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CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY

COKE DRUM RELIABILITY PROJECT

FINAL
ENVIRONMENTAL IMPACT REPORT

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PREFACE

This document constitutes the Final Environmental Impact Report (EIR) for the Chevron Products Company El Segundo Refinery Coke Drum Reliability Project. The Draft EIR was circulated for a 47-day public review and comment period on August 31, 2012. The comment period ended on October 16, 2012. Two comment letters were received during the public comment period on the Draft EIR. The comment letters and responses are included in Appendix E of this document. The comments were evaluated and minor modifications have been made to the Draft EIR such that it is now a Final EIR. None of the modifications alter any conclusions reached in the Draft EIR, nor provide new information of substantial importance relative to the draft document that would require recirculation of the Draft EIR pursuant to CEQA Guidelines §15088.5. Therefore, this document is now a Final EIR. Additions to the text of the EIR are denoted using italics. Text that has been eliminated is shown using ~~strike outs~~.

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CHEVRON PRODUCTS COMPANY EL SEGUNDO REFINERY

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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

Chevron Products Company (Chevron) is proposing a project at its El Segundo Refinery (Refinery) to replace the six existing coke drums that are reaching the end of their useful life cycle with six new coke drums of the same size and location within the Refinery. The overall focus of this project is to increase reliability of coke drum operations. The proposed Coke Drum Reliability Project (Project) is expected to take advantage of industry changes in coke drum design, which have improved over the more than 40 years since the installation of the existing coke drums. The proposed Project will not change the Refinery crude throughput capacity or Delayed Coker Unit capacity.

1.2 PURPOSE/LEGAL REQUIREMENTS

CEQA Public Resources Code §21000 et seq., requires that the environmental impacts of proposed projects be evaluated and that feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented. The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment (Public Resources Code §21067). The proposed Project requires discretionary approval from the South Coast Air Quality Management District (SCAQMD) for air quality permits for modifications to existing stationary source equipment and installation of new stationary source equipment and, therefore, it is subject to the requirements of CEQA (Public Resources Code, §21000 et seq.). Because the SCAQMD has the primary responsibility for supervising or approving the entire project as a whole it is the most appropriate public agency to act as lead agency (CEQA Guidelines §15051(b)).

In accordance with §15121(a) of the California Environmental Quality Act (CEQA) Guidelines (California Administrative Code, Title 14, Division 6, Chapter 3), the purpose of an Environmental Impact Report (EIR) is to serve as an informational document that: "will inform public agency decision-makers and the public generally of the significant environmental effect of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project."

To fulfill the purpose and intent of CEQA, as the lead agency for this project, the SCAQMD prepared and released for a 30-day public review and comment period, a Notice of Preparation and Initial Study (NOP/IS) to identify potentially significant environmental impacts and provided a preliminary analysis associated with the Chevron Coke Drum Reliability Project (see Appendix A).

1.3 SCOPE AND CONTENT

The NOP/IS was circulated for a 30-day comment period beginning on October 11, 2011, through November 10, 2011. The NOP/IS was circulated in El Segundo and to neighboring jurisdictions, responsible agencies, other public agencies, and interested individuals in order to solicit input on the scope of the environmental analysis to be included in the EIR. Two comment letters were received on the NOP/IS during the public comment period. Responses to those comments are provided in Appendix A. The NOP/IS formed the basis for and focus of the technical analyses in this ~~Draft~~ *Final* EIR. The following environmental issues were identified in the NOP/IS as potentially significant and are further addressed in this document:

- Air Quality and Greenhouse Gas Emissions,
- Noise, and
- Transportation/Traffic.

The NOP/IS concluded that the proposed Project would not create significant adverse environmental impacts to the following areas: aesthetics, agricultural and forestry resources, biological resources, cultural resources, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, population and housing, public services, recreation, and solid/hazardous waste. No comments were received disputing this conclusion.

Pursuant to CEQA Guidelines §15130, a discussion of potential cumulative impacts has been prepared and is provided in Chapter 5. Alternatives to the proposed Project in Chapter 6 of this ~~Draft~~ *Final* EIR were prepared in accordance with §15126.6 of the CEQA Guidelines. Chapter 6 describes a range of reasonable alternatives that could feasibly attain the basic objectives of the proposed Project as a means of eliminating or reducing some of the significant adverse environmental effects associated with the proposed Project.

1.4 RESPONSIBLE AND OTHER AGENCIES

CEQA Guidelines §15381 defines a "responsible agency" as: "a public agency which proposes to carry out or approve a project, for which a Lead Agency is preparing or has prepared an EIR or Negative Declaration. For purposes of CEQA, responsible agencies include all public agencies other than the lead agency that have discretionary approval authority over the project."

The following agencies may have ministerial permitting authority for aspects of the proposed Project, and have been given an opportunity to review and comment on the NOP/IS and EIR; however, no new discretionary permits or permit modifications are expected to be required from these agencies for the proposed Project:

- California Department of Transportation (Caltrans),
- City of El Segundo,
- City of Hermosa Beach,
- City of Manhattan Beach, and
- City of Redondo Beach.

For convenience, all the above agencies will be referred to generally as Responsible Agencies in this EIR. Of note, none of the above agencies submitted a comment letter on the NOP/IS.

No trustee agencies as defined by CEQA Guidelines §15386 have been identified with respect to the proposed Project. However, notice of the proposed Project has been sent to the Office of Planning and Research pursuant to Public Resources Code §21080.4 for distribution in the event trustee or other responsible agencies are identified for the proposed Project.

1.5 INTENDED USES OF THE EIR

The EIR is intended to be a decision-making tool that provides full disclosure of the environmental consequences associated with implementing the proposed Project. Additionally, CEQA Guidelines §15124(d)(1) requires a public agency to identify the following specific types of intended uses:

- A list of the agencies that are expected to use the EIR in their decision-making;
- A list of permits and other approvals required to implement the project; and,
- A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

To the extent that local public agencies, such as cities, county planning commissions, etc., are responsible for making land use and planning decisions related to the proposed Project, they could possibly rely on this EIR during their decision-making process. See the preceding section for a list of public agencies whose approval may be required and who may also be expected to use this EIR in their decision-making process. See also Table 2-1 in Chapter 2 for a list of permits and other approvals required to implement the proposed Project.

1.6 AREAS OF CONTROVERSY

In accordance with CEQA Guidelines §15123(b)(2), the areas of controversy known to the lead agency, including issues raised by agencies and the public, shall be identified in the CEQA document. After public notification and review of the NOP/IS, the SCAQMD received two comment letters. Consistent with the purpose of the NOP/IS to solicit comments or other information, issues raised in the comment letters are related specifically to potential impacts from the proposed Project and were addressed in the EIR

and responses to those comment letters are provided in Appendix A. "Controversy" is defined as a difference in opinion or a dispute. No such issues have been raised regarding the Chevron proposed Project. Consequently, there are no areas of controversy known to the lead agency.

1.7 EXECUTIVE SUMMARY – CHAPTER 2: PROJECT DESCRIPTION

1.7.1 INTRODUCTION

Chevron is proposing a project at its El Segundo Refinery to replace the six existing coke drums that are reaching the end of their useful life cycle with six new coke drums, of the same size, to be installed at the same location within the Refinery. The proposed Project includes fabrication of the six replacement coke drums in an overseas shop with the completed drums being shipped in their entirety to the Port of Los Angeles/Port of Long Beach.

Once the drums are onsite, they will be installed during a planned shutdown of the Delayed Coker Unit. This will be accomplished by removing the six-derrick structure, in one piece off the existing drums, setting it at grade, and replacing the drums one by one. The proposed Project will not change the Refinery crude throughput capacity or Delayed Coker Unit capacity.

1.7.2 PROJECT OBJECTIVES

The primary objective of the proposed Project is to replace six existing coke drums with six new coke drums. By installing the six new coke drums the proposed Project would also meet the following project objectives:

- Eliminate the need for frequent repair and maintenance due to equipment age and stresses (heating and cooling of metal) from decades of operation;

- Increase the reliability of coke drum operations through substantially reducing unplanned repairs;

- Increase the ability of the Refinery to produce and supply reformulated gasoline and other petroleum products by minimizing equipment disruption and unplanned repairs to the coke drums; and,

- Reduce costs currently associated with the increasing numbers of unplanned repairs.

1.7.3 PROJECT LOCATION

The proposed Project will occur within the confines of the Refinery. The Refinery is located within the overall southern California region, and is located at 324 West El Segundo Boulevard in the City of El Segundo, California.

1.7.4 LAND USE AND ZONING

The Refinery, which is zoned heavy industrial, is bounded by El Segundo Boulevard to the north, Sepulveda Boulevard to the east, Rosecrans Avenue to the south, and Vista Del Mar to the west. Land use to the north of the Refinery is primarily residential, with a mix of commercial and light industrial zoning. The predominant adjacent land uses west of the Refinery are nearly all heavy industrial, or open space, which includes: Dockweiler State Beach, Manhattan Beach, and the El Segundo Generating Station, although a small parcel of land at the southwest corner of the Chevron property is made up of commercial and multiple-family residential. The small parcel of residential land adjacent to the southwest corner of the Refinery is the closest residential area to the proposed Project and is approximately 1,000 feet away.

Directly south of the Refinery, there is a single-family residential area bordering the entire length of the Refinery separated by Rosecrans Avenue. The corridor immediately east of the Refinery is comprised of a golf course at the corner of Sepulveda Boulevard and El Segundo Boulevard, with light commercial and heavy industrial zoning for the rest of the tract.

1.7.5 EXISTING REFINERY CONFIGURATION AND OPERATION

Crude oil, used to produce gasoline and other refinery products, is delivered by ship to the marine terminal in Santa Monica Bay and pumped to the Refinery by existing pipelines or received via pipeline directly to the Refinery. The crude oil is then processed in the crude units where it is heated and distilled into multiple feedstock components that are later processed elsewhere in the Refinery. The heavy residual oil leaving the crude units is further distilled in the vacuum units to yield additional gas oils and vacuum residuum. The vacuum residuum is processed in the Delayed Coker Unit and the lighter hydrocarbon components from the crude units and vacuum units are fed to other Refinery units for further processing.

Certain units in the Refinery are designed to separate elemental constituents, such as sulfur and nitrogen, from crude oil for conversion into commercial products. Sulfur Recovery Units convert sulfur compounds separated from crude oil into elemental sulfur, which is sold commercially. Nitrogen separated from the crude oil is converted into ammonia and used onsite and also sold commercially.

Auxiliary systems are also needed to support Refinery operations including hydrogen plants (to produce hydrogen needed for certain refinery reactions), boilers to produce

steam, cogeneration plants to produce electricity and steam, and wastewater treatment systems.

1.7.6 PROPOSED PROJECT

The six existing coke drums at the Refinery increasingly require maintenance and repair to remain operational as they age. The six existing coke drums are approaching the end of their serviceable and economical life cycle and must be replaced. The proposed Project includes coke drum design improvements including upgraded metallurgy, seismic upgrades, and replacement of ancillary equipment (e.g., monitoring gauges). Existing pressure relief valves are currently vented to a vapor recovery system and flare, and will continue to be vented to this equipment once the proposed Project becomes operational. No changes will occur to the vapor recovery system and flare operations.

The six replacement coke drums will be fabricated overseas and shipped in their entirety to the Refinery via the Port of Los Angeles/Port of Long Beach. Once the ships carrying the fabricated coke drums have arrived at the Port of Los Angeles/Port of Long Beach, the coke drums will be transported via barge from the Port to King Harbor in Redondo Beach, and, then by public roads through the cities of Redondo Beach, Hermosa Beach, and Manhattan Beach to the Refinery located in El Segundo, CA. The coke drums are expected to be transported over local roads during the nighttime in order to avoid traffic. It is expected that each coke drum will take one night to be transported from King Harbor to the Refinery.

Once the replacement drums are onsite, installation will take place during a planned shutdown of the Delayed Coker Unit (commonly called a turn-around), at which time the other equipment in the Unit will also be shutdown. Installation will be accomplished by removal of the six-derrick structure in one piece from the existing drums, setting it nearby at grade, and replacing the drums one by one onto the existing support structure. Piping, electrical wiring, and control wiring will be disconnected to free the derrick structure for this lift. Once the new coke drums are in place. the derrick structure will then be reset atop the drums; piping, wiring, and controls will be reconnected; and, the Delayed Coker Unit will be placed back in operation.

The removed drums will be dismantled on site and transported by semi-truck for metal recycling. Other demolition debris will be transported to the appropriate disposal facility.

1.7.7 CONSTRUCTION OF THE PROPOSED PROJECT

The preliminary construction schedule calls for road surface improvements at King Harbor to be completed in the first phase of work, which is expected to commence in the fourth quarter of 2012. Construction work to be completed within the Refinery is expected to occur during 2013 and be completed by the mid-2014. The number of construction workers for the proposed Project will peak at approximately 335 during the first quarter of 2014. During this period, construction activities are planned for seven days per week, incorporating two 10-hour shifts per day. All other construction periods

for the proposed Project are expected to operate five days per week with one 10-hour shift per day.

1.7.8 OPERATION OF THE PROPOSED PROJECT

The proposed Project will not result in an increase in the permanent work force at the Refinery. The proposed Project is not expected to increase or decrease the overall Refinery crude throughput capabilities. The proposed Project will improve the reliability of the Delayed Coker Unit, which is expected to result in a three to four percent increase in the operational efficiency of the Delayed Coker Unit on an annual basis. Consequently, the proposed Project is expected to result in an increase in coke truck transport of three to four percent. Coke truck transport is expected to increase by up to 2,130 trucks per year, with no increase in the maximum number of trucks per day because daily truck trips are dependent of the maximum amount of coke produced per day, which will not change as a result of the proposed Project. No change to rail or marine vessel traffic is expected as a result of the proposed Project.

1.7.9 PERMITS AND APPROVALS

The proposed Project will require approvals or permits from a variety of federal, state, and local agencies. Examples of general permits and approvals required for the Refinery are summarized in Section 2.9 of Chapter 2.

1.8 EXECUTIVE SUMMARY – CHAPTER 3: EXISTING ENVIRONMENTAL SETTING

CEQA Guidelines §15125 requires that an EIR include a description of the environment within the vicinity of a proposed project as it exists at the time the NOP/IS is published, or if no NOP/IS is published, at the time the environmental analyses commences, from both a local and regional perspective. Chapter 3 presents the existing environmental setting for the proposed Project against which potential impacts of the Project have been evaluated. Chapter 3 also describes the existing environment around the El Segundo Refinery as applicable that could be adversely affected by the proposed Project. The environmental analyses in this EIR are focused only on the environmental topics identified in the NOP/IS (see Appendix A) that could be significantly adversely affected by the proposed Project. The reader is referred to the NOP/IS (Appendix A) for discussion of environmental topics not considered in this EIR, and the rationale for inclusion or exclusion of each environmental topic. The environmental topics identified in this chapter include both a regional and local setting.

1.8.1 AIR QUALITY

The Refinery is located within the SCAQMD's jurisdiction. Over the last decade and a half, air quality has substantially improved within the district. Nevertheless, several air quality standards continue to be frequently exceeded. For example, of the National

Ambient Air Quality Standards (NAAQS) established for six criteria pollutants, the district is in attainment for three (sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and carbon monoxide (CO). Lead is in non-attainment in the Los Angeles Metropolitan portion of Los Angeles County. Ozone and particulate matter (PM) are in non-attainment with the standards.

Chapter 3 discusses the effects of meteorological conditions, temperature and rainfall, and wind flow patterns on the existing air quality conditions in the South Coast Air Basin (Basin). The existing air quality includes a discussion of criteria pollutants, regional air quality, local air quality, the Refinery's criteria pollutant emissions, toxic air contaminants (TACs), as well as the regulatory setting.

1.8.2 NOISE

Land use in the vicinity of the Refinery is generally designated commercial and residential to the north; industrial, open, and public land to the east; residential to the south; and industrial to the west. The ambient noise environment in the project vicinity is composed of the contributions from equipment and operations within these commercial and industrial areas, and from the traffic on roadways along or near each of the Refinery boundaries.

The nearest sensitive noise receptors south of the Refinery are residences in the City of Manhattan Beach, approximately 200 to 400 feet south of the Refinery along Rosecrans Avenue and residents near the southwest corner of the Refinery. The areas north, east, and west of the Refinery are predominately commercial land uses.

A noise survey was performed to determine the existing ambient noise levels in the vicinity of the Refinery. Based on the noise survey, the existing Community Noise Equivalent Levels (CNEL) ranges between 58.5 and 68.6 decibels (dBA) adjacent to the Refinery. A nighttime noise survey was also conducted along the proposed transportation route from King Harbor to the Refinery. Existing noise levels varied depending on their location with respect to heavy traffic areas. The existing noise levels in the marina are less than the areas adjacent to Pacific Coast Highway/Sepulveda Boulevard.

1.8.3 TRANSPORTATION AND TRAFFIC

The construction and operation of the proposed Project will occur entirely within the confines of the existing Chevron Refinery. Additionally, transport of the six new coke drums associated with the proposed Project is expected to occur at night on public roadways between King Harbor and the Refinery traversing the cities of Redondo Beach, Hermosa Beach, and Manhattan Beach. The existing transportation and traffic conditions adjacent to the Refinery and the transport route are discussed in this section.

Regional transportation facilities in the vicinity of the project provide accessibility to the entire southern California region. The I-405 freeway lies approximately 1.25 miles east

of the Refinery and the I-105 freeway, and its related rail transit system are located approximately one mile north of the Refinery. El Segundo Boulevard, Sepulveda Boulevard, and Rosecrans Avenue are key arterials servicing the area near the Refinery.

The area surrounding the Refinery is accessible via public transit from most South Bay Communities. The Los Angeles County Metropolitan Transportation Authority (MTA) provides several routes in the project vicinity. A number of MTA bus routes are routed throughout the city. Additionally, the Metro Green Line operates through the proposed Project area, linking the Refinery area with the regional rail system. The Los Angeles Department of Transportation (LADOT), the City of Torrance Municipal Area Express (MAX), and the Torrance Transit also provide public transit services and commuter routes to and from the city.

The existing peak hour level of service analyses were developed for intersections in the vicinity of the Refinery that will be used by construction workers. The Level of Service (LOS) analysis indicated that all intersections are operating at LOS A.

1.9 EXECUTIVE SUMMARY – CHAPTER 4: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Chapter 4 assesses the potential environmental impacts of the construction and operation of the Chevron Products Company El Segundo Refinery Coke Drum Reliability Project. Chapter 4 evaluates those impacts that are considered potentially significant under the requirements of CEQA, as determined by the NOP/IS (see Appendix A). Specifically, an impact is considered significant under CEQA if it leads to a "substantial, or potentially substantial, adverse change in the environment." Table 1-1 (located at the end of this chapter) summarizes the impacts of the proposed Project.

1.9.1 AIR QUALITY

1.9.1.1 Environmental Impacts

Construction activities are expected to occur in two locations. The first two months of construction are expected to occur at King Harbor and is expected to commence in the last quarter of 2012. Construction Months 1 and 2 will prepare the site for delivery of the replacement coke drums. The construction activities at the Refinery are expected to begin in the first quarter of 2013, and are expected to last approximately until mid-2014.

Daily construction emissions were calculated for the peak construction day activities. Peak day emissions are the sum of the highest daily emissions from employee vehicles, fugitive dust sources, construction equipment, and transport activities for the construction period (e.g., ship and barge transport of drums, delivery truck, and waste transport trucks). Construction activities associated with the modifications to the Refinery would result in emissions of CO, volatile organic compounds (VOC), nitrogen oxides (NOx), sulfur oxides (SOx), particulate matter less than ten microns in diameter (PM10), and

particulate matter less than 2.5 microns in diameter (PM2.5). Construction emissions for the proposed Project are expected to exceed the significance thresholds for NOx. Construction emissions of CO, VOC, SOx, PM10, and PM2.5 are expected to be less than significant (see Table 4-2). Therefore, unmitigated air quality impacts associated with construction activities are considered significant. Detailed construction emissions calculations are provided in Appendix B.

In order to evaluate the health impacts associated with construction emissions, Localized Significant Threshold (LST) analysis was also completed. The LST analysis modeled the peak onsite construction emissions to determine the groundlevel concentrations. The results of the LST analysis indicated that the short-term construction emissions would be below the applicable LST significance thresholds. The LST significance thresholds are based on the most stringent ambient air quality standard for NO_2, CO, PM10, and PM2.5, and the ambient air quality standards are based on health effects (see Table 3-1). Since construction of the proposed Project is short-term and would not exceed the LST significance thresholds for local ambient air quality for NO_2, CO, PM10, and PM2.5, no significant adverse health impacts associated with construction emissions are expected.

Operational emissions include both stationary and mobile sources. The primary sources of emissions associated with the proposed Project are from the improved reliability of the new coke drums. Peak daily emissions are not expected to change, as the daily operation of the Delayed Coker Unit will not change. However, because of the improved reliability of the new coke drums, a three to four percent increase in the operational efficiency of the Delayed Coker Unit is expected on an annual basis. Consequently, the annual emissions from the Delayed Coker Unit are expected to increase by three to four percent. Annual emission increases are also expected due to increases in vehicle trips transporting coke. Therefore, dispersion modeling was completed to determine the potential impacts.

Air quality modeling was also completed for the NO_2, CO, PM10, and PM2.5 emission increases associated with operation of the proposed Project. The significance thresholds for modeling are based on the most stringent ambient air quality standards and the ambient air quality standards are based on health effects. Air quality modeling indicates that emission concentration increases associated with criteria pollutants due to the operation of the proposed Project would be less than the applicable significance thresholds and less than ambient air quality standards. Therefore, health impacts associated with the operation of the proposed Project are expected to be less than significant. The proposed Project is not expected to exceed or contribute to an exceedance of the ambient air quality standards so no such adverse health impacts (respiratory impacts) are expected due to the operation of the proposed Project.

Epidemiological analyses have consistently linked air pollution, especially PM, with excess mortality and morbidity. Health studies have shown both short-term and long-term exposures of ambient PM concentrations are directly associated with increased mortality and morbidity. Since the air quality analysis shows that the onsite PM emissions from the proposed Project do not have offsite consequences (i.e., no concentrations above the ambient air quality standards), the above modeling procedure is

not required and, thus, no increase in morbidity or mortality rates or related health effects are anticipated.

The long-term air quality impacts from exposure to toxics were evaluated through the preparation of a health risk assessment (HRA). The HRA evaluated the emissions associated with the operation of the proposed Project and compared them to carcinogenic and non-carcinogenic significance thresholds to determine potential health impacts. As demonstrated in the HRA, the carcinogenic and non-carcinogenic impacts for all receptors are expected to be less than the significance thresholds. Therefore, no significant adverse carcinogenic or non-carcinogenic health impacts associated with the operation of the proposed Project are expected.

Traffic impacts were analyzed for potential impact to CO ambient air quality and determined that no significant change in the ambient CO air quality is expected as a result of the proposed Project. Therefore, the proposed Project is not expected to cause CO hotspots and no significant adverse impact on ambient air quality is expected.

1.9.1.2 Mitigation Measures

A number of feasible mitigation measures have been imposed on the proposed Project to mitigate the potentially significant adverse impacts associated with construction emissions. The mitigation measures include the development of a Construction Emission Management Plan, limiting truck idling to five minutes, using electricity wherever possible, maintaining construction equipment, use newer Tier engines or install particulate filters on construction equipment, and suspending construction activities during first stage smog alerts. The mitigation measures are described in Section 4.2.3 and summarized in Table 1-1.

During the course of construction, Delayed Coker Unit and associated combustion sources will be shutdown to accomplish the proposed Project, and emission reductions will occur. However, while the reductions are quantifiable, the emission reductions do not directly offset peak construction emissions. Table 4-8 shows the estimated emission reductions that are expected to occur from not operating refinery equipment during the construction period.

No mitigation measures are required for the operation phase because all emissions were determined to be less than significant.

1.9.1.3 Level of Significance after Mitigation

Construction emissions of NOx from the proposed Project are expected to remain significant following mitigation. The construction emissions associated with CO, SOx, VOC, PM10, and PM2.5 are expected to be less than significant before and following mitigation. Construction emissions are expected to be short-term and they will be eliminated following completion of the construction phase.

Localized significant impacts from construction activities were analyzed for CO, NO_2, PM10, and PM2.5. The construction activities associated with the proposed Project are not expected to cause a significant adverse impact on ambient air quality and no mitigation would be required. The analysis concluded that construction emissions of CO, NO_2, PM10 and PM2.5 would not exceed applicable LSTs (Table 4-1).

The proposed Project is not expected to have significant impacts to CO, NOx, SOx, VOC, PM10, or PM2.5 during operation. Therefore, after mitigation the proposed Project is not expected to cause a potentially significant adverse impact on air quality.

Ambient air quality modeling indicates that the proposed Project emissions of NO_2, PM10, and PM2.5 during operation of the proposed Project will be below ambient air quality standards. Therefore, the operation of the proposed Project is not expected to cause a significant adverse impact on ambient air quality.

The proposed Project was analyzed for cancer and non-cancer human health impacts and determined to be less than significant. The estimated cancer risk due to the operation of the proposed Project is expected to be less than the significance criterion of 10 per million. The chronic hazard index and the acute hazard index are both below 1.0. Therefore, the proposed Project is not expected to cause a potentially significant adverse impact associated with exposure to toxic air contaminants.

1.9.2 NOISE

1.9.2.1 Environmental Impacts

Because of the nature of the construction activities, the types, number, operation time, and loudness of construction equipment will vary throughout the construction period. As a result, the sound level associated with construction will change as construction progresses. Construction noise sources will be temporary and will cease following construction activities. Noise levels within the Refinery were modeled and are not expected to noticeably increase during construction activities (either during the daytime or nighttime) because noise level increases during construction activities are not expected to exceed two dBA (see Table 4-10). A noise increase of less than three dBA is generally not noticeable to humans. During the peak construction period, the Delayed Coker Unit will be shut down and the noise reductions associated with the shut down of the unit have not been taken into consideration. Therefore, actual noise impacts are expected to be less than evaluated. No significant noise impacts related to construction activities associated with the proposed Project are expected.

The coke drums will be delivered to King Harbor in Redondo Beach via barge and off-loaded in Redondo Beach. The coke drums will be transported from King Harbor via an equipment transport carrier using the following route: Marina Way to Harbor Drive (north), to Herondo Street (east), to Pacific Coast Highway (north - which turns into Sepulveda Boulevard), to Rosecrans Avenue (west), and turning north into the Refinery at Gate 21. The coke drums would be transported during the evening and nighttime hours

to avoid traffic impacts along the heavily traffic roads that would include Pacific Coast Highway, Sepulveda Boulevard, and Rosecrans Avenue. Therefore, the potential noise impacts during transport were modeled and are expected to generate noise levels that exceed existing nighttime noise levels.

The predicted noise levels in the vicinity of King Harbor (at Monitoring Stations 1-3) indicate the highest potential maximum nighttime noise levels are calculated to be about 67-71 dBA, as compared to existing maximum nighttime noise levels of about 64 dBA. In King Harbor, there are some residents that live on the boats docked in the harbor so there are potential sensitive receptors in the vicinity of the proposed transport activities.

Residential areas are located along Herondo Street near Monitoring Station 6, west of Pacific Coast Highway. The maximum temporary nighttime noise levels in the vicinity of Herondo Street are predicted to be about 68-69 dBA as compared to existing nighttime maximum noise levels of about 59-60 dBA. Another largely residential area is located south of Rosecrans Avenue (Monitoring Stations 14-16). The maximum nighttime noise levels in the vicinity of Rosecrans Avenue are predicted to be about 65-66 dBA as compared to existing nighttime maximum noise levels of about 64-65 dBA.

The existing maximum nighttime noise levels along Pacific Coast Highway/Sepulveda Boulevard (Monitoring Stations 8-12) are higher than other locations along the proposed transport route. Pacific Coast Highway/Sepulveda Boulevard is a major transportation corridor in the South Bay and western coastal section of Los Angeles County, supporting a substantial amount of traffic which generates noise. The land uses along Pacific Coast Highway/Sepulveda Boulevard tend to be commercial land uses, although a number of residential areas are located adjacent to Pacific Coast Highway/Sepulveda Boulevard (see Figure 4.3-1).

Existing maximum nighttime noise levels along Pacific Coast Highway/Sepulveda Boulevard range from 73 to 78 dBA. The predominant noise sources along Pacific Coast Highway/Sepulveda Boulevard are vehicle and truck traffic. The maximum nighttime noise levels along Pacific Coast Highway/Sepulveda Boulevard associated with the coke drum transport are predicted to be 74 to 79 dBA. Therefore, the proposed Project noise levels along Pacific Coast Highway/Sepulveda Boulevard would not result in a substantial increase in existing maximum nighttime noise levels.

The noise levels associated with the transport carrier will be temporary and would occur evenings/nights during the construction period as the coke drums are transported one at a time from King Harbor to the Refinery. While the noise impacts are temporary, they are considered significant because the noise increase associated with the proposed Project activities has the potential to exceed three dBA in residential areas, specifically the King Harbor and along Herondo Street area. Therefore, the construction noise impacts associated with the proposed Project activities are expected to be significant.

Road surface improvements at King Harbor would occur in Months 1 and 2 of the construction period. The noise associated with road surface improvements at King Harbor are expected to be less than significant for the following reasons:

- Road surface improvements are not expected to generate noise in excess of the existing noise levels;
- During road surface improvements, other noise sources would be eliminated or minimized as portions of Marina Way would be shut down for repair;
- Noise levels are expected to be reduced to less than 55 dBA within 150 feet from the activities; and,
- Road surface improvements would only be completed during daylight hours as allowed by the Redondo Beach noise ordinance.

1.9.2.2 Mitigation Measures

The impact of the proposed Project on noise associated with the coke drum transport is potentially significant. In addition to the Project Design Features outlined in Section 4.3.2, the following noise mitigation measure will be employed to reduce the potential noise impact associated with the transport carrier:

N-1 Noise from the existing hydraulic power units on the transport carrier will be reduced by installation of mufflers.

1.9.2.3 Level of Significance Following Mitigation

The impact of the proposed Project on noise during the construction period, although of very short duration (six evenings/nights), is expected to remain significant following mitigation.

1.9.3 TRAFFIC AND TRANSPORTATION

1.9.3.1 Environmental Impacts

Construction of the proposed Project will generate additional traffic from construction personnel commuting to and from the site, as well as the transportation of construction materials and equipment to the Refinery. Construction work shifts are expected to operate Monday through Friday and last about ten hours per day during most portions of

the construction schedule. During most of the construction phase, about 100 construction workers or less are expected to be required.

However, during Refinery unit shutdown periods (e.g., about eight weeks), two 10-hour construction shifts are expected. The first shift is scheduled to operate from 6:30 a.m. to 5:00 p.m. and the second shift is scheduled to operate from 6:30 p.m. to 5:00 a.m. The number of construction workers for the proposed Project will peak at about 335 workers per day, and will be involved in the Project for about eight weeks. During this period, construction activities are planned for seven days per week, incorporating two 10-hour shifts per day.

The City of El Segundo General Plan Circulation Element describes the roadway segments of Sepulveda Boulevard between Imperial Avenue and Mariposa Avenue and Rosecrans Avenue between Douglas Street and Aviation Boulevard as operating at an unacceptable LOS "E". In order to avoid adding peak hour trips to these sections of roadway the temporary construction worker will be prohibited from accessing the site from Sepulveda Boulevard and Rosecrans Avenue, and will have access to the Refinery via the regional freeway system, Main Street, and Vista Del Mar.

A LOS impact analysis was conducted for study area intersections during construction activities associated with the proposed Project. Since the morning shift change at 5 a.m. and 6:30 a.m. would occur before the a.m. peak hours of travel from 7 a.m. to 9 a.m., a LOS analysis was not conducted for the a.m. peak hour. However the afternoon shift change at 5 p.m. would coincide with the p.m. peak hours of travel from 4 p.m. and 6 p.m. and is included in the analysis.

The traffic impacts from the proposed Project plus the existing traffic are summarized in Table 4-12. Based on the analysis, the proposed Project is not expected to result in any potentially significant impacts and the LOS at all intersections would be LOS A or B, indicating free flow traffic conditions. Therefore, no significant traffic impacts at local intersections are expected to occur during the construction phase of the proposed Project.

Drums will be transported one at a time from Redondo Beach to the Refinery. It is anticipated that it will take one night to move each drum from King Harbor to the Refinery, which is about a 4.6 mile route. A coke drum will be loaded on to the transport carrier and secured. The transport carrier is expected to be about 190 feet in length and about 28 feet wide. The size of the carrier and vessel will necessitate the closure of streets as the carrier moves along the proposed route. To accomplish this, a controlled perimeter around the transport carrier will be developed and enforced by the California Highway Patrol and licensed oversize escort cars. Methods of controlling the public and safe moving area will require temporary road closures, and sometimes closure of additional roads in order to remove all possible interferences. The escort cars and California Highway Patrol vehicles will be equipped with sirens, horns, and loud speakers which can be used for communication in the event of an emergency.

When all drums have been transported to the Refinery, a construction crew will permanently replace all items that were moved. Center dividers that were removed or damaged will be repaired or re-installed and any landscaping removed will be repaired or replanted. Overhead cables and lines will be moved back into place and all streets/roadways will be returned to their preconstruction condition.

Although the transport of the coke drums is expected to result in temporary road obstructions, the coke drums are expected to be transported during the nighttime hours (9 p.m. to 5 a.m.) when traffic is at a minimum. Implementation of the identified Project Design Features, which include development of transportation control plans, approvals from local jurisdictions, and notification to local fire and police departments are expected to minimize potential traffic impacts and traffic hazards to less than significant.

1.9.3.2 Mitigation Measures

The impact of the proposed Project on traffic and transportation would be less than significant with the implementation of traffic control plans and the related Project Design Features, so no additional mitigation measures are required. In order to enforce one of the Project Design Features, mitigation measure TT-1 will be required. (Note that other Project Design Features are enforced through required existing regulations, and required permits and approvals.)

TT-1 Construction workers during the Refinery turnaround (peak construction activities) will be prohibited from accessing the Refinery from Sepulveda Boulevard and Rosecrans Avenue, and will be required to use Main Street and Vista Del Mar via Imperial Highway. This mitigation measure will be incorporated into the contract with the construction contractor and enforced by observing employee arrivals at the beginning of the work shifts to observe the direction of arrivals. The measure will be enforced through initial training, consultations, reprimands, and ultimately through employee termination.

1.9.3.3 Level of Significance after Mitigation

The impact of the proposed Project modifications on traffic and transportation would be less than significant.

1.10 EXECUTIVE SUMMARY – CHAPTER 5: SUMMARY OF CUMULATIVE IMPACTS

CEQA Guideline §15130(a) requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in §15065(a)(3). There are a number of projects proposed for development in the vicinity of the Refinery, which may contribute cumulative impacts to those generated by the proposed Project. The discussion in Chapter 5 lists projects which are reasonably

expected to proceed in the foreseeable future, i.e., project information has been submitted to a public agency.

1.10.1 AIR QUALITY

1.10.1.1 Environmental Impacts

Construction Impacts: In the time period between 2013 and 2014, several construction projects identified in Table 5-1 have the potential for construction activities that overlap with the construction activities for the proposed Project and may result in short-term significant air quality impacts. One project that has the potential for cumulative air quality impacts during the construction period could include the Smart Energy Transport Project (#31). For most of the projects in Table 5-1, construction activities are expected to be completed or construction activities are unknown (projects that are on hold) and, therefore, the cumulative impacts would be considered speculative.

Construction air quality impacts from the proposed Project would contribute to potentially significant cumulative construction air quality impacts if project-specific construction emissions are considered to be cumulatively considerable as defined by CEQA Guidelines §15064(h)(1). Impacts are considered to be cumulatively considerable if they exceed the project-specific air quality significance thresholds. Because NOx construction emissions exceed the project-specific NOx construction significance threshold, it is considered to be cumulatively considerable and cumulatively significant when considered in combination with other cumulatively related projects. Since VOC, CO, SOx, PM10, and PM2.5 construction emissions do not exceed their respective project-specific thresholds, they are not considered to be cumulatively considerable and, therefore, are not considered to contribute to cumulative construction impacts. This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable."

Operational Impacts: It is possible that other cumulative projects could result in significant operational air quality impacts including modifications to the El Segundo Power Plant (#18). In addition, projects could provide air quality improvements by reducing traffic delays, such as the Sepulveda/Rosecrans Site Rezoning and Plaza El Segundo Development (#19). However, as already noted above operational emissions from the proposed Project are expected to be substantially less than the applicable project-specific operational significance thresholds. Therefore, operational emissions associated with the proposed Project would not contribute to significant adverse cumulative air quality impacts.

Toxic Air Contaminants: The proposed Project's impacts on health effects associated with exposure to TACs is expected to be below the CEQA significance thresholds and, therefore, less than significant. Therefore, the proposed Project impacts are not expected to contribute to cumulative impacts and are not considered to be cumulatively

considerable. The impacts from TACs are localized impacts. The only other major industrial project in the area is the El Segundo Power Plant Redevelopment Project. The potential overlap of the El Segundo Power Plant and the proposed Project would be well below the significance criteria of ten per million for carcinogenic risk and 1.0 for the acute and chronic hazard indices. Cumulative impacts of TACs on health are expected to be less than significant.

Greenhouse Gases: The analysis of greenhouse gas (GHG) emissions is a different analysis than for criteria pollutants for the following reasons. For criteria pollutants, significance thresholds are based on daily emissions because attainment or non-attainment for at least some standards is based on daily exceedances of applicable ambient air quality standards. Further, several ambient air quality standards are based on relatively short-term exposure effects to human health, e.g., one-hour and eight-hour. Using the half-life of carbon dioxide (CO_2), 100 years, for example, the effects of GHGs are longer-term, affecting the global climate over a relatively long time frame. As a result, the SCAQMD evaluates GHG effects over a longer timeframe than a single day. The interim significance threshold for industrial projects is 10,000 metric tons per year of CO_2 equivalent emissions (see Table 4-1).

The SCAQMD significance threshold for GHG emissions combines construction emissions amortized over 30 years with operational emissions. The total GHG construction emissions associated with the proposed Project are estimated to be 4,397 metric tons over the entire construction period, or 147 metric tons per year amortized over 30 years. The operation of the proposed Project modifications is expected to emit 5,285 metric tons per year of GHG emissions. The total GHG emissions associated with the proposed Project modifications, including the 30-year amortized construction GHG emission, is 5,432 metric tons per year, which is less than the interim SCAQMD GHG significance threshold (see Table 5-3). Therefore, the GHG emissions from the proposed Project are less than significant.

During the course of construction, the Delayed Coker Unit and the associated combustion sources will be shutdown to accomplish the project modifications. Therefore, emission reductions will occur from not operating refinery equipment (e.g., the Delayed Coker Unit) (see Table 5-4). Assuming an eight week turnaround period, the total estimated GHG emission reductions associated with the proposed Project would be 29,476 metric tons.

1.10.1.2 Mitigation Measures

The impact of the proposed Project on GHG emissions would be less than significant, so no additional mitigation measures are required.

1.10.1.3 Level of Significance Following Mitigation

The cumulative adverse air quality impacts due to construction activities are expected to exceed the SCAQMD's NOx construction significance threshold, are considered to be cumulatively considerable even after mitigation, and, therefore, would contribute to significant adverse cumulative NOx construction air quality impacts. The project-specific air quality impacts due to operational activities are not expected to exceed the SCAQMD significance thresholds, are not considered to be cumulatively considerable, and would not contribute to significant adverse cumulative operational air quality impacts. The project-specific TAC health impacts would not be significant, are also not considered to be cumulatively considerable, and would not be expected to generate significant adverse cumulative TAC impacts.

CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore the project's contribution to construction emissions of VOC, CO, SOx, PM10, PM2.5, and GHG and operational air emissions, including toxic air contaminant emissions are not cumulatively considerable and thus not cumulatively significant because the environmental conditions would essentially be the same whether or not the proposed Project is implemented (CEQA Guidelines §15130). This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable".

1.10.2 NOISE

1.10.2.1 Environmental Impacts from Construction

Construction phases of each of the related projects are expected to generate localized, short-term noise impacts, some of which may be significant during construction. Construction activities associated with the industrial projects are located in industrial areas where limited sensitive receptors are located. The use of muffling devices, restriction of most construction work hours to daytime hours, compliance with local noise ordinances, etc., are expected to mitigate the increase in noise at most of the construction sites.

The cumulative construction impacts associated with the related industrial projects are not expected to be significant or exceed noise ordinances. The Refinery and other industrial projects are generally a sufficient distance (about 0.5 mile) apart that the noise levels are not expected to overlap. Some of the commercial/office buildings are located close to residential and other sensitive receptors and may create noise impacts in residential areas, but because of the distances from the proposed Project to the other cumulative projects, and to the residential areas, construction noise from the proposed

Project at the Refinery is not expected to contribute to the noise impacts at the residential or sensitive receptors. The other cumulatively related projects at the Refinery are expected to be completed prior to the beginning of the proposed Project, so no construction activities are expected to overlap at the Refinery.

The transport of coke drums from King Harbor to the Refinery was determined to generate potentially significant noise impacts due to the nighttime transportation activities and the location of the route near residential areas. The coke drum transport activities are not expected to result in cumulative noise impacts because noise impacts will be of limited duration (six nights) and construction activities associated with other cumulative projects are not expected to occur during the nighttime. Therefore, the proposed Project is not expected to make a cumulatively considerable contribution to noise impacts.

1.10.2.2 Environmental Impacts from Operations

No increase in operational noise impacts at the Refinery is expected so the proposed Project would not make a cumulatively considerable contribution to operational noise impacts and, therefore, significant adverse cumulative noise impacts are expected to be less than significant.

1.10.2.3 Mitigation Measures

Mitigation measures for the proposed Project are addressed in Section 4.3.4. Since noise impacts from the Refinery proposed Project are not considered to be cumulatively considerable, no additional mitigation measures are required.

1.10.2.4 Level of Significance After Mitigation

The noise impacts associated with the cumulative projects are not expected to be significant or contribute to significant adverse cumulative noise impacts during construction or operation.

1.10.3 TRANSPORTATION/TRAFFIC

Traffic associated with the construction of the proposed Project is expected to avoid the morning peak hour and be mitigated to less than significant during the evening peak hour. The proposed Project would avoid the major intersections within the cities of El Segundo and Manhattan Beach and generally avoid other project locations by requiring construction workers to approach the Refinery on specific routes. The LOS at intersections along these routes are currently LOS A & B, indicating free-flowing traffic conditions. Therefore, the proposed Project's contribution to cumulative impacts on traffic during the construction phase would not be considered cumulatively considerable.

1.10.3.1 Mitigation Measures

Potentially significant adverse project-specific traffic impacts from the proposed Project are expected to be mitigated by avoiding starting the work shifts during the morning peak traffic hours and requiring that construction workers use a specific route that avoids the more congested intersections within the City of El Segundo. In addition, Chevron will encourage ride-sharing by construction workers to minimize construction traffic impacts.

No mitigation measures are required for the operational phase of the proposed Project as no significant project-specific impacts are expected.

1.10.3.2 Level of Significance After Mitigation

Individual project impacts on transportation and traffic from the construction and operation of the proposed Project are less than significant. CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts. Therefore the proposed Project's contribution to traffic impacts is not cumulatively considerable and thus not significant because the environmental conditions would essentially be the same whether or not the proposed Project is implemented (CEQA Guidelines §15130).

1.11 EXECUTIVE SUMMARY – CHAPTER 6: SUMMARY OF ALTERNATIVES

This EIR identifies and compares the relative merits of a range of reasonable alternatives to the proposed project as required by the CEQA guidelines. According to the CEQA Guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative. In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines, §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation.

1.11.1 Description of Alternatives

Alternatives to the proposed project included Alternative 1 - No Project Alternative; Alternative 2 – Alternative Transportation Route; Alternative 3 – Alternate On-Site Assembly of Coke Drums; Alternative 4 - Replacement of Coke Drums in Place; and, 5 – Replacement of Coke Drums in Pairs.

1.11.2 Environmental Impacts of Alternatives

Based on the alternatives analyses, no feasible alternatives were identified that would reduce or eliminate the potentially significant air quality or noise impacts during construction activities related to the proposed Project. The No Project Alternative would eliminate these impacts, but would not achieve the goals of the proposed Project.

Further, the No Project Alternative is only expected to result in a delay in the implementation of the proposed Project or an alternative as the existing coke drums are approaching the end of their operational life. The No Project Alternative (Alternative 1) would prevent Chevron from installing new coke drums to improve the operational efficiency of the Delayed Coker Unit. However, the No Project Alternative would simply postpone the potentially significant impacts related to air quality and noise during construction. Therefore, Alternative 1 would not be considered to be the environmentally superior alternative.

Alternative 2 would result in significant impacts to air quality during construction, although the construction emissions would be reduced because the transport of coke drums to King Harbor would be eliminated. Noise impacts associated with the transport of coke drums would be increased as the length of the transport route would be increased and more communities, cities, and residents would be impacted by the night time transport of the coke drums. Therefore, Alternative 2 would not be considered to be the environmentally superior alternative as it would not reduce project impacts. Alternative 2 would allow the Refinery to meet the project objectives of increasing the reliability of the Delayed Coker Unit by replacing the existing coke drums.

Alternatives 3 and 4 would result in the construction of the coke drums at the Refinery, and have similar impacts to the proposed Project on air quality. Alternatives 3 and 4 would result in greater onsite construction activities due to drum fabrication and the air quality impacts during construction activities are expected to remain significant. Alternatives 3 and 4 would also reduce the traffic impacts associated with coke drum transport and avoid temporary road closures during construction activities. Alternatives 3 and 4 would achieve the objectives of the proposed Project of replacing the existing coke drums. However, with Alternative 4 additional potentially significant safety hazard impacts are expected associated with construction work occurring as the Delayed Coker Unit is operating. Therefore, Alternatives 3 would be considered environmentally superior as it would eliminate potentially significant construction noise impacts. While considered feasible, the coke drums manufactured under Alternatives 3 and 4 would not be of the same quality as those fabricated in a shop. Large fabrication shops are equipped with permanent equipment that specializes in automated welding techniques, which cannot be duplicated in a field fabrication environment. Quality control testing would be facilitated by shop inspection, with automated equipment to map weld quality. The overall life, quality, and reliability of the six new drums are expected to be higher with complete shop fabrication as currently planned under the proposed Project. Therefore, Alternatives 3 and 4 are not the preferred alternatives.

Alternative 5 would result in significant impacts to air quality and noise during construction. Alternative 5 would result in additional air quality impacts due to increased onsite construction activities and add potential significant safety hazard impacts due to construction occurring while the Delayed Coker Unit is operating. Noise and traffic impacts associated with Alternative 5 would be the same as the proposed Project. Therefore, Alternative 5 would not be considered to be the environmentally superior alternative as it would not reduce project impacts. Alternative 5 would allow the

Refinery to meet the project objectives of replacing the existing coke drums and increasing the reliability of the Delayed Coker Unit.

1.12 EXECUTIVE SUMMARY – CHAPTER 7 AND 8: REFERENCES, ACRONYMS, AND GLOSSARY

Information on references cited (including organizations and persons consulted) and the acronyms and glossary are presented in Chapters 7 and 8, respectively.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts

IMPACT	MITIGATION MEASURES	RESIDUAL IMPACT
Air Quality		
The construction emissions for NOx will exceed the SCAQMD CEQA significance thresholds and are significant.	Develop a Construction Emission Management Plan for the proposed project; prohibit truck idling in excess of five minutes; maintain construction equipment tuned up; use electric welders and electric generators where electricity is available; use Tier 3 engines or Tier 2 engines equipped with diesel particulate filters on cranes of 200 hp or greater off-road use Tier 3 engines or Tier 2 engines equipped with diesel particulate filters construction equipment rated 50 to 200 hp that will be operating for eight hours or more; and, suspend construction activities during first stage smog alerts.	Construction emissions are expected to remain significant for NOx.
The construction emissions of CO, VOC, SOx, PM10, and PM2.5 will not exceed SCAQMD CEQA significant thresholds and are less than significant.	None required.	Construction emissions are expected to be less than significant for CO, VOC, SOx, PM10, and PM2.5.
Construction impacts for NO_2, CO, PM10, and PM2.5 would not exceed applicable local significance thresholds.	None required.	Concentrations of NO_2, CO, PM10, and PM2.5 are less than significant.
Traffic impacts from the proposed Project are not expected to cause CO hotspots and no significant adverse impact on ambient air quality is expected.	None required.	Concentration of CO from traffic is less than significant.

TABLE 1-1 (continued)

Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts

IMPACT	MITIGATION MEASURES	RESIDUAL IMPACT
Air Quality (continued)		
Operational emissions of criteria pollutants are less than significant for NOx, CO, VOC, SOx, PM10, and PM2.5.	None Required.	Operational emissions are expected to be less than significant NOx, CO, VOC, SOx, PM10, and PM2.5.
Ambient air quality modeling indicates that the Project emissions on NO_2, PM10, and PM2.5 will be below ambient air quality standards and are less than significant.	None required.	Project emissions of NO_2, PM10, and PM2.5 will be below ambient air quality standards and are less than significant.
The cancer risk due to the operation of the proposed Project is expected to be less than the significance criterion of 10 per million, so that project impacts are less than significant.	None required.	Cancer risk impacts are less than significant.
The proposed Project's impacts associated with exposure to non-carcinogenic compounds are expected to be less than significant. The chronic hazard index and the acute hazard index are both below 1.0.	None required.	No significant non-carcinogenic health impacts are expected.
Noise		
On-site construction noise increases are expected to be less than 1.9 decibels and less than significant.	None required.	Construction noise impacts are less than significant.
Drum transport-related noise increases are expected to exceed nighttime noise standards, so, although temporary, noise impacts are significant.	Project Design Features will minimize noise impacts. Noise from the existing hydraulic power units on the transport carrier will be reduced by installation of mufflers.	Drum transport-related noise impacts will remain significant.

TABLE 1-1 (concluded)

Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts

IMPACT	MITIGATION MEASURES	RESIDUAL IMPACT
Noise (continued)		
Road surface improvement-related noise at King Harbor is expected to be less than significant.	None Required.	Road surface improvement-related noise impacts are less than significant.
Transportation and Traffic		
Transportation impacts are expected to be less than significant. (Note that most Project Design Features are enforced through required existing regulations, and required permits and approvals.)	None required with the implementation of the Project Design Features	Transportation impacts are expected to be less than significant.
In order to enforce one of the Project Design Features, mitigation measure TT-1 will be required.	Construction workers during the Refinery turnaround (peak construction activities) will be prohibited from accessing the Refinery from Sepulveda Boulevard and Rosecrans Avenue, and will be required to use Main Street and Vista Del Mar via Imperial Highway. This mitigation measure will be incorporated into the contract with the construction contractor and enforced by observing employee arrivals at the beginning of the work shifts to observe the direction of arrivals. The measure will be enforced through initial training, consultations, reprimands, and ultimately through employee termination.	Transportation impacts are expected to be less than significant.

CHAPTER 2

PROJECT DESCRIPTION

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

Chevron Products Company (Chevron) is proposing a project at its El Segundo Refinery (Refinery) to replace the six existing coke drums that are reaching the end of their useful life cycle with six new coke drums, of the same size, to be installed at the same location within the Refinery. The Coke Drum Reliability Project (proposed Project) includes fabrication of the six replacement coke drums in an overseas shop with the completed drums being shipped in their entirety to the Port of Los Angeles/Port of Long Beach. Fabrication in a shop is proposed to take advantage of the expertise shop fabricators have developed to fabricate coke drums since the existing coke drums were manufactured and installed at the Refinery more than 40 years ago. The overseas fabrication shop was selected through a formal bid process.

Once the drums are onsite, they will be installed during a planned shutdown of the Delayed Coker Unit. Installation will be accomplished by removal of the six-derrick structure, in one piece off the existing drums, setting it at grade, and replacing the drums one by one. Piping, electrical wiring, and control wiring will be disconnected to free the derrick structure for this lift. Once the new coke drums have been set in place, the derrick structure will then be reset atop the drums; piping, wiring, and controls reconnected; and, the Delayed Coker Unit placed back in operation. The proposed Project will not change the Refinery crude throughput capacity or Delayed Coker Unit capacity.

2.2 PROJECT OBJECTIVES

The primary objective of the proposed Project is to replace six existing coke drums with six new coke drums. By installing the six new coke drums the proposed Project would also meet the following project objectives:

- Eliminate the need for frequent repair and maintenance due to equipment age and stresses (heating and cooling of metal) from decades of operation;
- Increase the reliability of coke drum operations through substantially reducing unplanned repairs;
- Increase the ability of the Refinery to produce and supply reformulated gasoline and other petroleum products by minimizing equipment disruption and unplanned repairs to the coke drums; and,
- Reduce costs currently associated with the increasing numbers of unplanned repairs.

2.3 PROJECT LOCATION

The proposed Project will occur within the confines of the existing Refinery. The Refinery, which was constructed over 100 years ago, is located within the overall southern California region, as shown in Figure 2-1. The Refinery is located at 324 West El Segundo Boulevard in the City of El Segundo, California, as shown in Figure 2-2.

2.4 LAND USE AND ZONING

The Refinery is located in the City of El Segundo within Los Angeles County in an urbanized area which includes a substantial amount of industrial development, due to the proximity of Los Angeles Airport (LAX) (see Figure 2-2).

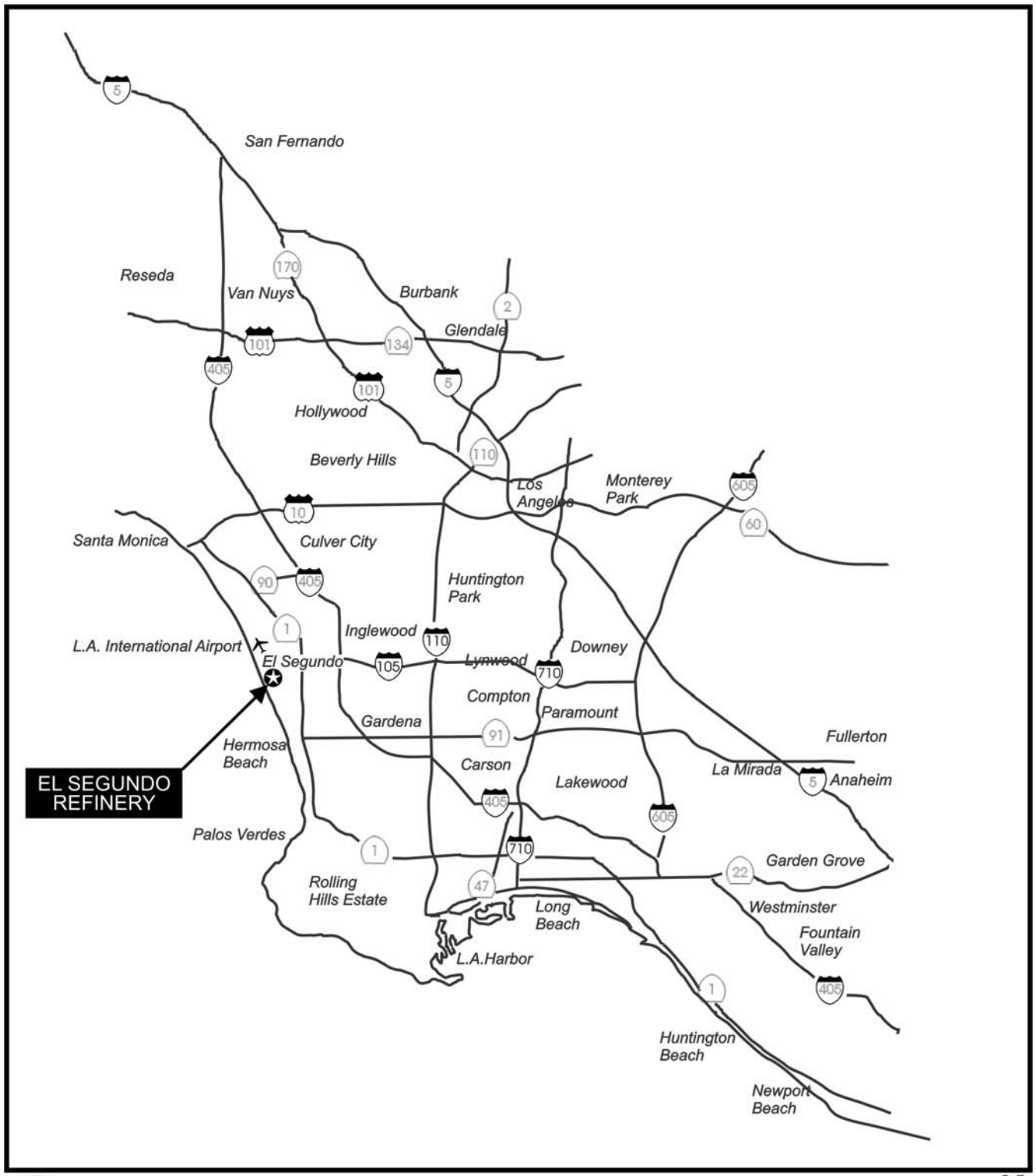
Implementation of the proposed Project at the Refinery will occur within existing property boundaries. The Refinery, which is zoned heavy industrial, is bounded by El Segundo Boulevard to the north, Sepulveda Boulevard to the east, Rosecrans Avenue to the south, and Vista Del Mar to the west. Land use to the north of the Refinery is primarily residential, with a mix of commercial and light industrial zoning. The predominant adjacent land uses west of the Refinery are nearly all heavy industrial, or open space, which includes: Dockweiler State Beach, Manhattan Beach, and the El Segundo Generating Station, although a small parcel of land at the southwest corner of the Chevron property is made up of commercial and multiple-family residential. The small parcel of residential land adjacent to the southwest corner of the Refinery is the closest residential area to the proposed Project and is approximately 1,000 feet away.

Directly south of the Refinery, there is a single-family residential area bordering the entire length of the Refinery separated by Rosecrans Avenue. The corridor immediately east of the Refinery is comprised of a golf course at the corner of Sepulveda Boulevard and El Segundo Boulevard, with light commercial and heavy industrial zoning for the rest of the tract.

2.5 EXISTING REFINERY CONFIGURATION AND OPERATION

The locations of all existing Refinery units are shown in Figure 2-3, which also designates the location of the proposed Project. Figure 2-4 shows a block flow diagram of the existing Refinery operations. Crude oil, used to produce gasoline and other refinery products, is delivered by ship to the marine terminal and pumped to the Refinery by existing pipelines or received via pipeline directly to the Refinery.

The crude oil is then processed in the crude units where it is heated and distilled into multiple feedstock components that are later processed elsewhere in the Refinery. The heavy residual oil leaving the crude units is further distilled in the vacuum units to yield additional gas oils and vacuum residuum. The vacuum residuum is processed in the Delayed Coker Unit and the lighter hydrocarbon components from the crude units and



Environmental Audit, Inc.

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REGIONAL MAP
Chevron Products Company
El Segundo Refinery

Project No. 2706

Figure 2-1

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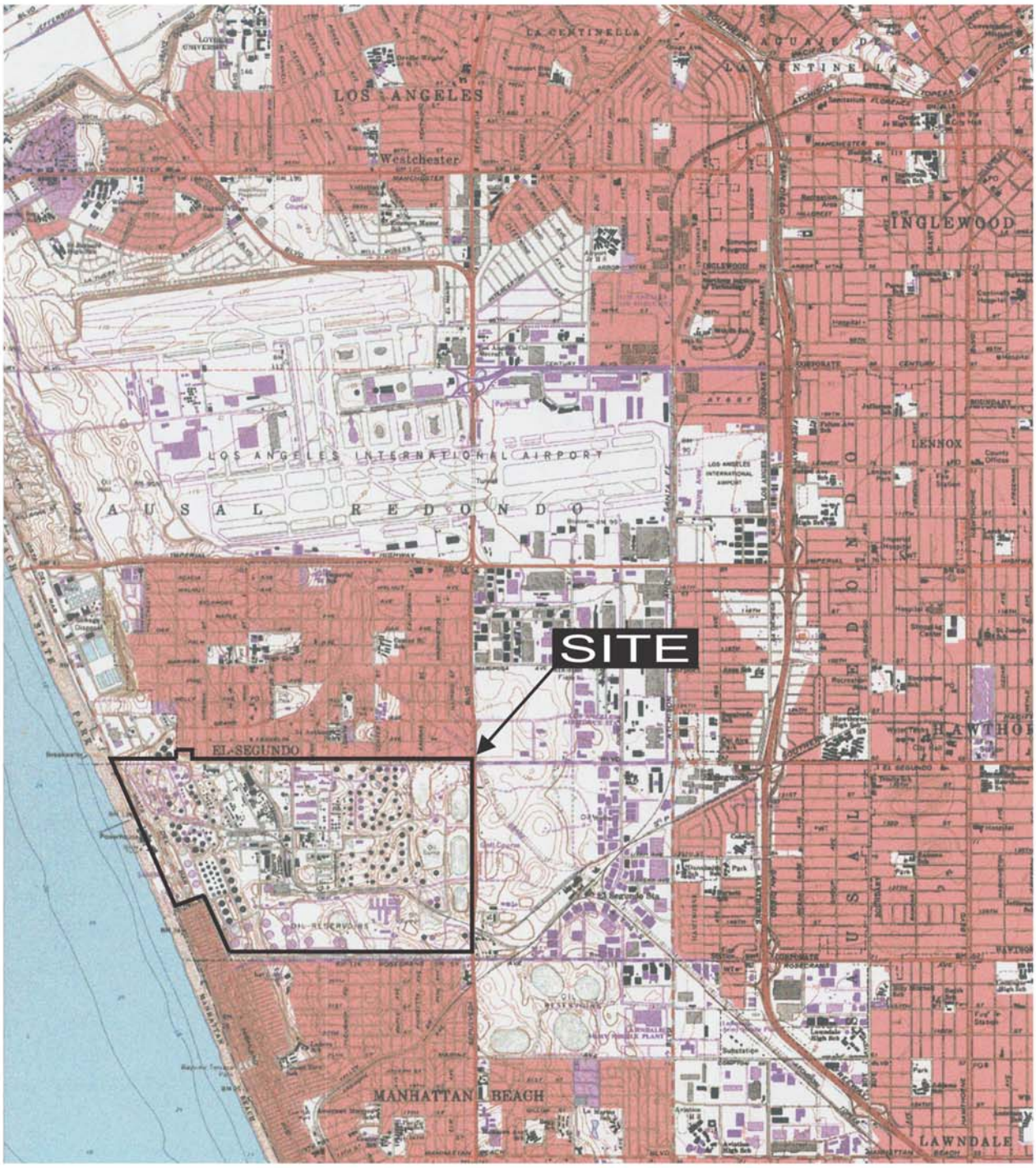

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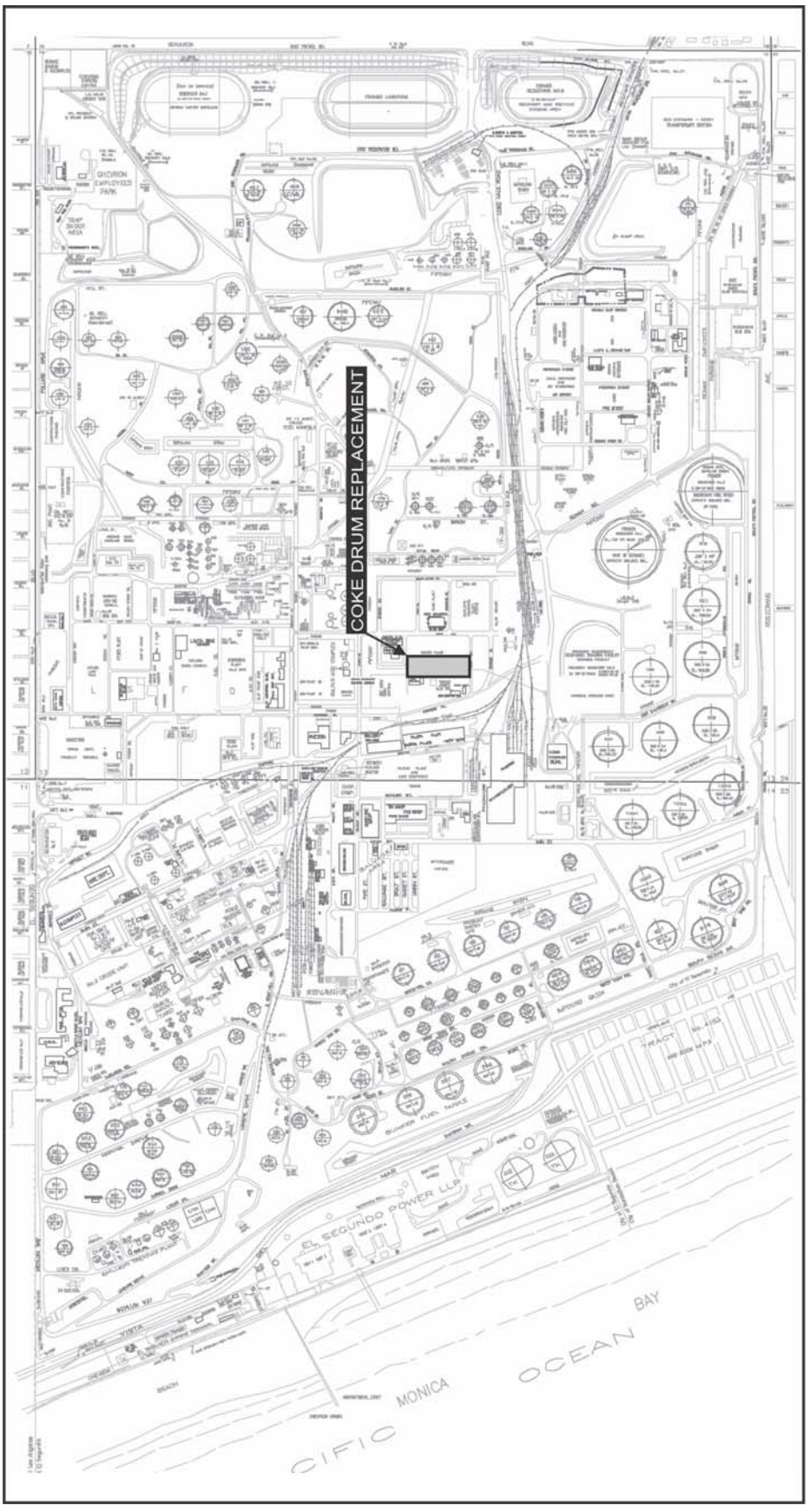
SITE LOCATION MAP
Chevron Products Company
El Segundo Refinery

Project No. 2706

Figure 2-2

N:\2706\SiteLocMap.cdr



CHEVRON PRODUCTS COMPANY
PROJECT COMPONENT LOCATION

Figure 2-3

Project No. 2706
N:\2706\SourceLocationsMap (rev.5).CDR

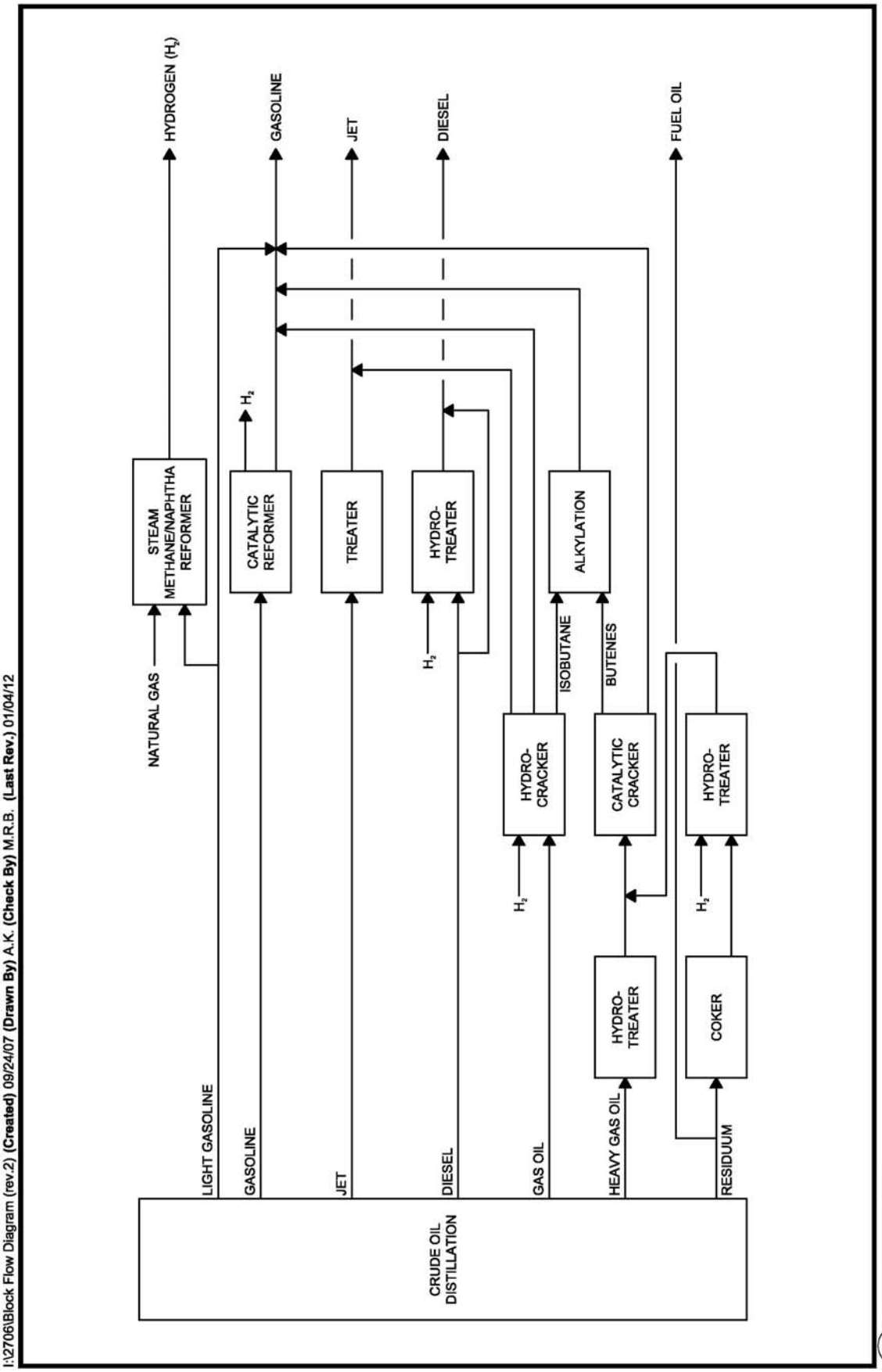

I:\2706\Block Flow Diagram (rev.2) (Created) 09/24/07 (Drawn By) A.K. (Check By) M.R.B. (Last Rev.) 01/04/12
HYDROGEN (H_2)
GASOLINE
JET
DIESEL
FUEL OIL
STEAM METHANE/NAPHTHA REFORMER
CATALYTIC REFORMER
TREATER
HYDRO-TREATER
ALKYLATION
HYDRO-CRACKER
CATALYTIC CRACKER
HYDRO-TREATER
HYDRO-TREATER
COKER
NATURAL GAS
H_2
H_2
ISOBUTANE
BUTENES
H_2
H_2
LIGHT GASOLINE
GASOLINE
JET
DIESEL
GAS OIL
HEAVY GAS OIL
RESIDUUM
CRUDE OIL DISTILLATION
Environmental Audit, Inc.
REFINERY BLOCK FLOW DIAGRAM
Project No. 2706

Figure 2-4

vacuum units are fed to other Refinery units for further processing, while residual petroleum coke is periodically removed from the Delayed Coker Unit.

Certain units in the Refinery are designed to separate elemental constituents, such as sulfur and nitrogen, from crude oil for conversion into commercial products. Sulfur Recovery Units convert sulfur compounds separated from crude oil into elemental sulfur, which is sold commercially. Nitrogen separated from the crude oil is converted into ammonia and used onsite and also sold commercially.

Auxiliary systems are also needed to support Refinery operations including hydrogen plants (to produce hydrogen needed for certain refinery reactions), boilers to produce steam, cogeneration plants to produce electricity and steam, and wastewater treatment systems.

2.6 PROPOSED PROJECT

The Delayed Coker Unit was built in 1968, together with No. 2 Crude Unit, to increase the efficiency of extracting high value lighter end products while reducing production of less desirable heavy fuel oil by the Refinery. The Delayed Coker Unit (see Figure 2-5), in combination with the Fluid Catalytic Cracking Unit (FCCU) and the ISOMAX, upgrade vacuum residuum and heavy and light gas oils to high value products, such as gasoline, jet, and diesel fuels. At the center of the coking process are six large cylindrical coke drums.

The six existing coke drums at the Refinery increasingly require maintenance and repair to remain operational as they age. The six existing coke drums are approaching the end of their serviceable and economical life cycle and must be replaced. The proposed replacement coke drums will have the same diameter and height as the existing drums, each measuring approximately 26-feet in diameter by 96 feet tall, allowing the Refinery to maintain the current processing capacity. Coke drum design improvements including upgraded metallurgy and a uniform shell wall-thickness will be incorporated in the construction of the six new coke drums. Seismic upgrades will be made to the structure that currently holds the six existing drums, which will ultimately be used to hold the replacement drums. A steam condensate drum will be replaced along with ancillary equipment, such as monitoring gauges, as needed. Existing pressure relief valves are currently vented to a vapor recovery system and flare and will continue to be vented to this equipment once the proposed Project becomes operational. No changes are proposed for the vapor recovery system and flare operations. The existing piping to the coke drums will be disconnected, set aside nearby on the Refinery property, and reinstalled once the new coke drums have been replaced. No new piping to the new coke drums is expected as a result of the proposed Project.

Drum metallurgy will be upgraded. Drum thickness will change from the current stepped design (thinner walls toward the top of the drum) to a uniform shell thickness. Level and

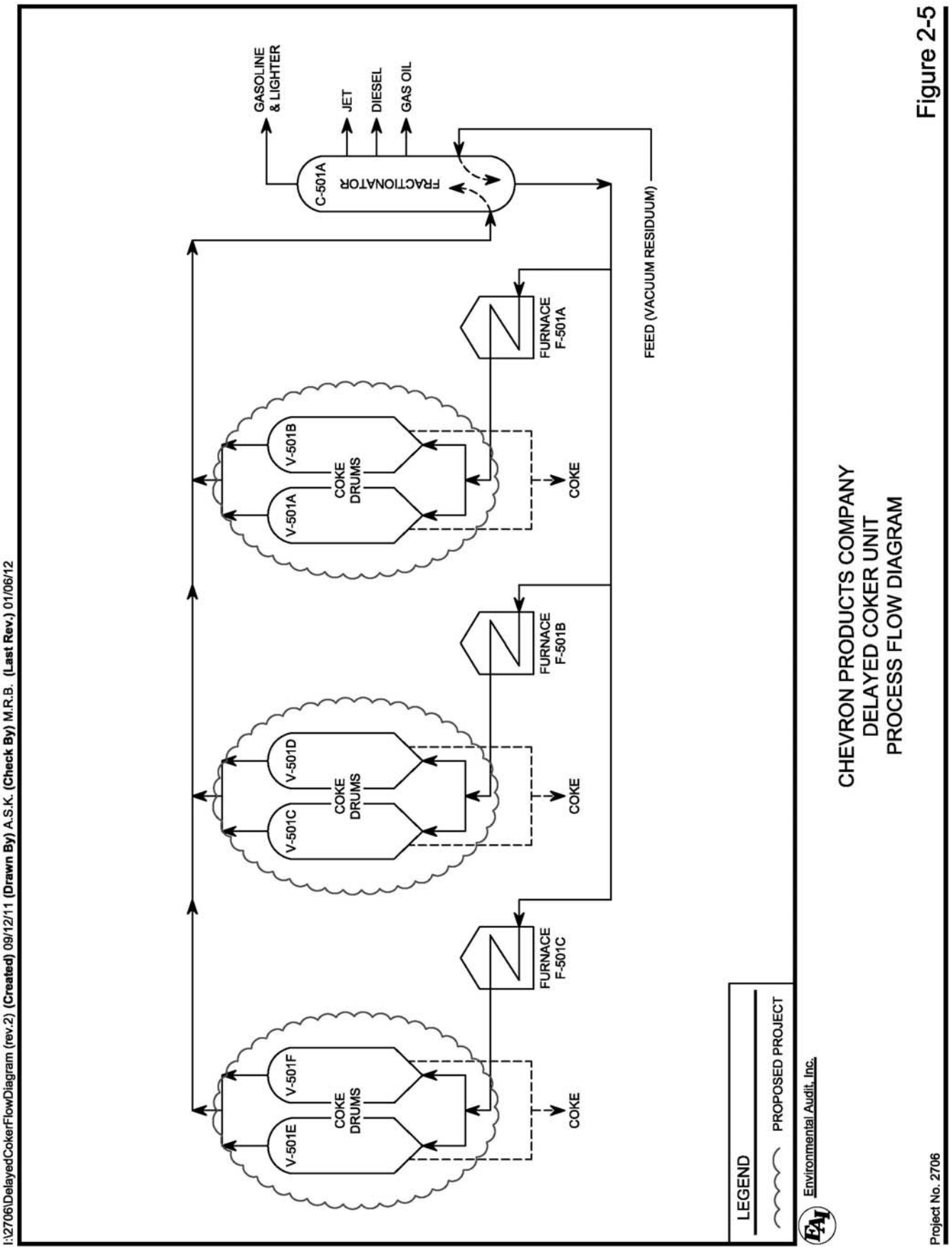

I:\2706\DelayedCokerFlowDiagram (rev.2) (Created) 09/12/11 (Drawn By) A.S.K. (Check By) M.R.B. (Last Rev.) 01/06/12
GASOLINE & LIGHTER
JET
DIESEL
GAS OIL
C-501A
FRACTIONATOR
FEED (VACUUM RESIDUUM)
FURNACE F-501A
FURNACE F-501B
FURNACE F-501C
V-501A
V-501B
V-501C
V-501D
V-501E
V-501F
COKE DRUMS
COKE
LEGEND
PROPOSED PROJECT
Environmental Audit, Inc.
CHEVRON PRODUCTS COMPANY
DELAYED COKER UNIT
PROCESS FLOW DIAGRAM
Project No. 2706

Figure 2-5

temperature monitoring instruments will be upgraded. With the change to a uniform drum thickness and thicker and stronger shell, the existing Pressure Relief Valves (PRVs) will be adjusted to accommodate the new coke drum operating pressure and ensure no change in the potential release rate to the vapor recovery system. No change in coke drum operating pressure is proposed. Therefore, no change will occur to the vapor recovery system operations.

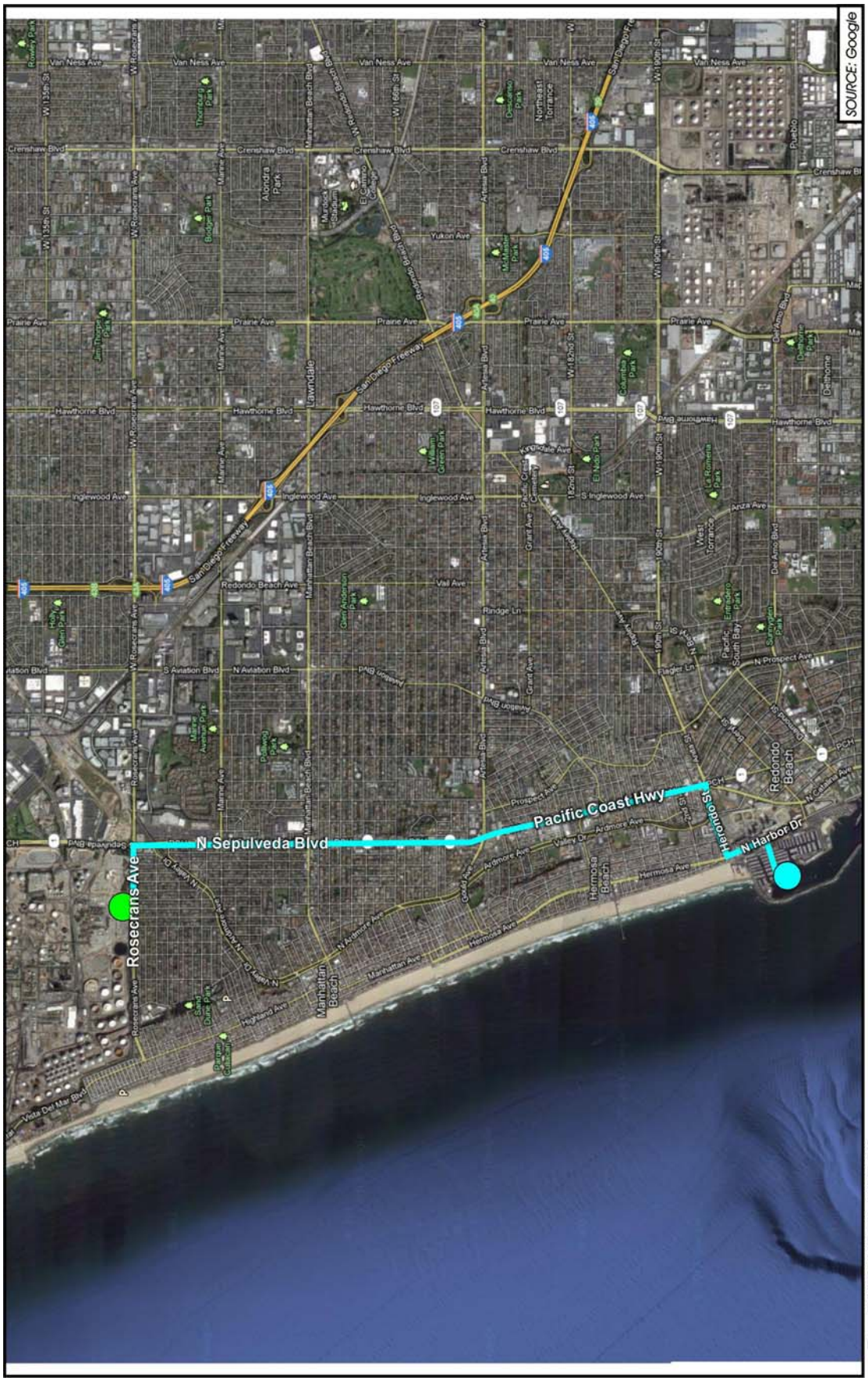
The six replacement coke drums will be fabricated overseas and shipped in their entirety to the Refinery via the Port of Los Angeles/Port of Long Beach. Fabrication of complete drums is proposed to take advantage of the expertise that the overseas shop fabricators have developed in recent years to fabricate coke drums, such as, plate-rolling equipment, automated grinding, beveling, and welding equipment, pre- and post-weld heat treating equipment, and well-established fabrication-shop quality control procedures.

Once the ships carrying the fabricated coke drums have arrived at the Port, the coke drums would be transported via barge from the Port to King Harbor in Redondo Beach. The current projected route calls for transporting the coke drums from either the Port of Los Angeles or the Port of Long Beach to King Harbor in Redondo Beach. Prior to drum arrival at King Harbor, preliminary site preparation activities including asphalt patching and landscape removal are expected to occur.

From Redondo Beach, the coke drums would be transported by public roads, following the approved and appropriately permitted route (see Figure 2-6), using a specially-designed heavy load transport vehicle (referred to as a transport carrier) (see Figure 2-7). The transport carrier is designed to distribute the weight of heavy loads to multiple axles so that the load per axle complies with Caltrans weight requirements and is protective of roadways.

The land portion of the proposed Project route for transporting the coke drums to the Refinery begins once the coke drums have been off-loaded from barges in King Harbor. Beginning at King Harbor, the transport will begin on Marina Way, turn left onto North Harbor Drive, turn right at Herondo Street, at Herondo Street and Highway 1 (PCH) turn left (north) and continue on PCH (which turns into Sepulveda Boulevard) until reaching Rosecrans Avenue. Transport will then turn left on Rosecrans Avenue, travel to the Refinery gate at Pacific Avenue (Gate 21), and then turn right into the Refinery where the coke drums will be staged in a lay down area. The coke drums are expected to be transported over local roads during the nighttime in order to avoid traffic.

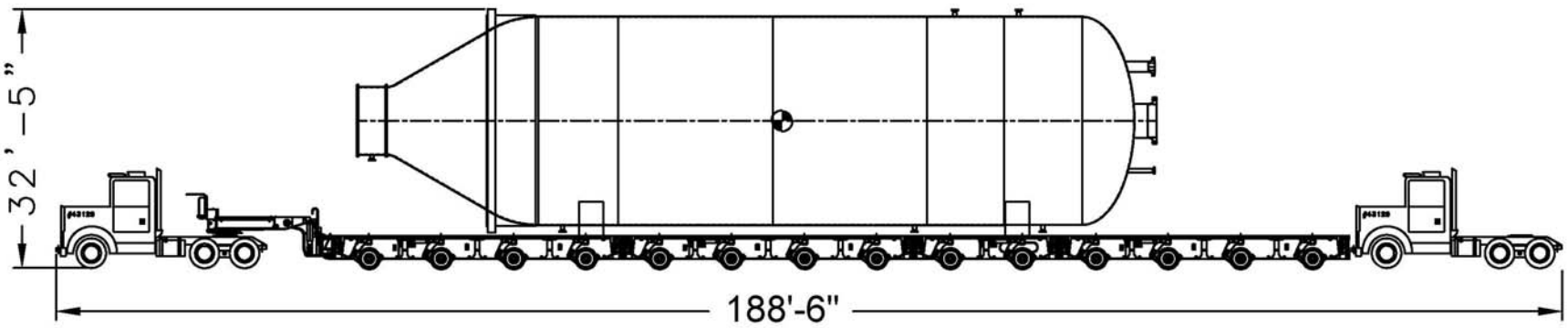
The transport process is expected to take one day from the Port to King Harbor, and one day from King Harbor to the Refinery. The current plan calls for moving one drum per night, taking six to eight weeks to move all six drums from the Port to the Refinery.



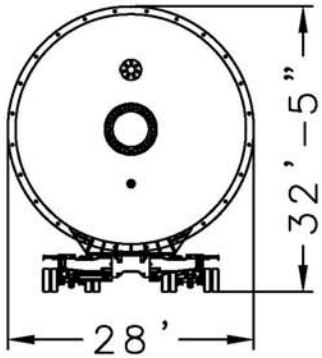
PROPOSED COKE DRUM TRANSPORTATION ROUTE
Chevron Products Company
El Segundo Refinery

Figure 2-6

Project No. 2706
N:\2706\Proposed Route Map.cdr



SIDE VIEW OF TRANSPORT CARRIER



REAR VIEW OF TRANSPORT CARRIER

Note: Typical Configuration Shown, Actual Configuration May Vary

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TYPICAL COKE DRUM TRANSPORT CARRIER

Project No. 2706

Figure 2-7

N:\2706\Coke Drum Transport Vehicle (rev.2).cdr

An alternative to the proposed Project would exclude the barge transport and use a surface street route from the Port to the Refinery. The surface street route would take four to five days per drum to make the transfer. This alternative would require between one and two months to complete moving the six drums. Transit on surface streets would occur at night if this alternative is implemented, and would be coordinated with local authorities and the California Highway Patrol. This alternate transport route is evaluated in Chapter 6.0 – Project Alternatives.

Once the replacement drums are onsite, installation would take place during a planned shutdown of the Delayed Coker Unit (commonly called a turn-around), at which time the other equipment in the Unit will also be shut down. Installation will be accomplished by removal of the six-derrick structure in one piece from the existing drums, setting it nearby at grade, and replacing the drums one by one onto the existing support structure. Piping, electrical wiring, and control wiring will be disconnected to free the derrick structure for this lift. Once the new coke drums are in place, the derrick structure will then be reset atop the drums; piping, wiring, and controls will be reconnected; and, the Delayed Coker Unit will be placed back in operation.

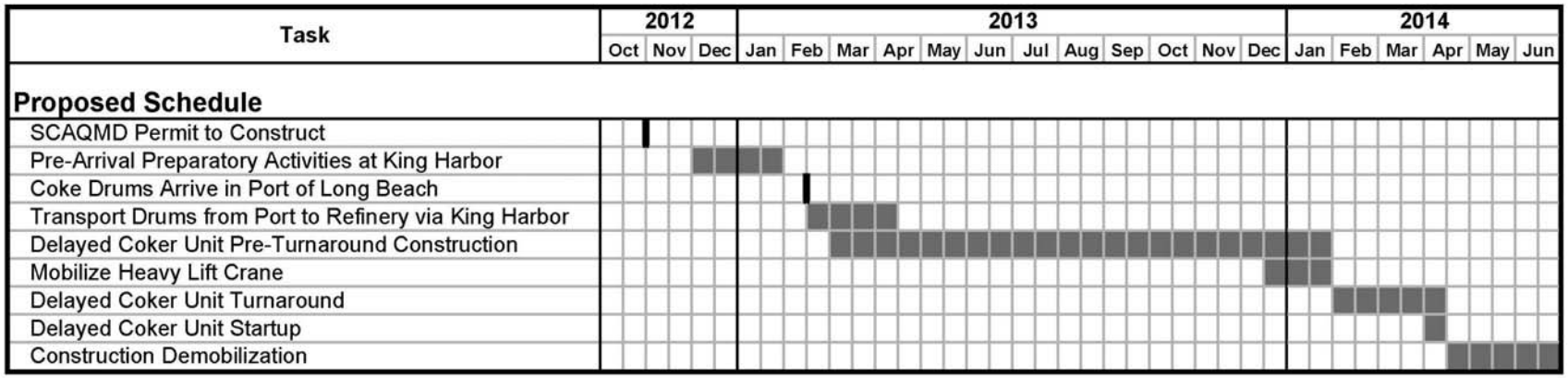
The removed drums will be dismantled on site and transported by semi-trucks for metal recycling. Other demolition debris will be transported to the appropriate disposal facility.

2.7 CONSTRUCTION OF THE PROPOSED PROJECT

The preliminary construction schedule calls for road surface improvements at King Harbor to be completed in the first phase of work, which is expected to commence in the fourth quarter of 2012. Construction work to be completed within the Refinery is expected to occur during 2013 and be completed by the mid-2014 (see Figure 2-8). The number of construction workers for the proposed Project will peak at approximately 335, which is expected to occur during the first quarter of 2014 (during the Delayed Coker Unit turnaround). During the peak construction period, construction activities are planned for seven days per week, incorporating two 10-hour shifts per day. All other construction periods for the proposed Project would operate five days per week with one 10-hour shift per day.

2.8 OPERATION OF THE PROPOSED PROJECT

The proposed Project will not result in an increase in the permanent work force at the Refinery. The proposed Project is not expected to increase or decrease the overall Refinery crude throughput capabilities. The proposed Project is not expected to change the daily coke production, because coke production is determined by the size and cycle time of the coke drums, which are not changing as a result of the proposed Project. The proposed Project will improve the reliability of the Delayed Coker Unit (i.e., the number of coke drums in service on a given day), which is expected to result in a three to four percent increase in the operational efficiency of the Delayed Coker Unit on an annual basis. Consequently, the proposed Project is expected to result in an increase in coke



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CONSTRUCTION SCHEDULE
Chevron Products Company
El Segundo Refinery

Project No. 2706
N:\2706\Construction Schedule.cdr

Figure 2-8

production of three to four percent annually. The Refinery currently transports coke produced in the Delayed Coker Unit offsite and will continue to do so. Coke truck transport is expected to increase by up to 2,130 trucks per year, with no increase in the maximum number of trucks per day because daily truck trips are dependent of the maximum amount of coke produced per day, which will not change as a result of the proposed Project. No change to rail or marine vessel traffic is expected as a result of the proposed Project.

2.9 PERMITS AND APPROVALS

The proposed Project will require approvals or permits from a variety of federal, state, and local agencies (see Table 2-1). Examples of general permits and approvals required for the Refinery are summarized in the following subsections. The following discussion summarizes representative permits required for the Refinery, but is not necessarily exhaustive. Many of these permits may not require permit modifications due to the proposed Project, but are included for completeness.

Federal Approvals

No federal agency approvals for the proposed Project are expected to be required although the project applicant is required to notify and receive concurrence agreement of non-applicability from some federal agencies on some issues (e.g., Prevention of Significant Deterioration (PSD) applicability). Many of the U.S. EPA regulations and requirements are implemented by state or local agencies. For example, Title V and New Source Performance Standards (NSPS) are implemented by the SCAQMD and hazardous waste regulations are enforced by the California Department of Toxic Substances Control (DTSC). However, the U.S. EPA will review the Air Permits for Title V compliance. The U.S. EPA also has authority over the PSD Program with some authority delegated to the SCAQMD and the proposed Project may require review to assure compliance with the PSD program for the proposed modifications. Finally, the Federal Aviation Administration regulates the height of structures that could impact navigable airspace.

State Approvals

Construction-related permits may be required from the California Occupational Safety and Health Administration (CalOSHA) for demolition, construction, excavation, and tower and crane erection. Any transport of heavy construction equipment or oversized equipment (e.g., coke drums), which requires the use of oversized transport vehicles on state highways, will require a Caltrans transportation permit. Department of Toxic Substances Control regulates the generation, transport, treatment, and disposal of hazardous wastes. Hazardous wastes generated by the proposed Project activities and related to refining activities are governed by rules and regulations enforced by DTSC.

TABLE 2-1

Federal, State and Local Agency Permits and Applications

Agency Permit or Approval	Requirement	Applicability to Project
Federal		
Environmental Protection Agency (U.S. EPA)	Prevention of Significant Deterioration	Air quality requirements for new and modified major stationary sources in attainment areas.
	Resource Conservation and Recovery Act (RCRA), 40 CFR Parts 260 – 279	Requires proper handling of hazardous waste material.
Federal Aviation Administration (FAA)	Notice of Proposed Construction or Alteration (FAA Form 7460-1) to comply with FAA Advisory Circular 70/7460-21, Proposed Construction or Alteration of Objects that may Affect Navigable Airspace (14 CFR Part 77.13)	Construction or alteration of a structure more than 200 feet above the ground level. Construction equipment, such as cranes, are subject to this requirement.
Occupational Safety and Health Administration (OSHA)	Process Safety Management OSHA 29 CFR Part 1910	Worker process safety standards.
State		
California Department of Transportation (Caltrans)	Transportation permit	Application required to transport overweight, oversize, and wide loads on highways.
California Occupational Safety and Health Administration (Cal-OSHA)	Construction - related permits	Excavation, construction, demolition, and tower and crane erection permit.
Department of Toxic Substances Control (DTSC)	Hazardous Waste Control Law (HSC, Division 20, Chapter 6.5)	Required if facility stores, treats or disposes of hazardous waste as described in the regulation.
Regional		
South Coast Air Quality Management District (SCAQMD)	CEQA Review/EIR	SCAQMD is the lead agency for certification of the proposed Project EIR.
	SCAQMD Rule 201: Permit to Construct	Applications are required to construct or modify stationary emissions sources.
	SCAQMD Rule 203: Permit to Operate	Applications are required to operate stationary source emissions.
	SCAQMD Rule 212: Standards for Approving Permits	Requires public notification for a "significant project."
	SCAQMD Rule 219: Equipment Not Requiring a Written Permit Pursuant to Regulation II	Equipment with minimal emissions does not need to be permitted.
	SCAQMD Rule 301 : Permitting and Associated Fees	Requires fees to be paid for new or modified sources and evaluation of projects.
	SCAQMD Rule 401: Visible Emissions	Prohibits visible emissions from single emission sources.
	SCAQMD Rule 402: Nuisance	Discharges which cause a nuisance to the public are prohibited.
	SCAQMD Rule 403: Fugitive Dust	Contains best available control measure requirements for operations or activities that cause or allow emissions of fugitive dust.
	SCAQMD Regulation IX: Standards of Performance for New Stationary Sources	Incorporates Federal regulations by reference.

TABLE 2-1 (concluded)

Federal, State and Local Agency Permits and Applications

Agency Permit or Approval	Requirement	Applicability to Project
SCAQMD (concluded)	SCAQMD Rule 1166: Excavation of VOC Contaminated Soils	Required if soils to be excavated are impacted by hydrocarbons.
	SCAQMD Rule 1173: Fugitive Emissions of VOC	Contains requirements for inspection and maintenance of fugitive VOC emitting components.
	SCAQMD Rule 1176: Sumps and Wastewater Separators	A compliance plan is required for VOC control from wastewater systems.
	SCAQMD Regulation XIII: New Source Review (NSR) including key rules Rule 1303: Requirements Rule 1304: Exemptions Rule 1306: Emission Calculations Rule 1309: Emission Reduction Credits	New source review requirements for non-RECLAIM pollutant emissions sources, including need for best available control technology (BACT), modeling for significant impacts, and providing offsets for emission increases.
	SCAQMD Rule 1401: NSR of Toxic Air Contaminants	New sources emitting toxic air contaminants must limit emissions to the extent that the health risks to the maximum exposed individual are within allowable limits. Best Available Control Technology for Toxics (T-BACT) is generally required when cancer risk is greater than one in one million (1×10^{-6}).
	SCAQMD Regulation XVII: Prevention of Significant Deterioration Permits	Partial delegation of Prevention of Significant Deterioration (PSD) Permits for new or modified PSD permit air quality requirements for modifications to stationary sources in attainment areas.
	SCAQMD Regulation XX: Regional Clean Air Incentives Market (RECLAIM)	RECLAIM is a market incentive program designed to allow facilities flexibility in achieving emission reduction requirements for NOx, and SOx under the Air Quality Management Plan using methods which include, but are not limited to: add-on controls, equipment modifications, reformulated products, operational changes, shutdowns, and the purchase of excess emission reductions.
	Title V of the 1990 Clean Air Act	SCAQMD Regulations XXX: Title V Permits. Applications are required to construct, operate, or modify air emission sources.
Local		
City of El Segundo	Building permit	Required for foundations, building, etc.
	Grading permit	Required prior to grading land.
	Plumbing and electrical permits	General construction permit.
City of Manhattan Beach	Load Permit	Required for heavy or large loads on City streets.
	Building Permit	Required for electrical work during street light modifications, etc.
City of Redondo Beach	Load Permit	Required for heavy or large loads on City streets.
	License Agreement	Access to King Harbor

Regional Approvals

The SCAQMD has responsibility as lead agency for the CEQA process and for certification of the EIR because it has primary approval authority over the proposed Project (CEQA Guidelines §15051(b)). Permits to Construct/Operate for new equipment and modifications to existing units will be required. Certain components of the proposed Project would also be subject to existing SCAQMD rules and regulations. Permits or plan approvals also may be required by SCAQMD Rule 1166 for soil remediation activities and demolition activities.

Local Approvals

The El Segundo Fire Department is responsible for assuring that the City fire codes are implemented. Building and grading permits for the proposed Project will be required from the City of El Segundo to assure that the proposed Project complies with the California Building Code.

CHAPTER 3

ENVIRONMENTAL SETTING

Introduction
Air Quality
Noise
Transportation/Traffic

3.0 ENVIRONMENTAL SETTING

3.1 INTRODUCTION

CEQA Guidelines §15125 requires that an EIR include a description of the environment within the vicinity of a proposed project as it exists at the time the NOP/IS is published, or if no NOP/IS is published, at the time the environmental analyses commences, from both a local and regional perspective. This chapter presents the existing environmental setting for the proposed Project against which potential impacts of the Project have been evaluated. This chapter also describes the existing environment around the El Segundo Refinery as applicable that could be adversely affected by the proposed Project. The environmental analyses in this EIR are focused only on the environmental topics identified in the NOP/IS (see Appendix A) that could be significantly adversely affected by the proposed Project. The reader is referred to the NOP/IS (Appendix A) for discussion of environmental topics not considered in this EIR, and the rationale for inclusion or exclusion of each environmental topic. The environmental topics identified in this chapter include both a regional and local setting.

3.2 AIR QUALITY

The Refinery is located within the SCAQMD jurisdiction (referred to hereafter as the district). The district consists of the four-county Basin that includes Orange, and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, the Riverside County portions of the Salton Sea Air Basin (SSAB), and the Mojave Desert Air Basin (MDAB). The Basin is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east.

3.2.1 METEOROLOGICAL CONDITIONS

The climate in the Basin generally is characterized by sparse winter rainfall and hot summers tempered by cool ocean breezes. A temperature inversion, a warm layer of air that traps the cool marine air layer underneath it and prevents vertical mixing, is the prime factor that allows contaminants to accumulate in the Basin. The mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, and Santa Ana winds. The climate of the area is not unique, but the high concentration of mobile and stationary sources of air contaminants in the western portion of the Basin, in addition to the mountains, which surround the perimeter of the Basin, contribute to air pollutant concentrations in the region.

3.2.2 TEMPERATURE AND RAINFALL

Temperature affects the air quality of the region in several ways. Local winds are the result of temperature differences between the relatively stable ocean air and the uneven heating and cooling that takes place in the Basin due to a wide variation in topography. Temperature also has a major effect on vertical mixing height and affects chemical and

photochemical reaction times. The annual average temperatures vary little throughout the Basin, averaging 75°F. The coastal areas show little variation in temperature on a year-round basis due to the moderating effect of the marine influence. On average, August is the warmest month while January is the coolest month. Most of the annual rainfall in the Basin falls between November and April. Annual average rainfall varies from nine inches in Riverside to 14 inches in downtown Los Angeles.

3.2.3 WIND FLOW PATTERNS

Wind flow patterns play an important role in the transport of air pollutants in the Basin. The winds flow from offshore and blow eastward during the daytime hours. In summer, the sea breeze starts in mid-morning, peaks at 10-15 miles per hour, and subsides after sundown. There is a calm period until about midnight. At that time, the land breeze begins from the northwest, typically becoming calm again about sunrise. In winter, the same general wind flow patterns exist except that summer wind speeds average slightly higher than winter wind speeds. This pattern of low wind speeds is a major factor that allows the pollutants to accumulate in the Basin.

The normal wind patterns in the Basin are interrupted by the unstable air accompanying the passing storms during the winter and infrequent strong northeasterly Santa Ana wind flows from the mountains and deserts north of the Basin.

3.2.4 EXISTING AIR QUALITY

Local air quality in the Basin is monitored by the SCAQMD, which operates a network of monitoring stations throughout the Basin. CARB operates additional monitoring stations.

3.2.4.1 Criteria Pollutants

The sources of air contaminants in the Basin vary by pollutant but generally include on-road mobile sources (e.g., automobiles, trucks and buses), other off-road mobile sources (e.g., airplanes, ships, trains, construction equipment, etc.), residential/commercial sources, and industrial/manufacturing sources. Mobile sources are responsible for a large portion of the total Basin emissions of several pollutants.

Mobile sources, both on-road and off-road, continue to be the major contributors for each of the seven criteria pollutants monitored in the Basin[1]. For example, mobile sources represent 64 percent of VOC emissions (an ozone precursor pollutant), 91 percent of NOx emissions, and 98 percent of CO emissions. For directly emitted PM2.5, mobile sources represent 39 percent of the emissions with another 20 percent due to vehicle-related entrained road dust (SCAQMD, 2007).

[1] Lead, also a criteria pollutant, is monitored at special monitoring stations near two large lead battery recycling facilities.

Criteria air pollutants are those pollutants for which the federal and state governments have established ambient air quality standards or criteria for outdoor concentrations in order to protect public health with a margin of safety (see Table 3-1). National Ambient Air Quality Standards (NAAQS) were first authorized by the federal Clean Air Act of 1970 and promulgated by the U.S. EPA. California Ambient Air Quality Standards were authorized by the state legislature in 1967 and promulgated by CARB. Air quality of a region is considered to be in attainment of the standards if the measured concentrations of air pollutants are continuously equal to or less than the air quality standards over the previous three-year period.

Health-based air quality standards have been established by the U.S. EPA and the CARB for ozone, CO, NOx, PM10, PM2.5, SOx, and lead. The California standards are typically more stringent than the federal air quality standards. California also has established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride. Hydrogen sulfide and vinyl chloride currently are not monitored in the Basin because they are not a regional air quality problem, but are generally associated with localized emission sources. The Basin is currently designated as non-attainment for PM10, PM2.5, and ozone for both state and federal standards. The Basin, including the project area, is classified as attainment for both the state and federal standards for CO, NOx, SOx, sulfates, and lead.

3.2.4.2 Regional Air Quality

The SCAQMD monitors levels of various criteria pollutants at 38 monitoring stations located throughout the district. In 2010, the district exceeded the federal and state standards for ozone at most monitoring locations on one or more days. The federal one-hour ozone standard was revoked and replaced by the eight-hour average ozone standard effective June 15, 2005. The state one-hour ozone standard was exceeded 79 days in 2010. The Central San Bernardino Mountains and the East San Bernardino Valley exceeded standards most frequently. Other areas that exceeded the state ozone standards included the San Gabriel Valley, San Fernando Valley, and Riverside County including the Coachella Valley. The federal and state eight-hour ozone standards were exceeded on 102 and 131 days in the Basin, respectively.

In 2010, the state and federal maximum concentrations of CO were not exceeded in the Basin. Because of improving CO air quality over the last several years, in 2005 the SCAQMD adopted and submitted to U.S. EPA a CO attainment re-designation request and CO maintenance plan. U.S. EPA declared the Basin as a maintenance area for CO in 2007.

The federal PM10 standards were not exceeded in the Basin in 2010. The state PM10 standards were exceeded at many of the monitoring locations in the Basin including the coast, San Fernando Valley, San Gabriel Valley, Riverside County, the Coachella Valley, and San Bernardino County. The state PM10 standard was exceeded 34 percent of the

TABLE 3-1

Ambient Air Quality Standards

Air Pollutant	State Standard Concentration/ Averaging Time	Federal Primary Standard Concentration/ Averaging Time	Most Relevant Effects
Ozone	0.070 ppm, 8-hr average>	0.075 ppm, 8-hr average>	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; and (d) Property damage.
Carbon Monoxide	20 ppm, 1-hr average> 9.0 ppm, 8-hr average>	35 ppm, 1-hr average> 9 ppm, 8-hr average>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses.
Nitrogen Dioxide	0.18 ppm, 1-hr average> 0.03 ppm, annual average>	0.0534 ppm, annual arithmetic mean>	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration.
Sulfur Dioxide	0.25 ppm, 1-hr. average> 0.04 ppm, 24-hr average>	75 ppb, 1-hr average>(1) 0.14 ppm, 24-hour average> 0.03 ppm, annual average>	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM10)	50 µg/ m^3, 24-hr average> 20 µg/m^3, ann. arithmetic mean>	150 µg/ m^3, 24-hr average>	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; and (b) Excess seasonal declines in pulmonary function in children
Suspended Particulate Matter (PM2.5)	12 µg/ m^3, ann. arithmetic mean>	35 µg/ m^3, 24-hr average> 15.0 µg/ m^3, annual arithmetic mean>	(a) Increased hospital admissions and emergency room visits for heart and lung disease; (b) Increased respiratory symptoms and disease; and (c) Decreased lung function and premature death.
Sulfates	25 µg/ m^3, 24-hr average>	Not applicable	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 µg/ m^3, 30-day average>	1.5 µg/ m^3, calendar average> 0.15 µg/ m^3, rolling 3-month average>	(a) Increased body burden; and (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10a.m. – 6p.m. PST)	Not applicable	Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent
Hydrogen Sulfide	0.03 ppm, 1-hr average>=	Not applicable	Odor annoyance.
Vinyl Chloride	0.01 ppm, 24-hour average>=	Not applicable	Known carcinogen.

Footnotes:
(1) Based on the 3-year average of the 99th percentile of the 1-hour daily maximum concentrations.

time in the Basin in 2010. The federal PM2.5 standard was exceeded 13 percent of the time in 2010.

In 2010, neither federal nor state standards for NOx, SOx, lead and sulfates were exceeded. Currently, the district is in attainment with the ambient air quality standards for NOx, SOx, and lead (SCAQMD, 2010).

3.2.4.3 Local Air Quality

The project site is located within the SCAQMD's Southwest Coastal Los Angeles County Monitoring Station No. 820 monitoring area. Recent background air quality data for criteria pollutants for the Southwest Coastal Los Angeles County Monitoring Station No. 820 are presented in Table 3-2. The area has shown a general improvement in air quality with decreasing or consistent concentrations of most pollutants. Air quality in the Southwest Coastal Los Angeles County Monitoring Station No. 820 monitoring area complies with the state and federal ambient air quality standards for CO, NOx, SOx, lead, and sulfate. The air quality in the area is also in compliance with the federal eight-hour and state one-hour ozone standards. The air quality in the Southwest Coastal Los Angeles County Monitoring Station No. 820 area is not in compliance with the state 24-hour or annual PM10 standards.

3.2.4.4 Refinery Criteria Pollutant Emissions

Operation of the existing Refinery results in the emissions of criteria pollutants. The reported emissions of criteria air pollutants from the Refinery for the last three-year period, based on the annual emission fee reports prepared for the SCAQMD, are shown in Table 3-3. The emissions in Table 3-3 are based on actual operations and not the maximum potential to emit (PTE). Baseline for the Refinery is considered to be the actual emissions for the facility (see Table 3-3). The Refinery is permitted for higher emissions than shown in Table 3-3.

The baseline for the Refinery was determined using three years of actual operational data because of the cyclical nature of the refining processes. Three years provides a reasonable period of time to take into consideration the variability of the refining operations, e.g., unit shutdowns for maintenance or repair, equipment replacement/repair, equipment failures, etc. In addition, the three-year baseline takes into consideration catalyst behavior which is generally more efficient during the earlier periods of use (catalysts generally require replacement every three to five years).

3.2.4.5 Toxic Air Contaminants (TACs)

The California Health and Safety Code (§39655) defines a toxic air contaminant as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health. Under California's toxic air contaminant program (Assembly Bill 1807, Health and Safety Code

TABLE 3-2

Southwest Coastal Los Angeles County Monitoring Station No. 820 (2006-2010) Maximum Observed Concentrations

CONSTITUENT		2006	2007	2008	2009	2010
Ozone:	1-Hour (ppm)	0.080	0.087	0.086	0.077	0.089
	Federal Standard	(0)	(0)	(0)	(0)	(0)
	State Standard	(0)	(0)	(0)	(0)	(0)
	8-Hour (ppm)	0.066	0.074	0.075	0.070	0.070
	Federal Standard	(0)	(0)	(0)	(0)	(0)
	State Standard	(0)	(1)	(1)	(0)	(1)
Carbon Monoxide:						
	1-Hour (ppm)	3	3	4	2	3
	8-Hour (ppm)	2.3	2.4	2.5	1.9	2.2
	Federal Standard	(0)	(0)	(0)	(0)	(0)
	State Standard	(0)	(0)	(0)	(0)	(0)
Nitrogen Dioxide:						
	1-Hour (ppm)	0.10	0.08	0.10	0.08	0.076
	State Standard	(--)	(--)	(--)	(--)	(--)
	Annual (ppm)	0.0155	0.0140	0.0143	0.0159	0.012
PM10:	24-Hour ($\mu g/m^3$)	45	96	50	52	37
	Federal Standard	(0%)	(0%)	(0%)	(0%)	(0%)
	State Standard	(0%)	(4%)	(0%)	(1.7)	(0%)
	Annual ($\mu g/m^3$) (arithmetic mean)	26.5	27.7	25.6	25.4	20.6
PM2.5:	24-Hour ($\mu g/m^3$)	--	--	--	--	--
	Federal Standard	--	--	--	--	--
	Annual Arithmetic Mean ($\mu g /m^3$)	--	--	--	--	--
Sulfur Dioxide:						
	1-Hour (ppm)	0.02	0.11	0.02	0.02	0.026
	24-Hour (ppm)	0.006	0.011	0.005	0.006	0.004
	Annual Arithmetic Mean (ppm)	0.0020	0.0027	0.0014	(--)	(--)
Lead:	30-Day ($\mu g/m^3$)	0.01	0.02	0.01	0.00	0.01
	Quarter ($\mu g/m^3$)	0.01	0.01	0.01	0.00	0.01
Sulfate:	24-Hour ($\mu g/m^3$)	13.6	10.5	14.0	8.6	9.7
	State Standard	(0%)	(0%)	(0%)	(0%)	(0%)

Source: SCAQMD Air Quality Data Annual Summaries 2006-2010.

Notes: (%) = Percent of samples exceeding the federal or state standard, (--) = Pollutant not monitored, ppm = parts per million of air by volume, AAA = Annual Arithmetic Mean, $\mu g/m^3$ = micrograms per cubic meter. -- = Pollutant not monitored

(1) The following PM10 data samples were excluded from compliance consideration in accordance with the EPA Exceptional Event Regulation: high concentrations throughout the District on October 21, with a maximum concentration of 559 $\mu g/m^3$ at Metropolitan Riverside County 1 (high wind and wildfire event).

TABLE 3-3

Chevron El Segundo Refinery
Reported Criteria Pollutant Emissions (tons/year)

Reporting Period	CO	VOC	NOx	SOx	PM10
2009	778	558	652	386	227
2010	1,052	551	639	425	212
2011	764	541	649	379	209
Baseline(1) (pounds/day)	4,737.9	3,013.7	3,543.4	2,173.5	1,183.6

(1) The Baseline emissions for the facility are derived by taking the average of the three latest years for which data are available.

§39650 et seq.), CARB, with the participation of the local air pollution control districts, evaluates and develops any needed control measures for air toxics. The general goal of regulatory agencies is to limit exposure to toxic air contaminants to the maximum extent feasible.

Monitoring for TACs is limited compared to monitoring for criteria pollutants because toxic pollutant impacts are typically more localized than criteria pollutant impacts. CARB conducts air monitoring for a number of TACs every 12 days at approximately 20 sites throughout California. The proposed Project modifications are located closest to the North Long Beach TAC monitoring station. A summary of the averaged data from 2009 from the Long Beach monitoring station for various TACs is considered to be an appropriate estimate of the TAC concentration in the vicinity of the Project (see Table 3-4).

The SCAQMD measured TAC concentrations as part of its Multiple Air Toxic Exposure Study (MATES). The purpose of the study was to provide an estimate of exposure to TACs to individuals within the Basin. The SCAQMD recently concluded a third study, referred to as MATES-III, that includes monitoring for 21 TACs at ten fixed, and five temporary, sites within the Basin in neighborhoods near toxic emission sources or in areas where community members are concerned about health risks from air pollution. The scope of the monitoring was from April 2004 through March 2006. The MATES-III found about 94 percent of the cancer risk is attributed to emissions associated with mobile sources and about six percent of the cancer risk is attributed to toxics emitted from stationary sources (e.g., industrial sources). The results indicate that diesel exhaust is the major contributor to cancer risk, accounting for about 84 percent of the total. Compared to previous studies of air toxics in the Basin, the MATES-III study found decreasing cancer risk for air toxics exposure, with the population-weighted risk down by eight percent from the analysis in MATES-II, which was based on monitoring in 1998 and 1999. The highest risks are found near the Port area, an area near central Los Angeles, and areas near transportation corridors. The average carcinogenic risk in the Basin is about 1,200 per million people. This means that 1,200 people out of a million

TABLE 3-4

Ambient Air Quality Toxic Air Contaminants – North Long Beach Peak 24-Hour Concentration 2009

Pollutant	Peak 24-hour Concentration	Pollutant	Peak 24-hour Concentration
VOCs			
	(ppbv)		**(ppbv)**
Acetaldehyde	1.9	Ethyl Benzene	0.4
Acetone	14	Formaldehyde	4.7
Acetonitrile	1.0	Methyl Bromide	0.15
Acrolein	1.5	Methyl Chloroform	0.31
Benzene	1.0	Methyl Ethyl Ketone	0.7
1,3-Butadiene	0.33	Methylene Chloride	0.7
Carbon Disulfide(1)	0.05	Perchloroethylene	0.14
Chloroform	0.25	Styrene	0.3
ortho-Dichlorobenzene(2)	0.15	Toluene	3.1
para-Dichlorobenzen(2)	0.15	Trichloroethylene	0.04
cis-1,3-Dichloropropene	0.05	meta/para-Xylene	1.6
trans-1,3-Dichloropropene	0.05	ortho-Xylene	0.6
PAHs(3)			
	(nanograms/m^3)		**(nanograms/m^3)**
Benzo(a)pyrene	0.61	Benzo(k)fluoranthene	0.019
Benzo(b)fluoranthene	0.51	Dibenz(a,h)anthracene	0.18
Benzo(g,h,i)perylene	1.7	Indeno(1,2,3-cd)pyrene	0.64
Inorganic compounds			
	(nanograms/m^3)		**(nanograms/m^3)**
Aluminum(4)	1700	Nickel	10
Antimony	10	Phosphorous(4)	35
Arsenic	20	Platinum	0.3
Barium(4)	56	Potassium6(2)	890
Bromine(4)	9	Rubidium(4)	4
Cadmium	1.7	Selenium	0.75
Calcium(4)	2300	Silicon(3)	5600
Chlorine(4)	2000	Strontium	26
Chromium	40	Sulfur	3800
Cobalt	1.6	Tin	5.0
Copper	57	Titanium	83
Hexavalent Chromium	0.08	Uranium(4)	1.5
Iron	2200	Vanadium	17
Lead	16	Yttrium(4)	2
Manganese	40	Zinc	210
Mercury(4)	1.5	Zirconium	3.1
Molybdenum	3.5		

Source: CARB, 2010. Annual Ambient Toxic Monitoring Sites, North Long Beach,

Notes: ppbv = parts per billion by volume; PAHs = polycyclic aromatic hydrocarbons; nanograms/m^3 = nanograms per cubic meter

(1) The most recent data is from 2006.
(2) The most recent data is from 2007.
(3) The most recent data for PAHs is from 2004.
(4) The most recent data is from 2003.

are susceptible to contracting cancer from exposure to the known TACs over a 70-year period of time (SCAQMD, 2008). Of the monitoring sites in the MATES-III study, the West Long Beach study site is the closest to the Refinery. The estimated cancer risk at the West Long Beach station was about 1,650 per million (SCAQMD, 2008). Areas surrounding the Refinery show cancer risk rates between 840 and 1,186 per million, with the highest risk area located northeast of the Refinery and southeast of LAX. An area of elevated risk was also found near Central Los Angeles with risks ranging from 1,400 to 1,900 per million. The areas projected to havehigher risk followed transportation corridors, including freeways and railways (SCAQMD, 2008).

From 1990 through 2007, CARB monitored outdoor concentrations for various TACs at seven sites in the Basin. Annual average concentrations and associated health risks for the top ten TACs individually as well as cumulatively for the South Coast Air Basin show that diesel PM poses the greatest health risk among the ten TACs monitored. In the Basin, the estimated health risk from diesel PM was 720 excess cancer cases per million people in 2000. Although the health risk is higher than the statewide average, it represents a 33 percent drop between 1990 and 2000. Trends and health risks for the nine other TACs were also evaluated. To examine their trends while minimizing the annual variation due to meteorology and sampling schedule, the air basin average concentration for the 1990 thru 1992 time period was compared to that for 2005 thru 2007. The health risks of 1,3-butadiene and benzene have been reduced by 73 percent and 82 percent, respectively. Methylene chloride and perchloroethylene also show substantial reductions of 65 percent and 87 percent, respectively (CARB, 2009).

The Refinery is required to prepare an AB2588 health risk assessment (HRA). The most recent AB2588 HRA was completed for the 2006-2007 emission inventory and was submitted to the SCAQMD in September 2009. The 2009 AB2588 HRA for the Refinery shows that the cancer risk at the maximum exposed individual resident (MEIR) and maximum exposed individual worker (MEIW) are 5.88 in one million and 1.31 in one million, respectively. The maximum chronic hazard index (MCHI) for the Refinery is 0.22 for the respiratory system. The maximum acute hazard index (MAHI) for the Refinery is 0.36 for the central nervous system. The Delayed Coker Unit contributions to the cancer risk for the Refinery are 0.07 per million at the MEIR and 0.03 per million at the MEIW. The Delayed Coker Unit contributions to the MCHI and MAHI are 0.01 and 0.25, respectively.

3.2.4.6 Climate Change

Global climate change is a change in the average weather of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. Historical records have shown that temperature changes have occurred in the past, such as during previous ice ages. Some data indicate that the current temperature record differs from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of greenhouse gases (GHGs) at 400 to 450 ppm carbon dioxide-equivalent concentration is required to keep global mean warming below two degrees Celsius, which is assumed to be necessary to avoid dangerous climate change.

The potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, and air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (i.e., heat rash and heat stroke). In addition, climate sensitive diseases may increase, such as those spread by mosquitoes and other disease carrying insects. Those diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding and hurricanes can displace people and agriculture, which would have negative consequences. Drought in some areas may increase, which would decrease water and food availability. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution.

The impacts of climate change will also affect projects in various ways. Effects of climate change are specifically mentioned in Assembly Bill 32 (AB32) the Global Warming Solutions Act of 2006 such as rising sea levels and changes in snow pack. The extent of climate change impacts at specific locations remains unclear. However, it is expected that California agencies will more precisely quantify impacts in various regions of the State. As an example, it is expected that the California Department of Water Resources will formalize a list of foreseeable water quality issues associated with various degrees of climate change. Once state government agencies make these lists available, they could be used to more precisely determine to what extent a project creates global climate change impacts. Due to the global nature of the effects of GHGs, GHG impacts are discussed in Chapter 5 – Cumulative Impacts.

Table 3-5 presents the GHG emission inventory by major source categories in calendar year 2008, as identified in the 2012 AQMP, for Basin. The emissions reported herein are based on in-Basin energy consumption and do not include out-of-Basin energy production (e.g., power plants, crude oil production) or delivery emissions (e.g., natural gas pipeline loss). Three major greenhouse gas pollutants have been included: the carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4). These GHG emissions are reported in million metric tons of CO_2 equivalent ($MMTCO_2e$.) Mobile sources generate 59.4 percent of the total GHG emissions in the Basin (47.0 percent from on-road vehicles and 12.5 percent from other mobile sources (aircraft, trains, ships and boats, and other sources (construction equipment, airport equipment, oil and gas drilling equipment)). The remaining 40.6 percent of the total Basin GHG emissions are from stationary and area sources. The largest stationary/area source is fuel combustion, which is 27.8 percent of the total Basin GHG emissions (68.6 percent of the GHG emissions from the stationary and area source category).

TABLE 3-5

2008 GHG Emissions for the Basin

Source Category	Emissions						
	CO_2	N_2O	CH_4	CO_2	N_2O	CH_4	CO_2e
	(TPD)			(TPY)			(MMT)
Fuel Combustion							
Electric Utilities	34,303	0.08	0.71	12,520,562	29.0	258	11.4
Cogeneration	872	0.00	0.02	318,340	0.60	6.00	0.29
Oil and Gas Production (Combustion)	2,908	0.01	0.08	1,061,470	4.71	29.5	0.96
Petroleum Refining (Combustion)	44,654	0.06	0.57	16,298,766	20.7	207	14.8
Manufacturing and Industrial	22,182	0.06	0.48	8,096,396	20.9	174	7.35
Food and Agricultural Processing	927	0.00	0.02	338,516	0.84	7.16	0.31
Service and Commercial	21,889	0.08	0.59	7,989,416	30.8	215	7.26
Other	2,241	0.02	0.16	818,057	8.58	58	0.75
Total Fuel Combustion	**129,977**	**0.32**	**2.62**	**47,441,523**	**116**	**956**	**43.1**
Petroleum Production and Marketing							
Oil and Gas Production	92.1	0.00	0.92	33,605	0.06	336	0.04
Petroleum Refining	770	0.00	1.65	280,932	0.36	603	0.27
Petroleum Marketing			83.8	0	0.00	30,598	0.58
Other			0.00	0	0.00	0	0.00
Total Petroleum Production and Marketing	**862**	**0.00**	**86.4**	**314,536**	**0.42**	**31,537**	**0.89**
Other Source Categories							
Total Waste Disposal[1]	3,772	0.04	508	1,376,870	14.9	185,278	4.78
Total Cleaning and Surface Coatings[2]	2,648	0.00	0.33	966,628	1.22	122	0.88
Total Industrial Processes[3]	279	0.00	1.49	101,832	0.19	543	0.10
Total Solvent Evaporation[4]	0.00	0.00	0.07	0.00	0.00	24.20	0.00
Total Miscellaneous Processes[5]	38,850	0.12	27.9	14,180,326	45.3	10,179	13.1
Total On-Road Motor Vehicles[6]	217,480	6.11	8.26	79,380,188	155	187	72.7
Total Other Mobile Sources[7]	57,572	1.83	8.95	21,013,816	668	3,268	19.3
Total Other Source Categories	**320,601**	**8.10**	**555**	**117,019,660**	**885**	**199,601**	**111**
Total 2008 Baseline GHG Emissions for Basin	**451,440**	**8.42**	**644**	**164,775,719**	**1,001**	**232,094**	**155**

(1) Waste Disposal includes sewage treatment, landfills, incineration, and other waste disposal.
(2) Cleaning and Surface Coatings includes laundering, degreasing, coatings and related processes, printing, adhesives and sealants, and other cleaning and surface coatings.
(3) Industrial Processes include chemical, food and agriculture, mineral processes, metal processes, wood and paper, glass and related products, electronic, and other industrial processes.
(4) Solvent Evaporation includes consumer products, architectural coating and related solvents, pesticides and fertilizers, and asphalt paving and roofing.
(5) Miscellaneous Processes include residential fuel combustion, farming operations, construction and demolition, paved road dust, unpaved road dust, fugitive windblown dust, fires, waste burning and disposal, utility equipment, cooking, and other miscellaneous processes.
(6) On-Road Motor Vehicles include trucks (all sizes), motorcycles, buses (all types), and motorhomes.
(7) Other Mobile Sources include aircraft; trains; ships; commercial boats, construction, airport, and oil and gas drilling equipment.

3.2.5 REGULATORY BACKGROUND

Ambient air quality standards in California are the responsibility of, and have been established by, both the U.S. EPA and CARB. These standards have been set at concentrations, which provide margins of safety for the protection of public health and welfare. Federal and state air quality standards are presented in Table 3-1. The SCAQMD has established levels of episodic criteria and has indicated measures that must be initiated to immediately reduce contaminant emissions when these levels are reached or exceeded. The federal, state, and local air quality regulations are listed in Table 2-1 and summarized in the following subsections.

3.2.5.1 Federal Regulations

The U.S. EPA is responsible for setting and enforcing the NAAQS for ozone, CO, NO_2, SO_2, PM10, PM2.5, and lead (see Table 3-1). The U.S. EPA has primary jurisdiction over emissions sources that are under the primary authority of the federal government including aircraft, locomotives, and emissions sources (marine vessels) outside state waters (Outer Continental Shelf). However, SCAQMD rules apply to stationary sources in the Outer Continental Shelf as authorized in the Clean Air Act (CAA). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

In 1990, the amendments to the federal CAA conditionally required states to implement programs in federal CO non-attainment areas to require gasoline to contain a minimum oxygen content in the winter beginning in November 1992. In response to the federal CAA requirements to reduce CO emissions, California established a wintertime oxygenate gasoline program requiring between 1.8 and 2.2 weight percent oxygen content in gasoline.

Other federal regulations applicable to the proposed Project include Title III of the CAA, which regulates TACs. Title V of the Act establishes a federal permit program. The Refinery is currently operating under its Title V permit, and the proposed Project will require modifications to this permit. The Title V program is implemented by the SCAQMD in the district. The U.S. EPA also has authority over the PSD Program with some authority delegated to the SCAQMD. A PSD review may be required for the proposed Project.

3.2.5.2 California Regulations

CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act and federal Clean Air Act, and for regulating emissions from consumer products and motor vehicles. CARB has established California Ambient Air Quality Standards for all pollutants for which the federal government has NAAQS and also has standards for sulfates, visibility, hydrogen sulfide, and vinyl chloride (see Table 3-1). Hydrogen sulfide and vinyl

chloride are not measured at any monitoring stations in the Basin because they are not considered to be a regional air quality problem. California standards are generally more stringent than the NAAQS. CARB has established emission standards for vehicles sold in California and for various types of equipment. CARB also sets fuel specifications to reduce vehicular emissions, although it has no direct regulatory approval authority over the proposed Project.

California gasoline specifications are governed by both state and federal agencies. During the past decade, federal and state agencies have imposed numerous requirements on the production and sale of gasoline in California. Most recently, CARB adopted the Reformulated Gasoline Phase III regulations that required, among other things, that California phase out the use of methyl tertiary butyl ether in gasoline.

The California Clean Air Act (AB2595) mandates achievement of the maximum degree of emission reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date.

California also has established a state air toxics program (AB1807, Tanner) which was revised by the new Tanner Bill (AB2728). This program sets forth provisions to implement the national program for control of hazardous air pollutants.

The Air Toxic "Hot Spots" Information and Assessment Act (AB2588), as amended by Senate Bill 1731 (SB1731), requires operators of certain stationary sources to inventory air toxic emissions from their operations and, if directed to do so by the local air district, prepare a health risk assessment to determine the potential health impacts of such emissions to adjacent receptors. If the health impacts are determined to be "significant" (cancer risk greater than ten per million exposures or non-cancer hazard index greater than 1.0), each facility operator must, upon approval of the health risk assessment, provide public notification to affected individuals.

3.2.5.3 Local Regulations

The Basin is under the jurisdiction of the SCAQMD, which has regulatory authority over stationary sources, air pollution control equipment, and limited authority over mobile sources. The SCAQMD is responsible for air quality planning in the Basin and development of the Air Quality Management Plan (AQMP). The AQMP establishes the strategies that will be used to achieve compliance with National and California Ambient Air Quality Standards in all areas within the SCAQMD's jurisdiction. The SCAQMD generally regulates stationary sources of air pollutants. There are a number of SCAQMD regulations that may apply to the proposed Project including Regulation II – Permits, Regulation III – Fees, Regulation IV – Prohibitions, Regulation IX – New Source Performance Standards, Regulation XI – Source Specific Standards, Regulation XIII – New Source Review, Regulation XIV – Toxics and Other Non-criteria Pollutants (including Rule 1401 - New Source Review of Toxic Air Contaminants, and Rule 1403 - Asbestos Emissions from Demolition/Renovation Activities), Regulation XVII –

Prevention of Significant Deterioration, Regulation XX – Regional Clean Air Incentives Market (RECLAIM) Program, and Regulation XXX – Title V Permits.

3.3 NOISE

3.3.1 INTRODUCTION

Noise is a by-product of urbanization and there are numerous noise sources and receptors in an urban community. Noise is generally defined as unwanted sound. The range of sound pressure perceived as sound is extremely large. Technical acoustical terms commonly used in this section are defined in Table 3-6.

TABLE 3-6

Definition of Acoustical Terms

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Noise Equivalent Level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to sound levels in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level (L_{dn})	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1 percent, 10 percent, 50 percent, and 90 percent of the time during the measurement period.
L_{max}, L_{min}	The maximum and minimum noise levels during the measurement period.
Loudness	The amplitude of sound waves combined with the reception characteristics of the human ear.
Sound Pressure	Sound pressure or acoustic pressure is the local pressure deviation from the ambient atmospheric pressure caused by a sound wave. Sound pressure can be measured using a microphone. The unit for sound pressure (p) is the pascal [symbol: Pa or 1 Newton exerted over an area of 1 square meter (N/m^2).
Sound Pressure Level	The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals in air). Sound pressure level is the quantity that is directly measured by a sound level meter.

The decibel is the preferred unit for measuring sound since it accounts for these variations using a relative scale adjusted to the human range for hearing (referred to as the A-weighted decibel or dBA). The A-weighted decibel is a method of sound measurement which assigns weighted values to selected frequency bands in an attempt to reflect how the human ear responds to sound. The range of human hearing is from 0 dBA (the threshold of hearing) to about 140 dBA which is the threshold for pain. Examples of noise and their A-weighted decibel levels are shown in Figure 3-1.

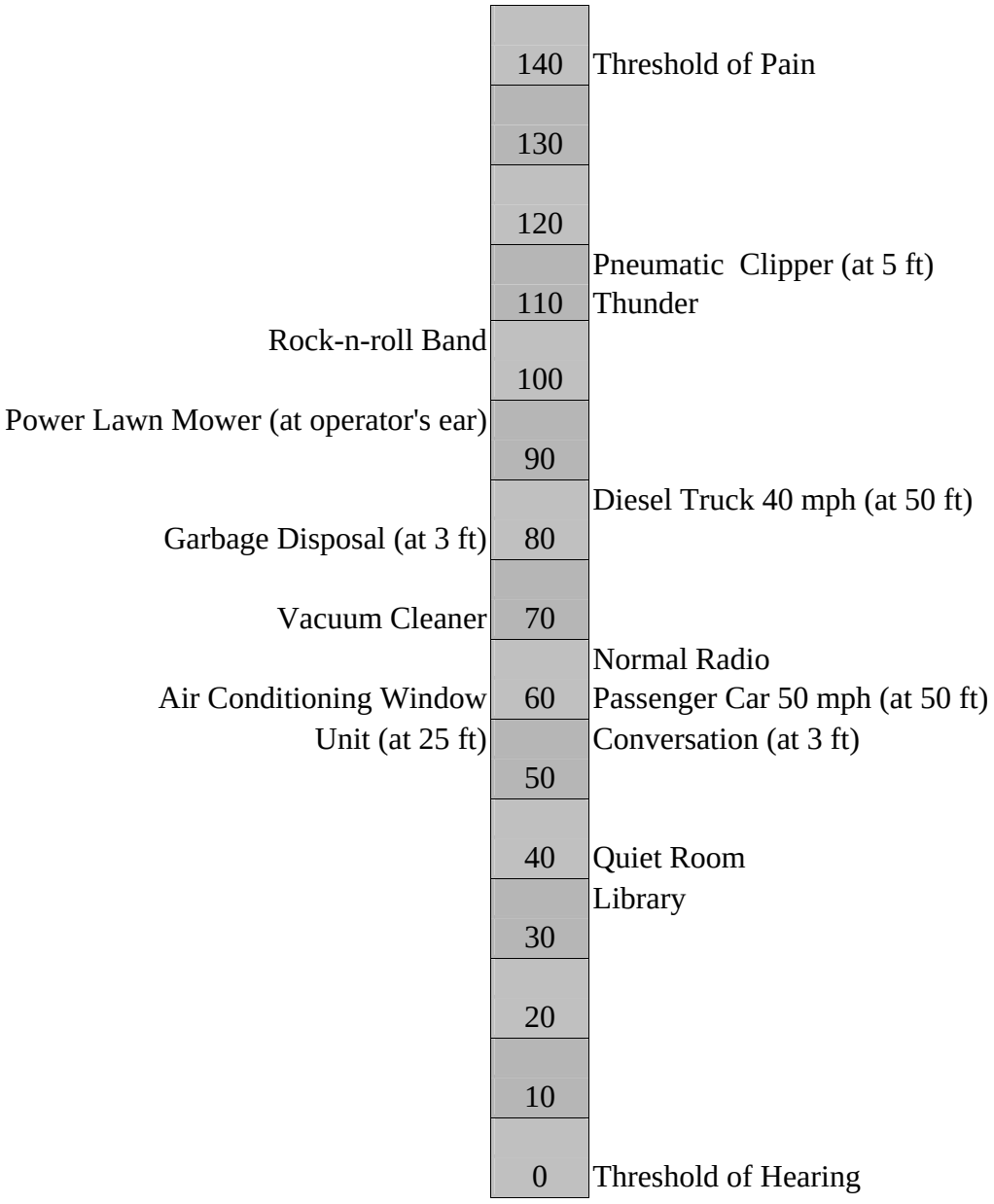
In addition to the actual instantaneous measurements of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. To analyze the overall noise levels in an area, noise events are combined for an instantaneous value or averaged over a specific time period. The time-weighted measure is referred to as equivalent sound level and represented by energy equivalent sound level (L_{eq}). The percentage of time that a given sound level is exceeded also can be designated as L_{10}, L_{50}, L_{90}, etc. The subscript notes the percentage of time that the noise level was exceeded during the measurement period. Namely, an L_{10} indicates the sound level is exceeded 10 percent of the time and is generally taken to be indicative of the highest noise levels experienced at the site. The L_{90} is that level exceeded 90 percent of the time and this level is often called the base level of noise at a location. The L_{50} sound (that level exceeded 50 percent of the time) is frequently used in noise standards and ordinances.

The sound pressure level is measured on a logarithmic scale with the 0 dBA level based on the lowest detectable sound pressure level that people can perceive. Decibels cannot be added arithmetically, but rather are added on a logarithmic basis. A doubling of sound energy is equivalent to an increase of three dBA. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged twice as loud. In general, a three to five dBA change in community noise levels starts to become noticeable, while one - two dBA changes are generally not perceived (Los Angeles, 1998).

The State Department of Aeronautics and the California Commission of Housing and Community Development have adopted the Community Noise Exposure Levels (CNEL) to measure and regulate noise sources within communities. The CNEL is the adjusted noise exposure level for a 24-hour day and accounts for noise source, distance, duration, single event occurrence frequency, and time of day. The CNEL considers a weighted average noise level for the evening hours, from 7:00 p.m. to 10:00 p.m., increased by five dBA (i.e., an additional five dBA is added to all actual noise measurements), and the late evening and morning hour noise levels from 10:00 p.m. to 7:00 a.m., increased by ten dBA (an additional ten dBA is added to all actual noise measurements). The daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value. Using this formula, the CNEL weighted average noise level weights noise measurements taken in the evening and nighttime hours more heavily than noise during the daytime. The adjustment accounts for the lower tolerance of people to noise during the evening and nighttime period relative to the daytime period.

FIGURE 3-1

GENERAL NOISE SOURCES AND THEIR SOUND PRESSURE LEVELS



Sources: Industrial Noise Manual, 3rd Edition, AIHA, 1975; City of Long Beach, 1975

3.3.2 REFINERY EXISTING AMBIENT NOISE LEVELS

Land use in the vicinity of the Refinery is generally designated commercial and residential to the north; industrial, open, and public land to the east; residential to the south; and industrial to the west. The ambient noise environment in the project vicinity is composed of the contributions from equipment and operations within these commercial and industrial areas, and from the traffic on roadways along or near each of the Refinery boundaries (El Segundo Boulevard, Sepulveda Boulevard, Rosecrans Avenue, and Vista Del Mar Avenue). Vehicular traffic is heavy on Sepulveda Boulevard and Rosecrans Avenue, which border the Refinery to the east and south, respectively, and dominates the local noise environment.

The Union Pacific and Burlington Northern Santa Fe railroads both operate daily to the Refinery and to other nearby industries. For Chevron, switching operations are located within the confines of the Refinery. Railroads in El Segundo do not pass through residential areas, so that rail traffic does not appear to contribute significantly to the existing community noise environment. Aircraft noise associated with the LAX affects the northwestern portion of the City of El Segundo.

The nearest sensitive noise receptors to the Refinery are residences in the City of Manhattan Beach, approximately 200 to 400 feet south of the Refinery along Rosecrans Avenue and residents near the southwest corner of the Refinery. The areas north, east and west of the Refinery are predominately commercial land uses.

A noise survey was performed on February 14 through February 18, 2012 to determine the existing ambient noise levels in the vicinity of the Refinery. The noise monitoring locations are summarized in Table 3-7 and shown on Figure 3-2. Noise monitoring stations were limited to the closest residential areas adjacent to the Refinery and near the Delayed Coking Unit (where the new coke drums are proposed to be installed).

TABLE 3-7

Existing Ambient Noise Survey Locations

Location[(1)]	Description
1	Located on the south-west berm, adjacent to Rosecrans Ave., close to Chevron Gate 22.
2	Located on the western property line at Crest Drive and Shell Street in Manhattan Beach.
3	Located on the south-east side of the Refinery, adjacent to Rosecrans Ave. at Maple Avenue.

(1) Locations identified in the noise survey are shown in Figure 3-2.

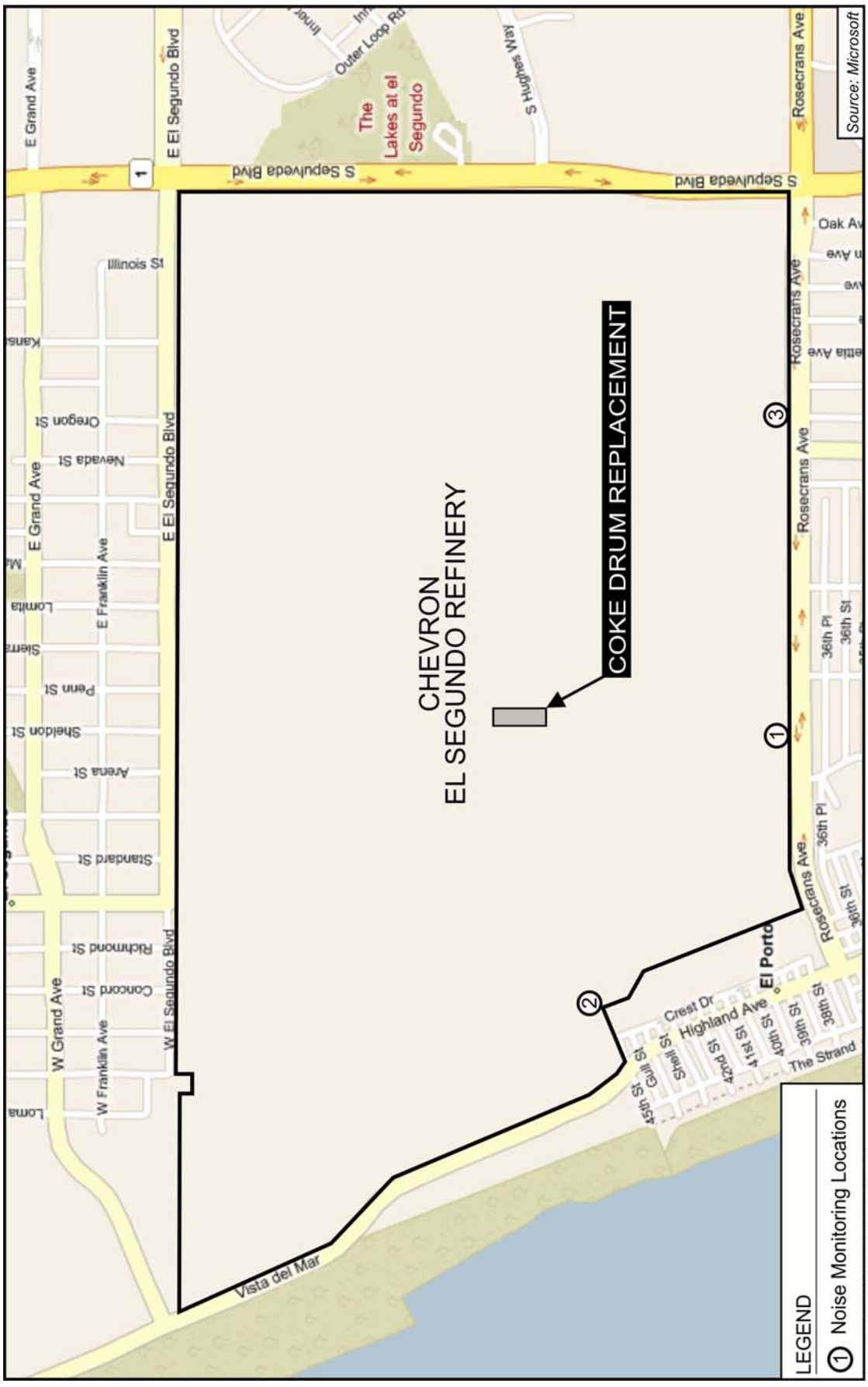


Figure 3-2

Project No. 2706
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All noise monitors used during the environmental noise survey meet the American National Standards Institute (ANSI) S1.4, 1983 specification for Type I (precision) sound level meters. Each monitor is calibrated on an annual basis in accordance with the National Institute of Standards Technology. The results of the noise survey are summarized in Table 3-8. Further details on noise monitoring activities are provided in Appendix C.

TABLE 3-8

Existing Ambient Noise Levels Near the Refinery

Date	Noise Levels at Each Monitoring Station (CNEL in dBA)		
	1	2	3
2/14/12	62.1	58.5	67.6
2/15/12	64.7	61.4	68.6
2/16/12	64.6	62.0	68.4
2/17/12	63.6	59.0	68.2
2/18/12	62.9	58.5	67.4
Average	63.6	59.9	68.0
Maximum	64.7	62.0	68.6
Minimum	62.1	58.5	67.4

See Appendix C for details.

Based on the noise survey, the ambient property line background noise level CNEL ranges between about 60 dBA and 68 dBA. The lowest noise levels are found on the west side of the Refinery adjacent to the residential areas along Crest Drive (noise monitoring location 2). The highest noise levels are found south of the Refinery at the residential area adjacent to Rosecrans Boulevard at Maple Avenue (noise monitoring location 3). The existing CNEL in the residential areas are in the "normally acceptable" to "conditionally acceptable" range for residential land use categories (see the Regulatory Setting for a further discussion).

3.3.3 EXISTING AMBIENT NOISE LEVELS ALONG COKE DRUM TRANSPORT ROUTE

In addition to ambient noise readings near the Refinery, a noise survey was also performed along the proposed coke drum transportation route. Coke drum transport commences in King Harbor where the each coke drum will be offloaded from a barge during the day prior to transport to the refinery during the night. Coke drum offloading operations would be considered construction activities, which are allowed to occur between 7:00 a.m. and 6:00 p.m. without restriction in compliance with the Redondo Beach Noise Ordinance (see Section 3.3.4.4). Therefore, the noise survey was conducted in the nighttime in order to determine ambient noise readings during the timeframe when the coke drums would be transported. Noise monitoring was conducted at 16 locations

along the proposed transport route. The noise monitoring locations are summarized in Table 3-9 and shown on Figure 3-3. The L_{eq} levels represent the average noise levels during the monitoring period and the L_{max} levels represent the maximum noise levels measured during the monitoring period.

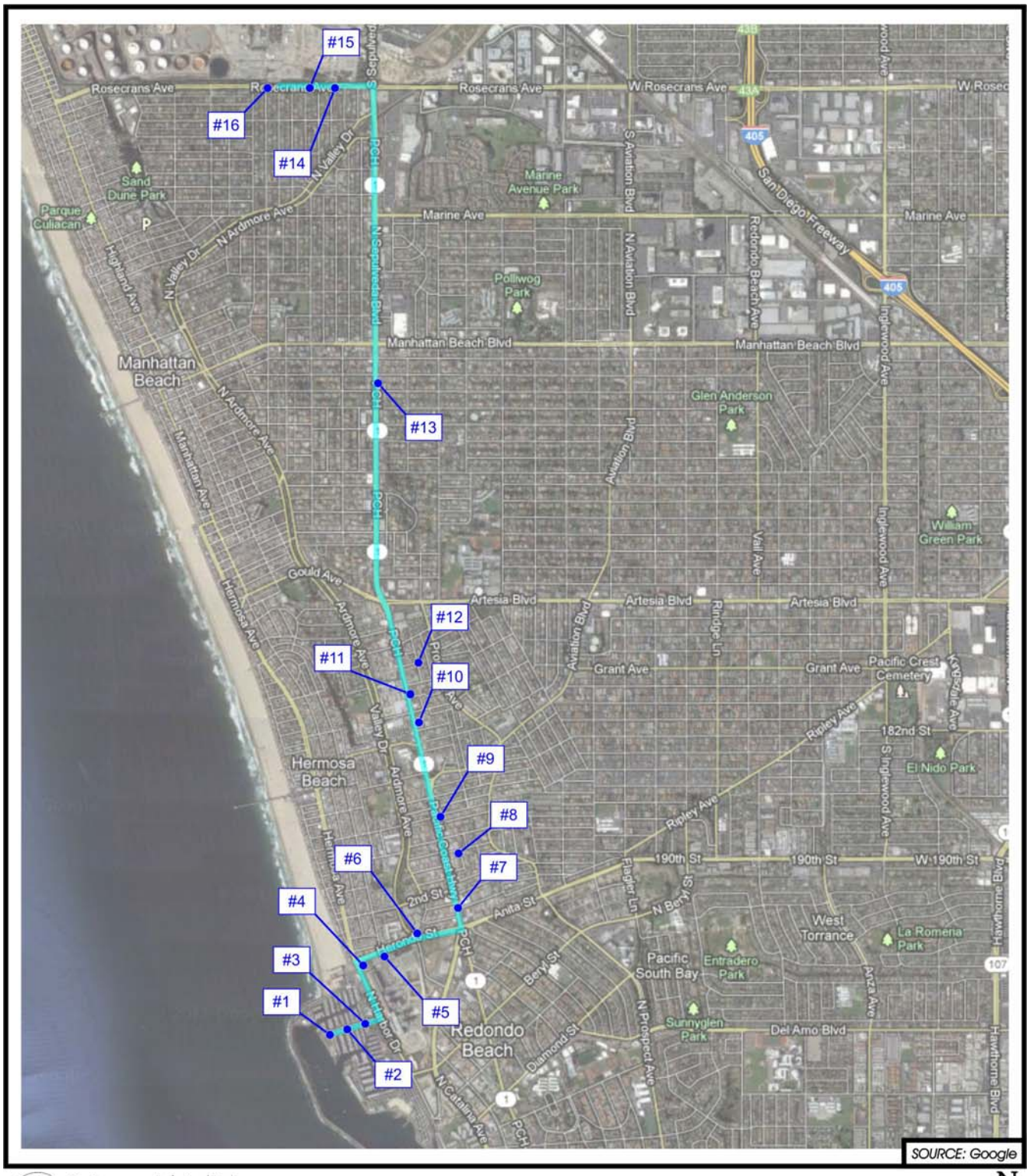
TABLE 3-9

Ambient Existing Noise Levels Along Coke Transport Route

Monitoring Station No.	Location	Noise Levels (dBA)	
		L_{eq}	L_{max}
1	West end of Marina Way	46.4	58.3
2	Center of Marina Way	46.2	54.5
3	Harbor area guard shack	47.0	63.5
4	Corner of Harbor Dr./Herondo St.	53.8	70.3
5	South side of Herondo St./Monterey Blvd.	59.3	75.1
6	501 Herondo St./Valley Dr.	49.2	59.3
7	NE Corner of Pacific Coast Hwy./1st St.	65.6	77.0
8	SW Corner of 5th Street/Ocean View Ave.	50.3	61.8
9	Pacific Coast Hwy/8th St.	60.3	72.7
10	Pacific Coast Hwy/Hampton Inn Driveway, between 15th and 16th Streets	63.4	75.5
11	1707 Pacific Coast Hwy, between 17th and 18th Street	65.3	77.7
12	2006 Rhodes St. at 20th Street (1 block east of Pacific Coast Hwy.)	44.5	55.5
13	Sepulveda Blvd. Between 9th and 10th Street	60.5	75.8
14	Rosecrans Ave./Pine Ave.	56.1	63.7
15	Rosecrans Ave./Poinsettia Ave.	57.3	65.2
16	SE Corner of Rosecrans Ave. and Pacific Ave.	57.9	64.4

L_{eq} = The average A-weighted noise level during the measurement period.
L_{max} = The maximum noise levels during the measurement period.
See Appendix C for details.

The land uses along the route vary, but generally consist of commercial and residential land uses. The nighttime noise levels along the route also vary depending on their location with respect to heavy traffic areas. The marina does not have a substantial amount of traffic so that noise levels are relatively quiet with average nighttime noise readings less than 50 dB and peak nighttime noise levels less than 65 dB (Locations 1-3). The nighttime noise levels are highest along Pacific Coast Highway/Sepulveda Boulevard where traffic is common throughout the night, with average nighttime noise levels between about 60 and 65 dBA (Locations 7, 9-11, and 13), and peak nighttime noise levels between 74 and 78 dBA. The higher noise readings generally represent the noise levels from trucks or other loud vehicles.



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NOISE MONITORING LOCATIONS
ALONG PROPOSED COKE DRUM TRANSPORT ROUTE
Chevron Products Company
El Segundo Refinery

Project No. 2706

Figure 3-3

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Finally, several monitoring locations were located about one block away from Pacific Coast Highway (monitoring locations 8 and 12). The average noise at locations 8 and 12 were between 44 and 50 dBA (maximum noise levels were between 55 and 62 dBA), indicating that noise from traffic along Pacific Coast Highway tends to dissipate fairly quickly.

3.3.4 REGULATORY BACKGROUND

The Refinery is located within the City of El Segundo, therefore, the noise guidelines and ordinances that are applicable to the Refinery are those adopted by the City of El Segundo (see Table 3-10). In addition, the six coke drums will be delivered to the Port of Los Angeles/Long Beach. The coke drums will be transported individually (one per night) from the Port of Los Angeles/Long Beach to King Harbor via barge. From King Harbor, the coke drums will be transported individually via transport carrier from King Harbor in Redondo Beach through the cities of Hermosa Beach and Manhattan Beach to the Refinery in El Segundo. It is expected that each coke drum will leave King Harbor in the evening or nighttime hours (after 8 p.m.) and be transported along the 4.6-mile route during the nighttime, reaching the Refinery in the early morning hours (before about 5 a.m.). Noise guidelines for the cities along the transportation route are also included in Table 3-10. In addition, most community local noise elements contain land use compatibility standards required by the State of California. Figure 3-4 shows state land use categories and the recommended noise levels associated with each (State of California, 2003).

3.3.4.1 City of El Segundo

The Refinery is located within the City of El Segundo. El Segundo's Municipal Code 7-2-4 (El Segundo, 1996) limits noise based on increases to the ambient sound level. El Segundo limits are specified for two zone types: residential and commercial/industrial. The properties adjacent to the Refinery in the City of El Segundo are a mix of commercial and industrial, with residential areas beyond the commercial and industrial areas. As summarized in Table 3-9, noise increases are limited in residential zones to five dBA above ambient (existing) sound level and eight dBA above ambient for commercial or industrial zones during both construction and operation.

As specified in 7-2-10D of the Municipal Code, construction noise may be exempted from having to meet 7-2-4 requirements if it does not cause a disturbance at night (6:00 p.m. to 7:00 a.m.) or on Sundays or Federal holidays, and is less than 65 dBA at the receptor. However, since portions of the construction for the proposed Project may occur at night and on Sundays (during Refinery turnaround), it will not be exempt from the requirements of Section 7-2-4 of El Segundo's Municipal Code.

TABLE 3-10

Local Noise Guidelines and Ordinances

City	Construction Limit	Operations Limit (exterior dBA unless noted)
El Segundo	Residential[1]: L_{eq}= 5 dBA over ambient noise level; Commercial/Industrial[1]: L_{eq}= 8 dBA over ambient noise level; OR Exempt if: Construction L_{50}= 65 dBA, and No construction noise occurs: 6:00 p.m. to 7:00 a.m., or Sundays and holidays	Residential[1]: L_{eq}= 5 dBA over ambient noise level; Commercial/Industrial[1]: L_{eq}= 8 dBA over ambient noise level
Manhattan Beach[2]	Construction allowed: Monday through Friday 7:30 a.m. to 6:00 p.m., Saturday 9:00 a.m. to 6:00 p.m.	Residential[1,3,4]: L_{eq}= 55 dBA (7 a.m.. to 10 p.m.) L_{eq}= 50 dBA (10 p.m. to 7 a.m.) Commercial[1,3,4]: Residential limits + 15 dBA Industrial[1,3,4]: Residential limits + 20 dBA
Hermosa Beach	Construction allowed: Monday through Friday 8:00 a.m. to 6:00 p.m., Saturday 9:00 a.m. to 5:00 p.m.	Residential: (R-1) = <45 dBA; (R-2) = 50 dBA; and (R-3) = 55 dBA Commercial: (C-1) = <55; (C-2/C-3) = < 60 dBA
Redondo Beach	Construction allowed: Monday through Friday 7:00 a.m. to 6:00 p.m., Saturday 9:00 a.m. to 5:00 p.m.	Residential: (Low Density) 45 dBA (10:00 p.m. to 7:00 a.m.) and 50 dBA (7:00 a.m. to 10:00 p.m.); (Medium Density) 50 dBA (10:00 p.m. to 7:00 a.m.) and 55 dBA (7:00 a.m. to 10:00 p.m.); (High Density) 55 dBA (10:00 p.m. to 7:00 a.m.) and 60 dBA (7:00 a.m. to 10:00 p.m.) Commercial: 60 dBA (10:00 p.m. to 7:00 a.m.) and 65 dBA (7:00 a.m. to 10:00 p.m.) Industrial: 60 dBA (10:00 p.m. to 7:00 a.m.) and 65 dBA (7:00 a.m. to 10:00 p.m.)

[1] Additional limits: $L_{50} = L_{eq}$; $L_{25} = L_{50} + 5$ dBA; $L_{8.3} = L_{50} + 10$ dBA; $L_{1.7} = L_{50} + 15$ dBA; $L_{<1.7}$ or $L_{max} = L_{50} + 20$ dBA

[2] The Refinery is located within the City of El Segundo and subject to the El Segundo Noise Ordinance. The Manhattan Beach, Hermosa Beach, and Redondo Beach Noise Ordinances are provided to account for transport of coke drums from King Harbor to the Refinery.

[3] If ambient noise exceeds limit then limit is increased to ambient noise

[4] Tonal or impulsive type noise also reduces limit by 5 dBA

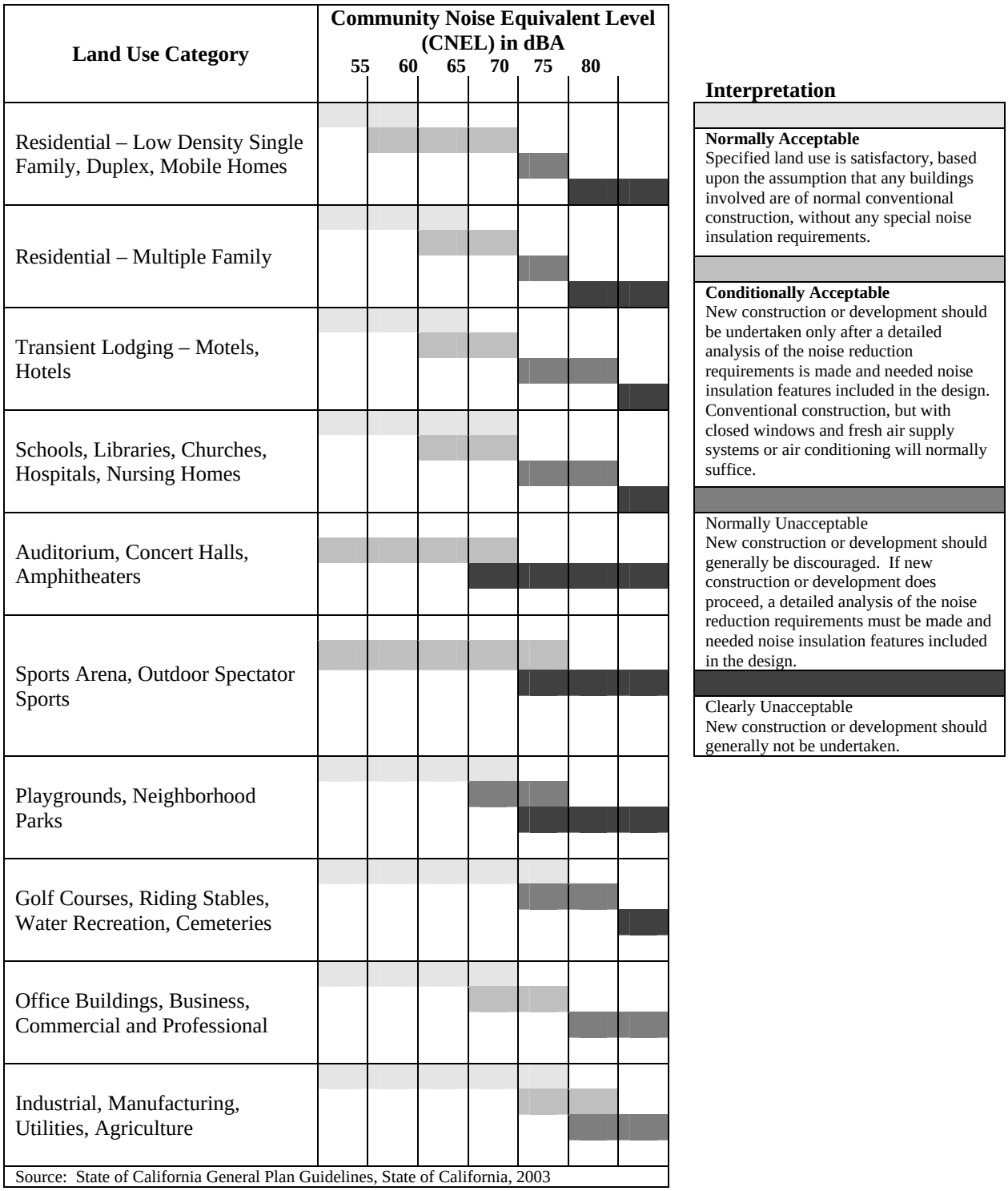
L_x, - A-weighted sound level, L, that may not be exceeded more than "x" percent of any one hour time period

L_{eq} – Exterior equivalent sound level

L_{max} – Maximum A-weighted sound level

FIGURE 3-4

Land Use Compatibility for Community Noise Environments



Source: State of California General Plan Guidelines, State of California, 2003

3.3.4.2 City of Manhattan Beach

The City of Manhattan Beach is located adjacent to the southern boundary of the Refinery. Section 5.48.160 of Chapter 5.48 (Noise Regulations) of the Manhattan Beach Municipal Codes (Manhattan Beach, 1999) limits operational noise to specific statistical sound levels, L_x, where "L" is the A-weighted sound level that may not be exceeded over "x" percent of the measured time period. Specifically, the Manhattan Beach noise ordinance limits operational noise to a 60-minute L_{50}, L_{25}, $L_{8.3}$, $L_{1.7}$, and L_{max}. The Manhattan Beach noise ordinance also specifies limits for the exterior L_{eq}. The properties in the vicinity of the Refinery in the City of Manhattan Beach are primarily residential, with commercial development farther away from the Refinery. Noise limits for these zones are summarized in Table 3-10.

Section 5.48.060 limits construction activity within the city to Monday through Friday from 7:30 a.m. to 6:00 p.m. and Saturday from 9:00 a.m. to 6:00 p.m. but does not impose an actual noise limit during those times. No construction noise is permitted on Sunday. Under Section 5.48.250, construction activities are exempted from the other provisions of the noise ordinances. Thus, the City of Manhattan Beach Municipal Codes do not specify noise limits specifically for construction noise.

3.3.4.3 City of Hermosa Beach

The City of Hermosa Beach is located adjacent to the southern boundary of the City of Manhattan Beach and includes a portion of the route to be taken while moving the six new coke drums from King Harbor to the Refinery. The Noise Element of the City of Hermosa Beach General Plan is in Section 9 (Noise) and designates the noise thresholds permitted within the city (Hermosa Beach, 1970). Section 8.24.050 (Construction) of Chapter 8.24 (Noise Control) of the City of Hermosa Beach Municipal Code specifies restrictions on noise regarding construction (see Table 3-10).

3.3.4.4 City of Redondo Beach

The City of Redondo Beach is located adjacent to the southern boundary of the City of Hermosa Beach and includes a portion of the route to be taken while moving the six new coke drums from King Harbor to the Refinery. Title 4 (Public Welfare, Morals, and Conduct) of the City of Redondo Beach Municipal Code designates Chapter 24 as Noise Regulation. Section 4-24.301 (Maximum permissible sound levels by land use categories) and section 4-24.503 (Construction noise) are applicable and the requirements of these portions of the Municipal Code (Redondo Beach, 1991) are identified in Table 3-10. Construction activities are limited in the city to Monday through Friday from 7:00 a.m. to 6:00 p.m. and Saturday from 9:00 a.m. to 5:00 p.m., but does not impose an actual limit during those times.

3.4 TRANSPORTATION AND TRAFFIC

The construction and operation of the proposed Project would occur entirely within the confines of the existing affected facility. Additionally, transport of the six new coke drums associated with the proposed Project is expected to occur at night on public roadways between King Harbor and the Refinery traversing the cities of Redondo Beach, Hermosa Beach, and Manhattan Beach. The existing transportation and traffic conditions adjacent to the Refinery and the proposed transport route that may be adversely affected are discussed below.

3.4.1 REGIONAL CIRCULATION

The Refinery is located at 324 West El Segundo Boulevard in the City of El Segundo. Regional transportation facilities in the vicinity of the Refinery provide accessibility to the entire southern California region. The San Diego Freeway (I-405) lies approximately 1.25 miles east of the Refinery and provides ramp connections at El Segundo Boulevard and Rosecrans Avenue. In addition, the I-105 freeway, and its related rail transit system are located approximately one mile north of the Refinery. Freeway interchanges to the regional arterial highway network provide access at regular intervals. El Segundo Boulevard, Sepulveda Boulevard, and Rosecrans Avenue are key arterials servicing the area near the Refinery.

The I-405 freeway is a north-south freeway facility located east of the El Segundo City boundary. This freeway provides four travel lanes and one High-Occupancy Vehicle (HOV) lane in each direction between the LAX and the Harbor Freeway (I-110). The I-405 freeway supports a heavy travel demand between residential areas and employment centers in the San Fernando Valley, West Los Angeles, LAX, and into Orange County. In addition to supporting the daily commute trips, heavy evening and weekend travel demand is caused by travel to and out of Los Angeles County destinations to the north and south. Surface street ramp access to the I-405 freeway is available from El Segundo Boulevard, Rosecrans Avenue and La Cienega Boulevard. Daily traffic volumes on the I-405 freeway along the segment bordering El Segundo, are approximately 280,000 vehicles per day (VPD) (El Segundo, 2004).

The I-105 freeway is an east-west freeway located above and adjacent to Imperial Highway, at the northern boundary of the City of El Segundo. This 17-mile eight-lane facility, including an HOV lane traveling in each direction, connects LAX on the west, to the San Gabriel River Freeway (I-605) and the City of Norwalk on the east. There is access to the I-105 freeway from the I-405 freeway or directly to/from Nash Street, Douglas Street, Atwood Way, or Imperial Highway in the City of El Segundo. Daily traffic volumes on the I-105 freeway diminish towards its western terminus near Sepulveda Boulevard. Approximately 120,000 VPD travel this freeway between the I-405 freeway and Douglas Street, with volumes dropping to less than 90,000 VPD at Sepulveda Boulevard, and finally to less than 25,000 VPD west of Sepulveda Boulevard (El Segundo, 2004).

3.4.2 LOCAL CIRCULATION

The Refinery occupies a rectangular shaped parcel of land and is bordered by El Segundo Boulevard to the north, Sepulveda Boulevard to the east, Rosecrans Avenue to the south and Vista Del Mar to the west (see Figure 3-5). Access to the Refinery is primarily from El Segundo Boulevard.

The City of El Segundo is served by an existing network of roadways. The existing street network is essentially a grid system of north/south and east/west roadways. The primary north/south roadways are: Aviation Boulevard, Douglas Street, Nash Street, Sepulveda Boulevard, Center Street, Main Street, and Vista Del Mar. The primary east/west streets are: Imperial Highway, Maple Avenue, Mariposa Avenue, Grand Avenue, El Segundo Boulevard, and Rosecrans Avenue. The City's roadway network is essentially established, with little or no opportunity to modify its basic configuration because of the developed pattern of existing land uses in the City (El Segundo, 2004).

El Segundo Boulevard, Sepulveda Boulevard, and Rosecrans Avenue are major highways, which function to connect traffic from collector streets to the major freeway systems as well as to provide access to adjacent land uses. Major highways move large volumes of automobiles, trucks and buses, and link principal elements within the City to other adjacent regions.

The area surrounding the Refinery is accessible via public transit from most South Bay Communities. The Los Angeles County Metropolitan Transportation Authority (MTA) provides several bus routes in the project vicinity. A number of MTA bus routes are routed throughout the city. Additionally, the Metro Green Line operates through the project area, linking the Refinery area with the regional rail system. The Los Angeles Department of Transportation (LADOT), the City of Torrance Municipal Area Express (MAX), and the Torrance Transit also provide public transit services and commuter routes to and from the city (El Segundo, 2004a).

In addition to the vehicular system, the area surrounding the Refinery is serviced by a network of railroad facilities. This system provides an alternative mode of transportation for the distribution of goods and materials. The railroad network includes an extensive system of private railroads and several publicly-owned freight lines. The southern California Regional Rail Authority operates commuter rail systems in the Los Angeles area. Additionally, Amtrak provides inter-city service, principally between San Diego and San Luis Obispo. The Los Angeles area is served by two main-line freight railroads, the Burlington Northern Santa Fe and the Union Pacific Railroad. These freight railroads connect southern California with other U.S. regions, Mexico, and Canada via their connections with other railroads.

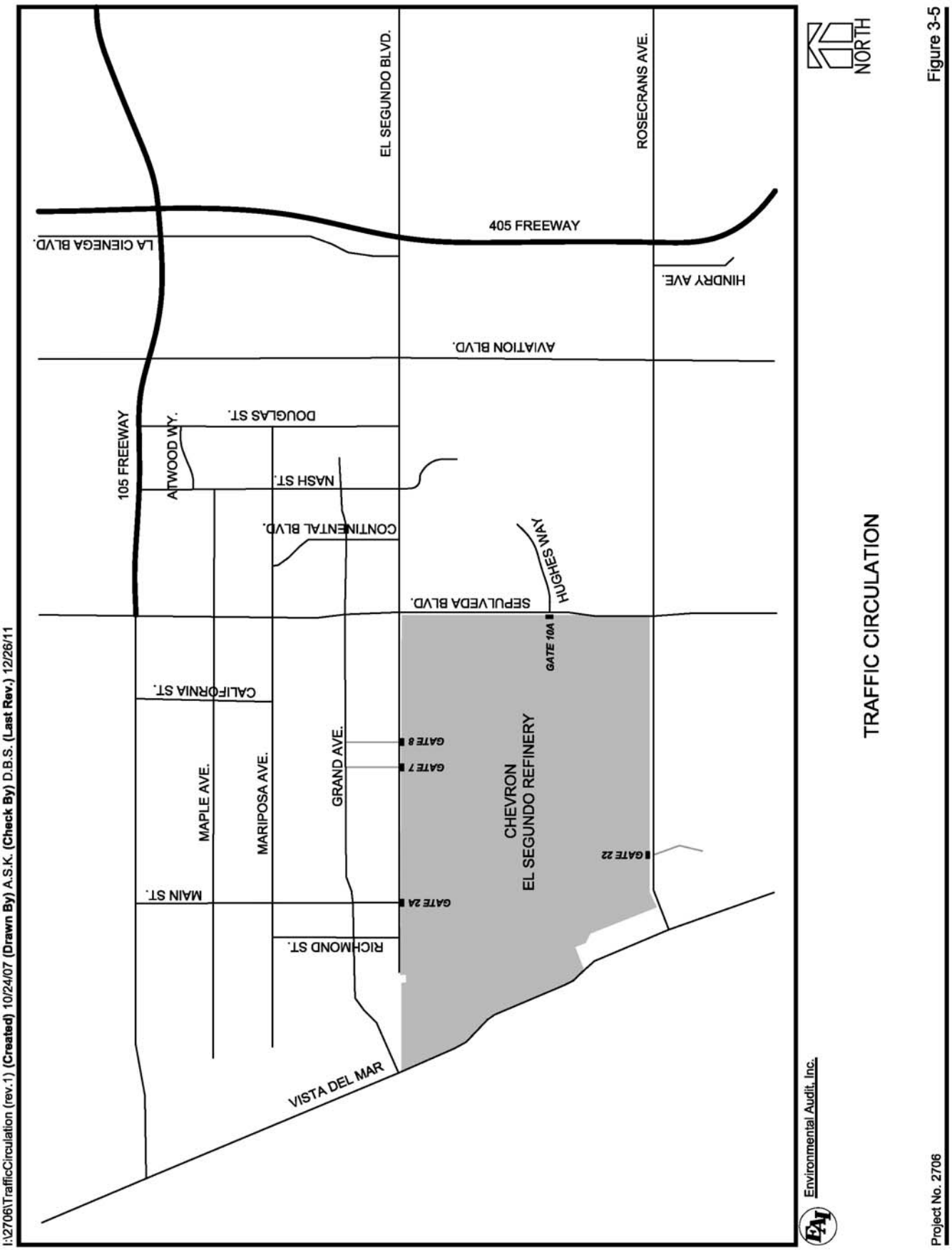


Figure 3-5

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3.4.3 EXISTING TRAFFIC CONDITIONS

The Los Angeles County Congestion Management Program (CMP) traffic study guidelines direct the usage of the intersection capacity utilization methodology from which a volume to capacity ratio is calculated to determine the intersection level of service. The operating characteristics of an intersection are defined in terms of the level of service (LOS), which is a measurement describing the quality of traffic flow based on variations in traffic volume and other variables such as the number of signal phases relative to the traffic flow capacity the intersection was designed to accommodate (see Table 3-11).

Intersections rated at LOS A to C operate well. Level C normally is taken as the design level in urban areas outside a regional core. Level D typically is the level for which a metropolitan area street system is designed. Level E represents volumes at or near the capacity of the highway which will result in possible stoppages of momentary duration and fairly unstable traffic flow. Level F occurs when a facility is overloaded and is characterized by stop-and-go (forced flow) traffic with stoppages of long duration.

TABLE 3-11
Intersection Level of Service Description

Volume to Capacity Ratio	Level of Service
0.00 – 0.60	A
>0.60 – 0.70	B
>0.70 – 0.80	C
>0.80 – 0.90	D
>0.90 – 1.00	E
>1.00	F

The existing peak hour LOS analyses were developed for intersections in the vicinity of the Refinery (see Table 3-12) that will be used by construction workers. The LOS analysis indicates that all intersections are operating at LOS A.

The six replacement coke drums will be fabricated overseas and shipped to the Refinery. The completed drums would be shipped in their entirety to the Port of Los Angeles/Port of Long Beach. Once the ships carrying the fabricated coke drums have arrived at the Port, the current projected route calls for transporting the coke drums from either the Port of Los Angeles or the Port of Long Beach via barge to King Harbor in the City of Redondo Beach, and, then by public roads following the approved and appropriately permitted route (see Figure 3-6). The coke drums would be off-loaded from the barges and transported via transport carrier on Marina Way. From Marina Way, the drums will move north onto North Harbor Drive, east onto Herondo Street, and north on to Pacific Coast Highway (which turns into Sepulveda Boulevard) until reaching Rosecrans

TABLE 3-12

Existing Peak Construction
Traffic LOS Analysis

Intersection	Baseline Conditions	
	P.M. Peak Hour	
	LOS	Volume/Capacity Ratio
1. Main St./Imperial Hwy	A	0.54
2. Vista Del Mar/Imperial Hwy	A	0.53
3. Vista Del Mar/Grant Ave.	A	0.52
4. Main St./Imperial Ave.	A	0.55
5. Main St./Grand Ave.	A	0.46
6. Main St./Holly Ave.	A	0.30
7. Main St./Mariposa Ave.	A	0.48

Details of the intersection calculations are included in the Appendix D.

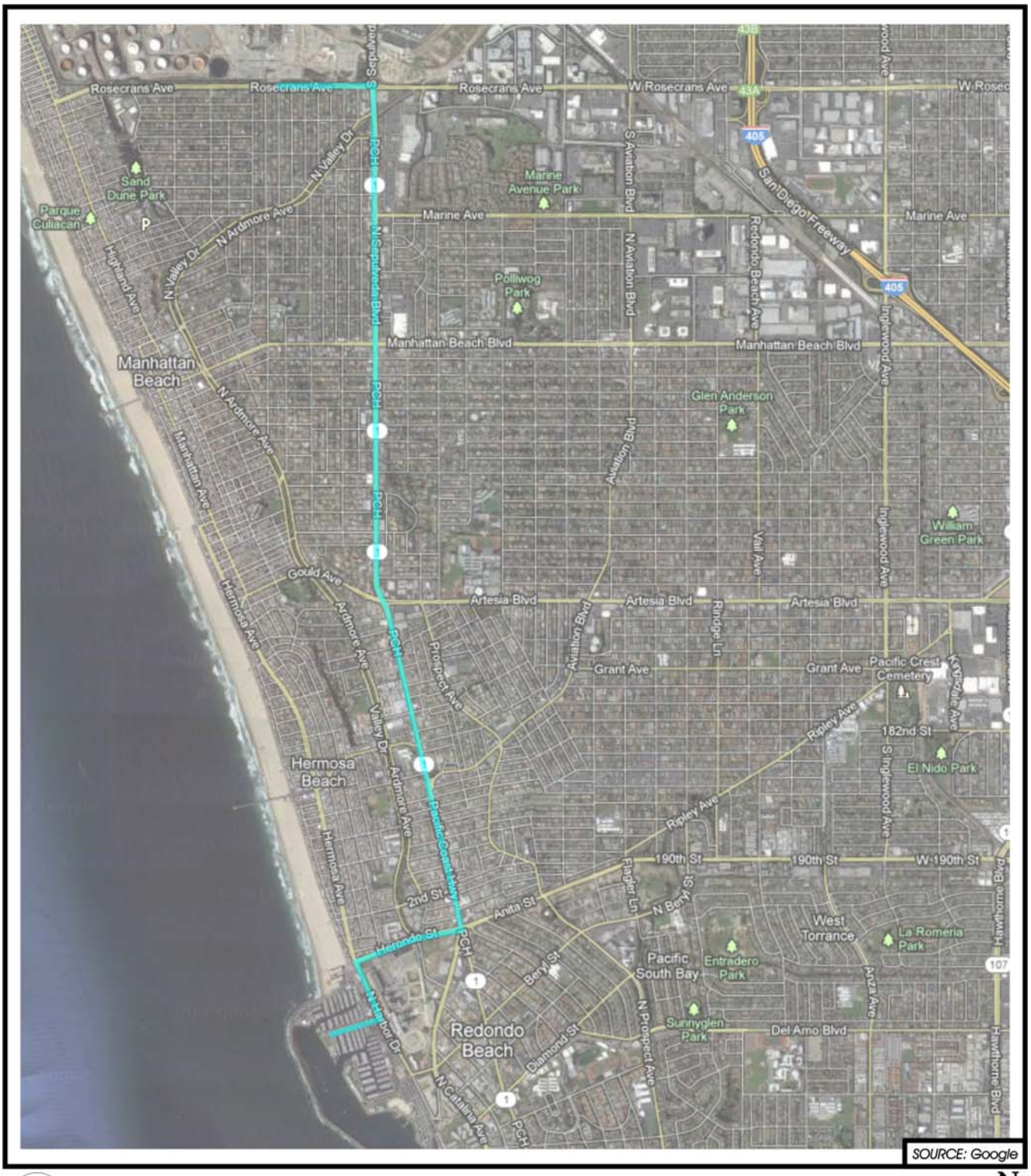
Avenue. The coke drums will then be transported west onto Rosecrans Avenue and then turn north into the Refinery at Gate 21.

The following is a description of the streets in the vicinity of the Refinery and the streets along the proposed transportation route for the coke drums to travel from King Harbor to the Refinery.

Marina Way: Marina Way is a one-lane looped roadway that directly serves the marina, connecting to Harbor Drive at a signalized intersection. The roadway has perpendicular parking on both the north and south sides with perpendicular and diagonal parking in the center separating the two sides of the looped roadway.

Harbor Drive: Harbor Drive is a two-lane north/south collector between Herondo Street and Beryl Street. Metered on-street parking and bike lanes are provided.

Herondo Street: Herondo Street is an east/west secondary arterial that runs between Harbor Drive and Pacific Coast Highway, with two lanes in each direction. Secondary arterials connect traffic from collectors to the major freeway system and handle intra-city trips. About 11,000 average daily trips occur on Herondo Street (Redondo Beach, 2008) west of Pacific Coast Highway. Herondo Street has a raised median and left-turn pockets at most intersections. On-street parking is generally permitted on both sides of Herondo Street.



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PROPOSED COKE DRUM TRANSPORT ROUTE
Chevron Products Company
El Segundo Refinery

Project No. 2706

Figure 3-6

N:\2706\3-6, Proposed Route Map.cdr

Pacific Coast Highway/Sepulveda Boulevard: Pacific Coast Highway/Sepulveda Boulevard (State Route 1) is a major north-south highway and is the key north/south transportation facility in the South Bay region, providing continuous service from the San Fernando Valley through Orange County. Major highways or arterials function to connect traffic collectors to the major freeway system as well as provide access to adjacent land uses and typical handle 40,000 to 75,000 vehicles per day. In Redondo Beach, the street is designated as Pacific Coast Highway and is a four-lane (two lanes in each direction), north/south major arterial. Left-turn lanes are provided at major intersections and travel speeds are relatively low through commercial areas. About 40,000 average daily trips occur on Pacific Coast Highway in the vicinity of King Harbor (Redondo Beach, 2008). Pacific Coast Highway is a designated truck route through the cities Redondo Beach, Hermosa Beach, Manhattan Beach, and El Segundo.

In Hermosa Beach, Pacific Coast Highway becomes Sepulveda Boulevard where it provides three through lanes in each direction and continues into Manhattan Beach. Sepulveda Boulevard is also a north-south major arterial. This roadway provides four travel lanes in each direction in the vicinity of LAX, but narrows to three lanes in each direction north of LAX and south of the Rosecrans Avenue. Left-turn channelization is provided at all major intersections. Through the study area, Sepulveda Boulevard is approximately 104 feet wide, including a 16-foot wide median and "No Parking" prohibitions are posted throughout the project vicinity. At the intersection of Sepulveda Boulevard and Rosecrans Avenue, dual left-turn lanes are currently provided in all directions.

Rosecrans Avenue: Rosecrans Avenue is an east-west continuous major arterial which creates the boundary between the Cities of El Segundo and Manhattan Beach. This roadway generally provides three through lanes in each direction with additional turn lanes provided at most intersections. Dual left-turn lanes are provided at most major intersections. Surface street access to the I-405 freeway is provided along Rosecrans Avenue approximately two miles east of the Refinery. As a major arterial, this street handles 40,000 to 75,000 vehicles per day. Rosecrans Avenue is a designated truck route.

El Segundo Boulevard: El Segundo Boulevard is an east-west major arterial east of Sepulveda Boulevard and a secondary arterial between Main Street and Sepulveda Boulevard. El Segundo Boulevard is located on the north side of the Refinery and provides access to the main entrance to the Refinery and the Chevron administration offices. The major arterial portion of El Segundo is approximately 90 feet in width, with three travel lanes in each direction and left- and/or right-turn channelization at major intersections. Access to the I-405 freeway is provided along El Segundo Boulevard east of the Refinery. A Metro Green Line station is provided on the south side of El Segundo Boulevard between Nash Street and Douglas Street.

3.4.4 PUBLIC TRANSPORTATION

Beach Cities Transit Route

Beach Cities Route 109 runs from Palos Verdes Boulevard at Via Valencia in Redondo Beach to the LAX City Bus Center in the Westchester neighborhood of Los Angeles. The route utilizes Rosecrans Avenue along the El Segundo/Manhattan Beach border that would be utilized by the transportation route of the Project coke drums. The line runs from 6:00 a.m. to 10:00 p.m.

Los Angeles County MTA Route

Metro Bus Route 232 provides north and southbound service between Long Beach, Torrance, Manhattan Beach, El Segundo, and the LAX City Bus Center. In the project vicinity, Route 232 provides stops along Pacific Coast Highway and Sepulveda Boulevard the length of the proposed coke drum transportation route. Weekday service operates on headways of approximately 10 minutes. Saturday, Sunday, and holiday service operates on approximately 30 minutes headways. Weekday service runs from about 4:00 a.m. to 1:00 a.m.

Metro Bus Route 130 travels between Redondo Beach and Cerritos. The portion of the route potentially affected by the proposed coke drum transportation route is along Harbor Drive between Marina Way and Herondo Street. Weekday service operates at 30 minute to one hour headways from approximately 5:00 a.m. to 10:00 p.m.

Metro Bus Route 126 travels from Manhattan Beach to Inglewood. The route crosses Sepulveda Boulevard at Manhattan Beach Boulevard. Route 126 operates on a limited schedule during the a.m. and p.m. peak hours of travel.

3.4.5 REGULATORY BACKGROUND

The Circulation Element, an Element of the El Segundo General Plan, was most recently revised in 2004. The Circulation Element is a required Element under Government Code Section 65302(b) and addresses the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals and other local public utilities and facilities, all correlated with the Land Use Element of the General Plan. The Circulation Element contains a Master Plan of Streets, as well as a series of policies designed to guide the future evolution of the City's roadway system. The Master Plan of Streets includes all major arterial roadways in the City. As an Element of the General Plan, the Circulation Element is connected to other City planning policies and designations, such as those reflected in the Land Use Element with respect to the planned location, type and density of land uses in the City. The Circulation Element also includes policies that identify intersection improvements to achieve LOS D or better at intersections in the City that include re-striping of lanes and addition of left turn, through and right turn lanes. The lane requirements are set forth in the adopted Circulation Element based upon the

designations of the roadways that comprise the legs of the intersections (e.g., major arterial, secondary arterial, collector, etc.) (El Segundo, 2004).

The County of Los Angeles has developed a CMP. The legislation establishing the requirement for counties to adopt a CMP was adopted in 1992 by the State of California and was last amended in 1997. The CMP is a state-mandated program designed to address urban congestion. The CMP is prepared and adopted by the Los Angeles County MTA. The most recent version of the CMP was adopted by MTA in 2010 (MTA, 2010). The CMP analysis assesses potential impacts on the freeway network and key intersections in the system of surface streets. The CMP includes a system of highways and roadways with minimum LOS standards, transit standards, a trip reduction, and travel demand management element, a program to analyze the impacts of local land use decisions on the regional transportation system, a capital improvement program, and a countywide computer model to evaluate traffic congestion and recommend relief strategies and actions. Proposed projects that have the potential to significantly impact the designated CMP network (mainline freeway segments and principal arterial streets and highways) are required to identify and to mitigate, where feasible and appropriate, their adverse effects on the network. If the LOS standards on CMP-monitored roadways are not maintained, local jurisdictions must prepare a "deficiency plan" which is in conformance with the Countywide CMP plan (El Segundo, 2004). Compliance with CMP requirements ensures a City's eligibility to compete for State gas tax funds for local transportation projects.

There is one CMP-designated arterial highway within the City of El Segundo: Sepulveda Boulevard. CMP intersections are defined as key intersections spread roughly two miles apart. The Sepulveda Boulevard/El Segundo Boulevard intersection is the only CMP-designated intersection in El Segundo (MTA, 2010). One other intersection along the transport route is also identified as a CMP intersection: Pacific Coast Highway at Artesia Boulevard/Gould Avenue in the City of Hermosa Beach (MTA, 2010).

Freeways are controlled-access, high-speed roadways with grade-separated interchanges intended to expedite movement between distant areas in the region. Planning, design, construction, and maintenance of freeways in California are the responsibility of the Caltrans.

CHAPTER 4

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Introduction
Air Quality
Noise
Transportation/Traffic

4.0 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 INTRODUCTION

This chapter assesses the potential environmental impacts of the construction and operation of the Chevron Products Company El Segundo Refinery Coke Drum Reliability Project described in Chapter 2.

Pursuant to the requirements of CEQA, Chapter 4 evaluates those impacts that are considered potentially significant for those environmental areas identified in the NOP/IS (see Appendix A). Specifically, an impact is considered significant under CEQA if it leads to a "substantial, or potentially substantial, adverse change in the environment." Impacts from the proposed project fall within one of the following categories:

Beneficial – Impacts will have a positive effect on the resource.

No impact – There would be no impact to the identified resource as a result of the proposed project.

Adverse but not significant – Some impacts may result from the project; however, they are judged to be insignificant. Impacts are frequently considered insignificant when the changes are minor relative to the size of the available resource base or would not change an existing resource.

Potentially significant but mitigation measures reduce to insignificance – Significant adverse impacts may occur; however, with proper mitigation, the impacts can be reduced to insignificance.

Potentially significant and mitigation measures are not available to reduce to insignificance – Adverse impacts may occur that would be significant even after mitigation measures have been applied to lessen their severity.

4.2 AIR QUALITY

The NOP/IS (see Appendix A) determined that the proposed Project at the Refinery has the potential to generate significant adverse air quality impacts. Project-specific adverse air quality impacts associated with increased emissions of air contaminants (both criteria air pollutants and toxic air contaminants (TACs)) during the construction and operation phases of the proposed Project have been evaluated in this EIR. Impacts to sensitive receptors have also been analyzed in the EIR. Project-specific air quality impacts from the proposed Project at the Refinery and the surrounding areas are provided in this section. Potentially significant adverse cumulative air quality impacts from the proposed Project are analyzed in Chapter 5 of this EIR.

While the proposed Project is expected to emit GHGs, the contribution of GHG emissions from a single project on global climate change cannot be readily measured. Rather, it is the increased accumulation of GHGs from more than one project and many sources in the atmosphere that may result in global climate change. The contribution of GHG emissions from a large number of sources can contribute to climate change, which in turn can cause adverse environmental effects such as increasing temperatures, more wildfires, rising sea levels, etc. Due to the complex physical, chemical, and atmospheric mechanisms involved in global climate change, it is likely impossible to identify the specific impact, if any, to global climate change from one project's incremental increase in global GHG emissions. As such, the project GHG emissions and the resulting significance of potential impacts are more properly assessed on a cumulative basis. Therefore, the analysis of potential impacts from the proposed Project's GHG emissions and significance determination are determined on a cumulative basis in Chapter 5 - Cumulative Impacts.

4.2.1 SIGNIFICANCE CRITERIA

To determine whether or not air quality impacts from the proposed Project are significant, impacts will be evaluated and compared to the significance criteria in Table 4-1. If impacts equal or exceed any of the criteria in Table 4-1, they will be considered significant.

Significance determinations for construction impacts are based on the maximum or peak daily emissions during the construction period, which provides a "worst-case" analysis of the construction emissions. Similarly, significance determinations for operational emissions are based on the maximum or peak daily allowable emissions during the operational phase.

4.2.2 ENVIRONMENTAL IMPACTS

4.2.2.1 Construction Emission Impacts

Regional Impacts

Construction emissions are expected from the following equipment and processes:

- Onsite Construction Equipment (dump trucks, backhoes, graders, etc.);
- Onsite and Offsite Vehicle Emissions, including Delivery Trucks and Worker Vehicles;
- Onsite Fugitive Dust Associated with Site Construction Activities;
- Onsite and Offsite Fugitive Dust Associated with Travel on Unpaved and Paved Roads;

TABLE 4-1

Air Quality Significance Thresholds

Mass Daily Thresholds[a]		
Pollutant	**Construction[b]**	**Operation[c]**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants, Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk $\geq$ 10 in 1 million Chronic and Acute Hazard Index $\geq$ 1.0 (project increment) Cancer Burden $\geq$ 0.5 excess cancer cases (in areas $\geq$ 1 in 1 million)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000MT/yr CO_2eq for industrial facilities	
Ambient Air Quality for Criteria Pollutants[d]		
NO_2 1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of any standard: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)	
PM10 24-hour annual average	10.4 $\mu g/m^3$ (construction)[e] and 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$	
PM2.5 24-hour average	10.4 $\mu g/m^3$ (construction)[e] and 2.5 $\mu g/m^3$ (operation)	
SO_2 1-hour average 24-hour average	0.255 ppm (state) and 0.075 ppm federal – 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 $\mu g/m^3$ (state)	
CO 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of any standard: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Lead 30-day average Rolling 3-month average Quarterly average	1.5 $\mu g/m^3$ (state) 0.15$\mu g/m^3$ (federal) 1.5$\mu g/m^3$ (federal)	

a) Source: SCAQMD CEQA Handbook (SCAQMD, 1993)
b) Construction thresholds apply to both the SCAB and Coachella Valley (Salton Sea and Mojave Desert Air Basin)
c) For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
d) Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
e) Ambient air quality threshold based on SCAQMD Rule 403.

KEY: ppm = parts per million; $\mu g/m^3$ = microgram per cubic meter; lbs/day = pounds per day; MT/yr CO2eq = metric tons per year of CO_2 equivalents, $\geq$ greater than or equal to, > = greater than

- Offsite Ship and Tug Emissions; and,
- Offsite Construction Emissions at King Harbor from Paving.

Construction activities are expected to occur in two locations. Months 1 and 2 of the construction period is expected to occur at King Harbor for road surface improvements and is expected to commence in the fourth quarter of 2012. This two-month construction period includes preparing King Harbor for delivery of the replacement coke drums. The construction activities at the Refinery, expected to last approximately 17 months, are not expected to begin until the first quarter of 2013 with no overlap with the road surface improvements at King Harbor.

As shown in Chapter 2, Figure 2-8, construction activities vary for the various portions of the proposed Project, but construction activities overlap for a number of portions of the proposed Project. Therefore, peak day emission calculations, presented in Appendix B and summarized in Table 4-2, were based on the schedule presented in Figure 2-8. Daily construction emissions are calculated for the peak construction day activities. Peak day emissions are the sum of the highest daily emissions from employee vehicles, fugitive dust sources, construction equipment, and transport activities for the construction period. Peak construction emissions for all pollutants except VOC and CO are expected to occur in Month 4 of the schedule presented in Figure 2-8. Peak daily VOC and CO emissions are expected to occur in Month 16, which is the middle of the two construction shifts per day turnaround period of the schedule presented in Figure 2-8. The Month 4 peak emissions include ship emissions, which make up the majority of emissions, and Month 16 is the turnaround month with the most construction workers. When emissions are strictly limited to Refinery-related construction emissions, the peak month for all pollutants is expected to occur in Month 16 when the Delayed Coker Unit is scheduled to be in turnaround. Detailed construction emissions calculations are provided in Appendix B.

Construction Equipment

On-site construction equipment will be a source of combustion emissions. Construction equipment is expected to include backhoes, compressors, concrete pumps, concrete saws, cranes, excavators, forklifts, front-end loaders, generators, pavers, roll-off trucks, tractors, water trucks, and welding machines. The equipment is assumed to be operational between two and ten hours per day. Construction workers are expected to be at the site for longer than eight hours per day, but including time for lunch and breaks, organization meetings, and so forth, construction equipment would not be expected to operate the entire time. Also, during peak construction periods, two work shifts per day are expected. Emission factors for construction equipment were taken from the CEQA Air Quality Handbook Construction Equipment Emissions tables available on the SCAQMD webpage (http://aqmd.gov/ceqa/hdbk.html). Estimated emissions from construction equipment used for construction are included in Table 4-2.

TABLE 4-2

Chevron El Segundo Refinery
Peak Construction Emissions
(lbs/day)

ACTIVITY	CO	VOC	NOx	SOx	PM10	PM2.5[2]
Peak Construction Emissions for NOx, SOx, PM10 and PM2.5[1]						
Construction Equipment	50.58	13.14	82.09	0.11	5.59	5.15
Vehicle Emissions	6.60	0.97	6.54	0.02	0.86	0.40
Fugitive Dust From Construction[3]	--	--	--	--	--	--
Fugitive Road Dust[3]	--	--	--	--	1.68	0.28
Paint Emissions	--	--	--	--	--	--
Ship Emissions	123.47	40.09	1,052.94	27.02	19.23	15.80
Total Emissions[4]	**180.65**	**54.20**	**1,141.57**	**27.14**	**27.36**	**21.63**
SCAQMD Threshold Level	550	75	100	150	150	55
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Peak Construction Emissions for CO and VOC[1]						
Construction Equipment	159.42	43.14	303.84	0.43	15.39	14.16
Vehicle Emissions	84.34	9.28	15.21	0.14	4.54	3.13
Fugitive Dust From Construction[3]	--	--	--	--	--	--
Fugitive Road Dust[3]	--	--	--	--	1.15	0.19
Paint Emissions	--	4.20	--	--	--	--
Ship Emissions	--	--	--	--	--	--
Total Emissions[4]	**243.76**	**56.62**	**319.05**	**0.57**	**21.09**	**16.20**
SCAQMD Threshold Level	550	75	100	150	150	55
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Peak Onsite Emissions[5]						
Construction Equipment	161.66	43.81	304.24	0.43	3.80	14.29
Vehicle Emissions	--	--	--	--	--	--
Fugitive Dust From Construction[3]	--	--	--	--	13.08	--
Fugitive Road Dust[3]	--	--	--	--	1.49	0.19
Paint Emissions	--	4.20	--	--	--	--
Ship Emissions	--	--	--	--	--	--
Total Emissions[4]	**161.66**	**48.01**	**304.24**	**0.43**	**18.36**	**14.48**
SCAQMD Threshold Level	550	75	100	150	150	55
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**

(1) Peak emissions for NOx, SOx, PM10, and PM2.5 predicted to occur during Month 4. Peak emissions for VOC and CO predicted to occur during Month 16.
(2) PM2.5 is determined using SCAQMD, 2006. Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 CEQA Significance Thresholds, SCAQMD, October 2006, https://www.aqmd.gov/ceqa/handbook /PM2_5/ pm2_5ratio.xls
(3) Assumes application of water three times per day.
(4) The emissions in the table may differ slightly from those in Appendix B due to rounding.
(5) Peak onsite emissions exclude vehicle trip emissions. Peak onsite emissions are expected to occur in Month 15, except for PM10, which occurs in Month 3 when earthmoving activities are expected to occur.

The proposed Project will also include off-site construction at King Harbor. Construction equipment working off-site includes cranes, line platforms, pavers, plate compactors, prime movers, rollers, and transporters. The equipment will be used for the road surface improvements of King Harbor and for the transport of the coke drums from King Harbor to the Refinery during the construction period. Emission factors for off-site construction equipment were taken from the Construction Equipment Emissions tables available on the SCAQMD webpage (http://aqmd.gov/ceqa/hdbk.html). Estimated emissions from equipment used for construction are included in Table 4-2.

Ship Emissions

A specialized ship is expected to be used for the transport of the replacement coke drums from the point of manufacture. The ship is capable of transporting all six replacement coke drums as a single load to the Port of Los Angeles or Long Beach. The coke drums will then be transferred onto a barge for transport from the Port to King Harbor. One or two coke drums can be held on a barge, so the transport of all six coke drums is expected to require the use of one specialized ship, three to six barges, and several tug boats for assistance in both harbors. Ship emissions for the proposed Project are based on methodology and emission factors from the 2009 Port of Los Angeles Inventory of Air Emissions (Starcrest 2010) (see Appendix B for detailed emission calculations).

Vehicle Emissions

Vehicle emissions include construction workers' vehicles, buses, pick up trucks, boom trucks, stakebed trucks, flatbed trucks, and delivery trucks. Primary emissions generated will include combustion emissions from engines during idling and while operating. Emissions are based on the estimated number of trips per day and the round trip travel distances.

Construction emissions include emissions from construction worker vehicles traveling to and from the work site. Fourteen workers are expected to be needed during the peak NOx, SOx, PM10, and PM2.5 construction emission period (during Month 4). The onsite work force for Month 4 is low, because few workers are needed when most of the emissions for Month 4 are expected to come from ships delivering the coke drums. The vehicle emission calculations for Month 4 are estimated assuming the 14 workers traveling to and from the site each weekday. The actual peak number of workers is expected to be about 335 during Month 16, which is expected to be the month with the peak VOC and CO emissions. Each worker commute vehicle is assumed to travel 16.2 miles per direction (SCAG, 2000) to and from work each day, making two one-way trips per day. Emissions from employee vehicles are presented in Table 4-2. Emissions from employee vehicles were calculated using the EMFAC 2007emission factors available on the SCAQMD webpage (SCAQMD, 2011).

All cars and pickup trucks used for short trips within and near the Refinery are assumed to travel five miles per trip. On-site buses will be used for delivering workers from the

parking area to the Delayed Coker Unit within the Refinery. All buses are assumed to travel ten miles per day.

Medium and heavy diesel trucks include boom trucks, dump trucks, lube trucks, stakebed trucks and delivery trucks. Heavy heavy-duty semi trucks are also included in the proposed Project construction analysis. Primary emissions generated include exhaust emissions from diesel engines while operating. Emissions from trucks (both delivery and heavy-duty) are calculated using the SCAQMD on-road emission factors. Estimated emissions for all trucks are included in Table 4-2.

Fugitive Dust Associated with Site Construction Activities

Fugitive dust sources include grading, trenching, wind erosion and truck filling/dumping at the site to construct necessary foundations. During construction activities, water used as a dust suppressant will be applied in the construction area during grading, trenching, and earth-moving activities to control or reduce fugitive dust emissions pursuant to SCAQMD Rule 403. Application of water reduces PM emissions by a factor of up to 61 percent (SCAQMD, 2011). It is assumed that one water application per day reduces PM emissions by 34 percent, two applications reduce emissions by 50 percent, and three applications reduce emissions by 61 percent. Fugitive dust suppression, often using water, is a standard operating practice and is one method of complying with SCAQMD Rule 403. Estimated peak controlled PM10 and PM2.5 emissions during peak construction activities for fugitive dust sources are 13.08 pounds per day and 2.72 pounds per day, respectively. The detailed emission calculations are provided in Appendix B.

Fugitive Dust Associated with Travel on Paved and Unpaved Roads

Vehicles and trucks traveling on paved and unpaved roads are also a source of fugitive emissions during the construction period. Fugitive dust emissions were also calculated for on-site cars, light-duty trucks, and buses. The fugitive emissions for trucks assume delivery trucks will travel on paved roads and water trucks will travel on unpaved areas (e.g., equipment staging areas known as laydown areas). Emissions of dust caused by travel on paved roads were calculated using the U.S. EPA's, AP-42, Section 13.2.1 emission factor for travel on paved roads and using the CARB's Methodology 7.9 to determine the appropriate silt loading. Minimal travel on unpaved roads is expected because most of the roads within the Refinery are paved. The estimated PM10 and PM2.5 emissions during peak construction activities (Month 4) from trucks and passenger autos for fugitive dust on paved roads are 1.68 pounds per day and 0.28 pound per day, respectively (see Table 4-2 and Appendix B).

Architectural Coatings

The proposed Project will include the use of some architectural coating for touch ups, as coke drums are already painted. All coating will be SCAQMD Rule 1113 approved. The

estimated VOC emissions during coating activities are expected to be less than 4.2 pounds per day (see Table 4-2 and Appendix B).

Miscellaneous Emissions

In addition to the construction-related emissions already identified for the proposed Project, the proposed Project could generate emissions of VOC if contaminated soil is found and soil remediation activities are necessary. VOC emission estimates from soil contamination would be speculative at this time, however, because the presence of contamination or levels of contamination are currently unknown. VOC contaminated soil is defined as soil which registers 50 parts per million or greater per the requirements of SCAQMD Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil. If VOC contamination is found, soil remediation must occur under an SCAQMD-approved Rule 1166 Plan to assure the control of fugitive emissions which generally includes covering soil piles with heavy plastic sheeting and watering activities to assure the soil remains moist.

Construction Emission Summary

Construction activities associated with the modifications to the Refinery could result in emissions of CO, VOC, NOx, SOx, PM10, and PM2.5. Construction emissions for the proposed Project are summarized in Table 4-2, together with the SCAQMD's daily construction significance threshold levels. The construction phase of the proposed Project is expected to exceed the significance thresholds for NOx. Construction emissions of CO, VOC, SOx, PM10, and PM2.5 are expected to be less than significant. Therefore, unmitigated air quality impacts associated with construction activities are considered significant due to NOx emissions.

Localized Construction Impacts

The SCAQMD has developed Localized Significance Threshold (LST) Methodology to evaluate the potential localized impacts of criteria pollutants from construction activities (SCAQMD, 2009). The LST Methodology requires that the emissions of CO, NO_2, PM10, and PM2.5 associated with the proposed Project be evaluated for impacts on ambient air quality standards at the local receptor. Impacts from other criteria pollutants are regional in nature and, therefore, are not included as part of the localized air quality analysis. Furthermore, only onsite construction emissions sources were included in the LST analysis.

The SCAQMD LST Methodology includes lookup tables for screening emission rates for significance for projects with an area of five acres or less, which is the approximate size of the construction area for the proposed Project. If the calculated emissions for the construction activity are below the emission level found in the LST lookup tables, the construction activity is not considered significant. The screening tables were developed using conservative assumptions, including the worst meteorological conditions. If

localized emissions exceed the values in the lookup tables dispersion modeling which is more precise, may be performed. The CO, PM10, and PM2.5 emissions from the construction activities for the proposed Project are expected to be below the LST emission levels found in the LST lookup tables, and therefore, are not considered significant (see Table 4-3).

TABLE 4-3

Localized Significance Threshold Evaluation for Construction Emissions

Criteria Pollutant	Averaging Period	Peak Onsite Emission Rate (lb/day)	LST Lookup Value[1] (lb/day)	Exceeds Screening Threshold?	Calculated GLC Conc. ($\mu g/m^3$)	Most Stringent Air Quality Standard ($\mu g/m^3$)	Exceeds LST Threshold?
CO	1-hour	161.66	4,119	No	--	--	No
	8-hour	161.66	4,119	No	--	--	No
NO_2	1-hour	304.24	222	Yes	275.9	339	No
PM10	24-hour	18.36	88	No	--	--	No
PM2.5	24-hour	14.48	35	No	--	--	No

(1) Appendix C of the SCAQMD Final LST Methodology (Oct. 2009). SRA #3 at 200 meters.

Emissions of NOx from the proposed Project construction are expected to be greater than the LST lookup table value for NO_2. To further assess the potential NOx impacts, an air dispersion model was used to estimate NOx concentrations and the NOx conversion to NO_2 was calculated. In order to determine the groundlevel concentrations, the U.S. EPA ISCST3 (Version 02035) air dispersion model was used to model the peak day on-site construction emissions (see Table 4-3) and calculate the maximum groundlevel concentrations. The modeled maximum NOx impact concentration for 1-hour averaging is 337.8 micrograms per cubic meter ($\mu g/m^3$). However, Table 2-4 of the SCAQMD LST Methodology shows that 25.8 percent of the total NOx is converted into NO_2 at 500 meters. The closest sensitive receptor is approximately 400 meters from the laydown area (construction equipment storage area); however, the NOx conversion rate is higher at 500 meters, so the 500 meter conversion rate was selected to be conservative. The converted NO_2 concentration at 500 meters is 87.1 $\mu g/m^3$. The total NO_2 concentration combined with established background levels is 275.9 $\mu g/m^3$, which is below the maximum 1-hour standard of 339 $\mu g/m^3$. Therefore, the maximum NO_2 concentration for the 1-hour averaging period is not expected to be significant. The results are shown in Table 4-3 (see Appendix B for more detailed calculations).

Federal ambient air quality standards were not analyzed because the federal standards are based on a three-year period. The proposed Project construction period will be less than three years.

The LST analysis indicates that construction emissions of NO_2, CO, PM10, or PM2.5 emissions are not expected to exceed the LST significance thresholds in Table 4-1 from construction activities associated with the proposed Project. Therefore, the proposed Project would not be expected to create any localized significant impacts on air quality during the construction period.

4.2.2.2 Operational Emission Impacts

The proposed Project's operational emissions are evaluated in this section. Operational emissions include both stationary and mobile sources. Stationary sources include combustion sources and fugitive sources. Detailed operational emission calculations are provided in Appendix B. The total operational emissions from the proposed Project are identified in Table 4-4. The primary sources of emissions are from the new coke drums and coke transport truck trips.

TABLE 4-4

Chevron Products Company El Segundo Refinery
Proposed Project Operational Emissions Increase
(tons/year)

Sources	CO	VOC	NOx	SOx	PM10	PM2.5[(1)]
STATIONARY SOURCES:						
Drum Vents	<0.001	0.010	--	--	0.001	0.001
Heater F-501	1.316	0.263	0.559	0.839	0.282	0.282
Coke Handling	--	--	--	--	0.014	0.014
Total Stationary Source Emission Increases	**1.316**	**0.273**	**0.559**	**0.839**	**0.297**	**0.297**
OFF-SITE EMISSION SOURCES:						
Coke Transport Trucks	0.408	0.095	1.130	0.002	1.127	1.127
Total Off-Site Emission Increases:	**0.408**	**0.095**	**1.130**	**0.002**	**1.127**	**1.127**
Total Operational Emission Increases	**1.724**	**0.368**	**1.689**	**0.841**	**1.424**	**1.424**

(1) Assumes all PM10 is PM2.5.

Peak daily emissions are not expected to change, as the daily operation of the Delayed Coker Unit will not change. The proposed Project will replace the existing coke drums with new coke drums of the same size and capacity. Current coke production is limited by operation of the coke drums (i.e., the amount of coke produced per drum cycle), which is not changing as part of the proposed Project, as well as in the SCAQMD permit. The peak daily emissions are based on a day when all six coke drums are in operation, which occurs currently and will continue following completion of the proposed Project. However, because of the new coke drums will require less unplanned maintenance, a three to four percent increase in the operational efficiency of the Delayed Coker Unit is

expected on an annual basis (i.e., less time when some coke drums are down for maintenance). Consequently, the annual emissions from the Delayed Coker Unit are expected to increase by three to four percent.

Equipment potentially impacted by the proposed Project (upstream or downstream) was evaluated to determine if the proposed Project would result in an emission increase, even though the equipment is operating within permit limits and no permit modification would be required. Due to the nature of Refinery operations, equipment activities fluctuate. However, no other units, beyond those evaluated for the proposed Project, were identified that would result in a discernible increase in emissions strictly due to the proposed Project.

Annual emission increases are also expected due to increases in vehicle trips transporting coke to the Port of Long Beach. As with the Delayed Coker Unit, the daily maximum amount of coke transported to the Port will not change as the maximum amount of coke produced per day will not change, but annually, the number of days operating at the maximum is expected to increase. Therefore, annual delivery truck trips are expected to increase.

Fugitive Component Emissions

The proposed Project is a replacement in kind, and is not expected to add any additional fugitive components. Therefore, no new fugitive VOC emissions from components would be expected from the operation of the proposed Project.

Combustion Sources

No new combustion sources will be installed. However, since the new coke drums will increase reliability of the Delayed Coker Unit, heaters F-501 A, B, and C are expected to have increased annual emissions. The peak daily emission rate for these heaters, though, would not change as a result of the proposed Project. The new coke drums would be the same size and operate in the same manner (i.e., the same cycle time) as the current coke drums. Therefore, the peak daily emissions from the Delayed Coker Unit would remain the same as current operations. Detailed emission calculations are presented in Appendix B.

Mobile Source Emissions

Emissions from off-site sources are those that are related to the proposed Project, but that would not be directly emitted from permitted equipment at the proposed Project site, i.e., trucks, worker commute trips, etc. The operation of the proposed Project is expected to require three to four percent more coke truck trips on an annual basis. However, the peak daily truck traffic is not expected to increase, because the daily maximum amount of coke transported to the Port will not change. The maximum amount of coke produced per day will not change, but annually, the number of days operating at the maximum is expected

to increase. Therefore, annual delivery truck trips are expected to increase. The emission increases associated with the increased mobile emission sources are shown in Table 4-4.

Operational Emissions Summary

Total unmitigated operational emissions from the proposed Project are summarized in Table 4-4. Unmitigated daily operational emissions are summarized in Table 4-5, together with the SCAQMD daily operational incremental threshold levels. The operation of the proposed Project is not expected to exceed any significance thresholds. Therefore, the air quality impacts associated with operational emissions from the proposed Project are not considered significant.

TABLE 4-5

Chevron Products Company El Segundo Refinery
Proposed Project Increase from Peak Day Operational Emissions Summary
(lbs/day)

Sources	CO	VOC	NOx	SOx	PM10	PM2.5(1)
Project Emissions(2)	0.0	0.0	0.0	0.0	0.0	0.0
Significance Thresholds	**550**	**55**	**55**	**150**	**150**	**55**
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

(1) Assumes all PM10 is PM2.5.
(2) Daily emissions are not expected to change.

4.2.2.3 CO Hot Spots

The potential for high concentration of CO emissions associated with truck/vehicle traffic was considered and evaluated per the requirements of the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993). The Handbook indicates that any project that could negatively impact levels of service at local intersections may create a CO hot spot and should be evaluated. As shown in Table 4-12, all intersections that would be affected by traffic from the proposed Project have LOS A designations, with the exception of one intersection with LOS B designation. No changes in level of service are expected from the proposed Project, and the proposed Project would not generate any significant adverse traffic impact. Therefore, the proposed Project is not expected to create significant adverse CO hotspots impacts to ambient air quality due to the traffic impact at the intersections affected by the proposed Project, so no mitigation is required.

4.2.2.4 Impacts to Ambient Air Quality

Dispersion modeling was used to calculate concentrations of the criteria pollutants from the proposed Project sources which emit NOx, PM10, and PM2.5 emissions to evaluate potential localized air quality impacts to the nearest sensitive receptor. CO emissions were not modeled because there are only daily (1-hour and 8-hour) ambient air quality

thresholds for CO, and daily CO emissions are not expected to change for the proposed Project. The U.S. EPA AERMOD air dispersion model was used to predict the ambient concentrations for NOx and PM10 (VOC and SOx are not required to be modeled because they do not normally contribute to localized air quality impacts). Since PM2.5 emissions are a fraction of PM10 emissions and the localized significance thresholds are the same for PM10 and PM2.5, PM2.5 emissions were not modeled, but were based on the modeling results for PM10.

A modeling file was used for NOx and PM10 with the 1-year averaging times. As previously mentioned, maximum daily emissions from the Delayed Coker Unit are not expected to change; therefore, all other averaging times (1-hour, 8-hour, and 24-hour) were not analyzed. The emission rates, locations, and groundlevel concentrations are included in Appendix B. The calculated impacts on ambient air concentrations of the modeled criteria pollutants are presented in Table 4-6.

TABLE 4-6

Results of Criteria Pollutants Air Quality Modeling

Criteria Pollutant	Averaging Time	Calculated Concentrations for Project(1)	State Ambient Air Quality Standard(2)	Federal Ambient Air Quality Standard(2)	Significant?
NOx	Annual	40 μg/m^3	57 μg/m^3	100 μg/m^3	No
PM10(3)	Annual (geometric mean)	0.003 μg/m^3	20 μg/m^3	None(4)	No
PM2.5(3)	Annual (geometric mean)	0.003 μg/m^3	12 μg/m^3	15 μg/m^3	No

(1) Calculated concentrations are the project impact combined with the background ambient concentrations for NOx. See Appendix B for detailed calculations.
(2) Most stringent ambient air quality standard.
(3) For PM10 and PM2.5, which are not in attainment, a change from the proposed Project in the ambient air concentration greater than 1 μg/m^3 is considered significant.
(4) No federal annual average PM10 ambient air quality standard has been established.

Based on the AERMOD air dispersion model results, the groundlevel concentrations of the criteria pollutants of concern will be below SCAQMD CEQA significance thresholds. Therefore, no significant adverse localized air quality impacts are anticipated to occur from the proposed Project.

4.2.2.5 Toxic Air Contaminants

A health risk assessment (HRA) was performed to determine if emissions of TACs generated by the proposed Project would exceed the SCAQMD thresholds of significance

for cancer risk and hazard indices. The following subsections outline the HRA methodology and the results of the HRA. The HRA summarized herein evaluates only the emission increases from the proposed Project.

HRA Methodology

The facility prepared an AB2588 HRA in September 2009 for the 2006-2007 annual emissions. That HRA was prepared in accordance with the August 2003 Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments (OEHHA, 2003) and the October 2003 Air Resources Board Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk memo (CARB/OEHHA, 2003). The 2009 AB2588 HRA includes a comprehensive analysis of the dispersion of certain AB2588-listed compounds into the environment, the potential for human exposure, and a quantitative assessment of individual health risks associated with the predicted levels of exposure. The CARB Hotspots Analysis Reporting Program (HARP) model, the most appropriate model for determining the air toxic impacts (CARB, 2003), was used to determine the health risks.

The Chevron 2009 AB2588 HRA has risk values for the coke drum vents (six), heaters F-501 A, B, and C, and fugitives from the Delayed Coker Unit area. Since the peak daily emissions are not expected to change, the acute hazard index is not expected to change for the proposed Project. However, cancer risk and chronic hazards, which are based on annual emissions, would increase due to the increased emissions associated with the improved reliability of the Delayed Coker Unit. The improved reliability would increase Delayed Coker Unit productivity by three to four percent. Consequently, cancer and chronic hazards are expected to increase by three to four percent for the Delayed Coker Unit. Table 4-7 summarizes the risk associated with the existing operations and proposed Project.

4.2.2.6 Summary of Health Impacts

The health impacts related to air quality impacts have been evaluated in several ways. First, the short-term air quality impacts related to construction emissions were evaluated by comparing the peak day construction emissions to the SCAQMD mass daily significance thresholds. In the short-term, the air quality impacts related to construction NOx emissions would exceed the SCAQMD construction significance threshold for NOx, which is considered an adverse significant air quality impact. In order to evaluate the health impacts associated with construction emissions, an LST analysis was also completed. The LST analysis modeled the peak onsite construction emissions to determine the groundlevel concentrations. The results of the LST analysis indicated that

TABLE 4-7

Summary of Health Risk Associated with the Proposed Project

Source	MEIR	MEIW	MCHI
Baseline Risk[1]			
Coke Drum A	3.69E-09	6.03E-10	1.09E-04
Coke Drum B	1.87E-10	3.00E-11	5.67E-06
Coke Drum C	1.33E-09	2.19E-10	3.98E-05
Coke Drum D	3.01E-10	4.87E-11	8.84E-06
Coke Drum E	1.23E-09	2.00E-10	3.63E-05
Coke Drum F	3.13E-10	5.06E-11	9.24E-06
Coker Heater	4.57E-08	3.09E-08	1.17E-02
Coker Area Fugitives	1.85E-08	2.08E-09	3.69E-05
Total	**7.13E-08**	**3.41E-08**	**1.19E-02**
Proposed Project-Related Incremental Risk Increase[2]			
Coke Drum A	1.35E-10	2.21E-11	3.99E-06
Coke Drum B	6.84E-12	1.10E-12	2.08E-07
Coke Drum C	4.87E-11	8.02E-12	1.46E-06
Coke Drum D	1.10E-11	1.78E-12	3.24E-07
Coke Drum E	4.50E-11	7.32E-12	1.33E-06
Coke Drum F	1.15E-11	1.85E-12	3.38E-07
Coker Heater	1.67E-09	1.13E-09	4.28E-04
Coker Area Fugitives[2]	0.00E-00	0.00E-00	0.00E-00
Total	**1.93E-09**	**1.17E-09**	**4.36E-04**
Significance Threshold	**1.00E-06**	**1.00E-06**	**1.00**
Significant?	**NO**	**NO**	**NO**

(1) From the 2009 AB2588 HRA. Acute risks are not affected by annual emission changes.

(2) Delayed Coker Unit Area Fugitives are fugitive emissions from compressors, pumps, piping valves, flanges, and other connectors in Delayed Coker Unit. These fugitive emissions will not increase due to the proposed Project; therefore, the risk will not increase.

the short-term construction emissions would be below the applicable LST significance thresholds. The LST significance thresholds are based on the most stringent ambient air quality standard for NO and CO, while the PM10 and PM2.5 significance thresholds were derived based on PM control in SCAQMD Rule 403 – Fugitive Dust, which is based on the state 24-hour PM10 standard. These significance thresholds are considered to be appropriate because the ambient air quality standards are based on health effects (see Table 3-1). Since construction of the proposed Project is short-term and would not exceed the LST significance thresholds for local ambient air quality for NO_2, CO, PM10,

and PM2.5, no significant adverse health impacts associated with construction emissions are expected. The primary health effects associated with exposure to NO_2, CO, PM10, and PM2.5 are respiratory impacts including decreased lung function, aggravation of chronic respiratory condition, and aggravation of heart disease conditions. No such adverse health impacts are expected during the construction phase of the proposed Project.

The peak day operational emissions are not expected to increase as a result of the proposed Project. However, the annual emissions are expected to increase by three to four percent from improved operational reliability of the coke drums. Air quality modeling was also completed for the NO_2, PM10, and PM2.5 emission increases associated with operation of the proposed Project. The proposed Project does not affect the CO emissions on an hourly or eight-hour basis for which ambient air quality standards have been established. Therefore, no CO air quality modeling was conducted. The significance thresholds for modeling are directly or indirectly based on the most stringent ambient air quality standards and the ambient air quality standards are based on health effects (see Table 3-1). Air quality modeling indicates that emission concentration increases associated with criteria pollutants due to the operation of the proposed Project would be less than the applicable significance thresholds and would not be expected to cause or contribute to an exceedance of any ambient air quality standards. Therefore, health impacts associated with the operation of the proposed Project are expected to be less than significant. The primary health effects associated with exposure to NO_2, CO, PM10, and PM2.5 are respiratory impacts including decreased lung function, aggravation of chronic respiratory conditions, and aggravation of heart disease conditions. The proposed Project is not expected to exceed or contribute to an exceedance of the ambient air quality standards so no such adverse health impacts (respiratory impacts) are expected due to the operation of the proposed Project.

Epidemiological analyses have consistently linked air pollution, especially PM, with excess mortality and morbidity. Health studies have shown both short-term and long-term exposures of ambient PM concentrations are directly associated with increased mortality and morbidity. To estimate potential air quality impacts from a particular facility, the AERMOD air dispersion model can be used to provide PM10 concentration levels at a set of receptor points. A concentration-response equation can be calculated on the modeled air quality impacts and changes in mortality to determine the relative change in mortality associated with the estimated changes in annual PM levels and estimate the potential for health impacts. For this calculation, it is assumed that all the PM10 is PM2.5. The log-linear form of the concentration response equation is:

$$\Delta \text{ Mortality} = y_0 \left(e^{\beta \Delta PM} - 1\right) * \text{population}$$

where

y_0 = county level all cause annual death rate per person for ages 30 and older,

β = PM2.5 coefficient from health study,

ΔPM = change in annual mean PM2.5 concentration, and
Population = population of ages 30 and older.

The resulting change in cases of mortality in a population age group living in a specific location with a given change in PM can then be calculated. By applying the census tract level for all census tracts within the modeling domain, the overall estimate in the change in mortality from PM emission of the facility is determined. Since the air quality analysis shows that the onsite PM emissions from the proposed Project do not have offsite consequences (i.e., no concentrations above the ambient air quality standards), the above modeling procedure is not required and, thus, no increase in morbidity or mortality rates or related health effects are anticipated.

The indirect PM emissions associated with the proposed Project are limited to an increase in truck trips associated with additional coke shipments from the Refinery. The potential annual increase in truck trips does not produce a localized increase in PM, but is dispersed along the route. Therefore, no significant air quality or related health impacts are expected due to the proposed Project.

The long-term air quality impacts from exposure to toxics were evaluated through the preparation of an HRA. The HRA evaluated the emissions associated with the operation of the proposed Project and compared them to carcinogenic and non-carcinogenic significance thresholds to determine potential health impacts. As demonstrated in the HRA, the carcinogenic and non-carcinogenic impacts for all receptors are expected to be less than the significance thresholds. Therefore, no significant adverse carcinogenic or non-carcinogenic health impacts associated with the operation of the proposed Project are expected.

4.2.3 MITIGATION MEASURES

Feasible mitigation measures are required to minimize the significant air quality impacts associated with the construction phase of the proposed Project as the emissions of NOx are considered significant.

No mitigation measures are required for the operation phase because all emissions were determined to be less than significant.

Construction Mitigation Measures

The proposed Project is expected to have significant adverse air quality impacts during the construction phase. Therefore, the following mitigation measures will be imposed on the proposed Project to reduce emissions associated with construction activities from heavy construction equipment and worker travel.

On-Road Mobile Sources:

A-1 Develop a Construction Emission Management Plan for the proposed Project. The Construction Emission Management Plan shall be submitted to SCAQMD CEQA for approval prior to the start of construction. The Plan shall include measures to minimize emissions from vehicles including, but not limited to consolidating truck deliveries, prohibiting truck idling in excess of five minutes, description of truck routing, description of deliveries including hours of delivery, description of entry/exit points, locations of parking, and construction schedule. At a minimum the Construction Emission Management Plan will include the following mitigation measures.

Off-Road Mobile Sources:

A-2 Prohibit construction equipment from idling longer than five minutes at the Refinery.

A-3 Maintain construction equipment tuned up and with two to four degree retard diesel engine timing or tuned to manufacturer's recommended specifications that optimize emissions without nullifying engine warranties.

A-4 The project proponent shall survey and document the proposed Project's construction areas and identify all construction areas that are served by electricity. This documentation shall be provided as part of the Construction Emissions Management Plan. Electric welders shall be used in all construction areas that are demonstrated to be served by electricity.

A-5 The project proponent shall survey and document the proposed Project's construction areas and identify all construction areas that are served by electricity. This documentation shall be provided as part of the Construction Emissions Management Plan. Onsite electricity rather than temporary power generators shall be used in all construction areas that are demonstrated to be served by electricity.

A-6 The project proponent shall use cranes rated 200 hp or greater equipped with Tier 3 or equivalent engines. Engines equivalent to Tier 3 may consist of Tier 2 engines retrofitted with diesel particulate filters and oxidation catalysts, selective catalytic reduction, or other equivalent NOx control equipment. Retrofitting cranes rated 200 hp or greater with PM and NOx control devices must occur before the start of construction. If cranes rated 200 hp or greater equipped with Tier 3 engines are not available or cannot be retrofitted with PM and NOx control devices, the

project proponent shall use cranes rated 200 hp or greater equipped with Tier 2 or equivalent engines. The project proponent shall provide documentation that cranes rated 200 hp or greater equipped with Tier 3 or equivalent engines are not available in the Construction Emissions Management Plan.

A-7 For off-road construction equipment rated 50 to 200 hp that will be operating for eight hours or more, the project proponent shall use equipment rated 50 to 200 hp equipped with Tier 3 or equivalent engines. Engines equivalent to Tier 3 may consist of Tier 2 engines retrofitted with diesel particulate filters and oxidation catalysts, selective catalytic reduction, or other equivalent NOx control equipment Retrofitting equipment rated 50 to 200 hp with PM and NOx control devices must occur before the start of construction If equipment rated 50 to 200 hp equipped with Tier 3 engines are not available or cannot be retrofitted with PM and NOx control devices, the project proponent shall use equipment rated 50 to 200 hp equipped with Tier 2 or equivalent engines. The project proponent shall provide documentation that equipment rated 50 to 200 hp equipped with Tier 3 or equivalent engines are not available in the Construction Emissions Management Plan or associated subsequent status reports as information becomes available.

A-8 Suspend use of all construction activities that generate air pollutant emissions during first stage smog alerts.

Other Mitigation Measures

During the course of construction, Delayed Coker Unit and associated combustion sources will be shutdown to accomplish the proposed Project and emission reductions will occur. However, while the reductions are quantifiable, the emission reductions do not directly offset all peak construction emissions, but only offset emissions during the turnaround and, therefore, are not being accumulated as emissions reductions mitigation. Table 4-8 shows the estimated emission reductions that are expected to occur from not operating refinery equipment during the construction period.

Other mitigation measures were considered but were rejected because they would not further mitigate the potential significant impacts. These mitigation measures include: (1) provide temporary traffic control during all phases of construction activities (traffic safety hazards have not been identified); (2) implement a shuttle service to and from retail services during lunch hours (most workers eat lunch on-site and lunch trucks will visit the construction site); (3) use methanol, natural gas, propane or butane powered construction equipment (equipment is not CARB-certified or commercially available); and (4) pave unpaved roads (most Refinery roads are already paved).

TABLE 4-8

Emission Reductions from the Delayed Coker Unit Shutdown During Construction (lbs/day)

Pollutant	Estimated Emissions Reduction
CO	284
NOx	121
SOx	181
VOC	59
PM10	64

4.2.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction emissions for the proposed Project for NOx are expected to remain significant following mitigation. The construction emissions associated with CO, SOx, VOC, PM10, and PM2.5 are expected to remain less than significant following mitigation. Construction emissions are expected to be short-term and they will be eliminated following completion of the construction phase.

Localized significant impacts from construction activities were analyzed for CO, NO_2, PM10, and PM2.5. The construction activities associated with the proposed Project are not expected to cause a significant adverse impact on ambient air quality and no mitigation would be required. The analysis concluded that construction emissions of CO, NO_2, PM10 and PM2.5 would not exceed applicable LSTs (Table 4-1).

Traffic impacts were analyzed for potential impact to CO ambient air quality and determined that no significant change in the ambient CO air quality is expected as a result of the proposed Project. Therefore, the proposed Project is not expected to cause CO hotspots and no significant adverse impact on ambient air quality is expected.

The proposed Project is not expected to have significant impacts to CO, NOx, SOx, VOC, PM10, or PM2.5 during operation. Therefore, no mitigation measures are required.

Ambient air quality modeling indicates that the proposed Project emissions of NO_2, PM10, and PM2.5 during operation of the proposed Project would not cause or contribute to an exceedance of any ambient air quality standard. Therefore, the operation of the proposed Project is not expected to cause a significant adverse impact on ambient air quality and no mitigation measures are required.

The proposed Project was analyzed for cancer and non-cancer human health impacts and determined to be less than significant. The estimated cancer risk due to the operation of the proposed Project is expected to be less than the significance criterion of 10 per million. The chronic hazard index is below 1.0. There is no change to the acute hazard index as a result of implementing the proposed Project. Therefore, the proposed project is not expected to cause a potentially significant adverse impact associated with exposure to toxic air contaminants.

4.3 NOISE

The NOP/IS (see Appendix A) determined that the proposed Project at the Chevron Products Company El Segundo Refinery has the potential to generate significant adverse noise impacts during construction activities at the Refinery. The NOP/IS concluded that no substantial increase in noise would occur due to the operation of the proposed Project because the six replacement coke drums are expected to have similar operating characteristics as the six existing coke drums. Therefore, the potential construction noise impacts are evaluated in this section.

4.3.1 SIGNIFICANCE CRITERIA

The proposed Project noise impacts would be considered significant if the following occurs:

> The project causes construction noise levels to exceed local noise ordinances or, if the noise threshold is currently exceeded, the project increases ambient noise levels by more than three decibels (dBA) at the site boundary.
>
> The project causes construction noise levels that exceed federal OSHA noise standards for workers.

4.3.2 PROJECT DESIGN FEATURES

A number of Project Design Features, which are required as part of permitting from other agencies or by regulation, have been included as part of the proposed Project to minimize the potential for noise impacts associated with the coke drum transport, including the following:

- Obtain applicable noise variance/permits from Caltrans and approval from local jurisdictions (cities of Redondo Beach, Hermosa Beach, and Los Angeles County).

- Coordinate transport efforts with the California Highway Patrol.

- Notify all local police and fire departments in Redondo Beach, Hermosa Beach, Manhattan Beach, and El Segundo at least two weeks prior to the planned transport activities and any changes to proposed plans.

- Provide notification of the proposed transport to all jurisdictions, property owners, and occupants adjacent to the coke drum route at least two weeks prior to transportation activities.

- Provide signage along the coke drum transportation route at least two weeks in advance to alert motorists to potential road closures.

- Pilot or escort cars will maintain communications with the escorted vehicle.

- All transport equipment will be inspected for mechanical problems and repaired, if necessary, prior to loading the coke drums.

- Fully-equipped mechanic, tire, and hydraulic repair teams will be included as part of the vehicle escorts in order to provide immediate response in the event of a mechanical problem.

- All contractors and workers associated with the transport of the coke drums will be trained prior to the beginning of coke drum transport activities on the transport route, permit requirements, safety hazards, emergency response, etc.

- Avoid use of horns on the transport carrier and associated escort vehicles except under emergency conditions.

4.3.3 ENVIRONMENTAL IMPACTS

Construction noise impacts associated with the proposed Project at the Refinery, during coke drum transport, and road surface improvements at King Harbor are analyzed in the following sections.

4.3.3.1 Construction-Related Noise Impacts at the Refinery

Heavy construction equipment is required during construction activities associated with the proposed Project. The expected noise levels from construction equipment are presented in Table 4-9. The construction equipment noise sources identified in Table 4-9 would operate primarily during daylight hours and would be an intermittent source of noise over the approximately one and one-half year construction period, with the exception of the period during the Delayed Coker Unit turnaround (about three months) when two shifts would operate from 6:30 a.m. to 5:00 p.m. and 6:30 p.m. to 5:00 a.m.

A noise model was used to estimate the potential noise impacts at various locations around the refinery perimeter during construction activities using the projected equipment schedule (see Appendix C). The construction activities will be located near the Delayed Coker Unit. The results of the noise model are shown in Table 4-10. Most of the construction noise sources will be located near ground level which will help to attenuate noise. The noise modeling was completed assuming that the two shifts were operating

TABLE 4-9

Construction Noise Sources

Equipment	Equipment Horsepower	Noise Level at 50 Feet (decibels)
Backhoe 580 Case	80	80
Mortar Mixer, gasoline	11	79
Crane, Diesel (300 ton)	450	85
Tractor Trailer	210	84
Crane, Diesel (20 ton)	125	85
Crane, Diesel (150 ton)	250	85
Crane, Diesel (400 ton)	400	85
Crane, Diesel (1,600 ton)	632	85
Manlift, Propane	66	75
Welder, Diesel (250 amp)	35	74
Air compressor, Diesel (185 cfm)	50	80
Air compressor, Diesel (375 cfm)	115	80
Power Unit	380	82
Generator, Diesel (6 kW)	30	80
Forklift (15 Ton)	140	80
Forklift, diesel (4 ton)	83	80
Fuel/Lube Truck	260	70
Pickup Truck (1/2 ton)	235	65
Car, gasoline	160	65
Stakebed Truck	260	70
Bus (50 passenger)	260	70
Light Tower, Diesel (4 kW)	20	75
36 Line Transporter	472	85
Sissor Lifts, propane	20	75
Impact Hammer	--	88
Impact Wrench	--	85

and construction noise sources would be operating 20 hours a day, including during the nighttime. Because of the nature of the construction activities, the types, number, operation time and loudness of construction equipment will vary throughout the construction period. As a result, the sound level associated with construction will change as construction progresses. Construction noise sources will be temporary and will cease following construction activities. Noise levels are not expected to noticeably increase during construction activities (either during the daytime or nighttime) because noise level increases during construction activities are not expected to exceed two dBA (see Table 4-10). A noise increase of less than three dBA is generally not noticeable to humans.

TABLE 4-10

Project Construction Noise Levels

Noise Monitoring Location[1]	Baseline Noise Level CNEL (dBA)[2]	Predicted Construction Noise CNEL (dBA)	Total Estimated Sound Level CNEL (dBA)[3]	Increased Noise Levels at Noise Sampling Locations due to Construction Activities (dBA)
1	63.6	60.9	65.5	1.9
2	59.9	53.5	60.8	0.9
3	68.0	42.4	68.0	0.0

(1) Refers to the noise monitoring locations identified in Figure 3-2.
(2) Includes all ambient noise sources. Noise levels are from Table 3-8.
(3) The total sound level was calculated using noise model. See Appendix C for further details.

The noise levels from the construction equipment at the Refinery are expected to be within the allowable noise levels established by the City of El Segundo noise ordinance (see Table 3-10), i.e., the proposed Project is not expected to increase the noise levels in the adjacent residential areas by three dBA. The noise levels during the construction phase are generally expected to be similar to current noise levels, because changes in noise levels of two dBA or less are not typically perceived by the human ear, so no significant (audible) increase in noise levels is expected. During the peak construction period, the Delayed Coker Unit would be shut down and the noise reductions associated with the shutdown of the Unit have not been taken into consideration. Therefore, actual noise impacts are expected to be less than those shown in Table 4-10. No significant adverse noise impacts related to construction activities associated with the proposed Project are expected. Therefore, the proposed Project on-site noise impacts during the construction phase are expected to be less than significant.

Workers exposed to noise sources in excess of 90 dBA for an eight-hour period will be required to wear hearing protection devices that conform to OSHA/NIOSH standards. Since the maximum noise level from any individual construction equipment is expected to be 88 decibels or less (see Table 4-9), no significant adverse noise impact to Refinery workers outside the construction area during construction activities is expected.

4.3.3.2 Construction-Related Noise Impacts Associated with Coke Drum Transport

The coke drums would be delivered to King Harbor in Redondo Beach via barge and off-loaded in Redondo Beach. The coke drums will be transported from King Harbor via an equipment transport carrier using the following route: Marina Way to Harbor Drive (north), to Herondo Street (east), to Pacific Coast Highway (north - which turns into

Sepulveda Boulevard), to Rosecrans Avenue (west), and turning north into the Refinery at Gate 21. The coke drums would be transported during the evening and nighttime hours to avoid traffic impacts along the heavily trafficked roads that would include Pacific Coast Highway, Sepulveda Boulevard, and Rosecrans Avenue.

In order to determine the noise impacts associated with the transport of the coke drums, noise measurements were taken of the equipment transport carrier to determine predicted noise levels along the route. The noise levels were a maximum of about 70 dBA (L_{max}) within 50 feet of the transport carrier engine. Using the noise data from the noise monitoring, the potential noise impacts along the proposed route can be evaluated (see Table 4-11 and Appendix C).

TABLE 4-11

Estimated Noise Levels along Coke Transport Route Associated with the Transport Carrier

Monitoring Station No.	Location	Ambient Nighttime Noise Levels (dBA)		Project Noise Levels (dBA)		Significant?
		L_{eq}	L_{max}	L_{eq}	L_{max}	
1	Harbor area guard shack	47.0	63.5	58.0	67.4	Yes
2	West end of Marina Way	46.4	58.3	59.7	71.3	Yes
3	Center of Marina Way	46.2	54.5	59.6	70.8	Yes
4	Corner of Harbor Dr./Herondo St.	53.8	70.3	55.6	65.1	No
5	South side of Herondo St./Monterey Blvd.	59.3	75.1	56.9	65.6	No
6	510 Herondo St./Valley Dr.	49.2	59.3	58.7	68.8	Yes
7	NE Corner of Pacific Coast Hwy./1st St.	65.6	77.0	65.3	79.4	No
8	SW Corner of 5th Street/Ocean View Ave.	50.3	61.8	46.6	59.9	No
9	Pacific Coast Hwy/8th St.	60.3	72.7	61.9	74.5	No
10	Pacific Coast Hwy, between 15th and 16th Streets	63.4	75.5	63.7	76.4	No
11	1707 Pacific Coast Hwy, between 17th and 18th Street	65.3	77.7	62.2	74.0	No
12	2006 Rhodes St. at 20th Street (1 block east of Pacific Coast Hwy.)	44.5	55.5	42.3	56.7	No
13	Sepulveda Blvd. Between 9th and 10th Street	60.5	75.8	62.6	74.5	No
14	SE Corner of Rosecrans Ave. and Pacific Ave.	57.9	64.4	56.0	65.1	No
15	Rosecrans Ave./Poinsettia Ave.	57.3	65.2	56.7	65.6	No
16	Rosecrans Ave./Pine Ave.	56.1	63.7	57.4	65.3	No

As shown in Table 4-11, the noise impacts associated with the transport carrier are expected to generate noise levels that exceed existing nighttime noise levels. The predicted noise levels in the vicinity of King Harbor (at Monitoring Stations 1-3) indicate the highest potential maximum nighttime noise levels are calculated to be about 67-71 dBA, as compared to existing maximum nighttime noise levels of about 64 dBA. In King Harbor, there are some residents who live on the boats docked in the harbor so there are sensitive receptors in the vicinity of the proposed transport activities in King Harbor.

Residential areas are located along Herondo Street near Monitoring Stations 4, 5 and 6, west of Pacific Coast Highway. At Monitoring Stations 4 and 5, the proposed Project is expected to generate noise below ambient nighttime levels. The maximum nighttime noise levels in the vicinity of Herondo Street are predicted to be about 68-69 dBA at monitoring station 6 as compared to existing nighttime maximum noise levels of about 59-60 dBA. Another largely residential area is located south of Rosecrans Avenue (Monitoring Stations 14-16). The maximum nighttime noise levels in the vicinity of Rosecrans Avenue are predicted to be about 65-66 dBA as compared to existing nighttime maximum noise levels of about 64-65 dBA.

The existing maximum nighttime noise levels along Pacific Coast Highway/Sepulveda Boulevard (Monitoring Stations 8-12) are higher than other locations along the proposed transport route. Pacific Coast Highway/Sepulveda Boulevard is a major transportation corridor in the South Bay and western coastal section of Los Angeles County, supporting a substantial amount of traffic which generates noise. The land uses along Pacific Coast Highway/Sepulveda Boulevard tend to be commercial land uses, although a number of residential areas are located adjacent to Pacific Coast Highway/Sepulveda Boulevard (see Figure 4-1). At noise Monitoring Station 13, the existing maximum nighttime noise level exceeds the proposed Project noise levels. Therefore, no discernible change in noise level is expected from the proposed Project.

Existing maximum nighttime noise levels along Pacific Coast Highway/Sepulveda Boulevard range from 73 to 78 dBA (Monitoring Stations 7, 9, 10, 11, and 13). The predominant noise sources along Pacific Coast Highway/Sepulveda Boulevard are vehicle and truck traffic. The maximum nighttime noise levels along Pacific Coast Highway/Sepulveda Boulevard associated with the coke drum transport are predicted to be 74 to 79 dBA. Therefore, the proposed Project noise levels along Pacific Coast Highway/Sepulveda Boulevard would not result in a substantial increase in existing maximum nighttime noise levels.

Noise monitoring locations 8 and 12 are located about one block off of Pacific Coast Highway. The background or existing maximum noise levels at noise Monitoring Locations 8 and 12 ranged from 55 to 62 dBA. The predicted noise levels at these locations associated with the transport carrier are about 57 to 60 dBA, which indicates that the predicted noise levels associated with the transport carrier are expected to rapidly drop off to background noise levels.

Environmental Audit, Inc.

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RESIDENTIAL LAND USE MAP
Chevron Products Company
El Segundo Refinery

Project No. 2706

Figure 4-1

N:\2706\Land Use\ProposedRoute LandUse (rev.6).cdr

The noise levels associated with the transport carrier will be temporary and would occur evenings/nights during the construction period as the coke drums are transported one at a time from King Harbor to the Refinery. While the noise impacts are temporary, they are considered significant because the noise increase associated with the proposed Project activities has the potential to exceed three dBA in residential areas, specifically at King Harbor and along Herondo Street in Redondo Beach. Therefore, the construction noise impacts associated with the proposed Project activities are concluded to be significant.

4.3.3.3 Construction-Related Noise Impacts Associated with Road Surface Improvements at King Harbor

There is the possibility that road surface improvements may be required at King Harbor, because the details of these activities are being evaluated. The road surface improvement may include patching or repairing of the existing roadway to minimize potholes and ensure that the roadway will support the weight of the coke drums and transport carrier. Construction equipment that would be required for these improvements is expected to be limited to a plate compactor, roller vibrator, and paving machine, only one of which would be operated at the same time. The noise levels associated with this type of equipment range from about 65 to 85 dBA and they would operate along Marina Way. The road maintenance activities would only occur during the day as allowed under the Redondo Beach noise ordinance, which allows construction activities Monday through Friday 7:00 a.m. to 6:00 p.m., and Saturday 9:00 a.m. to 5:00 p.m.

To estimate the potential noise impacts associated with this type of equipment, the same noise attenuation developed as part of the noise modeling associated with the transport carrier has been be used. Based on the noise model (see Appendix C), noise from the heavy transport carrier was expected to be reduced to less than 55 dBA within 150 feet of the carrier. The noise levels associated with the transport carrier, which is greater than the construction equipment associated with road surface improvements, were over 100 dBA. Therefore, the construction equipment associated with road surface improvements would also be reduced to less than 55 dBA within 150 feet from the maintenance activities. Existing noise sources along Marina Way include cars, vehicles and trucks, which are expected to generate noise in the similar ranges as the construction equipment. In addition, the marina supports a number of recreational boats and commercial barges on a routine basis.

Based on the above, noise associated with road surface improvements at King Harbor are expected to be less than significant for the following reasons:

- Road surface improvements are not expected to generate noise in excess of the existing noise levels;

- During road surface improvements, other noise sources would be eliminated or minimized as portions of Marina Way would be shut down for repair;

- Noise levels are expected to be reduced to less than 55 dBA within 150 feet from the activities; and,

- Road surface improvements would only be completed during daylight hours as allowed by the Redondo Beach noise ordinance.

4.3.4 MITIGATION MEASURES

The noise impacts from the proposed Project associated with the coke drum transport are potentially significant. In addition to the Project Design Features outlined in Section 4.3.2, the following noise mitigation measure will be employed to reduce the potential noise impact associated with the transport carrier:

N-1 Noise from the existing hydraulic power units on the transport carrier will be reduced by installation of mufflers.

4.3.5 LEVEL OF SIGNIFICANCE FOLLOWING MITIGATION

The impact of the proposed Project on noise during the construction period, although of very short duration (six nights), is expected to remain significant following mitigation.

4.4 TRANSPORTATION AND TRAFFIC

The NOP/IS (see Appendix A) determined that operation of the proposed Project would not require new employees or a change in daily operational truck trips, so traffic in the vicinity of the Refinery is not expected to change. However, the proposed Project has the potential to generate significant adverse transportation and traffic impacts during the construction phase of the proposed Project. Therefore, traffic impacts associated with the construction phase of the proposed Project are evaluated in this section.

4.4.1 SIGNIFICANCE CRITERIA

The proposed impacts on transportation and traffic would be considered significant if the following occurs:

- Peak period levels on major arterials within the vicinity of the proposed Project sites are disrupted to a point where intersections with a level of service (LOS) of C or worse are reduced to the next lower LOS, as a result of the projects for more than one month.

- An intersection's volume to capacity ratio increases by 0.02 (two percent) or more when the LOS is already D, E or F for more than one month.

- A major roadway is closed to all through traffic, and no alternate route is available.

- There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.

- Transit access or service will be disrupted due to the proposed Project activities.

- The demand for parking facilities is substantially increased.

4.4.2 PROJECT DESIGN FEATURES

A number of Project Design Features have been included as part of the proposed Project to meet permit requirements and to minimize the potential for traffic impacts associated with the coke drum transport. These Project Design Features are project components required under existing regulations (e.g., California Vehicle Code), permits (over-sized transport permit), and other approvals, and include the following:

- Obtain applicable over-sized transport permits from Caltrans and approval from local jurisdictions (cities of Redondo Beach, Manhattan Beach, El Segundo, and Los Angeles County).

- Comply with all permit requirements and applicable California Vehicle Code requirements for the transport of oversized vehicles, including the following:

  - Posting warning signs on the front and rear of the vehicle or on the front of the lead vehicle and the rear of the back trailer with multi-vehicle combinations;

  - Placing "oversized" warning signs and warning flags on pilot cars (California Vehicle Code (CVC) §27904.5, 28100); and,

  - Use appropriate flags, e.g., solid red or fluorescent orange flags on the extreme left front and left rear of the vehicle or equipment (CVC §25104, 24604).

  -

- Temporary removal of on-street parking along portions of Pacific Coast Highway and Sepulveda Boulevard due to construction activities.

- Temporary removal of Marina Way parking due to coke drum transportation activities.

- Coordinate transport efforts with the California Highway Patrol.

- Notify all local police and fire departments in Redondo Beach, Hermosa Beach, Manhattan Beach, and El Segundo at least two weeks prior to the planned transport activities and any changes to proposed plans.

- Notify Metro and Beach Cities Transit regarding potential overlap in transit service and coke drum transportation, identify route and bus stop relocation, if necessary.

- Provide notification of the proposed transport to all jurisdictions, property owners, and occupants adjacent to the route at least two weeks prior to transportation activities.

- Provide signage along the transportation route at least two weeks in advance to alert motorists to potential road closures.

- Post No Parking signs along the route at least two weeks prior to transportation activities.

- Develop a traffic control plan with each jurisdiction along the transportation route to address issues such as:

  - Potential blocked vehicular and pedestrian access to parcels fronting the route area;

  - Temporary removal of on-street parking due to the construction activities; and

  - Street and lane closures along the route.

- Pilot or escort cars will maintain communications with the escorted vehicle.

- Develop and implement plans to avoid overhead wires and other overhead structures (e.g., signs and signals) with the applicable jurisdiction along the transport route.

- All transport equipment will be inspected for mechanical problems and repaired, if necessary, prior to loading the coke drums.

- Fully equipped mechanic, tire, and hydraulic repair teams will be included as part of the vehicle escorts in order to provide immediate response in the event of a mechanical problem.

- All contractors and workers associated with the transport of the coke drums will be trained prior to the beginning of coke drum transport activities on the route, permit requirements, hazards, emergency response, etc.

In addition to the above, construction workers during the Refinery turnaround (peak construction activities) will be prohibited from accessing the Refinery from Sepulveda Boulevard and Rosecrans Avenue, and will be required to use Main Street and Vista Del Mar via Imperial Highway.

4.4.3 ENVIRONMENTAL IMPACTS

4.4.3.1 Construction Impacts at the Refinery

Construction of the proposed Project will generate additional traffic from construction personnel commuting to and from the site, as well as the transportation of construction materials and equipment to the Refinery. Construction work shifts are expected to operate Monday through Friday and last about ten hours per day during most portions of the construction schedule (all months except Months 15, 16, and 17). During most of the construction phase, about 100 construction workers or less are expected to be required.

However, during Delayed Coker Unit shutdown periods (e.g., about eight weeks during Months 15, 16, and 17), two 10-hour construction shifts are expected. The first shift is scheduled to operate from 6:30 a.m. to 5:00 p.m. and the second shift is scheduled to operate from 6:30 p.m. to 5:00 a.m. The number of construction workers for the proposed Project will peak at 167 workers per shift (335 total workers per day and 670 total construction-employee-related vehicle trips per day), who will be working on proposed Project construction during Months 15, 16, and 17 for about eight weeks. During this period, construction activities are planned for seven days per week, incorporating two 10-hour shifts per day. The analysis presented in this section assumes that all workers commute individually. However, Chevron will encourage ride-sharing by construction workers to minimize construction traffic impacts.

The City of El Segundo General Plan Circulation Element describes the roadway segments of Sepulveda Boulevard between Imperial Avenue and Mariposa Avenue and Rosecrans Avenue between Douglas Street and Aviation Boulevard as operating at an unacceptable LOS "E". In order to avoid adding peak hour trips to these sections of roadway, temporary construction workers will be prohibited from accessing the site from Sepulveda Boulevard and Rosecrans Avenue, but will have access to the Refinery via the regional freeway system, Main Street, and Vista Del Mar. A mitigation measure has been included to enforce this requirement.

The City of El Segundo uses the Los Angeles County Congestion Management Program traffic study guidelines, which require traffic impact analyses for projects that generate 500 trips or more in one day (Los Angeles County Metropolitan Transportation Authority, 2010). Construction activities associated with the proposed Project are expected to exceed that threshold during peak construction activities. Therefore, a LOS impact analysis was conducted for study area intersections. Since the morning shift change at 5 a.m. and 6:30 a.m. would occur before the a.m. peak hours of travel from 7 a.m. to 9 a.m., a LOS analysis was not conducted for the a.m. peak hour. However the

afternoon shift change would coincide with the p.m. peak hours of travel from 4 p.m. to 6 p.m. and is included in the analysis.

The Los Angeles County Congestion Management Program (CMP) traffic study guidelines direct the usage of the intersection capacity utilization methodology from which a volume to capacity ratio is calculated to determine the intersection level of service. A significant impact occurs when the proposed project increases traffic demand by two percent of capacity (volume to capacity ratio greater than or equal to 0.02) at an intersection operating at LOS D, E, or F. Traffic counts and intersection signalization and geometrics were collected for seven area intersections. For the purposes of this analysis 100 percent of the worker trips will utilize Main Street to access the project construction site.

The traffic impacts from the proposed Project plus the existing traffic are summarized in Table 4-12. Based on the analysis, the proposed Project is not expected to result in any potentially significant impacts and the LOS at all intersections would be LOS A or B, indicating free flow traffic conditions. Therefore, no significant traffic impacts at local intersections are expected to occur during the construction phase of the proposed Project.

TABLE 4-12

Peak Construction Traffic LOS Analysis

Intersection	Baseline Conditions		Baseline Conditions plus Project		Change in V/C Ratio
	P.M. Peak Hour		P.M. Peak Hour		
	LOS	V/C Ratio	LOS	V/C Ratio	P.M. Peak Hour
1. Main St./Imperial Hwy	A	0.54	B	0.60	0.06
2. Vista Del Mar/Imperial Hwy	A	0.53	A	0.53	0.00
3. Vista Del Mar/Grant Ave.	A	0.52	A	0.52	0.00
4. Main St./Imperial Ave.	A	0.55	A	0.60	0.05
5. Main St./Grand Ave.	A	0.46	A	0.51	0.05
6. Main St./Holly Ave.	A	0.30	A	0.35	0.05
7. Main St./Mariposa Ave.	A	0.48	A	0.53	0.05

See Appendix D for additional details on the traffic LOS analysis and intersection calculations.
V/C = volume to capacity ratio

The parking for all construction workers will be provided onsite at the Refinery. The Refinery has more than 335 parking spaces available for contract workers for the

proposed Project. Therefore, the existing parking spaces at the Refinery are adequate to handle the projected number of construction workers.

4.4.3.2 Construction Impacts Associated with Coke Drum Transport

The planned transportation route for the six new coke drums to the Refinery will begin once the coke drums have been off-loaded from a barge in King Harbor in the City of Redondo Beach. The coke drums will be off-loaded and transported on Marina Way. From Marina Way, the drums will move north onto N. Harbor Drive, east onto Herondo Street, and north on to Pacific Coast Highway (which turns into Sepulveda Boulevard) until reaching Rosecrans Avenue. The coke drums will then be transported west onto Rosecrans Avenue and then north into the Refinery at Gate 21. The characteristics of the road segments along the transportation route are summarized in Table 4-13.

TABLE 4-13

Normal Roadway Segment Conditions

Affected Roadway	Roadway Segment	Jurisdiction	Travel Lanes		Roadway width (ft)	Length of Segment (mile)	Median Type
			NB/EB	SB/WB			
Marina Way	West of Harbor Dr.	Redondo Beach	1	1	65-70	0.25	Divided
N. Harbor Drive	Marina to Yacht Club	Redondo Beach	1	1	55-60	0.20	Undivided
N. Harbor Drive	South of Yacht Club to Herondo St.	Redondo Beach	1	1	55-60	0.04	Divided
Herondo Street	Harbor Drive to Pacific Coast Hwy	Redondo Beach	2	2	75-85	0.44	Divided
Pacific Coast Hwy	Herondo to Artesia	Hermosa Beach	3	3	75	1.31	Undivided
Sepulveda Blvd.	Artesia to Manhattan Bch Blvd	Manhattan Beach	3	3	75-85	1.01	Divided
Sepulveda Blvd.	Manhattan Bch Blvd to Rosecrans	Manhattan Beach	3	3	75-85	1.00	Divided
Rosecrans Avenue	East of Chevron Gate 21	El Segundo	2	3	85-90	0.42	Divided

The total route is about 4.6 miles and is preferred because it is the shortest route of the available transport options and only involves one bridge along the route. Because the area is highly urbanized, a number of obstructions are located along the route including

overhead wires/cables, signals, medians/dividers, streets signs, and landscaping. The type and number of obstructions along the route are summarized in Table 4-14.

TABLE 4-14

Obstructions Along 4.6 Mile Transportation Route

Type of Obstruction	Estimated Number of Obstructions
Number of Cables or Wires that Need to be Lifted	38
Number of Signals that Need to be Temporarily Relocated	20
Medians/Dividers that Need to be Removed and Reinstalled	3
Number of Street Signs that Need to be Temporarily Removed and Reinstalled	26
Areas Where Landscaping Needs to be Removed and Replaced	7

The coke drums will be transported one per night from King Harbor in Redondo Beach to the Refinery in El Segundo. It is anticipated that it would take an entire night to move each coke drum from King Harbor to the Refinery. A coke drum will be loaded on to the transport carrier and secured. The transport vehicle is expected to be about 190 feet in length and about 28 feet wide. The size of the vehicle and vessel will necessitate the closure of streets as the carrier moves along the proposed route. To accomplish the transport, a controlled perimeter around the transport carrier will be developed using licensed oversize escort cars and escorted/enforced by the California Highway Patrol. Methods of controlling the public and safe moving area will require temporary road closures, and sometimes closure of additional roads in order to remove all possible interferences. The escort cars and California Highway Patrol vehicles will be equipped with sirens, horns, and loud speakers which can be used for communication in the event of an emergency.

A preconstruction crew will precede transport activities to lift, remove, and replace objects that are obstructing the route including overhead lines and cables, street signals, street signs, street dividers, and landscaping. The preconstruction crew will temporarily remove obstacles from the route. Traffic lights may be placed on swing arms to facilitate the multiple coke drum moves. Cables and overhead lines will be moved out of the way. Landscaping adjacent to portions of the route and in the center median divider along the route may need to be temporarily removed to allow access. Examples are a palm tree near the entrance to the harbor along Marina Way and landscaping along the center divider of Sepulveda Boulevard at several locations. Landscaping, such as trees, will be temporarily removed during the transport activities and will be put back into place following completion of the transport activities. Plants, bushes and scrubs are expected to be cut back, if necessary to avoid entanglement with the coke drums. The heavy

transport carrier is not expected to travel on the medians as the streets along the route have sufficient width. Initial work along the route is expected to occur several weeks prior to the move. Road closures would not be required for these preliminary modifications; however, a lane of traffic may require closure to complete the road preparations which could include relocating street signs, relocating landscaping along the street medians, relocating overhead power lines and signals, etc. All pre-transportation work will require approval from the local jurisdiction, implementation of a traffic control plan, and would be conducted during off-peak hours to minimize traffic conflicts, so that the preliminary construction activities are expected to be less than significant. There are various local jurisdictions with approval authority along the transportation route, however, Caltrans regulates state highways, which includes Sepulveda Boulevard and Pacific Coast Highway. So Caltrans has the predominant approval authority over the transportation route. Local jurisdictions, such as the City of Redondo Beach have approval authority over other streets such as Marina Way and Herondo Street.

Chevron will coordinate with Metro to relocate any stops or services that will be disrupted by the drum transportation route. The last scheduled Northbound Metro Route 232 stop at Pacific Coast Highway and 9th Street is scheduled to occur at 10:57 p.m., therefore all northbound Metro Route 232 service would conclude prior to the scheduled coke drum transportation along Pacific Coast Highway and Sepulveda Boulevard. Southbound Metro Route 232 would have service that overlaps with the scheduled coke drum transportation between 11:49 p.m. at Sepulveda and Rosecrans in El Segundo and 11:57 p.m. at Pacific Coast Highway and 9th Street in Hermosa Beach. Since it is likely that the coke drum transport will occur on the north bound side of the roadway, Chevron will work with the Metro to ensure the southbound Route 232 service can maintain through access along Pacific Coast Highway and Sepulveda Boulevard during street closure resulting from the coke drum transportation.

Westbound Metro Route 130 service along Harbor Drive at Marina Way would occur between 9:26 p.m. and 9:37 p.m. (schedule stops at Pacific Coast Highway at Artesia in Hermosa Beach and Torrance at Broadway in Redondo Beach, respectively), which would potentially overlap with the coke drum transportation. Metro will be informed of the potential for delay during the six days when coke drum transport will occur. The last Eastbound Metro Route 130 occurs between 8:32 p.m. and 8:46 p.m., which is before the start of the scheduled coke drum transport, so no impact from coke drum transport is expected to occur. Beach Cities Transit line 109 service could overlap with the coke drum transportation if took longer than its scheduled completion in the morning and will be notified of the proposed Project.

The transport carrier transporting a coke drum is expected to leave Redondo Beach in the evening following the completion of peak hour traffic. The preliminary schedule for the transport of the coke drums from King Harbor is provided in Table 4-15. (Note that this schedule may be modified based on transportation permits and traffic control plans approved by Caltrans, CHP, and local jurisdictions). During the move, the transport carrier will be escorted by the California Highway Patrol and oversize escort cars. The

transport carrier is expected to travel at about two to three miles per hour. A preconstruction crew will immediately precede the transport carrier and escorts, and temporarily move obstacles (e.g., signals, power lines, signs, etc.) out of the way. Once the transport carrier has passed a given location, a post construction crew will follow to put signals and signs, etc., back into place. This will be done after each drum passes through an area. It is anticipated that the transport carrier will reach the Refinery and all roadways will be returned to usable condition prior to beginning of the morning peak hour. Emergency situations are under the jurisdiction of the escorting CHP. Contingency plans for planned and emergency conditions would be developed as part of the oversized permit and the Traffic Management Plan.

TABLE 4-15

Preliminary Transportation Schedule

Transportation Segment	Start Time	End Time	Duration
Leave Marina Way, Herondo St. & Pacific Coast Hwy	9:00 p.m.	11:00 p.m.	2 hours
Pacific Coast Hwy to Rosecrans	11:00 p.m.	3:00 a.m.	4 hours
Rosecrans to Chevron Gate 21 staging area	3:00 p.m.	5:00 a.m.	2 hours

Intersections along the route where escort cars and the transport carrier travel straight through (i.e., no turns) are expected to be temporarily blocked for less than five minutes. The intersections where the route requires the transport carrier to make turns will take longer. The intersections of Marina Way/Harbor Drive, Harbor Drive/Herondo Street, Herondo Street/Pacific Coast Highway, Sepulveda Boulevard/Rosecrans Avenue, and Rosecrans Avenue/Chevron Gate 21 are expected to be temporarily blocked for 10 to 30 minutes as the transport carrier must take the corners slower because of its length to remain in the right-of-way and avoid any obstructions. Due to the extensive grid network in the area of the drum transportation route, alternative routes for closed roadway segments will be available for the duration of the coke drum transportation activities.

When all drums have been transported to the Refinery, a construction crew will permanently replace all items that were moved. Center dividers that were removed or damaged will be repaired or re-installed and any landscaping removed will be replaced and replanted. Overhead cables and lines will be moved back into place and all streets/roadways will be returned to their preconstruction condition.

Although the transport of the coke drums is expected to result in temporary road obstructions, the coke drums are expected to be transported during the nighttime hours (9 p.m. to 5 a.m.) when traffic is at a minimum. Implementation of the identified Project Design Features, which include development of transportation control plans, approvals

from local jurisdictions, and notification to local fire and police departments are expected to minimize potential traffic impacts and traffic hazards to less than significant.

4.4.4 MITIGATION MEASURES

The impact of the proposed Project on traffic and transportation would be less than significant with the implementation of traffic control plans and the related Project Design Features, so no additional mitigation measures are required. In order to enforce one of the Project Design Features, mitigation measure TT-1 will be required. (Note that other Project Design Features are enforced through required existing regulations, and required permits and approvals.)

TT-1 Construction workers during the Refinery turnaround (peak construction activities) will be prohibited from accessing the Refinery from Sepulveda Boulevard and Rosecrans Avenue, and will be required to use Main Street and Vista Del Mar via Imperial Highway. This mitigation measure will be incorporated into the contract with the construction contractor and enforced by observing employee arrivals at the beginning of the work shifts to observe the direction of arrivals. The measure will be enforced through initial training, consultations, reprimands, and ultimately through employee termination.

4.4.5 LEVEL OF SIGNIFICANCE FOLLOWING MITIGATION

The impact of the proposed Project on traffic and transportation would be less than significant.

4.5 GROWTH INDUCING IMPACTS

4.5.1 INTRODUCTION

CEQA defines growth-inducing impacts as those impacts of a proposed project that "could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects, which would remove obstacles to population growth" (CEQA Guidelines §15126.2(d)).

To address this issue, potential growth-inducing effects are examined through the following considerations:

- Facilitation of economic effects that could result in other activities that could significantly affect the environment;

- Expansion requirements for one or more public services to maintain desired levels of service as a result of the proposed Project ;

- Removal of obstacles to growth, e.g., through the construction or extension of major infrastructure facilities that do not presently exist in the project area or through changes in existing regulations pertaining to land development;
- Adding development or encroachment into open space; and/or

- Setting a precedent that could encourage and facilitate other activities that could significantly affect the environment.

4.5.2 ECONOMIC AND POPULATION GROWTH, AND RELATED PUBLIC SERVICES

The proposed Project would not directly foster economic or population growth or the construction of new housing in the southern California area. Although the proposed Project involves a construction project within an existing industrial area, it would not directly or indirectly stimulate substantial population growth, remove obstacles to population growth, or necessitate the construction of new community facilities that would lead to additional growth in the surrounding area.

A project would directly induce growth if it would directly foster economic or population growth or the construction of new housing in the surrounding environment (e.g., if it would remove an obstacle to growth by expanding existing infrastructure). The proposed Project would not remove barriers to population growth, as it involves no changes to General Plan, zoning ordinance, or related land use policy. The proposed Project does not include the development of new housing or population-generating uses or infrastructure that would directly encourage such uses. The residential areas in the immediate vicinity of the proposed Project (El Segundo and Manhattan Beach) are built out. Therefore, the proposed Project would not directly trigger new residential development in the area.

The proposed Project would temporarily contribute to regional employment, requiring employees for construction activities at the Refinery. The construction work force is expected to require between 100-200 construction workers. Peak construction activities are expected to require about 335 workers per day for about eight weeks. Operation of the proposed Project is not expected to create any additional jobs, as it involves the replacement of existing coke drums with new coke drums which would allow the Refinery to continue existing operations with less disruption than is occurring with the existing coke drums. It is expected that construction workers will be largely drawn from the existing workforce pool in southern California.

Considering the existing workforce in the region and current unemployment rates, it is expected that a sufficient number of workers are available locally and that few or no workers would relocate for construction jobs created by the proposed Project. Further, the proposed Project would not be expected to result in an increase in local population, housing, or associated public services (e.g. fire, police, schools, recreation, and library facilities) since no increase in the permanent number of Refinery workers is expected.

Likewise, the proposed Project would not create new demand for secondary services, including regional or specialty retail, restaurant or food delivery, recreation, or entertainment uses. As discussed in the NOP/IS (see Appendix A), implementation of the proposed Project would not increase the demand for water, wastewater, electricity, solid waste disposal capacity, or natural gas. As such, the proposed Project would not foster economic or population growth in the surrounding area in a manner that would be growth-inducing.

4.5.3 REMOVAL OF OBSTACLES TO GROWTH

The proposed Project is located within an existing Refinery where adequate infrastructure is already in place to serve the existing Refinery and existing surrounding population. The proposed Project would involve the replacement of existing coke drums with new coke drums. As such, the proposed Project would help ensure the continued reliable supply of petroleum products in an area that historically has been used for refinery and other related operations. The proposed Project would not result in an increase in the import or refining of crude oil and would not result in the increased production of petroleum products (e.g., gasoline and diesel fuels) but would result in a three to four percent increase in coke production.

The proposed Project would not employ activities or uses that would result in growth inducement, such as the development of new infrastructure (i.e., new roadway access or utilities) that would directly or indirectly cause the growth of new populations, communities, or currently undeveloped areas. Likewise, the proposed Project would not result in an expansion of existing public service facilities (e.g., police, fire, libraries, and schools) or the development of public service facilities that do not already exist.

4.5.4 DEVELOPMENT OR ENCROACHMENTS INTO OPEN SPACE

Development can be considered growth-inducing when it is not contiguous to existing urban development and introduces development into open space areas. The proposed Project is situated within an existing Refinery in a heavy industrial, urbanized area that is currently developed. The proposed Project would not result in development within or encroachment into an open space area.

4.5.5 PRECEDENT SETTING ACTION

The proposed Project will require permits and other regulatory approvals from state, federal, and local agencies. For construction and operation of the new coke drums, permits and approvals from a number of agencies are required including: (1) a Title V permit issue by the SCAQMD; (2) CalOSHA construction-related permits; (3) oversize transport permit from Caltrans and local jurisdictions; (4) permits to construct/operate from the SCAQMD; and (5) building and related permits from the City of El Segundo. These required approvals are routine permit actions and would not result in precedent-setting actions that might cause significant environmental impacts.

4.5.6 CONCLUSION

The proposed Project would consist of replacing six existing coke drums with new coke drums that are the same size. The proposed Project would not increase the crude throughput of the Refinery, but would help ensure the efficient manufacture of petroleum products at an existing Refinery that has been used for refining purposes since 1911. As a development project occurring in an urban, industrialized, and generally built-out environment, the proposed Project would increase long-term stability and the availability of petroleum products. However, the proposed Project would not be considered growth-inducing, because it would not result in an increase in production of resources or cause a progression of growth that could significantly affect the environment either individually or cumulatively.

4.6 SIGNIFICANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED AND SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Section 15126.2(b) of the *CEQA Guidelines* requires that an EIR describe significant environmental impacts that cannot be avoided, including those effects that can be mitigated but not reduced to a less than significant level. The following is a summary of the impacts associated with the proposed Project that this ~~Draft~~ *Final* EIR concluded are significant and unavoidable. These impacts are also described in detail in the preceding portions Chapter 4.0 of this EIR.

- Air quality impacts associated with the proposed Project construction activities are considered to be significant for NOx emissions.

- Noise impacts during construction activities are significant due to the transport of coke drums during the nighttime hours.

Feasible mitigation measures have been developed for the identified adverse significant impacts; however, those mitigation measures would not reduce the impacts to less than significant. However, impacts would no longer occur upon completion of the construction phase.

4.7 ENVIRONMENTAL EFFECTS NOT FOUND TO BE SIGNIFICANT

The environmental effects of the proposed Project are identified and discussed in detail in the preceding portions of Chapter 4 of this EIR and in the Initial Study (see Appendix A) per the requirements of the CEQA Guidelines (§15128). The following topics of analysis in this EIR were found to have no potentially significant adverse effects, after mitigation:

Air Quality during project operation
Transportation/Traffic
The following topics of analysis were found to have no potentially significant adverse effects in the Initial Study (see Appendix A):

Aesthetics
Agriculture and Forest Resources
Biological Resources
Cultural Resources
Energy
Geology/Soils
Hazards and Hazardous Materials
Land Use/Planning
Mineral Resources
Population/Housing
Public Services
Recreation
Solid/Hazardous Waste

Potentially significant adverse impacts were identified for air quality during construction and noise during construction.

CHAPTER 5

CUMULATIVE IMPACTS

Introduction
Air Quality
Noise
Transportation/Traffic

5.0 CUMULATIVE IMPACTS

5.1 INTRODUCTION

This chapter presents the requirements for analysis of the cumulative impacts, including the analysis of the potential for the proposed Project, together with other past, present, and reasonably foreseeable future projects in each resource area's cumulative geographic scope, to have significant cumulative effects. Following the presentation of the requirements related to cumulative impact analyses and a description of the related projects (Sections 5.1.1 and 5.1.2, respectively), the analysis in Section 5.2 addresses each of the resource areas for which the proposed Project may make a cumulatively considerable contribution to cumulative impacts when combined with other reasonable and foreseeable projects in the area.

5.1.1 REQUIREMENTS FOR CUMULATIVE IMPACT ANALYSIS

State CEQA Guidelines (14 CCR §15130) require that an EIR include a reasonable analysis of the significant cumulative impacts of a proposed project. Cumulative impacts are defined by CEQA as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (State CEQA Guidelines, §15355).

Cumulative impacts are further described as follows:

- The individual effects may be changes resulting from a single project or a number of separate projects.

- The cumulative impacts from several projects are the changes in the environment which result from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (State CEQA Guidelines, §15355[b]).

- As defined in §15355, a "cumulative impact" consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR.

When considering whether or not a project contributes to cumulative impacts, it is also necessary to consider CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable."

The following cumulative impact analysis focuses on whether the impacts of the proposed Project are cumulatively considerable within the context of impacts caused by

other past, present, or reasonably foreseeable future projects. This cumulative impact analysis considers other related projects or projects causing related impacts proposed within the area defined for each resource that would have the potential to contribute to cumulatively considerable impacts. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

For this ~~Draft~~ *Final* EIR, related projects with a potential to contribute to cumulative impacts were identified using the "list" approach, using a list of closely related projects that would be constructed in the cumulative geographic scope. The list of related projects or projects causing related impacts utilized in this analysis is provided in Table 5-1.

TABLE 5-1

List of Cumulative Projects

Map No.	Location	Size	Project description	Distance[(1)]	Status
City of El Segundo					
1	888 N. Sepulveda Blvd.	88,859 sq ft	9-story Hotel.	4,650	Coordinating and Preparing Plans
2	1960 E. Grand Ave.	90,004 sq ft	New 4-story, 160 room Hotel.	1,150	On Hold per Applicant's Request
3	301 Maryland St. 530 E. Imperial Ave. 219 W. Mariposa Ave.	Not Available	Environmental Review for Aquatics Site Feasibility Study for Three Potential Aquatic Centers.	1,100 2,700 5,100	EIR Certified 8/17/11
4	City of El Segundo	Citywide	General Plan Amendment and Zone Text Amendment (Title 14-Subdivision Regulations and Title 15- Zoning Regulations) Regarding Right-of-Way Dedications.		Work Started in Fiscal Year 2011
5	850 S. Sepulveda Blvd.	Not	Traffic Study (1C).	210	City Planning Review
6	540 E. Imperial Ave.	Not Available	Imperial School Site Senior Housing / Assisted Living Project.	5,100	EIR Certified 11/3/11
7	2100 El Segundo Blvd.	1.9 million sq ft	Raytheon Campus Specific Plan – Office Park Expansion.	890	Project on Hold
8	600 N. Sepulveda Blvd.	3,714 sq ft	Demo existing Sizzler for a new In-N-Out Burger.	2,800	Incomplete Permit 05/26/11
9	750 1/2 N. Lairport St.	Not Available	ESA to Modify Existing Wireless Communication Facility on a Monopole.	3,550	Incomplete Permit Submission 05/23/11
10	301 Vista Del Mar	Not Available	Major Wireless Facility with 80-foot Monopole.	160	Incomplete Permit Submission 09/14/11

TABLE 5-1 (continued)

List of Cumulative Projects

MAP NO.	LOCATION	SIZE	PROJECT DESCRIPTION	Distance[(1)]	STATUS
11	1501-1509 E. El Segundo Blvd.	Not Available	Dog Day Care and Animal Kennel.	80	Incomplete Permit Submission 06/23/11
12	629 W. Acacia Ave. / 620 W. Imperial Avenue	Not Available	Prop. 84 Grant for Acacia Park Improvements and Expansion.	5,100	Environmental Statutory Notice of Exemption Filed on 06/29/11
13	Chevron Refinery	38,000 sq ft	Construction of a Refinery Optimization Center building as the operations center for most of the Chevron Refinery.	Within Refinery	Under Construction
14	Chevron Refinery	89,900 sq ft	Construction of the Central Reliability Center consisting of the demolition of 7 existing structures, relocation of 3 trailers, construction of one new building (81,900 sq ft), and additions to existing buildings (8,000 sq ft).	Within Refinery	CEQA Document being Developed
15	Site#1: NW Corner of E. Mariposa Ave. & Douglas St. Site#2: 2283 & 2355 Utah Ave.	Buildings total 150,000 sq ft	Develop a high school capable of housing 1,100 to 1,200 students in grades 9 through 12. It is anticipated that the high school would have 40 to 50 classrooms plus athletic and support facilities.	4,400	NOP Released 06/20/11
16	1935 S. Hughes Way	Approx. 1 acre	Phase V Expansion of the Edward C. Little Water Recycling Facility, increasing treatment capacity to 72.2 mgd and updating systems to handle the increase capacity.	210	MND Certified 05/31/11
17	301-999 Vista Del Mar Blvd.	22 acres	Proposed closure activities to excavate up to 2,500 cubic yards of soil underlying two surface water impoundment units and associated pipelines and appurtenances at the SoCal Edison Generation Station.	160	NOE Published 07/26/10
City of Manhattan Beach					
18	Corner of Manhattan Beach Blvd. and Valley Dr.	349,321 sq ft	Civic Center / Library / Metlox Project.	6,000	Construction Completed
19	11400-12700 Vista Del Mar	Not Available	El Segundo Power Plant (Redevelopment) Cogeneration Replacement Project	160	Construction to be Completed 08/2013
20	NE Corner of Sepulveda Blvd. & Rosecrans Ave.	108 gross acres	Plaza El Segundo (Commercial).	250	Construction Complete
21	3912 Highland Ave.	Not Available	Demo / New Mixed-Use Building.	235	Approved 09/13/11
22	410 Manhattan Beach Blvd. / 1011 Valley Blvd.	Not Available	Vons- New Parking Lot.	6,050	Approved 10/24/11

TABLE 5-1 (concluded)

List of Cumulative Projects

MAP NO.	LOCATION	SIZE	PROJECT DESCRIPTION	Distance[(1)]	STATUS
23	1030 Manhattan Beach Blvd.	Not Available	Demo Existing Pre-School /Construct New Pre-School.	5,400	Submitted to Planning Commission 11/09/11
24	801 27th Street	Not Available	Modifications to Existing Telecom Facility.	2,120	Application Submitted 08/11/11
25	Beach, South of Pier	Not Available	Modify Existing Equipment (Telecom).	6,750	Application Submitted 08/25/11
26	3624 Bell Ave.	Not Available	Expand Existing Day Care Facility	160	Application Submitted 08/26/11le
27	1330 Parkview Ave.	Not Available	Amend Permit for 200 Additional Country Club Members.	1,400	Approved 12/28/11
28	201 3rd St.	Not Available	Demo Existing Duplex, Construct New Single Family Residence + Apartments.	8,450	Application Submitted 12/16/2011
City of Los Angeles					
29	12000 Vista Del Mar	144 acres	Hyperion Treatment Plant Digester Gas Utilization Project Proposed to Construct a Cogeneration Plant to Combust its Digester Gas.	1,350	NOP Filed 04/11/11
30	12700 Vista Del Mar	56 acres	Repower Scattergood Generating Station Unit 3 with modern, state-of-the art, combined-cycle units, and/or simple-cycle gas turbine units.	150	EIR Certified 05/17/2012
County of Los Angeles					
31	Cities of Los Angeles, Carson, Compton, Gardena, and Hawthorne	Not Applicable	The Smart Energy Transport System is a fuel delivery system that would include an approximately 24-mile pipeline of 12 to 16 inches in diameter as well as ancillary pumping and receiving systems from the Vopak Inland Terminal to LAX.	Approx. 1 mile	EIR certified in May 2011. Phase I under Construction 2012 through 2014

Footnote:
(1) Distance is from Refinery boundary to approximate project location.

5.1.2 PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

5.1.2.1 Past Projects

The City of El Segundo was once part of the Sausal Redondo Rancho controlled by Daniel Freeman, the founder of Inglewood. Standard Oil Company began construction of the Refinery in May 1911, after a two-mile long rail spur serving the site was completed. By the end of 1912, El Segundo had grown from a "tent city" to include 180 homes and 20 businesses, a school, a bank, churches and five hotels. The El Segundo Land and

Improvement Company offered inducements to those wanting to build a home. This company managed the growth of El Segundo until the City was incorporated on January 18, 1917.

The city grew along with the growth of the refinery. There were other short-lived smaller ventures such as a tractor assembly plant that later became a tile manufacturing plant. A nearby landing strip was used by early aviators and was later chosen as the site for the Los Angeles Municipal Airport. Expansion with the official opening of the airport in 1930 ushered in numerous aviation companies, including Douglas Aircraft, Hughes Aircraft, Northrop, Interstate, and North American Aviation (Northrop) all located in El Segundo. After World War II, many of these companies eventually transitioned into the aerospace/defense industry. In the 1960's, the Aerospace Company Corporation and the Los Angeles Air Force Base were also added to El Segundo, creating a high density of aerospace companies within the city. Today, the city's population is about 16,500.

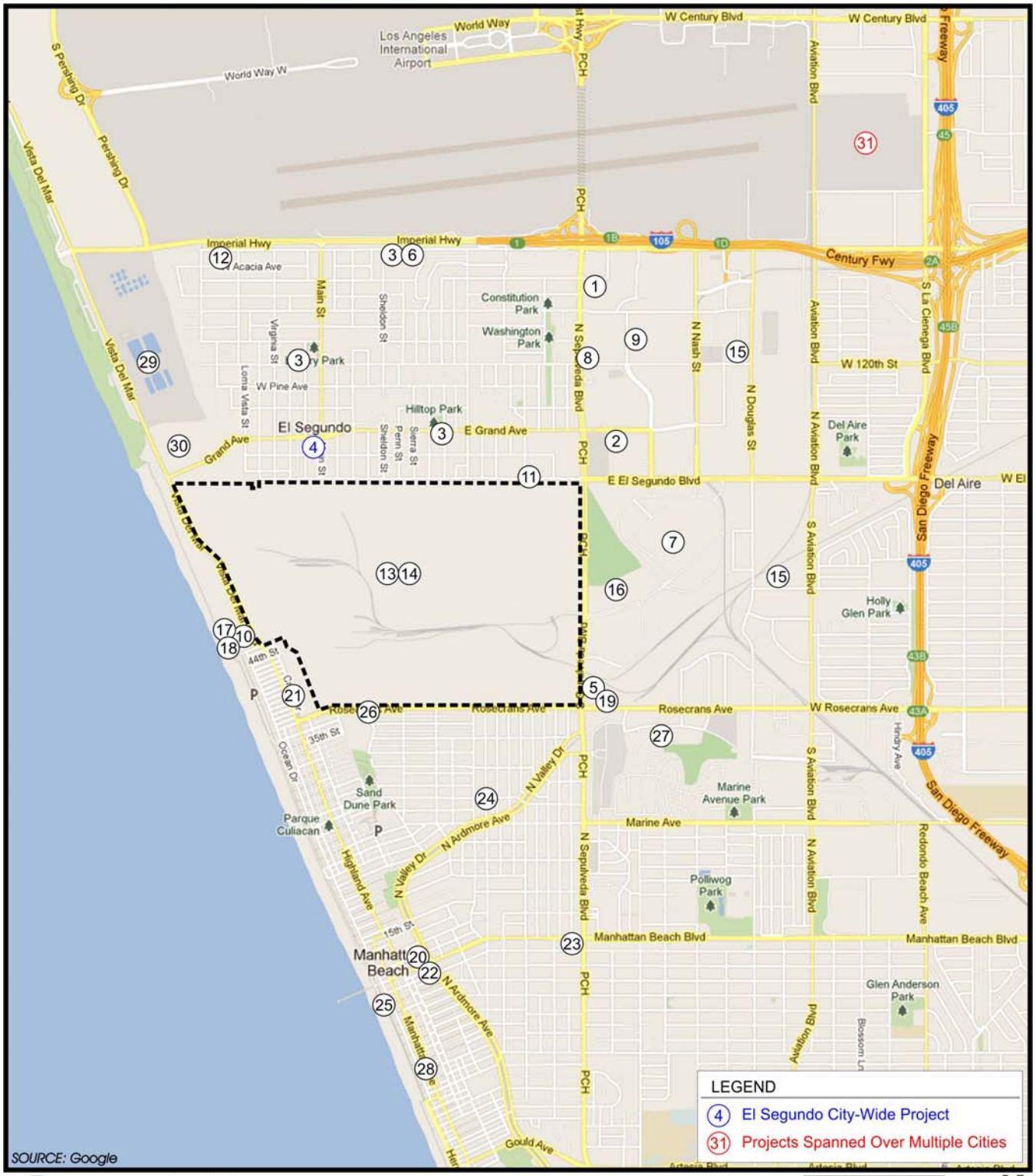
The Refinery, having been in operation since 1911, has undergone many improvements over the years. The most recent project implemented at the Refinery, where the SCAQMD was lead agency, was the Product Reliability and Optimization (PRO) Project, which underwent CEQA review in 2008. The most recent project implemented at the Refinery, where the City of El Segundo was the lead agency, was the Refinery Optimization Center (ROC), which underwent CEQA review in 2011. The PRO Project included modifications to specific existing process units and also new infrastructure that supports and links the units to other processes, units, or facilities throughout the Refinery. The ROC, currently under construction, is a new operations center, consolidating most Refinery operations located throughout the Refinery.

5.1.2.2 Current and Future Projects

The proposed Project will occur within the City of El Segundo, in the southwest portion of Los Angeles County within Southern California. There are a number of present, and reasonably foreseeable future, projects in the vicinity of the proposed Project. A total of 38 present or reasonably foreseeable future projects (approved or proposed) have been identified within the general vicinity of the proposed Project that could contribute to cumulative impacts. The list of cumulative projects is provided in Table 5-1 and the corresponding locations are shown in Figure 5-1.

The cumulative projects in Table 5-1 have been identified using databases from the City of El Segundo, City of Manhattan Beach, State Clearinghouse, City of Los Angeles, and County of Los Angeles. For the purposes of this EIR, the timeframe of current or reasonably anticipated projects extends up to the year 2015 and the vicinity is defined as the area over which effects of the proposed Project could contribute to cumulative effects.

Local impacts were assumed to include projects which would occur within the same timeframe as the Coke Drum Reliability Project and which are within a one-mile radius of the Refinery site. These projects generally include other Refinery projects and projects



CUMULATIVE PROJECTS LOCATION MAP
Chevron Coke Drum Reliability Project

Project No. 2706

Figure 5-1

N:\2706\Cumulative Projects\CumulativeProjectsLocationMap (rev.4).cdr

in near-by cities. Figure 5-1 identifies by number the location of each of the projects. The numbers are used to identify the related projects throughout the discussion of cumulative impacts.

Most of the resources affected by the proposed Project would primarily occur during the construction phase, e.g., potential impacts to air quality, noise, and traffic. Construction impacts on air quality, noise, and traffic are generally localized and there is sufficient distance between projects located over one mile away from the Refinery to avoid cumulative impacts.

5.2 CUMULATIVE IMPACT ANALYSIS

The following sections analyze the cumulative impacts identified for each resource area evaluated in the EIR. Except where noted, the significance criteria used for the cumulative analysis are the same as those used in Chapter 4 for the evaluation of the proposed Project impacts.

5.2.1 AIR QUALITY

5.2.1.1 Scope of Analysis

The region of analysis for cumulative effects on air quality is the Basin, but the analysis is focused on the communities adjacent to the Refinery (i.e., the cities of El Segundo and Manhattan Beach) because that is the area of maximum potential effect.

5.2.1.2 Construction Impacts

The proposed Project could result in significant construction emissions for NOx during the construction period (see Table 4-2). Therefore, the project-specific air quality impacts associated with construction activities are considered significant.

In the time period between 2013 and 2014, several construction projects identified in Table 5-1 have the potential for construction activities that overlap with the construction activities for the proposed Project and may result in significant construction air quality impacts. One project that has the potential to contribute to cumulative air quality impacts during the construction period could include the Smart Energy Transport Project (#31). For most of the projects in Table 5-1, construction activities are expected to be completed or construction activities are unknown (projects that are on hold) and, therefore, the cumulative impacts for these projects would be considered speculative.

Construction air quality impacts from the proposed Project would contribute to potentially significant cumulative construction air quality impacts if project-specific construction emissions are considered to be cumulatively considerable as defined by CEQA Guidelines §15064(h)(1). Impacts are considered to be cumulatively considerable if they exceed the project-specific air quality significance thresholds. Because NOx construction emissions exceed the project-specific NOx construction significance

threshold, it is considered to be cumulatively considerable and cumulatively significant when considered in combination with other cumulatively related projects. Since VOC, CO, SOx, PM10, and PM2.5 construction emissions do not exceed their respective project-specific thresholds, they are not considered to be cumulatively considerable and, therefore, are not considered to contribute to cumulative construction impacts. This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable."

5.2.1.3 Operational Impacts

The past, present, and reasonably foreseeable future projects would have a significant cumulative impact if their combined operational emissions would exceed the SCAQMD's project-specific daily emission thresholds for operations (see Table 4-1). The proposed Project is not expected to result in an increase in daily emissions as it will replace existing coke drums. The operations increase in emissions associated with the proposed Project is from the improved reliability of the new coke drums. Peak daily emissions would not change as the daily operational capacity of the Delayed Coker Unit will not change. However, because of the improved reliability of the new coke drums, a three to four percent increase in the operational efficiency of the Delayed Coker Unit is expected on an annual basis. Consequently, the annual emissions from the Delayed Coker Unit are expected to increase by three to four percent. Daily emissions during operation of the proposed Project are ~~not~~ expected to be substantially less than the applicable operational significance thresholds. Therefore, project-specific air quality impacts associated with operational emissions from the proposed Project are not considered to be cumulatively considerable and, therefore do not contribute to significant adverse cumulative air quality impacts.

Other related projects at the Refinery include the construction of new Optimization Center and Central Reliability Center Buildings (Nos.13 and 14) and relocation and demolition of other buildings (No. 14), none of which are expected to increase operational emissions. Therefore, no significant cumulative impacts are expected from other projects at the Refinery.

It is possible that other cumulative projects could result in significant operational air quality impacts including modifications to the El Segundo Power Plant (#18). In addition, projects could provide air quality improvements by reducing traffic delays, such as the Sepulveda/Rosecrans Site Rezoning and Plaza El Segundo Development (#19). However, as already noted above operational emissions from the proposed Project are expected to be substantially less than the applicable project-specific operational significance thresholds. Therefore, operational emissions associated with the proposed Project would not contribute to significant adverse cumulative air quality impacts.

5.2.1.4 Toxic Air Contaminant Impacts

The impacts from TACs are localized impacts. For example, impacts from exposures to TACs decline by approximately 90 percent at 300 to 500 feet from the emissions source (SCAQMD, 2005). As indicated in Table 5-1, most related projects are located at greater than 500 feet from the Delayed Coker Unit such that potential toxic air contaminant impacts would not overlap with the proposed Project. The proposed Project impacts on health effects associated with exposure to TACs are expected to be substantially below the SCAQMD's cancer risk and hazard index significance thresholds and, therefore, less than significant. The proposed Project impacts on cancer risk to the MEIR and MEIW were estimated to be 0.0019 per million and 0.0012 per million, respectively, which is well below the significance threshold of ten per million. The chronic health index was estimated to be 0.0004, which is well below the significance threshold of one (1.0). Since peak daily emissions are not expected to change, the acute hazard index is not expected to change for any pollutant. Therefore, the proposed Project impacts are not considered to be cumulatively considerable and, therefore; are not expected to contribute to significant adverse cumulative TAC impacts.

The only other major industrial project in the area that is likely to emit TACs is the El Segundo Power Plant Redevelopment Project, located 160 *feet* west of the Refinery boundary and over 3,000 feet from the Delayed Coker Unit. A health risk assessment for this project was completed (CEC, 2002). The cancer risk to the maximum exposed individual was calculated to be 0.94 per million. The maximum acute and chronic health indices were estimated to be 0.01 and 0.02, respectively. If TAC risks were to overlap, the potential overlap of the El Segundo Power Plant and the proposed Project would be well below the significance criteria of ten per million for carcinogenic risk and 1.0 for the acute and chronic hazard indices. The other cumulatively related projects are commercial and residential projects and are not expected to be major contributors to TAC emissions. Cumulative impacts of TACs on health are expected to be less than significant.

5.2.1.5 Mitigation Measures

For the construction period, the mitigation measures developed as part of the proposed Project (see Section 4.2.3) will be imposed on other related projects, if the SCAQMD is the lead agency and project-specific impacts are concluded to be significant. The mitigation measures to minimize emissions associated with operation of stationary sources of the related projects include the use of BACT for all new emission sources and modifications to existing sources. BACT would be required for stationary sources regardless of whether the SCAQMD is the lead agency or is a responsible agency. The use of BACT would control localized emissions. A BACT review will be completed during the SCAQMD permit approval process for all new/modified sources.

5.2.1.6 Level of Significance after Mitigation

The cumulative adverse air quality impacts due to construction activities are expected to exceed the SCAQMD's NOx construction significance threshold, are considered to be

cumulatively considerable even after mitigation, and, therefore, would contribute to significant adverse cumulative NOx construction air quality impacts. The project-specific air quality impacts due to operational activities are not expected to exceed the SCAQMD significance thresholds, are not considered to be cumulatively considerable, and would not contribute to significant adverse cumulative operational air quality impacts. The project-specific TAC health impacts would not be significant, are also not considered to be cumulatively considerable, and would not be expected to generate significant adverse cumulative TAC impacts.

CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore the project's contribution to operational air emissions, including toxic air contaminant emissions is not cumulatively considerable and thus not cumulatively significant because the environmental conditions would essentially be the same whether or not the proposed Project is implemented (CEQA Guidelines §15130). This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable".

5.2.2 GREENHOUSE GAS EMISSIONS

5.2.2.1 Contribution of the Proposed Project

The analysis of GHG emissions is a different analysis than for criteria pollutants for the following reasons. For criteria pollutant, significance thresholds are based on daily emissions because attainment or non-attainment is typically based on daily exceedances of applicable ambient air quality standards. Further, several ambient air quality standards are based on relatively short-term exposure effects to human health, e.g., one-hour and eight-hour. Using the half-life of carbon dioxide (CO_2), 100 years, for example, the effects of GHGs are longer-term, affecting the global climate over a relatively long time frame. As a result, the SCAQMD evaluates GHG effects over a longer timeframe than a single day. The interim significance threshold for industrial projects is 10,000 metric tons per year of CO_2 equivalent emissions (see Table 4-1).

GHGs do not have human health effects like criteria pollutants. Rather, it is the increased accumulation of GHGs in the atmosphere that may result in global climate change. Due to the complexity of conditions and interactions affecting global climate change, it is not possible to predict the specific impact, if any, attributable to GHG emissions associated with a single project. Furthermore, the GHG emissions associated with the proposed Project would be small relative to total global or even state-wide GHG emissions. Thus,

the significance of potential impacts from GHG emissions related to the proposed Project has been analyzed for long-term operations on a cumulative basis, as discussed below.

Construction: Construction equipment may include backhoes, compressors, concrete pumps, concrete saws, cranes, excavators, forklifts, front-end loaders, generators, pavers, roll-off trucks, tractors, water truck and welding machines. The equipment is assumed to be operational up to ten hours per day during most of the construction period. Construction workers are expected to be at the site for longer than eight hours per day, but including time for lunch and breaks, organization meetings, and so forth, construction equipment would not be expected to operate the entire time. Also, during peak construction periods, two work shifts are expected. Emission factors for construction equipment were taken from the Construction Equipment Emissions tables available on the SCAQMD webpage (http://aqmd.gov/ceqa/hdbk.html). Estimated emissions from construction equipment used for construction activities are included in Table 5-2, with more detailed calculations in Appendix B.

TABLE 5-2

Construction GHG Emissions for the Proposed Project (metric tons)

Source	CO_2e[(1)]
Construction Equipment	4,472.96
Ships and Tugs	155.36
TOTAL	4,628.32
30 Year Amortized	149.10

(1) CO_2 equivalent emissions or CO_2e.

The project will also include construction equipment working off-site. Construction equipment working off-site includes cranes, line platforms, prime movers, ships, and transporters. The equipment will be used for the transport of coke drums from King Harbor to the Refinery. Emission factors for off-site construction equipment were taken from the Construction Equipment Emissions tables available on the SCAQMD webpage (http://aqmd.gov/ceqa/hdbk.html). The emissions factors for ships were taken from the 2009 Port of Los Angeles Inventory of Air Emissions (Starcrest, 2010). Estimated emissions from construction equipment used for construction activities are included in Table 5-2.

Operational: The SCAQMD significance threshold for GHG emissions combines construction emissions amortized over 30 years with operational emissions. The total GHG construction emissions associated with the proposed Project are estimated to be 4,397 metric tons over the entire construction period, or 149 metric tons per year amortized over 30 years. The operation of the proposed Project is expected to emit 5,287 metric tons per year of GHG emissions (see Appendix B for detailed calculations). The

total GHG emissions associated with the proposed Project, including the 30-year amortized construction GHG emission, is 5,434 metric tons per year, which is less than the interim SCAQMD GHG significance threshold of 10,000 metric tons per year (see Table 5-3). Therefore, the GHG emissions from the proposed Project are less than significant.

TABLE 5-3

Operational GHG Emissions for the Proposed Project (metric tons per year)

Source	CO_2e
Heater F-501	5,081.77
Drum Vents	<0.01
Coke Handling/Truck Trips	203.30
Total Operational	5,285.08
30-Year Amortized Construction	149.10
Total GHG w/ Construction	5,434.18

5.2.2.2 GHG Mitigation Measures

Mitigation measures are not required because the proposed Project would not make a cumulatively considerable contribution to an existing cumulative significant impact. However, during the course of construction, the Delayed Coker Unit and the associated combustion sources would be shutdown to accomplish the proposed Project. Therefore, emission reductions would occur. Table 5-4 shows the emission reductions from not operating refinery equipment (e.g., the Delayed Coker Unit) that are expected to occur during the construction period. Assuming an eight week turnaround period, the total estimated GHG emission reductions associated with the proposed Project would be 29,476 metric tons.

TABLE 5-4

Emission Reductions from Unit Shutdowns During Construction (metric tons per day)

Pollutant	Daily Emissions Reduction
CO_2e	526.36

5.2.2.3 Level of Significance after Mitigation

The cumulative adverse air quality impacts due to construction activities are not expected to exceed the SCAQMD significance thresholds. Therefore, proposed Project impacts are not considered to be cumulatively considerable.

CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore the project's contribution to GHG emissions is not cumulatively considerable and thus not significant because the environmental conditions would essentially be the same whether or not the proposed Project is implemented (CEQA Guidelines §15130). This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable".

5.3 NOISE

5.3.1 CONSTRUCTION IMPACTS

Construction phases of each of the related projects are expected to generate localized, short-term noise impacts, some of which may be significant during construction. Construction activities associated with the industrial projects are located in industrial areas where limited sensitive receptors are located. The use of muffling devices, restriction of most construction work hours to daytime hours, compliance with local noise ordinances, etc., are expected to mitigate the increase in noise at most of the construction sites.

The cumulative construction impacts associated with the related industrial projects are not expected to be significant or exceed noise ordinances. The Refinery and other industrial projects are generally a sufficient distance (at least 0.5 mile) apart that the noise levels are not expected to overlap. Some of the commercial/office buildings are located close to residential and other sensitive receptors and may create noise impacts in residential areas, but because of the distances from the proposed Project to the other cumulative projects and to the residential areas, construction noise from the proposed Project at the Refinery is not expected to contribute to the noise impacts at the residential or sensitive receptors. The other cumulatively related projects at the Refinery are expected to be completed prior to the beginning of the proposed Project, so no construction activities are expected to overlap at the Refinery resulting in cumulative noise impact.

The transport of coke drums from King Harbor to the Refinery was determined to generate potentially significant adverse noise impacts due to the nighttime transportation activities and the location of the route near residential areas. The coke drum transport activities are not expected to result in cumulative noise impacts because noise impacts will be of limited duration (six nights) and construction activities associated with other cumulative projects are not expected to occur during the nighttime. Therefore, the proposed Project is not expected to make a cumulatively considerable contribution to noise impacts.

No increase in operational noise impacts at the Refinery is expected so the proposed Project would not make a cumulatively considerable contribution to operational noise impacts and, therefore, significant adverse cumulative noise impacts are expected to be less than significant.

5.3.2 MITIGATION MEASURES

Mitigation measures for the proposed Project are addressed in Section 4.3.4. Since noise impacts from the proposed Project are not considered to be cumulatively considerable, no additional mitigation measures are required.

5.3.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The noise impacts associated with the cumulative projects are not expected to be significant or contribute to significant adverse cumulative noise impacts during construction or operation. CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore the project's contribution to construction noise impacts is not cumulatively considerable and thus not significant because the environmental conditions would essentially be the same whether or not the proposed Project is implemented (CEQA Guidelines §15130). This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable".

5.4 TRANSPORTATION/TRAFFIC

As determined in the Initial Study, no increase in traffic is expected due to the operation of the proposed Project, therefore the proposed Project's contribution to cumulative traffic during the operational phase would not be considered cumulatively considerable.

5.4.1 CONSTRUCTION IMPACTS

Traffic associated with the construction of the proposed Project is expected to avoid the morning peak hour and be mitigated to less than significant during the evening peak hour. The proposed Project would avoid the major intersections within the cities of El Segundo and Manhattan Beach and generally avoiding other project locations by requiring construction workers to approach the Refinery on specific routes. The LOS at intersections along these routes are currently LOS A & B, indicating free-flowing traffic conditions. Therefore, the proposed Project's contribution to cumulative impacts on traffic during the construction phase would not be considered cumulatively considerable.

5.4.2 MITIGATION MEASURES

Potentially significant adverse project-specific traffic impacts from the proposed Project are expected to be mitigated by avoiding starting the work shifts during the morning peak traffic hours and requiring that construction workers use a specific route that avoids the more congested intersections within the City of El Segundo. In addition, Chevron will encourage ride-sharing by construction workers to minimize construction traffic impacts.

No mitigation measures are required for the operational phase of the proposed Project as no significant project-specific impacts are expected.

5.4.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Individual project impacts on transportation and traffic from the construction and operation of the proposed Project are less than significant. CEQA Guideline §15130(a) indicates that an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider the effect significant, but must briefly describe the basis for concluding that the incremental effect is not cumulatively considerable. Therefore the project's contribution to traffic impacts is not cumulatively considerable and thus not significant because the environmental conditions would essentially be the same whether or not the proposed Project is implemented (CEQA Guidelines §15130). This conclusion is consistent with CEQA Guidelines §15064(h)(4), which states, "The mere existence of cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed Project's incremental effects are cumulatively considerable".

CHAPTER 6

ALTERNATIVES

Introduction
Alternatives Rejected as Infeasible
Description of Project Alternatives
Environmental Impacts from the Project Alternatives
Conclusion

6.0 PROJECT ALTERNATIVES

6.1 INTRODUCTION

Chapter 6 provides a discussion of alternatives to the proposed Project as required by CEQA. According to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project, but would avoid or substantially lessen any significant effects of the project, and provide means for evaluating the comparative merits of each alternative. In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines, §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation.

Alternatives presented in this chapter were developed by identifying alternatives achieving most or some of the objectives of the proposed Project. The range of alternatives were limited due to the fact there is an existing Delayed Coker Unit with coke drums that are approaching the end of their useful life and will need replacement in the near future. Consequently, each project alternative described below is similar to the proposed Project in most respects. The rationale for selecting specific components of the proposed Project on which to focus the alternatives analysis rests on CEQA's requirements to present a range of reasonable project alternatives that could feasibly attain the basic objectives of the project, while generating fewer or less severe adverse environmental impacts.

The objective of the proposed Project at the Refinery is to increase the reliability of coke drum operations. The existing coke drums are in a state of increased repair due to the 40-year age of the coke drums and the amount of use they have been subjected to throughout decades of constant operation (heating and cooling of metal). By replacing the existing drums, maintenance shutdown times are expected to be reduced, increasing reliability in this portion of the Refinery operations.

The proposed Project involves replacing six existing coke drums at the Refinery with six new coke drums. The alternatives presented in this chapter include various options to transport the new coke drums to the site, modifications to the construction phase of the proposed Project, as well as, different operational technologies that would allow the Refinery to meet the basic project objective of increased reliability of the Delayed Coker Unit.

Section 15126.6(f) of the CEQA Guidelines stipulates that the range of alternatives required in an EIR is governed by a rule of reason in that the EIR must discuss only those alternatives "necessary to permit a reasoned choice" and those that could feasibly attain most of the basic objectives of the proposed Project, while reducing potential impacts from the proposed Project.

The project alternatives were developed by modifying one or more components of the proposed Project taking into consideration the project's limitations as to space, permitting requirements, and engineering constraints of the existing Refinery equipment. Unless otherwise stated, all other components of each project alternative are identical to the proposed Project. Alternatives rejected as infeasible and the identified feasible project alternatives are described in the following sections.

Aside from the alternatives described below, no other project alternatives were identified that met most of the objectives of the proposed Project, while substantially reducing significant adverse environmental impacts.

6.2 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reason underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts. Furthermore, CEQA Guidelines §15126.6(f)(2)(B) indicates that if the lead agency concludes that no feasible alternative locations for the project exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR. A description and discussion of the alternatives rejected as infeasible is identified in the following paragraphs.

Partial Derrick Removal: The concept of this alternative was to remove only enough derrick structure necessary to expose each drum for removal. Removing a smaller portion of the derrick structure would have reduced the size of the heavy lift crane, but would have required more lifts to accomplish the complete removal for replacement of the six coke drums. Reducing the size of the heavy lift crane has the potential of reducing crane emissions during construction, as well as increase the population of cranes that could be used during construction activities. However, further engineering and structural analysis determined that the entire cutting deck and derrick structure would need to be removed as a single unit to replace the coke drums; making partial derrick removal infeasible. The Partial Derrick Removal is not feasible and would result in the same or greater construction emission impacts as the proposed Project, i.e., potentially significant air quality impacts during construction and potentially significant noise impacts along the transport route.

Alternative Sites: The Refinery has limited space for new units. Placing the new coke drums at another location would require constructing a new Delayed Coker Unit at an alternate site. An alternate site within the Refinery is not feasible because:

- The optimum placement of the Delayed Coker Unit is within the inner portions of the Refinery to minimize visual and operational noise impacts to the adjacent

community. There is very limited space in the inner portions of the Refinery to site a new Delayed Coker Unit. Siting a new Delayed Coker Unit in a different location in the Refinery, outside the inner portions of the Refinery, would require extensive modifications to the surrounding facilities to provide connectivity with other process units and meet current code and safety requirements, creating a much more complex project.

- An alternative site would require extensive construction to develop the new unit, connect to upstream and downstream processes as well as vapor recovery and safety equipment; and consequently, would result in greater construction and fugitive emissions impacts compared to the proposed Project, thus, not meeting the alternatives criterion of avoiding significant environmental impacts.

An alternative location to the Chevron Refinery site is also not feasible as the proposed Project consists of modifications to an existing Refinery that contains necessary processing units; natural gas, water, and electric transmission infrastructures; crude oil and petroleum product transportation infrastructure; and the appropriate land use designation necessary to support the project. Advantages of the existing Refinery site would be lost if another location were proposed. The development of a new refinery in an alternative location would require substantially more equipment, construction, and potentially generate substantially greater impacts in many environmental categories (e.g., air quality, energy, noise, traffic, and hazards) than the proposed Project. Further, depending on the location of a new Refinery, potentially significant impacts to other environmental topics areas, e.g., aesthetics, biological resources, cultural resources, geology and soils, hydrology and water quality, etc., could occur. Therefore, an alternative refinery site for the proposed Project is not feasible.

Alternate Coking Technology: There are alternate technologies to take the place of a Delayed Coker Unit in upgrading vacuum residuum to high value products. However, in all cases, the process design and construction effort would be orders of magnitude greater than the proposed Project of simply replacing the existing coke drums. This is because changing from the Delayed Coking technology to either the FLUID COKING™ or FLEXICOKING™ technology, the most prominent options, would require construction of an entire new processing complex at a different location due to the magnitude of the changes required. Insufficient time is available during any conceivable turnaround scenario to accomplish the total makeover of the Delayed Coker Unit that would be required. A brief description of the two alternate technologies exemplifies the complexity of conversion to an alternate coking technology: In FLUID COKING™, conversion takes place continuously in a reactor containing fluidized coke rather than batch wise in individual drums as in a Delayed Coking Unit. In FLUID COKING™, overhead vapors from the reactor pass to the main fractionator and reactor bottoms are transferred to an adjacent vessel, called the “Burner”, where 15 percent to 25 percent of the coke is burned with air and circulated back to the reactor to provide the process heat requirements. Remaining hot coke from the Burner is withdrawn and sold as product. The Burner also produces a low heating value flue gas that is usually sent to a steam

boiler. In the FLEXICOKER™ process, excess coke from the Burner, rather than being withdrawn and sold as a product, is sent to another vessel, called the "Gasifier", where the coke is reacted with steam and air to produce fuel gas. In this latter process, essentially all of the coke generated in the reactor is consumed in the process.

Conversion of the existing Delayed Coker Unit to a unit utilizing either the FLUID COKING™ or FLEXICOKING™ technologies would require removal of major portions of the existing Delayed Coker Unit to make room for the reactor, burner, and gasifier vessels and appurtenances. As indicated earlier, this could not be accomplished during any reasonable turnaround scenario and would require construction of an entire new processing complex at a remote location. Successful integration of the low heating value gas by-product into the Refinery as well as combustion of coke are also major process changes that would have to be extensively engineered.

The existing Delayed Coker Unit, together with the No. 4 Crude Unit vacuum system, were extensively modified in 2007 to upgrade the product recovery, energy efficiency and hydraulic capability of the units. Therefore, the equipment in the two units still has a long economic useful life and cannot be readily adapted to the process streams recovered from other technologies. In addition to not being able to take advantage of existing coker support equipment, a Flexicoker, for example, produces a very low energy-content process gas that would require modifications to furnaces across the Refinery to burn it in place of current refinery fuel gas streams. Alternate coking technology would require a much more extensive engineering and permitting process, require much more new equipment, and, therefore result in more extensive construction activities than the proposed Project. Consequently, alternate coking technologies are not feasible.

6.3 DESCRIPTION OF THE PROJECT ALTERNATIVES

The five alternatives include: (1) the "No Project Alternative", (2) Alternative Transportation Route, (3) Alternate On-Site Assembly of Coke Drums, (4) Replacement of Coke Drums In Place, and (5) Replace Coke Drums in Pairs. The alternatives are described in the following subsections. Table 6-1 presents a summary of the descriptions of the alternatives.

6.3.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

CEQA Guidelines §15126.6 (e) require evaluation of a "No Project Alternative." Under the No Project Alternative, no Refinery modifications would occur. The proposed coke drum replacement would not occur and the Refinery would continue to operate under its current configuration.

The No Project Alternative would not meet the objective of the proposed Project, which is to increase the reliability of coke drum operations. The No Project Alternative would continue the current process of taking coke drums out of service as they require maintenance, isolating them for repair, and returning them to service. The immediate

TABLE 6-1

Comparison of the Proposed Project and Alternatives

Project Component	Proposed Project	Alternatives				
		1	2	3	4	5
Manufacturing Location	Fabrication Shop	None	Fabrication Shop	Onsite	Onsite	Fabrication Shop
Transport Method	Barge/ Transport Carrier	None	Transport Carrier	Delivery Truck	Delivery Truck	Barge/ Transport Carrier
Transport Routing	Surface Streets	None	Surface Streets	Freeway/ Truck Route	Freeway/ Truck Route	Surface Streets
Unit Status During Installation	Turnaround	Operating(1)	Turnaround	Turnaround	Operating(1)	Operating(1)
Installation Method	Lifted into Place	None	Lifted into Place	Built in Place	Built in Place	Lifted into Place

(1) Additional safety hazards associated from working in close proximity to elevated temperature and pressures of operating coke drums.

impacts are a slowdown of Delayed Coker Unit operation during the repair by approximately one third and adjustments to downstream units that depend on Delayed Coker Unit products for feed stock. The slowdown is one third because the six drums operate in three two-drum modules so that one drum out for repairs also takes out the other drum in the module. At times the drum repair may also require adjustments to downstream units that depend on Delayed Coker Unit products for feed stock. These downstream impacts are lessened and sometimes even eliminated by tankage between the Delayed Coker Unit and the downstream units, which allow the downstream units to continue operating from the feedstocks in tankage. The repair could also affect the upstream Crude Units, since they produce the Delayed Coker Unit residuum feed. The effect on the Crude Units, though, is much less frequent than on the downstream units since there is tankage to store the residuum and the Refinery can blend the residuum into fuel oil. Often, these two options eliminate the need to reduce crude rates.

More importantly, as the 40-year old drums continue to age, repairs are expected to become more frequent and extensive. Because of the age of the coke drums, parts are, generally, not available and must be engineered and constructed before, repairs can occur, resulting in further delays to bringing the equipment back online. Delayed Coker Unit operations would become so unreliable that the throughput of the Delayed Coker Unit would be reduced, increasing the amounts of Refinery product that would have to be supplied from elsewhere, leading to increased transportation emissions. Additionally, due to the lack of processing capability of the Delayed Coker Unit, Refinery capacity to

produce fuels would be dramatically reduced potentially impacting gasoline, diesel, and jet fuel supplies in the region. Partial plate replacement necessary for some repairs can lead to stresses in areas adjacent to these repairs due to the strength difference between the new and old shell plate. Due to these induced stresses, the original structural integrity is not completely restored by continued repairs. The induced stresses can lead to further metal fatigue and continued unpredictability of the Delayed Coker Unit availability for planning Refinery operations to meet market place demands.

By replacing the existing drums, maintenance shutdown times are expected to be reduced increasing reliability in this area of the Refinery operations. Approving the No Project Alternative would only delay replacement of the coke drums, i.e., implementation of the proposed Project or one of the feasible alternatives to ensure the continued reliability of the Refinery.

6.3.2 ALTERNATIVE 2 – ALTERNATIVE TRANSPORTATION ROUTE

Under Alternative 2, an alternative transportation route to deliver the coke drums would be used (see Figure 6-1). Part of the reason for evaluating an alternative transportation route is that it is possible that necessary permits or other approvals may not be granted or barges necessary to transport the coke drums to King Harbor and staged at the harbor are not available and/or feasible. Therefore, an alternative transportation route would ultimately be selected if the transport route associated with the proposed Project becomes infeasible.

Under Alternative 2, the coke drums would be delivered by ship to the Port of Los Angeles or Long Beach as they would for the proposed Project. The coke drums would then be transported via transport carrier from the Port directly to the Refinery in El Segundo, instead of transporting the coke drums via barge to King Harbor in Redondo Beach, then by road to the refinery. The surface street length under Alternative 2 is approximately 19 miles, versus approximately five miles for the King Harbor land transportation route. The proposed Project and the Alternative 2 routes would be the same for the final five miles on Sepulveda Boulevard and Rosecrans Avenue.

Because of the longer route under Alternative 2, more cities, communities, and residents would be impacted including Wilmington, Carson, Los Angeles, Torrance, and portions of unincorporated Los Angeles County, in addition to the communities of Redondo Beach, Hermosa Beach, Manhattan Beach, and El Segundo. Also, more obstructions would be encountered and the potential for significant traffic impacts would increase. The extent of overhead wires and traffic signals to be relocated is more extensive under Alternative 2 than the proposed Project (see Table 6-2).

Transport time for each coke drum is estimated to be three to four nights, as the drum progress will be paced by removal and then reinstallation of the overhead wires and traffic signals services and limited by movement of the drums only at nighttime during off peak traffic periods. Daytime stopover locations non-disruptive to traffic flow are

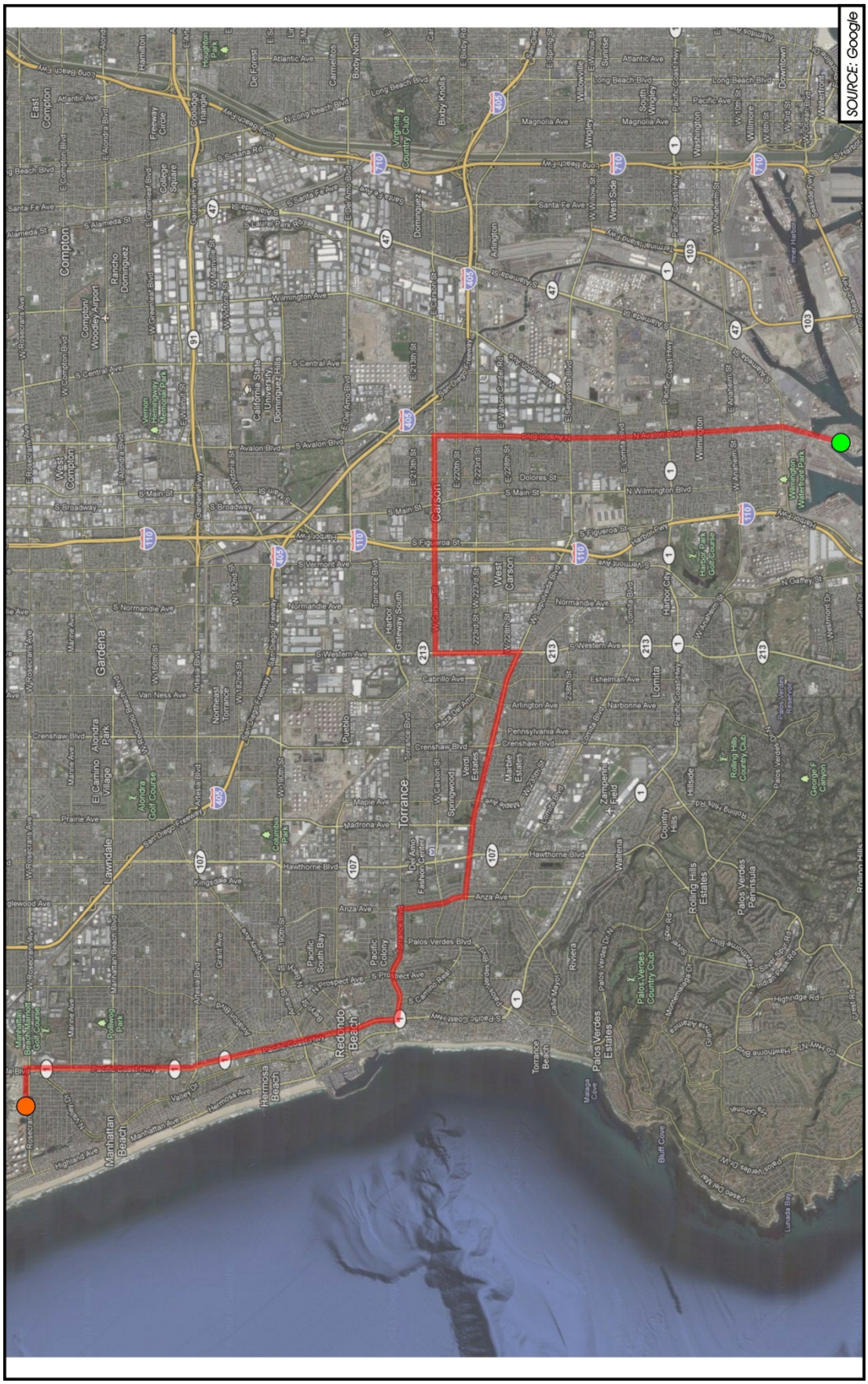

SOURCE: Google
N
ALTERNATIVE COKE DRUM TRANSPORTATION ROUTE
Chevron Products Company
El Segundo Refinery
ENVIRONMENTAL AUDIT, INC.
Project No. 2706
N:\2706\6-1, Alternate Route Map.cdr

Figure 6-1

difficult to locate and would require individual lease agreements with multiple stakeholders and specific site modifications for use as stopover points. As there are six drums to move, the removal/reinstallation of overhead wires and signals would be repeated for the movement of each coke drum. Alternative 2 is expected to have a more disruptive and sustained negative impact on the communities, businesses and individuals along the transport path than the proposed transport route due to its length (19 miles versus 4.6 miles associated with the proposed Project) and because transport of each coke drum cannot be completed in one night.

TABLE 6-2

Obstructions Along Alternative Transportation Route

Route Characteristics or Obstruction	Proposed Project Route Length or Estimated Number of Obstructions	Alternative 2 Route Length or Estimated Number of Obstructions
Total Route Length	4.6 miles	18.8
Number of Cables or Wires that Need to be Relocated	38	325
Number of Signals that Need to be Temporarily Relocated	20	78
Medians/Dividers that Need to be Removed/Replaced	3	1
Rail Road Signals	0	2
Number of Street Signs that Need to be Temporarily Removed/Replaced	26	24
Areas Where Landscaping Needs to be Removed/Replaced	7	10

Source: Bragg Companies, Chevron Coke Drum Feasibility Survey, September, 2011.

6.3.3 ALTERNATIVE 3 – ALTERNATE ON-SITE ASSEMBLY OF COKE DRUMS

The coke drums would be delivered to the Refinery from the Port of Los Angeles or Long Beach in smaller sections resulting in less complex transport under Alternative 3. Each individual coke drum would be delivered in ten sections, reducing the size of the transport vehicle so that the sections can be transported on standard heavy-duty delivery trucks (typically referred to as a semi-truck) as an oversized load due to width, which would require a transport permit from Caltrans. The coke drum sections are expected to measure approximately 28 feet wide, ten feet high, and 28 feet long (compared to 28 feet wide, 28 feet high, and 100 feet long for the proposed Project) and, therefore, will be considered an oversized load due to width, but will be capable of being transported on existing truck routes (including freeways) with a permit. The coke drums would then be

welded together at the Chevron Refinery and lifted into place. In addition, a completely new foundation to erect the drums at the Refinery would be required under Alternative 3. Additional construction work would include a substantial increase in welding operations, as well as, weld preheat and post-weld heat treatment. The length of the pre-turnaround construction effort would extend out approximately one year, requiring a larger general construction workforce and additional construction equipment under Alternative 3.

While considered feasible, the coke drum manufacturing process under Alternative 3 would not be of the same quality and may decrease long term reliability as compared to the proposed Project. Large fabrication shops contain permanent equipment that specialize in automated welding techniques, specialty-permanent equipment (e.g., large post-weld heat treat furnaces), and associated processes that cannot be duplicated in a field fabrication environment. Automated welding techniques are preferred over field welding, because automated welding techniques have lower weld inspection rejection rates resulting in less weld rework. Post-weld heat treatment, when performed in a large furnace, produces a more even residual stress in the welds than when unevenly heated in the field (i.e., heated at the bottom of the drum only). The more even the residual stress, the longer the weld will last. Additionally, quality control testing performed in the shop throughout the drum manufacturing process using automated equipment to map weld quality is preferred to field testing. Therefore, the overall life of the six new drums is expected to be longer with complete shop fabrication, as currently planned under the proposed Project, when compared to field fabrication.

6.3.4 ALTERNATIVE 4 – REPLACEMENT OF COKE DRUMS IN PLACE

Unlike Alternative 3 where the drums would be assembled onsite on their sides and then placed in the Delayed Coker Unit, Alternative 4 would replace the coke drums by taking two coke drums at a time out of service and replacing them one at a time in place without removing the derrick structure. There are two methods available to replace the coke drums in place. One method is to remove the existing drums one by one out the west side of the Delayed Coker Unit through the supporting structure in vertical sections or “cans” 20 to 40 feet tall. The new drums would be assembled by reversing the process as they would be built in 20 to 40-foot sections. The other method is to use 40 feet long vertical strips in lieu of cans. This second method historically has been used to repair rather than replace coke drums.

Like the on-site fabrication method, both of these methods require more extensive construction activities, including field welding, weld preheat and post-weld heat treatment necessary to complete the fabrication. The workforce would be at increased safety risk, due to the close proximity of working adjacent to operating coke drums with elevated temperatures and pressures as the Delayed Coker Unit would remain in operation under Alternative 4. In addition, the coke drums would be assembled in place, not on their sides which requires working at elevation. Working at elevation on the derrick structure with openings in the structure where the coke drums belong would present additional safety risks. The coke drums would be replaced one at a time while four of the other five drums remain in operation with the fifth drum idle (the drums

operate in pairs). All of the welding would be required at high elevation above the ground using scaffolding. The logistical considerations that would be necessary to complete construction activities on an operating unit of this magnitude are extensive and would result in a longer construction period to complete routine activities (e.g., welding activities at high elevations on the coke drums). Coker operation would be hindered over a longer period of time, where only four coke drums are in service and the coke drums not yet replaced would still be subject to unplanned maintenance; thereby further reducing productivity of the Delayed Coker Unit.

While considered feasible, the coke drum manufacturing process under Alternative 4 would not be of the same quality that is available in an offsite fabricating shop. As discussed under Alternative 3, large fabrication shops are equipped with permanent equipment that specializes in automated welding techniques, which cannot be duplicated in a field fabrication environment. Additionally, quality control testing would be facilitated by shop inspection, which has automated equipment to map weld quality. The overall life of the six new drums is expected to be higher with complete shop fabrication as currently planned under the proposed Project.

6.3.5 ALTERNATIVE 5 – REPLACE COKE DRUMS IN PAIRS

Under Alternative 5, the concept would be to take one module (consisting of two coke drums) out of service at a time, lift the pair of derricks off the structure, remove and replace the drums and reset the derricks. The coke drums would be delivered whole and transported from King Harbor to the Refinery via transport carrier. Alternative 5 is only viable following an overall turn around of the Delayed Coker Unit to first separate and reconfigure all utilities leading to the cutting deck so that the modules could be operated independently. Many utilities including the critical drilling equipment are currently shared across the modules. As a result, a larger overall construction effort is required to execute Alternative 5 over the proposed Project. From a safety perspective, the workforce would be at increased safety risk due to high operating temperatures and pressures since the Delayed Coker Unit would remain in operation under this alternative, and a large gaping hole 30 by 60 feet long would be left in the structure each time a module is removed, around which operations must continue to work, presenting significant safety concerns.

6.4 ENVIRONMENTAL IMPACTS FROM THE PROJECT ALTERNATIVES

6.4.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

Air Quality: Air quality impacts associated with construction of the proposed Project would be eliminated (see Table 4-2) under Alternative 1 because no construction activities would be required. Construction emissions associated with the proposed Project were considered significant for NOx. Under Alternative 1, air quality impacts from construction would be less than significant for all pollutants. Additional air quality

impacts would be generated under Alternative 1 during the repair of coke drums as construction equipment (e.g., welders, cranes, manlifts, etc.) is required to repair the coke drums, which depending on the amount of construction equipment needed for a given repair could be potentially significant.

The annual emissions associated with the operational phase of Alternative 1 would be three to four percent lower than the proposed Project. Peak daily emissions from the new coke drums would be similar compared to the existing coke drums. However, the proposed Project would increase annual emissions by three to four percent due to improved reliability because the new coke drums would not require frequent shutdown for maintenance. The increased operational emissions associated with the proposed Project were considered to be less than significant, but would be eliminated under Alternative 1. While the No Project Alternative would reduce construction emissions and eliminate operational emission increases, the No Project Alternative would be temporary because it is expected that, at some point, the existing coke drums could no longer be repaired and new coke drums would be required for the long term operation of the Refinery.

Alternative 1 would eliminate the increased TAC emissions and the associated health risks. The health risks from the proposed Project (both carcinogenic and non-carcinogenic) were considered to be less than significant (0.0019 per million to the MEIR, 0.0012 per million to the MEIW, and 0.0004 for the chronic hazard index, which is much less than the significance thresholds of 1.0 per million for cancer risk and 1.0 for chronic hazard index).

Greenhouse Gas Emissions: The GHG emissions associated with the proposed Project were associated with construction activities as well as an estimated three to four percent increase in the operational efficiency of the Delayed Coker Unit. The GHG emissions from the proposed Project would be less than significant, about 5,432 metric tons as compared to the SCAQMD significance threshold of 10,000 metric tons per year. Except for GHG emissions associated with future construction repair activities, Alternative 1 would eliminate GHG emissions from the proposed Project, so GHG emission impacts would not be cumulatively considerable and, therefore, would not be cumulatively significant.

Noise: The No Project Alternative would eliminate the increase in noise during the construction phase. The proposed Project is expected to temporarily increase the noise levels along the transport route used to deliver the coke drums and at the Refinery due to operation of construction equipment. The increased noise levels associated with the proposed Project were considered significant along portions of the coke drum transport route, since the coke drums will be transported during the nighttime, resulting in potential noise impacts to residents near King Harbor and along Herondo Street in Redondo Beach during the six evenings that the drums are moved along the transport route. The proposed Project construction noise levels at the Refinery were considered less than significant as no noticeable noise increase is expected. Implementation of the No Project Alternative would eliminate the potential noise impacts and noise levels would remain at current

levels. While the No Project Alternative would eliminate construction noise, except for future construction noise from repair activities, which would be less than construction noise at the Refinery for the proposed Project, the No Project Alternative would be temporary as new coke drums would ultimately be required for the long term operation of the Refinery. Under Alternative 1, the existing noise levels associated with the operation of the existing Refinery would remain unchanged.

Traffic/Transportation: The No Project Alternative would eliminate traffic impacts associated with construction activities since no portion of the proposed Project would be constructed. The construction traffic impacts associated with the proposed Project are considered to be less than significant as peak hour traffic levels are not expected to be adversely impacted. The LOS analysis indicates that all intersections would be LOS A or B during the project construction activities, indicating free flow traffic conditions. Therefore, no significant traffic impacts at local intersections are expected to occur during the construction phase of the proposed Project.

The No Project Alternative would eliminate traffic impacts as no construction activities or street closures would be required, since the transport of coke drums would be eliminated. While the No Project Alternative would eliminate construction traffic, the No Project Alternative would be temporary as new coke drums would be required for the long term operation of the Refinery, because the existing coke drums are near the end of their useful lives.

Under Alternative 1, the current traffic levels associated with the operation of the existing Refinery would remain unchanged from the existing Refinery operations.

6.4.2 ALTERNATIVE 2 – ALTERNATE TRANSPORTATION ROUTE

Air Quality: Under Alternative 2, the coke drums would be transported via a transport carrier from the Port of Long Beach or Los Angeles, instead of from King Harbor, increasing the overland transport distance and associated air quality impacts to communities adjacent to the transport route. The peak construction emissions associated with Alternative 2 (shown in Table 6-3) would be less than the proposed Project as no construction activities including tug boat usage would occur at King Harbor. However, Alternative 2 would not reduce NOx emissions during construction activities to less than significant. Therefore, construction emissions under Alternative 2 would remain significant, but less than the proposed Project.

The annual emissions associated with the operational phase of Alternative 2 would be the same as the proposed Project. Peak daily emissions from the new coke drums are essentially the same as the existing coke drums. Similar to the proposed Project, Alternative 2 would increase annual emissions by three to four percent since the new coke drums would not require regular shutdown for maintenance. The increased operational emissions associated with the proposed Project would be the same as Alternative 2 and are considered to be less than significant.

TABLE 6-3

Predicted Construction Emissions Under Alternative 2
Peak Construction Emissions
(lbs/day)

ACTIVITY	CO	VOC	NOx	SOx	PM10	PM2.5
Alternative 2 - Peak Construction Emissions[1]						
Construction Equipment	159.42	43.14	76.02	0.10	5.12	4.71
Vehicle Emissions	83.94	9.24	5.17	0.01	3.94	0.88
Fugitive Road Dust	--	--	--	--	1.77	0.30
Ship Emissions	--	--	960.50	27.02	16.45	13.23
Total Emissions	**243.37**	**52.37**	**1,041.68**	**27.13**	**27.28**	**19.12**
SCAQMD Threshold Level	550	75	100	150	150	55
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Proposed Project Peak Construction Emissions[1]						
Construction Equipment	159.42	43.14	82.09	0.11	5.59	5.15
Vehicle Emissions	84.34	9.28	6.54	0.02	0.86	0.40
Fugitive Road Dust	--	--	--	--	1.68	0.28
Ship Emissions	--	--	1,052.94	27.02	19.23	15.80
Total Emissions	**243.76**	**56.62**	**1,141.57**	**27.14**	**27.36**	**21.63**
SCAQMD Threshold Level	550	75	100	150	150	55
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Comparison of Alternative 2 to Proposed Project - Peak Construction Emissions						
Proposed Project Total Emissions	243.76	56.62	1,141.57	27.14	27.36	21.63
Alternative 2 Total Emissions	243.37	52.37	1,041.68	27.13	27.28	19.12
Difference[2]	**-0.39**	**-4.25**	**-99.89**	**-0.01**	**-0.08**	**-2.51**

(1) Peak CO and VOC emissions are expected to occur during turnaround months, since ships do not operate during the turnaround months, no ship emissions were included for those pollutants.
(2) Negative numbers represent less emissions for the alternative.

Alternative 2 would result in the same TAC emissions during operation as the proposed Project. Like the proposed Project, Alternative 2 would result in a three to four percent annual emissions increase since the new coke drums would not require regular shutdown for maintenance. The health risks from the proposed Project (both carcinogenic and non-carcinogenic) were considered to be less than significant and this conclusion would be the same for Alternative 2 (0.0019 per million to the MEIR, 0.0012 per million to the MEIW, and 0.0004 for the chronic hazard index, which is much less than the significance thresholds of 1.0 per million for cancer risk and 1.0 for chronic hazard index).

Greenhouse Gas Emissions: The GHG emissions from the proposed Project were associated with construction activities as well as an estimated three to four percent increase in the operational efficiency of the Delayed Coker Unit. Cumulative GHG

emissions from the proposed Project were concluded to be less than significant (about 5,432 metric tons as compared to the SCAQMD significance threshold of 10,000 metric tons per year). Alternative 2 would result in a slight decrease in GHG emissions during construction activities compared to the proposed Project, because no offsite construction activities, including tug boat usage, would occur at King Harbor. The 30-year amortized construction GHG emissions for the proposed Project compared to Alternative 2 would be 149 metric tons per year and 119 metric tons per year, respectively (see Appendix B for additional calculation details). Therefore, the GHG emission impacts associated with Alternative 2 are less than the proposed Project, are below the SCAQMD significance threshold of 10,000 metric tons per year, are not expected to be cumulatively considerable and, therefore, not cumulatively significant.

Noise: Alternative 2 would result in a longer land transport route of the coke drums from the Port of Los Angeles or Long Beach to El Segundo than the proposed Project (19 versus 4.5 miles). The proposed Project is expected to increase noise levels along the transport route used to deliver the coke drums and at the Refinery due to operation of construction equipment. The increased noise levels associated with the proposed Project were considered significant along the coke drum transport route since the coke drums will be transported during the nighttime. The noise levels associated with the truck transport of the coke drums under Alternative 2 would be approximately the same compared to the proposed Project with similar project design features, but would not travel from King Harbor and along Herondo Street in Redondo Beach, near the residential area. However, noise impacts from Alternative 2 are considered to be substantially greater than the proposed Project for the following reasons: (1) the length of the transport route is longer (19 miles instead of about five miles); (2) more communities including residential areas would be impacted; and (3) transport activities for each coke drum would take 3 to 4 nights as compared to the proposed Project of one night. Therefore, noise impacts associated with the movement of coke drums under Alternative 2 would be significant and substantially greater than noise impacts associated with the proposed Project.

The construction activities at the Refinery under Alternative 2 are expected to remain the same as the proposed Project. Therefore, no significant noise impacts are expected during construction activities at the Refinery under Alternative 2.

Traffic/Transportation: As with the proposed Project, the construction traffic impacts associated with Alternative 2 would be limited to the construction period. Alternative 2 would result in the same construction traffic impacts and have the same number of construction workers (approximately 335) and construction delivery trips as the proposed Project at the Refinery because the onsite construction activities are expected to be the same as the proposed Project. The peak construction traffic LOS analysis shown in Table 4-12 would apply to Alternative 2. Like the proposed Project, Alternative 2 is not expected to result in any potentially significant impacts and the LOS at all intersections would be LOS A or B, indicating free flow traffic conditions. Therefore, no significant traffic impacts at local intersections are expected to occur during the construction phase

under Alternative 2. Therefore, the traffic impacts associated with peak worker traffic for Alternative 2 are expected to be less than significant and equivalent to the proposed Project.

Because Alternative 2 includes the same traffic design features as the proposed Project, the magnitude of potential traffic impacts would be comparable. However, traffic impacts associated with delivery of the coke drums would be greater under Alternative 2 as a longer overland transport route of about 19 miles would be used as compared to the proposed Project of about five miles, impacting the cities, communities and residents of Wilmington, Carson, Los Angeles, Torrance, and portions of unincorporated Los Angeles County, in addition to the communities of Redondo Beach, Hermosa Beach, Manhattan Beach, and El Segundo. Although implementation of traffic control plans include notification of affected jurisdictions along the transport route, there would be more traffic impacts due to the increased transport distance from the Port.

6.4.3 ALTERNATIVE 3 – ALTERNATE ON-SITE ASSEMBLY OF COKE DRUMS

Air Quality: Under Alternative 3, the coke drums would be delivered in parts and assembled at the Refinery. The parts are expected to be delivered to the Refinery from the Port of Los Angeles or Long Beach, but would be transported by standard heavy-duty delivery trucks as a wide load as opposed to transport carriers. The peak construction emissions associated with Alternative 3 (shown in Table 6-4) would be less than the proposed Project as activities including tug boats to transport the barge to King Harbor would be eliminated. Additional construction emissions would occur under Alternative 3, including additional welding activities, additional vehicle trips associated with additional workers, and additional truck trips associated with the delivery of the coke drums. However, Alternative 3 would not reduce NOx emissions during construction activities to less than significant. Therefore, construction emissions under Alternative 3 would remain significant.

The annual emissions associated with the operational phase of Alternative 3 would be the same as the proposed Project. Peak daily emissions from the new coke drums are essentially the same as the existing coke drums. The operational emissions under Alternative 3 would be the same as the proposed Project and would result in a three to four percent annual emission increase, since the new coke drums would not require regular shutdown for maintenance. The increased operational emissions associated with the proposed Project, which would be equivalent to Alternative 3, are considered to be less than significant.

Alternative 3 would result in the same TAC emissions during operation as the proposed Project. The proposed Project would result in a three to four percent annual emissions increase since the new coke drums would not require regular shutdown for maintenance. The health risks from the proposed Project (both carcinogenic and non-carcinogenic) were considered to be less than significant and this conclusion would be the same for

TABLE 6-4

Predicted Construction Emissions Under Alternative 3
Peak Construction Emissions
(lbs/day)

ACTIVITY	CO	VOC	NOx	SOx	PM10	PM2.5
Alternative 3 - Peak Construction Emissions[1]						
Construction Equipment	153.08	41.61	57.58	0.08	14.55	3.28
Vehicle Emissions	83.96	9.24	3.73	0.01	10.12	0.64
Fugitive Road Dust	--	--	--	--	0.73	0.20
Ship Emissions	--	--	960.50	27.02	--	13.23
Total Emissions	**237.03**	**50.84**	**1,021.81**	**27.11**	**25.40**	**17.35**
SCAQMD Threshold Level	550	75	100	150	150	55
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Proposed Project Peak Construction Emissions[2]						
Construction Equipment	159.42	43.14	82.09	0.11	5.59	5.15
Vehicle Emissions	84.34	9.28	6.54	0.02	0.86	0.4
Fugitive Road Dust	--	--	--	--	1.68	0.28
Ship Emissions	--	--	1,052.94	27.02	19.23	15.8
Total Emissions	**243.76**	**56.62**	**1,141.57**	**27.14**	**27.36**	**21.63**
SCAQMD Threshold Level	550	75	100	150	150	55
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Comparison of Alternative 3 to Proposed Project - Peak Construction Emissions						
Proposed Project Total Emissions	243.76	56.62	1,141.57	27.14	27.36	21.63
Alternative 2 Total Emissions	237.03	50.84	1,021.81	27.11	25.40	17.35
Difference[3]	**-6.73**	**-5.78**	**-119.76**	**-0.03**	**-1.96**	**-4.28**

(1) Peak CO, VOC, and PM10 emissions are expected to occur during turnaround months, therefore, no ship emissions were included for those pollutants.

(2) Peak CO and VOC emissions are expected to occur during turnaround months, therefore, no ship emission were included for those pollutants.

(3) Negative numbers represent less emissions for the alternative.

Alternative 3 (0.0019 per million to the MEIR, 0.0012 per million to the MEIW, and 0.0004 for the chronic hazard).

Greenhouse Gas Emissions: The GHG emissions from the proposed Project were associated with construction activities as well as an estimated three to four percent increase in the operational efficiency of the Delayed Coker Unit. Cumulative GHG emissions from the proposed Project were concluded to be less than significant (about 5,432 metric tons as compared to the SCAQMD significance threshold of 10,000 metric tons per year). Alternative 3 would result in a slight decrease in GHG emissions during construction activities compared to the proposed Project, because no offsite construction

activities, including tug boat usage, would occur at King Harbor. The 30-year amortized construction GHG emissions for the proposed Project compared to Alternative 3 would be 149 metric tons per year and 134 metric tons per year, respectively. Therefore, the GHG emission impacts associated with Alternative 3, slightly less than the proposed Project, are below the SCAQMD significance threshold of 10,000 metric tons per year, not expected to be cumulatively considerable and, therefore, are not cumulatively significant.

Noise: Alternative 3 would eliminate the use of the transport carriers; however, the coke drums would still be considered oversized loads and transported at night by standard heavy-duty delivery truck. However, the oversized loads would be smaller than the proposed Project (28 feet wide, ten feet high, and 28 feet long as compared to 28 feet wide, 28 feet high, and 100 feet long of the proposed Project) and can travel on freeways and other approved truck routes with an oversized load permit from Caltrans. The coke drum parts would be expected to be delivered to the Ports of Los Angeles or Long Beach and transported via standard truck routes, using a route that would include the freeway system, avoiding the more sensitive residential areas and eliminating the significant impacts to sensitive receptors (near King Harbor and along Herondo Street in Redondo Beach). The construction activities at the Refinery under Alternative 3 are expected to be more extensive as the drums would need to be assembled at the Refinery. Alternative 3 would result in more onsite construction activities including welding, weld preheat and post-weld heat treatment at the Refinery. Nonetheless, the peak construction noise activities are associated with the Refinery turnaround activities when the Delayed Coker Unit is shut down and construction activities are expected to occur over two shifts (and operate throughout the night). The peak construction noise activities under Alternative 3 are expected to be the same as the proposed Project, because the same types of construction equipment would be used. Similar to the proposed Project, no significant noise impacts are expected during onsite construction activities under Alternative 3; however, construction activities would occur for a longer period of time.

Traffic/Transportation: As with the proposed Project, the construction traffic impacts associated with Alternative 3 would be limited to the construction period. The peak construction workers under Alternative 3 would be the same as the proposed Project (approximately 335 workers). The traffic analysis for the proposed Project concluded that no significant impacts would occur from construction workers commuting to the Refinery and the LOS at all intersections would be LOS A or B, indicating free flow traffic conditions. Therefore, no significant traffic impacts at local intersections are expected to occur during the construction phase of the proposed Project. Therefore, it is expected that the traffic impacts associated with Alternative 3 would also be less than significant and equivalent to the proposed Project.

Compared to the proposed Project, traffic impacts associated with delivery of the coke drums would be less under Alternative 3. Although the drum components would be transported from the Port of Los Angeles or Long Beach, they are not expected to require transport using the transport carrier required to transport the whole coke drum. Rather smaller standard heavy-duty delivery trucks would be required to transport the oversized

loads (28 feet wide, ten feet high, and 28 feet long as compared to 28 feet wide, 28 feet high, and 100 feet long for the proposed Project). These oversized loads would still be transported at night, but are expected to use standard transport routes using the freeway system and other truck routes, not require the shutdown of local roadways as required under the proposed Project. Therefore, traffic impacts under Alternative 3 would be reduced as compared to the proposed Project and considered less than significant.

6.4.4 ALTERNATIVE 4 – REPLACEMENT OF COKE DRUMS IN PLACE

Air Quality: Under Alternative 4, the coke drums would be delivered in parts and assembled at the Refinery. The parts are expected to be delivered from the Port of Long Beach or Los Angeles, but would be transported on standard heavy-duty delivery trucks as opposed to transport carriers. The peak daily construction emissions associated with Alternative 4 are expected to be similar to Alternative 3 (see Table 6-4) as similar construction activities would be expected. Construction activities would be spread out over a longer period as only one drum would be replaced at a time, while four of the five remaining coke drums would continue to operate during construction activities. Alternative 4 would not reduce NOx emissions during construction activities to less than significant. Therefore, construction emissions under Alternative 4 would remain significant, but less than the proposed Project.

The annual emissions associated with the operational phase of Alternative 4 would be the same as the proposed Project. Peak daily emissions from the new coke drums are essentially the same as the existing coke drums. The operational emissions under Alternative 4 would be the same as the proposed Project, and would result in a three to four percent annual emission increase since the new coke drums would not require regular shutdown for maintenance. The increased operational emissions associated with the proposed Project would be equivalent to Alternative 4 and both are considered to be less than significant.

Alternative 4 would result in the same TAC emissions during operation as the proposed Project. The proposed Project would result in a three to four percent annual emissions increase since the new coke drums would not require regular shutdown for maintenance. The health risks from the proposed Project (both carcinogenic and non-carcinogenic) were considered to be less than significant and this conclusion would be the same for Alternative 4 (0.0019 per million to the MEIR, 0.0012 per million to the MEIW, and 0.0004 for the chronic hazard index, which is much less than the significance thresholds of 1.0 per million for cancer risk and 1.0 for chronic hazard index).

Greenhouse Gas Emissions: The GHG emissions from the proposed Project were associated with construction activities as well as an estimated three to four percent increase in the operational efficiency of the Delayed Coker Unit. Cumulative GHG emissions from the proposed Project would be less than significant (about 5,432 metric tons as compared to the SCAQMD significance threshold of 10,000 metric tons per year). Alternative 4 would result in an increase in GHG emissions during construction activities

compared to the proposed Project due to the additional onsite construction activities. Like the proposed Project, the GHG emission impacts associated with Alternative 4 are not expected to be cumulatively considerable and, therefore, not cumulatively significant.

Noise: Alternative 4 would eliminate the use of the oversized transport carriers; however, the coke drums would still be considered oversized loads and transported on standard heavy-duty delivery trucks at night. The coke drum parts would be expected to be delivered to the Ports of Los Angeles or Long Beach and transported via the same route as Alternative 3, avoiding some of the more sensitive residential areas and reducing noise impacts associated with transport and eliminating the significant noise impacts to sensitive receptors (residents near King Harbor and along Herondo Street in Redondo Beach). The construction activities at the Refinery under Alternative 4 are expected to be more extensive as the drums would need to be assembled at the Refinery. Alternative 4 would result in more onsite construction activities including welding, weld preheat and post-weld heat treatment at the Refinery. Unlike Alternative 3 where the drums would be constructed onsite and all six set into place during a turnaround, construction noise would take place when the Delayed Coker Unit is operating without the need for a turnaround resulting in higher overall noise from the Refinery. Nonetheless, peak construction noise activities are expected to be limited to daytime, avoiding the more sensitive nighttime. Similar to the proposed Project, no significant noise impacts are expected during construction activities under Alternative 4. However, construction activities would occur for a longer period of 21 months under Alternative 4.

Traffic/Transportation: As with the proposed Project, the construction traffic impacts associated with Alternative 4 would be limited to the construction period. The peak construction workers under Alternative 4 would be the same as the proposed Project (approximately 335 workers). The traffic analysis for the proposed Project concluded that no significant impacts would occur from construction workers commuting to the Refinery. The LOS at all intersections would be LOS A or B, indicating free flow traffic conditions. Therefore, no significant traffic impacts at local intersections are expected to occur during the construction phase of the proposed Project. Therefore, it is expected that the traffic impacts associated with Alternative 4 would also be less than significant and equivalent to the proposed Project as no significant LOS impacts are expected at any of the local intersections.

Compared to the proposed Project, traffic impacts associated with delivery of the coke drums would be less under Alternative 4. While the drum components would be transported from the Port of Los Angeles or Long Beach, standard heavy-duty delivery trucks (28 feet wide, ten feet high, and 28 feet long as compared to 28 feet wide, 28 feet high, and 100 feet long for the proposed Project) are expected to transport the coke drum components to the Refinery using usual truck traffic routes on the freeway system at night. Therefore, traffic impacts under Alternative 4 would be reduced as compared to the proposed Project as no temporary street closures would be required.

Hazard Impacts: It should be noted that the replacement of the coke drums under Alternative 4 would result in construction activities while the Delayed Coker Unit is

operating. This would results in additional safety hazards as construction workers would be in close proximity to the elevated temperatures and pressures and potential flammable materials in the operating portions of the Delayed Coker Unit. Welders would be operating in close proximity to hydrocarbon operations creating potential fire hazards associated with flammable materials. These hazards are potentially significant. Under the proposed Project, the Delayed Coker Unit would not be operational when the coke drums are replaced.

6.4.5 ALTERNATIVE 5 – REPLACE DRUMS IN PAIRS

Air Quality: Under Alternative 5, two drums (or one module) would be replaced at a time. Under Alternative 5, the coke drums would be transported via transport carrier from King Harbor to the Refinery. Additional construction activities would be required at the Refinery as utilities (e.g., electricity and water supplies) including critical drilling equipment are currently shared across the three pairs of coke drums. In order to replace the drums in pairs, utilities would need to be separated by pairs so that four of the coke drums could continue to operate while two are taken out of service and replaced. The peak day construction emissions associated with Alternative 5 are expected to be similar to the proposed Project because the coke drum transport is the same, however, construction activities under Alternative 5 are expected to take longer to complete than the proposed Project resulting in construction air emissions occurring over a longer period of time. Therefore, the construction air quality impacts under Alternative 5 are expected to be significant for NOx, but less than significant for other pollutants, similar to the proposed Project.

The annual emissions associated with the operational phase of Alternative 5 would be the same as the proposed Project. Peak daily emissions from the new coke drums are essentially the same as the existing coke drums. The operational emissions under Alternative 5 would be the same as the proposed Project and would result in a three to four percent annual emission increase since the new coke drums would not require regular shutdown for maintenance. The increased operational emissions associated with the proposed Project and under Alternative 5 would be the same and are considered to be less than significant.

Alternative 5 would result in the same TAC emissions during operation as the proposed Project. The proposed Project would result in a three to four percent annual emissions increase since the new coke drums would not require regular shutdown for maintenance. The health risks from the proposed Project (both carcinogenic and non-carcinogenic) were considered to be less than significant and this conclusion would be the same for Alternative 5 (0.0019 per million to the MEIR, 0.0012 per million to the MEIW, and 0.0004 for the chronic hazard index, which is much less than the significance thresholds of 1.0 per million for cancer risk and 1.0 for chronic hazard index).

Greenhouse Gas Emissions: The GHG emissions from the proposed Project were associated with construction activities as well as an estimated three to four percent

increase in the operational efficiency of the Delayed Coker Unit. Cumulative GHG emissions from the proposed Project would be less than significant (about 5,434 metric tons as compared to the SCAQMD significance threshold of 10,000 metric tons per year).

Alternative 5 would result in an increase in GHG emissions during construction activities due to the additional onsite construction activities. The onsite construction activities are expected to be about twice the proposed Project estimated GHG emissions, which would increase the 30-year amortized construction emissions to about than 298 metric tons per year (as compared to the proposed Project GHG emissions of 149 metric tons per year). Like the proposed Project, the GHG emission impacts associated with Alternative 5 are not expected to be cumulatively considerable and, therefore, not cumulatively significant.

Noise: Alternative 5 would use the same transport route for the coke drums as the proposed Project, i.e., King Harbor to El Segundo, resulting in the same temporary noise impacts as the drums move along the transport route. The noise impacts associated with truck transport for the proposed Project are expected to be significant for residents near King Harbor and along Herondo Street in Redondo Beach. Therefore, noise impacts associated with coke drum transport would remain significant under Alternative 5 as the coke drums would be transported during the nighttime using the same transport carrier and would be equivalent to the proposed Project.

The construction activities at the Refinery under Alternative 5 are expected to occur for a longer period as additional construction activities are required to separate out utilities at the Delayed Coker Unit. Construction noise would also take place when the Delayed Coker Unit is operating resulting in higher overall noise from the Refinery. Nonetheless, peak construction noise activities are expected to be limited to daytime, avoiding the more sensitive nighttime. Similar to the proposed Project, no significant noise impacts are expected during construction activities under Alternative 5. However, construction activities will occur for a longer period under Alternative 5 than the proposed Project.

Traffic/Transportation: As with the proposed Project, the construction traffic impacts associated with Alternative 5 would be limited to the construction period. The peak construction workers under Alternative 5 would be the same as the proposed Project (approximately 335 workers). The traffic analysis for the proposed Project concluded that no significant impacts would occur from construction workers commuting to the Refinery. There would be no change in LOS at any intersection in the local Refinery area, and the LOS at all intersections would be LOS A or B, indicating free flow traffic conditions. Therefore, no significant traffic impacts at local intersections are expected to occur during the construction phase of the proposed Project. Therefore, it is expected that the traffic impacts associated with Alternative 5 would be equivalent to the proposed Project and both would be less than significant as no significant LOS impacts are expected at any of the local intersections.

Traffic impacts associated with delivery of the coke drums would be the same as for the proposed Project as the same transport route and transport method would be used. Coke drums would be transported from King Harbor to the Refinery during nighttime hours,

resulting in temporary road closures over a period of six nights. Because Alternative 5 includes the same design features as the proposed Project, e.g., implementation of traffic control plans and notification of affected jurisdictions along the transport route, the magnitude of potential traffic impacts would be comparable. Traffic impacts associated with Alternative 5 are expected to be less than significant and equivalent to the proposed Project.

Hazard Impacts: It should be noted that the replacement of the coke drums under Alternative 5 would result in construction activities while the Delayed Coker Unit is operating. This would results in additional safety hazards as construction workers would be in close proximity to the elevated temperatures and pressures and potential hydrocarbon in the operating portions of the Delayed Coker Unit. These hazards are potentially significant.

6.5 CONCLUSION

Table 6-5 provides a qualitative comparison of the potential environmental impacts of the various alternatives relative to the proposed Project. Based on the analyses herein, no feasible alternatives were identified that would reduce or eliminate the potentially significant air quality or noise impacts during construction activities related to the proposed Project. The No Project Alternative would eliminate these impacts, but would not achieve the goals of the proposed Project. Further, the No Project Alternative is only expected to result in a delay in the implementation of the proposed Project or an alternative as the existing coke drums are approaching the end of their operational life. The No Project Alternative (Alternative 1) would prevent Chevron from installing new coke drums to improve the operational efficiency of the Delayed Coker Unit. However, the No Project Alternative would simply postpone the potentially significant impacts related to air quality and noise during construction. Therefore, Alternative 1 would not be considered to be the environmentally superior alternative.

Alternative 2 would result in significant impacts to air quality during construction, although the construction emissions would be reduced because the transport of coke drums to King Harbor would be eliminated. Noise impacts associated with the transport of coke drums would be increased as the length of the transport route would be increased and more communities, cities, and residents would be impacted by the night time transport of the coke drums. Therefore, Alternative 2 would not be considered to be the environmentally superior alternative as it would not reduce project impacts. Alternative 2 would allow the Refinery to meet the project objectives of increasing the reliability of the Delayed Coker Unit by replacing the existing coke drums.

Alternatives 3 and 4 would result in the construction of the coke drums at the Refinery, and have similar impacts to the proposed Project on air quality. Alternatives 3 and 4 would result in greater onsite construction activities due to drum fabrication and the air quality impacts during construction activities are expected to remain significant. Alternatives 3 and 4 would also reduce the traffic impacts associated with coke drum

TABLE 6-5

Environmental Impacts of Alternatives as Compared to Proposed Project

ENVIRONMENTAL TOPIC	Proposed Project	Alt. 1 (1) No Project	Alt. 2 Alternate Transport Route	Alt. 3 Onsite Drum Assembly	Alt.4 Replace Drums in Place	Alt.5 Replace Drums in Pairs
Air Quality						
Construction	S	NS(-)	S(-)	S(-)	S(-)	S(+)
Operation	NS	NS(-)	NS(=)	NS(=)	NS(=)	NS(=)
Toxic Air Contaminants	NS	NS(-)	NS(=)	NS(=)	NS(=)	NS(=)
Greenhouse Gas Emissions	NS	NS(-)	NS(-)	NS(-)	NS(+)	NS(+)
Noise						
Construction Noise	S	NS(-)	S(+)	NS(-)	NS(-)	S(=)
Transportation/Traffic						
Construction	MNS	NS(-)	MNS(+)	NS(-)	NS(-)	MNS(=)
Hazards	NS	NS	NS	NS	S(+)	S(+)

(1) The No Project Alternative would eliminate the impacts associated with the proposed Project on a temporary basis only. The proposed Project or one of the feasible alternatives will be required to maintain the long term operation of the Refinery.

Notes:

S = Significant
NS = Not Significant
MNS = Mitigated, Not Significant
(-) = Potential impacts are less than the proposed Project.
(+) = Potential impacts are greater than the proposed Project.
(=) = Potential impacts are approximately the same as the proposed Project.

transport and avoid temporary road closures during construction activities. Alternatives 3and 4 would achieve the objectives of the proposed Project of replacing the existing coke drums. However, with Alternative 4 additional potentially significant safety hazard impacts are expected. Therefore, Alternatives 3 would be considered environmentally superior as it would eliminate potentially significant construction noise impacts. While considered feasible, the coke drums manufactured under Alternatives 3 and 4 would not be of the same quality as those fabricated in a shop. Large fabrication shops are equipped with permanent equipment that specializes in automated welding techniques, which cannot be duplicated in a field fabrication environment. Quality control testing would be facilitated by shop inspection, with automated equipment to map weld quality. The overall life, quality, and reliability of the six new drums are expected to be higher with complete shop fabrication as currently planned under the proposed Project. Therefore, Alternatives 3 and 4 are not the preferred alternatives.

Alternative 5 would result in significant impacts to air quality and noise during construction. Alternative 5 would result in additional air quality impacts due to increased onsite construction activities and add potential significant safety hazard impacts due to construction occurring while the Delayed Coker Unit is operating. Noise and traffic impacts associated with Alternative 5 would be the same as the proposed Project. Therefore, Alternative 5 would not be considered to be the environmentally superior alternative as it would not reduce project impacts. Alternative 5 would allow the Refinery to meet the project objectives of replacing the existing coke drums and increasing the reliability of the Delayed Coker Unit.

CHAPTER 7

REFERENCES

7.0 REFERENCES

7.1 REFERENCES

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7.2 ORGANIZATIONS AND PERSONS CONSULTED

The CEQA statues and Guidelines require that organizations and persons consulted be provided in the EIR. A number of organizations, state and local agencies, and private industry have been consulted. The following organizations and persons have provided input into this document.

7.2.1 ORGANIZATIONS

Chevron
Bragg Company
South Coast Air Quality Management District

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Environmental Audit, Inc.
Placentia, California

Navcon
Fullerton, Oklahoma

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CHAPTER 8

ACRONYMS AND GLOSSARY

Acronyms
Glossary

8.1 ACRONYMS

ABBREVIATION	DESCRIPTION
AB1807	California Toxic Air Contaminants
AB2588	Air Toxic "Hot Spots" Information and Assessment Act
AB2595	California Clean Air Act
AB2728	New Tanner Bill for Toxic Air Contaminants
AQMP	Air Quality Management Plan
BACT	Best Available Control Technology
Basin	South Coast Air Basin
CAA	Clean Air Act
CalOSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
cfm	cubic feet per minute
Chevron	Chevron Products Company
CMP	Congestion Management Program for Los Angeles County
CNEL	Community Noise Equivalent Level
CO	Carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent emissions
CUP	Central Utility Plant
CVC	California Vehicle Code
dB	Decibel
dBA	A-weighted noise level measurement in decibels
District	SCAQMD jusridiction
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EPA	California State Environmental Protection Agency
FAA	Federal Aviation Administration
FCCU	Fluid Catalytic Cracking Unit
GHGs	greenhouse gases
HARP	Hotspots Analysis Reporting Program
HOV	High-Occupancy Vehicle
HRA	Health Risk Assessment
HSC	Health and Safety Code
I-105	Glenn M. Anderson Freeway
I-110	Harbor Freeway
I-405	San Diego Freeway
I-605	San Gabriel River Freeway
I-710	Harbor Freeway
ISCST3	Industrial Source Complex – Short Term

LADOT	Los Angeles Department of Transportation
LAX	Los Angeles International Airport
lb/day	pounds per day
Ldn	average A-weighted 24-hour day after adding ten decibels to nighttime (10 p.m. – 7 a.m.) measurements
Leq	equivalent sound level
Lmax	maximum recorded noise level
Lmin	minimum recorded noise level
LOS	Level of Service
LST	Localized Significance Threshold
MAHI	maximum acute hazard index
MATES	Multiple Air Toxic Exposure Study
MAX	Municipal Area Express
MCHI	maximum chronic hazard index
MDAB	Mojave Desert Air Basin
MEIR	Maximum Exposed Individual Resident
MEIW	Maximum Exposed Individual Worker
MTA	Metropolitan Transportation Authority
MT/yr	metric tons per year
NAAQS	National Ambient Air Quality Standards
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
N/m^2	Newton per square meter
NO	nitrogen oxide
NOP/IS	Notice of Preparation and Initial Study
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PAHs	polycyclic aromatic hydrocarbons
PCH	Pacific Coast Highway 1
PM	particulate matter
PM10	particulate matter less than 10 microns in diameter
PM2.5	particulate matter less than 2.5 microns in diameter
ppm	parts per million
PRVs	Pressure Relief Valves
PRO	Product Reliability and Optimization
PSD	Prevention of Significant Deterioration
PTE	potential to emit
RCRA	Resource Conservation and Recovery Act
RECLAIM	Regional Clean Air Incentives Market
Refinery	El Segundo Refinery

ROC	Refinery Optimization Center
RON	Runway Overnight
RWQCB	Los Angeles County Regional Water Quality Control Board
SB1731	Senate Bill 1731, Toxic Air Contaminants
SCAQMD	South Coast Air Quality Management District
SO_2	sulfur dioxide
SOx	sulfur oxide
SR1	Sepulveda Boulevard, State Route 1
SRA	source receptor area
SSAB	Salton Sea Air Basin
TACs	Toxic Air Contaminants
T-BACT	Best Available Control Technology for Toxics
U.S. EPA	United States Environmental Protection Agency
V/C	volume to capacity
VOC	Volatile Organic Compounds
VPD	vehicles per day
$\mu g/m^3$	micrograms per cubic meter

8.2 GLOSSARY

TERM	DEFINITION
Ambient Noise	The background sound of an environment in relation to which all additional sounds are heard
CO_2 equivalent (CO_2e)	A measure for comparing CO2 with other GHGs, based on the amount of the other GHGs multiplies by the appropriate global warming potential factor.
Cracking	The process of breaking down higher molecular weight hydrocarbons to components with smaller molecular weights by the application of heat; cracking in the presence of a suitable catalyst produces an improvement in product yield and quality over simple thermal cracking.
Crude Oil	Crude oil is "unprocessed" oil, which has been extracted from the subsurface. It is also known as petroleum and varies in color, from clear to tar-black, and in viscosity, from water to almost solid.
dBA	The decibel (dDB) is one tenth of a *bel* where one bel represents a difference in noise level between two intensities I_1, I_0 where one is ten times greater than the other. (A) indicates the measurement is weighted to the human ear.
Delayed Coking	The Delayed Coker Unit is a high temperature cracking unit where large hydrocarbon molecules are broken into small molecules (light hydrocarbons). The light hydrocarbons are sent to other units in the Refinery for the manufacture of products such as gasoline, diesel, and jet fuels. A tail gas stream is produced which is burned as fuel. The remaining material, called petroleum coke, is a solid and sols as a by-product.
Distillation	The process of heating a liquid to its boiling point and condensing and collecting the vapor.
Feedstock	Material used as a stream in the refining process.
Heater	Process equipment used to raise the temperature of refinery streams processing.

Hydrocarbon	Organic compound containing hydrogen and carbon, commonly occurring in petroleum, natural gas, and coal.
L_{50}	Sound level exceeded 50 percent of the time (average or mean level)
Peak Hour	This typically refers to the hour during the morning (typically 7 AM to 9 AM) or the evening (typically 4 PM to 6 PM) in which the greatest number of vehicles trips are generated by a given land use or are traveling on a given roadway.