

City of Pittsburg - K2 Pure Solutions
CalEEMod Emissions Calculations Data Assumptions
Chlorine Rail Transportation Curtailment Project

General Project Data

Project Site Area – 0.02 acre (1,000 sq. ft.)

Number of additional employees at site: 0

Assume no additional Trip rate (The proposed Project operations would not require additional operators at the facility.)

CalEEMod Project Characteristics

Assumptions:

Project Location: Contra Costa County

Forecast Climate Zone: 4 (From Appendix F: Zip code 94565 - Pittsburg - Contra Costa County)

Land Use Setting: Urban

Operational Year: 2019

Utility Company: Pacific Gas & Electric Company

Land Use

Chlorine Rail Transportation Curtailment Project

- Total Disturbed Area = Less than 1,000 sq-ft = 0.02-acres.
- Rail Car Loading Rack would be installed on a concrete pad.
 - Unrefrigerated Warehouse-Rail = 40 ft x 25 ft = 1,000 sq-ft

Construction Phases:

Estimates assume construction begins in May-2019. Construction assumed to be completed within 8-10 weeks. Except where noted the phase duration and equipment are default assumptions generated by CalEEMod for a construction site of this size.

Demolition – Not Applicable (CalEEMod default = 10 days)

No demolition will be required at the site for construction of the rail car loading facilities.

Site Preparation - Five days (5/6/2019 to 5/10/2019) - 5-days per week (CalEEMod default = 1 days)
Involves clearing rocks & stones prior to grading. Conservatively assumed to require 5-days.
Assume no material imported or exported.

Equipment - 1 Grader - 187-Horsepower (0.41 load factor) - 8.0 hours/day
- 1 Tractors/Loaders/Backhoes - 97-Horsepower (0.37 load factor) - 8.0 hours/day

Grading - Five days (5/13/2019 to 5/17/2019) - 5-days per week (CalEEMod default = 2 days)
Default CalEEMod construction phase, involves the cut and fill of land to ensure the proper base and slope for the construction foundation. Assume no graded materials required to be hauled off site.

Equipment - 1 Grader - 187-Horsepower (0.41 load factor) - 8.0 hours/day
- 1 Rubber Tire Dozer - 247-Horsepower (0.4 load factor) - 1.0 hours/day
- 2 Tractors/Loaders/Backhoes - 97-Horsepower (0.37 load factor) - 6.0 hours/day

Building Construction - Twelve weeks / 60-days (5/20/2019 to 8/9/2019) - 5-days per week - (CalEEMod default=100 days)
The building construction phase is anticipated to be significantly shorter than CalEEMod defaults, as it entails the pouring of a slab on grade, and construction of the loading rack, rather than new construction of a building.
Activities will include:

- Pouring of a slab on grade;
- Construction of the loading rack
- Construction of approximately 700 feet of above ground pipeline from an existing fixed chlorine storage tank to the rail car loading facility.
- Installation of Rail Car loading equipment and piping.

Equipment - 1 Crane - 231-Horsepower (0.29 load factor) - 4.0 hours/day
- 2 Forklift - 89-Horsepower (0.2 load factor) - 6.0 hours/day
- 2 Tractors/Loaders/Backhoes - 97-Horsepower (0.37 load factor) - 8.0 hours/day

Paving - Three-days (8/12/2019 to 8/14/2019) - 5-days per week - (CalEEMod default = 5 days)
Only minimal paving will be required at the facility to provide a walkway for K2 operators to access this station, No access roads to be paved unless damaged by construction equipment.

Equipment - 4 Cement and Mortar Mixers - 9-Horsepower (0.56 load factor) - 6.0 hours/day
- 1 Paver - 130-Horsepower (0.42 load factor) - 7.0 hours/day
- 1 Roller - 80-Horsepower (0.38 load factor) - 7.0 hours/day
- 1 Tractors/Loaders/Backhoes - 97-Horsepower (0.37 load factor) - 7.0 hours/day

Architectural Coating - Five-days (8/15/2019 to 8/21/2019) - 5-days per week (CalEEMod default = 5 days)
Architectural Coating phase includes surface coating of containment structures and painting of loading rack, piping and equipment as needed.

- Equipment - 1 Air Compressor - 78-Horsepower (0.48 load factor) - 6.0 hours/day
- Exterior Coatings = 1,500 sq-ft
(CalEEMod default = 500 sq-ft)
 - Interior Coatings = 0 sq-ft External Coatings only (CalEEMod ratio of 3 to 1 Interior to Exterior).
(CalEEMod default = 1,500 sq-ft)

Operational Emissions

Operational - Mobile Source Assumptions

The proposed Project operations would not require additional operators at the facility.

Operational - Energy Use

With the exception of additional lighting included with the project, no additional energy use will result from this project.

Natural Gas Assumptions

There will be no NG used at site. (CalEEMod default = 3.4 kBTU/size/yr).

Operational - Water and Wastewater Usage

No potable water use associated with Rail Car Loading Rack (CalEEMod default = 231,250 gal/yr).

Operational - Solid Waste

No waste generation will be associated with the Rail Car Loading Rack (CalEEMod default = 0.94 tons/year).

Operational - Off-Road Equipment

Switching locomotive for moving rail cars onsite. Conservatively assume switching operations of 1.0-hr per car loading and 58 cars per year expected maximum. The Rail Car Loading Rack will include no additional stationary sources.

Equipment -

- 1 Other General Industrial Equipment – 130-Horsepower (0.8 load factor) – 1.0 hours/day. 58 days/yr.

Vegetation

Land Use Change: Assume no change in vegetation.

Sequestration: There are no trees or other vegetation at the project site. No replanting will be required.

City of Pittsburg - K2 Pure Solutions
CalEEMod Emissions Calculations Data Assumptions
Chlorine Rail Transportation Curtailment Project

CalEEMod Report for Peak Summer Emissions

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-Rail	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	58
Climate Zone	4			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	641.35	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

Project Characteristics -

Land Use -

Construction Phase - See comments in "Phase Description".

Off-road Equipment - - Corrected to include appropriate construction phase equipment.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Area Coating - - Exterior surphases only. See CalEEMod data assumptions summary.

Energy Use - - Only additional exterior lighting required.

Water And Wastewater - No additional potable water use or domestic waste water generation will result from this project .

Solid Waste - No waste generation will be associated with the project.

Operational Off-Road Equipment - Switching locomotive for moving rail cars onsite.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	500	1500
tblAreaCoating	Area_Nonresidential_Interior	1500	0
tblConstructionPhase	NumDays	100.00	60.00
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	NumDays	5.00	3.00
tblConstructionPhase	NumDays	1.00	5.00
tblConstructionPhase	PhaseEndDate	10/23/2019	8/21/2019
tblConstructionPhase	PhaseEndDate	10/9/2019	8/9/2019
tblConstructionPhase	PhaseEndDate	5/22/2019	5/17/2019
tblConstructionPhase	PhaseEndDate	10/16/2019	8/14/2019
tblConstructionPhase	PhaseEndDate	5/20/2019	5/10/2019
tblConstructionPhase	PhaseStartDate	10/17/2019	8/15/2019
tblConstructionPhase	PhaseStartDate	5/23/2019	5/20/2019

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

tblConstructionPhase	PhaseStartDate	5/21/2019	5/13/2019
tblConstructionPhase	PhaseStartDate	10/10/2019	8/12/2019
tblConstructionPhase	PhaseStartDate	5/18/2019	5/6/2019
tblEnergyUse	NT24E	1.07	0.00
tblEnergyUse	NT24NG	0.07	0.00
tblEnergyUse	T24E	0.32	0.00
tblEnergyUse	T24NG	3.40	0.00
tblGrading	AcresOfGrading	2.50	0.00
tblGrading	AcresOfGrading	2.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Graders
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	58.00
tblOperationalOffRoadEquipment	OperHorsePower	88.00	130.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	1.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.34	0.80
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblSolidWaste	SolidWasteGenerationRate	0.94	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblWater	IndoorWaterUseRate	231,250.00	0.00

2.0 Emissions Summary

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2019	2.3522	15.2081	9.8430	0.0195	0.8349	0.7488	1.5837	0.4356	0.7072	1.1428	0.0000	1,903.6349	1,903.6349	0.4315	0.0000	1,914.4227
Maximum	2.3522	15.2081	9.8430	0.0195	0.8349	0.7488	1.5837	0.4356	0.7072	1.1428	0.0000	1,903.6349	1,903.6349	0.4315	0.0000	1,914.4227

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	lb/day										lb/day					
2019	2.3522	15.2081	9.8430	0.0195	0.8349	0.7488	1.5837	0.4356	0.7072	1.1428	0.0000	1,903.6349	1,903.6349	0.4315	0.0000	1,914.4227
Maximum	2.3522	15.2081	9.8430	0.0195	0.8349	0.7488	1.5837	0.4356	0.7072	1.1428	0.0000	1,903.6349	1,903.6349	0.4315	0.0000	1,914.4227

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K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

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	lb/day										lb/day					
Area	0.0243	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	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
Mobile	3.7600e-003	0.0146	0.0428	1.3000e-004	0.0104	1.4000e-004	0.0106	2.7900e-003	1.3000e-004	2.9200e-003		13.3067	13.3067	4.9000e-004		13.3189
Offroad	0.0692	0.6876	0.7432	1.1200e-003		0.0359	0.0359		0.0330	0.0330		110.5903	110.5903	0.0350		111.4650
Total	0.0972	0.7022	0.7861	1.2500e-003	0.0104	0.0360	0.0464	2.7900e-003	0.0331	0.0359		123.8972	123.8972	0.0355	0.0000	124.7842

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

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	lb/day										lb/day					
Area	0.0243	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	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
Mobile	3.7600e-003	0.0146	0.0428	1.3000e-004	0.0104	1.4000e-004	0.0106	2.7900e-003	1.3000e-004	2.9200e-003		13.3067	13.3067	4.9000e-004		13.3189
Offroad	0.0692	0.6876	0.7432	1.1200e-003		0.0359	0.0359		0.0330	0.0330		110.5903	110.5903	0.0350		111.4650
Total	0.0972	0.7022	0.7861	1.2500e-003	0.0104	0.0360	0.0464	2.7900e-003	0.0331	0.0359		123.8972	123.8972	0.0355	0.0000	124.7842

	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	0.00	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**

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/6/2019	5/10/2019	5	5	Conservatively assumed to require 5-days.
2	Grading	Grading	5/13/2019	5/17/2019	5	5	Conservatively assumed to require 5-days.
3	Building Construction	Building Construction	5/20/2019	8/9/2019	5	60	The building construction phase entails the pouring of a slab on grade, and construction of the loading rack, rather than new construction of a building.
4	Paving	Paving	8/12/2019	8/14/2019	5	3	Only minimal paving will be required at the facility to provide a walkway for K2 operators to access this station.
5	Architectural Coating	Architectural Coating	8/15/2019	8/21/2019	5	5	Architectural Coating phase includes surface coating of containment structures and painting of loading rack, piping and equipment as needed.

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,500; Non-Residential Outdoor: 500; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Graders	1	8.00	187	0.41
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.2 Site Preparation - 2019**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	lb/day										lb/day					
Fugitive Dust					0.1061	0.0000	0.1061	0.0115	0.0000	0.0115			0.0000			0.0000
Off-Road	0.7195	8.9170	4.1407	9.7500e-003		0.3672	0.3672		0.3378	0.3378		965.1690	965.1690	0.3054		972.8032
Total	0.7195	8.9170	4.1407	9.7500e-003	0.1061	0.3672	0.4733	0.0115	0.3378	0.3493		965.1690	965.1690	0.3054		972.8032

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	lb/day										lb/day					
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
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
Worker	0.0200	0.0123	0.1566	4.3000e-004	0.0411	2.7000e-004	0.0413	0.0109	2.5000e-004	0.0111		43.1754	43.1754	1.1700e-003		43.2046
Total	0.0200	0.0123	0.1566	4.3000e-004	0.0411	2.7000e-004	0.0413	0.0109	2.5000e-004	0.0111		43.1754	43.1754	1.1700e-003		43.2046

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.2 Site Preparation - 2019**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	lb/day										lb/day					
Fugitive Dust					0.1061	0.0000	0.1061	0.0115	0.0000	0.0115			0.0000			0.0000
Off-Road	0.7195	8.9170	4.1407	9.7500e-003		0.3672	0.3672		0.3378	0.3378	0.0000	965.1690	965.1690	0.3054		972.8032
Total	0.7195	8.9170	4.1407	9.7500e-003	0.1061	0.3672	0.4733	0.0115	0.3378	0.3493	0.0000	965.1690	965.1690	0.3054		972.8032

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	lb/day										lb/day					
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
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
Worker	0.0200	0.0123	0.1566	4.3000e-004	0.0411	2.7000e-004	0.0413	0.0109	2.5000e-004	0.0111		43.1754	43.1754	1.1700e-003		43.2046
Total	0.0200	0.0123	0.1566	4.3000e-004	0.0411	2.7000e-004	0.0413	0.0109	2.5000e-004	0.0111		43.1754	43.1754	1.1700e-003		43.2046

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.3 Grading - 2019**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	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.4398	15.1835	9.5298	0.0186		0.7483	0.7483		0.7068	0.7068		1,817.284 2	1,817.284 2	0.4292		1,828.013 5
Total	1.4398	15.1835	9.5298	0.0186	0.7528	0.7483	1.5010	0.4138	0.7068	1.1205		1,817.284 2	1,817.284 2	0.4292		1,828.013 5

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	lb/day										lb/day					
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
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
Worker	0.0399	0.0246	0.3132	8.7000e-004	0.0822	5.4000e-004	0.0827	0.0218	5.0000e-004	0.0223		86.3508	86.3508	2.3400e-003		86.4093
Total	0.0399	0.0246	0.3132	8.7000e-004	0.0822	5.4000e-004	0.0827	0.0218	5.0000e-004	0.0223		86.3508	86.3508	2.3400e-003		86.4093

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.3 Grading - 2019**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	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.4398	15.1835	9.5298	0.0186		0.7483	0.7483		0.7068	0.7068	0.0000	1,817.284 2	1,817.284 2	0.4292		1,828.013 5
Total	1.4398	15.1835	9.5298	0.0186	0.7528	0.7483	1.5010	0.4138	0.7068	1.1205	0.0000	1,817.284 2	1,817.284 2	0.4292		1,828.013 5

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	lb/day										lb/day					
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
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
Worker	0.0399	0.0246	0.3132	8.7000e-004	0.0822	5.4000e-004	0.0827	0.0218	5.0000e-004	0.0223		86.3508	86.3508	2.3400e-003		86.4093
Total	0.0399	0.0246	0.3132	8.7000e-004	0.0822	5.4000e-004	0.0827	0.0218	5.0000e-004	0.0223		86.3508	86.3508	2.3400e-003		86.4093

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.4 Building Construction - 2019**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	lb/day										lb/day					
Off-Road	0.9576	9.8207	7.5432	0.0114		0.6054	0.6054		0.5569	0.5569		1,127.6696	1,127.6696	0.3568		1,136.5892
Total	0.9576	9.8207	7.5432	0.0114		0.6054	0.6054		0.5569	0.5569		1,127.6696	1,127.6696	0.3568		1,136.5892

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	lb/day										lb/day					
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
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
Worker	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
Total	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

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.4 Building Construction - 2019**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	lb/day										lb/day					
Off-Road	0.9576	9.8207	7.5432	0.0114		0.6054	0.6054		0.5569	0.5569	0.0000	1,127.6696	1,127.6696	0.3568		1,136.5892
Total	0.9576	9.8207	7.5432	0.0114		0.6054	0.6054		0.5569	0.5569	0.0000	1,127.6696	1,127.6696	0.3568		1,136.5892

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	lb/day										lb/day					
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
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
Worker	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
Total	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

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.5 Paving - 2019**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	lb/day										lb/day					
Off-Road	0.8300	7.8446	7.1478	0.0113		0.4425	0.4425		0.4106	0.4106		1,055.182 3	1,055.182 3	0.3016		1,062.723 1
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.8300	7.8446	7.1478	0.0113		0.4425	0.4425		0.4106	0.4106		1,055.182 3	1,055.182 3	0.3016		1,062.723 1

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	lb/day										lb/day					
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
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
Worker	0.0718	0.0443	0.5638	1.5600e-003	0.1479	9.7000e-004	0.1488	0.0392	9.0000e-004	0.0401		155.4314	155.4314	4.2100e-003		155.5367
Total	0.0718	0.0443	0.5638	1.5600e-003	0.1479	9.7000e-004	0.1488	0.0392	9.0000e-004	0.0401		155.4314	155.4314	4.2100e-003		155.5367

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.5 Paving - 2019**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	lb/day										lb/day					
Off-Road	0.8300	7.8446	7.1478	0.0113		0.4425	0.4425		0.4106	0.4106	0.0000	1,055.182 3	1,055.182 3	0.3016		1,062.723 1
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.8300	7.8446	7.1478	0.0113		0.4425	0.4425		0.4106	0.4106	0.0000	1,055.182 3	1,055.182 3	0.3016		1,062.723 1

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	lb/day										lb/day					
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
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
Worker	0.0718	0.0443	0.5638	1.5600e-003	0.1479	9.7000e-004	0.1488	0.0392	9.0000e-004	0.0401		155.4314	155.4314	4.2100e-003		155.5367
Total	0.0718	0.0443	0.5638	1.5600e-003	0.1479	9.7000e-004	0.1488	0.0392	9.0000e-004	0.0401		155.4314	155.4314	4.2100e-003		155.5367

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.6 Architectural Coating - 2019**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	lb/day										lb/day					
Archit. Coating	2.0858					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	2.3522	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423

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	lb/day										lb/day					
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
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
Worker	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
Total	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

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

3.6 Architectural Coating - 2019**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	lb/day										lb/day					
Archit. Coating	2.0858					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	2.3522	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423

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	lb/day										lb/day					
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
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
Worker	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
Total	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

4.0 Operational Detail - Mobile

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

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	lb/day										lb/day					
Mitigated	3.7600e-003	0.0146	0.0428	1.3000e-004	0.0104	1.4000e-004	0.0106	2.7900e-003	1.3000e-004	2.9200e-003		13.3067	13.3067	4.9000e-004		13.3189
Unmitigated	3.7600e-003	0.0146	0.0428	1.3000e-004	0.0104	1.4000e-004	0.0106	2.7900e-003	1.3000e-004	2.9200e-003		13.3067	13.3067	4.9000e-004		13.3189

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Unrefrigerated Warehouse-Rail	1.68	1.68	1.68	4,905	4,905
Total	1.68	1.68	1.68	4,905	4,905

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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
Unrefrigerated Warehouse-Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Unrefrigerated Warehouse-Rail	0.571348	0.041302	0.187452	0.129481	0.019048	0.005152	0.010609	0.022861	0.001566	0.001884	0.005572	0.002772	0.000953

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

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	lb/day										lb/day					
NaturalGas Mitigated	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
NaturalGas Unmitigated	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

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

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	lb/day										lb/day					
Unrefrigerated Warehouse-Rail	0	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
Total		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

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	lb/day										lb/day					
Unrefrigerated Warehouse-Rail	0	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
Total		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

6.0 Area Detail**6.1 Mitigation Measures Area**

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

	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	lb/day										lb/day					
Mitigated	0.0243	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	0.0243	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

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	lb/day										lb/day					
Architectural Coating	2.8600e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0214					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	0.0243	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

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	lb/day										lb/day					
Architectural Coating	2.8600e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0214					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	0.0243	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

7.0 Water Detail**7.1 Mitigation Measures Water****8.0 Waste Detail****8.1 Mitigation Measures Waste****9.0 Operational Offroad**

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Other General Industrial Equipment	1	1.00	58	130	0.80	Diesel

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Summer

UnMitigated/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
Equipment Type	lb/day										lb/day					
Other General Industrial Equipment	0.0692	0.6876	0.7432	1.1200e-003		0.0359	0.0359		0.0330	0.0330		110.5903	110.5903	0.0350		111.4650
Total	0.0692	0.6876	0.7432	1.1200e-003		0.0359	0.0359		0.0330	0.0330		110.5903	110.5903	0.0350		111.4650

10.0 Stationary Equipment**Fire Pumps and Emergency Generators**

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

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

Equipment Type	Number
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11.0 Vegetation

City of Pittsburg - K2 Pure Solutions
CalEEMod Emissions Calculations Data Assumptions
Chlorine Rail Transportation Curtailment Project

CalEEMod Report for Annual Emissions

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-Rail	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	58
Climate Zone	4			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	641.35	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

Project Characteristics -

Land Use -

Construction Phase - See comments in "Phase Description".

Off-road Equipment - - Corrected to include appropriate construction phase equipment.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Area Coating - - Exterior surphases only. See CalEEMod data assumptions summary.

Energy Use - - Only additional exterior lighting required.

Water And Wastewater - No additional potable water use or domestic waste water generation will result from this project .

Solid Waste - No waste generation will be associated with the project.

Operational Off-Road Equipment - Switching locomotive for moving rail cars onsite.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	500	1500
tblAreaCoating	Area_Nonresidential_Interior	1500	0
tblConstructionPhase	NumDays	100.00	60.00
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	NumDays	5.00	3.00
tblConstructionPhase	NumDays	1.00	5.00
tblConstructionPhase	PhaseEndDate	10/23/2019	8/21/2019
tblConstructionPhase	PhaseEndDate	10/9/2019	8/9/2019
tblConstructionPhase	PhaseEndDate	5/22/2019	5/17/2019
tblConstructionPhase	PhaseEndDate	10/16/2019	8/14/2019
tblConstructionPhase	PhaseEndDate	5/20/2019	5/10/2019
tblConstructionPhase	PhaseStartDate	10/17/2019	8/15/2019
tblConstructionPhase	PhaseStartDate	5/23/2019	5/20/2019

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

tblConstructionPhase	PhaseStartDate	5/21/2019	5/13/2019
tblConstructionPhase	PhaseStartDate	10/10/2019	8/12/2019
tblConstructionPhase	PhaseStartDate	5/18/2019	5/6/2019
tblEnergyUse	NT24E	1.07	0.00
tblEnergyUse	NT24NG	0.07	0.00
tblEnergyUse	T24E	0.32	0.00
tblEnergyUse	T24NG	3.40	0.00
tblGrading	AcresOfGrading	2.50	0.00
tblGrading	AcresOfGrading	2.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Graders
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	58.00
tblOperationalOffRoadEquipment	OperHorsePower	88.00	130.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	1.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.34	0.80
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblSolidWaste	SolidWasteGenerationRate	0.94	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblWater	IndoorWaterUseRate	231,250.00	0.00

2.0 Emissions Summary

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

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					
2019	0.0415	0.3714	0.2776	4.4000e-004	2.6600e-003	0.0219	0.0246	1.2000e-003	0.0203	0.0215	0.0000	39.5384	39.5384	0.0119	0.0000	39.8347
Maximum	0.0415	0.3714	0.2776	4.4000e-004	2.6600e-003	0.0219	0.0246	1.2000e-003	0.0203	0.0215	0.0000	39.5384	39.5384	0.0119	0.0000	39.8347

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					
2019	0.0415	0.3714	0.2776	4.4000e-004	2.6600e-003	0.0219	0.0246	1.2000e-003	0.0203	0.0215	0.0000	39.5383	39.5383	0.0119	0.0000	39.8346
Maximum	0.0415	0.3714	0.2776	4.4000e-004	2.6600e-003	0.0219	0.0246	1.2000e-003	0.0203	0.0215	0.0000	39.5383	39.5383	0.0119	0.0000	39.8346

[illegible]

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Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	5-6-2019	8-5-2019	0.3473	0.3473
2	8-6-2019	9-30-2019	0.0353	0.0353
		Highest	0.3473	0.3473

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	4.4300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.6226	0.6226	3.0000e-005	1.0000e-005	0.6250
Mobile	5.8000e-004	2.7500e-003	7.2700e-003	2.0000e-005	1.8300e-003	2.0000e-005	1.8600e-003	4.9000e-004	2.0000e-005	5.2000e-004	0.0000	2.0484	2.0484	8.0000e-005	0.0000	2.0504
Offroad	2.0100e-003	0.0199	0.0216	3.0000e-005		1.0400e-003	1.0400e-003		9.6000e-004	9.6000e-004	0.0000	2.9095	2.9095	9.2000e-004	0.0000	2.9325
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	7.0200e-003	0.0227	0.0288	5.0000e-005	1.8300e-003	1.0600e-003	2.9000e-003	4.9000e-004	9.8000e-004	1.4800e-003	0.0000	5.5804	5.5804	1.0300e-003	1.0000e-005	5.6079

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

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	4.4300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.6226	0.6226	3.0000e-005	1.0000e-005	0.6250
Mobile	5.8000e-004	2.7500e-003	7.2700e-003	2.0000e-005	1.8300e-003	2.0000e-005	1.8600e-003	4.9000e-004	2.0000e-005	5.2000e-004	0.0000	2.0484	2.0484	8.0000e-005	0.0000	2.0504
Offroad	2.0100e-003	0.0199	0.0216	3.0000e-005		1.0400e-003	1.0400e-003		9.6000e-004	9.6000e-004	0.0000	2.9095	2.9095	9.2000e-004	0.0000	2.9325
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	7.0200e-003	0.0227	0.0288	5.0000e-005	1.8300e-003	1.0600e-003	2.9000e-003	4.9000e-004	9.8000e-004	1.4800e-003	0.0000	5.5804	5.5804	1.0300e-003	1.0000e-005	5.6079

	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	0.00	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**

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/6/2019	5/10/2019	5	5	Conservatively assumed to require 5-days.
2	Grading	Grading	5/13/2019	5/17/2019	5	5	Conservatively assumed to require 5-days.
3	Building Construction	Building Construction	5/20/2019	8/9/2019	5	60	The building construction phase entails the pouring of a slab on grade, and construction of the loading rack, rather than new construction of a building.
4	Paving	Paving	8/12/2019	8/14/2019	5	3	Only minimal paving will be required at the facility to provide a walkway for K2 operators to access this station.
5	Architectural Coating	Architectural Coating	8/15/2019	8/21/2019	5	5	Architectural Coating phase includes surface coating of containment structures and painting of loading rack, piping and equipment as needed.

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,500; Non-Residential Outdoor: 500; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Graders	1	8.00	187	0.41
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

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	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.2 Site Preparation - 2019**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					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8000e-003	0.0223	0.0104	2.0000e-005		9.2000e-004	9.2000e-004		8.4000e-004	8.4000e-004	0.0000	2.1890	2.1890	6.9000e-004	0.0000	2.2063
Total	1.8000e-003	0.0223	0.0104	2.0000e-005	2.7000e-004	9.2000e-004	1.1900e-003	3.0000e-005	8.4000e-004	8.7000e-004	0.0000	2.1890	2.1890	6.9000e-004	0.0000	2.2063

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	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	5.0000e-005	3.0000e-005	3.5000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0898	0.0898	0.0000	0.0000	0.0899
Total	5.0000e-005	3.0000e-005	3.5000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0898	0.0898	0.0000	0.0000	0.0899

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.2 Site Preparation - 2019**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					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8000e-003	0.0223	0.0104	2.0000e-005		9.2000e-004	9.2000e-004		8.4000e-004	8.4000e-004	0.0000	2.1890	2.1890	6.9000e-004	0.0000	2.2063
Total	1.8000e-003	0.0223	0.0104	2.0000e-005	2.7000e-004	9.2000e-004	1.1900e-003	3.0000e-005	8.4000e-004	8.7000e-004	0.0000	2.1890	2.1890	6.9000e-004	0.0000	2.2063

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	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	5.0000e-005	3.0000e-005	3.5000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0898	0.0898	0.0000	0.0000	0.0899
Total	5.0000e-005	3.0000e-005	3.5000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0898	0.0898	0.0000	0.0000	0.0899

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.3 Grading - 2019**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					1.8800e-003	0.0000	1.8800e-003	1.0300e-003	0.0000	1.0300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6000e-003	0.0380	0.0238	5.0000e-005		1.8700e-003	1.8700e-003		1.7700e-003	1.7700e-003	0.0000	4.1215	4.1215	9.7000e-004	0.0000	4.1459
Total	3.6000e-003	0.0380	0.0238	5.0000e-005	1.8800e-003	1.8700e-003	3.7500e-003	1.0300e-003	1.7700e-003	2.8000e-003	0.0000	4.1215	4.1215	9.7000e-004	0.0000	4.1459

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	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	9.0000e-005	7.0000e-005	7.0000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1797	0.1797	0.0000	0.0000	0.1798
Total	9.0000e-005	7.0000e-005	7.0000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1797	0.1797	0.0000	0.0000	0.1798

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.3 Grading - 2019**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					1.8800e-003	0.0000	1.8800e-003	1.0300e-003	0.0000	1.0300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6000e-003	0.0380	0.0238	5.0000e-005		1.8700e-003	1.8700e-003		1.7700e-003	1.7700e-003	0.0000	4.1215	4.1215	9.7000e-004	0.0000	4.1459
Total	3.6000e-003	0.0380	0.0238	5.0000e-005	1.8800e-003	1.8700e-003	3.7500e-003	1.0300e-003	1.7700e-003	2.8000e-003	0.0000	4.1215	4.1215	9.7000e-004	0.0000	4.1459

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	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	9.0000e-005	7.0000e-005	7.0000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1797	0.1797	0.0000	0.0000	0.1798
Total	9.0000e-005	7.0000e-005	7.0000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1797	0.1797	0.0000	0.0000	0.1798

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.4 Building Construction - 2019

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	0.0287	0.2946	0.2263	3.4000e-004		0.0182	0.0182		0.0167	0.0167	0.0000	30.6901	30.6901	9.7100e-003	0.0000	30.9329
Total	0.0287	0.2946	0.2263	3.4000e-004		0.0182	0.0182		0.0167	0.0167	0.0000	30.6901	30.6901	9.7100e-003	0.0000	30.9329

Unmitigated Construction Off-Site

[illegible]

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.4 Building Construction - 2019

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	0.0287	0.2946	0.2263	3.4000e-004		0.0182	0.0182		0.0167	0.0167	0.0000	30.6901	30.6901	9.7100e-003	0.0000	30.9329
Total	0.0287	0.2946	0.2263	3.4000e-004		0.0182	0.0182		0.0167	0.0167	0.0000	30.6901	30.6901	9.7100e-003	0.0000	30.9329

Mitigated Construction Off-Site

[illegible]

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.5 Paving - 2019**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	1.2400e-003	0.0118	0.0107	2.0000e-005		6.6000e-004	6.6000e-004		6.2000e-004	6.2000e-004	0.0000	1.4359	1.4359	4.1000e-004	0.0000	1.4461
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.2400e-003	0.0118	0.0107	2.0000e-005		6.6000e-004	6.6000e-004		6.2000e-004	6.2000e-004	0.0000	1.4359	1.4359	4.1000e-004	0.0000	1.4461

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	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	1.0000e-004	7.0000e-005	7.6000e-004	0.0000	2.1000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1940	0.1940	1.0000e-005	0.0000	0.1942
Total	1.0000e-004	7.0000e-005	7.6000e-004	0.0000	2.1000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1940	0.1940	1.0000e-005	0.0000	0.1942

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.5 Paving - 2019**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	1.2400e-003	0.0118	0.0107	2.0000e-005		6.6000e-004	6.6000e-004		6.2000e-004	6.2000e-004	0.0000	1.4359	1.4359	4.1000e-004	0.0000	1.4461
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.2400e-003	0.0118	0.0107	2.0000e-005		6.6000e-004	6.6000e-004		6.2000e-004	6.2000e-004	0.0000	1.4359	1.4359	4.1000e-004	0.0000	1.4461

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	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	1.0000e-004	7.0000e-005	7.6000e-004	0.0000	2.1000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1940	0.1940	1.0000e-005	0.0000	0.1942
Total	1.0000e-004	7.0000e-005	7.6000e-004	0.0000	2.1000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1940	0.1940	1.0000e-005	0.0000	0.1942

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

3.6 Architectural Coating - 2019

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	5.2100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.7000e-004	4.5900e-003	4.6000e-003	1.0000e-005		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	0.6383	0.6383	5.0000e-005	0.0000	0.6397
Total	5.8800e-003	4.5900e-003	4.6000e-003	1.0000e-005		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	0.6383	0.6383	5.0000e-005	0.0000	0.6397

Unmitigated Construction Off-Site

[illegible]

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3.6 Architectural Coating - 2019**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	5.2100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.7000e-004	4.5900e-003	4.6000e-003	1.0000e-005		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	0.6383	0.6383	5.0000e-005	0.0000	0.6397
Total	5.8800e-003	4.5900e-003	4.6000e-003	1.0000e-005		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	0.6383	0.6383	5.0000e-005	0.0000	0.6397

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	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	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
Total	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

4.0 Operational Detail - Mobile

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

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	5.8000e-004	2.7500e-003	7.2700e-003	2.0000e-005	1.8300e-003	2.0000e-005	1.8600e-003	4.9000e-004	2.0000e-005	5.2000e-004	0.0000	2.0484	2.0484	8.0000e-005	0.0000	2.0504
Unmitigated	5.8000e-004	2.7500e-003	7.2700e-003	2.0000e-005	1.8300e-003	2.0000e-005	1.8600e-003	4.9000e-004	2.0000e-005	5.2000e-004	0.0000	2.0484	2.0484	8.0000e-005	0.0000	2.0504

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Unrefrigerated Warehouse-Rail	1.68	1.68	1.68	4,905	4,905
Total	1.68	1.68	1.68	4,905	4,905

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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
Unrefrigerated Warehouse-Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Unrefrigerated Warehouse-Rail	0.571348	0.041302	0.187452	0.129481	0.019048	0.005152	0.010609	0.022861	0.001566	0.001884	0.005572	0.002772	0.000953

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

[illegible]

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5.2 Energy by Land Use - NaturalGas

Unmitigated

[illegible]

Mitigated

[illegible]

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5.3 Energy by Land Use - Electricity**Unmitigated**

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Unrefrigerated Warehouse-Rail	2140	0.6226	3.0000e-005	1.0000e-005	0.6250
Total		0.6226	3.0000e-005	1.0000e-005	0.6250

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Unrefrigerated Warehouse-Rail	2140	0.6226	3.0000e-005	1.0000e-005	0.6250
Total		0.6226	3.0000e-005	1.0000e-005	0.6250

6.0 Area Detail**6.1 Mitigation Measures Area**

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

	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	4.4300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	4.4300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

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	5.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.9100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	4.4300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

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	5.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.9100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	4.4300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

7.0 Water Detail**7.1 Mitigation Measures Water**

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/ Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Unrefrigerated Warehouse-Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

7.2 Water by Land Use**Mitigated**

	Indoor/ Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Unrefrigerated Warehouse-Rail	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

8.0 Waste Detail

8.1 Mitigation Measures Waste**Category/Year**

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

8.2 Waste by Land Use**Unmitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Unrefrigerated Warehouse-Rail	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Unrefrigerated Warehouse-Rail	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

9.0 Operational Offroad

K2 Pure Solutions Chlorine Rail Transportation Curtailment Project - Contra Costa County, Annual

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Other General Industrial Equipment	1	1.00	58	130	0.80	Diesel

UnMitigated/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
Equipment Type	tons/yr										MT/yr					
Other General Industrial Equipment	2.0100e-003	0.0199	0.0216	3.0000e-005		1.0400e-003	1.0400e-003		9.6000e-004	9.6000e-004	0.0000	2.9095	2.9095	9.2000e-004	0.0000	2.9325
Total	2.0100e-003	0.0199	0.0216	3.0000e-005		1.0400e-003	1.0400e-003		9.6000e-004	9.6000e-004	0.0000	2.9095	2.9095	9.2000e-004	0.0000	2.9325

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

Health Risk Screening Analysis

Air Toxics Exposure Assessment (Operational Impacts)

Human health risks potentially associated with hazardous substance emissions from the proposed operation of the K2 Pure Solutions (K2) proposed Chlorine Rail Transportation Curtailment Project (proposed Project) were evaluated, including compounds on the list of Office of Environmental Health Hazard Assessment (OEHHA) toxic air contaminants (TACs) and U.S. Environmental Protection Agency (USEPA) hazardous air pollutants (HAPs). The health risk screening analysis (HRSA) was conducted in accordance with Bay Area Air Quality Management District (BAAQMD) Regulation 2, Rule 5, and the following guidance:

- *BAAQMD California Environmental Quality Act (CEQA) Guidelines (BAAQMD 2017);*
- *BAAQMD Air Toxics NSR Program, Health Risk Screening Analysis (HRSA) Guidelines (BAAQMD 2010);*
- *BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards (BAAQMD 2012);*

The HRSA process follows the approach depicted in Figure 5-2 of the BAAQMD CEQA Guidelines (BAAQMD 2017), “*Phased Approach for Estimating Community Risks and Hazards – New Sources*”. This phased approach requires the following steps to estimate human health impacts:

- 1) identify and quantify project generated emissions,
- 2) estimate screening level impacts using trigger levels,
- 3) if the Proposed Project Toxic Air Contaminant (TAC) risk and hazard are greater than CEQA thresholds, evaluate pollutant transport (air dispersion modeling) to estimate ground level TAC concentrations at each receptor location, assess human exposure, and use a risk characterization model to estimate the potential health risk at each receptor location.

The following sections describe in detail the methods used in this HRSA.

B.1 Air Toxics Emission Calculations

Air toxics (TACs and HAPs) emission sources associated with the proposed Project will include fugitive emissions of Chlorine gas from the proposed liquid chlorine rail car loading facility, and emissions of diesel exhaust particulate matter from diesel powered rail switcher equipment used for moving the rail cars onsite.

B.1.1 Liquid chlorine rail car loading facility

Chlorine emissions from loading operations are expected to be very small. The venting of chlorine, that would occur while loading a pressurized railcar, would be directed to K2’s existing bleach production unit, an existing source on K2’s BAAQMD air quality permit to operate. The only new source of emissions would be the result of residual chlorine gas in the loading hoses after the hoses are disconnected and isolated. The design of the proposed Project includes a purging system for the hoses that includes a small scrubber at the loading station. The scrubber would be used to purge the approximately 50-ft of 1-inch diameter loading hose, to safely shutdown after a loading event.

Following the Chlorine Vent Scrubber vendor emission estimation methodology, resulting additional chlorine emissions are estimated to be 0.0033 lbs per loading event (assuming 30 minute per evacuation/purge), or 0.22-lbs/yr, assuming 66 loading hose purge events per year. The emissions

calculations are detailed in Table B-1. The BAAQMD Reg 2, Rule 5: New Source Review of Toxic Air Contaminants Table 2-5-1 Toxic Air Contaminant Trigger Levels for Chlorine are 0.26 lbs/hr and 7.7 lbs/yr.

TABLE B-1
Chlorine Vent Scrubber Emission Calculations

Vent Chlorine Supply Line			
Description	Units	Qty	Notes
Pipeline Data			
Pipe Diameter	in	1	
Pipe Length	ft	50	
Scrubber Data			
Eductor	#	1	
Caustic Depth	ft	6	
Eductor Transfer Units	#	3	3 Transfer units assumed per eductor
Liquid Transfer Units	#	6	1 Transfer Unit/1ft. Liquid Depth
Total Number of Transfer Units (NTU)	#	9	
Gas Flow Data			
Cl ₂ mass In (ClmIn)	lb/hr	50.02	Pipeline volume x density Cl ₂ / evacuation time
Cl ₂ molar rate In (ClmrIn)	lbmol/hr	0.7054	ClmrIn=ClmIn/70.9
Cl ₂ mole fraction In (ClmfIn)	mol fraction	1.00	
Cl ₂ mole fraction Out (ClmfOut)	mol fraction	0.00013	ClmfOut=ClmfIn*(1/e^NTU)
Total Gas molar rate Out (TGmrOut)	lbmol/hr	0.00009251	TGmrOut=ClmrIn*ClmfOut
Cl ₂ Gas Flow Out (ClgfOut)	lb/hr	0.00655901	ClgfOut=TGmrOut*70.9
Time			
Evacuation Time	Minutes	30	
Events per Year	#	66	
Emissions Data			
Chlorine Emissions per Event	lb	0.0033	ClgfOut * Evacuation time
Chlorine Emissions per Year	lb	0.216	Lb/Event * Events per year
Caustic Consumed (100% Basis) per Event	lb	28.2	
Scrubber Efficiency	%	99.9869%	

B.1.2 Rail-yard Switcher engine

The proposed Project may result in an increase the rail car movement onsite. Switcher equipment used for moving the rail cars onsite would result in operational emissions of diesel exhaust particulate matter, a BAAQMD Regulation 2 Rule 5 Toxic Air Contaminant. The switcher engine currently planned for use moving chlorine rail cars between the liquid chlorine rail car loading facility and the Dow facility is a 130-hp Trackmobile Viking mobile railcar mover. The switcher engine exhaust emissions estimate is based on the California Air Resources Board (CARB) OFFROAD2011 methodology using the equation presented below:

$$\text{Emission}_{\text{DieselEx}} = \text{EF} \times \text{AvgHp} \times \text{Load} \times \text{Activity}$$

Where:

EF = Emission factor in grams per horsepower-hour (g/bhp-hr)

AvgHp = Maximum rated average horsepower

Load = Load factor

Activity = Hours of operation

Attachment 1 contains the specification sheet for the Trackmobile Viking mobile railcar mover and the ARB certification letter for the Trackmobile Viking Cummins QSB4.5 engine. To convert the certification levels (CERT) for diesel particulate matter (PM) in grams per kilowatt-hour (g/kW-hr) to grams per brake horsepower-hour (g/bhp-hr), multiply it by 0.7457 kW/bhp. The maximum rated average horsepower for the Trackmobile Viking is 130-hp, the Load Factor is conservatively assumed to be 0.8 and the Activity is 66 hours per year.

$$\text{Emission}_{\text{DieselEx}} = 0.015 \text{ g/bhp-hr} \times 130\text{-bhp} \times 0.8 \times 66 \text{ hr/yr} \times 1 \text{ lb} / 453.6 \text{ g} = 0.23 \text{ lb/yr}$$

B.2 Screening Level Impacts

The Thresholds of Significance for Toxic Air Contaminants (TAC) in the 2017 guidance is whether the "ground-level concentrations of carcinogenic TACs from any source result in an increased cancer risk greater than 10.0 in one million, assuming a 70-year lifetime exposure", or "ground-level concentrations of non-carcinogenic TACs that result in an increased chronic or acute Hazard Index (HI) from any source greater than 1.0" (BAAQMD, 2017). The BAAQMD Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants Table 2-5-1 (Adopted December 7, 2016) includes Toxic Air Contaminant Trigger Levels for acute and chronic exposure to TACs. For non-carcinogenic adverse health effects, a TAC specific concentration that would result in the target chronic hazard index of 0.2 is used in the calculation of the chronic trigger level. For carcinogenic health effects, a TAC specific concentration that would result in the target residential cancer risk of one in a million is used in the calculation of the chronic trigger level. Therefore, for carcinogenic health effects, an emission rate below the Table 2-5-1 Toxic Air Contaminant Trigger Levels conservatively estimates the target residential cancer risk of less than one in a million.

A summary of the air toxics emissions included in the HRSA is presented in Table B-2. The details of the emission calculations are provided in Section B.1.

TABLE B-2
Emission Sources Included In HRSA

Source (Type)	Pollutant	CAS Number	Emissions (lbs/hr)	Emissions (lbs/yr)	Table 2-5-1 Chronic Trigger Level (lbs/yr)
Liquid chlorine rail car loading facility	Chlorine	7782-50-5	6.56-03	0.22	7.7
Rail-yard Switcher engine	Diesel Exhaust Particulate Matter		3.42-03	0.23	0.26

As detailed in Section B.1.1 liquid chlorine rail car loading facility emission are estimated to result in additional chlorine emissions of 6.56-03 lbs/hr and 0.22 lbs/yr, assuming 66 loading hose purge events per year. The BAAQMD Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants Table 2-5-1 acute and chronic Trigger Levels for Chlorine are 0.46 lbs/hr and 7.7 lbs/yr.

As detailed in Section B.1.2, emissions from the proposed increase in rail car movement onsite are estimated to result in additional diesel particulate matter emissions of 0.23 lb/yr, conservatively assuming switching operations of 1.0 hour per car loading, a Load Factor of 0.8, and 66 cars per year expected maximum. The BAAQMD Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants Table 2-5-1 chronic Trigger Level for diesel particulate matter emissions is 0.26 lbs/yr. There is no acute Toxic Air Contaminant Trigger Level for diesel particulate matter.

The proposed Project Toxic Air Contaminant (TAC) risk and hazard are less than the CEQA thresholds of an increased cancer risk of 10.0 in one million, and an increased chronic or acute Hazard Index (HI) from any source of 1.0. Therefore, no further Toxic Air Contaminant analysis is required.

B.3 References

BAAQMD. 2010. *BAAQMD Air Toxics NSR Program, Health Risk Screening Analysis (HRS) Guidelines*. San Francisco, CA Jan 2017.

http://www.baaqmd.gov/~media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx

BAAQMD. 2012. *BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards*. San Francisco, CA May 2012. <http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf>

BAAQMD. 2017. *Bay Area Air Quality Management District California Environmental Quality Act Air Quality Guidelines*. San Francisco, CA May 2017. http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf

Attachment 1

Specification sheet for the Trackmobile Viking mobile railcar mover

ARB certification letter for the Trackmobile Viking Cummins QSB4.5 engine

Certification Summary Information Report



TRACKMOBILE®
MOBILE RAILCAR MOVERS

VIKING

Specifications

Leading Railcar Mobility Since 1948

Maximum Tractive Effort

Double Coupled*	42,689 lbs. [19,363 kg]
Single Coupled*	27,014 lbs. [12,253 kg]

Dimensions / Performance

	On Rail	On Road
Wheel Base	121" [3,792 mm]	82.5" [2,096 mm]
Rail & Road Clearance	3.5" [88.9 mm]	6.5" [165.1 mm]
Rail & Road Height **	142" [3,607 mm]	153" [3,988 mm]
Length	152" [3,861 mm]	
Width	123" [3,124 mm]	
Weight, Non-Ballasted	34,360 lbs. [15,585 kg]	
Rail Gauge **	AAR Standard 56.5" [1,435 mm]	
Centerline to Cab Side	63.47" [1,612.14 mm]	
Centerline to Non-Cab Side	59.03" [1,499.36 mm]	
Cab Interior Cubic Feet³	150 cu. ft.	

Road Turning Radius

Inside Tire	13' 10" [4.0 m]
Outside Tire	21' 5" [6.5 m]
Outside Clearance	23' 6" [7.2 m]

Speeds (Forward & Reverse)***

Low	2.4 MPH, [3.9 km/h]	1.5 MPH, [2.4 km/h]
2nd Gear	4.0 MPH, [6.4 km/h]	2.5 MPH, [4.0 km/h]
3rd Gear	8.0 MPH, [12.8 km/h]	5.1 MPH, [8.2 km/h]
4th Gear	13.6 MPH, [21.9 km/h]	8.7 MPH, [14.0 km/h]

Engine

Cummins Electronic Turbo-Charged Diesel Engine	QSB-4.5 Liter
Meets EPA Tier III EU Stage III A Emissions	Standard
Meets EPA Tier IV Final and EU Stage IV Emissions	Optional
Configuration	4 Cylinder inline
Valves per Cylinder	4
Engine Displacement Tier III & Tier IV	275 In ³ [4.5 liters]
Horsepower Tier III & Tier IV	130hp [97 kW] @ 2500 rpm
Maximum Torque Tier III	459lb-ft [622 N-m] @ 1500 rpm
Maximum Torque Tier IV	457lb-ft [620 N-m] @ 1500 rpm

Fuel Tank - Steel Twenty-five (25) gallon [94.5 liter] capacity

Air Intake

Intake Air Heater - preheats incoming combustion air prior to start¹
3 - Stage Filtration, High-Efficiency Pre-Cleaner, Primary and Safety Filter

Powertrain

Transmission

Funk, DF 150 series, constant mesh spur gearing Four Speed Forward and Reverse with selectable Power shift manual or automatic with 4th or 3rd and 4th Lock-Out for Rail, Road, or Both

Axles

On Road - Two Heavy duty steel axles

On-Rail - Two (2) out-board internal planetary type with high-strength ductile iron rear axle drive hubs with friction drive

Differential - Two (2) Rigid, outboard planetary air actuated, auto-control differential locking

Transfer Case - Heavy duty, hardened alloy steel spur gears with oil bath lubrication

Automatic Shutdown

Automatic shutdown as a result of: High Engine Temperature; Low Engine Coolant Level; High Compressor Temperature; High Hydraulic System Oil Temperature; (Optional Low Hydraulic System Oil Level)

Brake System

On-Road Machine Braking² - Hydraulic disc brakes with Dual Calipers
On-Rail Machine Braking² - Hydraulic disc brakes, 18" [457 mm] diameter Machine Parking Brake - Spring applied, air released 14" [355.6 mm] diameter disc, driveline mounted
Selectable Neutral Braking - Automatically applies brake to full pressure within 5 seconds of operator inactivity

Train Air Brakes - glad hand connections

16 CFM Engine Driven Dual piston air compressor Tier III
60 CFM Twin Piston air compressor Tier IV
100 CFM Rotary Screw air compressor Tier III only
In-Cab Train Air Valves

STANDARD
STANDARD
OPTIONAL

Pneumatic System

Air dryer for machine air system and to fill air ride seat. Heated with internal thermostatically controlled 12-Volt heater to prevent pneumatic line release valve freeze ups in damp/cold climates.

Hydraulic

Constant Pressure Hydraulic System, piston pump and O-ring face seal fittings and oil filtered below ISO 18/16/13
On-Road Machine Braking² - Hydraulic disc brakes, dual calipers
On-Rail Machine Braking² - Hydraulic disc brakes, 18" [457 mm] diameter

Steering

On Road - front axle power steering w/pivot away steering wheel

Electrical

H D 12 Volt DC, 160 AMP Alternator with Dual 925 CCA Batteries
Digital Instrumentation - SAE-J1939 CAN-Bus Control System
7" Digital Display for real-time machine statistics and diagnostic data
Safe-T-Vue™ 360° visibility and railing camera with 10" color monitor
Additional 2 outputs for extra camera locations
Alarms - Automatic Backup Road-Mode Alarm, Selectable Electronic Warble-type alarm, blast type air horn, and amber strobe warning lights

Wheels/Tire

On Road

Four (4), 16 Ply 9.00 x 20 Heavy duty Mine Service Rubber Tires

On Rail

AAR Profile Standard Gauge 56 1/2" [1,435 mm] ****

Four (4), 27" [685.8 mm], heat-treated, cast steel, ring-style flanged railwheels

Eight (8) Individual, Air- Operated, Electronically-Controlled Sanders

Main Frame

Heavy duty -High strength 2" [51.0 mm] thick welded steel Main Frame with (2) 3" [76.2 mm] thick cross-members

Body Frame

Heavy duty all-welded construction using pre-formed steel plates and structural forms

Suspension

Six (6) mounts between cab and body frame (deck), four (4) Lord rubber mounts between body and main frame

Couplers

Two heavy duty cast steel weight transfer design positive coupling and uncoupling with AAR contour coupler and locking knuckle
Optional wide traverse coupler beam for adverse and severe curve radius
Standard width beam handles most standard curve radius

Note¹ **Not to be used in conjunction with Ether starting fluid.**

Note² **Maximum application pressure is varied automatically, depending on whether the machine is in rail or road mode. If the machine is on rail, the application pressure will vary depending on weight transferred, for best stopping capability.**

TIER IV ENGINES ADD APPROXIMATELY 2" ADDITIONAL HEIGHT DUE TO HEIGHT OF EXHAUST STACK ON NEW EXHAUST SYSTEM.

* Depending on weight package option, actual tractive effort may vary with rail and weather conditions.

** For shipping purposes, add 1.5" (38 mm) to Rail height for a 2 x 4 block under wheel tread. Additional variations may occur due to options selected.

*** Actual speeds obtained will depend on grade, load, altitude, and other factors.

**** Rail Gauges available in a various sizes, speak to your local dealer regarding the gauge best suited for your line.

Trackmobile® LLC reserves the right to change specifications at any time without prior notice.

VIKING

VIKING STANDARD FEATURES:

- CAN-Bus Control System
 - On Board Diagnostics
 - UltraView 7" Color Touch Screen Display
 - Safe-T-Vue™ 360° Visibility and Railing Camera with 10" Monitor
 - Air Ride, High Back 180° Swivel Seat
 - Joystick and Armrest Controls
 - Neutral Braking with Programmed Throttle Control
 - Automatic / Manual Power-Shift Transmission
 - 16 CFM Engine Driven Air Compressor*
 - In-Cab Train Air Valve
 - Incremental Train Air Brake Controller
 - Train Air Hold Button
 - Wide Coupler Table
 - Front and Rear Train Air Valves
 - Ring Style Railwheels
 - Accessible External Disc Brakes
 - Impact Sensor/Recorder
 - Coupler Rollers
 - LED head lighting, strobes, and work lighting
 - GPS Positioning Capabilities*
 - Telematics Remote Monitoring & Diagnostic Capabilities
- *60 CFM on Tier IV Viking Models*



Customized for Optimum Efficiency

Having the right tools to do the job improves productivity. Trackmobile serves many different industries receiving materials through rail service, with each industry representing unique challenges in their daily operations. To meet these demands, we offer a wide variety of options to customize your Trackmobile to your specific needs.

Popular Options:

- Tier IV Final and EURO Stage IV Emissions
- Radio Remote Control System with Train Air Indicator
- MAX-Tran Automatic Weight Transfer System
- MAX-Trac Automatic Traction Control System
- GCS- Ground Control System for ground crew safety
- Train Air Charge Indicator
- Cab Extensions
- Extended Coupler Beam
- Rail Line-of-Sight Cameras
- Spark Arrestor
- Vigilance Control
- Air Conditioning
- Flange Lubricators
- Rotary Broom
- Ballast Box
- Cab Pressurization

Cab Extension



Roof Mounted Spotlight



Rotary Broom



Train Air Charge Indicator

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2018	JCEXL04.5AAH	4.5	Diesel	8000
SPECIAL FEATURES & EMISSION CONTROL SYSTEMS			TYPICAL EQUIPMENT APPLICATION	
Engine Control Module, Exhaust Gas Recirculation, Electronic Direct Injection, Turbocharger, Charge Air Cooler, Diesel Oxidation Catalyst, Selective Catalytic Reduction – Urea, Ammonia Oxidation Catalyst			Crane, Loader, Tractor, Dozer, Pump, and Compressor	

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for non-methane hydrocarbon (NMHC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
75 ≤ kW < 130	Tier 4 Final	STD	0.19	0.40	N/A	5.0	0.02	N/A	N/A	N/A
		CERT	0.04	0.10	--	0.04	0.02	--	--	--

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 15th day of August 2017.


 Annette Hebert, Chief

Emissions Compliance, Automotive Regulations and Science Division

U-12-002-0662

Adelmynt B 141

6/23/2017

Engine Model Summary Template

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
JCEXL04.5AAH	4189.FR94118	QSB4.5	173@2500	115	97	520@1500	155	78	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94220	QSB4.5	162@2500	109	93	466@1500	138	70	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94221	QSB4.5	129@2500	92	77	457@1500	136	68.6	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94222	QSB4.5	158@2300	112	87	460@1500	137	69	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94223	QSB4.5	129@2300	95	74	378@1500	113	57	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94224	QSB4.5	158@2200	117	86	460@1500	137	69	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4189.FR94593	QSB4.5	139@2200	104	77	440@1500	131	66	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4189.FR94225	QSB4.5	129@2200	98	73	430@1500	128	64.6	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94226	QSB4.5	119@2200	92	68	347@1500	104	52.5	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4189.FR94227	QSB4.5	173@2000	141	94	520@1500	155	78	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94228	QSB4.5	154@2000	125	84	460@1500	137	69	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4222.FR94229	QSB4.5	138@2000	113	76	457@1500	136	68.6	SCR,DOC,DDI,TC, EGR,CAC,ECM
JCEXL04.5AAH	4831.FR95210	QSB4.5	154@2000	125	84	460@1500	137	69	SCR,DOC,DDI,TC, EGR,CAC,ECM

+ Annex

Hultgren-Tillis Engineers

December 22, 2016
Project No. 197.54

K2 Pure Solutions
950 Loveridge Road
Pittsburg, California 94565

Attention: Mr. Michael Cordova

**Geotechnical Report Update
K2 Plus Project
K2 Pure Facility
Pittsburg, California
Purchase Order K2PS-G511-C0003-45**

Dear Mr. Cordova:

This letter presents a geotechnical report update for the K2 Plus Project at the K2 Pure Solutions facility in Pittsburg, California. The facility is located near the north end of Loveridge Road, as shown on the attached Vicinity Map, Plate 1. We previously performed two geotechnical investigations for the facility and presented the results in reports dated July 17, 2009 and September 15, 2011. We recently provided preliminary geotechnical pile design criteria in a letter dated November 16, 2016.

The attached Site Plan, Plate 2, shows an overall foundation plan for the K2 Plus Project. The project will consist of a plant expansion including installation of new equipment, vessels, pipe racks, rail loading dock, and other process related features. Site work will include demolition of existing infrastructure, grading to re-route existing underground utilities and roadways, foundations, underground utility installation, and paving.

Most of the planned structures and vessels will be supported on shallow spread footings or mat foundations, except the new HCL Burner Number 2. The burner will be on a pile supported mat to resist large overturning forces. The mat will be approximately 25 feet wide and 36 feet long, supported by auger cast piles spaced about 7 to 8 feet on centers.

SURFACE AND SUBSURFACE CONDITIONS

The ground surface includes both paved and unpaved areas that are relatively level or slope slightly to facilitate surface water run-off. Ground surface elevations range from about 10 to 13 feet above the Dow vertical datum, generally increasing to the north. The Dow vertical datum is approximately 1.2 feet above NGVD29 and 3.8 feet above NAVD88. Unless noted otherwise, elevations in this letter are based on the Dow vertical datum.

The area is generally underlain by fill over firm alluvial deposits. Variations in the original topography resulted in little to no fill in some areas and up to 10 feet of fill in others.

The fills include soft to stiff silts and clays with occasional sand layers typically less than a foot thick. Some of the clays have moderate to high plasticity and will shrink/swell with moisture

variations. In general, the fill is poorly compacted based on observations during various projects on the Dow property and samples collected during previous investigations. Additionally, the fill has varying amounts of debris, slag, and concrete remnants from previous foundations or other site improvements.

Groundwater levels in the area are variable. Groundwater was encountered in previous investigations at depths ranging from 1 to 8 feet below existing grades, corresponding to approximately Elevations +4 to +11 feet. In general, stabilized groundwater levels were not recorded because the borings were immediately backfilled or groundwater levels were obscured by the drilling methods.

The above descriptions of soil and groundwater conditions include field observations and results from previous borings by others at the times of their investigations. Conditions vary across the site due to previous land use, recent construction activity, and seasonal weather. At greater depths variations are due to conditions inherent in alluvial deposition and erosion processes.

SEISMIC CONSIDERATIONS

The predominant seismic hazard for the site is strong groundshaking resulting from earthquakes. The structures should be designed to accommodate such groundshaking in accordance with existing codes. No known active faults pass through the site and we conclude that the risk of fault rupture at the site is low. For use with the 2013 or 2016 California Building Code (CBC), the site can be classified as Site Class D, a stiff soil profile.

The following seismic design criteria based on the CBC can be used for the project. The site coordinates are estimated to be: Latitude 38.02485 and Longitude -121.85702. From the USGS website calculator, the mapped acceleration parameters S_s and S_1 are 1.743 and 0.592, respectively.

Soil liquefaction is a phenomenon in which a loose to medium dense, saturated granular soil undergoes reduction of internal strength as a result of increased pore water pressure generated by shear strains within the soil mass. This behavior is most commonly induced by strong groundshaking associated with earthquakes. Subsurface conditions consist mainly of clayey soils and medium dense to dense sands. Where the medium dense sands are located, there is a risk of triggering liquefaction due to a large earthquake. We estimate that the consequences of liquefaction, if it occurred, would be surface settlements of less than 1-inch.

CONCLUSIONS AND RECOMMENDATIONS

We conclude that the planned shallow foundations can be designed using the same geotechnical criteria presented in our reports dated July 17, 2009 and September 15, 2011. We reviewed our preliminary pile recommendations and conclude that the HCL Burner Number 2 can be supported on auger cast piles using the criteria presented in our November 16, 2016 letter. The updated seismic parameters presented herein should be used for seismic design. Other geotechnical conclusions and recommendations from the previous reports can be used for earthwork design issues where applicable.

The piles should be installed in accordance with the Process Industry Practices (PIP) STS02465, *Augered Cast-in-Place Piles Installation Specification* dated February 2012. For this

project, we judge that pile load tests are not necessary. Our field engineer should observe geotechnical aspects of the pile installations on a full time basis.

Temporary shoring, bracing, underpinning, and dewatering may be needed during construction to stabilize excavations. The contractor should be solely responsible for design and construction of these temporary features. Preconstruction surveys and periodic monitoring should be performed where foundation excavations may impact existing site improvements. The contractor's shoring/bracing, underpinning, dewatering, and monitoring plans should be submitted for review by the project team.

During construction, we should observe and/or test geotechnical aspects of the work including excavations, placement and compaction of fill and backfill, subgrade preparation for pavements and railroads, and foundation installations. If conditions encountered during construction are not consistent with those described herein, we should be contacted to review our recommendations and provide supplemental recommendations, as needed.

It should be noted that the site vicinity has a long history of chemical manufacturing and industrial use dating back more than 100 years. At an industrial facility such as this, there is always the possibility that hazardous chemicals may have leaked into the ground or were contained in groundwater. The purpose of our services was limited to evaluating some of the characteristics of the soils as they relate to foundation design. We did not assess the possible chemical constituents within the soils or groundwater. Designers and contractors working at the site should contact the appropriate safety officer regarding the risk of encountering hazardous materials in the soils and groundwater.

If you have any questions regarding this letter, please call.

Sincerely,

Hultgren - Tillis Engineers



Christian P. Muller
Geotechnical Engineer

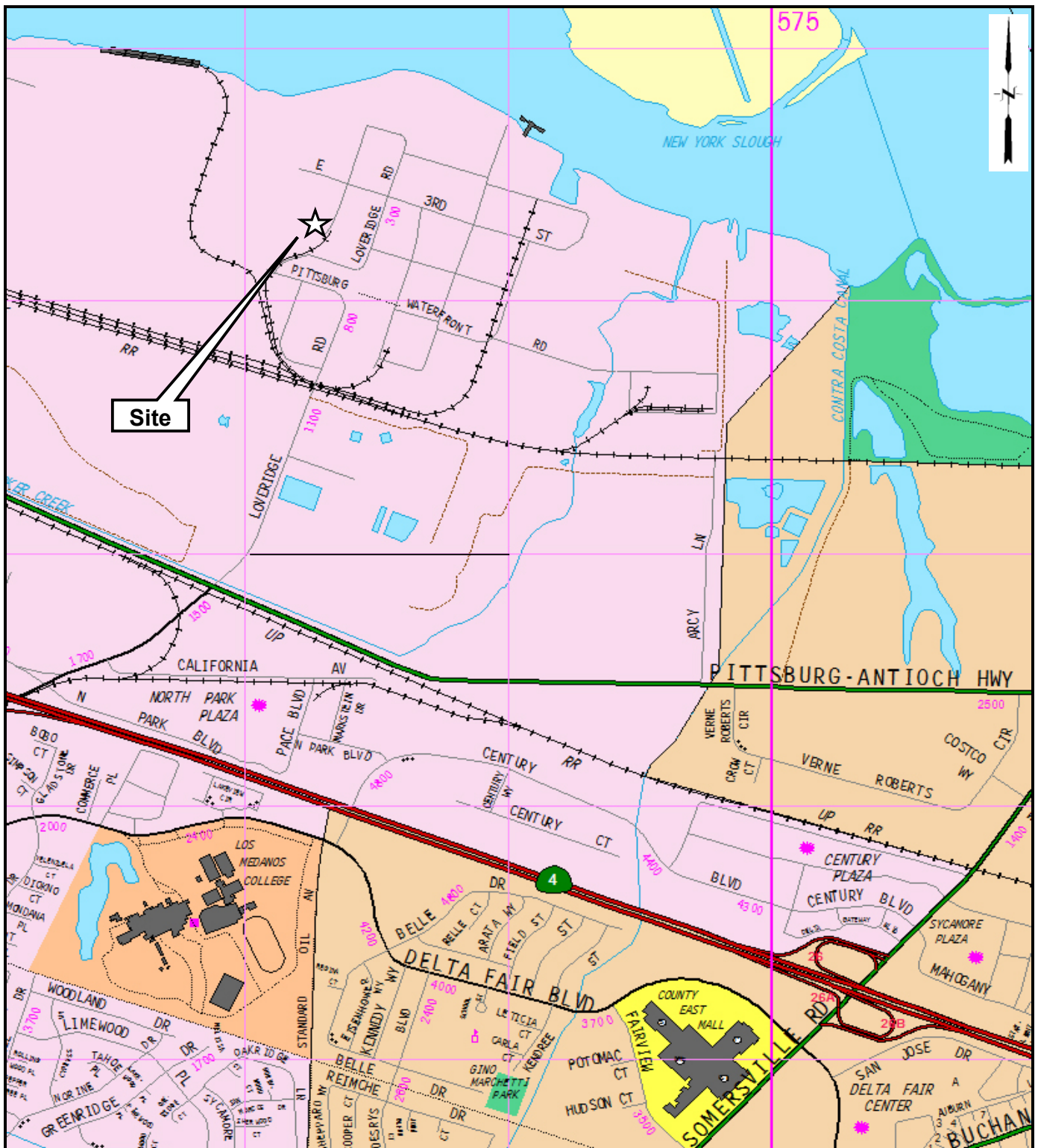


CPM:JAH:lm:la

Attachments: Plate 1 – Vicinity Map
Plate 2 – Site Plan

cc: Mr. Chuks Mbeledogu and Mr. Kevin Kelley, K2 Pure Solutions; and Mr. Kurtis Boehm and Mr. Scott Cooper, KBR (via email)

Filename: 19754L02 report update



0 1400 feet

APPROXIMATE SCALE

Base: Thomas Guide Map

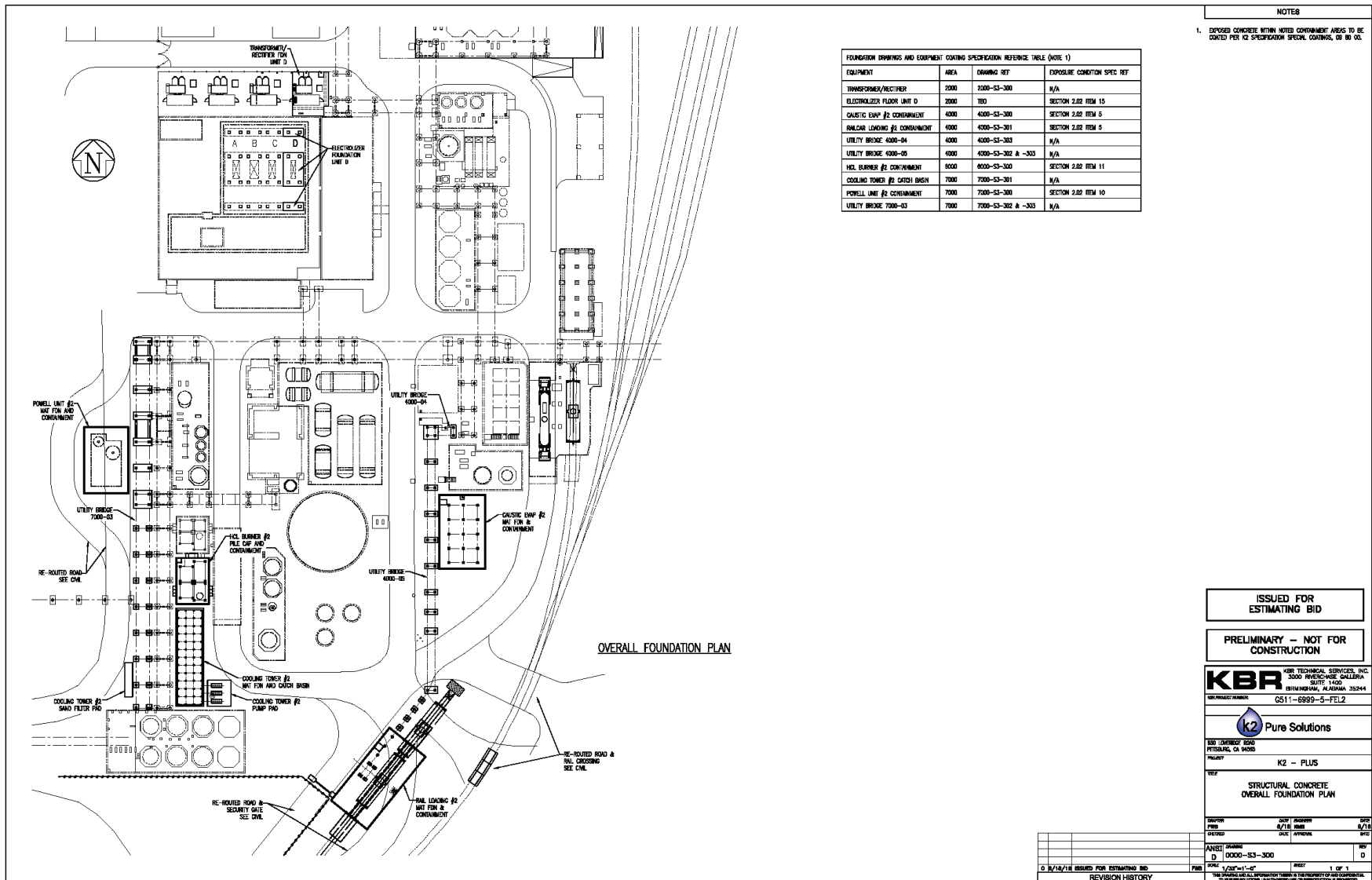
K2 Plus Project
K2 Pure Facility
Pittsburg, California

Vicinity Map

Hultgren - Tillis Engineers

Project No. 197.54

Plate No. 1



K2 Plus Project
K2 Pure Facility
Pittsburg, California

Site Plan

Hultgren - Tillis Engineers

Project No. 197.54

Plate No. 2