# Revised Appendix P.1

Energy Calculation Worksheets

## LACMA Building for the Permanent Collection - Energy Calculations

**Summary of Energy Use During Construction**

| | Project | |
|---|---|---|
| **Electricty** | | |
| Water Consumption | 43,631 | kWh |
| **Total:** | **43,631** | kWh |
| | | |
| **Gasoline** | | |
| On Road | 396,288 | Gallons |
| Off Road | 0 | |
| **Total:** | **396,288** | Gallons |
| | | |
| **Diesel** | | |
| On Road | 161,129 | Gallons |
| Off Road | 300,913 | Gallons |
| **Total:** | **462,042** | Gallons |

**Summary of Energy Use During Operations**

| | Baseline (at Buildout) | Buildout (w/o PDFs) | Buildout (with PDFs) | | Percent Reduction from Buildout (w/o PDFs) | Reduction from Baseline (at | Net ((Buildout (with PDFs) less Baseline (at Buildout)) |
|---|---|---|---|---|---|---|---|
| **Electricity** | | | | | | | |
| Electricity (building) | 4,950,770 | 4,868,608 | 3,934,703 | kWh/year | -19% | -21% | (1,016,067) |
| Electricity (water) | 319,177 | 303,362 | 242,689 | kWh/year | -20% | -24% | (76,488) |
| **Electricity Total** | 5,269,947 | 5,171,970 | 4,177,392 | kWh/year | -19% | -21% | (1,092,555) |
| | | | | | | | |
| **Natural Gas** | 7,307,143 | 6,945,086 | 5,648,495 | cu ft/year | -19% | -23% | (1,658,648) |
| | | | | | | | |
| **Mobile** | | | | | | | |
| Gasoline | 121,799 | 370,231 | 148,068 | Gallons/year | -60% | 22% | 26,270 |
| Diesel | 3,730 | 11,339 | 4,535 | Gallons/year | -60% | 22% | 805 |

**Calculation of Diesel Usage During Cosnstruciton (Offroad Equipment):**

| Phase Name | Off Road Equipment Type | Units | Hours | HP | Load Factor | Avg. Daily Factor | Number of Days | Diesel Fuel Usage |
|---|---|---|---|---|---|---|---|---|
| Demo/Grade Overlap | Bore/Drill Rigs | 1 | 8 | 221 | 0.5 | 0.6 | 80 | 2,122 |
| Demo/Grade Overlap | Cranes | 3 | 8 | 231 | 0.29 | 0.6 | 80 | 3,859 |
| Demo/Grade Overlap | Excavators | 2 | 8 | 158 | 0.38 | 0.6 | 80 | 2,306 |
| Demo/Grade Overlap | Pumps | 2 | 8 | 84 | 0.74 | 0.6 | 80 | 2,387 |
| Demo/Grade Overlap | Rubber Tired Dozers | 2 | 8 | 247 | 0.4 | 0.6 | 80 | 3,794 |
| Demo/Grade Overlap | Rubber Tired Loaders | 13 | 8 | 203 | 0.36 | 0.6 | 80 | 18,241 |
| Demo/Grade Overlap | Tractors/Loaders/Backhoes | 10 | 8 | 97 | 0.37 | 0.6 | 80 | 6,891 |
| Demo/Grade/Piles/Foundation Overlap | Aerial Lifts | 4 | 8 | 63 | 0.31 | 0.6 | 87 | 1,631 |
| Demo/Grade/Piles/Foundation Overlap | Air Compressors | 6 | 8 | 78 | 0.48 | 0.6 | 87 | 4,690 |
| Demo/Grade/Piles/Foundation Overlap | Bore/Drill Rigs | 2 | 8 | 221 | 0.5 | 0.6 | 87 | 4,614 |
| Demo/Grade/Piles/Foundation Overlap | Cranes | 4 | 8 | 231 | 0.29 | 0.6 | 87 | 5,595 |
| Demo/Grade/Piles/Foundation Overlap | Excavators | 3 | 8 | 158 | 0.38 | 0.6 | 87 | 3,761 |
| Demo/Grade/Piles/Foundation Overlap | Forklifts | 5 | 8 | 89 | 0.2 | 0.6 | 87 | 1,858 |
| Demo/Grade/Piles/Foundation Overlap | Pumps | 5 | 8 | 84 | 0.74 | 0.6 | 87 | 6,490 |
| Demo/Grade/Piles/Foundation Overlap | Rubber Tired Dozers | 2 | 8 | 247 | 0.4 | 0.6 | 87 | 4,126 |
| Demo/Grade/Piles/Foundation Overlap | Rubber Tired Loaders | 13 | 8 | 203 | 0.36 | 0.6 | 87 | 19,837 |
| Demo/Grade/Piles/Foundation Overlap | Tractors/Loaders/Backhoes | 3 | 8 | 97 | 0.37 | 0.6 | 87 | 2,248 |
| Demo/Grade/Piles/Foundation Overlap | Tractors/Loaders/Backhoes | 10 | 8 | 97 | 0.37 | 0.6 | 87 | 7,494 |
| Demo/Grade/Piles/Foundation Overlap | Welders | 6 | 8 | 46 | 0.45 | 0.6 | 87 | 2,593 |
| Piles/Foundation/Superstructure | Aerial Lifts | 4 | 8 | 63 | 0.31 | 0.6 | 100 | 1,875 |
| Piles/Foundation/Superstructure | Air Compressors | 6 | 8 | 78 | 0.48 | 0.6 | 100 | 5,391 |
| Piles/Foundation/Superstructure | Bore/Drill Rigs | 1 | 8 | 221 | 0.5 | 0.6 | 100 | 2,652 |
| Piles/Foundation/Superstructure | Cranes | 1 | 8 | 231 | 0.29 | 0.6 | 100 | 1,608 |
| Piles/Foundation/Superstructure | Excavators | 1 | 8 | 158 | 0.38 | 0.6 | 100 | 1,441 |
| Piles/Foundation/Superstructure | Forklifts | 5 | 8 | 89 | 0.2 | 0.6 | 100 | 2,136 |
| Piles/Foundation/Superstructure | Pumps | 3 | 8 | 84 | 0.74 | 0.6 | 100 | 4,476 |
| Piles/Foundation/Superstructure | Tractors/Loaders/Backhoes | 3 | 8 | 97 | 0.37 | 0.6 | 100 | 2,584 |
| Piles/Foundation/Superstructure | Welders | 6 | 8 | 46 | 0.45 | 0.6 | 100 | 2,981 |
| Piles/Foundation/Superstructure/Building Envelop | Aerial Lifts | 4 | 8 | 63 | 0.31 | 0.6 | 217 | 4,068 |
| Piles/Foundation/Superstructure/Building Envelop | Air Compressors | 12 | 8 | 78 | 0.48 | 0.6 | 217 | 23,399 |
| Piles/Foundation/Superstructure/Building Envelop | Bore/Drill Rigs | 1 | 8 | 221 | 0.5 | 0.6 | 217 | 5,755 |
| Piles/Foundation/Superstructure/Building Envelop | Excavators | 1 | 8 | 158 | 0.38 | 0.6 | 217 | 3,127 |
| Piles/Foundation/Superstructure/Building Envelop | Forklifts | 10 | 8 | 89 | 0.2 | 0.6 | 217 | 9,270 |
| Piles/Foundation/Superstructure/Building Envelop | Pumps | 4 | 8 | 84 | 0.74 | 0.6 | 217 | 12,949 |
| Piles/Foundation/Superstructure/Building Envelop | Tractors/Loaders/Backhoes | 3 | 8 | 97 | 0.37 | 0.6 | 217 | 5,607 |
| Piles/Foundation/Superstructure/Building Envelop | Welders | 9 | 8 | 46 | 0.45 | 0.6 | 217 | 9,703 |
| Architectural Coating | Air Compressors | 0 | 6 | 78 | 0.48 | 0.6 | 268 | 0 |
| Architectural Coating | Pavers | 0 | 8 | 130 | 0.42 | 0.6 | 268 | 0 |
| Architectural Coating | Paving Equipment | 0 | 8 | 132 | 0.36 | 0.6 | 268 | 0 |
| Architectural Coating | Rollers | 0 | 8 | 80 | 0.38 | 0.6 | 268 | 0 |
| Super Structure/Building Envelope/Interior/Paving | Aerial Lifts | 4 | 8 | 63 | 0.31 | 0.6 | 221 | 4,143 |
| Super Structure/Building Envelope/Interior/Paving | Air Compressors | 12 | 8 | 78 | 0.48 | 0.6 | 221 | 23,830 |
| Super Structure/Building Envelope/Interior/Paving | Bore/Drill Rigs | 1 | 8 | 221 | 0.5 | 0.6 | 221 | 5,861 |
| Super Structure/Building Envelope/Interior/Paving | Cranes | 0 | 7 | 231 | 0.29 | 0.6 | 221 | 0 |
| Super Structure/Building Envelope/Interior/Paving | Excavators | 1 | 8 | 158 | 0.38 | 0.6 | 221 | 3,185 |
| Super Structure/Building Envelope/Interior/Paving | Forklifts | 10 | 8 | 89 | 0.2 | 0.6 | 221 | 9,441 |
| Super Structure/Building Envelope/Interior/Paving | Pavers | 1 | 8 | 130 | 0.42 | 0.6 | 221 | 2,896 |
| Super Structure/Building Envelope/Interior/Paving | Pumps | 4 | 8 | 84 | 0.74 | 0.6 | 221 | 13,188 |
| Super Structure/Building Envelope/Interior/Paving | Skid Steer Loaders | 1 | 8 | 65 | 0.37 | 0.6 | 221 | 1,276 |
| Super Structure/Building Envelope/Interior/Paving | Tractors/Loaders/Backhoes | 4 | 8 | 97 | 0.37 | 0.6 | 221 | 7,614 |
| Super Structure/Building Envelope/Interior/Paving | Welders | 9 | 8 | 46 | 0.45 | 0.6 | 221 | 9,881 |
| Paving/Concrete/Landscape/Cleanup | Pavers | 1 | 8 | 130 | 0.42 | 0.6 | 55 | 721 |
| Paving/Concrete/Landscape/Cleanup | Skid Steer Loaders | 1 | 8 | 65 | 0.37 | 0.6 | 55 | 317 |
| Paving/Concrete/Landscape/Cleanup | Tractors/Loaders/Backhoes | 1 | 8 | 97 | 0.37 | 0.6 | 55 | 474 |
| MEP | Cranes | 0 | 7 | 231 | 0.29 | 0.6 | 154 | 0 |
| MEP | Forklifts | 0 | 8 | 89 | 0.2 | 0.6 | 154 | 0 |
| MEP | Generator Sets | 0 | 8 | 84 | 0.74 | 0.6 | 154 | 0 |
| MEP | Tractors/Loaders/Backhoes | 0 | 7 | 97 | 0.37 | 0.6 | 154 | 0 |
| MEP | Welders | 0 | 8 | 46 | 0.45 | 0.6 | 154 | 0 |
| Ogden Demo/Excavation/Shoring | Bore/Drill Rigs | 1 | 8 | 221 | 0.5 | 0.6 | 42 | 1,114 |
| Ogden Demo/Excavation/Shoring | Cranes | 1 | 8 | 231 | 0.29 | 0.6 | 42 | 675 |
| Ogden Demo/Excavation/Shoring | Excavators | 1 | 8 | 158 | 0.38 | 0.6 | 42 | 605 |
| Ogden Demo/Excavation/Shoring | Forklifts | 1 | 8 | 89 | 0.2 | 0.6 | 42 | 179 |
| Ogden Demo/Excavation/Shoring | Rubber Tired Dozers | 1 | 8 | 247 | 0.4 | 0.6 | 42 | 996 |
| Ogden Demo/Excavation/Shoring | Tractors/Loaders/Backhoes | 3 | 8 | 97 | 0.37 | 0.6 | 42 | 1,085 |
| Ogden Structure | Forklifts | 2 | 8 | 89 | 0.2 | 0.6 | 132 | 1,128 |
| Ogden Structure | Pumps | 1 | 8 | 84 | 0.74 | 0.6 | 132 | 1,969 |
| Ogden Structure | Tractors/Loaders/Backhoes | 2 | 7 | 97 | 0.37 | 0.6 | 132 | 1,990 |
| Ogden Structure | Welders | 1 | 8 | 46 | 0.45 | 0.6 | 132 | 656 |
| Ogden Cladding/Finishes | Aerial Lifts | 1 | 8 | 63 | 0.31 | 0.6 | 86 | 403 |
| Ogden Cladding/Finishes | Air Compressors | 1 | 8 | 78 | 0.48 | 0.6 | 86 | 773 |
| Ogden Cladding/Finishes | Forklifts | 2 | 8 | 89 | 0.2 | 0.6 | 86 | 735 |
| Ogden Cladding/Finishes | Skid Steer Loaders | 1 | 8 | 65 | 0.37 | 0.6 | 86 | 496 |
| Ogden Cladding/Finishes | Tractors/Loaders/Backhoes | 2 | 7 | 97 | 0.37 | 0.6 | 86 | 1,296 |
| Ogden Cladding/Finishes | Welders | 1 | 8 | 46 | 0.45 | 0.6 | 86 | 427 |
| | | | | | | **Total Diesel Usage for Construction (Offroad Equipment):** | | **300,913 gallons of diesel fuel** |

| | |
|---|---|
| gallons of diesel fuel per horsepower-hour= | 0.05 |

Notes: Equipment assumptions are provide in the CalEEMod output files and fuel usage estimate of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

EMFAC2014 Emissions Inventory
Region Type: Air Basin
Region: South Coast
Calendar Year: 2018
Season: Annual
Vehicle Classification: EMFAC2011 Categories

| Region | Veh_Class | Fuel | Speed (miles/hr) | Population (vehicles) | VMT (miles/day) | Trips (trips/day) | Fuel_Gas (1000 gallons/day) | Fuel_DSL (1000 gallons/day) | Miles per Gallon |
|---|---|---|---|---|---|---|---|---|---|
| South Coast | LDA | GAS | Aggregate | 5875768.44 | 200195489.9 | 37093739.66 | 7958.701801 | 0 | 25.2 |
| South Coast | LDT1 | GAS | Aggregate | 688812.912 | 23474880.58 | 4178427.192 | 786.3689689 | 0 | 29.9 |
| South Coast | LDT2 | GAS | Aggregate | 1941482.89 | 70793524.59 | 12222710.26 | 3952.17611 | 0 | 17.9 |
| | | | | | | | **Construction Worker Trip (Composite LDA/LDT1/LDT2):** | | **24.5** |
| South Coast | T7 tractor cnstruction | DSL | Aggregate | 4134.94479 | 324016.2809 | 0 | 0 | 46.95465586 | **6.9** |

Notes: Consistent with CalEEMod, a construction worker trip is assumed to be a composite of 50% LDA , 25% for LDT1, and 25% for LDT2. Used EMFAC 2011 Categories for construciton as EMFAC2011 has specific categories for vehicle class T7.

**Calculation of Gasoline and Diesel Usage During Construction (Onroad Vehicles):**

| Phase Name | Daily Woker Trips | Daily Vendor Trips | Days | Total Worker Trips | Total Vendor Trips | Total Haul Trips | Trip Length (miles) | | | Total Length (miles) | | | Avg. Daily Factor | Gallons of Fuel | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Worker | Vendor | Haul | Worker | Vendor | Haul | (worker and vendor) | Gasoline | Diesel |
| Demo/Grade Overlap | 200 | 30 | 80 | 16000 | 2400 | 5156 | 14.7 | 6.9 | 62 | 235200 | 16560 | 319672 | 0.6 | 5,755.7 | 47,765.0 |
| Demo/Grade/Piles/Foundation O | 1660 | 95 | 87 | 144420 | 8265 | 5157 | 14.7 | 6.9 | 74 | 2122974 | 57028.5 | 381618 | 0.6 | 51,952.3 | 60,260.5 |
| Piles/Foundation/Superstructure | 1400 | 95 | 100 | 140000 | 9500 | 0 | 14.7 | 6.9 | 20 | 2058000 | 65550 | 0 | 0.6 | 50,362.3 | 5,699.5 |
| Piles/Foundation/Superstructure | 1600 | 147 | 217 | 347200 | 31899 | 0 | 14.7 | 6.9 | 20 | 5103840 | 220103.1 | 0 | 0.6 | 124,898.5 | 19,137.7 |
| Architectural Coating | 0 | 0 | 268 | 0 | 0 | 0 | 14.7 | 6.9 | 20 | 0 | 0 | 0 | 0.6 | 0.0 | 0.0 |
| Super Structure/Building Envelop | 1600 | 147 | 221 | 353600 | 32487 | 0 | 14.7 | 6.9 | 20 | 5197920 | 224160.3 | 0 | 0.6 | 127,200.8 | 19,490.4 |
| Paving/Concrete/Landscape/Clea | 1000 | 52 | 55 | 55000 | 2860 | 0 | 14.7 | 6.9 | 20 | 808500 | 19734 | 0 | 0.6 | 19,785.2 | 1,715.8 |
| MEP | 157 | 5 | 154 | 24178 | 770 | 0 | 14.7 | 6.9 | 20 | 355416.6 | 5313 | 0 | 0.6 | 8,697.6 | 462.0 |
| Ogden Demo/Excavation/Shoring | 42 | 6 | 42 | 1764 | 252 | 1463 | 14.7 | 6.9 | 20 | 25930.8 | 1738.8 | 29260 | 0.6 | 634.6 | 4,391.4 |
| Ogden Structure | 66 | 22 | 132 | 8712 | 2904 | 0 | 14.7 | 6.9 | 64 | 128066.4 | 20037.6 | 0 | 0.6 | 3,134.0 | 1,742.2 |
| Ogden Cladding/Finishes | 125 | 9 | 86 | 10750 | 774 | 0 | 14.7 | 6.9 | 64 | 158025 | 5340.6 | 0 | 0.6 | 3,867.1 | 464.4 |
| | | | | | | | | | | | | | **Total:** | **396,288** | **161,129** |

| | | |
|---|---|---|
| Worker Miles per gallon= | 24.52 | gasoline |
| Vedor/Haul miles per gallon= | 6.90 | diesel |

Notes: Consistent with CalEEMod worker vehicles are assumed to be gasoline and 50% LDA, 25%LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy Duty Trucks (T7)

**Water Usage for Control of Fugitive Dust during Construction:**

| Phase | Days | Average Daily Acerage Distrubed | Gallons Per Year | Electricity (kWhr) |
|---|---|---|---|---|
| Demo/Grade Overlap | 30 | 6.6 | 597,960 | 5,816 |
| Demo/Grade/Piles/Foundation Ov | 190 | 6.6 | 3,787,080 | 36,837 |
| Piles/Foundation/Superstructure | 190 | 0 | 0 | 0 |
| Piles/Foundation/Superstructure/E | 294 | 0 | 0 | 0 |
| Architectural Coating | 0 | 0 | 0 | 0 |
| Super Structure/Building Envelope | 294 | 0 | 0 | 0 |
| Paving/Concrete/Landscape/Clean | 104 | 0 | 0 | 0 |
| MEP | 61 | 0 | 55,266 | 538 |
| Ogden Demo/Excavation/Shoring | 6 | 2.2 | 39,864 | 388 |
| Ogden Structure | 44 | 0 | 0 | 0 |
| Ogden Cladding/Finishes | 18 | 0 | 5,436 | 53 |
| | | **Total:** | **4,485,606** | **43,631** |

| | | |
|---|---|---|
| Water application rate= | 3020 | gal/acre/day |
| kWhr equivalent= | 0.01 | kWhr |

Notes: 1) Gallons per year of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gal/acre/day (Air & Waste Management Association Air Pollution Engineering Manual (1992 Edition)) and average of 26 construction days per month.
2) CalEEMod Default: Each gallon of delivered potable water in Southern California is associated with 0.009727 kWhr of electricity).

EMFAC2014 Emissions Inventory
Region Type: Air Basin
Region: South Coast
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2011 Categories

| Region | CalYr | Season | Veh_Class | Fuel | MdYr | Speed (miles/hr) | Population (vehicles) | VMT (miles/day) | Trips (trips/day) | Fuel_Gas (1000 gallons/day) | Fuel_DSL (1000 gallons/day) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South Coast | 2023 | Annual | LDA | GAS | Aggregated | Aggregated | 6264982.16 | 209913843.8 | 39567465 | 6950.725188 | 0 | | |
| South Coast | 2023 | Annual | LDA | DSL | Aggregated | Aggregated | 68231.2764 | 2395771.457 | 427576.6 | 0 | 59.47674109 | | |
| South Coast | 2023 | Annual | LDT1 | GAS | Aggregated | Aggregated | 524963.824 | 17443322.44 | 3198449.4 | 685.9808977 | 0 | | |
| South Coast | 2023 | Annual | LDT1 | DSL | Aggregated | Aggregated | 566.917344 | 15079.56095 | 2949.351 | 0 | 0.530284268 | | |
| South Coast | 2023 | Annual | LDT2 | GAS | Aggregated | Aggregated | 2280873.15 | 82643235.78 | 14458786 | 3602.056455 | 0 | | |
| South Coast | 2023 | Annual | LDT2 | DSL | Aggregated | Aggregated | 4457.65336 | 169032.7022 | 28615.437 | 0 | 5.518573443 | | |
| South Coast | 2023 | Annual | LHD1 | GAS | Aggregated | Aggregated | 101835.847 | 2836538.916 | 1517202.4 | 256.8877602 | 0 | | |
| South Coast | 2023 | Annual | LHD1 | DSL | Aggregated | Aggregated | 96131.4384 | 3321303.353 | 1209212.6 | 0 | 158.9216856 | | |
| South Coast | 2023 | Annual | LHD2 | GAS | Aggregated | Aggregated | 23131.973 | 792817.5726 | 344631.93 | 76.60380604 | 0 | | |
| South Coast | 2023 | Annual | LHD2 | DSL | Aggregated | Aggregated | 42055.0468 | 1595083.718 | 528999.58 | 0 | 83.03195225 | | |
| South Coast | 2023 | Annual | MCY | GAS | Aggregated | Aggregated | 308501.647 | 1969480.034 | 616941.59 | 56.14954463 | 0 | | |
| South Coast | 2023 | Annual | MDV | GAS | Aggregated | Aggregated | 1435217.69 | 46739844.42 | 8932873.6 | 2782.188459 | 0 | | |
| South Coast | 2023 | Annual | MDV | DSL | Aggregated | Aggregated | 27835.2241 | 1018901.6 | 178160.76 | 0 | 43.0452531 | | |
| South Coast | 2023 | Annual | MH | GAS | Aggregated | Aggregated | 34406.2524 | 277627.0723 | 3442.0015 | 37.20200301 | 0 | | |
| South Coast | 2023 | Annual | MH | DSL | Aggregated | Aggregated | 9347.50271 | 77260.38527 | 934.75027 | 0 | 7.498703852 | | |
| South Coast | 2023 | Annual | OBUS | GAS | Aggregated | Aggregated | 8907.14328 | 391252.705 | 178214.12 | 53.8881013 | 0 | | |
| South Coast | 2023 | Annual | SBUS | GAS | Aggregated | Aggregated | 2552.0065 | 93077.74203 | 10208.026 | 8.137394815 | 0 | | |
| South Coast | 2023 | Annual | T6TS | GAS | Aggregated | Aggregated | 19258.4987 | 928087.5087 | 385324.04 | 130.9319991 | 0 | | |
| South Coast | 2023 | Annual | T7IS | GAS | Aggregated | Aggregated | 845.222589 | 107869.2013 | 16911.214 | 22.32171747 | 0 | | |
| South Coast | 2023 | Annual | UBUS | GAS | Aggregated | Aggregated | 2458.62325 | 269036.4331 | 9834.493 | 53.0431744 | 0 | | |
| South Coast | 2023 | Annual | UBUS | DSL | Aggregated | Aggregated | 4123.34193 | 453343.6808 | 16493.368 | 0 | 92.69912806 | | |
| | | | | | | | | | | | | **MPG** | Gallons Per Mile |
| | | | | | | Totals | 373,451,810.08 | | | 14,716.12 | 450.72 | **24.6** | 0.04 |
| | | | | | | Total (GAS) | 364,406,033.63 | 0.98 | | | | **24.8** | 0.04 |
| | | | | | | Total (DSL) | 9,045,776.46 | 0.02 | | | | **20.1** | 0.05 |

**LACMA Building for the Permanent Collection - Baseline (at Buildout)**
**Los Angeles-South Coast County, Annual**

**Land Use Details**

| *Land Uses* | *Size* | *Metric* | *Lot Acreage* | *Floor Surface Area* | *Population* |
|---|---|---|---|---|---|
| Library | 387.50 | 1000sqft | 8.90 | 387,500.00 | 0 |
| Parking Lot | 260.00 | Space | 2.34 | 88,400.00 | 0 |

**Trip Summary Information**

| *Land Uses* | *Average Daily Trip Rate* | | | *Unmitigated* |
|---|---|---|---|---|
| | *Weekday* | *Saturday* | *Sunday* | |
| Library | 2,735.75 | 3,743.25 | 3,743.25 | *3,090,894* |
| Parking Lot | 0.00 | 0.00 | 0.00 | 0 |
| **Total** | **2,735.75** | **3,743.25** | **3,743.25** | **3,090,894** |

**Unmitigated Gasoline and Diesel Usage**

| | *Gasoline* | *Diesel* |
|---|---|---|
| *Miles/Gallon* | 24.8 | 20.1 |
| *% Fleet Mix* | 97.6% | 2.4% |
| **Total (Gallons):** | **121,799** | **3,730** |

**Energy by Land Use - Natural Gas**

| *Land Uses* | *kBTU/yr* | cu ft/year |
|---|---|---|
| Library | 7,672,500 | 7,307,143 |
| Parking Lot | 0 | 0 |
| **Total** | 7,672,500 | 7,307,143 |

**Energy by Land Use - Electricity**

| *Land Uses* | *kWH/yr* |
|---|---|
| Library | *4,859,250* |
| Parking Lot | 91,520 |
| **Total** | **4,950,770** |

**Water Detail (Unmitigated)**

| *Land Uses* | *Indoor Use (Mgal)* | *Outdoor Use (Mgal)* | *Electricity Use (kWh/yr)* |
|---|---|---|---|
| Library | *12.1245* | *18.9639* | 319,177 |
| Parking Lot | 0.00 | 0.00 | 0 |
| **Total** | 12.12 | 18.96 | 319,177 |

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod ). Outdoor water results in 0.009727 kWhr of electricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod).

**LACMA Building for the Permanent Collection - Buildout (w/o PDFs)**
**Los Angeles-South Coast County, Annual**

**Land Use Details**

| *Land Uses* | *Size* | *Metric* | *Lot Acreage* | *Floor Surface Area* | *Population* |
|---|---|---|---|---|---|
| Library | 368.30 | 1000sqft | 8.46 | 368,300.00 | 0 |
| Enclosed Parking with Elevator | 74.00 | Space | 0.67 | 29,600.00 | 0 |
| Unenclosed Parking with Elevator | 186.00 | Space | 1.67 | 74,400.00 | 0 |

**Trip Summary Information**

| *Land Uses* | *Average Daily Trip Rate* | | | *Unmitigated* |
|---|---|---|---|---|
| | *Weekday* | *Saturday* | *Sunday* | |
| Library | 3,406.78 | 4,507.99 | 4,507.99 | 9,395,387 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | 0 |
| Unenclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | 0 |
| Total | 3,406.78 | 4,507.99 | 4,507.99 | 9,395,387 |

**Unmitigated Gasoline and Diesel Usage**

| | *Gasoline* | *Diesel* |
|---|---|---|
| *Miles/Gallon* | 24.8 | 20.1 |
| *% Fleet Mix* | 97.6% | 2.4% |
| **Total (Gallons):** | **370,231** | **11,339** |

**Energy by Land Use - Natural Gas (Unmitigated)**

| *Land Uses* | *kBTU/yr* | cu ft/year |
|---|---|---|
| Library | 7,292,340 | 6,945,086 |
| Enclosed Parking with Elevator | 0 | 0 |
| Unenclosed Parking with Elevator | 0 | 0 |
| **Total** | 7,292,340 | **6,945,086** |

**Energy by Land Use - Electricity (Unmitigated)**

| *Land Uses* | *kWH/yr* |
|---|---|
| Library | 4,618,480 |
| Enclosed Parking with Elevator | 83,472 |
| Unenclosed Parking with Elevator | 166,656 |
| **Total** | **4,868,608** |

**Water Detail (Unmitigated)**

| *Land Uses* | *Indoor Use (Mgal)* | *Outdoor Use (Mgal)* | *Electricity Use (kWh/yr)* |
|---|---|---|---|
| Library | 11.52 | 18.02 | 303,362 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0 |
| Unenclosed Parking with Elevator | 0.00 | 0.00 | 0 |
| **Total** | 11.52 | 18.02 | **303,362** |

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod ). Outdoor water results in 0.009727 kWhr of electricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod).

**LACMA Building for the Permanent Collection Project Operations - Buildout (with PDFs)**
**Los Angeles-South Coast County, Annual**

**Land Use Details**

| *Land Uses* | *Size* | *Metric* | *Lot Acreage* | *Floor Surface Area* | *Population* |
|---|---|---|---|---|---|
| Library | 368.3 | 1000sqft | 8.46 | 368300 | 0 |
| Enclosed Parking with Elevator | 74 | Space | 0.67 | 29600 | 0 |
| Unenclosed Parking with Elevator | 186 | Space | 1.67 | 74400 | 0 |

**Trip Summary Information**

| *Land Uses* | *Average Daily Trip Rate* | | | *Mitigated* |
|---|---|---|---|---|
| | *Weekday* | *Saturday* | *Sunday* | |
| Library | 3,406.78 | 4,507.99 | 4,507.99 | 3,757,541 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | 0 |
| Unenclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | 0 |
| Total | 3,406.78 | 4,507.99 | 4,507.99 | 3,757,541 |

**Mitigated Gasoline and Diesel Usage**

| | *Gasoline* | *Diesel* |
|---|---|---|
| *Miles/Gallon* | 24.8 | 20.1 |
| *% Fleet Mix* | 97.6% | 2.4% |
| **Total (Gallons):** | **148,068** | **4,535** |

**Energy by Land Use - Natural Gas (Mitigated)**

| *Land Uses* | *kBTU/yr* | cu ft/year |
|---|---|---|
| Library | 5,930,920 | 5,648,495 |
| Enclosed Parking with Elevator | 0 | 0 |
| Unenclosed Parking with Elevator | 0 | 0 |
| **Total** | 5,930,920 | **5,648,495** |

**Energy by Land Use - Electricity (Mitigated)**

| *Land Uses* | *kWH/yr* |
|---|---|
| Library | 3,740,450 |
| Enclosed Parking with Elevator | 65,727 |
| Unenclosed Parking with Elevator | 128,526 |
| **Total** | **3,934,703** |

**Water Detail (Unmitigated)**

| *Land Uses* | *Indoor Use (Mgal)* | *Outdoor Use (Mgal)* | *Electricity Use (kWh/yr)* |
|---|---|---|---|
| Library | 9.22 | 14.42 | 242,689 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0 |
| Unenclosed Parking with Elevator | 0.00 | 0.00 | 0 |
| **Total** | 9.22 | 14.42 | **242,689** |

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod ). Outdoor water results in 0.009727 kWhr of electricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod).

**EMFAC Emission inventories for County**

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: County
Region: Los Angeles
Calendar Year: 2016
Season: Annual
Vehicle Classification: EMFAC2011 Categories

| Region | CalYr | VehClass | MdlYr | Speed | Fuel | Fuel_Gasoline (1000 gallons/day) | Fuel_DSL (1000 gallons/day) |
|---|---|---|---|---|---|---|---|
| Los Angeles | 2016 | All Other B | Aggregatec | Aggregatec | DSL | 0.00 | 21.11 |
| Los Angeles | 2016 | LDA | Aggregatec | Aggregatec | DSL | 0.00 | 29.15 |
| Los Angeles | 2016 | LDT1 | Aggregatec | Aggregatec | DSL | 0.00 | 0.63 |
| Los Angeles | 2016 | LDT2 | Aggregatec | Aggregatec | DSL | 0.00 | 2.47 |
| Los Angeles | 2016 | LHD1 | Aggregatec | Aggregatec | DSL | 0.00 | 82.60 |
| Los Angeles | 2016 | LHD2 | Aggregatec | Aggregatec | DSL | 0.00 | 41.79 |
| Los Angeles | 2016 | MDV | Aggregatec | Aggregatec | DSL | 0.00 | 18.19 |
| Los Angeles | 2016 | MH | Aggregatec | Aggregatec | DSL | 0.00 | 4.04 |
| Los Angeles | 2016 | Motor Coa | Aggregatec | Aggregatec | DSL | 0.00 | 18.34 |
| Los Angeles | 2016 | PTO | Aggregatec | Aggregatec | DSL | 0.00 | 19.50 |
| Los Angeles | 2016 | SBUS | Aggregatec | Aggregatec | DSL | 0.00 | 15.18 |
| Los Angeles | 2016 | T6 Ag | Aggregatec | Aggregatec | DSL | 0.00 | 0.34 |
| Los Angeles | 2016 | T6 CAIRP h | Aggregatec | Aggregatec | DSL | 0.00 | 0.83 |
| Los Angeles | 2016 | T6 CAIRP s | Aggregatec | Aggregatec | DSL | 0.00 | 2.55 |
| Los Angeles | 2016 | T6 instate | Aggregatec | Aggregatec | DSL | 0.00 | 13.42 |
| Los Angeles | 2016 | T6 instate | Aggregatec | Aggregatec | DSL | 0.00 | 36.35 |
| Los Angeles | 2016 | T6 instate l | Aggregatec | Aggregatec | DSL | 0.00 | 94.70 |
| Los Angeles | 2016 | T6 instate s | Aggregatec | Aggregatec | DSL | 0.00 | 242.96 |
| Los Angeles | 2016 | T6 OOS hea | Aggregatec | Aggregatec | DSL | 0.00 | 0.48 |
| Los Angeles | 2016 | T6 OOS sm | Aggregatec | Aggregatec | DSL | 0.00 | 1.46 |
| Los Angeles | 2016 | T6 Public | Aggregatec | Aggregatec | DSL | 0.00 | 7.76 |
| Los Angeles | 2016 | T6 utility | Aggregatec | Aggregatec | DSL | 0.00 | 1.91 |
| Los Angeles | 2016 | T7 Ag | Aggregatec | Aggregatec | DSL | 0.00 | 0.38 |
| Los Angeles | 2016 | T7 CAIRP | Aggregatec | Aggregatec | DSL | 0.00 | 165.01 |
| Los Angeles | 2016 | T7 CAIRP c | Aggregatec | Aggregatec | DSL | 0.00 | 14.53 |
| Los Angeles | 2016 | T7 NNOOS | Aggregatec | Aggregatec | DSL | 0.00 | 196.09 |
| Los Angeles | 2016 | T7 NOOS | Aggregatec | Aggregatec | DSL | 0.00 | 66.49 |
| Los Angeles | 2016 | T7 POLA | Aggregatec | Aggregatec | DSL | 0.00 | 195.66 |
| Los Angeles | 2016 | T7 Public | Aggregatec | Aggregatec | DSL | 0.00 | 22.04 |
| Los Angeles | 2016 | T7 Single | Aggregatec | Aggregatec | DSL | 0.00 | 78.43 |
| Los Angeles | 2016 | T7 single c | Aggregatec | Aggregatec | DSL | 0.00 | 36.16 |
| Los Angeles | 2016 | T7 SWCV | Aggregatec | Aggregatec | DSL | 0.00 | 75.82 |
| Los Angeles | 2016 | T7 tractor | Aggregatec | Aggregatec | DSL | 0.00 | 212.42 |
| Los Angeles | 2016 | T7 tractor | Aggregatec | Aggregatec | DSL | 0.00 | 27.15 |
| Los Angeles | 2016 | T7 utility | Aggregatec | Aggregatec | DSL | 0.00 | 1.63 |
| Los Angeles | 2016 | UBUS | Aggregatec | Aggregatec | DSL | 0.00 | 115.03 |
| Los Angeles | 2016 | LDA | Aggregatec | Aggregatec | ELEC | 0.00 | 0 |
| Los Angeles | 2016 | LDT1 | Aggregatec | Aggregatec | ELEC | 0.00 | 0 |
| Los Angeles | 2016 | LDA | Aggregatec | Aggregatec | GAS | 5175.68 | 0 |
| Los Angeles | 2016 | LDT1 | Aggregatec | Aggregatec | GAS | 530.59 | 0 |
| Los Angeles | 2016 | LDT2 | Aggregatec | Aggregatec | GAS | 2524.56 | 0 |
| Los Angeles | 2016 | LHD1 | Aggregatec | Aggregatec | GAS | 255.89 | 0 |
| Los Angeles | 2016 | LHD2 | Aggregatec | Aggregatec | GAS | 59.34 | 0 |
| Los Angeles | 2016 | MCY | Aggregatec | Aggregatec | GAS | 30.30 | 0 |
| Los Angeles | 2016 | MDV | Aggregatec | Aggregatec | GAS | 2139.17 | 0 |
| Los Angeles | 2016 | MH | Aggregatec | Aggregatec | GAS | 27.02 | 0 |
| Los Angeles | 2016 | OBUS | Aggregatec | Aggregatec | GAS | 35.64 | 0 |
| Los Angeles | 2016 | SBUS | Aggregatec | Aggregatec | GAS | 3.56 | 0 |
| Los Angeles | 2016 | T6TS | Aggregatec | Aggregatec | GAS | 96.97 | 0 |
| Los Angeles | 2016 | T7IS | Aggregatec | Aggregatec | GAS | 14.35 | 0 |
| Los Angeles | 2016 | UBUS | Aggregatec | Aggregatec | GAS | 30.02 | 0 |
| | | | | | | 3,986,927,263 | 679,846,446 |
| | | | | | Fuel Usage for Project Construction | 396,288 | 462,042 |
| | | | | | Percentage of County for Construction | 0.0099% | 0.068% |
| | | | | | Net Fuel Usage for Project Operation | 26,270 | 805 |
| | | | | | Percentage of County for Operation | 0.0007% | 0.0001% |