APPENDIX B-2

LST ANALYSIS

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Tesoro Refining & Marketing Company LLC
Los Angeles Refinery Integration and Compliance Project
Revised SCAQMD Localized Significance Threshold Analysis

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INTRODUCTION

This Localized Significance Threshold (LST) analysis has been prepared to evaluate the potential impacts of the criteria pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM10), and particulate matter less than 2.5 microns in diameter (PM2.5) emitted by the construction activities associated with the proposed Tesoro Refining & Marketing Company LLC Los Angeles Refinery (Refinery) Integration and Compliance (I&C) Project.

In June 2013, Tesoro purchased the adjacent BP West Coast Products LLC (BP) Carson Refinery, which, as part of the proposed project will be more fully integrated with the Tesoro Los Angeles Refinery – Wilmington Operations to form the Tesoro Los Angeles Refinery (Refinery). The proposed project will be designed to better integrate the Wilmington Operations and Carson Operations.

In addition to further Refinery integration, the proposed project will be designed to comply with the federally mandated Tier 3 gasoline specifications and with State and local regulations mandating emission reductions. The Refinery I&C Project is expected to shut down the Fluid Catalytic Cracking Unit (FCCU) at the Wilmington Operations and reconfigure the combined Refinery complex. Additionally, heat recovery will be optimized by installing new heat exchangers and modifying specified units to further minimize GHG and other emissions. Facilities will be added to remove impurities such as sulfur, nitrogen compounds, and organic acids from distillates. The modifications will be designed so that the combined Refinery operates within the existing capacity of the Sulfur Recovery Plants (SRPs). There will be no modifications at any of the marine terminals associated with the Tesoro Los Angeles Refinery.

As part of the proposed project, Environmental Audit, Inc. (EAI) has calculated construction emissions to evaluate the potential impacts from construction activities associated with the proposed project. Based on information provided by Tesoro, the LST analysis includes a a modeled analysis of the criteria pollutants for the peak daily emissions from the I&C Project. The results of this analysis are provided below.

FACILITY LOCATION

The proposed project will occur at both the Wilmington and Carson Operations of the Tesoro Los Angeles Refinery (see Figure 1). Tesoro will more fully integrate the recently purchased adjacent BP Carson Refinery (referred to as the Carson Operations) with the existing Wilmington Operations, to become a more efficient single entity owned and operated by Tesoro. The Refinery will be comprised of approximately 950 contiguous acres in size and operate within the Cities of Los Angeles (Wilmington District) and Carson, California.

The Wilmington Operations are located within Wilmington, a community under the jurisdiction of the City of Los Angeles, at 2101 East Pacific Coast Highway, Wilmington, Los Angeles County, California 90744. The Carson Operations are located at 2350 East 223rd Street, Carson, California, 90745. Both new and modified equipment, as well as connecting piping, will be located within

portions of the Refinery under both the City of Carson jurisdiction and the City of Los Angeles jurisdiction.

The Wilmington Operations are bounded to the north by Sepulveda Boulevard (as well as other tank farms and refinery activities), to the west by Alameda Street (as well as the Alameda Corridor and other tank farms), to the south by railroad tracks (as well as tank farms and metal recycling/scrap yards), and to the east by the Dominguez Channel (as well as other tank farms and rail yard activities). The Wilmington Operations are bisected by Pacific Coast Highway, with the larger portion of the Wilmington Operations to the north of Pacific Coast Highway and the smaller portion to the south. The closest residential area to the Wilmington Operations is about 200 feet southwest of the Truck Loading Rack.

The Carson Operations are bounded by Wilmington Avenue to the west, 223rd Avenue to the north, Alameda Street to the east, and Sepulveda Boulevard to the south. The Dominguez Channel flows through the Carson Operations, dividing the property into two sections: Northeastern and Southern. Several industrial/commercial facilities and the 405 Freeway border the Carson Operations to the north. The Alameda Corridor and other industrial facilities, including the Tesoro Coke Barn, the Air Products Hydrogen Plant, and the Tesoro Sulfur Recovery Plant, are located to the east of the Carson Operations. Commercial and residential areas are located to the west of the Carson Operations. The Phillips 66 Refinery and tank farms occupy the area located to the south of the Carson Operations.

The Carson Operations and all adjacent facilities and properties are zoned manufacturing heavy (MH) according to the City of Carson's Land Use element of its General Plan. The closest residential area to the Carson Operations is approximately 250 feet southwest of the Refinery on the southwest corner of the Sepulveda Boulevard/Wilmington Avenue intersection.

Additionally, the SRP (considered to be a portion of the Wilmington Operations) is located at 23208 South Alameda Street in the City of Carson (see Figure 1). The SRP is zoned MH according to the City of Carson's Land Use element of its General Plan. Adjacent land uses to the SRP also are heavy industrial and include other refineries, a hydrogen plant, undeveloped lots, and container storage areas.

EMISSION ESTIMATES

Construction emission estimates for the peak day are calculated by each project component that will be under construction during that peak period for the proposed project. A summary of construction emissions is found on Table 1. More detailed construction emissions can be found in Attachment 1. Construction emissions vary based on activities and the worst-case scenario has been evaluated. It is expected that the calculated peak day emissions estimates will occur infrequently during the proposed project construction activities and, most of the time, construction emissions will be less.

Based on information provided by Tesoro, construction activities by month for the proposed project are calculated to determine the peak construction day. Only on-site emissions sources are included, and though equipment (such as cranes) would be shared between project components, no equipment sharing was assumed for this LST analysis. The peak on-site construction day for most project components is spread over 12 hours and is expected to occur during Month 20. Project components that would be in turnaround (hydrotreating unit) are based on two shifts which cover 24 hours of construction. Construction activities included in this evaluation are the use of construction equipment and fugitive dust emissions from earth moving activities.

CRITERIA POLLUTANT IMPACT MODELING

In order to determine the groundlevel concentrations, the U.S. EPA AERMOD air dispersion model was used to model the peak day construction emissions (see Table 1) and calculate the annual average and maximum 1-hour, 8-hour, and 24-hour concentrations. NO_2 emissions were estimated using the U.S. EPA recommended ambient ratio method (ARM), which converts NOx to NO_2 based on a fixed ratio (U.S EPA, 2014).

The location of the source is identified based on data provided by Tesoro and the Long Beach USGS Quadrangle (see Figure 2). The model is run using the Long Beach meteorological data available from the SCAQMD. The dispersion model was run using regulatory defaults.

The model is not set to include algorithms to model the effects of building downwash on emissions since area sources are not influenced by building downwash.

Terrain elevations are taken into account even though the facility and the vicinity are in a relatively flat area.

The AERMOD model is run using a coarse receptor grid of 500 meters, that extends at least 1,000 meters in every cardinal direction from the boundaries of the Refinery, and a fine receptor grid of 100 meters in the residential area most affected by the construction emissions (see Figure 2). The maximum impact location is determined for the applicable averaging periods from the AERMOD model output. The maximum groundlevel concentration and the Universal Tranverse Mercator (NAD 83) coordinates for each maximum impact point at a sensitive receptor are presented in Table 2.

MODELED CRITERIA POLLUTANT IMPACT ANALYSIS

The proposed project maximum groundlevel concentrations are compared to the localized significance thresholds to demonstrate that if the project would cause or contribute to a violation of any state ambient air quality standard. The ambient air quality data for South Coastal Los Angeles County (Station No. 033 and 077) is used to establish background levels of the pollutants. Table 3 identifies the ambient air quality data for CO, NO_2, PM10, and PM2.5 published by the SCAQMD in the last three years (2012, 2013, and 2014), as well as federal NO_2 ambient background concentration data published by SCAQMD.

The CO and NO_2 concentrations are combined with the ambient background concentrations and compared to the Most Stringent Air Quality Standard. The PM10 and PM2.5 24-hour, and PM10 and PM2.5 annual average concentrations are compared to the Significant Change in Air Quality Concentration thresholds. Impacts from other criteria pollutants are regional in nature or in attainment and, therefore, are not included as part of the localized air quality analysis. The maximum impact locations are shown in Figure 2.

State Standards

The maximum CO impact concentrations for 1-hour and 8-hour averages are 8,221.1 and 4,967.4 micrograms per cubic meter ($\mu g/m^3$), respectively. The maximum NO_2 impact concentrations for 1-hour and annual averages are 455.9 and 52.7 $\mu g/m^3$, respectively. The maximum PM10 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. The maximum PM2.5 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. Therefore, the proposed project modeling results only exceed State criteria pollutant significance thresholds for 1-hour NO_2. The results are presented in Table 4.

Federal Standards

The maximum CO impact concentrations for 1-hour and 8-hour averages are 8,221.1 and 4,967.4 $\mu g/m^3$, respectively. The maximum NO_2 impact concentrations for 1-hour and annual averages are 302.8 and 52.7 $\mu g/m^3$, respectively. The maximum PM10 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. The maximum PM2.5 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. Therefore, the proposed project modeling results only exceed Federal criteria pollutant significance thresholds for 1-hour NO_2. The results are presented in Table 4.

CONCLUSIONS

The emissions for the proposed project results in a significant change air quality and exceedances of both state and federal air quality standards for 1-hour NO_2 during the peak on-site construction. The emissions for the proposed project do not results in a significant change air quality for CO, annual NO_2, or PM emission during the construction phase.

TABLES

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Tesoro Integration and Compliance Project
Localized Significance Threshold Analysis

Table 1. Onsite Construction Emission Summary

	2017 - Month 20								
	33.84	30.81	30.44	30.44	29.31	112.84	38.42	79.11	155.19
PM10 (lb/day)	2.12	1.76	1.86	1.86	1.72	6.68	2.54	5.38	8.44
PM2.5 (lb/day)[1]	2.07	1.73	1.82	1.82	1.68	6.55	2.49	5.27	8.27

	2017 - Month 20								
Emission from Trips - Onsite	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
CO (lb/day)	0.10	0.10	0.16	0.16	0.08	0.09	0.12	0.18	0.12
NOx (lb/day)	0.11	0.11	0.09	0.09	0.11	0.11	0.11	0.14	0.13
PM10 (lb/day)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06	0.05
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.04
PM2.5 (lb/day)[1]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

	2017 - Month 20								
Fugitive Earthmoving PM - Peak	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
PM10 (lb/day)[2]	0.00	2.36	2.36	2.36	0.00	2.36	2.36	0.00	0.00
PM2.5 (lb/day)[1][2]	0.00	1.37	1.37	1.37	0.00	1.37	1.37	0.00	0.00

	2017 - Month 20								
Offroad Fugitive PM - Peak	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
PM10 (lb/day)[2]	0.00	0.00	0.37	0.37	0.00	0.00	0.00	0.74	0.00
PM2.5 (lb/day)[1][2]	0.00	0.00	0.08	0.08	0.00	0.00	0.00	0.16	0.00

		2017 - Month 20								
Total Emissions	**Thresholds**	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
CO (lb/day)	550	32.77	30.59	25.67	25.67	26.97	99.65	37.95	82.11	114.37
NOx (lb/day)	100	33.95	30.92	30.53	30.53	29.42	112.95	38.53	79.25	155.32
PM10 (lb/day)[2]	150	2.16	4.17	4.63	4.63	1.76	9.08	4.94	6.17	8.49
PM2.5 (lb/day)[1][2]	55	2.09	3.11	3.29	3.29	1.70	7.93	3.87	5.44	8.29
CO (lb/hr)	NA	3.28	3.06	2.57	2.57	2.70	9.96	3.80	8.21	5.72
NOx (lb/hr)	NA	3.39	3.09	3.05	3.05	2.94	11.29	3.85	7.93	7.77
PM10 (lb/hr)[2]	NA	0.22	0.42	0.46	0.46	0.18	0.91	0.49	0.62	0.42
PM2.5 (lb/hr)[1][2]	NA	0.21	0.31	0.33	0.33	0.17	0.79	0.39	0.54	0.41

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

Tesoro Integration and Compliance Project
Localized Significance Threshold Analysis

Table 2. Modeling Results

Criteria Pollutant	Averaging Period	Max (µg/m3)	UTME	UTMN
CO	1-hr	291.38	385250	3739503
	8-hr	58.46	385250	3739503
NO_2	1-hr	200.43	385250	3739503
	1-hr (98%)	156.51	385250	3739503
	Annual	4.99	385250	3739503
PM10	24-hr	3.46	385250	3739503
	Annual	0.86	384900	3740000
PM2.5	24-hr	3.46	385250	3739503
	Annual	0.86	384900	3740000

Model results based on the last 5 years of available meterological data from SCAQMD for Long Beach.

Assumes PM2.5 is 100% of PM10.

Table 3. Ambient Concentrations

Criteria Pollutant	Averaging Period	Concentration (ppm)			Max Conc.	
		2012	2013	2014	(ppm)	($\mu g/m^3$)
CO	1-hr	4.2	4.1	3.7	4.2	7929.8
	8-hr	2.6	2.6	2.6	2.6	4908.9
NO_2	1-hr	0.0978	0.0813	0.1359	0.1359	255.5
	1-hr (98%)	0.0774	0.0713	0.0848	0.0778	146.3
	AAM	0.0253	0.0215	0.0207	0.0253	47.7
		Concentration ($\mu g/m^3$)				
PM10	24-hr	54	54	59		59.0
	AAM	25.5	27.3	26.6		27.3
PM2.5	24-hr	46.7	42.9	59		59.0
	AAM	10.57	10.97	26.6		26.6

Data from South Coastal LA County Station number 33 and 77. Missing PM2.5 substituted with PM10.

AAM = Annual Arithmetic Mean

Table 4. Localized Significance Threshold Summary

Criteria Pollutant	Averaging Period	Max Modeled GLC Conc. ($\mu g/m^3$)	Background GLC Conc. ($\mu g/m^3$)	Total GLC Conc. ($\mu g/m^3$)	Most Stringent Air Quality Standard ($\mu g/m^3$)	Significant
CO	1-hour	291.38	7929.8	8221.1	23000	NO
	8-hour	58.46	4908.9	4967.4	10000	NO
NO_2	1-hour	200.43	255.5	455.9	339	YES
	1-hour (Federal)	156.51	146.30	302.8	188	YES
	Annual	4.99	47.7	52.7	57	NO
PM10	24-hour	3.46	--	--	10.4	NO
	Annual	0.86	--	--	1	NO
PM2.5	24-hour	3.46	--	--	10.4	NO
	Annual	0.86	--	--	1	NO

FIGURE

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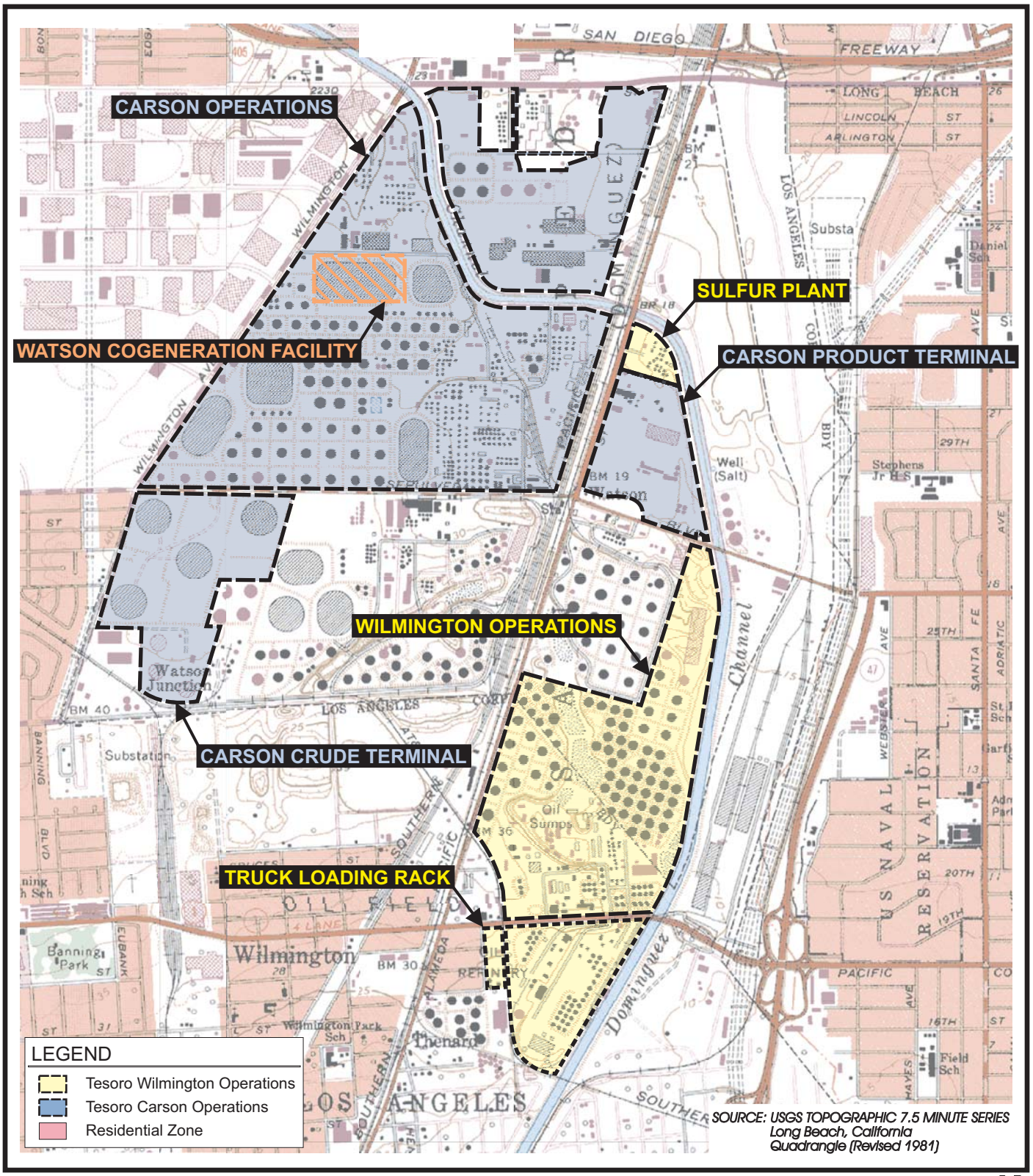
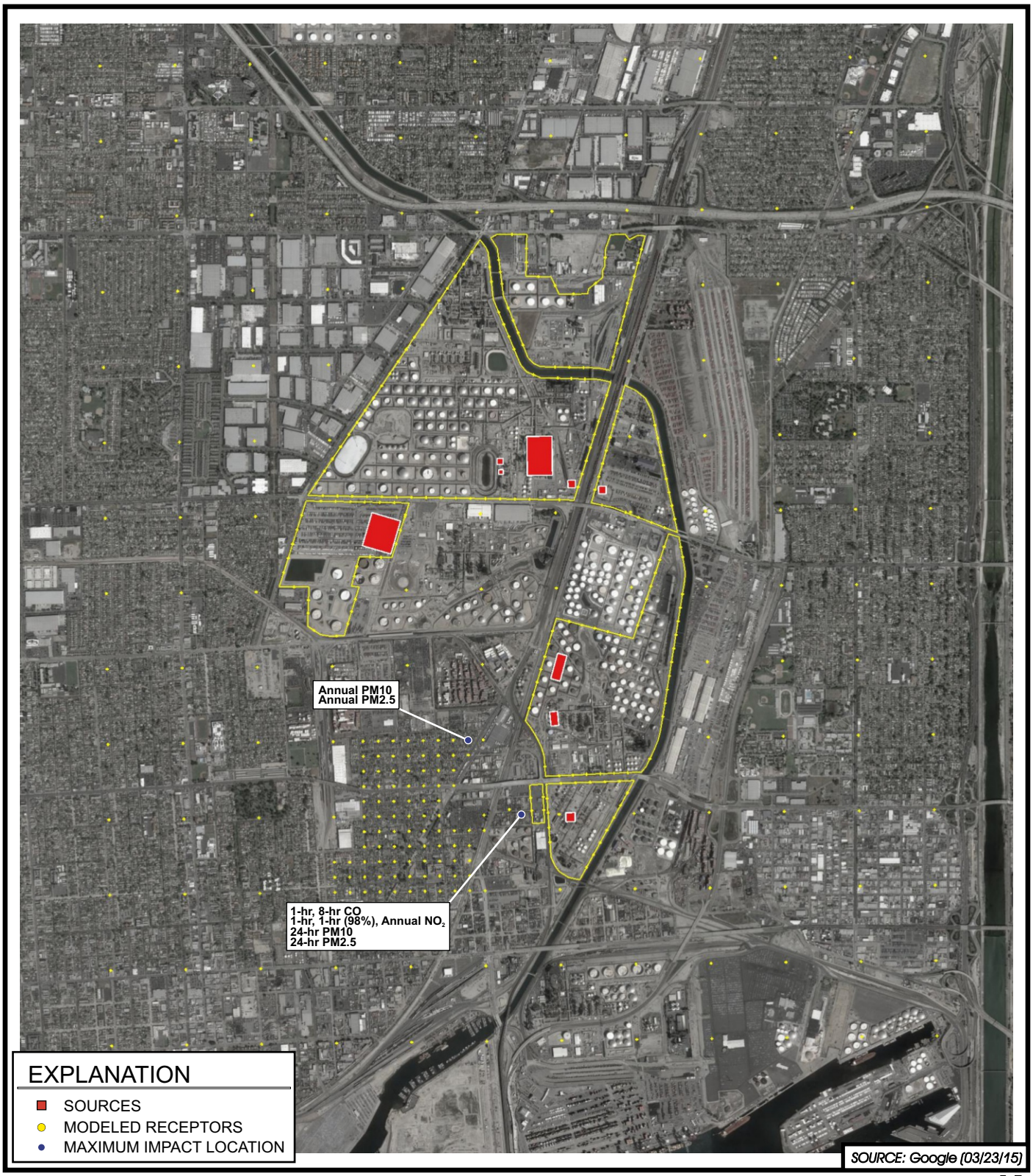


Environmental Audit, Inc.

FIGURE 1
SITE LOCATION MAP
TESORO LOS ANGELES REFINERY

Project No. 2844

N:\2844\LST\SiteLocMap (rev.7).cdr



Environmental Audit, Inc.

FIGURE 2
LST MAXIMUM IMPACT LOCATION MAP
TESORO LOS ANGELES REFINERY

Project No. 2844

N:\2844\LST\Max Impacts (rev.1).cdr

ATTACHMENT A

PEAK EMISSION CALCULATIONS

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Attachment A
Tesoro Integration and Compliance Project
Peak Project Component
Construction Emission Summary

	Component								
Emissions from Equipment	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
VOC (lb/day)	3.93	3.00	3.22	3.22	3.07	11.83	4.54	10.18	13.93
CO (lb/day)	32.67	30.49	25.50	25.50	26.89	99.56	37.84	81.93	114.25
NOx (lb/day)	33.84	30.81	30.44	30.44	29.31	112.84	38.42	79.11	155.19
SOx (lb/day)	0.07	0.08	0.06	0.06	0.06	0.24	0.08	0.18	0.31
PM10 (lb/day)	2.12	1.76	1.86	1.86	1.72	6.68	2.54	5.38	8.44
PM2.5 (lb/day)[1]	2.07	1.73	1.82	1.82	1.68	6.55	2.49	5.27	8.27
CO_2 (lb/day)	1.79	1.88	1.43	1.43	1.56	5.82	1.91	4.22	7.41

	Component								
Emission from Trips - Onsite	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
CO (lb/day)	0.10	0.10	0.16	0.16	0.08	0.09	0.12	0.18	0.12
NOx (lb/day)	0.11	0.11	0.09	0.09	0.11	0.11	0.11	0.14	0.13
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06	0.05
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.04
PM2.5 (lb/day)[1]	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

	Component								
Fugitive Earthmoving PM - Peak	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
PM10 (lb/day)[2]		2.36	2.36	2.36		2.36	2.36		
PM2.5 (lb/day)[1][2]		1.37	1.37	1.37		1.37	1.37		

	Component								
Offroad Fugitive PM - Peak	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
PM10 (lb/day)[2]			0.37	0.37				0.74	
PM2.5 (lb/day)[1][2]			0.08	0.08				0.16	

		Component								
Total Emissions	**Thresholds**	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
CO (lb/day)	550	32.77	30.59	25.67	25.67	26.97	99.65	37.95	82.11	114.37
NOx (lb/day)	100	33.95	30.92	30.53	30.53	29.42	112.95	38.53	79.25	155.32
SOx (lb/day)	150	0.07	0.08	0.06	0.06	0.07	0.24	0.08	0.18	0.31
PM10 (lb/day)[2]	150	2.16	4.17	4.63	4.63	1.76	9.08	4.94	6.17	8.49
PM2.5 (lb/day)[1][2]	55	2.09	3.11	3.29	3.29	1.70	7.93	3.87	5.44	8.29
CO (lb/hr)	NA	3.28	3.06	2.57	2.57	2.70	9.96	3.80	8.21	5.72
NOx (lb/hr)	NA	3.39	3.09	3.05	3.05	2.94	11.29	3.85	7.93	7.77
SOx (lb/hr)	NA	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02
PM10 (lb/hr)[2]	NA	0.22	0.42	0.46	0.46	0.18	0.91	0.49	0.62	0.42
PM2.5 (lb/hr)[1][2]	NA	0.21	0.31	0.33	0.33	0.17	0.79	0.39	0.54	0.41

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment - Peak CO

Equipment	C-No51	C-Wet	Pipe	C-Alk	W-Tank	C-Tank	W-SAR	TAR-WHTU
<40 T Cranes	1	1	3	0.75	6	2	2	2
>40T Cranes	1		2	0.75	2		1	2
Pile Rig		0.1			0.5		1	
Tractors	0.5	0.5	1	0.2	1	1	3	0.5
Welders	8	4	8	5	20	8	24	3
Light Plants	0.5	1	4	1	4	2	3	1
Genertors	0		4		4	1		1
Hydro Vacs		0.25					0.5	
Fork Lifts	0.75	1	2	1	4	2	3	0.5
Loader/Backhoe	0.1	0.2	1	0.2	2	2	1	0.2
Air Compressors	0.1	0.1	4	0.3	1	2	0.75	0.1
Manlifts	4	5	2	4	10	2	4	3
Crawler Tractors								
Scrapers								
Rubber Tired Loaders								
Graders								
Rollers								
Excavators								

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Component						
Equipment	**Hours (hr/day)**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	7	1	1	3	1	6	2	2
>40T Cranes	5	1	0	2	1	2	0	1
Pile Rig	8	0	1	0	0	1	0	1
Tractors	5	1	1	1	1	1	1	3
Welders	8	8	4	8	5	20	8	24
Light Plants	3	1	1	4	1	4	2	3
Genertors	3	0	0	4	0	4	1	0
Hydro Vacs	5	0	1	0	0	0	0	1
Fork Lifts	4	1	1	2	1	4	2	3
Loader/Backhoe	5	1	1	1	1	2	2	1
Air Compressors	4	1	1	4	1	1	2	1
Manlifts	8	4	5	2	4	10	2	4

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
VOC	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.065	0.46	0.46	1.37	0.46	2.75	0.92	0.92
>40T Cranes	0.072	0.36	0.00	0.72	0.36	0.72	0.00	0.36
Pile Rig	0.040	0.00	0.32	0.00	0.00	0.32	0.00	0.32
Tractors	0.030	0.15	0.15	0.15	0.15	0.15	0.15	0.46
Welders	0.036	2.29	1.15	2.29	1.43	5.73	2.29	6.87
Light Plants	0.036	0.11	0.11	0.43	0.11	0.43	0.21	0.32
Genertors	0.042	0.00	0.00	0.50	0.00	0.50	0.13	0.00
Hydro Vacs	0.042	0.00	0.21	0.00	0.00	0.00	0.00	0.21
Fork Lifts	0.019	0.08	0.08	0.16	0.08	0.31	0.16	0.23
Loader/Backhoe	0.030	0.15	0.15	0.15	0.15	0.30	0.30	0.15
Air Compressors	0.036	0.14	0.14	0.57	0.14	0.14	0.29	0.14
Manlifts	0.006	0.19	0.23	0.09	0.19	0.47	0.09	0.19
Total		3.93	3.00	6.44	3.07	11.83	4.54	10.18

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
CO	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.415	2.91	2.91	8.72	2.91	17.44	5.81	5.81
>40T Cranes	0.424	2.12	0.00	4.24	2.12	4.24	0.00	2.12
Pile Rig	0.501	0.00	4.01	0.00	0.00	4.01	0.00	4.01
Tractors	0.367	1.83	1.83	1.83	1.83	1.83	1.83	5.50
Welders	0.241	15.41	7.71	15.41	9.63	38.53	15.41	46.24
Light Plants	0.305	0.91	0.91	3.66	0.91	3.66	1.83	2.74
Genertors	0.473	0.00	0.00	5.67	0.00	5.67	1.42	0.00
Hydro Vacs	0.480	0.00	2.40	0.00	0.00	0.00	0.00	2.40
Fork Lifts	0.452	1.81	1.81	3.62	1.81	7.24	3.62	5.43
Loader/Backhoe	0.367	1.83	1.83	1.83	1.83	3.67	3.67	1.83
Air Compressors	0.221	0.88	0.88	3.53	0.88	0.88	1.77	0.88
Manlifts	0.155	4.95	6.19	2.48	4.95	12.38	2.48	4.95
Total		32.67	30.49	51.00	26.89	99.56	37.84	81.93

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
NOX	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.909	6.36	6.36	19.09	6.36	38.19	12.73	12.73
>40T Cranes	1.117	5.58	0.00	11.17	5.58	11.17	0.00	5.58
Pile Rig	0.675	0.00	5.40	0.00	0.00	5.40	0.00	5.40
Tractors	0.358	1.79	1.79	1.79	1.79	1.79	1.79	5.37
Welders	0.189	12.08	6.04	12.08	7.55	30.19	12.08	36.23
Light Plants	0.189	0.57	0.57	2.26	0.57	2.26	1.13	1.70
Genertors	0.453	0.00	0.00	5.44	0.00	5.44	1.36	0.00
Hydro Vacs	0.453	0.00	2.27	0.00	0.00	0.00	0.00	2.27
Fork Lifts	0.297	1.19	1.19	2.38	1.19	4.76	2.38	3.57
Loader/Backhoe	0.358	1.79	1.79	1.79	1.79	3.58	3.58	1.79
Air Compressors	0.189	0.75	0.75	3.02	0.75	0.75	1.51	0.75
Manlifts	0.116	3.72	4.65	1.86	3.72	9.31	1.86	3.72
Total		33.84	30.81	60.88	29.31	112.84	38.42	79.11

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
SOx	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.001	0.01	0.01	0.03	0.01	0.06	0.02	0.02
>40T Cranes	0.002	0.01	0.00	0.02	0.01	0.02	0.00	0.01
Pile Rig	0.002	0.00	0.02	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Welders	0.000	0.02	0.01	0.02	0.02	0.06	0.02	0.07
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.01	0.00	0.01	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.01	0.00	0.01	0.01	0.01
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Air Compressors	0.000	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Manlifts	0.000	0.01	0.02	0.01	0.01	0.04	0.01	0.01
Total		0.07	0.08	0.12	0.06	0.24	0.08	0.18

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
PM10	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.043	0.30	0.30	0.90	0.30	1.80	0.60	0.60
>40T Cranes	0.045	0.23	0.00	0.45	0.23	0.45	0.00	0.23
Pile Rig	0.025	0.00	0.20	0.00	0.00	0.20	0.00	0.20
Tractors	0.024	0.12	0.12	0.12	0.12	0.12	0.12	0.35
Welders	0.017	1.06	0.53	1.06	0.66	2.66	1.06	3.19
Light Plants	0.017	0.05	0.05	0.20	0.05	0.20	0.10	0.15
Genertors	0.035	0.00	0.00	0.43	0.00	0.43	0.11	0.00
Hydro Vacs	0.035	0.00	0.18	0.00	0.00	0.00	0.00	0.18
Fork Lifts	0.015	0.06	0.06	0.12	0.06	0.24	0.12	0.18
Loader/Backhoe	0.024	0.12	0.12	0.12	0.12	0.24	0.24	0.12
Air Compressors	0.017	0.07	0.07	0.27	0.07	0.07	0.13	0.07
Manlifts	0.004	0.11	0.14	0.06	0.11	0.28	0.06	0.11
Total		2.12	1.76	3.72	1.72	6.68	2.54	5.38

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Component						
CO2EQ	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.035	0.25	0.25	0.74	0.25	1.48	0.49	0.49
>40T Cranes	0.051	0.26	0.00	0.51	0.26	0.51	0.00	0.26
Pile Rig	0.059	0.00	0.47	0.00	0.00	0.47	0.00	0.47
Tractors	0.019	0.10	0.10	0.10	0.10	0.10	0.10	0.29
Welders	0.009	0.60	0.30	0.60	0.38	1.50	0.60	1.80
Light Plants	0.009	0.03	0.03	0.11	0.03	0.11	0.06	0.08
Genertors	0.018	0.00	0.00	0.22	0.00	0.22	0.05	0.00
Hydro Vacs	0.018	0.00	0.09	0.00	0.00	0.00	0.00	0.09
Fork Lifts	0.021	0.09	0.09	0.17	0.09	0.34	0.17	0.26
Loader/Backhoe	0.019	0.10	0.10	0.10	0.10	0.19	0.19	0.10
Air Compressors	0.009	0.04	0.04	0.15	0.04	0.04	0.08	0.04
Manlifts	0.011	0.34	0.43	0.17	0.34	0.85	0.17	0.34
Total		1.79	1.88	2.87	1.56	5.82	1.91	4.22

Onsite Construction Vehicle Trip Emissions

		Component (Vehicles per day)						
Vehicle	**Miles per Day**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
Cars	2							
Pickup Trucks	2	10	10	42	7	8	12	21
Total Light Vehicle Miles		20	20	84	14	16	24	42
Water Truck	10	1	1	1	1	1	1	1
Delivery Truck	2							
1 Ton Truck	2	1	1	3	1	1	1	2
Misc. MD Truck	5							
Total Medium Truck Miles		12	12	16	12	12	12	14
Truck, Dump Ford LT8000	2		0	0	0	0	0	0
Concrete Truck	2		0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2		0	0	0	0	0	0
Misc. HD Truck	2		0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0

	Emission Rate (lb/mi)[1]	**Component (lb/day)**						
VOC	**2017**	**C-No51**	**CNHDS**	**Pipe**	**C-Alk**	**W-Tank**	**W-PST**	**W-SAR**
Light Duty	0.0001035	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Medium Duty	0.0003717	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Heavy Duty	0.0006131	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.01	0.01	0.01	0.01	0.01	0.01	0.01
CO	**2017**	**C-No51**	**CNHDS**	**Pipe**	**C-Alk**	**W-Tank**	**W-PST**	**W-SAR**
Light Duty	0.0033327	0.07	0.07	0.28	0.05	0.05	0.08	0.14
Medium Duty	0.0030301	0.04	0.04	0.05	0.04	0.04	0.04	0.04
Heavy Duty	0.0043046	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.10	0.10	0.33	0.08	0.09	0.12	0.18
NOx	**2017**	**C-No51**	**CNHDS**	**Pipe**	**C-Alk**	**W-Tank**	**W-PST**	**W-SAR**
Light Duty	0.0005080	0.01	0.01	0.04	0.01	0.01	0.01	0.02
Medium Duty	0.0082326	0.10	0.10	0.13	0.10	0.10	0.10	0.12
Heavy Duty	0.0154328	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.11	0.11	0.17	0.11	0.11	0.11	0.14
SOx	**2017**	**C-No51**	**CNHDS**	**Pipe**	**C-Alk**	**W-Tank**	**W-PST**	**W-SAR**
Light Duty	0.0000090	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000217	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2017**	**C-No51**	**CNHDS**	**Pipe**	**C-Alk**	**W-Tank**	**W-PST**	**W-SAR**
Light Duty Exhaust	0.0001064	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0004787	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Exhaust	0.0004727	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.01	0.01	0.02	0.01	0.01	0.01	0.01
Light Duty Fugitive[2]	0.000386	0.01	0.01	0.03	0.01	0.01	0.01	0.02
Medium Duty Fugitve[2]	0.002104	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Heavy Duty Fugitive[2]	0.020119	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.03	0.03	0.07	0.03	0.03	0.03	0.05
Total		0.04	0.04	0.08	0.04	0.04	0.04	0.06
CO_{2EQ}	**2017**	**C-No51**	**CNHDS**	**Pipe**	**C-Alk**	**W-Tank**	**W-PST**	**W-SAR**
Light Duty	0.907	18.14	18.14	76.19	12.70	14.51	21.77	38.10
Medium Duty	2.261	27.13	27.13	36.18	27.13	27.13	27.13	31.65
Heavy Duty	3.768	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		45.27	45.27	112.37	39.83	41.64	48.90	69.75

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2017		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

Equipment	Hours (hr/day)	Wilmington HTU Turnaround
<40 T Cranes	14	4
>40T Cranes	10	4
Pile Rig	16	0
Tractors	10	1
Welders	16	6
Light Plants	15	2
Genertors	15	2
Hydro Vacs	10	0
Fork Lifts	8	1
Loader/Backhoe	10	1
Air Compressors	8	1
Manlifts	16	6

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Wilmington HTU Turnaround
VOC	**2017**	
<40 T Cranes	0.065	3.66
>40T Cranes	0.072	2.89
Pile Rig	0.040	0.00
Tractors	0.030	0.30
Welders	0.036	3.44
Light Plants	0.036	1.07
Genertors	0.042	1.25
Hydro Vacs	0.042	0.00
Fork Lifts	0.019	0.16
Loader/Backhoe	0.030	0.30
Air Compressors	0.036	0.29
Manlifts	0.006	0.56
Total		13.93

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Wilmington HTU Turnaround
CO	**2017**	
<40 T Cranes	0.415	23.25
>40T Cranes	0.424	16.97
Pile Rig	0.501	0.00
Tractors	0.367	3.67
Welders	0.241	23.12
Light Plants	0.305	9.14
Genertors	0.473	14.19
Hydro Vacs	0.480	0.00
Fork Lifts	0.452	3.62
Loader/Backhoe	0.367	3.67
Air Compressors	0.221	1.77
Manlifts	0.155	14.86
Total		114.25

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Wilmington HTU Turnaround
NOX	**2017**	
<40 T Cranes	0.909	50.92
>40T Cranes	1.117	44.68
Pile Rig	0.675	0.00
Tractors	0.358	3.58
Welders	0.189	18.11
Light Plants	0.189	5.66
Genertors	0.453	13.60
Hydro Vacs	0.453	0.00
Fork Lifts	0.297	2.38
Loader/Backhoe	0.358	3.58
Air Compressors	0.189	1.51
Manlifts	0.116	11.17
Total		155.19

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Wilmington HTU Turnaround
SOx	**2017**	
<40 T Cranes	0.001	0.08
>40T Cranes	0.002	0.09
Pile Rig	0.002	0.00
Tractors	0.001	0.01
Welders	0.000	0.04
Light Plants	0.000	0.01
Genertors	0.001	0.02
Hydro Vacs	0.001	0.00
Fork Lifts	0.001	0.01
Loader/Backhoe	0.001	0.01
Air Compressors	0.000	0.00
Manlifts	0.000	0.04
Total		0.31

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Wilmington HTU Turnaround
PM10	**2017**	
<40 T Cranes	0.043	2.40
>40T Cranes	0.045	1.81
Pile Rig	0.025	0.00
Tractors	0.024	0.24
Welders	0.017	1.60
Light Plants	0.017	0.50
Genertors	0.035	1.06
Hydro Vacs	0.035	0.00
Fork Lifts	0.015	0.12
Loader/Backhoe	0.024	0.24
Air Compressors	0.017	0.13
Manlifts	0.004	0.34
Total		8.44

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Wilmington HTU Turnaround
CO2EQ	**2017**	
<40 T Cranes	0.035	1.98
>40T Cranes	0.051	2.06
Pile Rig	0.059	0.00
Tractors	0.019	0.19
Welders	0.009	0.90
Light Plants	0.009	0.28
Genertors	0.018	0.54
Hydro Vacs	0.018	0.00
Fork Lifts	0.021	0.17
Loader/Backhoe	0.019	0.19
Air Compressors	0.009	0.08
Manlifts	0.011	1.02
Total		7.41

Attachment A
Tesoro Integration and Compliance Project

Onsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Vehicles W-HTU
Cars	2	
Pickup Trucks	2	12
Total Light Vehicle Miles		24
Water Truck	10	1
Delivery Truck	2	
1 Ton Truck	2	2
Misc. MD Truck	5	
Total Medium Truck Miles		14
Truck, Dump Ford LT8000	2	0
Concrete Truck	2	0
Semi-Tractor, Diesel 20 Ton	2	0
Misc. HD Truck	2	0
Total Heavy Truck Miles		0

VOC	Emission Rate (lb/mi)[1] 2017	W-HCU (lb/day)
Light Duty	0.0001035	0.00
Medium Duty	0.0003717	0.01
Heavy Duty	0.0006131	0.00
Total		0.01

CO	2017	W-HCU
Light Duty	0.0033327	0.08
Medium Duty	0.0030301	0.04
Heavy Duty	0.0043046	0.00
Total		0.12

NOx	2017	W-HCU
Light Duty	0.0005080	0.01
Medium Duty	0.0082326	0.12
Heavy Duty	0.0154328	0.00
Total		0.13

SOx	2017	W-HCU
Light Duty	0.0000090	0.00
Medium Duty	0.0000217	0.00
Heavy Duty	0.0000359	0.00
Total		0.00

PM10	2017	W-HCU
Light Duty Exhaust	0.0001064	0.00
Medium Duty Exhaust	0.0004787	0.01
Heavy Duty Exhaust	0.0004727	0.00
Total Exhaust PM		0.01
Light Duty Fugitive[2]	0.000386	0.01
Medium Duty Fugitve[2]	0.002104	0.03
Heavy Duty Fugitive[2]	0.020119	0.00
Total Fugitive PM		0.04
Total		0.05

CO_{2EQ}	2017	W-HCU
Light Duty	0.907	21.77
Medium Duty	2.261	31.65
Heavy Duty	3.768	0.00
Total		53.42

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CO_E) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Chemical	2017 Light	Medium	Heavy
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Attachment A
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Light Vehicles	0.05	1
Total Light Vehicle Miles		0.05

Delivey Trucks	0.05	0
Water Trucks	0.1	1
Total Medium Truck Miles		0.1

Concrete Truck	0.05	0
Dump Trucks	0.05	10
Total Heavy Truck Miles		0.5

Tractors	0.05	1
Fork Lifts	0.05	2
Loader/Backhoe	0.05	2
Total Heavy-Heavy Duty Miles		0.25

PM10	Emission Rate (lb/mi)[1]	Emissions (lb/day)
Light Duty	0.9021196	0.05
Medium Duty	1.2863357	0.13
Heavy Duty	2.1931267	1.10
Heavy Heavy Duty	2.4962390	0.62
Uncontrolled Total		1.89
Controlled Total[2]		0.74

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 8.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy, and 24 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by 61 percent (Uncontrolled Emissions x 0.39)

Attachment A
Tesoro Integration and Compliance Project

Peak Monthly Fugitive PM Construction Emissions

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions (lbs/day)	Controlled Emissions: Peak PM10 Emissions (lbs/day)	Uncontrolled Emissions: Average PM10 Emissions (lbs/day)	Uncontrolled Emissions: Peak PM10 Emissions (lbs/day)	SCAQMD Emission Factor Source
Construction Activities[1]	2	2	8	0.348	0.39	2.17	2.17	5.56218435	5.56218435	Table A9-9-F

Stockpiles	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Construction Activities[2]	1200	1200	0.00005	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9-G

Assumptions: 1cubic yard trench spoils = 1 ton

WIND EROSION Disturbed Area and Temporary Stockpiles	Days of Construction	Average Acreage Disturbed Per Day	Peak Acreage Disturbed Per Day	PM10 Emission Factor (lb/day/acre)	Average PM10 Emissions Pounds/day	Peak PM10 Emissions Pounds/day	Average PM10 Emissions Tons/Year	Peak PM10 Emissions Tons/Year	SCAQMD Emission Factor Source
Construction Activities[3]	20	0.25	1	0.120	0.030	0.120	0.000	0.001	Table A9-9-E

Filling and Dumping	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Truck Filling[4]	1200.0	1200.0	5.153E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9
Truck Dumping	1200.0	1200.0	5.153E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9

TOTAL PM10 Pounds/day	Average	Peak
(Controlled Emissions)	2.2715	2.36133
(Uncontrolled Emissions)	5.748	5.749

(1) Emissions (lbs/hr) = [0.75 x $(G^{1.5})/(H^{1.4})$ x J
where G = silt content (7.5%), H = moisture content (15.0%) and J = hrs of operation (EPA AP-42 Table 11.9-1 for bulldozing overburden).

(2) Emissions (lbs/ton) = 0.00112 x $[(G/5)^{1.3}/(H/2)^{1.4}]$ x I/J
where G=mean wind speed (4.1 mph), H=moisture content of surface material (15%); I=lbs of dirt handled per day; and J=2,000 lbs/ton. Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.

(3) Emissions (lbs/day/acre) = 1.7 x [(G/1.5)*(365-H)/235] x I/15 x J
where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (0.3%) and J= fraction of TSP (0.5). Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.

(4) Used SCAQMD Table 9-9 Default emission factors.

(5) Mitigated Emissions assume that watering 3 times per day controls emissions by 61 percent (Uncontrolled Emissions x 0.39). www.AQMD.gov/CEQA/handbook/mitigation/fugitive/Table XI-A.doc