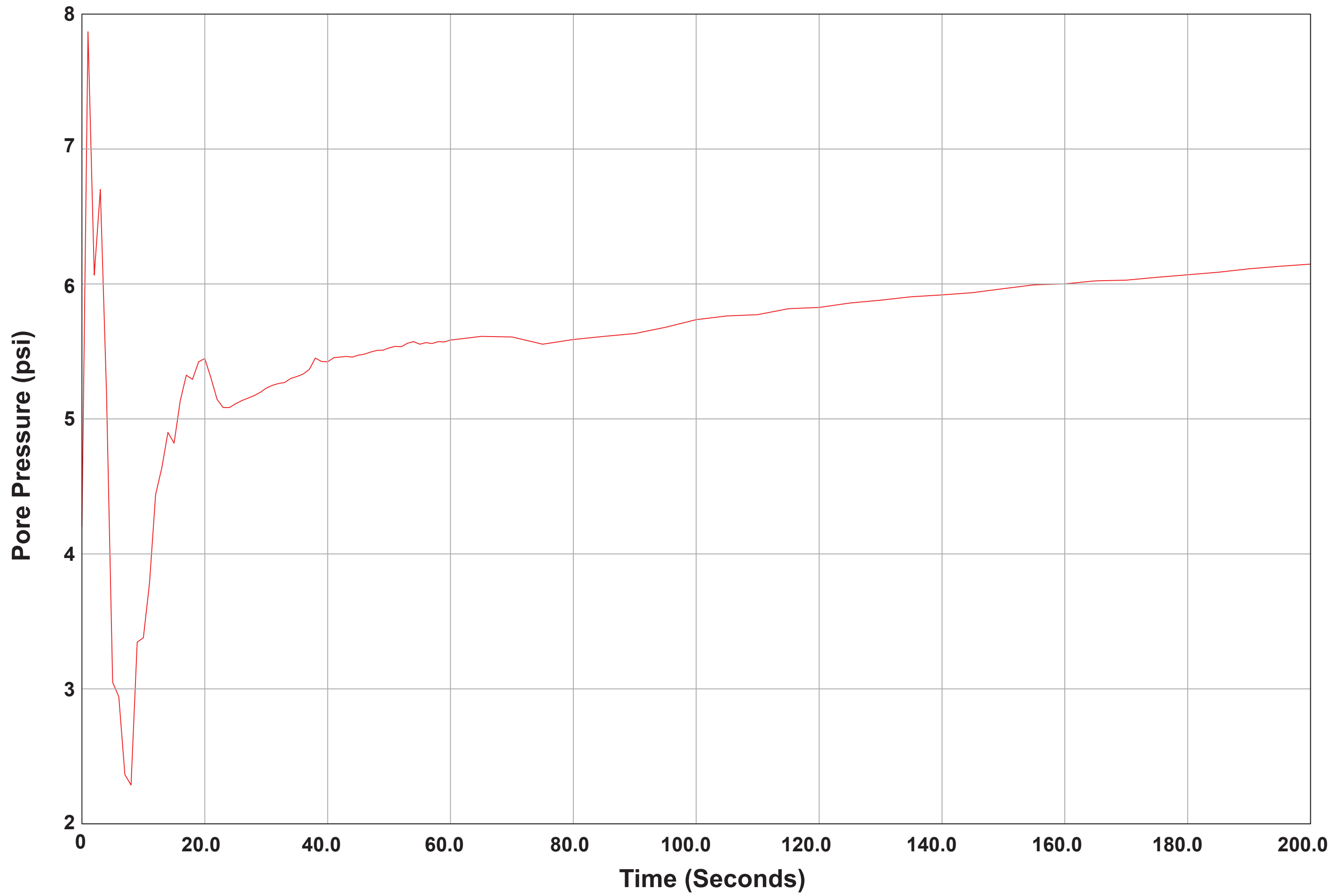
Note:
1. Ground Surface Elevation: 205.3 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

PORE PRESSURE DISSIPATION TEST
CPT-8

Date 06/06/18	Project No. 770620902	Figure C-13

LANGAN



CPT (no.)	Approximate Depth (feet)	End Point (psi)	Calculated Head (feet)	Calculated GW Depth (feet)	Calculated GW Elevation (feet)
CPT-9	83.3	6.1	14.0	69.3	132.8

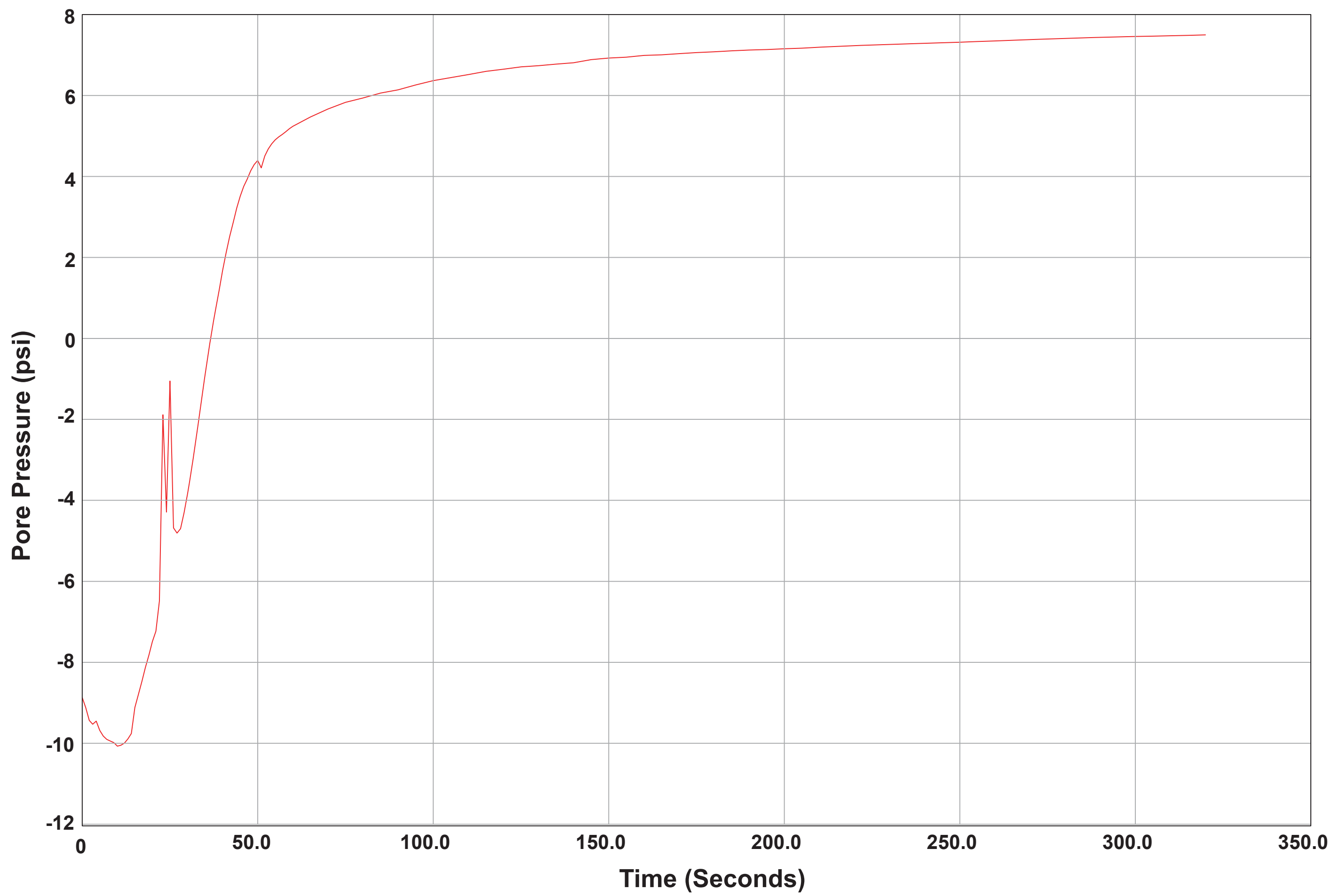
Note:
1. Ground Surface Elevation: 202.1 feet, NAVD 88. .

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

PORE PRESSURE DISSIPATION TEST
CPT-9

Date 06/06/18 | Project No. 770620902 | Figure C-14

LANGAN



CPT (no.)	Approximate Depth (feet)	End Point (psi)	Calculated Head (feet)	Calculated GW Depth (feet)	Calculated GW Elevation (feet)
CPT-11	81.0	7.4	17.0	64.0	138.5

Note:
1. Ground Surface Elevation: 202.5 feet, NAVD 88.

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

PORE PRESSURE DISSIPATION TEST
CPT-11

Date 06/06/18 | Project No. 770620902 | Figure C-15

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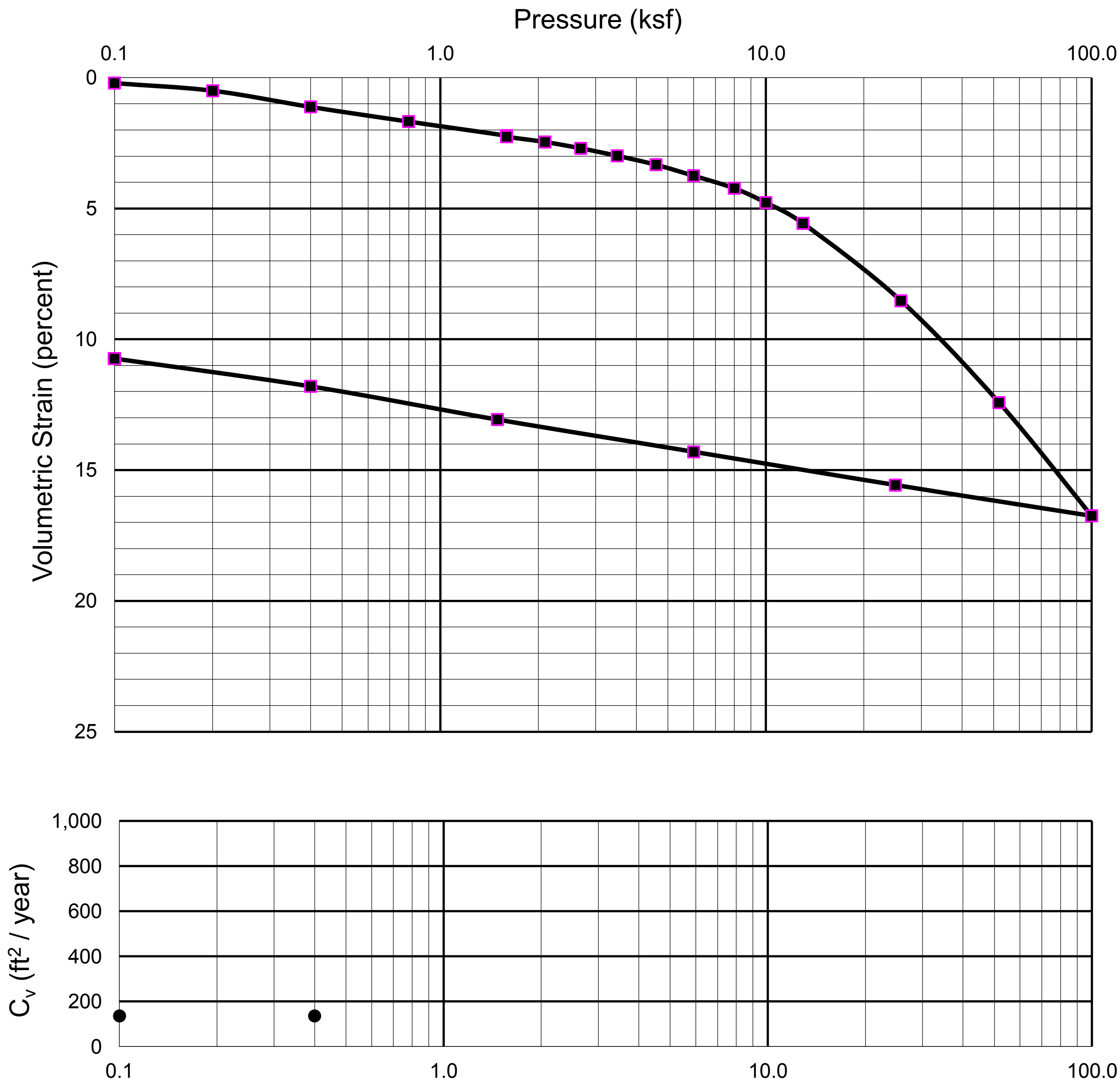
APPENDIX D

LABORATORY RESULTS



Sampler Type: Shelby Tube (ST)				Condition		Before Test		After Test
Diameter (in) 2.42		Height (in) 1.00		Water Content	w_o	22.5 %	w_f	16.7 %
Overburden Pressure, p_o	4,000	psf		Void Ratio	e_o	0.63	e_f	0.45
Preconsol. Pressure, p_c	18,000	psf		Saturation	S_o	97 %	S_f	100 %
Compression Ratio, $C_{\varepsilon c}$	0.15			Dry Density	γ_d	104 pcf	γ_d	116 pcf
LL - -		PL - -		PI - -			G_s 2.70	(assumed)
Classification CLAY (CL), yellow-brown with olive-gray and dark brown mottling							Source	B-4 at 35 feet

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

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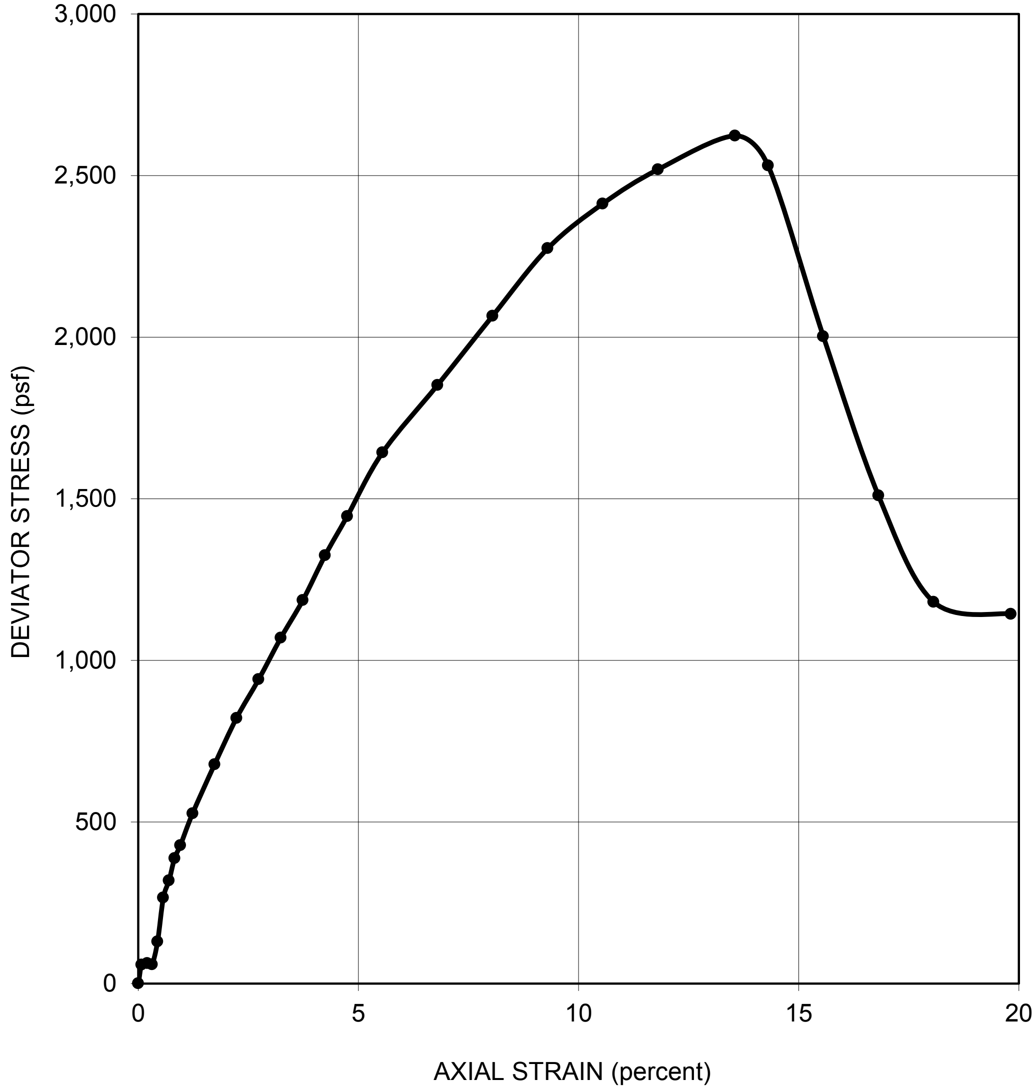
CONSOLIDATION TEST REPORT

Date 06/06/18 | Project No. 770620902 | Figure D-1



SAMPLER TYPE	Sprague and Henwood		SHEAR STRENGTH	1,310	psf
DIAMETER (in.) 2.4	HEIGHT (in.) 5.8		STRAIN AT FAILURE	13.6	%
MOISTURE CONTENT	28.7	%	CONFINING PRESSURE	3,200	psf
DRY DENSITY	91	pcf	STRAIN RATE	0.50	% / min
DESCRIPTION	CLAY (CL), light brown		SOURCE	B-1 at 24.5 feet	

EQUINIX SV12
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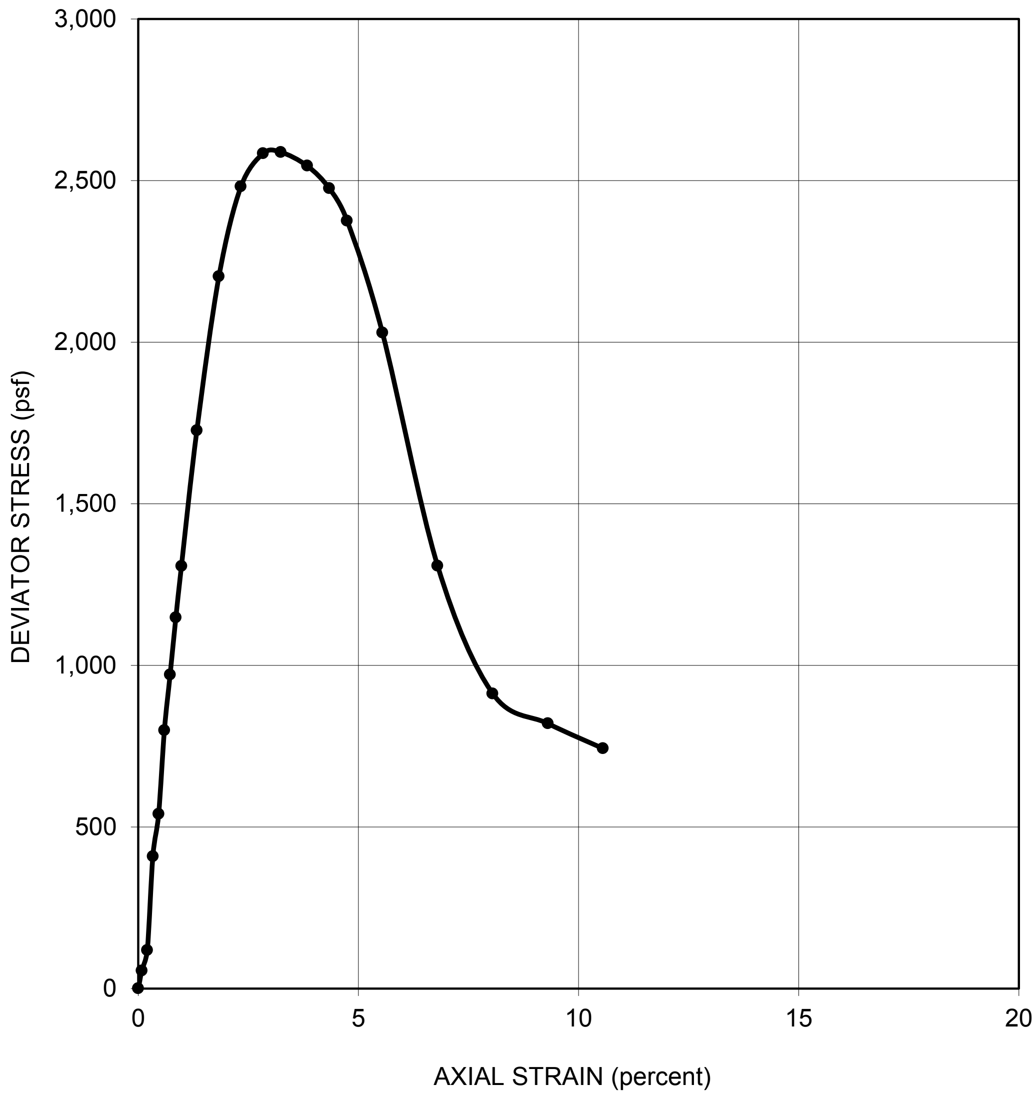
San Jose, California

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

LANGAN

Date 06/06/18 | Project No. 770620902 | Figure D-2



SAMPLER TYPE	Shelby Tube		SHEAR STRENGTH	1,290	psf
DIAMETER (in.) 2.9	HEIGHT (in.) 6.1		STRAIN AT FAILURE	3.2	%
MOISTURE CONTENT	27.9	%	CONFINING PRESSURE	2,400	psf
DRY DENSITY	95	pcf	STRAIN RATE	0.50	% / min
DESCRIPTION	SANDY CLAY (CL) yellow-brown with gray-brown mottling		SOURCE	B-2 at 20 feet	

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

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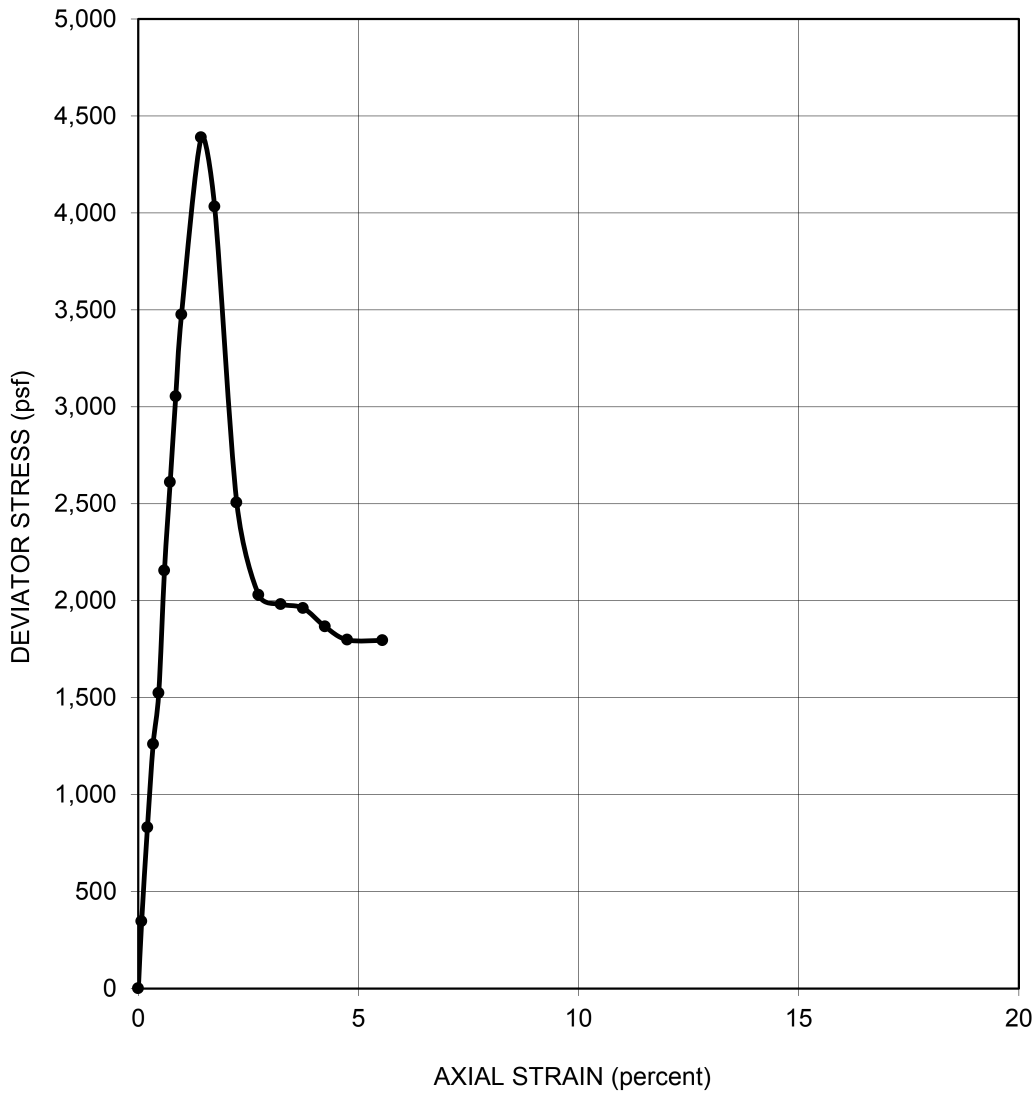
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Date 06/06/18 | Project No. 770620902 | Figure D-3



SAMPLER TYPE	Sprague and Henwood			SHEAR STRENGTH	2,190	psf
DIAMETER (in.)	2.4	HEIGHT (in.) 5.8		STRAIN AT FAILURE	1.4	%
MOISTURE CONTENT		10.8	%	CONFINING PRESSURE	1,050	psf
DRY DENSITY		100	pcf	STRAIN RATE	0.50	% / min
DESCRIPTION	SANDY CLAY (CL), yellow-brown				SOURCE	B-3 at 8.5 feet

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

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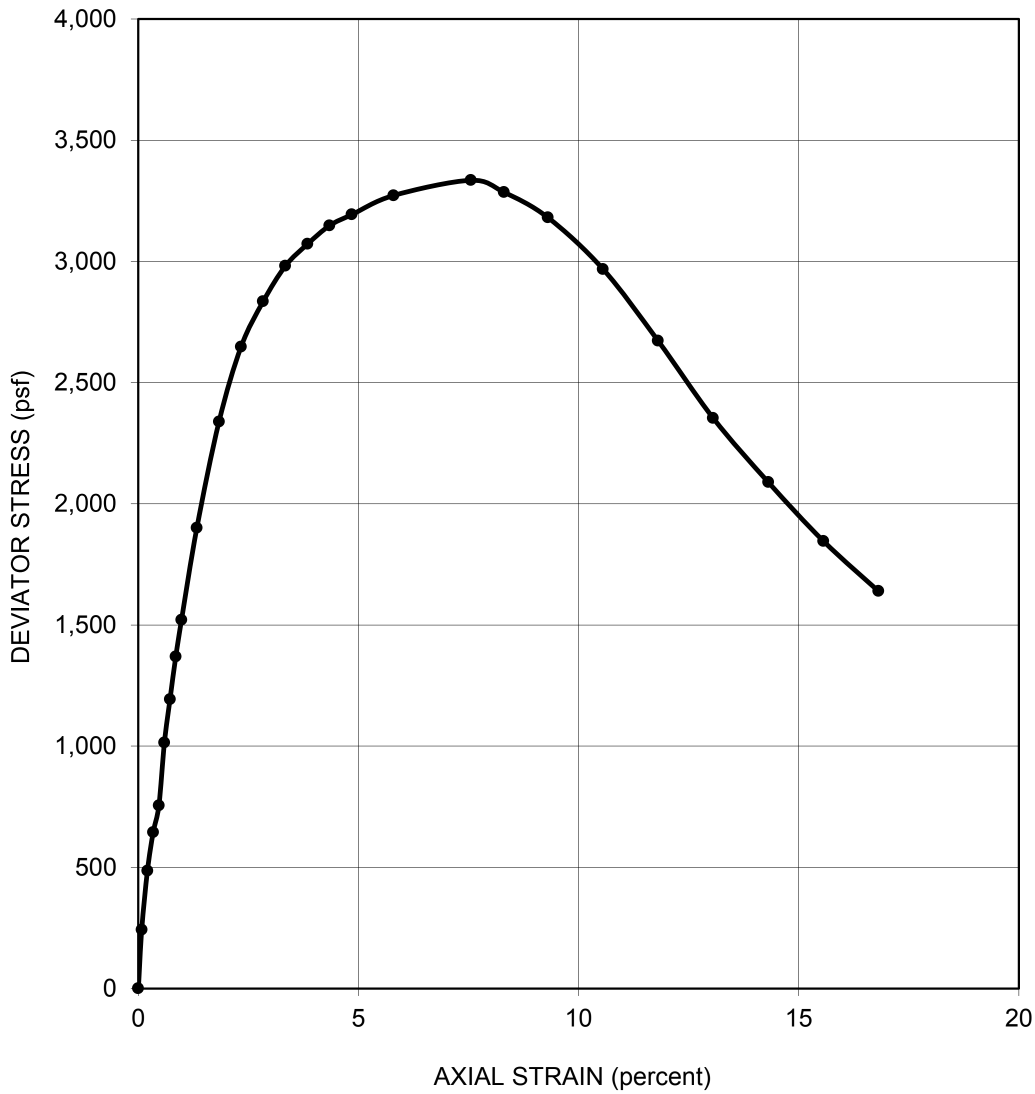
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Date 06/06/18 | Project No. 770620902 | Figure D-4



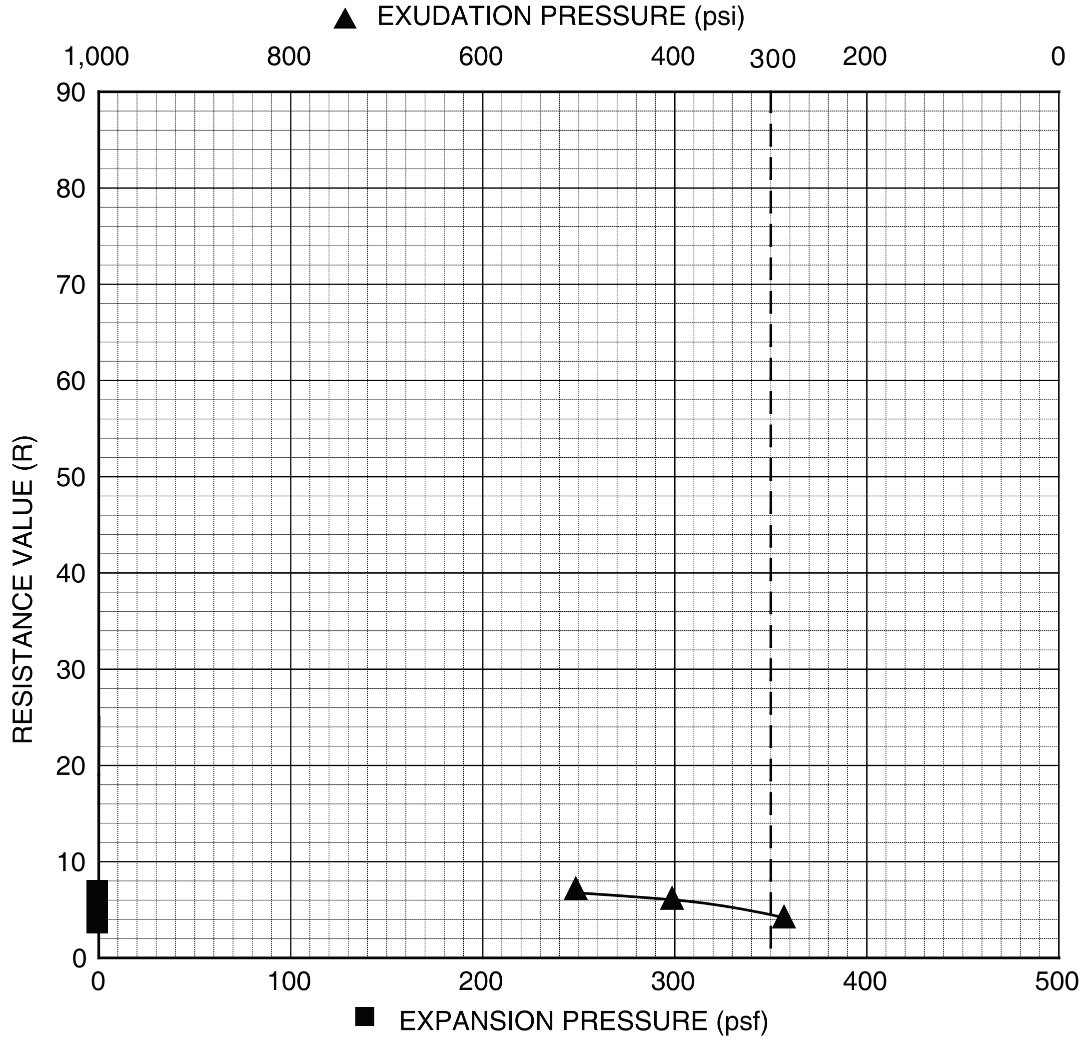
SAMPLER TYPE	Shelby Tube			SHEAR STRENGTH	1,670	psf
DIAMETER (in.)	2.9	HEIGHT (in.) 6.1		STRAIN AT FAILURE	7.6	%
MOISTURE CONTENT		19.5	%	CONFINING PRESSURE	6,000	psf
DRY DENSITY		109	pcf	STRAIN RATE	0.50	% / min
DESCRIPTION	CLAY with SAND (CL), yellow-brown				SOURCE	B-3 at 40 feet

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

LANGAN

Date 06/06/18 | Project No. 770620902 | Figure D-5



Specimen ID:	A	B	C	D
Water Content (%)	21.4	19.6	18.3	--
Dry Density (pcf)	104.0	105.1	108.1	--
Exudation Pressure (psi)	285	404	504	--
Expansion Pressure (psf)	0.00	0.00	0.00	--
Resistance Value (R)	4	6	7	--

Sample Source	Sample Description	Sand Equivalent	Expansion Pressure	R value
B-4 at 0-5 feet	CLAY (CL), brown	--	--	5

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

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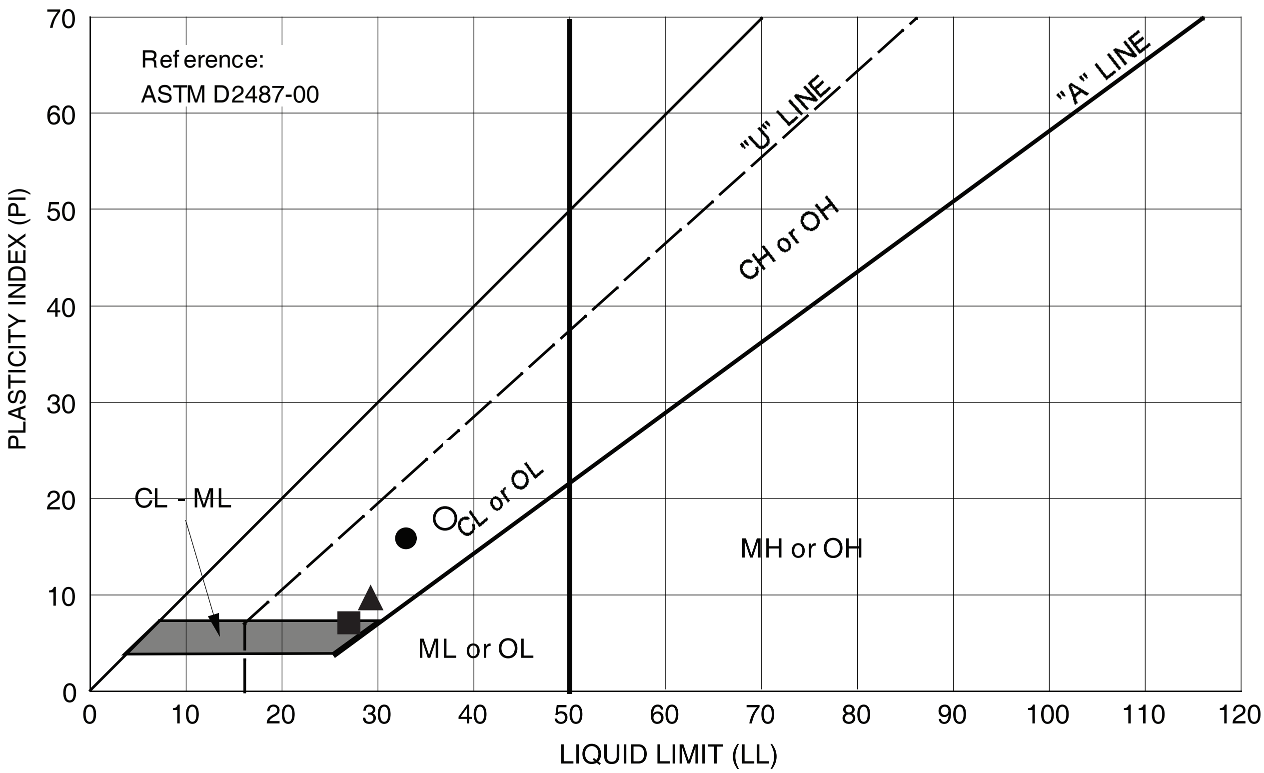
RESISTANCE VALUE TEST DATA

Date 06/06/18 | Project No. 770620902 | Figure D-6



Symbol	Source	Description and Classification	Natural M.C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
●	B-1 at 0.5 feet	CLAY (CL), brown	--	33	16	--
■	B-2 at 8.5 feet	SANDY SILTY CLAY (CL-ML), yellow-brown	--	27	7	--
▲	B-3 at 11 feet	CLAY with SAND (CL), yellow-brown	--	29	9	--
○	B-4 at 3 feet	CLAY (CL), brown	--	37	18	--

EQUINIX SV12
GREAT OAKS BLVD & VIA DEL ORO
San Jose, California

LANGAN

PLASTICITY CHART

Date 06/06/18 | Project No. 770620902 | Figure D-7

APPENDIX E

CORROSIVITY ANALYSES WITH BRIEF EVALUATION

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

14 May, 2015

Job No. 1505065
Cust. No.10727

Ms. Serena Jang
Langan Treadwell Rollo
555 Montgomery Street, Suite 1300
San Francisco, CA 94111

Subject: Project No.: 770620902.700.211
Project Name: SV12 – San Jose
Corrosivity Analysis – ASTM Methods

Dear Ms. Jang:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on May 11, 2015. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, both samples are classified as "moderately corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations are none detected to 15 mg/kg

The sulfate ion concentrations range from none detected to 16 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils range from 7.63 to 8.18, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials range from 430 to 440-mV which is indicative of aerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Langan Treadwell Rollo
Client's Project No.: 770620902.700.211
Client's Project Name: SV12 - San Jose
Date Sampled: 04/28 & 05/01/15
Date Received: 11-May-15
Matrix: Soil
Authorization: Chain of Custody

Date of Report: 14-May-2015

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1505065-001	B-2, 5-3	440	8.18	-	5,700	-	N.D.	16
1505065-002	B-8, 5-1	430	7.63	-	7,100	-	N.D.	N.D.

	Redox	pH	Conductivity	Resistivity	Sulfide	Chloride	Sulfate
Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	13-May-2015	13-May-2015	-	11-May-2015	-	13-May-2015	13-May-2015

* Results Reported on "As Received" Basis

N.D. - None Detected

Cheryl McMillen
Laboratory Director

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

1505065

10727

Chain of Custody

Page 1 of 1

1100 Willow Pass Court
Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775
CERCC analytica

Job No.	CU#		Client Project I.D.
770620902	900	217	SV12

Schedule:

Analyte:

Date Sampled:

Date Due: Normal TAT

Full Name: SERENA JANG + Matt Lautton

Fax:

Phone: (415) 955-5273

Company: LANGAN TREADWELL ROLLO

Cell: ☒

Sample Source: SV12 - San Jose

ASTM w/Brief Evaluation — ANALYSIS

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated		Brief Evaluation
001	B-2, 5-3	4/28		S				1	x	x	x	x	x		x
002	B-8, 5-1	5/1		S				1	x	x	x	x	x		x

Send result to both Matt + Seena

GSO

MATRIX
DW - Drinking Water
GW - Ground Water
SW - Surface Water
WW - Waste Water
Water
SL - Sludge
S - Soil
Product

ABBREVIATIONS
HB - Hosebib
PV - Petcock Valve
PT - Pressure Tank
PH - Pump House
RR - Restroom
GL - Glass
PL - Plastic
ST - Sterile

SAMPLE RECEIPT
Total No. of Containers:
Rec'd Good Cond/Cold:
Conforms to Record:
Temp. a t Lab -°C:
Sampler:

	Date	Time
Relinquished By:		
Received By: [illegible]	5/11/15	8:23
Relinquished By:		
Received By:		
Relinquished By:		
Received By:		

Comments:
THERE IS AN ADDITIONAL CHARGE FOR METAL/POLY TUBES

APPENDIX F

FIELD ELECTRICAL RESISTIVITY AND THERMAL CONDUCTIVITY TESTING

August 13, 2015

Langan Treadwell Rollo
4030 Moorpark Ave., Suite 210
San Jose, CA 95117-1849

Attention: **Ms. Serena T. Jang, P.E.**
Associate

Subject: **Field Electrical Resistivity Testing and Thermal Conductivity Testing**
SV12 Data Center
San Jose, CA

Dear Ms. Jang,

Pursuant to your request, **JDH Corrosion Consultants, Inc**. has conducted electrical resistivity testing and thermal conductivity testing at the above referenced project site and we have provided herein the data required for grounding calculations and cable rating analysis.

Our Scope of Work was:

TASK A – Field Resistivity Testing

Perform resistivity soundings in general accordance with ASTM G57, using the Wenner, four electrode array, and "a" spacing of 2, 5, 10, 15, 20, 30, 50, 75, and 100 ft. at three (3) locations in the proposed structure footprint area at each of the two project sites. At each location, collect data along two perpendicular arrays, centering at the approximate location, as site conditions and physical constraints allow. The actual location may be adjusted in location, length, or angle while on site to avoid obstructions or known buried metallic objects. This portion of the study will be conducted prior to drilling activities.

Deliverable

Provide the resistivity data in both tabular and graphical format in a data report, including a brief description of a plan showing the location of our survey and coordinates of the center points of each array in a conventional coordinate system. Include a written discussion of the data collection methods, conditions encountered, and results. Include the probe spacing ("a" spacing), current, potential, resistance, and apparent resistivity in ohm-cm.

TASK B – Thermal Conductivity Testing

Conduct in-situ thermal resistivity and ambient temperature measurements at each location; at depth of 3-ft and 5-ft. At each location a single borehole shall be advanced (or 4-ft wide by 8-ft long by 5-ft deep test pit be excavated) to perform in-situ thermal tests and retrieve soil samples at appropriate depths.
Please note that in-situ testing cannot not be conducted if very hard, very gravelly soil or if bedrock is encountered.
We will supply the test instrument (Thermal Property Analyzer, developed by EPRI - Electric Power Research Institute), thermal probes, accessories, and the services of our field engineer to perform in-situ testing and soil sampling. Thermal testing will be conducted in accordance with IEEE Standard.

Laboratory Testing

Perform laboratory tests on a total of 9 soil samples. The tests will include: the measurements of moisture content, density and thermal dryout tests (thermal resistivity versus moisture content). For thermal dryout tests, undisturbed tube samples will be used (if taken) otherwise, split-spoon samples or bulk samples will be re-constituted at 95% of single-point standard Proctor density and at field moisture content. All geotechnical testing shall be performed in accordance with **ASTM.**

Deliverable

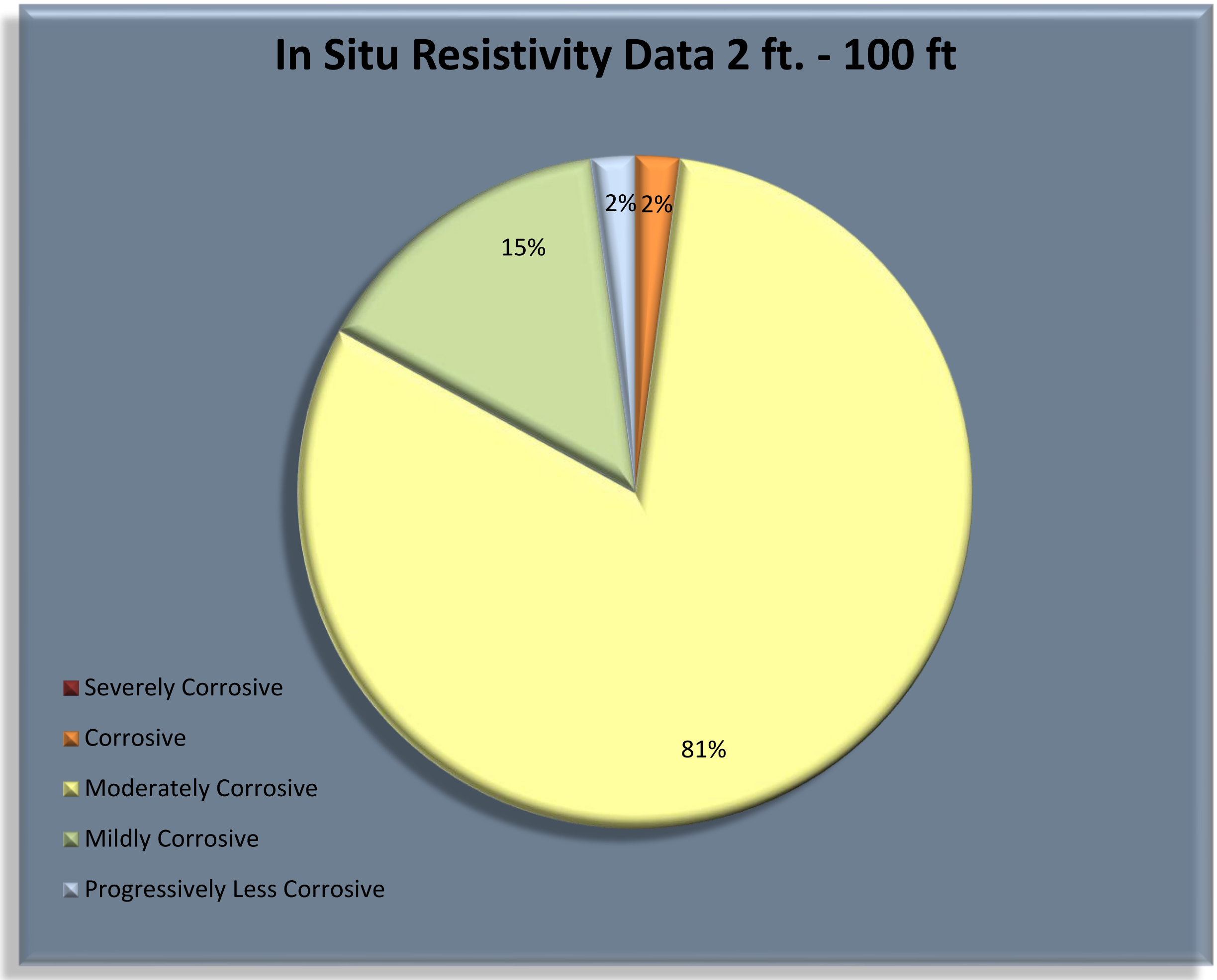
Provide a factual report on the findings, including in-situ and laboratory test results and a recommended thermal resistivity value for the cable rating. This will take into consideration the thermal dryout characteristics of the duct-bank concrete, native soil and corrective thermal backfill (if used).

Soil Testing and Analysis

In-Situ Soil Resistivity Measurements

The chart of the in-situ soil resistivity data for the soil layers 0 to 100 feet indicate that 2% of the soils are classified as “corrosive”, 81% of the soils are classified as “moderately corrosive”, 15%of the soils are classified as “mildly corrosive” and 2% of the soils are classified as “progressively less corrosive”.

Electrical resistivity data for grounding calculations is presented in the attached table.



The required data was collected using a Digital Ground Resistance and Soil Resistivity Tester Model 6470 manufactured by AEMC Instruments and presented in the Data Tables attached.

Weather conditions are the time of testing was a temperature of 83 degrees, humidity of 36% and winds SW at 5 mph.

Thermal Resistivity Measurements

In-situ thermal resistivity measurements were performed at the three (3) test locations and 9 soil samples were collected for laboratory analysis. Data and analysis is presented in the attached report.

LIMITATIONS

The conclusions and recommendations contained in this report reflect the opinion of the author of this report and are based on the information and assumptions referenced herein. All services provided herein were performed by persons who are experienced and skilled in providing these types of services and in accordance with the standards of workmanship in this profession. No other warrantees or guarantees either expressed or implied are provided.

We thank you for the opportunity to be of assistance on this important project. If you have any questions concerning this report or the recommendations provided herein, please feel free to contact us at (925) 927-6630.

Respectfully submitted,

Mohammed Ali

Mohammed Ali., P.E.
JDH Corrosion Consultants, Inc.
Principal

Brendon Hurley

Brendon Hurley
JDH Corrosion Consultants, Inc.
Field Technician

CC: File 15118

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Livermore, CA 94551
Tel: 925-999-9232
Fax: 925-999-8837
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SOIL THERMAL SURVEY
UNDERGROUND POWER CABLES - EQUINIX SV12 SITE
SAN JOSE, CALIFORNIA

July 2015

Prepared for:

JDH Corrosion Consultants, Inc.
1100 Willow Pass Court
Concord, CA 94520

Submitted by:

GEOTHERM USA, LLC

COOL SOLUTIONS FOR UNDERGROUND POWER CABLES
THERMAL SURVEYS, CORRECTIVE BACKFILLS & INSTRUMENTATION

Serving the electric power industry since 1978

SOIL THERMAL SURVEY
UNDERGROUND [POWER CABLES - EQUINIX SV12 SITE
SAN JOSE, CALIFORNIA

July 2015

Introduction:

A field thermal resistivity survey of the native soils was performed for the proposed underground power cables at the *Equinix SV12 site in San Jose, California*. The fieldwork was carried out on July 22nd 2015. *Langan Treadwell Rollo* identified the test locations and provided a backhoe with operator to excavate the test pits.

Field (in-situ) thermal testing and soil sampling:

In-situ thermal testing was conducted at 3 test locations (Table 1). At each location a backhoe was used to dig a 5-foot deep pit and in-situ thermal testing (TR) was performed at depths of 3, 4 and 5 feet. In addition, samples for visual description, moisture content and thermal dryout characterization were taken at each test location. Filed type thermal probes and the *Geotherm* TPA-2000 run off a portable power source was used for the in-situ testing. Thermal testing was conducted in accordance with the IEEE Standard 442. Laboratory geotechnical testing was conducted in accordance with ASTM.

The attached Tables present factual information on the subsurface conditions at the specific test pit locations; no warrantee is expressed or implied that materials or conditions other than those described may not be encountered along the cable routes.

Laboratory testing:

Laboratory tests were conducted on all nine (9) samples. The tests included the measurement of moisture content, density and thermal dryout characterization. The samples were prepared at the field (in-situ) moisture content and at 95% of the single-point standard Proctor density. A series of thermal resistivity measurements were made with the moisture content ranging from the 'in-situ' to totally dry condition. The results are given in **Table 2** and the dryout curves are presented in **Figures 1 to 3.**

Please contact us should you have any questions or require additional information.

Geotherm USA

Deepak Parmar

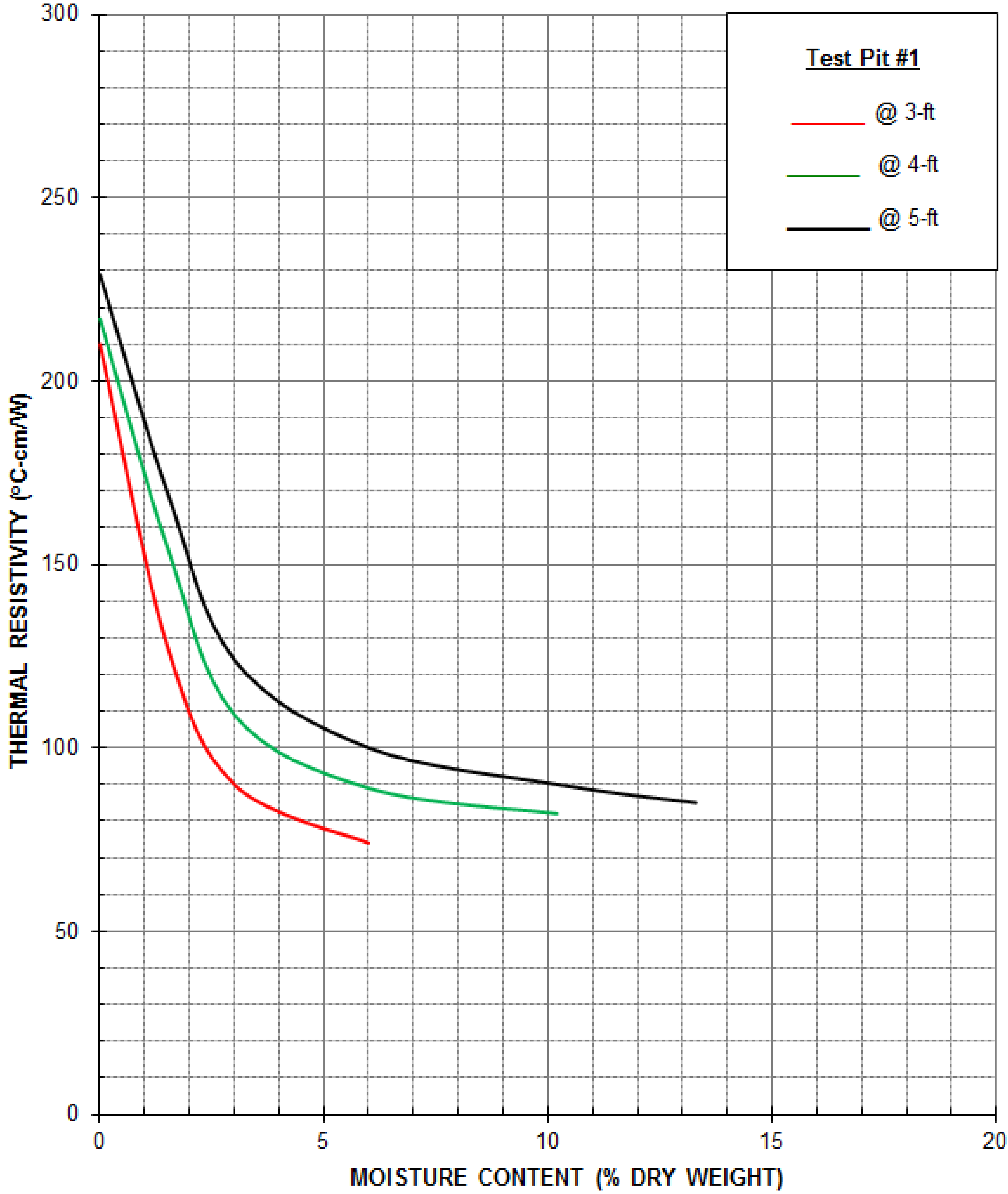
Table 1 (Field Test Results)

Test Pit #	Depth (ft)	Ambient Temp. (°C)	Thermal Resistivity (°C-cm/W)	Visual Description
1	3	27.0	64	Brown sandy clayey silt with fine roots becoming soft with depth
	4	25.7	68	
	5	24.6	76	
2	3	26.0	66	Brown sandy clayey silt with fine roots becoming soft and more clayey with depth
	4	25.7	70	
	5	24.1	78	
3	3	24.8	62	Brown sandy clayey silt with fine roots becoming soft and more clayey with depth
	4	23.7	65	
	5	22.9	73	

Table 2 (Laboratory Test Results)

Test Pit #	Depth (Ft.)	Visual Description	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
			Wet	Dry		
1	3	Brown sandy clayey silt becoming soft with depth	74	210	6.2	100
	4		78	217	10.2	99
	5		85	229	13.3	96
2	3	Brown sandy clayey silt becoming soft and more clayey with depth	70	198	12.8	102
	4		76	203	13.4	100
	5		83	217	13.7	99
3	3	Brown sandy clayey silt becoming soft and more clayey with depth	71	187	12.2	101
	4		78	207	15.2	98
	5		88	237	15.4	97

THERMAL DRYOUT CURVES

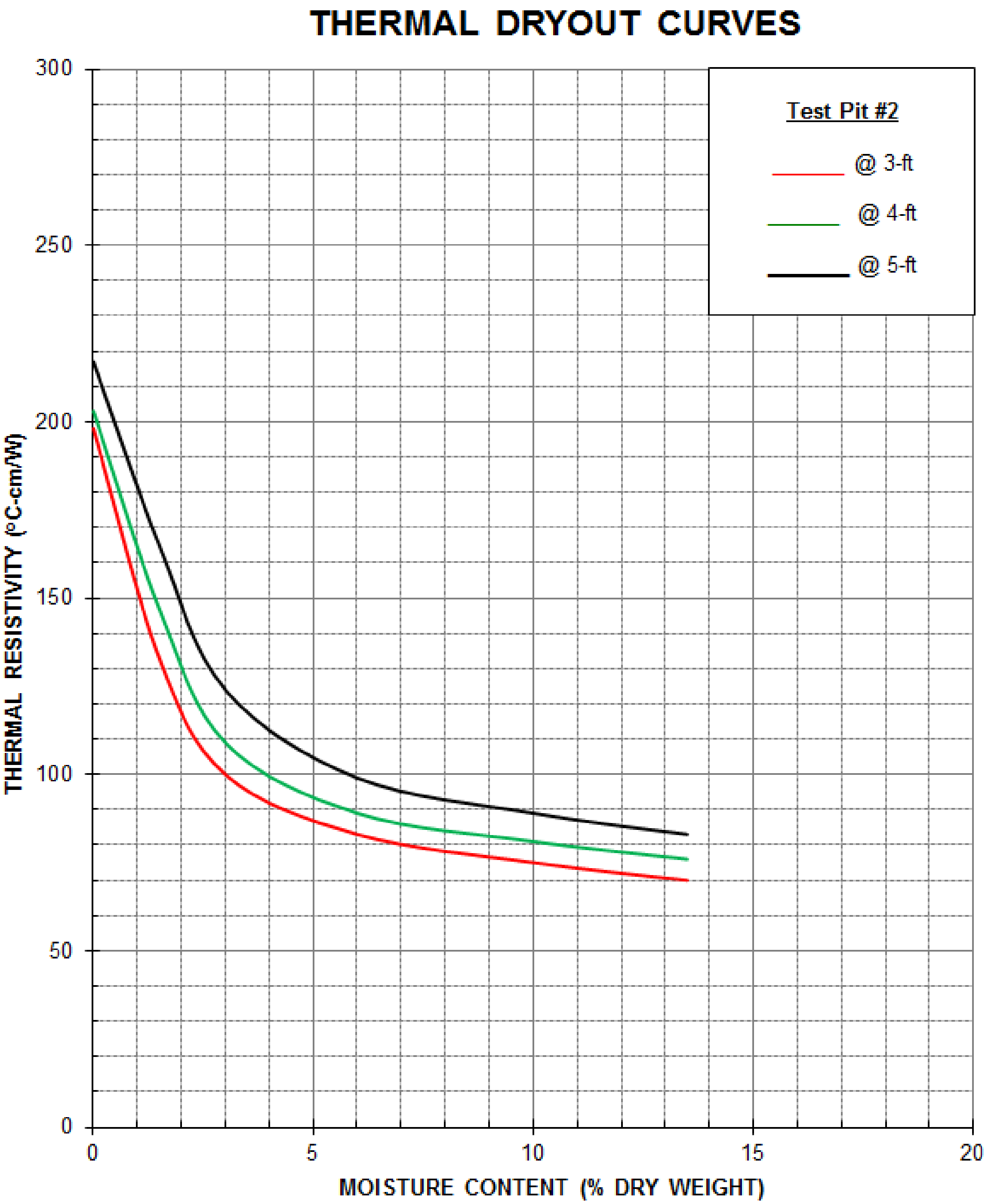


JDH Corrosion Consultants, Inc.

Thermal Analysis of Native Soil

U/G Cable - Equinix SV12 Site, San Jose, California

July 2015 **Figure 1**



JDH Corrosion Consultants, Inc.

Thermal Analysis of Native Soil

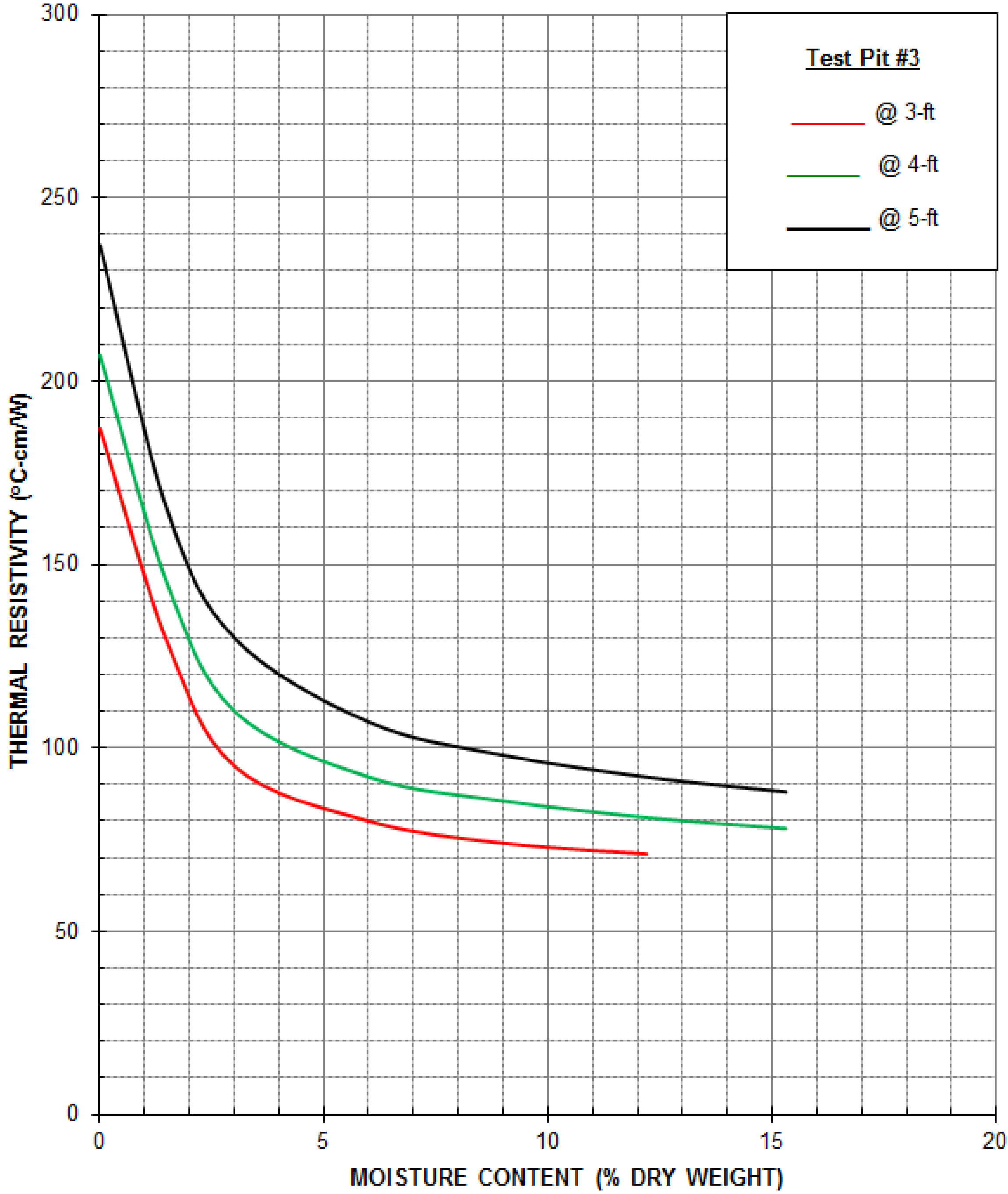
U/G Cable - Equinix SV12 Site, San Jose, California

July 2015

Figure 2

Geotherm USA

THERMAL DRYOUT CURVES



JDH Corrosion Consultants, Inc.

Thermal Analysis of Native Soil

U/G Cable - Equinix SV12 Site, San Jose, California

July 2015

Figure 3

Client: ***Langan Treadwell Rollo***
Project: ***SV12 Data Center***
Location: ***San Jose, CA***
Date: ***7/22/2015***
Subject: ***In-Situ Soil Resistivity Data***

Severely Corrosive
Corrosive
Moderately Corrosive
Mildly Corrosive
Progressively Less Corrosive

*Test	Location	Resistance Data From AEMC Meter								
#	Description	2	5	10	15	20	30	50	75	100
1	TP 1 (N/S)	11.10	4.30	2.23	1.39	0.97	0.65	0.35	0.23	0.19
2	TP 1 (E/W)	9.75	5.05	1.97	1.28	1.07	0.74	0.78	0.23	0.75
3	TP 2 (N/S)	12.70	2.97	1.81	1.18	3.30	1.22	2.74	0.64	0.78
4	TP 2 (E/W)	10.90	3.61	1.62	1.10	0.83	0.73	0.38	0.25	0.29
5	TP 3 (N/S)	11.60	3.62	1.52	1.03	0.85	0.63	0.47	0.37	0.77
6	TP 3 (E/W)	11.70	2.76	1.70	1.10	0.94	0.77	0.54	0.43	0.34

*Test	Location	Soil Resistivities (ohm-cm)								
#	Description	2	5	10	15	20	30	50	75	100
1	TP 1 (N/S)	4251	4117	4270	3993	3715	3734	3351	3303	3639
2	TP 1 (E/W)	3734	4835	3773	3677	4098	4251	7469	3303	14363
3	TP 2 (N/S)	4864	2844	3466	3390	12639	7009	26236	9192	14937
4	TP 2 (E/W)	4175	3457	3102	3160	3179	4194	3639	3591	5554
5	TP 3 (N/S)	4443	3466	2911	2959	3256	3619	4500	5314	14746
6	TP 3 (E/W)	4481	2643	3256	3160	3600	4424	5171	6176	6511

*Test	Location	Barnes Layer Analysis (ohm-cm)								
#	Description	0-2'	2-5'	5-10'	10-15'	15-20'	20-30'	30-50'	50-75'	75-100'
1	TP 1 (N/S)	4251	4032	4435	3533	3074	11319	2904	3212	5230
2	TP 1 (E/W)	3734	6018	3093	3499	6245	13785	NA	1562	NA
3	TP 2 (N/S)	4864	2227	4437	3246	NA	11120	NA	3998	NA
4	TP 2 (E/W)	4175	3101	2814	3281	3238	34809	3036	3499	NA
5	TP 3 (N/S)	4443	3023	2509	3059	4657	13984	7088	8325	NA
6	TP 3 (E/W)	4481	2075	4238	2984	6188	24460	6924	10106	7777

DISTRIBUTION

4 copies: Mr. Craig Epperly
Equinix
11 Great Oaks Boulevard
San Jose, California 95119

QUALITY CONTROL REVIEWER

John Gouchon, PE, GE #2282
Principal/Vice President