

APPENDIX D – GREENHOUSE GAS ANALYSIS

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Polytechnic High Auditorium Retrofit and Upgrade

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
High School	41.60	1000sqft	0.96	41,600.00	0

1.2 Other Project Characteristics

Urbanization Urban Wind Speed (m/s) 2.2 Precipitation Freq (Days) 33

Climate Zone 9 Operational Year 2015

Utility Company Southern California Edison

CO2 Intensity (lb/MW/hr) 630.89 CH4 Intensity (lb/MW/hr) 0.029 N2O Intensity (lb/MW/hr) 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction would start June 2014 and be completed by August 2015

Off-road Equipment - Painting - 1 Air Compressor

Off-road Equipment - Building Construction - 1 Crane, 2 Forklifts, 2 aerial lifts, 2 Tractor/Loaders/Backhoes

Off-road Equipment - Demolition - 2 Concrete Saws, 2 Aerial lifts, 1 Crane and 1 Tractor/Loader/Backhoe

Demolition - 41,600 square feet - max area to be demolished

Trips and VMT -

Table Name	Column Name	Default Value	New Value
tbIconstructionPhase	NumDays	5.00	56.00
tbIconstructionPhase	NumDays	100.00	205.00
tbIconstructionPhase	NumDays	10.00	65.00
tbIconstructionPhase	PhaseEndDate	6/12/2015	6/13/2015
tbIconstructionPhase	PhaseEndDate	8/29/2014	8/31/2014
tbIOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tbIOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tbIOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tbIOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tbIOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tbIOffRoadEquipment	PhaseName		Demolition
tbIOffRoadEquipment	PhaseName		Building Construction
tbIOffRoadEquipment	PhaseName		Demolition
tbIProjectCharacteristics	OperationalYear	2014	2015

2.0 Emissions Summary

2.1 Overall Construction Unmitigated Construction

Year	tons/yr											MT/yr				
	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
2014	0.1976	1.5440	1.0215	1.5900e-003	0.0372	0.0992	0.1363	7.5800e-003	0.0935	0.1010	0.0000	145.5372	145.5372	0.0303	0.0000	146.1732
2015	0.5558	1.0179	0.7183	1.0500e-003	0.0127	0.0682	0.0809	3.4100e-003	0.0632	0.0666	0.0000	97.2944	97.2944	0.0233	0.0000	97.7826
Total	0.7534	2.5619	1.7398	2.6400e-003	0.0499	0.1673	0.2172	0.0110	0.1567	0.1677	0.0000	242.8316	242.8316	0.0535	0.0000	243.9558

Mitigated Construction

Year	tons/yr											MT/yr				
	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
2014	0.1974	1.5423	1.0205	1.5800e-003	0.1062	0.0990	0.2053	0.0245	0.0934	0.1179	0.0000	145.3942	145.3942	0.0303	0.0000	146.0296
2015	0.5557	1.0167	0.7175	1.0500e-003	0.0127	0.0681	0.0808	3.4100e-003	0.0632	0.0666	0.0000	97.1997	97.1997	0.0232	0.0000	97.6874
Total	0.7531	2.5590	1.7381	2.6300e-003	0.1189	0.1671	0.2861	0.0279	0.1565	0.1844	0.0000	242.5940	242.5940	0.0535	0.0000	243.7169

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
Percent Reduction	0.0398	0.1136	0.1000	0.3788	-138.5356	0.1195	-31.7050	-154.2311	0.1149	-9.9958	0.0000	0.0978	0.1307	0.0000	0.0979

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	6/1/2014	8/31/2014	5	65	
2	Building Construction	Building Construction	9/1/2014	6/13/2015	5	205	
3	Architectural Coating	Architectural Coating	6/14/2015	8/31/2015	5	56	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Aerial Lifts	2	4.00	62	0.31
Demolition	Concrete/Industrial Saws	2	8.00	81	0.73
Demolition	Cranes	1	8.00	226	0.29
Demolition	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Aerial Lifts	2	4.00	62	0.31
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	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
Demolition	7	18.00	0.00	167.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	15.00	6.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2014

Unmitigated Construction On-Site

Acres of Grading: 0

Category	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
	tons/yr															
	MT/yr															
Fugitive Dust					0.0205	0.0000	0.0205	3.1000e-003	0.0000	3.1000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0868	0.7683	0.4461	7.2000e-004		0.0500	0.0500		0.0482	0.0482	0.0000	65.0756	65.0756	0.0130	0.0000	65.3491
Total	0.0868	0.7683	0.4461	7.2000e-004	0.0205	0.0500	0.0705	3.1000e-003	0.0482	0.0513	0.0000	65.0756	65.0756	0.0130	0.0000	65.3491

Unmitigated Construction Off-Site

Category	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
	tons/yr															
	MT/yr															
Hauling	4.5900e-003	0.0317	0.0219	6.0000e-005	1.4300e-003	5.6000e-004	1.9900e-003	3.9000e-004	5.2000e-004	9.1000e-004	0.0000	5.8281	5.8281	5.0000e-005	0.0000	5.8291
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0150	4.5800e-003	0.0477	8.0000e-005	6.4100e-003	7.0000e-005	6.4800e-003	1.7000e-003	6.0000e-005	1.7700e-003	0.0000	6.6706	6.6706	4.2000e-004	0.0000	6.6794
Total	0.0196	0.0363	0.0695	1.4000e-004	7.8400e-003	6.3000e-004	8.4700e-003	2.0900e-003	5.8000e-004	2.6800e-003	0.0000	12.4987	12.4987	4.7000e-004	0.0000	12.5085

Mitigated Construction On-Site

Category	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
	tons/yr															
	MT/yr															
Fugitive Dust					0.0205	0.0000	0.0205	3.1000e-003	0.0000	3.1000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0867	0.7674	0.4455	7.2000e-004		0.0499	0.0499		0.0482	0.0482	0.0000	64.9982	64.9982	0.0130	0.0000	65.2713
Total	0.0867	0.7674	0.4455	7.2000e-004	0.0205	0.0499	0.0704	3.1000e-003	0.0482	0.0513	0.0000	64.9982	64.9982	0.0130	0.0000	65.2713

Mitigated Construction Off-Site

Category	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
	tons/yr															
	MT/yr															
Hauling	4.5900e-003	0.0317	0.0219	6.0000e-005	0.0705	5.6000e-004	0.0711	0.0173	5.2000e-004	0.0179	0.0000	5.8281	5.8281	5.0000e-005	0.0000	5.8291
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0150	4.5800e-003	0.0477	8.0000e-005	6.4100e-003	7.0000e-005	6.4800e-003	1.7000e-003	6.0000e-005	1.7700e-003	0.0000	6.6706	6.6706	4.2000e-004	0.0000	6.6794
Total	0.0196	0.0363	0.0695	1.4000e-004	0.0769	6.3000e-004	0.0775	0.0190	5.8000e-004	0.0196	0.0000	12.4987	12.4987	4.7000e-004	0.0000	12.5085

**3.3 Building Construction - 2014
Unmitigated Construction On-Site**

Acres of Grading: 0

Category	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
	tons/yr															
	MT/yr															
Off-Road	0.0687	0.7030	0.4151	5.7000e-004		0.0479	0.0479		0.0440	0.0440	0.0000	55.0644	55.0644	0.0163	0.0000	55.4061
Total	0.0687	0.7030	0.4151	5.7000e-004		0.0479	0.0479		0.0440	0.0440	0.0000	55.0644	55.0644	0.0163	0.0000	55.4061

Unmitigated Construction Off-Site

Category	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
tons/yr																
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6100e-003	0.0313	0.0371	6.0000e-005	1.6200e-003	5.8000e-004	2.1900e-003	4.6000e-004	5.3000e-004	9.9000e-004	0.0000	5.3727	5.3727	5.0000e-005	0.0000	5.3737
Worker	0.0169	5.1700e-003	0.0538	9.0000e-005	7.2300e-003	8.0000e-005	7.3100e-003	1.9200e-003	7.0000e-005	1.9900e-003	0.0000	7.5258	7.5258	4.7000e-004	0.0000	7.5358
Total	0.0225	0.0364	0.0909	1.5000e-004	8.8500e-003	6.6000e-004	9.5000e-003	2.3800e-003	6.0000e-004	2.9800e-003	0.0000	12.8985	12.8985	5.2000e-004	0.0000	12.9095
MT/yr																

Mitigated Construction On-Site

Category	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
tons/yr																
Off-Road	0.0686	0.7021	0.4146	5.7000e-004		0.0478	0.0478		0.0440	0.0440	0.0000	54.9989	54.9989	0.0163	0.0000	55.3402
Total	0.0686	0.7021	0.4146	5.7000e-004		0.0478	0.0478		0.0440	0.0440	0.0000	54.9989	54.9989	0.0163	0.0000	55.3402
MT/yr																

Mitigated Construction Off-Site

Category	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
tons/yr																
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6100e-003	0.0313	0.0371	6.0000e-005	1.6200e-003	5.8000e-004	2.1900e-003	4.6000e-004	5.3000e-004	9.9000e-004	0.0000	5.3727	5.3727	5.0000e-005	0.0000	5.3737
Worker	0.0169	5.1700e-003	0.0538	9.0000e-005	7.2300e-003	8.0000e-005	7.3100e-003	1.9200e-003	7.0000e-005	1.9900e-003	0.0000	7.5258	7.5258	4.7000e-004	0.0000	7.5358
Total	0.0225	0.0364	0.0909	1.5000e-004	8.8500e-003	6.6000e-004	9.5000e-003	2.3800e-003	6.0000e-004	2.9800e-003	0.0000	12.8985	12.8985	5.2000e-004	0.0000	12.9095
MT/yr																

3.3 Building Construction - 2015
Unmitigated Construction On-Site

Category	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
	tons/yr										MT/yr					
Off-Road	0.0888	0.9028	0.5493	7.6000e-004		0.0613	0.0613		0.0564	0.0564	0.0000	72.4451	72.4451	0.0216	0.0000	72.8993
Total	0.0888	0.9028	0.5493	7.6000e-004		0.0613	0.0613		0.0564	0.0564	0.0000	72.4451	72.4451	0.0216	0.0000	72.8993

Unmitigated Construction Off-Site

Category	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
	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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.3100e-003	0.0363	0.0451	8.0000e-005	2.1500e-003	5.8000e-004	2.7400e-003	6.1000e-004	5.4000e-004	1.1500e-003	0.0000	7.0641	7.0641	6.0000e-005	0.0000	7.0653
Worker	0.0209	6.1900e-003	0.0645	1.2000e-004	9.6200e-003	1.0000e-004	9.7100e-003	2.5500e-003	9.0000e-005	2.6400e-003	0.0000	9.7070	9.7070	5.8000e-004	0.0000	9.7191
Total	0.0272	0.0425	0.1096	2.0000e-004	0.0118	6.8000e-004	0.0125	3.1600e-003	6.3000e-004	3.7900e-003	0.0000	16.7710	16.7710	6.4000e-004	0.0000	16.7844

Mitigated Construction On-Site

Category	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
	tons/yr										MT/yr					
Off-Road	0.0887	0.9018	0.5486	7.6000e-004		0.0612	0.0612		0.0563	0.0563	0.0000	72.3589	72.3589	0.0216	0.0000	72.8125
Total	0.0887	0.9018	0.5486	7.6000e-004		0.0612	0.0612		0.0563	0.0563	0.0000	72.3589	72.3589	0.0216	0.0000	72.8125

Mitigated Construction Off-Site

Category	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
	tons/yr															
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.3100e-003	0.0363	0.0451	8.0000e-005	2.1500e-003	5.8000e-004	2.7400e-003	6.1000e-004	5.4000e-004	1.1500e-003	0.0000	7.0641	7.0641	6.0000e-005	0.0000	7.0653
Worker	0.0209	6.1900e-003	0.0645	1.2000e-004	9.6200e-003	1.0000e-004	9.7100e-003	2.5500e-003	9.0000e-005	2.6400e-003	0.0000	9.7070	9.7070	5.8000e-004	0.0000	9.7191
Total	0.0272	0.0425	0.1096	2.0000e-004	0.0118	6.8000e-004	0.0125	3.1600e-003	6.3000e-004	3.7900e-003	0.0000	16.7710	16.7710	6.4000e-004	0.0000	16.7844

3.4 Architectural Coating - 2015

Unmitigated Construction On-Site

Category	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
	tons/yr															
Archit. Coating	0.4264					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.0720	0.0533	8.0000e-005		6.1800e-003	6.1800e-003		6.1800e-003	6.1800e-003	0.0000	7.1491	7.1491	9.3000e-004	0.0000	7.1687
Total	0.4378	0.0720	0.0533	8.0000e-005		6.1800e-003	6.1800e-003		6.1800e-003	6.1800e-003	0.0000	7.1491	7.1491	9.3000e-004	0.0000	7.1687

Unmitigated Construction Off-Site

Category	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
	tons/yr															
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-003	5.9000e-004	6.1700e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.9292	0.9292	6.0000e-005	0.0000	0.9304
Total	2.0000e-003	5.9000e-004	6.1700e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.9292	0.9292	6.0000e-005	0.0000	0.9304

Mitigated Construction On-Site

Category	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
	tons/yr															
	MT/yr															
Archit. Coating	0.4264					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.0719	0.0532	8.0000e-005		6.1800e-003	6.1800e-003		6.1800e-003	6.1800e-003	0.0000	7.1406	7.1406	9.3000e-004	0.0000	7.1601
Total	0.4378	0.0719	0.0532	8.0000e-005		6.1800e-003	6.1800e-003		6.1800e-003	6.1800e-003	0.0000	7.1406	7.1406	9.3000e-004	0.0000	7.1601

Mitigated Construction Off-Site

Category	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
	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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-003	5.9000e-004	6.1700e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.9292	0.9292	6.0000e-005	0.0000	0.9304
Total	2.0000e-003	5.9000e-004	6.1700e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.9292	0.9292	6.0000e-005	0.0000	0.9304

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