CITY OF
LONGBEACH

Development Services Department
411 West Ocean Boulevard, 3rd Floor Long Beach, CA 90802
(562) 570-5237

~~H-22~~

CH-13

June 14, 2022

HONORABLE MAYOR AND CITY COUNCIL
City of Long Beach
California

RECOMMENDATION:

Receive supporting documentation into the record and conclude the public hearing; consider an appeal from David Derahim care of Ahmad Ghaderi (APL 22-003); and, uphold the Planning Commission's decision to deny a Conditional Use Permit (CUP 18-001) for a new car wash located at 5005 Long Beach Boulevard in the Commercial Automobile-Oriented (CCA) Zoning District or provide alternative direction to approve or approve with conditions. (District 8)

DISCUSSION

On March 17, 2022, the Planning Commission held a public hearing, considered public testimony, and denied a Conditional Use Permit (CUP) for a new car wash at 5005 Long Beach Boulevard (Attachment A). The Project site is 1.48-acres in size and is developed with a stand-alone restaurant and gas station with a mini mart (Attachment B). The gas station and restaurant use are intended to continue operations at the site. The existing gas station and mini mart have operated at the subject site in the current configuration since at least 1989. The restaurant building is currently vacant. At the time this staff report was prepared, interior soft demolition was underway at the restaurant in preparation for new interior restaurant improvements under review with the City of Long Beach (City).

The site is located within the Commercial Automobile-Oriented Zoning District and has a Neighborhood Serving Centers and Corridors-Low (NSC-L) General Plan PlaceType Designation. The project site abuts the playground areas of Dooley Elementary School to the north and west, a convenience store and drug store with a drive-through pharmacy (drive-through is currently closed) to the east across Long Beach Boulevard; to the south, across Del Amo Boulevard, is a gas station with a mini mart and single-family residences; and a gas station with a drive-through car wash and mini mart is located catty-corner to the site across Long Beach Boulevard.

The proposed automated self-service car wash would be located north of the mini mart and gas station abutting the northerly property line shared with the elementary school, adjacent to the school playground. An existing nine-foot perimeter wall serves as a buffer between the school and car wash. The proposed car wash features a modern design with quality materials. The car wash tunnel would have a length of 100 feet and includes two drive-up lanes, each with a pay station and a queuing length of approximately 130 feet before the pay station. The proposed project includes 15 parking stalls for vacuuming (Attachment C). Access to the car wash would be from the existing southernmost curb cut along Long Beach Boulevard. The northerly curb cut would be closed, and a full height curb and sidewalk would be constructed to lessen the impact on pedestrians along Long Beach Boulevard. Other site modifications include new landscaping, security cameras, and lighting. The car wash would operate between the hours of 7:00 am to 7:00 pm daily.

Certain types of land uses, like car washes, may or may not be appropriate in every location and context due to the nature of the use. Therefore, such proposed uses require a discretionary review process and permit before the use can be allowed in a given location. Because of the unique nature and potential impacts of car washes on neighboring properties, pedestrians, and the public, new car washes can only be permitted through a CUP and are not allowed by-right in accordance with the Zoning Ordinance. The CUP process allows for the individual review of these uses so that the decision-making body can determine if the use is compatible with the surrounding land uses, can be made compatible with conditions of approval, or is incompatible and therefore may be denied based on the adoption of appropriate findings.

The CUP for the proposed project was originally scheduled for a hearing before the Planning Commission in October of 2020 and was continued to a date uncertain at the applicant's request. In July of 2021, the project was again scheduled for a hearing and continued at the applicant's request to allow additional time for the applicant to confer with the Long Beach Unified School District (LBUSD). On March 17, 2022, the Planning Commission held a public hearing and considered testimony from the applicant and the public in addition to considering the application materials, including technical reports and City staff's report. Public testimony included written correspondence from the LBUSD Facilities Staff which expressed concerns over lack of adequate buffers for the school site and concerns related to safety for students walking to or from school. An adjacent neighborhood group, the Jane Addams Neighborhood Association, also provided a public comment expressing opposition to the project due to over-concentration of car washes in the area, wanting more desired uses and the negative impacts to the school. A letter from the school principal of Dooley Elementary was also received and did not oppose the proposed use (Attachment D). The Planning staff recommended denial of the CUP based on the inability to make the required General Plan findings, particularly the first required finding that the proposed use be consistent with and carry out the General Plan; as well as the second required finding that the proposed use would not be a detriment to the surrounding community including public health, safety, general welfare, environmental quality or quality of life (Attachment E). After hearing, the Planning Commission denied the CUP (5-1, with one Commissioner absent).

Appeal

Within the ten-day appeal period, an appeal was filed by the applicant (Attachment F). The appellant asserts that the Planning Commission erred in its interpretation of the General Plan goals and policies, particularly as it relates to over-concentration of car washes in the vicinity, the potential conflict with environmental justice policies and potential for air quality, noise, and traffic-related impacts to the adjacent Dooley Elementary School. The applicant also asserts that the Planning Commission erred in determining a residential use was potentially feasible.

The Planning Commission considered the applicant's technical reports (noise, traffic, air quality) conclusions of no significant environmental impact from the proposed use in accordance with the California Environmental Quality Act (CEQA) (Attachment G, Attachment H, and Attachment I), and also considered relevant General Plan policies and requirements related to pollution burdened areas, which is required by the State of California because the project site is located within an area that is documented to be one of the most cumulatively pollution burdened not only in Long Beach but is also in the State of California (Attachment J).

The Commission did not deny the project based on the CEQA related studies' findings or contribution to cumulative impacts. Rather, the Planning Commission, within in its discretionary authority, found the car wash use at the location undesirable due to what they found to be a sufficient number of existing auto-oriented uses, including two existing car washes within 1,600 linear feet of Dooley Elementary School, which is classified as a sensitive receptor; children specifically, are sensitive receptors as they are more susceptible to the impacts of pollution and noise (Attachment K), and that the air quality conditions create an inequitable environmental burden on the surrounding community.

The Planning Commission did consider the development of the site with alternative uses including residential uses, as well as other commercial uses. The consideration of a residential alternative was one of many project alternatives the Planning Commission considered. This was appropriate given the property has a NSC-L General Plan PlaceType designation that permits a mix of residential and commercial uses, including low-density apartment and condominium buildings. As outlined in the LUE, this PlaceType is intended to "benefit the surrounding community by promoting or reinforcing a neighborhood's unique identity, accommodating daily retail and service needs, focusing on healthy goods and services, enhancing pedestrian and bicycle connections to neighborhoods, providing community gathering places and providing convenient access to transit." This is particularly important for the project location given its proximity to public transit, including bus service on both major corridors (Long Beach and Del Amo Boulevards) and the nearby Metro A-Line stop on Del Amo Boulevard less than one mile away.

Ultimately, the car wash may have the highest and best economic value for the applicant (Attachment L), and in cases where economic considerations align with the goals and policies of the General Plan, such considerations can be considered appropriate, particularly given other General Plan goals and policies that support economic development. However, the Planning Commission concurred with City staff's analysis that all required findings could not be made in the affirmative, including the finding of conformance with the General Plan goals and policies. The Commission found the school and area are disproportionately burdened by pollution and allowing the car wash would not align with the goals and policies of the LUE.

The City Council in its capacity is tasked with reviewing this appeal "de novo" and can take action to deny the project, approve, or conditionally approve the project in accordance with the Long Beach Municipal Code (LBMC) CUP findings. The City Council should consider whether there are merits of the appeal and the policy tradeoffs inherent in this application, as there are a variety of policies and considerations that are appropriate to consider from the General Plan, including the CEQA findings, in this case. Upholding the Planning Commission's denial could result in some period of vacancy on this portion of the subject site. However, the project site overall has a gas station and mini mart, and a restaurant space currently under remodel.

Public hearing notices were distributed on May 24, 2022, in accordance with the requirements of Chapter 21.21 of the LBMC. Any comments received prior to the City Council hearing will be provided to the City Council for its review and consideration.

This matter was reviewed by Retired Annuitant Attorney Michael J. Mais on May 26, 2022 and by Revenue Management Officer Geraldine Alejo on May 17, 2022.

TIMING CONSIDERATIONS

City Council action is requested on June 14, 2022. Pursuant to LBMC, in the case of appeals to the City Council, hearings are typically held within a 90-day period. June 14, 2022 was the first available City Council date to consider this appeal.

FISCAL IMPACT

This recommendation has no staffing impact beyond the normal budgeted scope of duties and is consistent with City Council priorities. There is no fiscal or local job impact associated with this recommendation.

SUGGESTED ACTION

Approve recommendation.

Respectfully submitted,

OSCAR W. ORCI
DIRECTOR OF DEVELOPMENT SERVICES

APPROVED:

THOMAS B. MODICA
CITY MANAGER

ATTACHMENTS:
- ATTACHMENT A – PLANNING COMMISSION STAFF REPORT
- ATTACHMENT B – VICINITY MAP
- ATTACHMENT C – PROJECT PLANS
- ATTACHMENT D – PUBLIC COMMENTS
- ATTACHMENT E – FINDINGS
- ATTACHMENT F – APPEAL
- ATTACHMENT G – NOISE ANALYSIS
- ATTACHMENT H – TRAFFIC IMPACT ANALYSIS
- ATTACHMENT I – AIR QUALITY STUDY
- ATTACHMENT J – IMPACTED COMMUNITY MAP
- ATTACHMENT K – ENVIRONMENTAL INTERNATIONAL STUDY
- ATTACHMENT L – SUPPLEMENTAL APPLICATION MATERIALS

CITY OF LONG BEACH

AGENDA ITEM No. 1

Development Services
Planning Bureau
411 West Ocean Boulevard, 3rd Floor, Long Beach, CA 90802
(562) 570-6194

March17, 2022

CHAIR AND PLANNING COMMISSIONERS
City of Long Beach
California

RECOMMENDATION:

Deny Conditional Use Permit CUP 18-001 to operate a new 3,058-square-foot detached self-service automated car wash connected to an existing service station and mini mart located at 5005 Long Beach Boulevard within the Commercial Automobile-Oriented (CCA) Zoning District. (District 8)

APPLICANT: Ahmad Ghaderi
A & S Engineering C/O
David Delhraim
29501 Canwood Street
Agoura Hills, CA 91301
(Application 1801-02)

DISCUSSION

The site is located at the northwest corner of Long Beach Boulevard and Del Amo Boulevard (Attachment A – Vicinity Map) within the Commercial Automobile-Oriented (CCA) Zoning District and has a Neighborhood Serving Centers and Corridors-Low (NSC-L) General Plan PlaceType Designation . The 1.48-acre site is currently developed with a standalone restaurant and a gas station with a mini mart. The existing gas station and mini mart have operated at the subject site in its current configuration since 1989. The restaurant building is currently vacant and undergoing soft demolition and plans for the new restaurant improvements are under review with the City. The applicant is requesting a Conditional Use Permit (CUP) to construct and operate a new 3,058-square-foot detached self-service automated car wash (2,000-square-foot car wash tunnel and 1,058 square feet of equipment rooms and office space) along the north property line. Staff recommends denial of this application on the basis that the project is inconsistent with a number of General Plan policies, which are discussed in detail later in this report.

The proposed project abuts Dooley Elementary School to the north and west, a convenience store and drug store with a drive-through pharmacy (drive-through is currently closed) to the east across Long Beach Boulevard; to the south, across Del Amo Boulevard, is a gas station with a mini mart and single-family residences; and a gas station with a drive-through car wash and mini mart is located catty-corner to the site across Long Beach Boulevard. This matter was previously scheduled to be heard by the Planning Commission on October 1, 2020 and was continued at the request of the applicant. The item was rescheduled to be heard in July 2021 by the Planning Commission; at the applicant's request the matter was not agendized to allow them additional time to coordinate with the Long Beach Unified School District (LBUSD).

The proposed automated self-service car wash has a modern design that uses quality materials. The car wash tunnel would have a length of 100 feet and includes two drive up lanes and pay stations and a queuing length of approximately 130 feet before each pay station. The proposed project includes 15 parking stalls for vacuuming (Attachment B – Plans). Site modifications include new landscaping, security cameras, lighting, and a curb cut closure along Long Beach Boulevard. The car wash would operate between the hours of 7:30 am to 10:00 pm daily.

Certain types of land uses, like car washes, due to the nature of the use, require a CUP. The CUP process allows for the individual review so that the Planning Commission can determine if the use is compatible with the surrounding land uses, can be made compatible with conditions of approval, or is incompatible. The proposed area of the lot which is to be developed with the automated car wash is located on the north end of the site and is currently developed with parking. The car wash would abut the northernmost property line and the playground of Dooley Elementary school. The school and car wash would be separated by an existing 9-foot high block wall.

To address the matter of compatibility, the applicant submitted three focused studies pertaining to sound, air quality, and traffic. Additionally, the applicant has submitted supplemental materials in support of the application, including letters from two real estate professionals on the properties best use (Attachment C – Applicant's Supporting Materials). The air quality analysis was prepared by Rincon Consultants (Attachment D - Air Quality Study). The analysis focused on the pollutant emissions from the vehicles using and queuing at the proposed car wash. The report assumed the car wash would service up to 300 vehicles per day, and the maximum queuing and car wash process time for a vehicle would be in the range of 6-10 minutes. The study evaluated the project based on the Southern California Air Quality Management Districts' Localized Significance Threshold for criteria pollutants and found that none of the thresholds were exceeded.[1]

A noise analysis was prepared by BridgeNet International (Attachment E - Noise Analysis) for the project and evaluated the impacts from both the construction and operation of the use. The noise study found that the use of the car wash would not result in violations of either the established interior or exterior noise standards when the thresholds were adjusted for the "ambient noise level."[2] The report concludes that the vacuum equipment would not be a significant source of noise since it is located within the building. There is insufficient information in the report regarding the manufacturer and equipment specifications to verify this conclusion.

While the reports conclude there is no significant impact from noise or air quality for the purposes of the state mandated environmental review under the California Environmental Quality Act

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[1] Criteria pollutants are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. The Environmental Protection Agency establishes National Ambient Air Quality Standards for the six pollutants in accordance with the Clean Air Act.

[2] "Ambient noise level" means the composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location (Long Beach Municipal Code 8.80.020).

(CEQA), there are other factors of compatibility that must be considered. The Administration Chapter of the Land Use Element (LUE) of the General Plan (see pages 168-171), establishes that, “Conditional Use Permits are consistent if the proposed project carries out the policies of the Land Use Element and meets the PlaceType density and intensity levels.” The following discussion details the stated policies with which the proposed car wash would be in conflictand would therefore conflict with vision of the LUE and the Zoning Code, an implementation tool of the General Plan. Staff’s recommendation for denial is based on inconsistency with applicable General Plan policies, not on the exceedance of any environmental thresholds pursuant to the California Environmental Quality Act.

The proposed use is adjacent to an elementary school which is classified as a sensitive receptor; children, specifically, are sensitive receptors as they are more susceptible to the impacts of pollution. This project site is located within an area that is documented to be one of the most pollution burdened areas of the City of Long Beach (City) by income (Attachment F - Impacted Community Map). This map is derived from the California Office of Environmental Health Hazard Assessment’s Cal EnviroScreen which uses environmental, health, and socioeconomic information to assess the pollution burden and vulnerability of populations by Census tract. This location is within the 90th percentile or top 10 percent for the most pollution burdened. The proposed car wash will intensify the auto-oriented land uses adjacent to a school and would conflict with many of the stated goals of the General Plan and Zoning Code. Automobile-oriented uses currently exist on all four corners of the Long Beach Boulevard and Del Amo Boulevard intersection, and the proposed project further intensifies these uses on the subject site. Although the environmental documents concluded no significant exposure/cumulative impacts from the proposed project? the proposed use is contrary to important policies of the General Plan to protect sensitive receptors. While it is largely impossible to quantify the impacts of air pollution on childhood development and health in a manner disaggregated to a single source, it is well documented that cumulative exposure to pollutants has a negative impact on neurodevelopment. Staff has included a literature summary from the scholarly journal Environment International as Attachment G - Environment International 121 (2018) 199-206.

Specifically, the proposed car wash in this location would not be consistent with the environmental health vision established in the LUE of the General Plan, which promotes the creation of buffers between residential uses and sensitive receptors (e.g., schools, hospitals and daycare centers) and facilities such as trucking uses, auto-body shops, drive-through uses, polluting industrial uses and other special use categories that might affect them. Additionally, the proposed project does not support Policy UD 2-3 of the Urban Design Element which calls for enhancing the built environment through façade improvements, quality and context-sensitive infill development, and landscaping. While the proposed use includes modern high-quality materials, the experience from the pedestrian standpoint walking down the street is further deteriorated rather than enhanced.

This portion of the Long Beach Boulevard is one of the designated walking routes to Dooley Elementary School (Attachment H – Dooley Elementary Walking Routes). The proposed project improvements include eliminating one of the two curb cuts along Long Beach Boulevard which is generally a positive improvement for safe pedestrian circulation. The project has been designed with a dual drive-through lane with approximately 130 feet of queuing length between the pay station and driveway for each lane. It is estimated that there will be up to 738 vehicle trips daily to the car wash or approximately 77 vehicle trips per hour if equally distributed throughout the day.

With a total combined queue length of 260 feet between the pay station and driveway, there would be sufficient queue length to accommodate approximately 11 vehicles at one time. The Traffic Impact Analysis prepared by Kimley Horn finds that the site configuration would accommodate the 95^{th} percentile queue of seven vehicles at one time (Attachment I – Traffic). Correspondingly, there remains a probability of approximately five percent, that the car wash queue may be at capacity or greater during peak hours on Fridays or Saturdays after 2 pm. Furthermore, the study recommends restricting parking on adjacent driveway curbs for the purpose of enhancing pedestrian safety. Staff finds that with the potential bunching of trips, occasional equipment malfunction, or user error at the pay station, there would at times be conflicts on site, with the pedestrian path of travel on the sidewalk, and/or south bound traffic on Long Beach Boulevard. This conflicts with the required findings for approval.

Additionally, the Planning Commission may wish to consider the compatibility of this use along the walking path and adjacent to the play area with respect to its impact on the early childhood experience at the school. While air quality levels will not exceed those maximum standards established under law, there will still be new emissions immediately adjacent to a play area already situated within an area of increased ambient pollution.

Likewise, while the noise is not expected to exceed standards, part of the reason they do not exceed standards is because the ambient noise level in this location is already elevated from the surrounding automotive uses. Under the City's noise ordinance, elevated noise levels are permitted when they will not increase background noise by more than five decibels. Children at Dooley already experience higher levels of noise and pollution during recess and this project will further contribute to that problem. Whether the queue for the car wash creates a safety hazard or not, it does further degrade the comfort and perception of safety on that walk to school. Furthermore, a carwash is already available to the public directly south of the subject parcel as well as at other locations to the north, therefore it is not clear that the proposed use is needed in the requested location to fill any particular community gap or need. The Planning Commission will need to balance these concerns with the fact that the principal for the school expressed no concerns with the proposed use interfering with the learning environment.

In 2006, the legislature approved Senate Bill 1000, which instructed every City and County to address environmental justice in their General Plan. The City complied with this law by incorporating environmental justice policies within the General Plan, including LU Policy 14-3 which states "[a]void concentrating undesirable uses, service facilities and infrastructure projects in any manner that results in an inequitable environmental burden on low-income or minority neighborhoods." In the case of the CUP before the Planning Commission, the Commission will need to determine if the use is undesirable. The existing conditions show that that auto-oriented uses are already over-concentrated near Dooley Elementary school and that air quality conditions create an inequitable environmental burden on the surrounding community.

The existing auto-oriented uses within the project vicinity predate the City's adoption of environmental justice policies, the adoption of drive through standards and the current General Plan policies which intend to provide equity in the land use decisions. The environmental justice policies and data are intended to improve the City's land use decisions going forward so that the overall health of people living within these areas is improved.

The current General Plan LUE reflects a substantial shift in how land use regulation is to be considered by the City including in communities with high pollution burdens and existing non-compatible land-uses. LUE Strategy 11 relates to “[c]reate healthy and sustainable neighborhoods,” with associated relevant policies: 11-1 Require that land use plans, polices and regulations promote health and wellness and reduce barriers to healthy living, 11-6 Achieve health equity, eliminate disparities and improve health of residents throughout the City, and 11-7 Diminish the impact of drive-through facilities on the pedestrian environment. Strategy 16 relates to “[p]revent and reduce disproportionate environmental burdens affecting low-income and minority populations.”

A car wash may be an appropriate use in many locations along major corridors within the greater community but not in this specific location which abuts an elementary school. Furthermore, this particular area is already served by two existing car wash facilities within 1,600 feet or less of the project site. Allowing the car wash would also be contrary to General Plan land use Policy 10-1 to, “ensure neighborhoods contain a variety of functional attributes that contribute to residents’ day-to-day living, including schools, parks and commercial and public spaces.” Based on staff’s public outreach for the on-going Uptown Planning Land Use and Neighborhood plan (UPLAN) zoning code update efforts in North Long Beach, there is an expressed need for a wider range of neighborhood-serving commercial uses such as banking, retail, and dining within the North Long Beach area, and a simultaneous concern about the overconcentration of auto-oriented uses such as the proposed car wash use.

The development of new zones for the larger area after an extensive community outreach process and the City-initiated rezoning of key corridors such as Atlantic Avenue and Artesia Boulevard acknowledged these neighborhood conditions. As a result, new applicable zoning districts introduced zoning regulations that prohibit new auto-oriented uses and create incentives for needed uses such as banks and grocery stores in the area, consistent with NSC-L PlaceType goal to accommodate the range commercial uses to meet consumers’ daily needs. A systematic geographic rezoning consistent with the 2019 LUE is ongoing, and it is anticipated that more of the City’s corridors such as Long Beach Boulevard will be rezoned to such zones that better implement General Plan policies and encourage a diverse mix of commercial uses and mixed commercial and residential development. While the commercial uses that currently exist on the site are long-standing uses, sites such as the subject site are also going to become increasingly important to meeting the City’s State-mandated housing production goals.

The materials submitted by the applicant (Attachment C) do reference the proposed development as the most economically viable and submit two expert opinions that the site is not viable for residential development. The Planning Commission should consider these materials, including the possibility that denial of the CUP request may result in the continued vacant or blighted state of the site for some period of time. At the same time, the Planning Commission may wish to consider that the 38-townhome 5100 Long Beach Boulevard residential project, across the street from the proposed car wash, was viable, was approved by the Planning Commission in 2020 and is now in construction. The applicant’s materials do not consider a consolidated development combining the adjacent closed restaurant site with the subject parcel and make reference to the cost of podium structured parking as well as rising lumber prices. There are housing models, such as the attached townhome project at 5100 Long Beach Boulevard that do not include costly structured parking and, while still elevated, the temporary COVID-19 related supply issues impacting lumber prices have begun to reverse.

While staff recommends denial of the subject application, the Planning Commission should carefully consider the merits of the request and the policy tradeoffs inherent in this application. Denial will result in some period of vacancy at the subject site; furthermore, under certain circumstances that period of vacancy could extend many years into the future. In the view of staff, the potential impacts of the project on the adjacent school playground, combined with the overconcentration of automobile-oriented uses and the opportunity cost of not using the land for a project more-consistent with the LUE vision make the recommendation clear. The applicant however does raise substantial and valid counter points both about the benefit of the car wash as well as the reasonableness or likelihood that a different, more desirable in the view of the City, use will emerge after the denial of this requested entitlement.

Accordingly, staff recommends that the Planning Commission deny the use, as the findings regarding compatibility and consistency cannot all affirmatively be made in support of the car wash in this location adjacent to an elementary school (Attachment J – Findings).

PUBLIC HEARING NOTICE

A Notice of Application was sent to the local community groups on February 26, 2018, and 90 Public Hearing Notices were distributed on March 2, 2022, in accordance with the provision of the Zoning Ordinance.

At the time of writing the original staff report in October of 2020 staff received one letter from the Principal of Dooley Elementary School which did not express opposition to the project. In May of 2021 staff has received an email from the facility development staff with LBUSD staff which indicated opposition without further analysis and resolution of their concerns (Attachment K – Public Comment). In February 2022 City staff met virtually with the LBUSD facility development staff who affirmed that there was no change in the District's position.

ENVIRONMENTAL REVIEW

The recommendation of the proposed project is to deny the project therefore CEQA review is not required.

Respectfully submitted,

ALEXIS OROPEZA
CURRENT PLANNING OFFICER

PATRICIA A. DIEFENDERFER, AICP
PLANNING BUREAU MANAGER

CHRISTOPHER KOONTZ, AICP
DEPUTY DIRECTOR OF DEVELOPMENT SERVICES

OSCAR W. ORCI
DIRECTOR OF DEVELOPMENT SERVICES

OO:CK:PD:ao

Attachments:

Attachment A - Vicinity Map
Attachment B - Plans
Attachment C - Applicant's Supporting Materials
Attachment D - Air Quality Study
Attachment E - Noise Analysis
Attachment F - Impacted Community Map
Attachment G - Environment International 121 (2018) 199-206
Attachment H - Dooley Elementary Walking Routes
Attachment I - Traffic
Attachment J - Findings
Attachment K – Public Comment

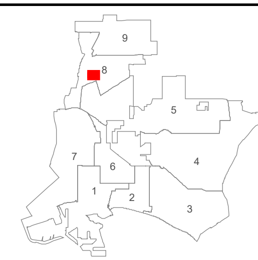
Attachment B

Subject Property:

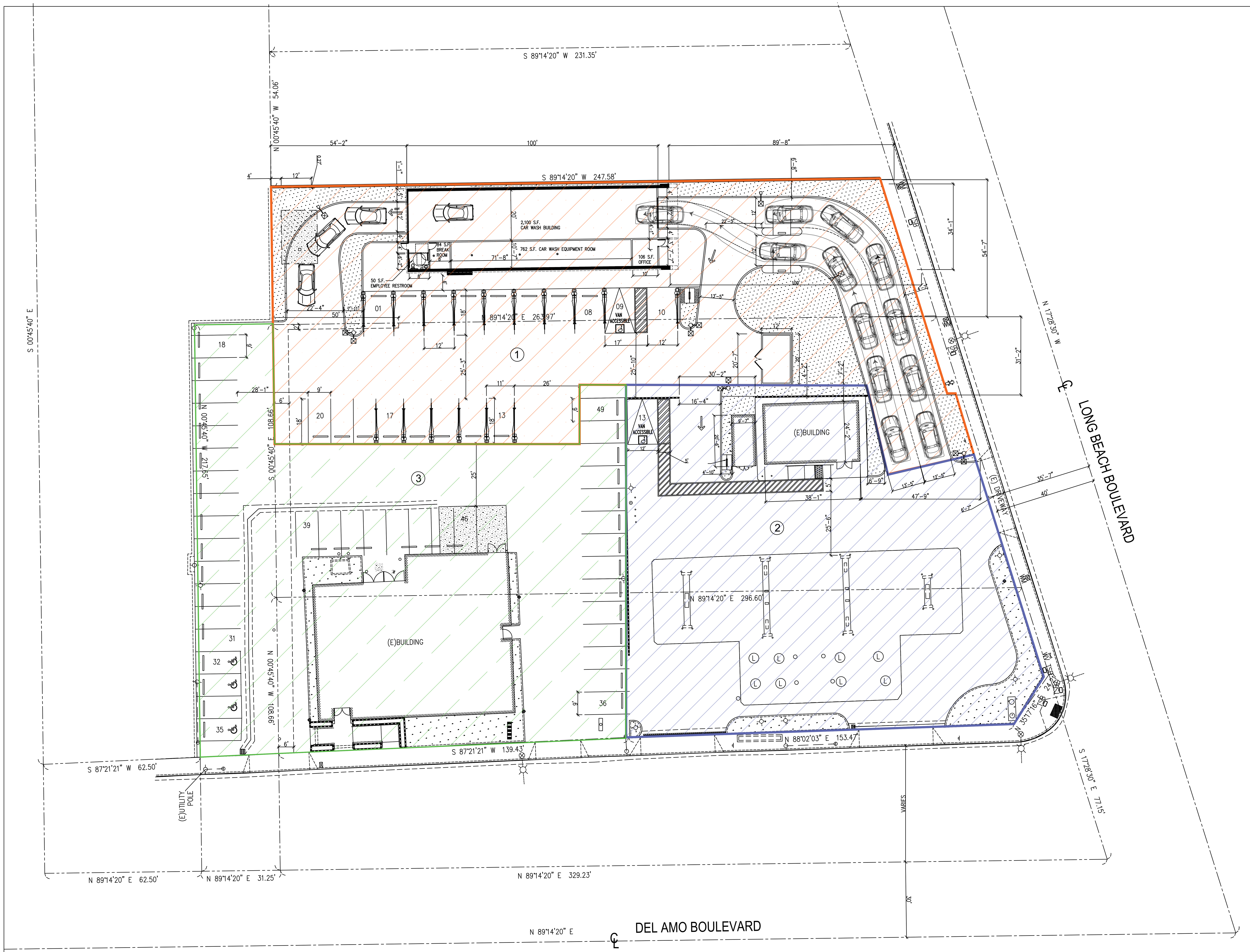
APNs: 7132-028-017, 7132-028-019, 7132-028-039, & 7132-028-040
Application No. 1801-02
Council District 8
Zoning Code : CCA

N

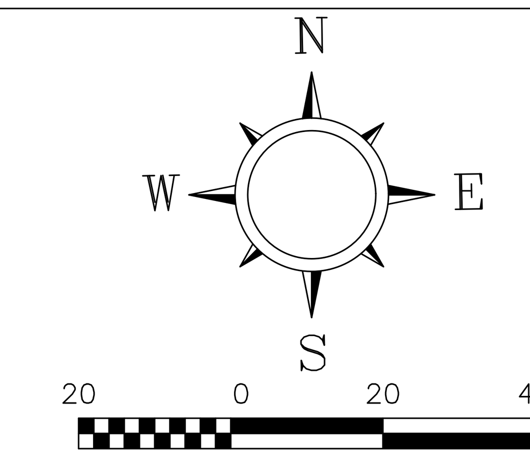
80 40 0 80 160 Feet



Attachment C

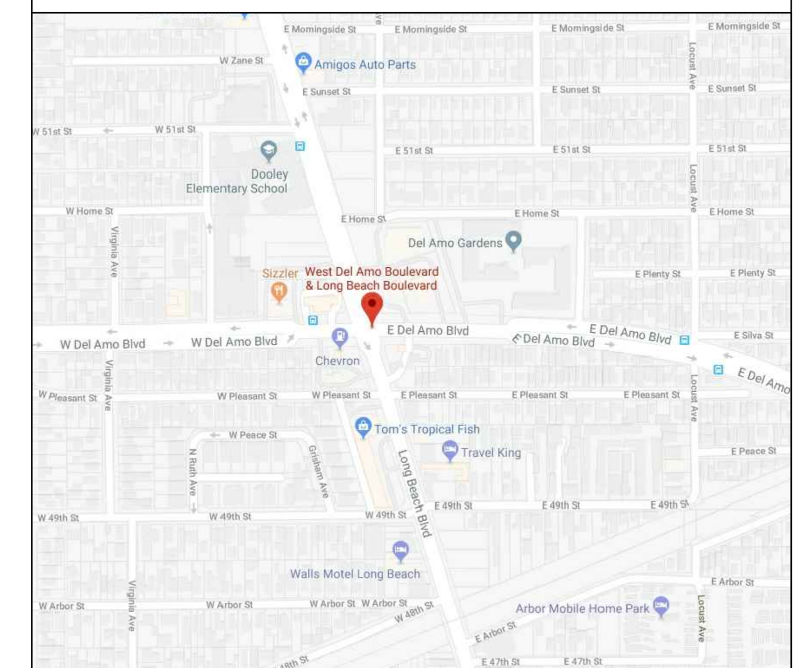


DIRECTIONAL ARROW/ GRAPHIC SCALE



GRAPHIC SCALE
1"=20'-0"

VICINITY MAP



SITE INFORMATION

ITEM	SIZE	LOT %	AREA (SQ.FT.)
TOTAL LOT AREA	N/A	N/A	66,551.00
EXISTING FOOD MART	24'-2" x 38'-1"	1.42	920.3
EXISTING STORY STUCCO BUILDING	AS SHOWN	6.90	4,300
EXISTING CANOPY	91'-5" x 30'-0"	4.23	2,743
NEW CAR WASH	100'-0" x 20'-0"	3.08	2000

LOT INFORMATION

TOTAL LOT AREA = 66,551 SQ.FT.

1. BLISS CAR WASH = 24,532 SQ.FT.
2. C-STORE & GAS = 19,504 SQ.FT.
3. EXISTING BUILDING = 22,514 SF

PARKING:
PARKING REQUIREMENTS:

STORE : 920 SQ.FT. = 920:250 = 4 SPACES
STORY STUCCO BUILDING: 4,475 SQ.FT. = 4,300:100 = 43 SPACES

TOTAL REQUIRED: 47 SPACES

PARKING PROVIDED:

TOTAL OF 6 (17'x18'–HANDICAP PARKING)
11 (12'x18' – VACUUM SPACES)
46 (9'X18' STANDARD PARKING)

TOTAL: 63 SPACES

1	01/04/2019	ER
2	01/11/2019	IJ
3	01/14/2019	IJ
4	02/15/2019	SH
5	04/28/2020	SH
6	01/05/2020	SH
7	03/15/2021	SH
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

PLANS PREPARED BY:
A & S ENGINEERING
PLANNING ENGINEERING CONSTRUCTION MANAGEMENT
28405 SAND CANYON RD., SUITE "B" CANYON COUNTRY, CA 91387
PHONE #: (661)250-9300 FAX #: (661) 250-9333

Platinum Energy
30343 Canwood Street, Suite 200 Agoura Hills, CA 91301
Phone #: (818) 206-5700

STORE# : –
ADDRESS: 5005 LONG BEACH BLVD
LONG BEACH, CA 90805

DRAWN
SH
CHECKED

DATE
10/30/2018
SHT. TITLE
PROPOSED SITE PLAN
SCALE
1"=20'-0"
SHEET
S1

H:\PLATINUM ENERGY\HOLT (5515 – MONTCLAIR)


BLISS
carwash

From: [redacted]
To: Alexis Oropeza; Jorge Ramirez
Cc: [redacted]
Subject: Proposed carwash at 5005 Long Beach, Long Beach
Date: Monday, September 21, 2020 4:34:37 PM

-EXTERNAL-

Good afternoon Jorge,
Please see email below in support of our project. We have provided the information that was supplied to you to Ms. Chiles and we received the email below.
Look forward to your supportive staff report.
Sincerely,

Ahmad Ghaderi
A & S Engineering, Inc.
28405 Sand Canyon Road, suite "B"
Canyon Country, CA., 91387
Ph: 661-250-9300
FX: 661-250-9333
[redacted]

From: Nicole Howton Chiles [redacted]
Sent: Monday, September 21, 2020 3:25 PM
To: Ahmad Ghaderi [redacted]
Subject: Re: [EXTERNAL] Proposed carwash at 5005 Long Beach, Long Beach

Thank you for sharing with me the details of your project. All of my questions were answered and I have no concerns that this car wash will interfere with our learning environment.
Thank you again.
I wish you all the best.

NICOLE

Nicole Howton Chiles, Principal
Dooley Elementary School
5075 Long Beach Blvd.
Long Beach, CA 90805
(562) 428-7274

"Education is the most powerful weapon we can use to change the world." ~ Nelson Mandela

Alexis Oropeza

Subject: FW: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.

From: Tracy Nishihira [redacted]
Sent: Monday, May 24, 2021 10:23 AM
To: Alexis Oropeza <Alexis.Oropeza@longbeach.gov>
Cc: ALAN REISING [redacted] David Miranda [redacted]
Subject: RE: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.

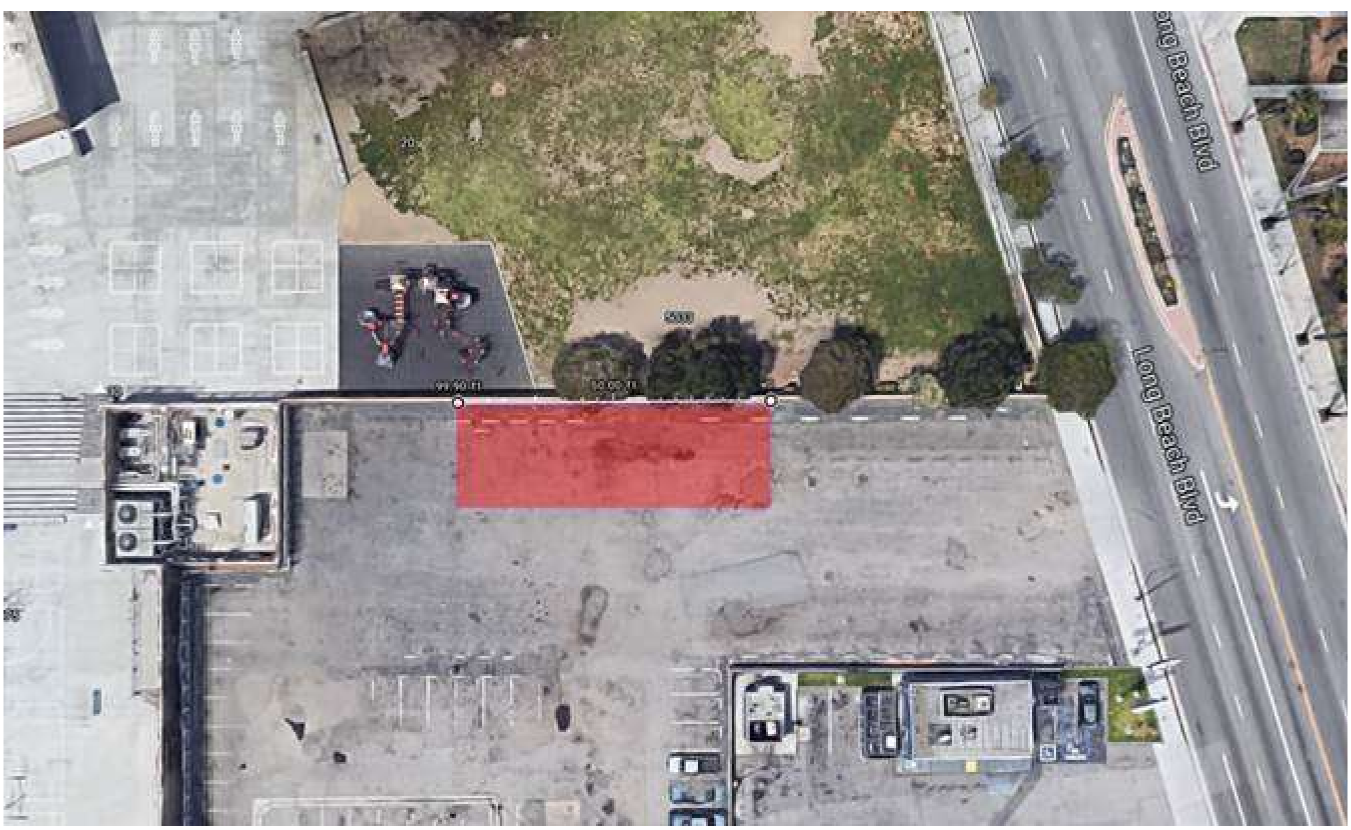
-EXTERNAL-

Good morning Alexis,

I appreciate your patience as the District reviewed the documents provided by the City for these projects.

Based upon our preliminary evaluation of the project exhibits provided for the proposed car wash at 5005 Long Beach Blvd., we have the following concerns:

- District concurs with the City's finding that the existing wall is not an adequate buffer between incompatible uses and that project will expose students to elevated levels of noise and air pollutants, particularly due to proximity of the 22-6" tall building to the only play field and apparatus available to 1st-5th grade students on the Dooley ES school site. The proposed structure would only be 1'-1" away from the 9'-0" high wall separating the two lots. The project documents do not illustrate the proximity but is roughly shown here:



- Applicant's assessment of noise levels in relation to school building location is not adequate. Play areas need to be taken into consideration also. District concurs with City that students at Dooley already experience higher levels of noise and pollution during recess that will be further impacted by the project.
- Construction will impact the Dooley ES site as it is not reasonable to expect that the construction of the building on the north side can be completed within 1'-1" of space. Potential impact to trees along the north property line also.
- Detailed peer review is necessary to applicant's Air Quality Study and Greenhouse Gas study to ensure emission factors/modeling used are adequate and vehicle and equipment detail/usages are accurate to confirm impacts as less than significant. Study is based on 600 trips per day which is 25% less than trips noted in applicant's Traffic Impact Analysis.
- District concurs with City finding that traffic, particularly during peak hours, would conflict with the pedestrian path creating safety hazards.

Until further analysis is completed and items of concern resolved, District fully concurs with City's recommendation to deny the project permit.

Thank you,

Tracy Nishihira, AIA
Interim Planning Administrator
Long Beach USD – Facilities Development & Planning

Email: tnishihira@lbschools.net
Phone: 562-997-7550 | Cell: [redacted]

From: Alexis Oropeza
To: Patricia Diefenderfer
Subject: FW: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.
Date: Wednesday, June 30, 2021 11:33:00 AM
Attachments: image001.png
image002.png
image003.png
image004.png
image007.png
image008.png
image009.png
image010.png
image011.png
image012.png

Alexis Oropeza
Current Planning Officer

Long Beach Development Services I Planning Bureau
T 562.570.6413 **F** 562.570.6068
411 West Ocean Blvd., 3rd Floor I Long Beach, CA 90802
Alexis.Oropeza@longbeach.gov I www.lbds.info

From: Tracy Nishihira <TNishihira@lbschools.net>
Sent: Monday, June 7, 2021 11:25 AM
To: Alexis Oropeza <Alexis.Oropeza@longbeach.gov>
Cc: ALAN REISING <AReising@lbschools.net>; David Miranda <DMiranda1@lbschools.net>
Subject: RE: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.

-EXTERNAL-

Good morning Alexis,

That is correct. The revised studies do not address these concerns.

Thank you,

Tracy Nishihira, AIA
Interim Planning Administrator
Long Beach USD – Facilities Development & Planning

Email: tnishihira@lbschools.net
Phone: 562-997-7550 | Cell: [redacted]

From: Alexis Oropeza [mailto:Alexis.Oropeza@longbeach.gov]
Sent: Monday, June 07, 2021 9:25 AM
To: Tracy Nishihira <TNishihira@lbschools.net>
Cc: ALAN REISING <AReising@lbschools.net>; David Miranda <DMiranda1@lbschools.net>
Subject: RE: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.

Hi Tracy,

I wanted to clarify that the comments provided from the school district remain even based on the revised studies that were attached to my email.

Thank you,

Alexis Oropeza
Current Planning Officer

Long Beach Development Services I Planning Bureau
T 562.570.6413 **F** 562.570.6068
411 West Ocean Blvd., 3rd Floor I Long Beach, CA 90802
Alexis.Oropeza@longbeach.gov I www.lbds.info

From: Tracy Nishihira <TNishihira@lbschools.net>
Sent: Monday, May 24, 2021 10:23 AM
To: Alexis Oropeza <Alexis.Oropeza@longbeach.gov>
Cc: ALAN REISING <AReising@lbschools.net>; David Miranda <DMiranda1@lbschools.net>
Subject: RE: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.

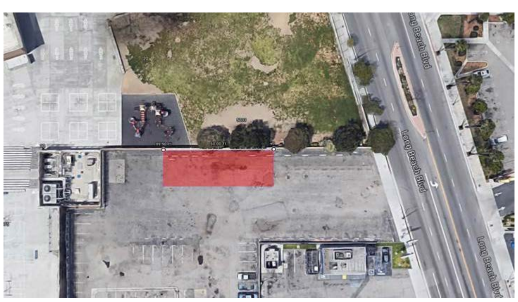
-EXTERNAL-

Good morning Alexis,

I appreciate your patience as the District reviewed the documents provided by the City for these projects.

Based upon our preliminary evaluation of the project exhibits provided for the proposed car wash at 5005 Long Beach Blvd., we have the following concerns:

- District concurs with the City's finding that the existing wall is not an adequate buffer between incompatible uses and that project will expose students to elevated levels of noise and air pollutants, particularly due to proximity of the 22-6" tall building to the only play field and apparatus available to 1st-5th grade students on the Dooley ES school site. The proposed structure would only be 1'-1" away from the 9'-0" high wall separating the two lots. The project documents do not illustrate the proximity but is roughly shown here:



- Applicant's assessment of noise levels in relation to school building location is not adequate. Play areas need to be taken into consideration also. District concurs with City that students at Dooley already experience higher levels of noise and pollution during recess that will be further impacted by the project.
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- District concurs with City finding that traffic, particularly during peak hours, would conflict with the pedestrian path creating safety hazards.

Until further analysis is completed and items of concern resolved, District fully concurs with City's recommendation to deny the project permit.

Thank you,

Tracy Nishihira, AIA
Interim Planning Administrator
Long Beach USD – Facilities Development & Planning

Email: tnishihira@lbschools.net
Phone: 562-997-7550 | Cell:[redacted]

From: Tracy Nishihira
Sent: Monday, May 17, 2021 4:39 PM
To: Alexis.Oropeza@longbeach.gov
Cc: ALAN REISING <AReising@lbschools.net>; David Miranda <DMiranda1@lbschools.net>
Subject: RE: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.

Good afternoon Alexis,

Thank you for the reminder…my apologies for not responding to your prior email. It was sent to my alternate email address and was buried amongst a slew of other emails. We will respond within the week.

Thanks again,

Tracy Nishihira, AIA
Planning PM / Interim Planning Administrator

Long Beach USD - Facilities Development & Planning Branch
2425 Webster Avenue
Long Beach, CA 90810
t: 562-997-7550
c[redacted]7
e[redacted]lbschools.net

www.lbschoolbonds.net

From: Alexis Oropeza [mailto:Alexis.Oropeza@longbeach.gov]
Sent: Monday, May 17, 2021 3:31 PM
To: ALAN REISING <AReising@lbschools.net>; TracyN@CapitalPM.com; David Miranda <DMiranda1@lbschools.net>
Subject: RE: 5005 Long Beach Blvd. & 6090 Long Beach Blvd.

Hi All,

I am writing in follow up to find out if the District has any comments regarding the proposed car wash at 5005 Long Beach Blvd., located just south of Dooley Elementary School.

Additionally, I wanted to know if there were any specific conditions the district would like to to see incorporated into the project at 6090 Long Beach Blvd, in the event that it is approved.

Sincerely,

Alexis Oropeza
Current Planning Officer

Long Beach Development Services I Planning Bureau
T 562.570.6413 **F** 562.570.6068
411 West Ocean Blvd., 3rd Floor I Long Beach, CA 90802
Alexis.Oropeza@longbeach.gov I www.lbds.info

From: Alexis Oropeza
Sent: Monday, April 26, 2021 11:01 AM
To: areising@lbschools.net; TracyN@CapitalPM.com; DMiranda1@lbschools.net
Subject: 5005 Long Beach Blvd.

Hi All,

Thanks for the meeting this morning. In follow up I am sending you the background information on the car wash at 5005 Long Beach Blvd.

It was agendized for the October 1st Planning Commission meeting with a recommendation for denial. The matter was continued at the applicant's request.

Planning Commission October 1st Agenda, See Agenda Item 8 here: http://longbeach.legistar.com/View.ashx?M=A&ID=805961&GUID=56858238-BD2D-4D24-9404-6460D1879744

The following is a link to letter: http://longbeach.legistar.com/View.ashx?M=F&ID=8811155&GUID=D9EA6BF4-007B-4A78-A1E5-8174D8DA846C

Since October the applicant has updated the review of the traffic queuing and moved the pay station closer to the car wash tunnel. Attached is the updated study and site plan that the City is currently under review.

-
Please let us know if you have any comments on this on or before May 10th.

Thank you,

Alexis Oropeza
Current Planning Officer

Long Beach Development Services I Planning Bureau
T 562.570.6413 **F** 562.570.6068
411 West Ocean Blvd., 3rd Floor I Long Beach, CA 90802
Alexis.Oropeza@longbeach.gov I www.lbds.info

Heather Flores

From: Laurie C. Angel [redacted]
Sent: Tuesday, March 15, 2022 3:43 PM
To: PlanningCommissioners
Subject: Comments on March 17 Agenda item 1

-EXTERNAL-

Regarding the CUP for the proposed car wash at 5005 Long Beach Blvd.I have looked through the attachments and I see nothing that explains how cars exit the car wash onto the street. It looks as though the proposed use barely has any room at all to operate without encroaching on the adjacent vacant property (former Sizzler property).

You must consider how the proposed use will impact the ability of this adjacent (Sizzler) property to sell, and develop in the future. Truly, this is pretty poor land use for such an important corner. The property should be given better long term consideration for the promise of improved development. The car wash would undoubtedly adversely impact any decent development to the Sizzler property in the future.

It seems that a car wash is merely a last ditch effort to improve profits for the gas station at the expense of proper development ifor he area. There are car washes on other corners. How many car washes do you need at one intersection? How does a car wash impact water and sewage usage?

Also, since this is right next to a school, I am concerned about the noise, trash, dirt and water borne dirt that may make its way onto or near the Dooley School property.

Regards,

Laurie Angel
Jane Addams Neighborhood Association

CONDITIONAL USE PERMIT FINDINGS

Application No. 1801-02 (CUP 18-001)
5005 Long Beach Boulevard
June 14, 2022

Pursuant to Section 21.25.206 of the Long Beach Municipal Code, a Conditional Use Permit can be granted only when positive findings are made consistent with the following criteria set forth in the Zoning Ordinance. These findings and staff analysis are presented for consideration, adoption and incorporation into the record of proceedings:

1. THE APPROVAL IS <u>NOT CONSISTENT</u> WITH AND DOES NOT CARRY OUT THE GENERAL PLAN, ANY APPLICABLE SPECIFIC PLANS SUCH AS THE LOCAL COASTAL PROGRAM AND ALL ZONING REGULATIONS OF THE APPLICABLE DISTRICT;

The project site (1.48 acres), which includes two (2) existing buildings (dine-in restaurant, gas station with mini mart) situated within the southerly portion of the project site and adjacent to Del Amo Boulevard and west of Long Beach Boulevard. The proposed self-service drive-through car wash would be located within the northerly portion of the project site, adjacent to the playground of Dooley Elementary School. This area most recently served as a passive parking area, which is now fenced off prohibiting its use. The project site has an underlying General Plan Designation of Neighborhood Serving Centers and Corridors-Low (NSC-L) which encourages a variety of commercial uses to meet consumers' daily needs and is within the Community Commercial - Automobile Oriented (CCA) Zoning District which is intended for retail and service-related uses capable of supporting the entire community. The NSC-L PlaceType also allows residential and mixed residential and commercial development.

The Administration Chapter of the Land Use Element of the General Plan (see pages 168-171), establishes that, "Conditional Use Permits are consistent if the proposed project carries out the policies of the Land Use Element and meets the PlaceType density and intensity levels." Following are the policies that with which the proposed car wash would be in conflict, contrary to the stated policies, and would create a conflict with vision of the Land Use Element and the Zoning Code, an implementation tool to the General Plan.

The project site is located within 1,600 feet of two existing car wash facilities: 1) a self-service drive through car wash located across the street from the project site at 113 E. Del Amo Boulevard; and 2) a do-it-yourself carwash is located north of the site at 5190 Long Beach Boulevard. General Plan Land Use Policy No. 10 establishes a policy, "of ensuring that neighborhoods contain a variety of functional attributes that contribute to residents' day-to-day living, including schools, parks and commercial and public spaces." With two existing commercial car wash options, this particular community need is being met, whereas there are other expressed needs for a greater diversity of neighborhood-serving uses including but not limited to banks and grocery stores, as an example, as captured by the Uptown Planning Land Use and Neighborhood (UPLAN) zoning code update efforts in North Long Beach. Furthermore, the General Plan seeks to achieve more equitable outcomes. The proposed use in this location intensifies the existing auto-centric uses adjacent to a school facility and would be counter to those guiding principles in this location adjacent to an elementary school.

The established purpose of the Zoning Code includes protecting institutional uses such as the adjacent Dooley Elementary School from the intrusion of incompatible uses (LBMC 20.10.020). A 9-foot perimeter wall serves as a buffer between the school and car wash. However, that does not mitigate all relevant concerns about compatibly as the project site is located within an area that is documented to be one of the most pollution-burdened areas of the city by income (Attachment F - Impacted Community Map). The elementary school is a sensitive receptor; children, specifically, are sensitive receptors as they are more susceptible to the impacts of pollution. Contrary to the goal of prohibiting incompatible uses, the proposed car wash would intensify the auto-oriented land uses adjacent to a school. The proposed car wash in this location would not be consistent with the environmental health vision established in the Land Use Element of the General Plan (page 6) which promotes the creation of buffers between residential uses and sensitive receptors (e.g., schools, hospitals and daycare centers) and facilities such as freeways, industries, the ports of Long Beach and Los Angeles and the Long Beach Airport that might affect them. Additionally, the proposed project does not support Policy UD 2-3 of the Urban Design Element as it is not a context sensitive design or use. This policy calls for enhancing the built environment through façade improvements, quality and context-sensitive infill development, and landscaping. The proposed use is inconsistent with LUE Strategy 11, Policy 11-1, 11-6, 11-7, Policy 14-3, and Strategy 16. Broadly, the use of the subject parcel as a car wash will expose pedestrians, residents, and, in particular, adjacent elementary school children to elevated levels of noise and air pollutants. The existing environmental setting is disadvantaged both with respect to its current pollutant load as well as demographic and health indicators. Introducing additional auto-oriented uses to this location is inconsistent with the environmental justice policies of the General Plan.

2. THE PROPOSED USE WILL BE DETRIMENTAL TO THE SURROUNDING COMMUNITY INCLUDING PUBLIC HEALTH, SAFETY OR GENERAL WELFARE, ENVIRONMENTAL QUALITY OR QUALITY OF LIFE; AND

The proposed car wash with dual drive-through queuing lanes would be located within the northernmost portion of commercial that is currently unused and was most recently used for passive parking. The drive-through lanes are designed as dual queuing lanes that merge at the drive-through tunnel entrance. The drive-through lanes have also accommodated a by-pass or exit lane to exit the drive-through facility if so desired by the patron. The length of the queuing lanes between the car wash menu payment station and the driveway approach on Long Beach Boulevard is approximately 260 feet (130 feet each lane). The City Councils finds that with the bunching of trips (especially during peak hours), occasional equipment malfunction, or periodic user error at the pay station, there would be times when vehicles on site would conflict with the pedestrian path of travel on the adjacent sidewalk, and with south bound traffic on Long Beach Boulevard that would create a hazard. Per the Focused Air Quality Analysis prepared by Rincon Consultants, Inc. on August 21, 2020, air quality emissions from the vehicles using the car wash would be below both regional and localized thresholds from the South Coast Air Quality Management District. Localized thresholds are used to determine impacts to the nearby community, such as the elementary school. While the report concludes there is no significant impact from noise or air quality, there are limitations to those studies and there are other factors of compatibility that must be considered. The proposed use is adjacent to an elementary school which is classified as a sensitive receptor; children, specifically, are sensitive receptors as they are more susceptible to the impacts of pollution. This project site is located within an area that is documented to be one of the most pollution-burdened areas of the city by income (Attachment F -Impacted Community Map). This map is derived from the California Office of Environmental Health Hazard Assessment's Cal EnviroScreen which uses environmental, health, and socioeconomic information to assess the pollution burden and vulnerability of populations by census tract. This location is within the 95th percentile or top five percent for the most pollution burdened. The proposed car wash will intensify the auto-oriented land uses adjacent to a school and would conflict with the stated goals of the General Plan and Zoning Code. While it is largely impossible to quantify the impacts of air pollution on childhood development and health in a manner disaggregated to a single source, it is well documented that cumulative exposure to pollutants has a negative impact on neurodevelopment. A literature summary from the scholarly journal Environment International (Attachment X) incorporated by reference.

The proposed car wash in this location would not be consistent with the environmental health vision established in the Land Use Element of the General Plan, which promotes the creation of buffers between residential uses and sensitive receptors (e.g., schools, hospitals and daycare centers) and facilities such trucking uses, auto-body shops, drive-through uses, polluting industrial uses and other special use categories that might affect them. Within approximately 500 feet of the school there are two drive throughs (fast food and pharmacy), one car wash, and four gas stations. General Plan Land Use Policy 14-3 to "[a]void concentrating undesirable uses, service facilities and infrastructure projects in any manner that results in an inequitable environmental burden on low-income or minority neighborhoods." Allowing another auto-oriented use would be inconsistent in this location as it would contribute to the generation of new emissions in an area already overburdened with pollution.

3. THE APPROVAL IS NOT IN COMPLIANCE WITH ALL OF THE SPECIAL CONDITIONS FOR SPECIFIC CONDITIONAL USES, AS LISTED IN CHAPTER 21.52.

Section 21.52.206 states that the following conditions shall apply to auto repair shops, service stations, car washes, auto upholstery shops, auto parts and tire sales uses requiring a Conditional Use Permit:

A. The proposed use shall not intrude into a concentration of retail uses and not impede pedestrian circulation between retail uses.

As proposed the car wash will not intrude into a concentration of retail uses and not impede pedestrian circulation between retail uses as the car wash will be developed on a vacant and underutilized portion of an existing commercial development that consists of a dine-in restaurant and service station. The project does however diminish an established walking route to the adjacent elementary school and degrade the pedestrian environment.

B. The proposed use shall not create unreasonable obstructions to traffic circulation around or near the site.

The proposed project fronts on Long Beach Boulevard, which serves as one of the designated school walking routes to the adjacent Dooley Elementary School. The project has been designed with a dual drive-through lane with approximately 130 feet of queuing length between the pay station and driveway for each lane. It is estimated that there will be up to 738 vehicle trips daily to the car wash or approximately 77 vehicle trips per hour if equally distributed throughout the day. With a total combined queue length of 260 feet between the pay station and driveway, there would be sufficient queue length to accommodate approximately 11 vehicles at one time. The Traffic Impact Analysis prepared by Kimley Horn finds that the site configuration would accommodate the 95th percentile queue of seven vehicles at one time. Correspondingly, there remains a probability of approximately five percent, that the car wash queue may be at capacity or greater during peak hours on Fridays or Saturdays after 2 p.m.

C. No curb cuts shall be permitted within forty feet (40’) of any public roadway intersection.

The proposed car wash will not necessitate the need to create any new or additional curb cuts or approaches to accommodate ingress/egress from the project site. As demonstrated by the site plan (Attachment B), access will be achieved via an existing approach which currently serves the existing fueling facility.

D. No vehicles may be stored at the site for the purposes of sale, unless the use is also, vehicle sales lot or for use as parts for vehicles under repair.

The proposed car wash would not result in the need to store vehicles for sale or repair. The self-service drive-through car wash is designed as an ancillary use to the existing fueling facility. No vehicle storage, repairs or sales are associated with the current or proposed use.

E. The site shall comply with all applicable development standards for open storage and repair uses specified in chapter 21.45. "Special Development Standards".

As previously described above, the proposed car wash will not result in the need to store vehicles for sale or repair. The self-service drive-through car wash is designed as an ancillary use to the existing fueling facility. No vehicle storage, repairs or sales are associated with the current or proposed use.

F. In the CB District, such uses shall be limited to locations inside parking structures:

The subject property is located in the CCA Zoning District therefore, this condition is not applicable.

G. In the CR and CO zones, Conditional Use Permit shall be limited to the expansion of existing nonconforming uses;

The subject property is located in the CCA Zoning District. Therefore, this condition is not applicable.

4. THE RELATED DEVELOPMENT APPROVAL, IF APPLICABLE, IS CONSISTENT WITH THE GREEN BUILDING STANDARDS FOR PUBLIC AND PRIVATE DEVELOPMENT, AS LISTED IN SECTION 21.45.400

Section 21.45.400 specifies types of projects that require compliance with green building standards. The proposed use is only 2,000 square feet in size below the established 50,000 square foot minimum threshold requiring compliance with Section 21.45.400 and therefore, this section of the Municipal Code would not be applicable to the proposed use.

Attachment F

CITY OF LONG BEACH

Development Services
Planning Bureau
411 West Ocean Boulevard, 2nd Floor, Long Beach, CA 90802
562.570.6194

Application For Appeal

An appeal is hereby made to Your Honorable Body from the decision of the

- ○ Site Plan Review Committee
- ○ Zoning Administrator
- ◉ Planning Commission
- ○ Cultural Heritage Commission

Which was taken on the 17th day of March, 20 22.

Project Address: 5005 Long Beach Boulevard

I/We, your appellant(s), hereby respectfully request that Your Honorable Body **reject** the decision and ◉ **Approve** / ☐ **Deny** the application or permit in question.

ALL INFORMATION BELOW IS REQUIRED

Reasons for Appeal: Appellant is the Applicant, who is aggrieved by the denial of the project and appeared before the Planning Commission. The Planning Commission erred in its interpretation and application of the General Plan goals and policies, particularly in its determination of an over-concentration of car washes in the vicinity the potential conflict with environmental justice policies, and the potential for air quality-, noise-, and traffic-related impacts to the adjacent Dooley Elementary School. The Planning Commission also erred in determining a residential use was potentially feasible.

Appellant Name(s): Ahamad Ghaderi

Organization (if representing) David Delrahim

Address: 29501 Canwood Street

City Agoura Hills State CA ZIP 91301 Phone (661) 250-9300

Signature(s) [signature] Date 3/22/22

- A separate appeal form is required for each appellant party, except for appellants from the same address, or an appellant representing an organization.
- Appeals must be filed within 10 days after the decision is made (LBMC 21.21.502).
- You must have established *aggrieved* status by presenting oral or written testimony at the hearing where the decision was rendered; otherwise, you may not appeal the decision.
- See reverse of this form for the statutory provisions on the appeal process.

BELOW THIS LINE FOR STAFF USE ONLY

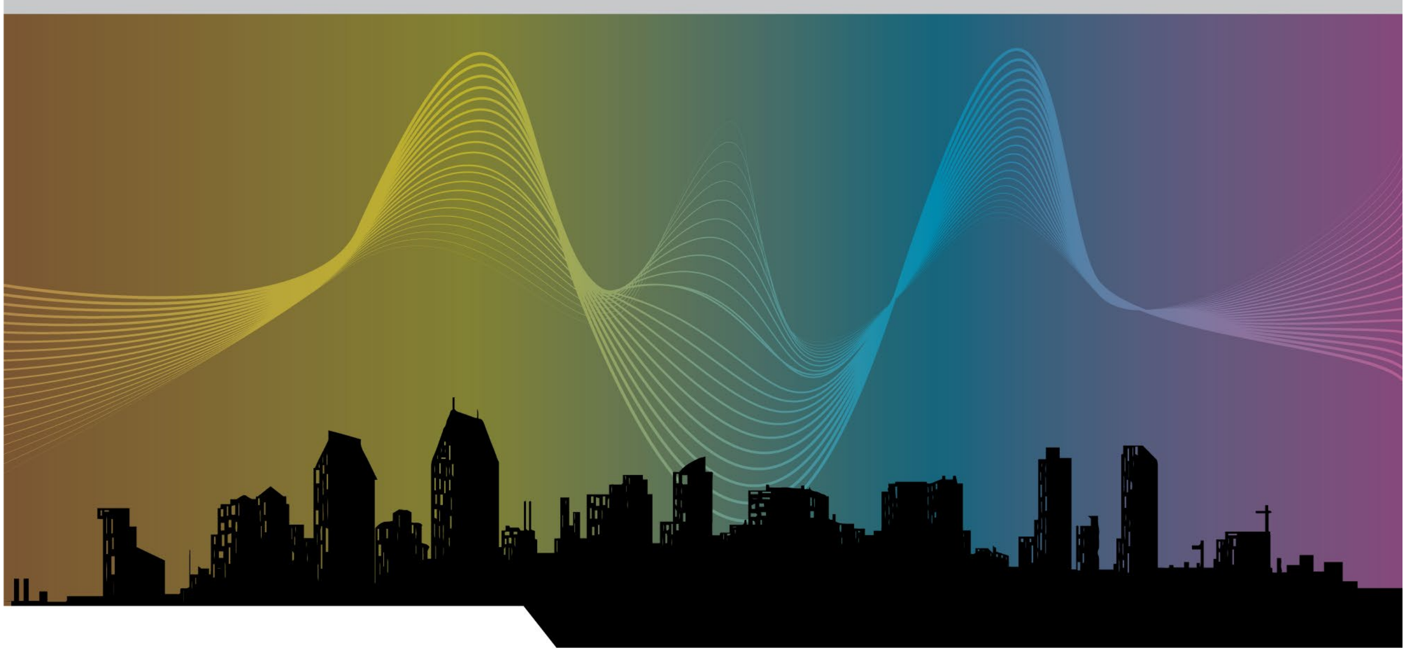
☐ **Appeal by Applicant** ☐ **Appeal by Third Party**

Received by: ______ Case. No.: ______ Appeal Filing Date: ______

Fee: ______ ☐ Fee Paid Project (receipt) No.: ______

Attachment G

Report #2019-003-D
Revised June 22, 2021



Noise Analysis

5005 Long Beach Boulevard Car Wash

Long Beach, California

Prepared for:
A & S Engineering
28405 Sand Canyon Road, Suite B
Canyon Country, CA 91387

BridgeNet International

Mike Holritz, INCE
20201 SW Birch Street, Suite 250
Newport Beach, CA 92660
714-272-2302
Mike.Holritz@AirportNetwork.com

1.0 Definitions

- **Noise** is undesired sound.
- **Sound** is defined as vibrations traveling through the air or another medium that can be heard when they reach the ear.
- **Decibel (dB)** is a unit used to measure the level of a sound by comparing it with a given reference level on a logarithmic scale. One decibel equals 10 times the common logarithm of the power ratio.
- "**A-Weighting**" is a frequency correction that correlates overall sound pressure levels with the frequency response of the human ear.
- **Lmax** is the highest sound pressure level during a measurement period.
- **L(N)** or L% is a statistical method of describing noise which accounts for variance in noise levels throughout a given measurement period. L(N) is a way of expressing the noise level exceeded for a percentage of time in a given measurement period. For example, since 5 minutes is 25% of 20 minutes, L(25) is the noise level that is equal to or exceeded for five minutes in a twenty-minute measurement period.

2.0 Introduction

This report addresses the potential noise impacts of the planned 5005 Long Beach Boulevard Car Wash on the adjacent properties. The car wash location is shown in Figure 1. The site plan is shown in Figure 2. Figure 3 depicts the project site on an aerial with the adjacent school shown. The facility is now planning to use Aerodry A120 blowers. Noise levels from the proposed car wash will be determined at the adjacent school. These noise levels will then be compared to the City of Long Beach Noise Ordinance limits and other City requirements.

3.0 Noise Standards

The project site is adjacent to the Dooley Elementary School to the north, and the Sizzler restaurant to the south. According to the Noise District Map in the City's Noise Ordinance, the project is in District 1. Section 8.80.150 of the Long Beach Noise Ordinance specifies the City's exterior noise standards. Section 8.80.170 of the Noise Ordinance specifies the interior noise standards. The criteria contained in the City's Noise Ordinance are given in terms of allowable noise levels for a given period of time at the affected property. It is our understanding that the City will require the car wash noise levels at the school playground to meet the exterior standards, and the car wash noise levels inside the school buildings need to meet the interior standards. Although the standards apply at all times, for this project they would only be relevant while school is in session. The City of Long Beach Noise Ordinance limits are presented below in Table 1 and Table 2.

Figure 1 – Project Location

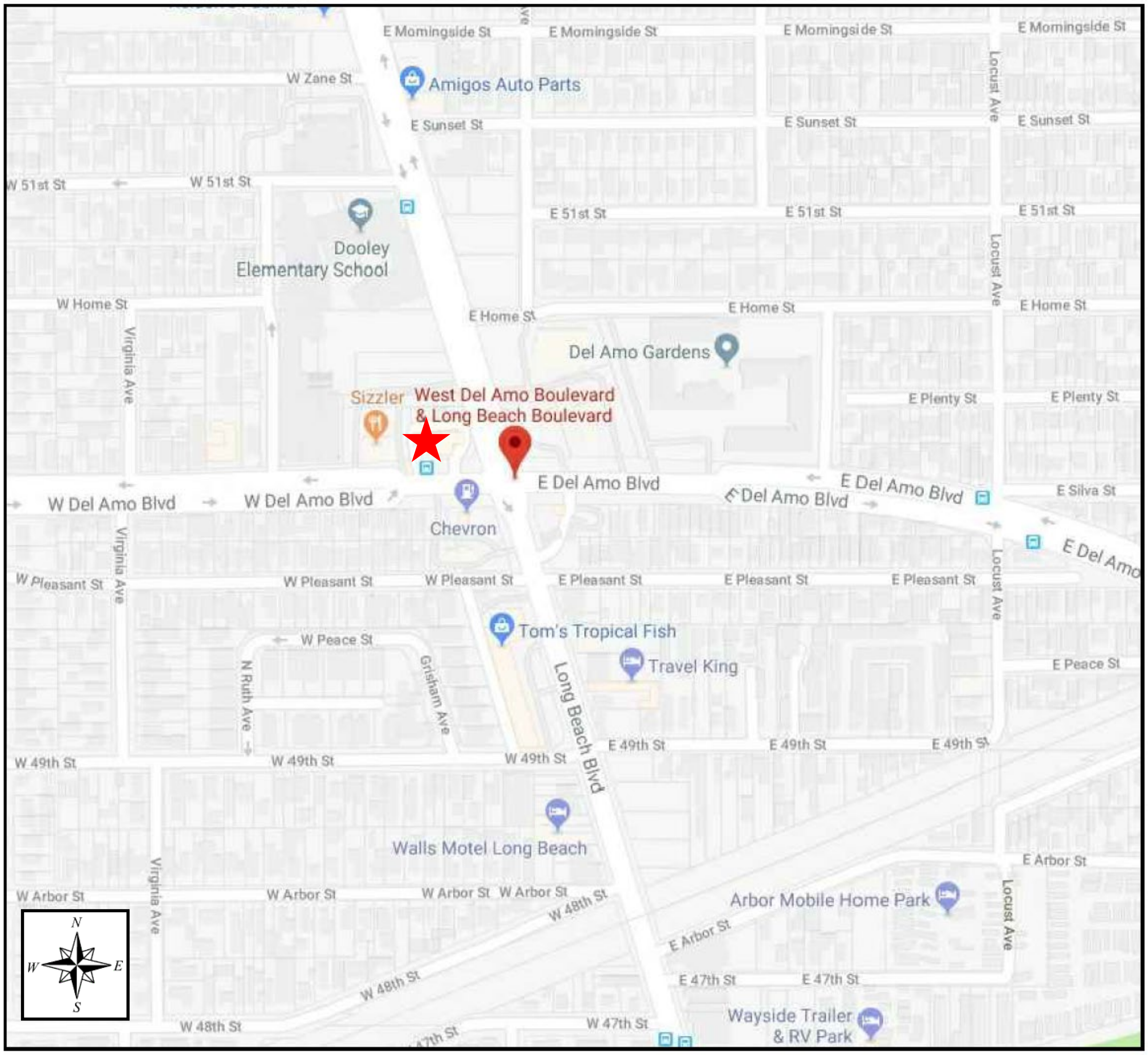


Figure 2 – Project Site Plan

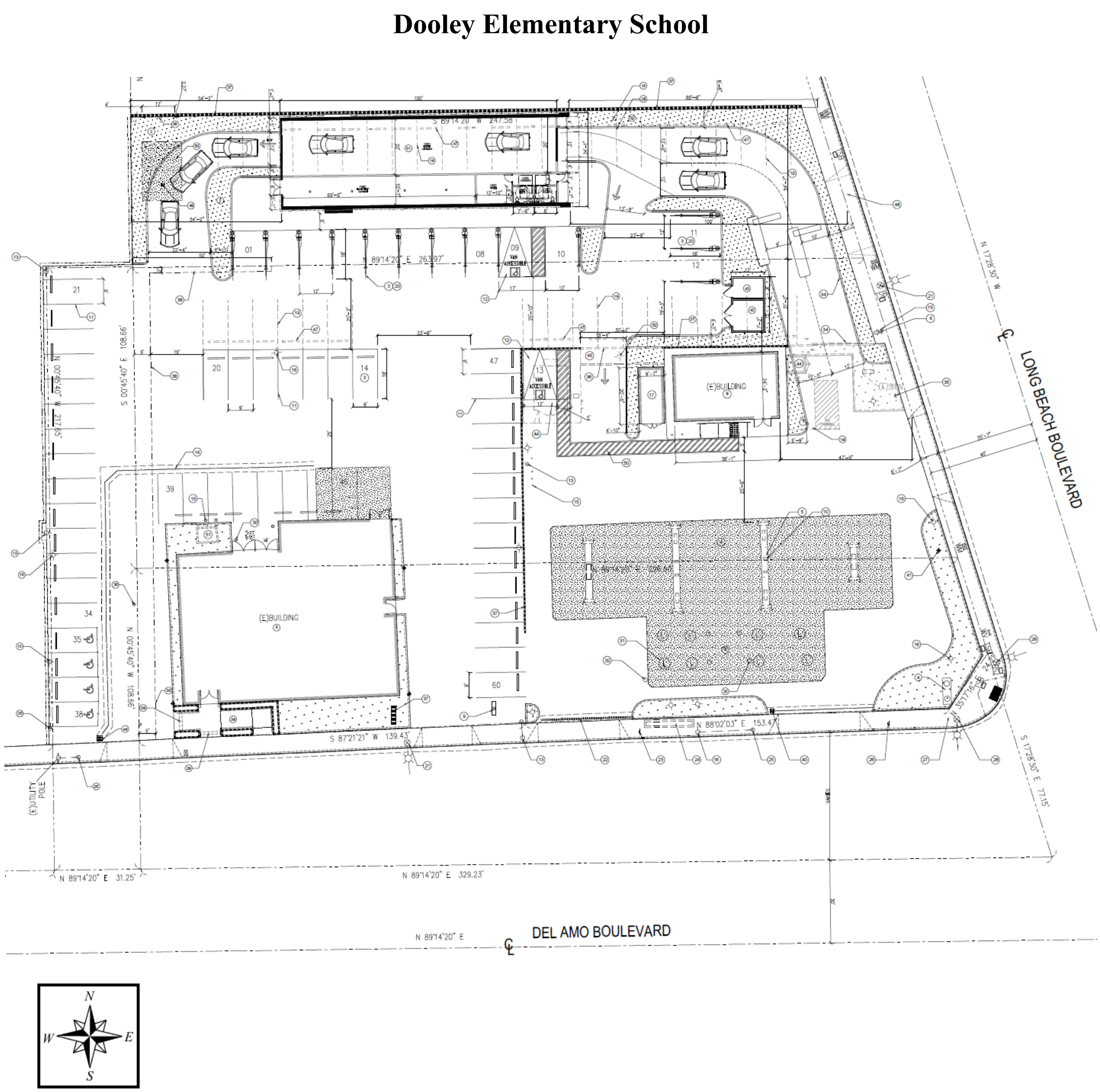


Figure 3 – Project Site Plan on Aerial

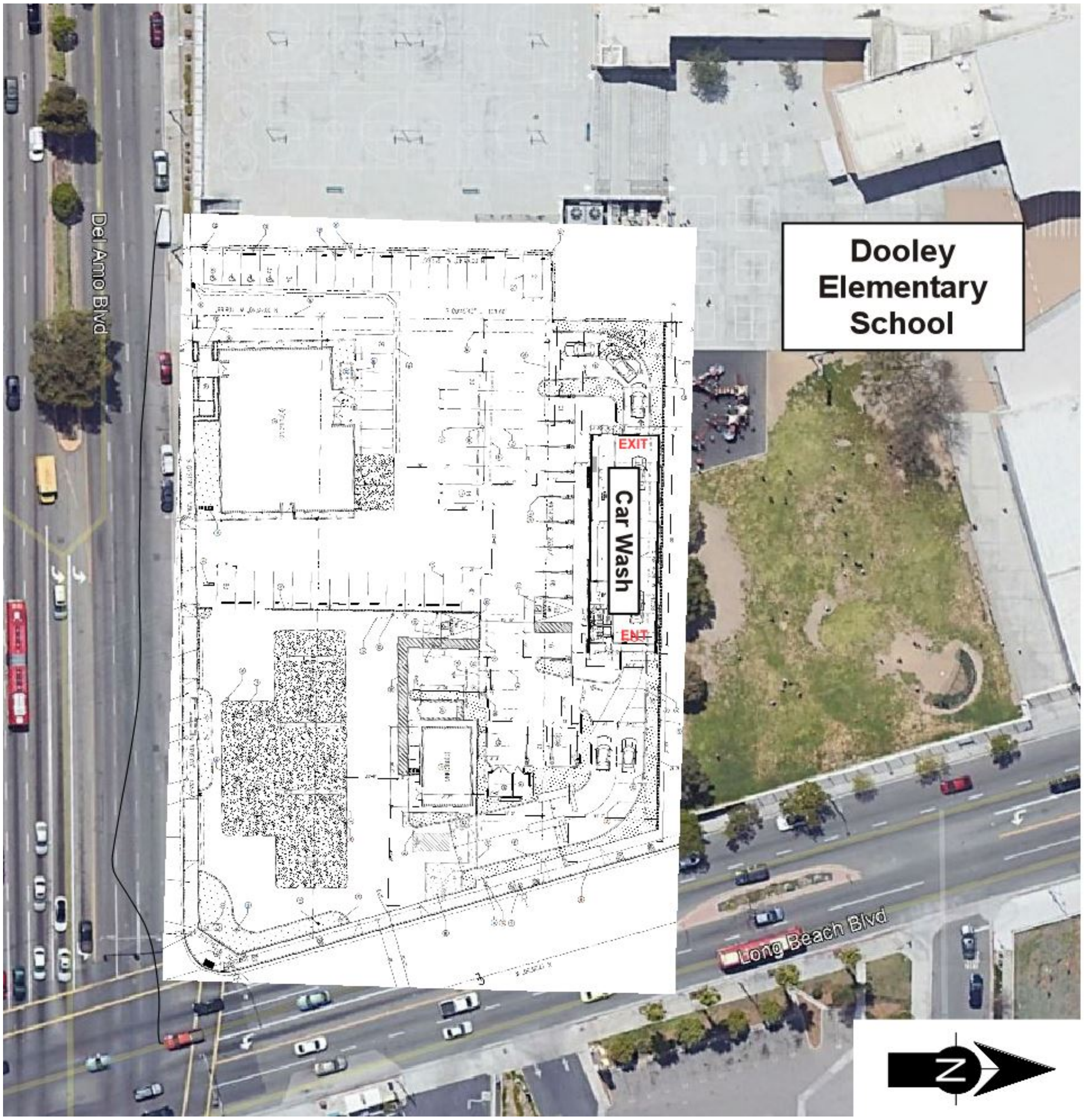


Table 1
CITY OF LONG BEACH
EXTERIOR NOISE ORDINANCE CRITERIA (dBA)

Location	Lmax	L1.7	L8.3	L25	L50
School Playground	70	65	60	55	50

Table 2
CITY OF LONG BEACH
INTERIOR NOISE ORDINANCE CRITERIA (dBA)

Location	Lmax	L1.7	L8.3
School Buildings	55	50	45

The ordinance states that if the ambient conditions are louder than the ordinance limits, the ambient conditions essentially become the new (adjusted) ordinance limits.

5.0 Ambient Noise Levels

The ordinance states that if the measured ambient level already exceeds the allowable limit, then the limits can be adjusted upwards to the ambient level. Ambient noise measurements were performed at a location representing the boundary between the car wash and the school. Since access to the school playground was not possible, measurements were conducted in the Sizzler parking lot, very close to the location of the exit end of the tunnel. A 9.5' masonry wall mitigates the traffic noise from Del Amo Boulevard. Therefore, traffic noise from Del Amo Boulevard was subtracted out, so the measured noise levels at this location represent the ambient noise levels from Long Beach Boulevard at the nearest playground area.

Three noise measurements were made for approximately thirty minutes each on February 28, 2020, at a normal receptor height of 5 feet above the ground. The measurements were performed during the daytime period, between 8:00 a.m. and 1:30 p.m. The measurements were made with a Brüel & Kjær Type 2250 Sound Level Meter, which was calibrated before and after the measurements. This noise measurement system meets the American National Standards Institute "Type 1" specifications, which is the most accurate type of sound level meter available for community noise measurements. The meter and calibrator have current certification traceable to the National Institute of Standards and Technology (NIST). The results of the ambient noise measurements are presented below in Table 3.

Table 3
AMBIENT NOISE MEASUREMENT RESULTS

Time Period	Lmax	L1.7	L8.3	L25	L50
Standard (no adjustment)	70	65	60	55	50
8:10 to 8:40 a.m.	74.8	64.3	60.2	58.5	56.5
10:00 to 10:30 a.m.	80.4	65.9	60.2	58.0	56.5
1:00 to 1:30 p.m.	75.4	67.0	62.0	60.0	58.8
(Lowest Measured Ambient)	74.8	64.3	60.2	58.0	56.5

The measured noise levels were caused by traffic on Long Beach Boulevard and by jet overflights.

The measured ambient traffic noise levels for some metrics (The Lmax, L8.3, L25, and L50) exceed the Noise Ordinance limits, so the Noise Ordinance limits for those metrics will be adjusted. According to the Noise Ordinance, if the ambient L1.7, L8.3, L25 and L50 noise levels exceed the Noise Ordinance limits, the limits can be adjusted upward to the next 5 dB increment above the measured ambient levels. If the maximum (Lmax) ambient noise levels exceed the Noise Ordinance limit, the limit can be adjusted upward to the ambient level. To be conservative, for each metric, we have used the lowest measured ambient as the basis for the adjusted Noise Ordinance limit. The adjusted Noise Ordinance limits are shown below in Table 4.

Table 4
ADJUSTED EXTERIOR NOISE ORDINANCE CRITERIA

Location	Lmax	L1.7	L8.3	L25	L50
School Playground	74.8	65	65	60	60

6.0 Noise Exposure

The project calls for the construction of a car wash facility very similar to an existing car wash at 4294 University Parkway in San Bernardino, California. Noise measurements were conducted at this facility on February 11, 2019 to determine the noise levels expected at the Long Beach car wash site. The major noise-producing components are the blowers for the dryer section. This facility uses 11 Motor City Air One blowers. The blowers are set back approximately 21 feet from the exit end of the tunnel. The vacuum equipment is located in the equipment room. Therefore, noise from this source is not expected to be significant.

Using the Motor City Air One blowers, the noise levels would slightly exceed the City's Noise Ordinance limits. Therefore, the developer plans to use Aerodry Model A120 Blowers. Data provided by the manufacturer shows that these blowers are 6 dB quieter than the Motor City dryers. With this equipment, the noise levels from the car wash (including the effect of the existing 9.5' high wall) are projected to be 52.2 dBA at the nearest receptor at the school playground. To represent a worst-case scenario, the equipment was assumed to run continuously. Therefore, the noise level for all metrics would be 52.2 dBA. This meets the strictest adjusted limit of 56.5 dBA (60 dBA if rounded up). To meet the exterior standards, the Aerodry equipment must be used. With the Aerodry equipment, no additional mitigation measures are required in order to meet the noise standards. (However, the City is asking for an additional 5 dB of noise reduction. This is addressed later in the report). The remaining analysis is based on the use of Aerodry A120 blowers.

Two school buildings were analyzed, and these are shown in the Appendix. The nearest building is 150 feet to the northwest of the exit end of the tunnel, at an orientation of approximately 45 degrees off-axis to the tunnel. The measurements at the San Bernardino site showed that at this orientation, the sound level at a distance of 15 feet from the tunnel end would 83 dBA. Extrapolating this to a distance of 150 feet yields a noise level of 63 dBA. With 5 dBA of reduction provided by the existing masonry wall, the noise level at the building face would be 58 dBA. The Aerodry equipment is 6 dB quieter, so the resulting exterior noise level is projected to be 52 dBA.

Another building is 200 feet to the north of the entrance end of the tunnel, at an orientation of approximately 80 degrees off-axis to the tunnel. The measurements at the San Bernardino site showed that at this orientation, the sound level at a distance of 15 feet from the tunnel end was 71 dBA. Extrapolating this to a distance of 210 feet yields a noise level of 48 dBA. With 5 dBA of reduction provided by the existing masonry wall, the noise level at the building face would be 43 dBA. The Aerodry equipment is 6 dB quieter, so the resulting exterior noise level is projected to be 37 dBA.

With windows open, the noise reduction of a typical building is at least 12 dBA. Therefore, the interior noise levels at these buildings are expected to be 40 dBA and 25 dBA, respectively. These levels meet the City's strictest (L8.3) noise standard of 45 dBA. Therefore, with the Aerodry Model A120 equipment, the 5005 Long Beach Boulevard car wash is projected to meet all the City's noise standards without any additional mitigation measures.

7.0 Additional Noise Reduction

The City is requesting that the project go beyond the Noise Ordinance limits, and provide an additional 5 dB of noise reduction above what is projected in the section above. To provide this 5 dB of noise reduction, absorptive materials can be added to the car wash tunnel. In order to provide some safety margin, we would recommend designing for at least 7 dB of additional reduction from added absorption.

The car wash tunnel noise levels can be reduced by approximately 7.5 dB by adding the following absorptive materials:

WALLS AND CEILING:

2,350 square feet of QuietFiber QF4 noise absorption material, available from AcoustiBlok, Inc. (acoustiblok.com). Information on this product is included in the Appendix.

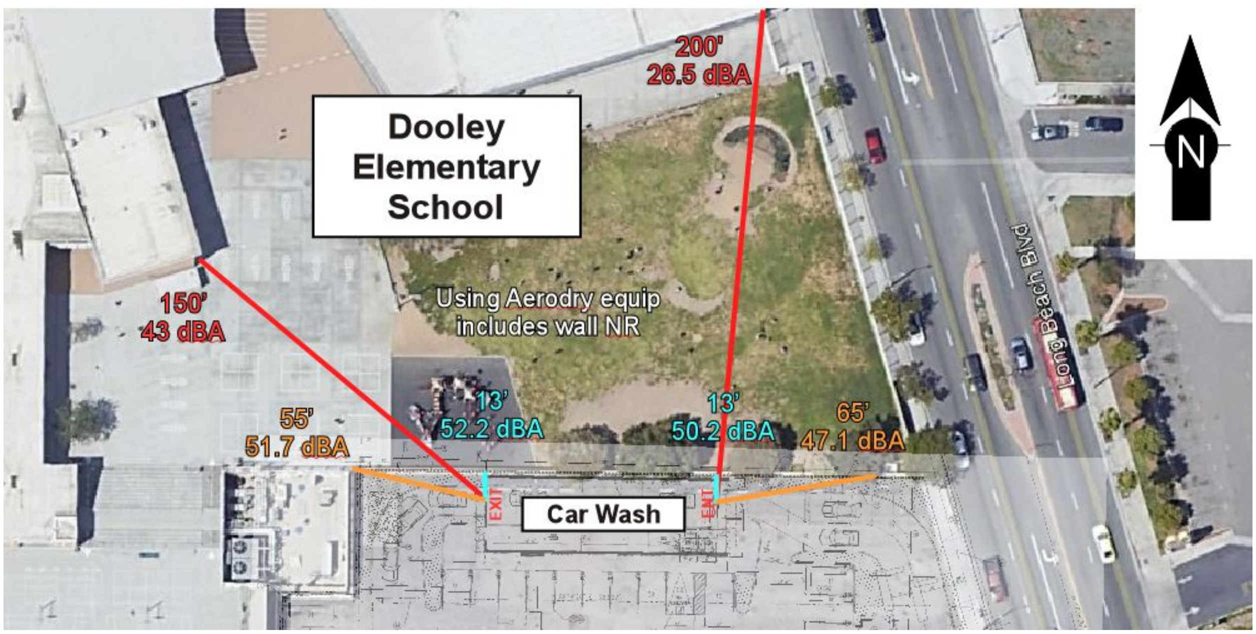
The 7.5 dB noise reduction is based on a total of 2,350 square feet of noise absorption material. In order to allow the developer some flexibility to adapt to the tunnel configuration, this total area of absorptive material can be provided by any combination of wall and ceiling panels totaling 2,350 square feet or more. The absorptive material should be distributed fairly evenly throughout the tunnel. (If desired, some of the square footage can be provided using free hanging clouds with the same absorption coefficients).

Calculations show that with this absorptive material added, the sound levels would be reduced at all locations by roughly 7.5 dBA.

APPENDIX

RECEPTOR LOCATIONS
AND PROJECTED EXTERIOR NOISE LEVELS

Including effect of existing 9.5-foot-high masonry wall
(the added absorption would reduce these levels by 7.5 dBA)



Acoustiblok quieting the world ® Product Data Sheet

Product Name

QuietFiber® Hydrophobic Noise Absorption Material – QF4

For Manufacturer Info:

Contact:
Acoustiblok, Inc.
6900 Interbay Boulevard
Tampa, FL 33616
Call - (813) 980-1400
Fax - (813)849-6347
Email - sales@acoustiblok.com
www.acoustiblok.com

Product Description

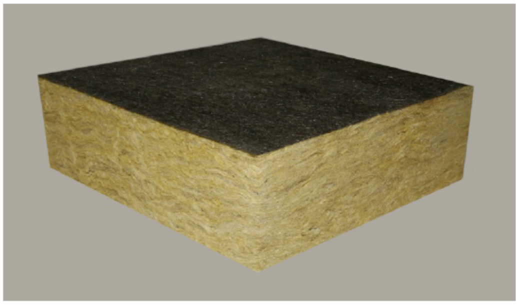
Basic Use

QuietFiber hydrophobic noise absorption material is an easily installed solution to many noise problems. It is engineered specifically for maximum noise absorption and is used extensively for industrial and commercial applications and is now being successfully introduced into non-industrial environments where reverberant sound and echo is a problem.

QuietFiber®

QuietFiber is rated at the noise reduction level – NRC 1.20. Areas of high noise levels including sound reverberation can be resolved easily and economically by introducing QuietFiber into as much of the area as possible. The amount of noise reduction in highly reflective rooms will be directly relative to how much of the QuietFiber material can be installed into the room.

Unlike other fibrous materials which do not have the same high NRC ratings, QuietFiber is hydrophobic, meaning it will not absorb nor combine with water. Marine noise reduction applications are endless.



3" QuietFiber® QF4 Material

QuietFiber®

- Noise absorption rating of NRC 1.20
- Non Silica
- Virtually fireproof – Class A fire rating
  - 0 Smoke + 0 Flame Development
- Hydrophobic – will not combine with water
- Will not support mold or mildew growth
- Available in black face only
- Full outdoor weather and U.V. tolerant
- Significant sound benefit v. fiberglass
- Install on top of acoustical ceiling tiles
- High temperature capable
- Comprised of up to 90% recycled material
- 100% recyclable

Acoustiblok® quieting the world

Product Data Sheet

Product Name

QuietFiber® Hydrophobic Noise Absorption Material – QF4

NRC 1.20 Rated	125hz	250hz	500hz	1000hz	2000hz	4000hz
	1.01	1.26	1.23	1.13	1.11	1.20

Technical Data:

- ASTM C 423 – NRC 1.20
- ASTM E 84 – Class 1, 0 Flame 0 Smoke
- ASTM C 518 – R 4.2 per inch
- ASTM C 518 – 0.24 @ 75°F (24°C)

Standards Compliance:

- ASTM C 665 Non-Corrosive Type I
- ASTM C 612 1A, 1B, II, III
- ASTM E 136 Rated Non-combustible per NFPA Standard 220
- ASTM C 1104 Absorption less than 1% by volume
- ASTM C 356 Linear shrinkage <2% @ 1200°F (650°C)

Acoustiblok® quieting the world
6900 Interbay Blvd
Tampa, Florida USA 33616
Telephone: (813)980-1440
www.Acoustiblok.com
sales@acoustiblok.com

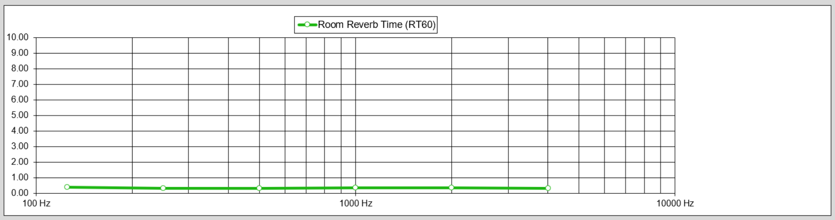
ABSORPTION:
Car Wash Tunnel

Element	Area (sq ft)	Alpha α (Sound Absorption Coefficient) 125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	Notes		Absorption in sabins for each element Alpha (α) x Area 125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
GYPSUM - Walls, Partitions		0.29	0.10	0.05	0.04	0.07	0.09								
CONCRETE - Walls	1,962	0.01	0.01	0.015	0.02	0.02	0.02			19.62	19.62	29.43	39.24	39.24	39.24
CONCRETE - Floor	2,000	0.01	0.01	0.015	0.02	0.02	0.02			20.00	20.00	30.00	40.00	40.00	40.00
WOOD - Ceiling	1,000	0.15	0.11	0.10	0.07	0.06	0.07			150.00	110.00	100.00	70.00	60.00	70.00
Entrance Opening	156	1.00	1.00	1.00	1.00	1.00	1.00			156.00	156.00	156.00	156.00	156.00	156.00
Exit Opening	156	1.00	1.00	1.00	1.00	1.00	1.00			156.00	156.00	156.00	156.00	156.00	156.00
XXX		0.01	0.01	0.015	0.02	0.02	0.02								
WALLS - Sound Panel AWSPIND		0.36	0.80	1.12	1.05	1.00	1.05		AcoustiBlok, Inc.						
CEILING - Sound Panel AWSPIND		0.36	0.80	1.12	1.05	1.00	1.05		AcoustiBlok, Inc.						
SIDE WALLS - QF4	1,200	1.01	1.26	1.23	1.13	1.11	1.20	40%	AcoustiBlok, Inc.	1212.00	1512.00	1476.00	1356.00	1332.00	1440.00
FRONT & BACK WALLS - QF4	150	1.01	1.26	1.23	1.13	1.11	1.20	48%	AcoustiBlok, Inc.	151.50	189.00	184.50	169.50	166.50	180.00
CEILING - QF4	1,000	1.01	1.26	1.23	1.13	1.11	1.20	50%	AcoustiBlok, Inc.	1010.00	1260.00	1230.00	1130.00	1110.00	1200.00
Hanging Panels - QF4		1.01	1.26	1.23	1.13	1.11	1.20	Double-Sided	AcoustiBlok, Inc.						
WALLS - Sound Silencer Panels 2"		0.07	0.21	0.81	0.85	0.93	0.88								
CEILING - Sound Silencer Panels 2"		0.07	0.21	0.81	0.85	0.93	0.88								
QFA Curtains		0.46	0.94	0.850	0.64	0.47	0.33								
XXX		0.01	0.01	0.015	0.02	0.02	0.02								
PLATE GLASS - Windows, Doors		0.18	0.06	0.04	0.03	0.02	0.02								
WOOD - Doors		0.15	0.11	0.10	0.07	0.06	0.07								
OTHER		XX	XX	XX	XX	XX	XX								
		Total Persons Sound Absorption (sabins)													
NUMBER OF PEOPLE		2.50	3.50	4.20	4.60	5.00	5.00								

Total Interior Area:	**7,624**	length		width		height
Total Interior Volume:	**30,000**	100	x	20	x	15

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Total Absorption (sabins) A_1	**2875.12**	**3422.62**	**3361.93**	**3116.74**	**3059.74**	**3281.24**
Alphabar (sabins / surface area)	0.38	0.45	0.44	0.41	0.40	0.43
Frequency	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Room Reverb Time (RT60) (reference only)	**0.41**	**0.32**	**0.33**	**0.37**	**0.38**	**0.34**

REF starting level	resulting level with added absorption	improvement with added absorption
52.2	**44.7**	**7.5**
at 13' A-WTD No added absorption		



TOTAL ABSORPTION ADDED: **2,350** sq. ft.

Traffic Impact Analysis

for the:

Car Wash Development Project

In the City of Long Beach

Prepared for:

A & S Engineering, Inc.

March, 2021

Kimley»Horn

TRAFFIC IMPACT ANALYSIS
FOR THE PROPOSED CAR WASH DEVELOPMENT PROJECT

IN THE
CITY OF LONG BEACH

Prepared for:

A & S Engineering, Inc.

Prepared by:

Kimley-Horn and Associates, Inc.
1100 W Town and Country Road, Suite 700
Orange, CA 92868

March, 2021

TRAFFIC IMPACT ANALYSIS
FOR THE CAR WASH DEVELOPMENT PROJECT
IN THE CITY OF LONG BEACH

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FOR THE PROPOSED CAR WASH DEVELOPMENT PROJECT
IN THE CITY OF LONG BEACH

INTRODUCTION

This traffic impact analysis has been prepared to evaluate the project-related traffic impacts associated with the proposed car wash development located at 5005 Long Beach Boulevard in the City of Long Beach, California. The analysis assesses the project impact by providing an analysis of existing and future conditions, with project traffic and with cumulative project traffic. This Traffic Impact Analysis (TIA) document follows the assumptions established during discussions with the City of Long Beach staff and the approved Scope of Study Form. The approved Scope of Study form is provided in *Appendix A*.

This report has been prepared in accordance with the City of Long Beach Traffic Impact Analysis Guidelines, dated June 2020.

PROJECT DESCRIPTION

The proposed project will be developed on the northwest corner of Del Amo Boulevard and Long Beach Boulevard in the City of Long Beach, California. The project site location is shown in its regional setting on Figure 1. The project will involve the development of a 3,058-square-foot automated car wash with a 2,000-square-foot car wash tunnel and 15 vacuum pumps; and 1,058 square feet of equipment rooms and office space; and will be constructed at an existing gas station with convenience store. The project site plan is shown on Figure 2. The project will be constructed in a single phase. For purposes of this analysis, the project is assumed to open in 2022, to provide a conservative assessment of future conditions.

The site is bounded by Dooley Elementary School to the north and west, a gas station and restaurant to the south, and Long Beach Boulevard to the east. Ingress to the site will be provided via two unsignalized driveways: one right-in right-out (RIRO) only driveway along Long Beach Boulevard and one RIRO only driveway along Del Amo Boulevard. Egress from the site will be provided via two unsignalized RIRO only driveways along Del Amo Boulevard. The Project would share ingress with the existing gas station and egress with the existing restaurant.

FIGURE 1
VICINITY MAP

Kimley»Horn

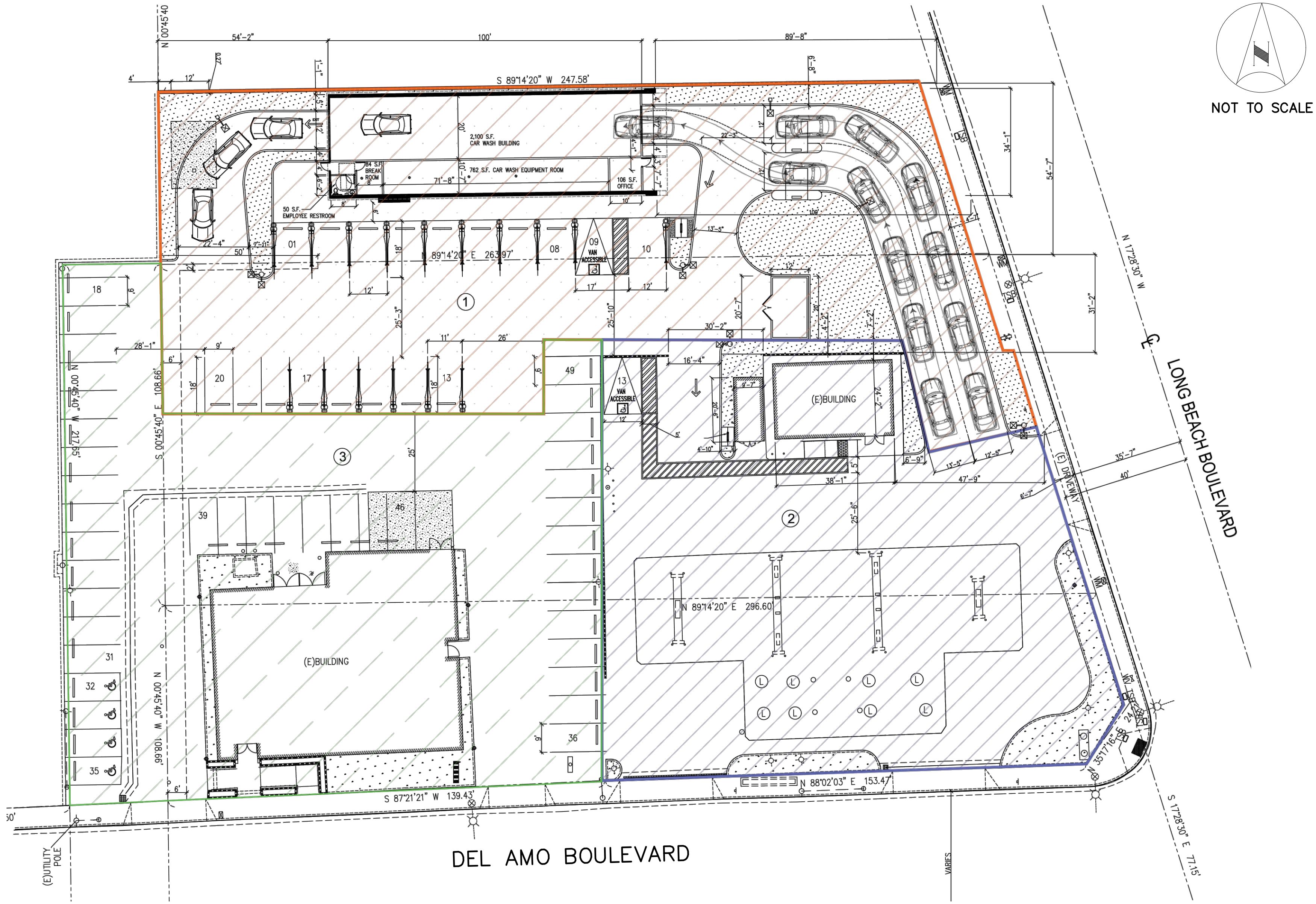

FIGURE 2
SITE PLAN

ANALYSIS SCENARIOS AND METHODOLOGY

Analysis Scenarios

Based on the City's guidelines and per the approved Scope of Study, this traffic analysis provides an evaluation of morning and evening peak hour operations for the following scenarios:

- Existing Conditions
- Opening Year 2022
- Opening Year 2022 With Project

Any mitigation measures for the future conditions will be identified, if necessary.

The study area was determined with input from City Staff through the scoping process. A copy of the approved Scope of Study Form, as previously mentioned, is provided in *Appendix A*. The following study intersections were identified for evaluation:

Study Intersections:

1. Virginia Avenue at Del Amo Boulevard
2. Long Beach Boulevard at Del Amo Boulevard
3. Long Beach Boulevard at 51st Street

ANALYSIS METHODOLOGY

The Synchro 10 software (Trafficware) was used to analyze the peak hour operations of both signalized and unsignalized intersections. Synchro 10 uses the methodologies outlined in the latest Highway Capacity Manual.

The Highway Capacity Manual, 6th Edition (HCM 6), published by the Transportation Research Board (TRB), establishes a system whereby highway facilities are rated for their ability to accommodate traffic volumes. The terminology "Level of Service" is used to provide a qualitative evaluation based on certain quantitative calculations, which are related to empirical values.

Level of Service (LOS) for signalized and unsignalized intersections is defined in terms of average vehicle delay, which is a measure of driver discomfort, frustration, fuel consumption, and loss of travel time. Specifically, LOS criteria are stated in terms of the average control delay per vehicle for the peak 15-minute period within the hour analyzed. The average control delay includes initial deceleration delay, queue move-up time, and final acceleration time, in addition to the stop delay. The Level of Service criteria for the various LOS designations are summarized on the following chart.

LEVEL OF SERVICE DESCRIPTIONS HCM METHODOLOGY			
LOS	Average Delay (sec / vehicle)		Description
	Signalized	Unsignalized	
A	< 10.0	< 10.0	LOS A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
B	> 10.0 - 20.0	> 10.0 - 15.0	LOS B represents stable flow, but the presence of others in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.
C	> 20.0 - 35.0	> 15.0 - 25.0	LOS C is in the range of stable flow, but marks the beginning of operation in which individual users become affected by interaction with others in the traffic stream.
D	> 35.0 - 55.0	> 25.0 - 35.0	LOS D represents high-density, but stable flow. Speed and freedom to maneuver are restricted, and the driver experiences a generally poor level of comfort and convenience.
E	> 55.0 - 80.0	> 35.0 - 50.0	LOS E represents operating conditions at or near the capacity of the intersection. All speeds are reduced to a low, but relatively uniform level. Small increases in flow will cause breakdowns in traffic movement.
F	> 80.0	> 50.0	LOS F represents forced, or breakdown flow. This condition occurs when the amount of traffic approaching the intersection exceeds the volume which can pass through the intersection, resulting in queues and congestion.

Significant Impact Criteria

The City of Long Beach has established LOS D as the threshold for acceptable service level for peak hour intersection volumes. Based on the City of Long Beach Traffic Impact Analysis Guidelines, the following criteria shall determine if the addition of project traffic would be responsible for deficiencies in the intersection LOS:

Signalized Intersections

- If, under without project conditions, the intersection operates at LOS D or better and the addition of project trips result in an unacceptable LOS (E or F).
- If, under without project conditions, the intersection operates at an unacceptable LOS (E or F) the project increases average control delay at the intersection by 2.5 seconds or more.
- If, under project conditions, the 95th percentile queue length exceeds the available storage length at any turn bay.

Unsignalized Intersections

- If, under project conditions, the intersection operates at an unacceptable LOS (E or F).
- If the intersection meets the peak-hour traffic signal warrant after the addition of project traffic. If the intersection meets the peak-hour traffic signal warrant, all other applicable warrants must also be assessed.

AREA CONDITIONS

This section summarizes the existing roadway circulation network, peak-hour traffic volumes, and existing operating conditions and Level of Service at the study intersections.

Existing Street System

Regional access to the site is provided by the I-710 and the I-405 Freeways. The I-710 Freeway is located approximately 0.5 miles west of the project site. The I-710 Freeway can be accessed via SR-91 Artesia Freeway and the I-405 Freeway. SR-91 Artesia Freeway runs in the east-west direction and is located approximately 2 miles north of the project site. The I-405 Freeway runs in the east-west direction and is located approximately 2 miles south of the project site.

Local access to the project vicinity is provided by several roadways. Roadway classifications were taken from the City of Long Beach Mobility Element. These roadway classifications are shown on Figure 3.

Del Amo Boulevard is a six-lane divided roadway with three lanes in each direction and a raised median within the project vicinity. Parking is permitted on both sides of the street. The posted speed limit is 40 miles per hour. The street is oriented in the east-west direction. Del Amo Boulevard is classified as a Major Avenue in the City of Long Beach Mobility Plan.

Long Beach Boulevard is a four-lane divided roadway with two lanes in each direction and a raised median within the project vicinity. Restricted parking is permitted on both sides of the street. The posted speed limit is 35 miles per hour, and 25 miles per hour just north of Del Amo Boulevard when children are present. The street is oriented in the north-south direction. Long Beach Boulevard is classified as a Boulevard in the City of Long Beach Mobility Plan.

Virginia Avenue is a two-lane undivided roadway with one lane in each direction. Parking is permitted on both sides of the street. The speed limit is 25 miles per hour. The street is oriented in the north-south direction. Virginia Avenue is classified as a Local Street in the City of Long Beach Mobility Plan.

51st Street is a two-lane undivided roadway with one lane in each direction. Parking is permitted on both sides of the street, west of the project site. The speed limit is 25 miles per hour. The street is oriented in the east-west direction. 51st Street is classified as a Local Street in the City of Long Beach Mobility Plan.

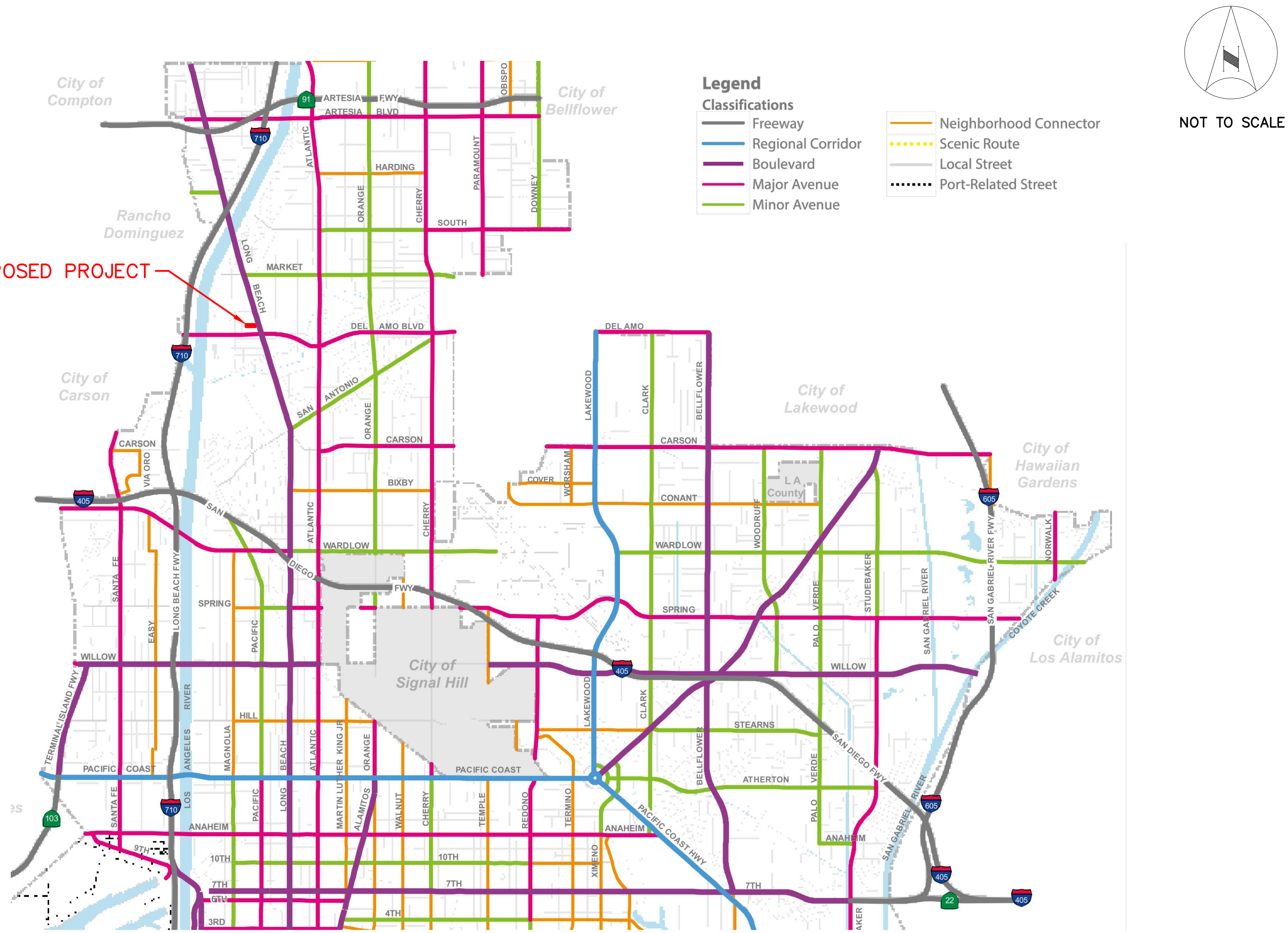

FIGURE 3

GENERAL PLAN STREET CLASSIFICATION SYSTEM

SOURCE: CITY OF LONG BEACH MOBILITY ELEMENT

Kimley»Horn

Existing Transit Services

Long Beach Transit Route 51 is a bus route that travels along Long Beach Boulevard within the vicinity of the project. Route 51 operates seven days a week and provides transportation services to the Cities of Long Beach and Signal Hill.

Long Beach Transit Route 191 is a bus route that travels along Del Amo Boulevard within the vicinity of the project. Route 191 operates seven days a week and provides transportation services to the Cities of Long Beach, Carson, Lakewood, Cerritos, and Hawaiian Gardens.

Long Beach Transit Route 192 is a bus route that travels along Long Beach Boulevard and Del Amo Boulevard within the vicinity of the project. Route 192 operates seven days a week and provides transportation services to the Cities of Long Beach, Carson, Cerritos, and Artesia.

Metro Local Line 60 is a bus route that travels along Long Beach Boulevard within the vicinity of the project. Line 60 operates seven days a week and provides transportation services to the Cities of Long Beach, Compton, Lynwood, South Gate, Huntington Park, Vernon, and Los Angeles.

A map of Existing Local Transit Routes in the City are shown on Figure 4.

Existing Bike Facilities

There are no existing bike facilities in the immediate vicinity of the project. A map of the Existing Bicycle Network in the City can be found on Figure 5.

Existing Traffic Volumes

Existing morning peak period (7:00 to 9:00 AM) and evening peak period (4:00 to 6:00 PM) turning movement counts were collected for all study intersections. The counts were completed in February, 2021. Due to impacts of the ongoing COVID-19 pandemic on current traffic patterns and on closures of local schools and businesses, an approach to factor count volumes was taken into consideration. Historical traffic data for the intersection of Long Beach Boulevard at Del Amo Boulevard was provided by City staff. These volumes were collected in May, 2018. These historical counts were grown with an ambient growth of 1.5% per year to 2021, to be consistent with newly collected traffic volumes. Overall COVID adjustment factors were then determined based on a comparison of grown historical counts and current counts. These factors, which were then rounded up to be conservative, were a 65% increase in the AM and a 25% increase in the PM over traffic volumes collected in 2021. Traffic counts collected in February, 2021 were increased by 65% in the AM and 25% in the PM to obtain “Existing” traffic volumes for use in the analysis.

The existing lane configurations and traffic control at the study intersections are shown in Figure 6. Existing peak hour turning movement volumes at the study intersections are shown in Figure 7. Peak hour intersection traffic count worksheets are provided in *Appendix B*.

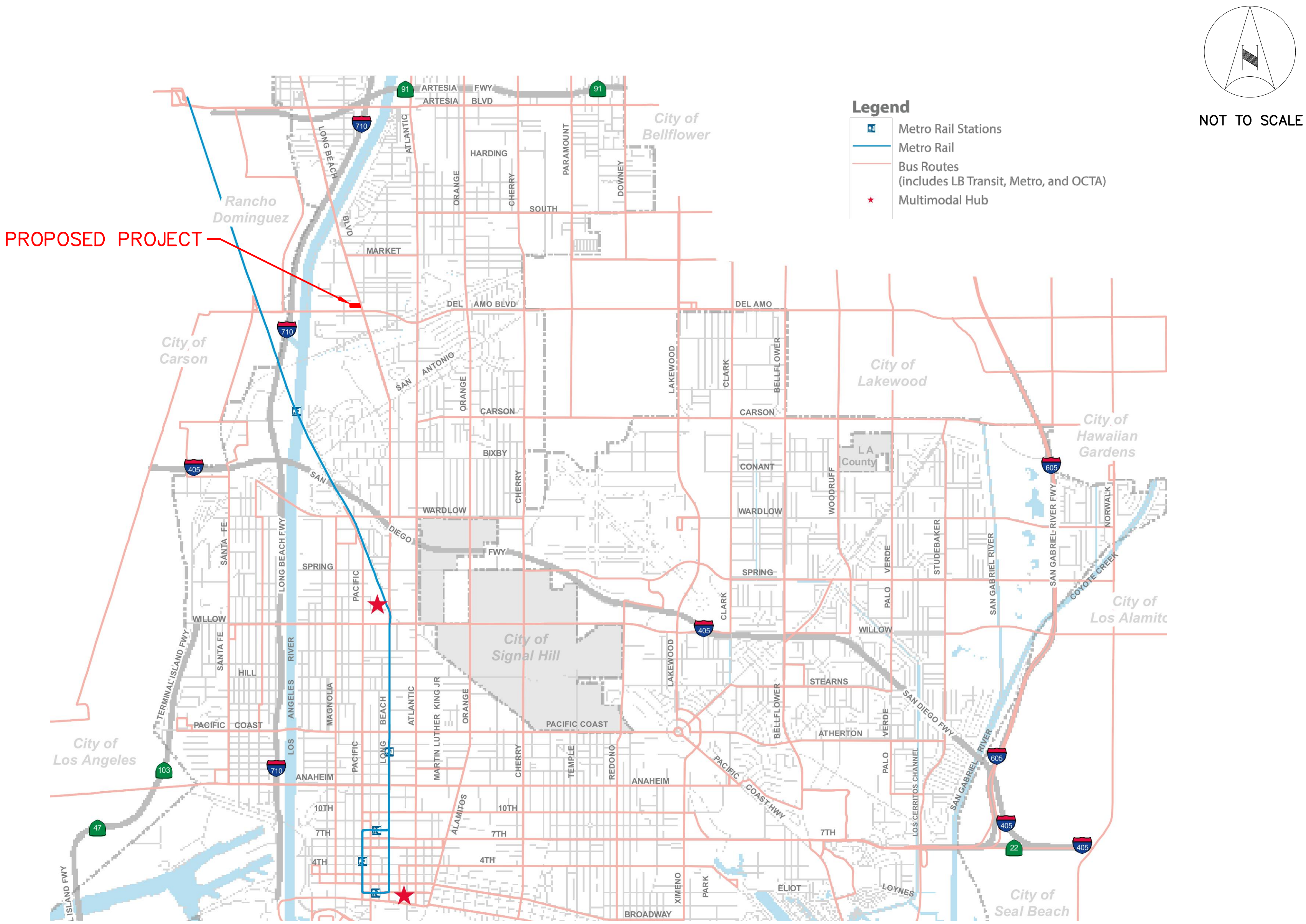

FIGURE 4
EXISTING LOCAL TRANSIT ROUTES
SOURCE: CITY OF LONG BEACH MOBILITY ELEMENT

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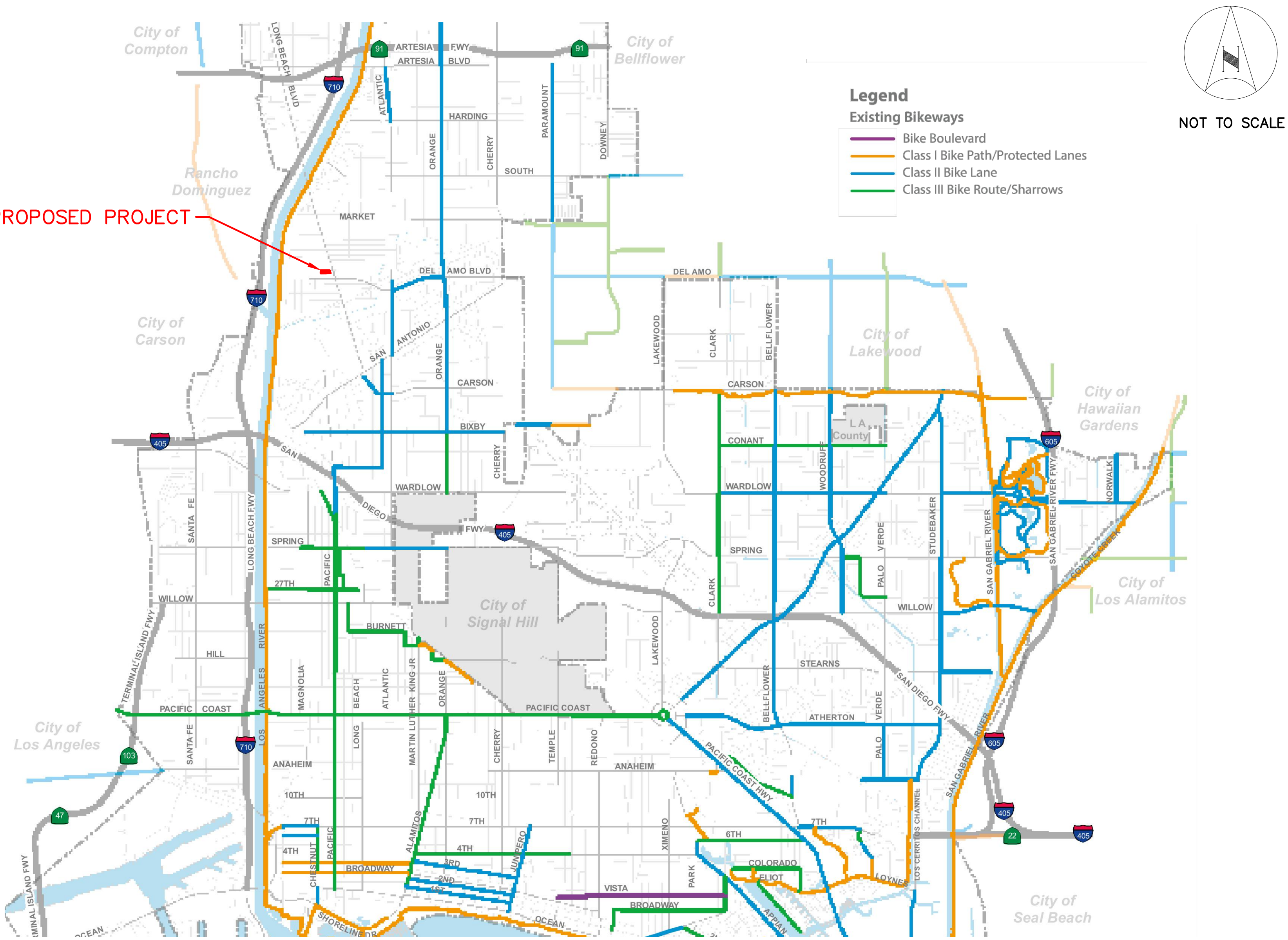

FIGURE 5
EXISTING BICYCLE NETWORK
SOURCE: CITY OF LONG BEACH MOBILITY ELEMENT

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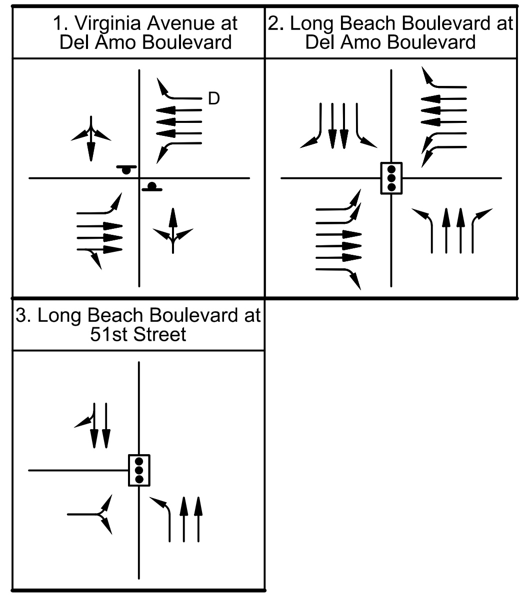
NOT TO SCALE

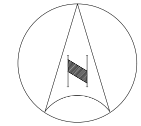


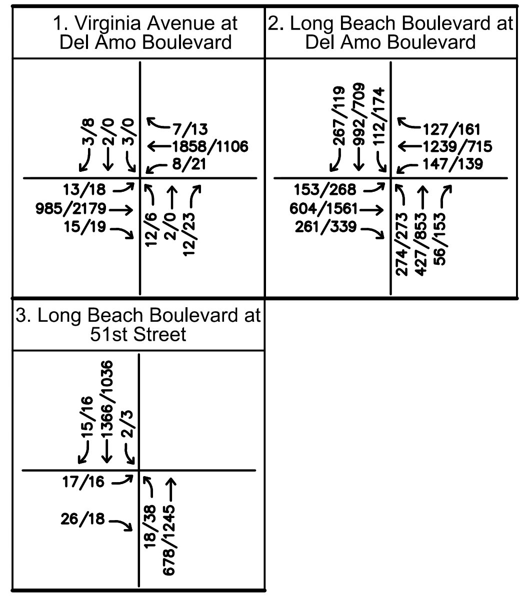
LEGEND:

- (X) = Study Intersection
- = Turn or Through Lane
- = Signal
- = Stop Sign
- D = Defacto Right Turn

FIGURE 6
EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

Kimley»Horn





LEGEND:

(X) = Study Intersection

XX/YY = AM/PM Peak Hour Volumes

FIGURE 7
EXISTING TRAFFIC VOLUMES

Kimley»Horn

PROJECT TRAFFIC

Project Trip Generation

Due to the limited data within the Institute of Transportation Engineers (ITE) Trip Generation Manual, daily and peak hour trips for the proposed project were determined based on data provided by the applicant for an existing BLISS Car Wash located at 4294 University Parkway in San Bernardino, CA and for an existing BLISS Car Wash located at 600 N Rose Drive in Placentia, CA. Transaction data in 2019 was provided and averaged on a daily basis to indicate the number of vehicles utilizing the car wash facility each hour. Data between these two sites, which are similar in operation to the proposed project, was averaged for trip generation purposes.

Daily, morning peak hour, and evening peak hour trip generation estimates are summarized on Table 1 and supplemental trip generation data is presented in *Appendix C*. The project is estimated to generate 738 daily trips, 64 morning peak hour trips, and 74 evening peak hour trips. These values reflect site volumes on a Friday, which tends to generate higher volumes than on a typical weekday.

Table 1 – Summary of Project Trip Generation

			Trip Generation Estimates						
				AM Peak Hour			PM Peak Hour		
Land Use	Quantity	Unit	Daily	In	Out	Total	In	Out	Total
Automated Car Wash	3.058	KSF	738	32	32	64	37	37	74

1 Source: Existing BLISS Car Wash at 4294 University Parkway, San Bernardino CA
Existing BLISS Car Wash at 600 N Rose Drive, Placentia, CA

Project Trip Distribution and Assignment

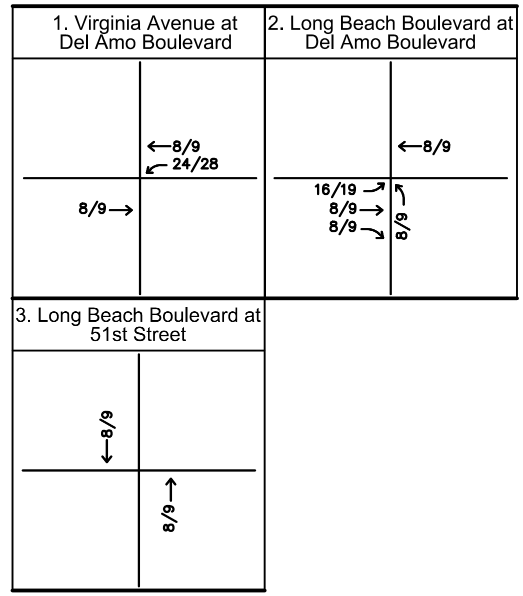
Project trip distribution and assignment assumptions for the proposed project were developed with approval from the City Traffic Engineering staff. Trip distribution assumptions are shown on Figure 8.

Based on the proposed project trip distribution, project trips were assigned through the study intersections. Figure 9 shows new project trips that would be added to the study intersections.

FIGURE 8
TRIP DISTRIBUTION ASSUMPTIONS

Kimley»Horn

NOT TO SCALE



LEGEND:

(X) = Study Intersection

XX/YY = AM/PM Peak Hour Volumes

FIGURE 9
PROJECT–RELATED TRAFFIC VOLUMES

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PROJECTED FUTURE TRAFFIC

Opening Year 2022 Conditions

Opening Year 2022 traffic forecasts were developed using the following "build-up" forecasting method:

- Existing traffic volumes, plus
- An annual ambient growth rate of 1.5% per year to the Existing traffic volumes, plus
- Cumulative projects traffic
  - Cumulative projects consist of projects that have been approved but are not yet built and fully occupied, as well as projects that are in various stages of the application and approval process, but have not yet been approved. These projects are considered to be "reasonably foreseeable," and must therefore be included in the Cumulative Projects analysis.

Cumulative Project information was obtained from City of Long Beach Staff at the start of the study process. The complete list of cumulative projects is provided in *Appendix D*. For the purpose of this traffic study, the projects were assessed for their proximity to the project site and for their potential to contribute traffic through the study intersections based on their approved or pending land uses. Therefore, not all cumulative projects are anticipated to affect the study area. A summary of the Cumulative Projects is provided on Table 2. The location of the Cumulative Projects in relation to the project site is shown on Figure 10. Cumulative project-related trips at study intersections are shown on Figure 11. Opening Year 2022 peak hour traffic volumes are shown on Figure 12.

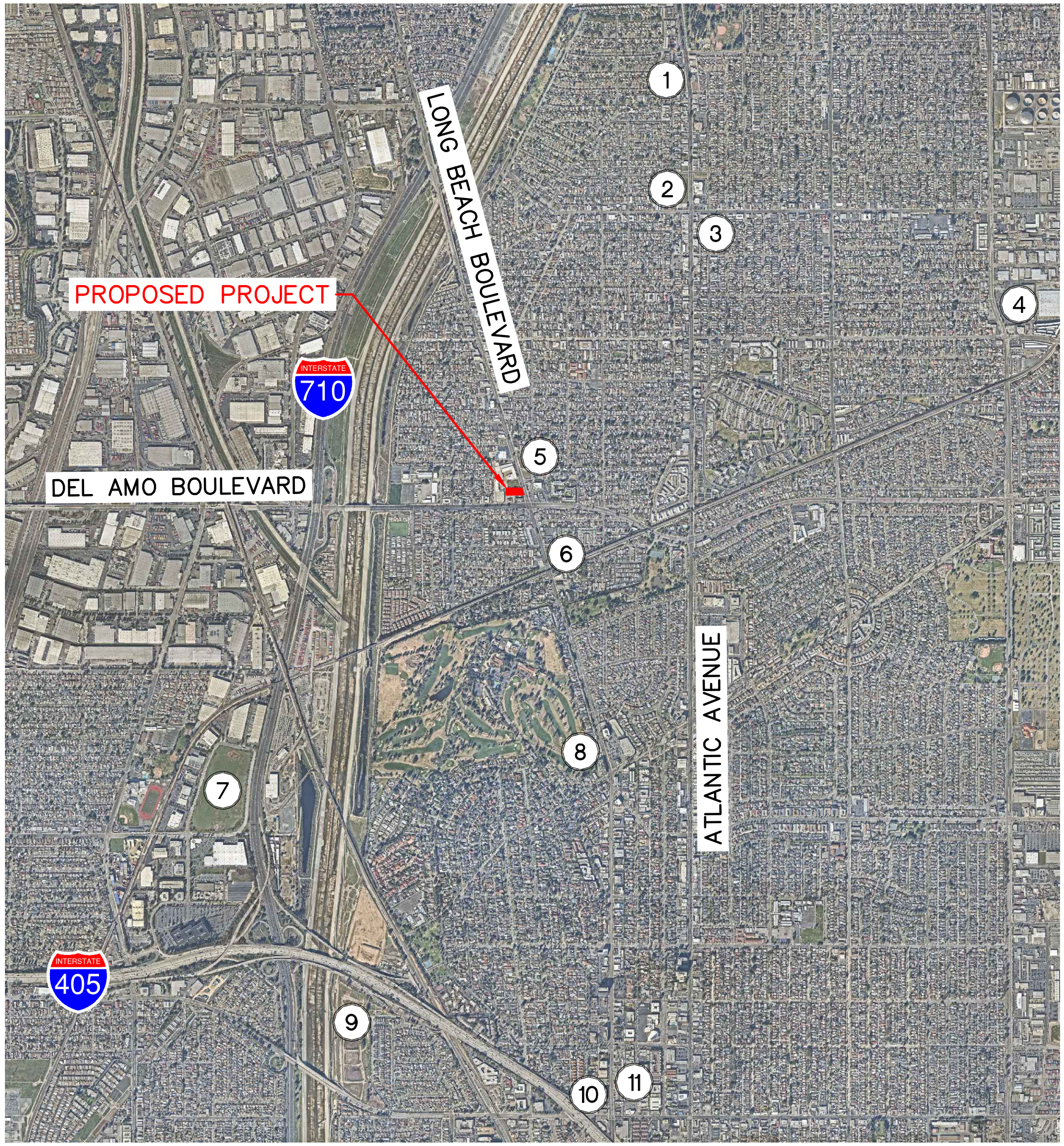
Opening Year 2022 With Project Conditions

Project-related traffic was added to the Opening Year 2022 traffic volumes to develop the Opening Year 2022 With Project peak hour forecasts, which are shown on Figure 13.

TABLE 2
SUMMARY OF CUMULATIVE PROJECTS

Proj #	Description	Land Use	Quantity	Units	Trip Generation Estimates						
						AM Peak Hour			PM Peak Hour		
					Daily	In	Out	Total	In	Out	Total
1	6151-6191 Atlantic Ave	Mixed Use	18.047	KSF	681	11	6	17	33	36	69
2	5801 Atlantic Ave	Multifamily Housing (Mid-Rise)	84	DU	457	8	22	30	23	14	37
		Shopping Center	4.600	KSF	174	3	2	5	8	9	17
3	5721 Lime Ave	Multifamily Housing (Mid-Rise)	15	DU	82	1	4	5	4	3	7
4	5450 Cherry Ave	High-Turnover (Sit-Down) Restaurant	6.000	KSF	673	33	27	60	36	22	58
5	5100 Long Beach Blvd	Multifamily Housing (Mid-Rise)	38	DU	207	4	10	14	10	7	17
6	4800 Long Beach Blvd	Multifamily Housing (Mid-Rise)	20	DU	109	2	5	7	5	3	8
7	4000 Via Oro Ave	Manufacturing	517.037	KSF	2,032	247	74	321	108	239	347
8	4251 Long Beach Blvd	Medical-Dental Office Building	8.559	KSF	298	19	5	24	8	21	29
9	712 Baker St	Multifamily Housing (Mid-Rise)	226	DU	1,229	21	60	81	61	39	100
		Single-Family Detached Housing	7	DU	66	1	4	5	4	3	7
10	3435-3459 Long Beach Blvd and 3464 Locust Ave	General Office Building	104.227	KSF	1,015	104	17	121	19	101	120
11	3450 Long Beach Blvd	General Office Building	15.200	KSF	148	15	2	17	3	15	18
Total Project Trips					4,897	469	238	707	322	512	834

DU = Dwelling Unit, KSF = 1,000 square feet



NOT TO SCALE

LEGEND:

(X) = Cumulative Project Location

FIGURE 10
CUMULATIVE PROJECT LOCATIONS

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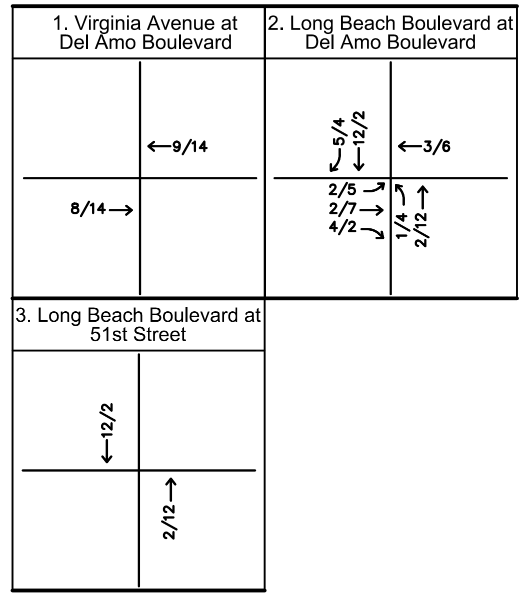
NOT TO SCALE



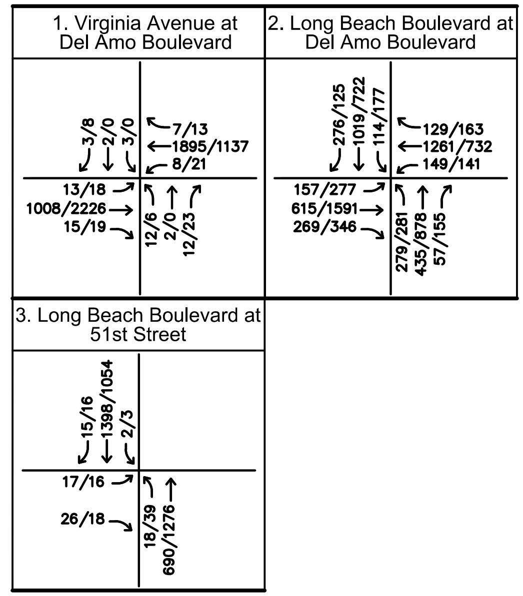
LEGEND:

X = Study Intersection

XX/YY = AM/PM Peak Hour Volumes

FIGURE 11
CUMULATIVE PROJECT
TRAFFIC VOLUMES

Kimley»Horn



NOT TO SCALE

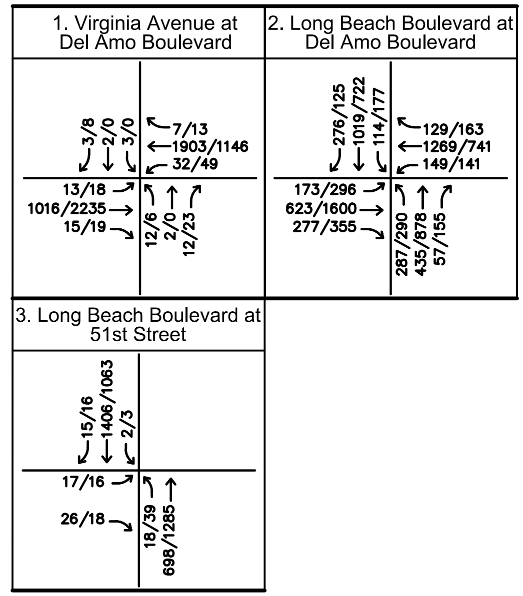
LEGEND:

(X) = Study Intersection

XX/YY = AM/PM Peak Hour Volumes

FIGURE 12
OPENING YEAR 2022
TRAFFIC VOLUMES

Kimley»Horn



NOT TO SCALE

LEGEND:

(X) = Study Intersection

XX/YY = AM/PM Peak Hour Volumes

FIGURE 13
OPENING YEAR 2022 WITH PROJECT
TRAFFIC VOLUMES

TRAFFIC ANALYSIS

The study intersections were analyzed in accordance with the analysis methodology described earlier in this report for the following scenarios:

- Existing Conditions
- Opening Year 2022
- Opening Year 2022 With Project

Intersection Analysis – Existing Conditions

The study intersections were analyzed for Existing Conditions. Intersection Level of Service worksheets are provided in *Appendix E*. The Existing Conditions analysis results and Level of Service for the study intersections are presented in Table 3. Review of this table indicates that the following study intersection currently operates at an unacceptable Level of Service (F) in both peak periods:

- #1 – Del Amo Boulevard at Virginia Avenue

Table 3 – Summary of Intersection Operations – Existing Conditions

Int. #	Intersection	Intersection Control	Peak Hour	Delay (sec/veh)	LOS
1	Del Amo Boulevard at Virginia Avenue	TWSC	AM	266.7	F
			PM	190.1	F
2	Del Amo Boulevard at Long Beach Boulevard	Signal	AM	48.7	D
			PM	47.9	D
3	Long Beach Boulevard at 51st Street	Signal	AM	2.7	A
			PM	2.5	A

TWSC – Two-Way Stop Control

The 95th Percentile queue length at the turn bays of the signalized study intersections were analyzed for the Existing Conditions. Queuing worksheets are provided in *Appendix E*. Results indicate that the queue of the northbound left and southbound left lanes at the following intersection exceed the capacity of the turn bay:

- #2 – Del Amo Boulevard at Long Beach Boulevard

Intersection Analysis – Opening Year 2022 Conditions

The study intersections were analyzed for the Opening Year 2022 Conditions. Intersection Level of Service worksheets are provided in *Appendix E*. The Opening Year 2022 Conditions analysis results and Level of Service for the study intersections are presented in Table 4. Review of this table indicates that the following study intersection would continue to operate at an unacceptable Level of Service (F) in both peak periods:

- #1 – Del Amo Boulevard at Virginia Avenue

Table 4 – Summary of Intersection Operations – Opening Year 2022 Conditions

Int. #	Intersection	Intersection Control	Peak Hour	Delay (sec/veh)	LOS
1	Del Amo Boulevard at Virginia Avenue	TWSC	AM	266.7	F
			PM	253.3	F
2	Del Amo Boulevard at Long Beach Boulevard	Signal	AM	50.6	D
			PM	50.3	D
3	Long Beach Boulevard at 51st Street	Signal	AM	2.7	A
			PM	2.5	A

The 95th Percentile queue length at the turn bays of the signalized study intersections were analyzed for the Opening Year 2022 Conditions. Queuing worksheets are provided in *Appendix E*. Results indicate that the queue of the northbound left and southbound left lanes at the following intersection exceed the capacity of the turn bay:

- #2 – Del Amo Boulevard at Long Beach Boulevard

Intersection Analysis – Opening Year 2022 With Project Conditions

The study intersections were analyzed for the Opening Year 2022 With Project Conditions in accordance with the analysis methodology described earlier in this report. Intersection Level of Service worksheets are provided in *Appendix E*. The Opening Year 2022 with Project Conditions analysis results and Level of Service for the study intersections are presented in Table 5. Review of this table indicates that the following study intersection would continue to operate at an unacceptable Level of Service (F) in both peak periods:

- #1 – Del Amo Boulevard at Virginia Avenue

Table 5 – Summary of Intersection Operations –
Opening Year 2022 With Project Conditions

				Without Project		With Project	
Int. #	Intersection	Intersection Control	Peak Hour	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	Del Amo Boulevard at Virginia Avenue	TWSC	AM	266.7	F	383.4	F
			PM	253.3	F	647.6	F
2	Del Amo Boulevard at Long Beach Boulevard	Signal	AM	50.6	D	52.3	D
			PM	50.3	D	51.5	D
3	Long Beach Boulevard at 51st Street	Signal	AM	2.7	A	2.8	A
			PM	2.5	A	2.5	A

The 95th Percentile queue length at the turn bays of the signalized study intersections were analyzed for the Opening Year 2022 With Project Conditions. Queuing worksheets are provided in *Appendix E*. Results indicate that the queue of the northbound left and southbound left lanes at the following intersection exceed the capacity of the turn bay:

- #2 – Del Amo Boulevard at Long Beach Boulevard

This is an existing deficiency and the addition of project trips would not impose a significant impact on the study intersection.

QUEUING ANALYSIS

Kimley-Horn performed a queueing analysis to evaluate the adequacy of the drive-through queuing capacity for the proposed project.

The opening to the drive-through lane would be located at the southeast corner of the project site, and would wrap around the east, north, and west sides of the project in a counter-clockwise direction. The drive-through would provide two side-by-side entry lanes and two transaction kiosks. After the transaction kiosks, the two lanes would merge back into a single drive-through lane and proceed through the car wash. There would be approximately 260 feet of total queuing capacity (approximately 130 feet per lane) from the opening of the two drive-through lanes to the two transaction kiosks. This would provide a queuing capacity of 10 to 13 vehicles, assuming 20 to 25 feet per vehicle, from the beginning of the drive-through lanes to the transaction kiosks.

Queuing Data Collection

Drive-through queuing observations and counts were conducted at the following existing car wash site:

- 4294 University Pkwy, San Bernardino

This site location was selected for queuing data collection because of the following site characteristics that are similar to the proposed project:

- Location has drive-through lane with similar project size
- Located adjacent to an existing gas station
- Located within 1 mile of an interstate
- Located along a major roadway

The drive-through activity at the data collection site was observed on a Friday from 2:00 PM to 6:00 PM and a Saturday from 10:00 PM to 2:00 PM, during the periods of peak demand. The drive-through queuing data can be found in *Appendix F*.

The results of the observations are summarized on Table 6 and Table 7 for the Friday and Saturday peak periods, respectively. The data summary on these tables present the observed Average queue, the Peak queue, and the 95th Percentile queue. The peak activity at each site was observed to occur intermittently, with an ebb and flow pattern throughout each peak with periods of lower queuing activity between peaks.

Projected Queue Requirements for the Proposed Project

Assuming the proposed Car Wash development would experience similar queuing activity to the studied site, the typical Peak number of queued vehicles is estimated to be 1 to 4 vehicles on a Friday and 3 to 8 vehicles on a Saturday, with fewer vehicles outside of these peaks. The 95th percentile, which is estimated to be 7 vehicles in its worst case among the observed Friday and Saturday, would occur more frequently than the site peak and is within the capacity of the proposed project with fewer vehicles outside of these peaks.

The proposed project's drive-through lane would have enough stacking distance for approximately 10-13 vehicles, and there are no anticipated disruptions to onsite circulation resulting from this project queue. Queues are not anticipated to block the main drive aisles that provide access to other portions of the site. The proposed site location and queuing capacity is provided on Figure 14.

Table 6 - Summary of Drive-Through Queuing Data Collection - Friday	
Site Average	
Time	Vehicles
2:00-2:15PM	1.5
2:15-2:30PM	1.3
2:30-2:45PM	0.7
2:45-3:00PM	0.8
3:00-3:15PM	1.1
3:15-3:30PM	1.5
3:30-3:45PM	0.5
3:45-4:00PM	1.0
4:00-4:15PM	1.6
4:15-4:30PM	1.1
4:30-4:45PM	2.1
4:45-5:00PM	1.3
5:00-5:15PM	0.7
5:15-5:30PM	1.0
5:30-5:45PM	1.0
5:45-6:00PM	0.7
Site Peak	
2:00-2:15PM	3.0
2:15-2:30PM	3.0
2:30-2:45PM	2.0
2:45-3:00PM	2.0
3:00-3:15PM	3.0
3:15-3:30PM	3.0
3:30-3:45PM	1.0
3:45-4:00PM	2.0
4:00-4:15PM	4.0
4:15-4:30PM	3.0
4:30-4:45PM	3.0
4:45-5:00PM	3.0
5:00-5:15PM	2.0
5:15-5:30PM	3.0
5:30-5:45PM	2.0
5:45-6:00PM	2.0
Site 95th %-ile [1]	
2:00-2:15PM	3.0
2:15-2:30PM	3.0
2:30-2:45PM	1.5
2:45-3:00PM	2.0
3:00-3:15PM	2.2
3:15-3:30PM	3.0
3:30-3:45PM	1.0
3:45-4:00PM	2.0
4:00-4:15PM	3.3
4:15-4:30PM	2.4
4:30-4:45PM	3.0
4:45-5:00PM	2.6
5:00-5:15PM	1.6
5:15-5:30PM	2.5
5:30-5:45PM	2.0
5:45-6:00PM	1.7
[1] 95th percentile = The queue will be less than the queue shown 95% of the time.	

Table 7 - Summary of Drive-Through Queuing Data Collection - Saturday	
Site Average	
Time	Vehicles
10:00-10:15AM	2.9
10:15-10:30AM	1.1
10:30-10:45AM	1.5
10:45-11:00AM	2.1
11:00-11:15AM	3.8
11:15-11:30AM	1.4
11:30-11:45AM	2.4
11:45-12:00PM	1.9
12:00-12:15PM	1.7
12:15-12:30PM	1.6
12:30-12:45PM	1.8
12:45-1:00PM	4.1
1:00-1:15PM	1.9
1:15-1:30PM	2.6
1:30-1:45PM	3.6
1:45-2:00PM	1.5
Site Peak	
10:00-10:15AM	5.0
10:15-10:30AM	3.0
10:30-10:45AM	3.0
10:45-11:00AM	5.0
11:00-11:15AM	6.0
11:15-11:30AM	3.0
11:30-11:45AM	5.0
11:45-12:00PM	3.0
12:00-12:15PM	3.0
12:15-12:30PM	3.0
12:30-12:45PM	4.0
12:45-1:00PM	7.0
1:00-1:15PM	4.0
1:15-1:30PM	5.0
1:30-1:45PM	8.0
1:45-2:00PM	3.0
Site 95^{th} %-ile [1]	
10:00-10:15AM	4.0
10:15-10:30AM	2.6
10:30-10:45AM	3.0
10:45-11:00AM	5.0
11:00-11:15AM	6.0
11:15-11:30AM	3.0
11:30-11:45AM	4.0
11:45-12:00PM	3.0
12:00-12:15PM	3.0
12:15-12:30PM	3.0
12:30-12:45PM	3.1
12:45-1:00PM	6.0
1:00-1:15PM	3.4
1:15-1:30PM	4.8
1:30-1:45PM	7.0
1:45-2:00PM	3.0

[1] 95th percentile = The queue will be less than the queue shown 95% of the time.

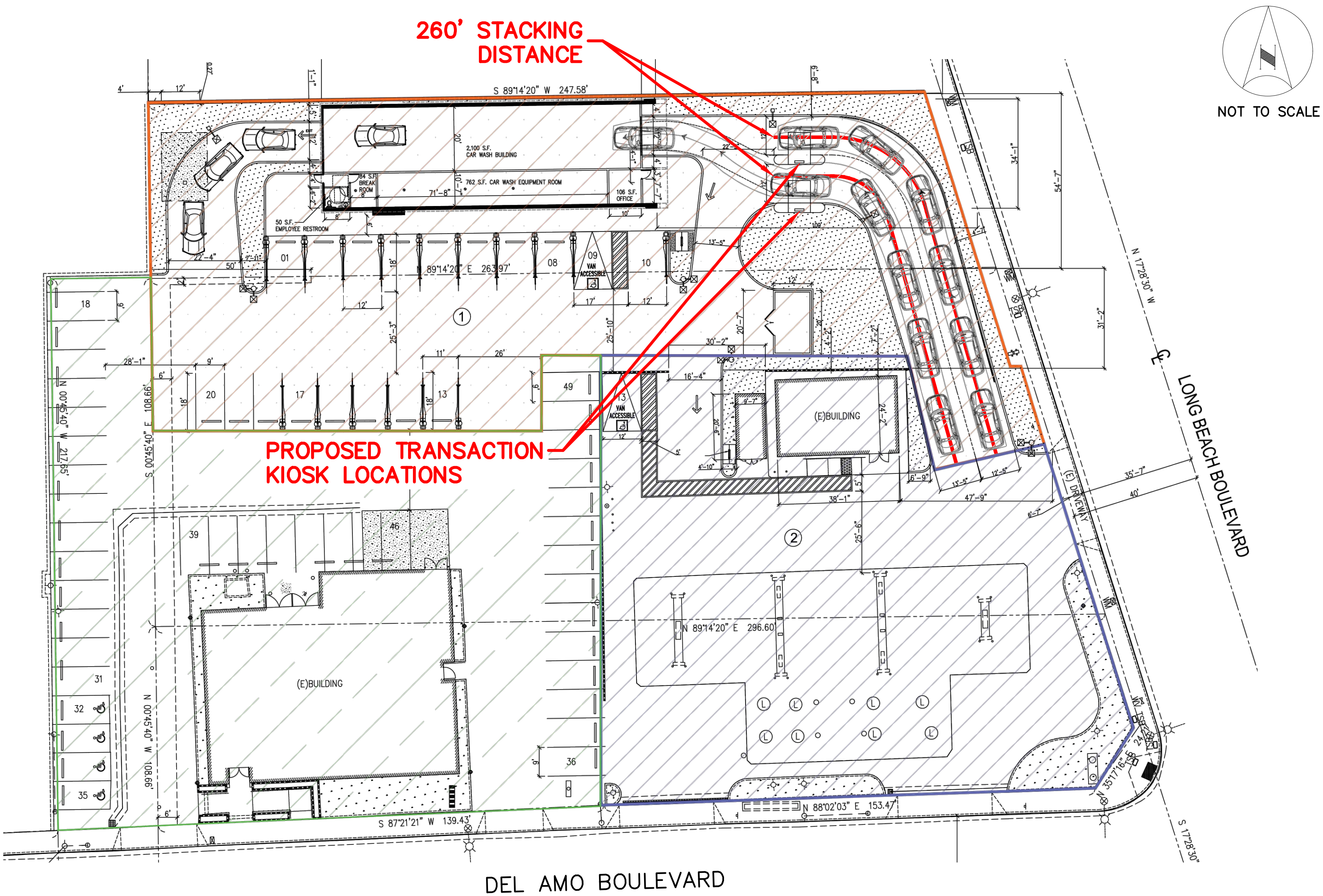


FIGURE 14
QUEUING CAPACITY

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MULTIMODAL ANALYSIS

Although there are no bike facilities in the immediate vicinity of the project, pedestrian access is provided via sidewalk on both sides of the roadways surrounding the project area, including Long Beach Boulevard and Del Amo Boulevard. Both signalized study intersections on Long Beach Boulevard possess pedestrian crosswalks with push buttons and signal heads, thereby providing connectivity to existing bus stops along Long Beach Boulevard and Del Amo Boulevard. The proposed project will maintain the existing pedestrian access routes.

Existing morning peak period (7:00 to 9:00 AM) and evening peak period (4:00 to 6:00 PM) pedestrian and bicycle volumes were collected at the study intersections. These counts were completed in February, 2021. Peak hour pedestrian and bicycle counts are provided in *Appendix B*. As traffic patterns have been significantly affected by the COVID-19 pandemic and students of Dooley Elementary School (immediately north of the project) have transitioned to distance-learning, pedestrian volumes for the school were developed by applying an appropriate factor to the total student population.

Studies by the Centers for Disease Control and Prevention (CDC) show that approximately 10% or less of students walk or bike to school on an average school morning in most (61.5%) schools. There were a total of 1,001 students enrolled at Dooley Elementary School in the 2018-2019 school year, as published by the Nation Center for Education Statistics (NCES). Therefore, after applying a 10% factor to the student population of 1,001 students, there are approximately 100 students that walk or bike to school on an average school-day morning.

It is assumed that the distribution of the Dooley Elementary School pedestrian and bicycle traffic would be 25% from each of the north, east, south and west directions. Based on these assumptions, the following student trip assignment information can be considered:

- Most of the 25 students from the north on Long Beach Boulevard would turn west onto 51st Street before the project to get to the main entrance of Dooley Elementary School and would not cross any project driveways;
- however, few (~5) students from the north might continue south toward Del Amo Boulevard and cross all project driveways along Long Beach Boulevard and Del Amo Boulevard;
- 25 students from the east would cross both project driveways along Del Amo Boulevard;
- 25 students from the south would cross both project driveways along Del Amo Boulevard;
- 25 students from the west would turn north before the project and would not cross any project driveways.

In summary, approximately 55 students would cross all project driveways along Del Amo Boulevard, and only few of these students would cross the project driveway along Long Beach Boulevard. In addition, there will be negligible amounts of existing pedestrian-foot traffic and bicycle traffic that would cross the project driveways. Furthermore, the total amount of pedestrian and bicycle traffic is not anticipated to significantly affect vehicle delay entering the project site.

Sight Distance Analysis

A sight distance analysis was performed at the project driveways along Del Amo Boulevard to evaluate the visibility from the project driveways for the right-turn movements. The existing intersection control are stop-control at the project driveways and free-flow along Del Amo Boulevard.

The sight distance standard used, Case B2, in this analysis are from the 2018 American Association of State Highway and Transportation Officials (AASHTO) – Geometric Design of Highways and Streets, Chapter 9 – Intersections (Intersection Sight Distance). Case B2 is used for right turners at a stopped position from a minor street. Table 8 shows the sight distance requirement evaluated for a 35-mph roadway.

Table 8 – Sight Distance Requirements

Case	Passenger Car			
	45 mph	*40 mph*	*35 mph*	*30 mph*
B2	430 feet	385 feet	335 feet	290 feet

2018 American Association of State Highway and Transportation Officials (AASHTO) – Geometric Design of Highways and Streets, Chapter 9 – Intersections (Intersection Sight Distance)

Drivers wanting to make a southbound right turn from the project driveways along Del Amo Boulevard would need approximately 335 feet of sight distance looking towards the east from Position 1 (driver is 7.5 feet behind the limit line) and Position 2 (driver is 2.5 feet behind the limit line). At Driveway 1 in the existing conditions, permitted on-street parking obstructs the view at both Positions 1 and 2, and the minimum sight distance requirements are not met looking towards the east. A representation of the Existing Intersection Sight Distance is shown on Figure 15. However, the visibility of pedestrians within the sidewalk as drivers approach the driveways is adequate.

The following improvement would improve the sight distance towards the east on Driveway 1 to meet the minimum sight distance requirement of 335 feet:

- Paint curb along the north side of Del Amo Boulevard (south of the project site) red and install "NO PARKING ANY TIME" signs along the sidewalk.

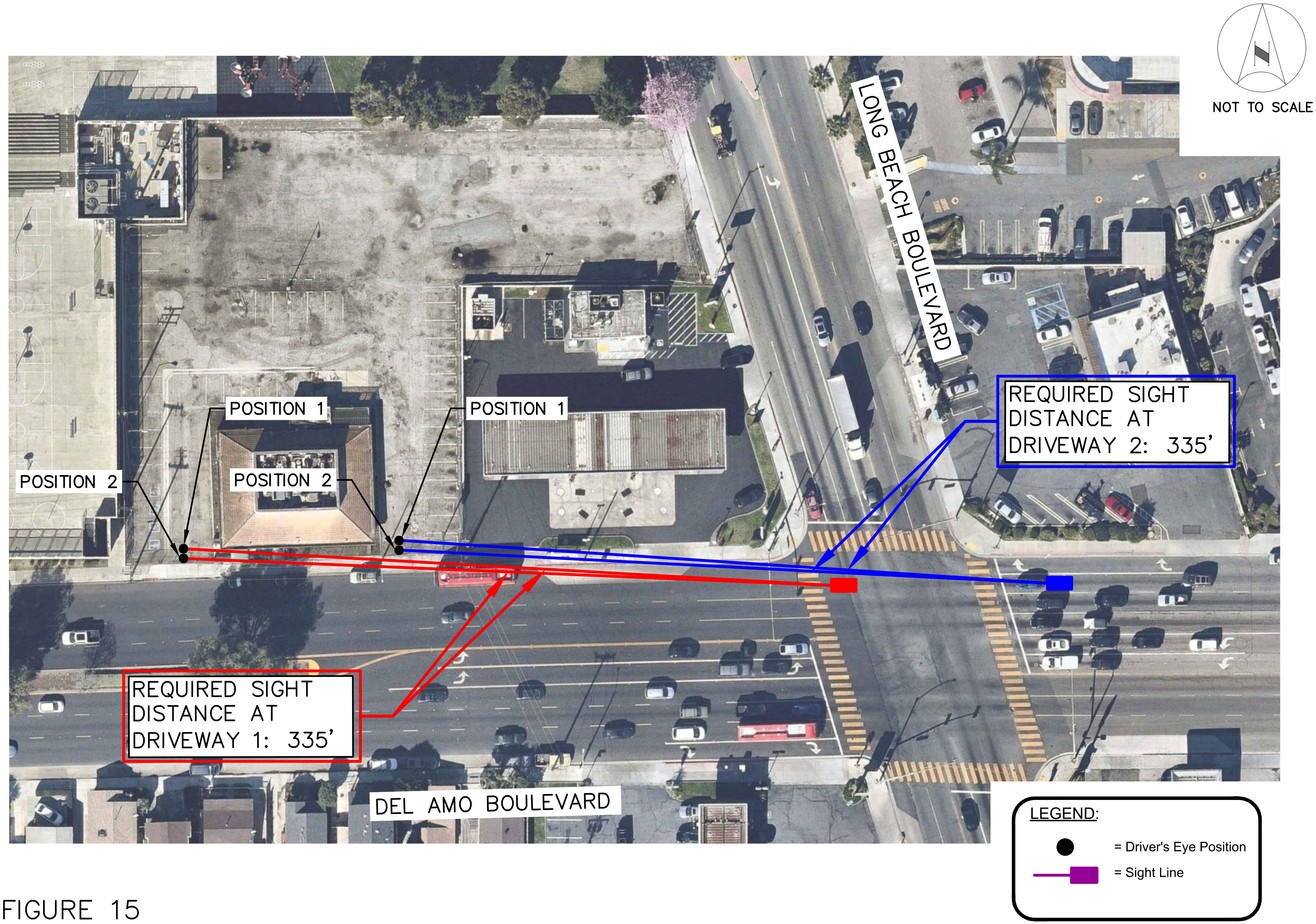

FIGURE 15
INTERSECTION SIGHT DISTANCE AT DEL AMO BOULEVARD
AND PROJECT DRIVEWAYS (EXISTING CONDITIONS)

Kimley»Horn

FINDINGS AND CONCLUSIONS

This traffic impact analysis has been prepared to evaluate the project-related traffic impacts associated with the proposed car wash development located 5005 Long Beach Boulevard in the City of Long Beach, California. The project is estimated to generate 738 daily trips, 64 morning peak hour trips, and 74 evening peak hour trips.

Existing traffic volumes were collected in February, 2021. Due to the impacts of COVID-19 on current traffic patterns, historical counts in the area were used to derive a factor to apply to recent counts. Traffic volumes collected in 2018 were increased by 65% in the AM and 25% in the PM to account for the decrease in traffic related to COVID-19.

Factored existing volumes, along with existing lane geometrics and traffic control at each intersection, were used in conducting peak hour Level of Service (LOS) analyses. Under Existing Conditions, the following study intersection currently operates at an unacceptable Level of Service (F) in both peak periods:

- #1 – Del Amo Boulevard at Virginia Avenue

The 95th Percentile queue length at the turn bays of the signalized study intersections were analyzed for the Existing Conditions. Results indicate that the queue of the northbound left and southbound left lanes at the following intersection exceed the capacity of the turn bay:

- #2 – Del Amo Boulevard at Long Beach Boulevard

An ambient growth of 1.5% and cumulative project traffic were added to the Existing scenario to develop the Opening Year 2022 scenario volumes. In the Opening Year 2022 scenario, the following study intersection would continue to operate at an unacceptable Level of Service (F) in both peak periods:

- #1 – Del Amo Boulevard at Virginia Avenue

The 95th Percentile queue length at the turn bays of the signalized study intersections were analyzed for the Opening Year 2022 Conditions. Results indicate that the queue of the northbound left and southbound left lanes at the following intersection exceed the capacity of the turn bay:

- #2 – Del Amo Boulevard at Long Beach Boulevard

Proposed project trips were added to the Opening Year 2022 traffic volumes to determine the traffic volumes for the Opening Year 2022 With Project scenario. In the Opening Year 2022 With Project scenario, the following study intersection would continue to operate at an unacceptable Level of Service (F) in both peak periods:

- #1 – Del Amo Boulevard at Virginia Avenue

The 95th Percentile queue length at the turn bays of the signalized study intersections were analyzed for the Opening Year 2022 With Project Conditions. Results indicate that the queue of the northbound left and southbound left lanes at the following intersection exceed the capacity of the turn bay:

- #2 – Del Amo Boulevard at Long Beach Boulevard

This is an existing deficiency and the addition of project trips would not impose a significant impact on the study intersection.

The drive-through capacity would be approximately 220 feet (110 feet per lane) from the opening of the two drive-through lanes to the two transaction kiosks, providing a queuing capacity of 9 to 11 vehicles, assuming 20 to 25 feet per vehicle. Drive-through queuing data collection at a similar site and analysis shows that the typical Peak queue expected at the project site would be 3 to 8 vehicles. The 95th Percentile queue, which is estimated to be 7 vehicles in its worst case, would occur more frequently than the site peak and is within the capacity of the proposed project. These queue lengths are within the capacity provided by the proposed site layout.

Although there are no bike facilities in the immediate vicinity of the project, pedestrian access is provided via sidewalk on both sides of the roadways surrounding the project area, including Long Beach Boulevard and Del Amo Boulevard. Appropriate factoring was applied to the Dooley student population of 1,001 students, to determine that approximately 100 students walk or bike to school on an average school-day morning.

Based on trip distribution assumptions, about 55 students would cross all project driveways along Del Amo Boulevard, and only 5 of these students would cross the project driveway along Long Beach Boulevard. Existing pedestrian-foot traffic and bicycle traffic is negligible; therefore, the total amount of pedestrian and bicycle traffic is not anticipated to significantly affect vehicle delay entering the project site.

A sight distance analysis was performed at the project driveways along Del Amo Boulevard to evaluate the visibility from the project driveways for the right-turn movements. Per sight distance standard Case B2, drivers wanting to make a southbound right turn from the project driveways along Del Amo Boulevard would need approximately 335 feet of sight distance looking towards the east. At Driveway 1, permitted on-street parking obstructs the view at both Positions 1 (driver is 7.5 feet behind the limit line) and 2 (driver is 2.5 feet behind the limit line), and the minimum sight distance requirements are not met.

The recommended improvement to improve the sight distance to meet the standard requirement for Case B2 from Driveway 1 is to paint the curb along the north side of Del Amo Boulevard (south of the project site) red and install "NO PARKING ANY TIME" signs along the sidewalk.

The 95th Percentile queue length at the turn bays of the signalized study intersections were analyzed for the Opening Year 2022 With Project Conditions. Results indicate that the queue of the northbound left and southbound left lanes at the following intersection exceed the capacity of the turn bay:

- #2 – Del Amo Boulevard at Long Beach Boulevard

This is an existing deficiency and the addition of project trips would not impose a significant impact on the study intersection.

The drive-through capacity would be approximately 260 feet (130 feet per lane) from the opening of the two drive-through lanes to the two transaction kiosks, providing a queuing capacity of 10 to 13 vehicles, assuming 20 to 25 feet per vehicle. Drive-through queuing data collection at a similar site and analysis shows that the typical Peak queue expected at the project site would be 3 to 8 vehicles. The 95th Percentile queue, which is estimated to be 7 vehicles in its worst case, would occur more frequently than the site peak and is within the capacity of the proposed project. These queue lengths are within the capacity provided by the proposed site layout.

Although there are no bike facilities in the immediate vicinity of the project, pedestrian access is provided via sidewalk on both sides of the roadways surrounding the project area, including Long Beach Boulevard and Del Amo Boulevard. Appropriate factoring was applied to the Dooley student population of 1,001 students, to determine that approximately 100 students walk or bike to school on an average school-day morning.

Based on trip distribution assumptions, about 55 students would cross all project driveways along Del Amo Boulevard, and only 5 of these students would cross the project driveway along Long Beach Boulevard. Existing pedestrian-foot traffic and bicycle traffic is negligible; therefore, the total amount of pedestrian and bicycle traffic is not anticipated to significantly affect vehicle delay entering the project site.

A sight distance analysis was performed at the project driveways along Del Amo Boulevard to evaluate the visibility from the project driveways for the right-turn movements. Per sight distance standard Case B2, drivers wanting to make a southbound right turn from the project driveways along Del Amo Boulevard would need approximately 335 feet of sight distance looking towards the east. At Driveway 1, permitted on-street parking obstructs the view at both Positions 1 (driver is 7.5 feet behind the limit line) and 2 (driver is 2.5 feet behind the limit line), and the minimum sight distance requirements are not met.

The recommended improvement to improve the sight distance to meet the standard requirement for Case B2 from Driveway 1 is to paint the curb along the north side of Del Amo Boulevard (south of the project site) red and install “NO PARKING ANY TIME” signs along the sidewalk.

APPENDIX A

APPROVED SCOPE OF STUDY FORM

Kimley»Horn

January 12, 2021

Alexis Oropeza
Long Beach Development Services
411 West Ocean Boulevard, 3rd Floor
Long Beach, CA 90802

RE: *Traffic Impact Analysis Scoping Agreement for the Proposed Development at the Car Wash Project at 5005 Long Beach Boulevard*

Dear Ms. Oropeza:

Kimley-Horn and Associates, Inc. is pleased to submit this Scoping Agreement for the proposed car wash development at 5005 Long Beach Boulevard in the City of Long Beach. The scope of the traffic impact analysis is summarized below. This scope of work is based on the review comments and recommendations provided by LSA in their peer review letter dated September 2020, and on the City of Long Beach Traffic Impact Analysis Guidelines (June 2020). The Scoping Agreement for Traffic Impact Analysis form is included in the Appendix.

Project Description

The applicant proposes a development consisting of a 3,058-square-foot automated car wash at an existing gas station with convenience store located at the northwest corner of Del Amo Boulevard and Long Beach Boulevard. The project, in its local setting, is shown on Figure 1. The project site plan is shown on Figure 2.

Study Scenarios

The following study scenarios will be included for analysis:

- Existing Conditions
- Opening Year 2021
- Opening Year 2021 with Project

Study Methodology

Intersection Level of Service calculations will be based on the latest version of the Highway Capacity Manual (HCM) Methodology for unsignalized and signalized intersections.

Project Trip Distribution

Project trip distribution assumptions for the Plus Project conditions are shown on Figure 3.

Background Traffic

The project is anticipated to be open in 2021. Existing traffic volumes will be grown at a rate of 1.5% per year to account for ambient growth between Existing and Opening Year scenarios. Additionally, traffic from cumulative projects within a five-mile radius of the proposed site will be included in the Opening Year scenario. A list of these projects will be provided by City of Long Beach staff.

Project Trip Generation

Due to the limited data within the Institute of Transportation Engineers (ITE) Trip Generation Manual, daily and peak hour trips for the proposed project were determined based on data provided by the applicant for an existing BLISS Car Wash located at 4294 University Parkway in San Bernardino, CA and for an existing BLISS Car Wash located at 600 N Rose Drive in Placentia, CA. Transaction data in 2019 was provided and averaged on a daily basis to indicate the number of vehicles utilizing the car wash facility each hour. Data between these two sites, which are similar in operation to the proposed project, was averaged for trip generation purposes. This information is summarized in Table 1 for the morning and the evening peak hour, with the data sheet attached in the Appendix. The values here reflect site volumes on a Friday, which tends to generate higher volumes than on a typical weekday.

TABLE 1
SUMMARY OF PROJECT TRIP GENERATION

			Trip Generation Estimates						
				AM Peak Hour			PM Peak Hour		
Land Use	Quantity	Unit	Daily	In	Out	Total	In	Out	Total
Automated Car Wash	3.058	KSF	738	32	32	64	37	37	74

1 Source: Existing BLISS Car Wash at 4294 University Parkway, San Bernardino CA
Existing BLISS Car Wash at 600 N Rose Drive, Placentia, CA

Study Intersections

The following study intersections are proposed:

1. Virginia Avenue/Del Amo Boulevard
2. Long Beach Boulevard/Del Amo Boulevard
3. Long Beach Boulevard/51st Street

Traffic Counts

Peak hour traffic counts at intersections are typically conducted on a weekday during the morning and evening peak periods (7:00AM – 9:00AM, 4:00PM-6:00PM). Data will be collected at each study intersection and will be factored to account for any anomalies resulting from the impacts of Covid-19 on traffic. This factor will be determined based on a traffic count provided by the city, which was conducted in 2018 at the intersection of Long Beach Boulevard and Del Amo Boulevard.

Queuing Analysis

Queueing analysis will be conducted to demonstrate that the 95th percentile queue can be contained within the project site without disrupting the flow of traffic along Long Beach Boulevard. Queueing data will be collected at a similar existing BLISS car wash site, between 2PM and 6PM on a Friday and between 10AM and 2PM on a Saturday, to demonstrate peak operating conditions during the week and weekend.

Multimodal Analysis

Bicycle and pedestrian volumes will be obtained on Long Beach Boulevard and Del Amo Boulevard. Volumes will be derived from historic data from the City, if available, or from counts. Due to the nature of the current Covid-19 situation, the adjacent school will be contacted to obtain information regarding the student population. This information will be used to estimate the number of students walking to school, in the absence of in-person classes during the pandemic.

Additionally, a sight distance analysis will be conducted at the project driveways along Long Beach Boulevard and along Del Amo Boulevard to demonstrate that conflicts would not be present in the proposed design.

APPENDIX

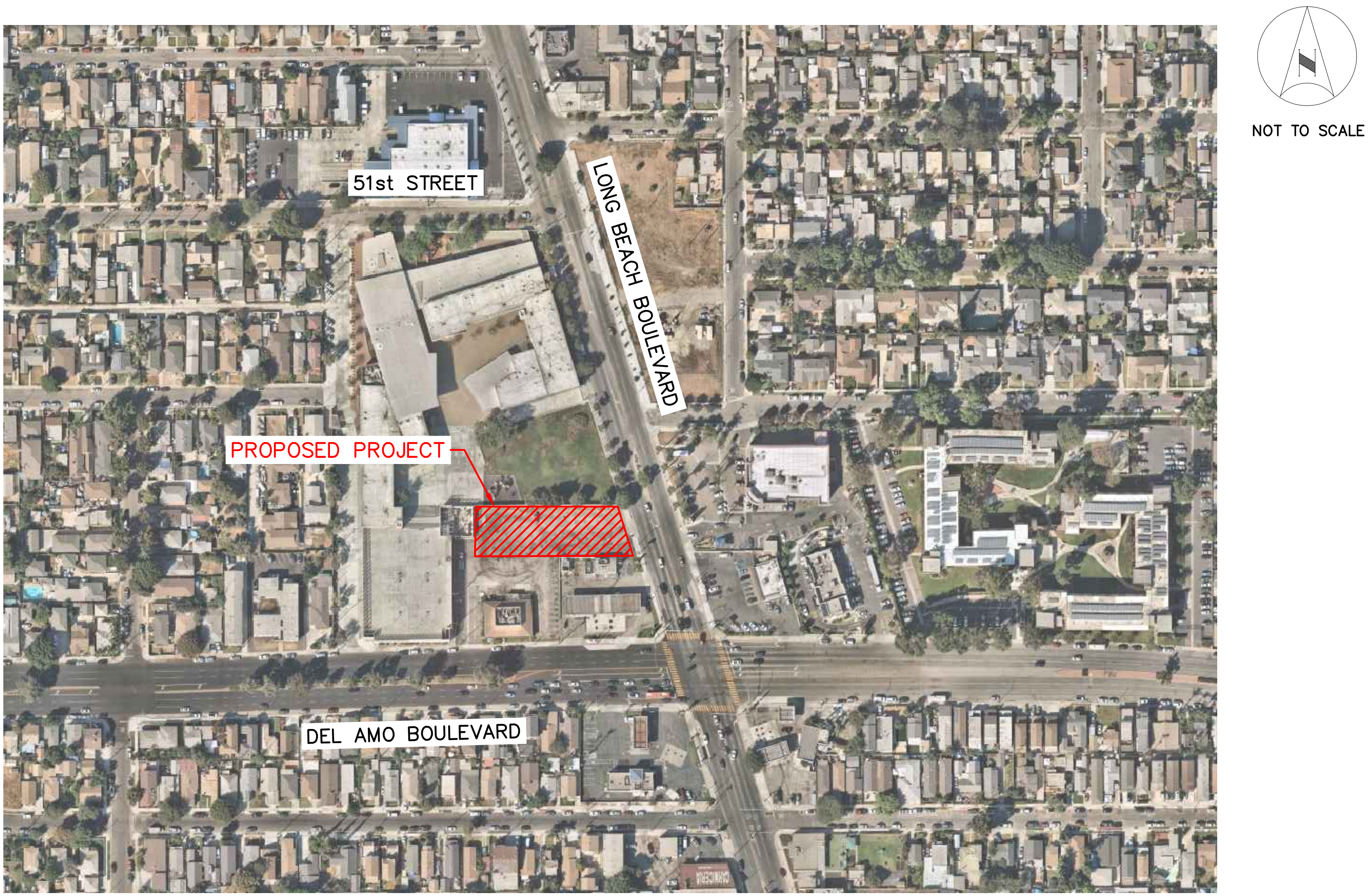

FIGURE 1
VICINITY MAP

Kimley»Horn

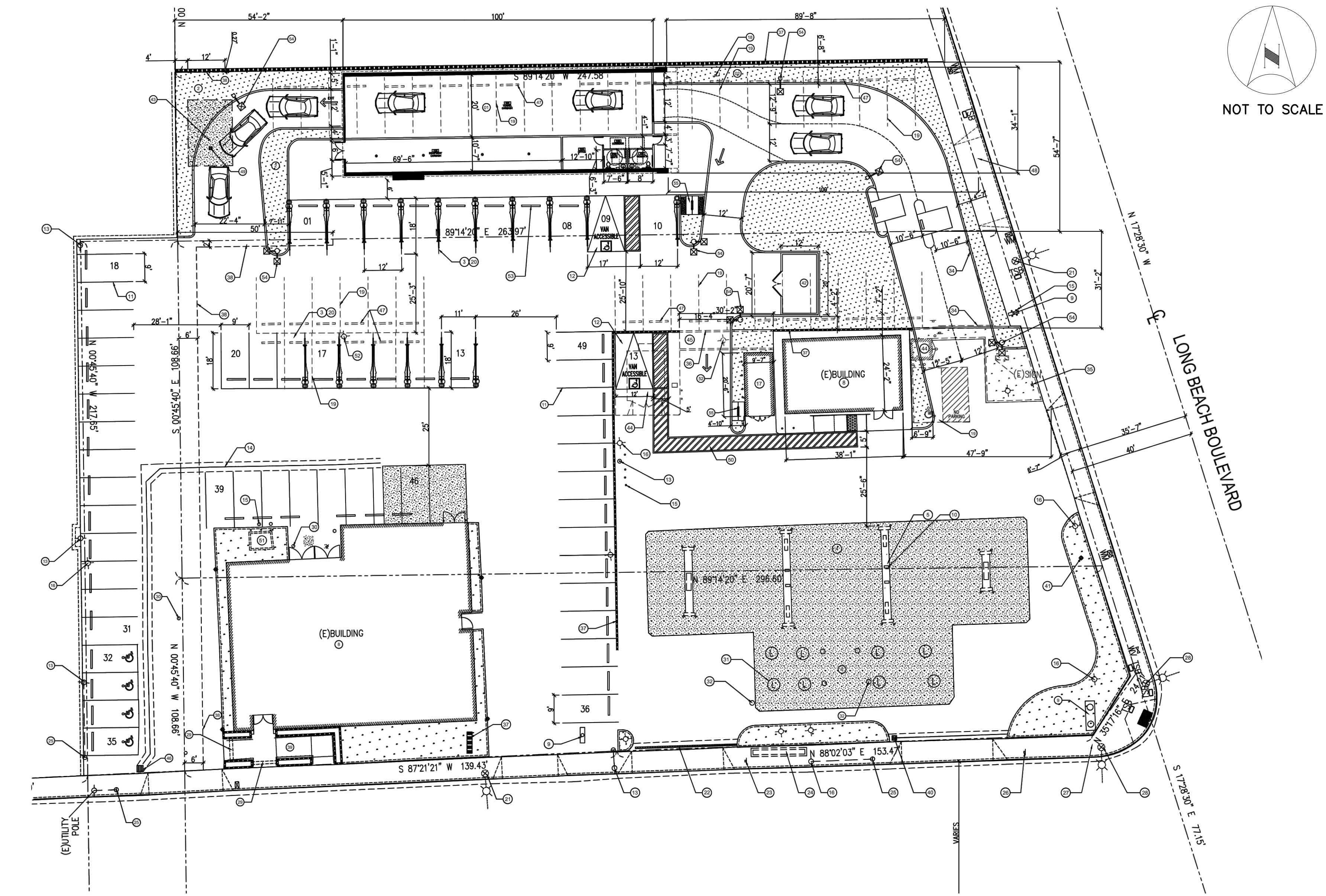

FIGURE 2
SITE PLAN

Kimley»Horn

NOT TO SCALE

LEGEND:

(hatched)	Project Site
XX%	Trip Distribution Percentage

FIGURE 3
TRIP DISTRIBUTION ASSUMPTIONS

Kimley»Horn

Scoping Agreement for Traffic Impact Analysis

This Scoping Agreement acknowledges the Transportation Impact Study for the following Project will be prepared in accordance with the City of Long Beach's Transportation Impact Study Guidelines:

A. Project Information

Project Name: CUP 1801-02: Proposed Automated Car Wash

Project Location: 5005 Long Beach Boulevard, Long Beach CA

Project Description: Construction of a new 3,058-square-foot automated car wash facility at an existing gas station with convenient store at the northwest corner of Del Amo Blvd and Long Beach Blvd.

Project Site Plan Attached? *(required)* ☒ Yes ☐ No

B. Trip Generation

Source of Trip Generation Rates ☐ ITE Trip Generation ☒ Other Historical Data

	In	Out	Total
AM Trips	32	32	64
PM Trips	37	37	74
Daily Trips	369	369	738

Internal Trips ☐ Yes ☒ No Trip Discount % ____

Pass-by Trips ☐ Yes ☒ No Trip Discount % ____

Trip Geographic Distribution N 25 % S 25 % E 25 % W 25 %

Map of Project trip distribution % at Study intersections attached? ☒ Yes ☐ No

C. Study Area and Assumptions

Project Completion Year 2021 Annual Growth Rate 1.5 % per year

Related Projects List attached? *(obtain from City)* ☐ Yes ☒ No TO BE PROVIDED BY CITY STAFF

List of Study Intersection (attach map)

1 Virginia Avenue/Del Amo Blvd
2 Long Beach Boulevard/Del Amo Boulevard
3 Long Beach Boulevard/51st Street
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

D. Other Jusrisdictional Impacts

Is the project within any other Agency's sphere of infuence ☐ Yes ☒ No

If yes, name of Jurisdiction ____

E. Contact Information

	Consultant	Developer
Name:	Kimley-Horn and Associates, Inc.	A & S Engineering
Address:	765 The City Drive, Suite 200	28405 Sand Canyon Road, Suite B
	Orange, CA 92868	Canyon Country, CA 91387
Telephone:	714-939-1030	661-250-9300
Email:	tim.chan@kimley-horn.com	ahmadg@asengineer.com

Approved by:

[signature]	1/12/20
Consultant's Representative	Date
City of Long Beach Representative	Date

Single Wash Avg Hourly Volume: San Bernadino June-December 2019

	Event Date Time						
Hour of E..	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7	12	16	10	11	12	16	13
8	18	17	17	18	18	22	27
9	27	21	19	20	18	26	33
10	30	21	18	17	19	24	33
11	33	22	19	20	20	24	39
12	33	26	21	21	21	29	40
13	31	24	21	21	23	27	36
14	30	24	20	19	22	26	34
15	29	25	21	21	23	31	31
16	29	25	23	26	24	31	30
17	23	25	26	23	25	30	24
18	20	21	21	24	23	27	22
Grand To..	**311**	**268**	**233**	**226**	**237**	**309**	**348**

Avg Daily Vol broken down by Event Date Time Weekday vs. Event Date Time Hour. The data is filtered on Site, EventDate Year and EventDate Month. The Site filter keeps San Bernadino. The EventDate Year filter keeps 2019. The EventDate Month filter excludes January, February, March, April and May. The view is filtered on Event Date Time Hour, which keeps 12 members.

Bliss Placentia	For the Day 7/5/2019	For the Day 7/12/2019	For the Day 7/19/2019	For the Day 7/26/2019	Average
	Hourly Washes	Hourly Washes	Hourly Washes	Hourly Washes	
Washes by Hour					
7 AM Wash Count	8	18	17	33	19
8 AM Wash Count	18	20	28	43	27
9 AM Wash Count	29	36	36	51	38
10 AM Wash Count	37	23	34	50	36
11 AM Wash Count	40	31	31	52	39
12 PM Wash Count	39	26	37	45	37
1 PM Wash Count	40	28	25	53	37
2 PM Wash Count	36	29	35	50	38
3 PM Wash Count	36	37	31	47	38
4 PM Wash Count	45	35	35	53	42
5 PM Wash Count	36	31	40	54	40
6 PM Wash Count	16	48	44	48	39
TOTAL	380	362	393	579	429

From:	Alexis Oropeza <Alexis.Oropeza@longbeach.gov>
Sent:	Friday, January 22, 2021 12:11 AM
To:	Chan, Tim
Subject:	FW: 5005 Long Beach Blvd. (Car Wash)
Attachments:	Scoping Agreement Form - January 2021.pdf

Hi Tim,

The parameters outlined in the revised scope dated January 12th and attached to this email is accepted.

Sincerely,

Alexis Oropeza
Current Planning Officer

Long Beach Development Services I Planning Bureau
T 562.570.6413 F 562.570.6068
411 West Ocean Blvd., 3rd Floor I Long Beach, C A 90802
Alexis.Oropeza@longbeach.gov I www.lbds.info

APPENDIX B

TRAFFIC DATA COLLECTION SHEETS

National Data & Surveying Services

Intersection Turning Movement Count

Location: Virginia Ave & Del Amo Blvd
City: Long Beach
Control: 2-Way Stop(NB/SB)

Project ID: 21-020034-001
Date: 2/9/2021

Total

NS/EW Streets:	Virginia Ave				Virginia Ave				Del Amo Blvd				Del Amo Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	3	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	2	0	1	0	0	0	6	0	0	99	2	1	0	254	0	0	365
7:15 AM	2	0	1	0	1	1	0	0	0	128	3	1	0	269	3	0	409
7:30 AM	2	0	1	0	0	0	1	0	1	142	1	0	0	308	1	0	457
7:45 AM	3	0	1	0	1	0	0	0	3	164	3	0	0	310	0	1	486
8:00 AM	0	1	4	0	0	0	1	0	2	163	2	1	2	239	0	2	417
8:15 AM	4	0	0	0	0	0	0	0	0	158	1	0	0	229	0	2	394
8:30 AM	2	0	2	0	0	0	0	0	1	178	0	1	1	207	0	2	394
8:45 AM	0	0	1	0	0	0	0	1	0	174	3	1	0	205	1	0	386
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	15	1	11	0	2	1	8	1	7	1206	15	5	3	2021	5	7	3308
APPROACH %'s :	55.56%	3.70%	40.74%	0.00%	16.67%	8.33%	66.67%	8.33%	0.57%	97.81%	1.22%	0.41%	0.15%	99.26%	0.25%	0.34%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	7	1	7	0	2	1	2	0	6	597	9	2	2	1126	4	3	1769
PEAK HR FACTOR :	0.583	0.250	0.438	0.000	0.500	0.250	0.500	0.000	0.500	0.910	0.750	0.500	0.250	0.908	0.333	0.375	0.910
	0.750				0.625				0.903				0.912				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	3	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	0	6	0	0	0	1	0	2	385	2	1	1	204	2	3	608
4:15 PM	0	0	5	0	0	0	0	0	2	392	2	0	4	243	2	2	652
4:30 PM	2	0	6	0	0	0	0	0	2	402	2	3	1	234	2	2	656
4:45 PM	1	0	3	0	0	0	1	0	2	456	4	1	1	225	2	2	698
5:00 PM	0	0	4	0	0	0	3	0	1	438	7	0	7	223	2	2	687
5:15 PM	2	0	5	0	0	0	2	0	4	447	2	1	1	203	4	1	672
5:30 PM	3	0	5	0	0	0	1	0	0	389	2	2	2	241	3	0	648
5:45 PM	1	0	4	0	0	0	1	0	1	440	2	0	0	188	1	0	638
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	10	0	38	0	0	0	9	0	14	3349	23	8	17	1761	18	12	5259
APPROACH %'s :	20.83%	0.00%	79.17%	0.00%	0.00%	0.00%	100.00%	0.00%	0.41%	98.67%	0.68%	0.24%	0.94%	97.40%	1.00%	0.66%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	5	0	18	0	0	0	6	0	9	1743	15	5	10	885	10	7	2713
PEAK HR FACTOR :	0.625	0.000	0.750	0.000	0.000	0.000	0.500	0.000	0.563	0.956	0.536	0.417	0.357	0.946	0.625	0.875	0.972
	0.719				0.500				0.957				0.954				

National Data & Surveying Services
Intersection Turning Movement Count

Location: Virginia Ave & Del Amo Blvd
City: Long Beach
Control: 2-Way Stop(NB/SB)

Project ID: 21-020034-001
Date: 2/9/2021

Bikes

NS/EW Streets:	Virginia Ave				Virginia Ave				Del Amo Blvd				Del Amo Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	3	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
7:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	7	0	0	0	6	0	0	13
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.500	0.000	0.000	0.438
									0.375				0.500				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	1	3	0	0	1	3	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
4:45 PM	1	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	5
5:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	1	0	1	9	0	0	0	4	0	0	16
APPROACH %'s :	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	10.00%	90.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	1	0	0	0	0	0	1	0	0	6	0	0	0	2	0	0	10
PEAK HR FACTOR :	0.25	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.500	0.000	0.000	0.000	0.500	0.000	0.000	0.500
	0.250				0.250				0.500				0.500				

National Data & Surveying Services
Intersection Turning Movement Count

Location: Virginia Ave & Del Amo Blvd
City: Long Beach

Project ID: 21-020034-001
Date: 2/9/2021

Pedestrians (Crosswalks)

NS/EW Streets:	Virginia Ave		Virginia Ave		Del Amo Blvd		Del Amo Blvd		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	1	0	0	0	0	0	0	0	1
7:15 AM	3	3	0	1	1	0	1	0	9
7:30 AM	0	0	0	0	0	1	0	0	1
7:45 AM	0	1	0	1	0	0	0	0	2
8:00 AM	1	1	0	0	0	0	0	0	2
8:15 AM	0	3	1	0	0	0	0	0	4
8:30 AM	0	1	3	0	0	0	0	0	4
8:45 AM	0	2	0	0	0	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	5	11	4	2	1	1	1	0	25
APPROACH %'s :	31.25%	68.75%	66.67%	33.33%	50.00%	50.00%	100.00%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM								TOTAL
PEAK HR VOL :	4	5	0	2	1	1	1	0	14
PEAK HR FACTOR :	0.333	0.417		0.500	0.250	0.250	0.250		0.389
	0.375		0.500		0.500		0.250		

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	1	0	0	0	0	1
4:30 PM	2	0	2	1	0	0	0	0	5
4:45 PM	0	2	0	2	0	0	0	0	4
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	2	0	0	0	0	0	0	0	2
5:30 PM	1	0	0	1	0	0	0	0	2
5:45 PM	0	0	1	0	1	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	5	2	3	5	1	0	0	0	16
APPROACH %'s :	71.43%	28.57%	37.50%	62.50%	100.00%	0.00%			
PEAK HR :	04:30 PM - 05:30 PM								TOTAL
PEAK HR VOL :	4	2	2	3	0	0	0	0	11
PEAK HR FACTOR :	0.500	0.250	0.250	0.375					0.550
	0.750		0.417						

National Data & Surveying Services
Intersection Turning Movement Count

Location: Long Beach Blvd & Del Amo Blvd
City: Long Beach
Control: Signalized

Project ID: 21-020034-002
Date: 2/9/2021

Total

NS/EW Streets:	Long Beach Blvd				Long Beach Blvd				Del Amo Blvd				Del Amo Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	31	45	3	0	11	86	22	0	19	65	14	0	11	185	13	0	505
7:15 AM	44	61	7	0	10	110	46	0	27	76	24	0	12	176	13	0	606
7:30 AM	46	74	7	0	18	127	37	0	14	79	42	0	22	213	22	0	701
7:45 AM	55	63	4	0	13	171	52	0	23	98	38	0	20	205	19	1	762
8:00 AM	34	51	12	0	17	138	36	0	31	108	37	0	25	173	18	0	680
8:15 AM	31	71	11	0	20	165	37	0	23	81	41	2	21	160	18	0	681
8:30 AM	42	69	19	0	17	132	29	0	18	117	53	0	14	136	22	0	668
8:45 AM	35	65	19	0	21	140	35	0	23	109	39	0	22	139	15	0	662
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	318	499	82	0	127	1069	294	0	178	733	288	2	147	1387	140	1	5265
APPROACH %'s :	35.37%	55.51%	9.12%	0.00%	8.52%	71.74%	19.73%	0.00%	14.82%	61.03%	23.98%	0.17%	8.78%	82.81%	8.36%	0.06%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	166	259	34	0	68	601	162	0	91	366	158	2	88	751	77	1	2824
PEAK HR FACTOR :	0.755	0.875	0.708	0.000	0.850	0.879	0.779	0.000	0.734	0.847	0.940	0.250	0.880	0.881	0.875	0.250	0.927
	0.904				0.880				0.876				0.892				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	44	158	35	0	24	141	29	0	48	268	64	0	23	129	38	0	1001
4:15 PM	57	151	29	0	42	135	34	0	40	324	65	0	18	159	33	0	1087
4:30 PM	58	157	27	0	30	144	35	0	52	269	71	0	42	150	35	0	1070
4:45 PM	52	175	31	0	29	138	22	0	55	323	79	0	28	140	30	0	1102
5:00 PM	59	165	28	0	33	143	28	0	56	305	65	0	29	140	28	1	1080
5:15 PM	44	160	21	0	41	143	19	0	37	336	76	0	28	143	38	0	1086
5:30 PM	63	182	42	0	36	143	26	0	65	285	51	1	25	149	33	0	1101
5:45 PM	38	105	32	0	47	134	25	0	51	328	59	2	20	130	37	0	1008
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	415	1253	245	0	282	1121	218	0	404	2438	530	3	213	1140	272	1	8535
APPROACH %'s :	21.69%	65.50%	12.81%	0.00%	17.40%	69.15%	13.45%	0.00%	11.97%	72.24%	15.70%	0.09%	13.10%	70.11%	16.73%	0.06%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	218	682	122	0	139	567	95	0	213	1249	271	1	110	572	129	1	4369
PEAK HR FACTOR :	0.865	0.937	0.726	0.000	0.848	0.991	0.848	0.000	0.819	0.929	0.858	0.250	0.948	0.960	0.849	0.250	0.991
	0.890				0.977				0.949				0.971				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Long Beach Blvd & Del Amo Blvd
City: Long Beach
Control: Signalized

Project ID: 21-020034-002
Date: 2/9/2021

Bikes

NS/EW Streets:	Long Beach Blvd				Long Beach Blvd				Del Amo Blvd				Del Amo Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
7:30 AM	0	1	0	0	0	0	0	0	0	1	2	0	0	2	0	0	6
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	0	5
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	1	0	1	0	0	0	0	3	3	0	1	5	0	0	15
APPROACH %'s :	0.00%	50.00%	50.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	16.67%	83.33%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	1	0	0	1	0	0	0	0	1	2	0	0	3	0	0	8
PEAK HR FACTOR :	0.000	0.250	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.250	0.250	0.000	0.000	0.375	0.000	0.000	0.333
	0.250				0.250				0.250				0.375				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	3
4:30 PM	0	3	0	0	0	1	0	0	1	0	0	0	0	0	0	0	5
4:45 PM	0	2	0	0	0	1	0	0	0	2	0	0	0	1	0	0	6
5:00 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
5:30 PM	0	2	0	0	1	1	0	0	1	0	0	0	0	0	0	0	5
5:45 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	10	0	0	1	5	1	0	2	6	0	0	0	1	0	0	26
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	14.29%	71.43%	14.29%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	5	0	0	1	3	0	0	1	4	0	0	0	1	0	0	15
PEAK HR FACTOR :	0.00	0.625	0.000	0.000	0.250	0.750	0.000	0.000	0.250	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.625
	0.625				0.500				0.625				0.250				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Long Beach Blvd & Del Amo Blvd
City: Long Beach

Project ID: 21-020034-002
Date: 2/9/2021

Pedestrians (Crosswalks)

NS/EW Streets:	Long Beach Blvd		Long Beach Blvd		Del Amo Blvd		Del Amo Blvd		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	0	3	0	0	0	0	0	2	5
7:15 AM	6	1	0	0	0	0	3	1	11
7:30 AM	1	1	1	0	1	3	0	0	7
7:45 AM	0	1	0	3	0	1	3	0	8
8:00 AM	1	1	0	0	1	1	0	1	5
8:15 AM	0	5	0	1	1	2	0	3	12
8:30 AM	0	1	2	2	1	2	3	1	12
8:45 AM	0	0	3	3	1	5	2	2	16
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	8	13	6	9	5	14	11	10	76
APPROACH %'s :	38.10%	61.90%	40.00%	60.00%	26.32%	73.68%	52.38%	47.62%	
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	2	8	1	4	3	7	3	4	32
PEAK HR FACTOR :	0.500	0.400	0.250	0.333	0.750	0.583	0.250	0.333	0.667
	0.500		0.417		0.625		0.583		

	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
PM	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	1	2	2	1	2	0	1	1	10
4:15 PM	0	1	2	3	0	4	0	2	12
4:30 PM	3	0	2	0	3	4	3	0	15
4:45 PM	2	3	0	0	0	1	1	3	10
5:00 PM	1	1	1	0	2	0	1	5	11
5:15 PM	2	0	3	3	2	3	3	0	16
5:30 PM	2	2	1	0	1	3	1	5	15
5:45 PM	0	0	1	0	2	0	0	1	4
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	11	9	12	7	12	15	10	17	93
APPROACH %'s :	55.00%	45.00%	63.16%	36.84%	44.44%	55.56%	37.04%	62.96%	
PEAK HR :	04:45 PM - 05:45 PM								TOTAL
PEAK HR VOL :	7	6	5	3	5	7	6	13	52
PEAK HR FACTOR :	0.875	0.500	0.417	0.250	0.625	0.583	0.500	0.650	0.813
	0.650		0.333		0.600		0.792		

National Data & Surveying Services
Intersection Turning Movement Count

Location: Long Beach Blvd & W 51st St
City: Long Beach
Control: Signalized

Project ID: 21-020034-003
Date: 2/9/2021

Total

NS/EW Streets:	Long Beach Blvd				Long Beach Blvd				W 51st St				W 51st St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	1	74	0	0	0	127	2	0	2	0	0	0	0	0	0	0	206
7:15 AM	1	97	0	0	0	171	2	0	3	0	2	0	0	0	0	0	276
7:30 AM	5	102	0	0	0	176	3	0	0	0	3	0	0	0	0	0	289
7:45 AM	4	107	0	2	0	245	4	0	1	0	2	0	0	0	0	0	365
8:00 AM	3	91	0	0	0	187	1	1	3	0	5	0	0	0	0	0	291
8:15 AM	1	104	0	0	0	219	3	0	3	0	6	0	0	0	0	0	336
8:30 AM	1	109	0	0	0	177	1	0	3	0	3	0	0	0	0	0	294
8:45 AM	3	97	0	1	0	195	3	0	3	0	3	0	0	0	0	0	305
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	19	781	0	3	0	1497	19	1	18	0	24	0	0	0	0	0	2362
APPROACH %'s :	2.37%	97.26%	0.00%	0.37%	0.00%	98.68%	1.25%	0.07%	42.86%	0.00%	57.14%	0.00%					
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	9	411	0	2	0	828	9	1	10	0	16	0	0	0	0	0	1286
PEAK HR FACTOR :	0.563	0.943	0.000	0.250	0.000	0.845	0.563	0.250	0.833	0.000	0.667	0.000	0.000	0.000	0.000	0.000	0.881
	0.934				0.841				0.722								

	Long Beach Blvd				Long Beach Blvd				W 51st St				W 51st St				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	11	222	0	1	0	211	4	0	1	0	4	0	0	0	0	0	454
4:15 PM	7	229	0	1	0	226	1	0	4	0	0	0	0	0	0	0	468
4:30 PM	2	236	0	0	0	213	6	0	4	0	5	0	0	0	0	0	466
4:45 PM	5	263	0	1	0	203	3	0	1	0	2	0	0	0	0	0	478
5:00 PM	6	224	0	1	0	184	3	2	2	0	3	0	0	0	0	0	425
5:15 PM	6	246	0	1	0	227	4	0	3	0	4	0	0	0	0	0	491
5:30 PM	8	263	0	2	0	215	3	0	7	0	5	0	0	0	0	0	503
5:45 PM	7	207	0	0	0	204	2	0	3	0	5	0	0	0	0	0	428
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	52	1890	0	7	0	1683	26	2	25	0	28	0	0	0	0	0	3713
APPROACH %'s :	2.67%	96.97%	0.00%	0.36%	0.00%	98.36%	1.52%	0.12%	47.17%	0.00%	52.83%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	25	996	0	5	0	829	13	2	13	0	14	0	0	0	0	0	1897
PEAK HR FACTOR :	0.781	0.947	0.000	0.625	0.000	0.913	0.813	0.250	0.464	0.000	0.700	0.000	0.000	0.000	0.000	0.000	0.943
	0.940				0.913				0.563								

National Data & Surveying Services
Intersection Turning Movement Count

Location: Long Beach Blvd & W 51st St
City: Long Beach
Control: Signalized

Project ID: 21-020034-003
Date: 2/9/2021

Bikes

NS/EW Streets:	Long Beach Blvd				Long Beach Blvd				W 51st St				W 51st St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
PEAK HR FACTOR :	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500
	0.250				0.250												

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	0	2	0	0	0	1	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	3
4:45 PM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:15 PM	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
5:30 PM	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	6
5:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	11	0	0	0	6	3	0	2	0	0	0	0	0	0	0	22
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	66.67%	33.33%	0.00%	100.00%	0.00%	0.00%	0.00%					
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	8	0	0	0	3	3	0	0	0	0	0	0	0	0	0	14
PEAK HR FACTOR :	0.00	0.500	0.000	0.000	0.000	0.375	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.583
	0.500				0.500												

National Data & Surveying Services

Intersection Turning Movement Count

Location: Long Beach Blvd & W 51st St
City: Long Beach

Project ID: 21-020034-003
Date: 2/9/2021

Pedestrians (Crosswalks)

NS/EW Streets:	Long Beach Blvd		Long Beach Blvd		W 51st St		W 51st St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	3	0	0	0	0	0	3	1	7
7:15 AM	1	1	0	0	0	0	1	2	5
7:30 AM	0	0	0	0	0	0	0	1	1
7:45 AM	0	3	0	0	0	0	0	4	7
8:00 AM	1	2	0	0	0	0	0	1	4
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	1	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	1	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	5	7	0	0	0	0	5	9	26
APPROACH %'s :	41.67%	58.33%					35.71%	64.29%	
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	1	6	0	0	0	0	0	5	12
PEAK HR FACTOR :	0.250	0.500						0.313	0.429
	0.583						0.313		

	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
PM	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	1	1
4:15 PM	0	0	0	0	0	0	1	1	2
4:30 PM	1	0	0	0	0	0	1	2	4
4:45 PM	1	1	0	0	0	0	4	2	8
5:00 PM	1	3	0	0	0	0	1	3	8
5:15 PM	1	0	0	0	0	0	1	0	2
5:30 PM	1	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	1	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	5	4	0	0	0	0	9	9	27
APPROACH %'s :	55.56%	44.44%					50.00%	50.00%	
PEAK HR :	04:45 PM - 05:45 PM								TOTAL
PEAK HR VOL :	4	4	0	0	0	0	6	5	19
PEAK HR FACTOR :	1.000	0.333					0.375	0.417	0.594
	0.500						0.458		

National Data & Surveying Services

Intersection Turning Movement Count

Location: Long Beach Blvd & Del Amo Blvd
City: Long Beach
Control: Signalized

Project ID: 18-05307-028
Date: 5/23/2018

Total

NS/EW Streets:	Long Beach Blvd				Long Beach Blvd				Del Amo Blvd				Del Amo Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	44	97	13	0	15	115	53	0	23	108	25	2	16	351	40	0	902
7:15 AM	61	93	7	0	16	148	61	0	31	117	39	1	29	355	29	0	987
7:30 AM	55	96	10	0	30	148	59	0	29	142	41	1	16	424	25	0	1076
7:45 AM	72	121	14	0	25	185	77	0	33	121	43	1	36	342	21	0	1091
8:00 AM	54	102	8	0	19	148	63	0	49	174	66	1	34	390	24	0	1132
8:15 AM	70	119	14	0	29	171	52	0	25	146	58	1	22	354	34	0	1095
8:30 AM	79	103	18	0	38	154	33	0	24	207	58	3	43	319	23	0	1102
8:45 AM	63	107	12	0	28	146	46	0	44	153	70	3	23	329	20	0	1044
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	498	838	96	0	200	1215	444	0	258	1168	400	13	219	2864	216	0	8429
APPROACH %'s :	34.78%	58.52%	6.70%	0.00%	10.76%	65.36%	23.88%	0.00%	14.03%	63.51%	21.75%	0.71%	6.64%	86.81%	6.55%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	275	445	54	0	111	658	225	0	131	648	225	6	135	1405	102	0	4420
PEAK HR FACTOR :	0.870	0.919	0.750	0.000	0.730	0.889	0.731	0.000	0.668	0.783	0.852	0.500	0.785	0.901	0.750	0.000	0.976
	0.935				0.866				0.865				0.916				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	3	1	0	2	3	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	45	132	23	0	45	131	30	0	71	393	85	0	15	159	36	0	1165
4:15 PM	49	166	24	0	42	136	31	0	54	358	81	0	38	175	39	1	1194
4:30 PM	44	142	24	0	53	157	29	0	66	412	89	0	27	159	27	1	1230
4:45 PM	45	158	32	0	32	163	36	0	59	364	86	2	41	185	34	0	1237
5:00 PM	52	165	20	0	40	173	31	0	66	417	91	0	29	149	36	0	1269
5:15 PM	50	205	25	0	47	154	28	0	72	401	75	1	41	188	26	0	1313
5:30 PM	58	184	28	0	46	140	31	0	55	433	79	1	30	172	35	0	1292
5:45 PM	50	180	30	0	42	145	31	0	52	389	84	0	31	222	33	0	1289
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	393	1332	206	0	347	1199	247	0	495	3167	670	4	252	1409	266	2	9989
APPROACH %'s :	20.35%	68.98%	10.67%	0.00%	19.35%	66.87%	13.78%	0.00%	11.42%	73.04%	15.45%	0.09%	13.06%	73.04%	13.79%	0.10%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	210	734	103	0	175	612	121	0	245	1640	329	2	131	731	130	0	5163
PEAK HR FACTOR :	0.905	0.895	0.858	0.000	0.931	0.884	0.976	0.000	0.851	0.947	0.904	0.500	0.799	0.823	0.903	0.000	0.983
	0.935				0.930				0.965				0.867				

APPENDIX C

SUPPLEMENTAL TRIP GENERATION INFORMATION

Single Wash Avg Hourly Volume: San Bernadino June-December 2019

	Event Date Time						
Hour of E..	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7	12	16	10	11	12	16	13
8	18	17	17	18	18	22	27
9	27	21	19	20	18	26	33
10	30	21	18	17	19	24	33
11	33	22	19	20	20	24	39
12	33	26	21	21	21	29	40
13	31	24	21	21	23	27	36
14	30	24	20	19	22	26	34
15	29	25	21	21	23	31	31
16	29	25	23	26	24	31	30
17	23	25	26	23	25	30	24
18	20	21	21	24	23	27	22
Grand To..	311	268	233	226	237	309	348

Avg Daily Vol broken down by Event Date Time Weekday vs. Event Date Time Hour. The data is filtered on Site, EventDate Year and EventDate Month. The Site filter keeps San Bernadino. The EventDate Year filter keeps 2019. The EventDate Month filter excludes January, February, March, April and May. The view is filtered on Event Date Time Hour, which keeps 12 members.

Bliss Placentia	For the Day	For the Day	For the Day	For the Day	
	7/5/2019	7/12/2019	7/19/2019	7/26/2019	Average
	Hourly Washes	Hourly Washes	Hourly Washes	Hourly Washes	
Washes by Hour					
7 AM Wash Count	8	18	17	33	19
8 AM Wash Count	18	20	28	43	27
9 AM Wash Count	29	36	36	51	38
10 AM Wash Count	37	23	34	50	36
11 AM Wash Count	40	31	31	52	39
12 PM Wash Count	39	26	37	45	37
1 PM Wash Count	40	28	25	53	37
2 PM Wash Count	36	29	35	50	38
3 PM Wash Count	36	37	31	47	38
4 PM Wash Count	45	35	35	53	42
5 PM Wash Count	36	31	40	54	40
6 PM Wash Count	16	48	44	48	39
TOTAL	380	362	393	579	429

APPENDIX D

CUMULATIVE PROJECT INFORMATION

TOTAL CUMULATIVE PROJECTS TRAFFIC

AM Peak Hour

	Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Virginia Avenue at Del Amo Boulevard	0	0	0	0	0	0	0	8	0	0	9	0
2	Long Beach Boulevard at Del Amo Boulevard	1	2	0	0	12	5	2	2	4	0	3	0
3	Long Beach Boulevard at 51st Street	0	2	0	0	12	0	0	0	0	0	0	0

PM Peak Hour

	Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Virginia Avenue at Del Amo Boulevard	0	0	0	0	0	0	0	14	0	0	14	0
2	Long Beach Boulevard at Del Amo Boulevard	4	12	0	0	2	4	5	7	2	0	6	0
3	Long Beach Boulevard at 51st Street	0	12	0	0	2	0	0	0	0	0	0	0

Enter only in blue cells	Yellow cells calculate

Int. #:	1	Virginia Avenue at Del Amo Boulevard

Mirror distribution? Y — Entire Intersection

Mirror distribution?

TOTAL CUMULATIVE PROJECTS TRAFFIC

Pk Hr		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In		0	0	0	0	0	0	0	8	0	0	0	0
AM Out		0	0	0	0	0	0	0	0	0	0	9	0
AM Tot		0	0	0	0	0	0	0	8	0	0	9	0
PM In		0	0	0	0	0	0	0	14	0	0	0	0
PM Out		0	0	0	0	0	0	0	0	0	0	14	0
PM Tot		0	0	0	0	0	0	0	14	0	0	14	0

Zone #	1	North Zone

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In								10%				
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	10%	0%		0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	23	0	0	0	0	0	0	0	2	0	0	0	0
AM Out	34	0	0	0	0	0	0	0	0	0	0	3	0
PM In	68	0	0	0	0	0	0	0	7	0	0	0	0
PM Out	62	0	0	0	0	0	0	0	0	0	0	6	0

Zone #	2	5100 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In								50%				
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	4	0	0	0	0	0	0	0	2	0	0	0	0
AM Out	10	0	0	0	0	0	0	0	0	0	0	5	0
PM In	10	0	0	0	0	0	0	0	5	0	0	0	0
PM Out	7	0	0	0	0	0	0	0	0	0	0	4	0

Zone #	3	4800 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	2	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	5	0	0	0	0	0	0	0	0	0	0	0	0
PM In	5	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	3	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	4	4251 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In								20%				
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	19	0	0	0	0	0	0	0	4	0	0	0	0
AM Out	5	0	0	0	0	0	0	0	0	0	0	1	0
PM In	8	0	0	0	0	0	0	0	2	0	0	0	0
PM Out	21	0	0	0	0	0	0	0	0	0	0	4	0

Int. #:	1	Virginia Avenue at Del Amo Boulevard

Zone #	5	Southwest Zone

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	269	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	138	0	0	0	0	0	0	0	0	0	0	0	0
PM In	173	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	281	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	6	South Zone

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	119	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	19	0	0	0	0	0	0	0	0	0	0	0	0
PM In	22	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	116	0	0	0	0	0	0	0	0	0	0	0	0

Enter only in blue cells	Yellow cells calculate

Int. #:	2	Long Beach Boulevard at Del Amo Boulevard

Y

TOTAL CUMULATIVE PROJECTS TRAFFIC

Pk Hr		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In		0	0	0	0	12	0	2	2	4	0	0	0
AM Out		1	2	0	0	0	5	0	0	0	0	3	0
AM Tot		1	2	0	0	12	5	2	2	4	0	3	0
PM In		0	0	0	0	2	0	5	7	2	0	0	0
PM Out		4	12	0	0	0	4	0	0	0	0	6	0
PM Tot		4	12	0	0	2	4	5	7	2	0	6	0

Zone #	1	North Zone

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In								10%				
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	10%	0%		0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	23	0	0	0	0	0	0	0	2	0	0	0	0
AM Out	34	0	0	0	0	0	0	0	0	0	0	3	0
PM In	68	0	0	0	0	0	0	0	7	0	0	0	0
PM Out	62	0	0	0	0	0	0	0	0	0	0	6	0

Zone #	2	5100 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In							50%					
Y	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	4	0	0	0	0	0	0	2	0	0	0	0	0
AM Out	10	0	0	0	0	0	5	0	0	0	0	0	0
PM In	10	0	0	0	0	0	0	5	0	0	0	0	0
PM Out	7	0	0	0	0	0	4	0	0	0	0	0	0

Zone #	3	4800 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	2	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	5	0	0	0	0	0	0	0	0	0	0	0	0
PM In	5	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	3	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	4	4251 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In									20%			
Y	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%
PM Out	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	19	0	0	0	0	0	0	0	0	4	0	0	0
AM Out	5	1	0	0	0	0	0	0	0	0	0	0	0
PM In	8	0	0	0	0	0	0	0	0	2	0	0	0
PM Out	21	4	0	0	0	0	0	0	0	0	0	0	0

Zone #	5	Southwest Zone

Int. #:	2	Long Beach Boulevard at Del Amo Boulevard

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	269	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	138	0	0	0	0	0	0	0	0	0	0	0	0
PM In	173	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	281	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	6	South Zone

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In					10%							
Y	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	119	0	0	0	0	12	0	0	0	0	0	0	0
AM Out	19	0	2	0	0	0	0	0	0	0	0	0	0
PM In	22	0	0	0	0	2	0	0	0	0	0	0	0
PM Out	116	0	12	0	0	0	0	0	0	0	0	0	0

Int. #:	3	Long Beach Boulevard at 51st Street

Y

TOTAL CUMULATIVE PROJECTS TRAFFIC

Pk Hr		NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In		0	0	0	0	12	0	0	0	0	0	0	0
AM Out		0	2	0	0	0	0	0	0	0	0	0	0
AM Tot		0	2	0	0	12	0	0	0	0	0	0	0
PM In		0	0	0	0	2	0	0	0	0	0	0	0
PM Out		0	12	0	0	0	0	0	0	0	0	0	0
PM Tot		0	12	0	0	2	0	0	0	0	0	0	0

Zone #	1	North Zone

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	23	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	34	0	0	0	0	0	0	0	0	0	0	0	0
PM In	68	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	62	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	2	5100 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	4	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	10	0	0	0	0	0	0	0	0	0	0	0	0
PM In	10	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	7	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	3	4800 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	2	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	5	0	0	0	0	0	0	0	0	0	0	0	0
PM In	5	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	3	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	4	4251 Long Beach Blvd

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	19	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	5	0	0	0	0	0	0	0	0	0	0	0	0
PM In	8	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	21	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	5	Southwest Zone

	Int. #:	3	Long Beach Boulevard at 51st Street

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In												
Y	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	269	0	0	0	0	0	0	0	0	0	0	0	0
AM Out	138	0	0	0	0	0	0	0	0	0	0	0	0
PM In	173	0	0	0	0	0	0	0	0	0	0	0	0
PM Out	281	0	0	0	0	0	0	0	0	0	0	0	0

Zone #	6	South Zone

Pk Hr	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In					10%							
Y	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
AM Out												
PM In	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%
PM Out	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Pk Hr	T Gen	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
AM In	119	0	0	0	0	12	0	0	0	0	0	0	0
AM Out	19	0	2	0	0	0	0	0	0	0	0	0	0
PM In	22	0	0	0	0	2	0	0	0	0	0	0	0
PM Out	116	0	12	0	0	0	0	0	0	0	0	0	0

APPENDIX E

INTERSECTION ANALYSIS WORKSHEETS

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	985	15	8	1858	7	12	2	12	3	2	3
Future Vol, veh/h	13	985	15	8	1858	7	12	2	12	3	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	95	-	40	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	1071	16	9	2020	8	13	2	13	3	2	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2028	0	0	1087	0	0	1934	3153	544	2495	3153	1010
Stage 1	-	-	-	-	-	-	1107	1107	-	2038	2038	-
Stage 2	-	-	-	-	-	-	827	2046	-	457	1115	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	121	-	-	355	-	-	70	11	414	31	11	204
Stage 1	-	-	-	-	-	-	168	284	-	36	99	-
Stage 2	-	-	-	-	-	-	301	98	-	505	282	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	121	-	-	355	-	-	50	9	414	22	9	204
Mov Cap-2 Maneuver	-	-	-	-	-	-	50	9	-	22	9	-
Stage 1	-	-	-	-	-	-	149	251	-	32	97	-
Stage 2	-	-	-	-	-	-	282	96	-	429	249	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	133.2	266.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	53	121	-	-	355	-	-	21
HCM Lane V/C Ratio	0.533	0.117	-	-	0.024	-	-	0.414
HCM Control Delay (s)	133.2	38.6	-	-	15.4	-	-	266.7
HCM Lane LOS	F	E	-	-	C	-	-	F
HCM 95th %tile Q(veh)	2.1	0.4	-	-	0.1	-	-	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	604	261	147	1239	127	274	427	56	112	992	267
Future Volume (veh/h)	153	604	261	147	1239	127	274	427	56	112	992	267
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	166	657	284	160	1347	138	298	464	61	122	1078	290
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	198	1397	434	215	1422	441	319	1523	679	149	1185	528
Arrive On Green	0.06	0.27	0.27	0.06	0.28	0.28	0.18	0.43	0.43	0.08	0.33	0.33
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	166	657	284	160	1347	138	298	464	61	122	1078	290
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.6	12.7	18.8	5.4	30.6	8.2	19.5	10.2	2.7	8.0	34.4	17.7
Cycle Q Clear(g_c), s	5.6	12.7	18.8	5.4	30.6	8.2	19.5	10.2	2.7	8.0	34.4	17.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	1397	434	215	1422	441	319	1523	679	149	1185	528
V/C Ratio(X)	0.84	0.47	0.65	0.74	0.95	0.31	0.94	0.30	0.09	0.82	0.91	0.55
Avail Cap(c_a), veh/h	198	1397	434	233	1422	441	319	1523	679	238	1230	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	35.9	38.1	54.6	41.9	33.8	48.0	22.3	20.1	53.4	37.8	32.2
Incr Delay (d2), s/veh	25.7	1.1	7.5	11.2	14.2	1.8	33.9	0.1	0.1	11.3	10.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	5.3	8.1	2.6	14.3	3.3	11.5	4.2	1.0	4.0	16.2	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.0	37.0	45.6	65.8	56.1	35.6	81.8	22.4	20.2	64.7	47.8	33.3
LnGrp LOS	F	D	D	E	E	D	F	C	C	E	D	C
Approach Vol, veh/h		1107			1645			823			1490	
Approach Delay, s/veh		45.8			55.3			43.7			46.3	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.9	36.9	25.7	44.0	11.3	37.5	14.4	55.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.0	31.8	21.2	41.0	6.8	33.0	15.8	46.4
Max Q Clear Time (g_c+I1), s	7.4	20.8	21.5	36.4	7.6	32.6	10.0	12.2
Green Ext Time (p_c), s	0.0	4.0	0.0	3.1	0.0	0.3	0.1	3.4

Intersection Summary		
HCM 6th Ctrl Delay		48.7
HCM 6th LOS		D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	26	18	678	1366	15
Future Volume (veh/h)	17	26	18	678	1366	15
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	28	20	737	1485	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	28	43	352	2912	2951	32
Arrive On Green	0.04	0.04	0.82	0.82	0.82	0.82
Sat Flow, veh/h	636	989	350	3647	3695	39
Grp Volume(v), veh/h	47	0	20	737	732	769
Grp Sat Flow(s),veh/h/ln	1661	0	350	1777	1777	1863
Q Serve(g_s), s	1.8	0.0	1.2	3.1	8.3	8.3
Cycle Q Clear(g_c), s	1.8	0.0	9.6	3.1	8.3	8.3
Prop In Lane	0.38	0.60	1.00			0.02
Lane Grp Cap(c), veh/h	73	0	352	2912	1456	1527
V/C Ratio(X)	0.65	0.00	0.06	0.25	0.50	0.50
Avail Cap(c_a), veh/h	684	0	352	2912	1456	1527
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	0.0	3.3	1.4	1.8	1.8
Incr Delay (d2), s/veh	9.2	0.0	0.3	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.1	0.3	0.6	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.2	0.0	3.6	1.6	2.1	2.1
LnGrp LOS	D	A	A	A	A	A
Approach Vol, veh/h	47			757	1501	
Approach Delay, s/veh	40.2			1.6	2.1	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		58.4		7.4		58.4
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		53.9		27.1		53.9
Max Q Clear Time (g_c+I1), s		11.6		3.8		10.3
Green Ext Time (p_c), s		6.6		0.1		15.9

Intersection Summary			
HCM 6th Ctrl Delay			2.7
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	2179	19	21	1106	13	6	0	23	0	0	8
Future Vol, veh/h	18	2179	19	21	1106	13	6	0	23	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	95	-	40	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	2368	21	23	1202	14	7	0	25	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1216	0	0	2389	0	0	2946	3681	1195	2235	3677	601
Stage 1	-	-	-	-	-	-	2419	2419	-	1248	1248	-
Stage 2	-	-	-	-	-	-	527	1262	-	987	2429	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	307	-	-	79	-	-	16	5	153	45	5	380
Stage 1	-	-	-	-	-	-	19	63	-	133	243	-
Stage 2	-	-	-	-	-	-	459	239	-	240	62	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	307	-	-	79	-	-	12	3	153	28	3	380
Mov Cap-2 Maneuver	-	-	-	-	-	-	12	3	-	28	3	-
Stage 1	-	-	-	-	-	-	18	59	-	124	172	-
Stage 2	-	-	-	-	-	-	318	169	-	188	58	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	190.1	14.7
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	45	307	-	-	79	-	-	380
HCM Lane V/C Ratio	0.7	0.064	-	-	0.289	-	-	0.023
HCM Control Delay (s)	190.1	17.5	-	-	68.1	-	-	14.7
HCM Lane LOS	F	C	-	-	F	-	-	B
HCM 95th %tile Q(veh)	2.7	0.2	-	-	1.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	1561	339	139	715	161	273	853	153	174	709	119
Future Volume (veh/h)	268	1561	339	139	715	161	273	853	153	174	709	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	291	1697	368	151	777	175	297	927	166	189	771	129
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	301	1778	552	174	1590	494	286	1113	496	220	982	438
Arrive On Green	0.09	0.35	0.35	0.05	0.31	0.31	0.16	0.31	0.31	0.12	0.28	0.28
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	291	1697	368	151	777	175	297	927	166	189	771	129
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	9.2	35.4	21.5	4.7	13.5	9.3	17.5	26.5	8.8	11.4	21.9	7.0
Cycle Q Clear(g_c), s	9.2	35.4	21.5	4.7	13.5	9.3	17.5	26.5	8.8	11.4	21.9	7.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	301	1778	552	174	1590	494	286	1113	496	220	982	438
V/C Ratio(X)	0.97	0.95	0.67	0.87	0.49	0.35	1.04	0.83	0.33	0.86	0.79	0.29
Avail Cap(c_a), veh/h	301	1778	552	174	1590	494	286	1361	607	273	1335	595
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.7	34.7	30.2	51.5	30.5	29.1	45.8	34.8	28.8	46.9	36.5	31.1
Incr Delay (d2), s/veh	43.0	13.0	6.3	34.0	1.1	2.0	64.0	3.8	0.4	19.9	2.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	16.0	8.9	2.8	5.5	3.8	12.7	11.7	3.3	6.2	9.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.6	47.8	36.5	85.5	31.6	31.1	109.9	38.7	29.1	66.8	38.7	31.5
LnGrp LOS	F	D	D	F	C	C	F	D	C	E	D	C
Approach Vol, veh/h		2356			1103			1390			1089	
Approach Delay, s/veh		51.5			38.9			52.7			42.7	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	42.5	22.0	34.7	14.0	38.5	18.0	38.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	38.0	17.5	41.0	9.5	34.0	16.7	41.8
Max Q Clear Time (g_c+I1), s	6.7	37.4	19.5	23.9	11.2	15.5	13.4	28.5
Green Ext Time (p_c), s	0.0	0.5	0.0	5.3	0.0	5.5	0.2	5.7

Intersection Summary		
HCM 6th Ctrl Delay		47.9
HCM 6th LOS		D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	18	38	1245	1036	16
Future Volume (veh/h)	16	18	38	1245	1036	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	20	41	1353	1126	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	29	34	476	2930	2954	45
Arrive On Green	0.04	0.04	0.82	0.82	0.82	0.82
Sat Flow, veh/h	749	881	492	3647	3677	54
Grp Volume(v), veh/h	38	0	41	1353	558	585
Grp Sat Flow(s),veh/h/ln	1674	0	492	1777	1777	1861
Q Serve(g_s), s	1.5	0.0	1.5	7.1	5.3	5.3
Cycle Q Clear(g_c), s	1.5	0.0	6.8	7.1	5.3	5.3
Prop In Lane	0.45	0.53	1.00			0.03
Lane Grp Cap(c), veh/h	64	0	476	2930	1465	1534
V/C Ratio(X)	0.60	0.00	0.09	0.46	0.38	0.38
Avail Cap(c_a), veh/h	690	0	476	2930	1465	1534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	0.0	2.3	1.6	1.5	1.5
Incr Delay (d2), s/veh	8.6	0.0	0.4	0.5	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.1	0.5	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.6	0.0	2.7	2.2	1.6	1.6
LnGrp LOS	D	A	A	A	A	A
Approach Vol, veh/h	38			1394	1143	
Approach Delay, s/veh	39.6			2.2	1.6	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		58.5		7.0		58.5
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		54.0		27.0		54.0
Max Q Clear Time (g_c+I1), s		9.1		3.5		7.3
Green Ext Time (p_c), s		15.8		0.1		10.1

Intersection Summary			
HCM 6th Ctrl Delay			2.5
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	1008	15	8	1895	7	12	2	12	3	2	3
Future Vol, veh/h	13	1008	15	8	1895	7	12	2	12	3	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	95	-	40	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	1096	16	9	2060	8	13	2	13	3	2	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2068	0	0	1112	0	0	1975	3218	556	2545	3218	1030
Stage 1	-	-	-	-	-	-	1132	1132	-	2078	2078	-
Stage 2	-	-	-	-	-	-	843	2086	-	467	1140	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	115	-	-	345	-	-	66	10	406	29	10	198
Stage 1	-	-	-	-	-	-	161	276	-	34	94	-
Stage 2	-	-	-	-	-	-	294	93	-	499	274	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	115	-	-	345	-	-	47	9	406	20	9	198
Mov Cap-2 Maneuver	-	-	-	-	-	-	47	9	-	20	9	-
Stage 1	-	-	-	-	-	-	141	242	-	30	92	-
Stage 2	-	-	-	-	-	-	275	91	-	420	241	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	141.6	266.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	51	115	-	-	345	-	-	21
HCM Lane V/C Ratio	0.554	0.123	-	-	0.025	-	-	0.414
HCM Control Delay (s)	141.6	40.6	-	-	15.7	-	-	266.7
HCM Lane LOS	F	E	-	-	C	-	-	F
HCM 95th %tile Q(veh)	2.1	0.4	-	-	0.1	-	-	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	615	269	149	1261	129	279	435	57	114	1019	276
Future Volume (veh/h)	157	615	269	149	1261	129	279	435	57	114	1019	276
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	171	668	292	162	1371	140	303	473	62	124	1108	300
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	1445	449	197	1449	450	307	1506	672	151	1196	534
Arrive On Green	0.06	0.28	0.28	0.06	0.28	0.28	0.17	0.42	0.42	0.08	0.34	0.34
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	171	668	292	162	1371	140	303	473	62	124	1108	300
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	5.9	12.9	19.3	5.5	31.3	8.3	20.2	10.5	2.8	8.2	35.8	18.4
Cycle Q Clear(g_c), s	5.9	12.9	19.3	5.5	31.3	8.3	20.2	10.5	2.8	8.2	35.8	18.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	194	1445	449	197	1449	450	307	1506	672	151	1196	534
V/C Ratio(X)	0.88	0.46	0.65	0.82	0.95	0.31	0.99	0.31	0.09	0.82	0.93	0.56
Avail Cap(c_a), veh/h	194	1445	449	197	1449	450	307	1506	672	238	1223	546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.8	35.2	37.5	55.5	41.8	33.5	49.2	22.8	20.6	53.6	38.1	32.3
Incr Delay (d2), s/veh	33.8	1.1	7.2	23.3	13.9	1.8	48.0	0.1	0.1	11.8	11.9	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	5.4	8.3	3.0	14.6	3.4	13.0	4.4	1.0	4.1	17.1	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.6	36.3	44.7	78.9	55.6	35.3	97.2	22.9	20.6	65.4	49.9	33.6
LnGrp LOS	F	D	D	E	E	D	F	C	C	E	D	C
Approach Vol, veh/h		1131			1673			838			1532	
Approach Delay, s/veh		46.5			56.2			49.6			48.0	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.3	38.2	25.0	44.6	11.2	38.3	14.6	55.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.8	33.7	20.5	41.0	6.7	33.8	15.9	45.6				
Max Q Clear Time (g_c+I1), s	7.5	21.3	22.2	37.8	7.9	33.3	10.2	12.5				
Green Ext Time (p_c), s	0.0	4.3	0.0	2.3	0.0	0.4	0.1	3.5				
Intersection Summary												
HCM 6th Ctrl Delay			50.6									
HCM 6th LOS			D									

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	26	18	690	1398	15
Future Volume (veh/h)	17	26	18	690	1398	15
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	28	20	750	1520	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	28	43	342	2912	2952	31
Arrive On Green	0.04	0.04	0.82	0.82	0.82	0.82
Sat Flow, veh/h	636	989	338	3647	3696	38
Grp Volume(v), veh/h	47	0	20	750	749	787
Grp Sat Flow(s),veh/h/ln	1661	0	338	1777	1777	1864
Q Serve(g_s), s	1.8	0.0	1.3	3.2	8.7	8.7
Cycle Q Clear(g_c), s	1.8	0.0	10.0	3.2	8.7	8.7
Prop In Lane	0.38	0.60	1.00			0.02
Lane Grp Cap(c), veh/h	73	0	342	2912	1456	1527
V/C Ratio(X)	0.65	0.00	0.06	0.26	0.51	0.52
Avail Cap(c_a), veh/h	684	0	342	2912	1456	1527
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	0.0	3.4	1.4	1.9	1.9
Incr Delay (d2), s/veh	9.2	0.0	0.3	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.1	0.3	0.6	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.2	0.0	3.7	1.6	2.2	2.2
LnGrp LOS	D	A	A	A	A	A
Approach Vol, veh/h	47			770	1536	
Approach Delay, s/veh	40.2			1.6	2.2	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		58.4		7.4		58.4
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		53.9		27.1		53.9
Max Q Clear Time (g_c+I1), s		12.0		3.8		10.7
Green Ext Time (p_c), s		6.8		0.1		16.6

Intersection Summary			
HCM 6th Ctrl Delay			2.7
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	2226	19	21	1137	13	6	0	23	0	0	8
Future Vol, veh/h	18	2226	19	21	1137	13	6	0	23	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	95	-	40	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	2420	21	23	1236	14	7	0	25	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1250	0	0	2441	0	0	3011	3767	1221	2290	3763	618
Stage 1	-	-	-	-	-	-	2471	2471	-	1282	1282	-
Stage 2	-	-	-	-	-	-	540	1296	-	1008	2481	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	296	-	-	74	-	-	14	4	147	42	4	370
Stage 1	-	-	-	-	-	-	17	59	-	126	234	-
Stage 2	-	-	-	-	-	-	450	231	-	232	58	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	296	-	-	74	-	-	10	3	147	25	3	370
Mov Cap-2 Maneuver	-	-	-	-	-	-	10	3	-	25	3	-
Stage 1	-	-	-	-	-	-	16	55	-	117	161	-
Stage 2	-	-	-	-	-	-	303	159	-	180	54	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	253.3	15
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	38	296	-	-	74	-	-	370
HCM Lane V/C Ratio	0.83	0.066	-	-	0.308	-	-	0.024
HCM Control Delay (s)	253.3	18	-	-	74	-	-	15
HCM Lane LOS	F	C	-	-	F	-	-	C
HCM 95th %tile Q(veh)	3.1	0.2	-	-	1.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	277	1591	346	141	732	163	281	878	155	177	722	125
Future Volume (veh/h)	277	1591	346	141	732	163	281	878	155	177	722	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	301	1729	376	153	796	177	305	954	168	192	785	136
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	329	1757	545	172	1526	474	282	1131	504	222	1012	451
Arrive On Green	0.10	0.34	0.34	0.05	0.30	0.30	0.16	0.32	0.32	0.12	0.28	0.28
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	301	1729	376	153	796	177	305	954	168	192	785	136
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	9.5	37.1	22.5	4.9	14.3	9.7	17.5	27.6	8.9	11.7	22.4	7.4
Cycle Q Clear(g_c), s	9.5	37.1	22.5	4.9	14.3	9.7	17.5	27.6	8.9	11.7	22.4	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	1757	545	172	1526	474	282	1131	504	222	1012	451
V/C Ratio(X)	0.92	0.98	0.69	0.89	0.52	0.37	1.08	0.84	0.33	0.86	0.78	0.30
Avail Cap(c_a), veh/h	329	1757	545	172	1526	474	282	1339	597	273	1319	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.5	35.9	31.1	52.2	32.2	30.6	46.5	35.1	28.7	47.4	36.3	30.9
Incr Delay (d2), s/veh	29.3	18.0	7.0	38.9	1.3	2.3	76.7	4.4	0.4	20.5	2.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	17.5	9.4	3.0	5.9	4.0	13.6	12.3	3.4	6.4	9.8	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.8	54.0	38.1	91.1	33.4	32.8	123.2	39.5	29.1	67.9	38.5	31.3
LnGrp LOS	E	D	D	F	C	C	F	D	C	E	D	C
Approach Vol, veh/h		2406			1126			1427			1113	
Approach Delay, s/veh		54.6			41.2			56.2			42.7	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	42.5	22.0	35.9	15.0	37.5	18.3	39.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	38.0	17.5	41.0	10.5	33.0	16.9	41.6
Max Q Clear Time (g_c+I1), s	6.9	39.1	19.5	24.4	11.5	16.3	13.7	29.6
Green Ext Time (p_c), s	0.0	0.0	0.0	5.3	0.0	5.4	0.2	5.5

Intersection Summary	
HCM 6th Ctrl Delay	50.3
HCM 6th LOS	D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	18	39	1276	1054	16
Future Volume (veh/h)	16	18	39	1276	1054	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	20	42	1387	1146	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	29	34	468	2930	2955	44
Arrive On Green	0.04	0.04	0.82	0.82	0.82	0.82
Sat Flow, veh/h	749	881	483	3647	3678	53
Grp Volume(v), veh/h	38	0	42	1387	568	595
Grp Sat Flow(s),veh/h/ln	1674	0	483	1777	1777	1861
Q Serve(g_s), s	1.5	0.0	1.6	7.4	5.4	5.4
Cycle Q Clear(g_c), s	1.5	0.0	7.0	7.4	5.4	5.4
Prop In Lane	0.45	0.53	1.00			0.03
Lane Grp Cap(c), veh/h	64	0	468	2930	1465	1534
V/C Ratio(X)	0.60	0.00	0.09	0.47	0.39	0.39
Avail Cap(c_a), veh/h	690	0	468	2930	1465	1534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	0.0	2.4	1.7	1.5	1.5
Incr Delay (d2), s/veh	8.6	0.0	0.4	0.6	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.1	0.6	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.6	0.0	2.8	2.2	1.7	1.6
LnGrp LOS	D	A	A	A	A	A
Approach Vol, veh/h	38			1429	1163	
Approach Delay, s/veh	39.6			2.2	1.6	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		58.5		7.0		58.5
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		54.0		27.0		54.0
Max Q Clear Time (g_c+I1), s		9.4		3.5		7.4
Green Ext Time (p_c), s		16.4		0.1		10.4

Intersection Summary				
HCM 6th Ctrl Delay			2.5	
HCM 6th LOS			A	

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	1016	15	32	1903	7	12	2	12	3	2	3
Future Vol, veh/h	13	1016	15	32	1903	7	12	2	12	3	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	95	-	40	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	1104	16	35	2068	8	13	2	13	3	2	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2076	0	0	1120	0	0	2038	3286	560	2609	3286	1034
Stage 1	-	-	-	-	-	-	1140	1140	-	2138	2138	-
Stage 2	-	-	-	-	-	-	898	2146	-	471	1148	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	114	-	-	342	-	-	60	9	404	26	9	197
Stage 1	-	-	-	-	-	-	159	274	-	30	88	-
Stage 2	-	-	-	-	-	-	272	87	-	496	272	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	114	-	-	342	-	-	38	7	404	16	7	197
Mov Cap-2 Maneuver	-	-	-	-	-	-	38	7	-	16	7	-
Stage 1	-	-	-	-	-	-	139	240	-	26	79	-
Stage 2	-	-	-	-	-	-	234	78	-	417	239	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	202.1	$ 383.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	41	114	-	-	342	-	-	16
HCM Lane V/C Ratio	0.689	0.124	-	-	0.102	-	-	0.543
HCM Control Delay (s)	202.1	41	-	-	16.7	-	-	$ 383.4
HCM Lane LOS	F	E	-	-	C	-	-	F
HCM 95th %tile Q(veh)	2.6	0.4	-	-	0.3	-	-	1.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	623	277	149	1269	129	287	435	57	114	1019	276
Future Volume (veh/h)	173	623	277	149	1269	129	287	435	57	114	1019	276
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	188	677	301	162	1379	140	312	473	62	124	1108	300
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	194	1445	449	197	1449	450	307	1506	672	151	1196	534
Arrive On Green	0.06	0.28	0.28	0.06	0.28	0.28	0.17	0.42	0.42	0.08	0.34	0.34
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	188	677	301	162	1379	140	312	473	62	124	1108	300
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	6.5	13.1	20.0	5.5	31.6	8.3	20.5	10.5	2.8	8.2	35.8	18.4
Cycle Q Clear(g_c), s	6.5	13.1	20.0	5.5	31.6	8.3	20.5	10.5	2.8	8.2	35.8	18.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	194	1445	449	197	1449	450	307	1506	672	151	1196	534
V/C Ratio(X)	0.97	0.47	0.67	0.82	0.95	0.31	1.02	0.31	0.09	0.82	0.93	0.56
Avail Cap(c_a), veh/h	194	1445	449	197	1449	450	307	1506	672	238	1223	546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	35.3	37.8	55.5	41.8	33.5	49.3	22.8	20.6	53.6	38.1	32.3
Incr Delay (d2), s/veh	54.8	1.1	7.8	23.3	14.6	1.8	55.9	0.1	0.1	11.8	11.9	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	5.4	8.6	3.0	14.8	3.4	13.8	4.4	1.0	4.1	17.1	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.9	36.4	45.6	78.9	56.4	35.3	105.2	22.9	20.6	65.4	49.9	33.6
LnGrp LOS	F	D	D	E	E	D	F	C	C	E	D	C
Approach Vol, veh/h		1166			1681			847			1532	
Approach Delay, s/veh		50.8			56.8			53.1			48.0	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	38.2	25.0	44.6	11.2	38.3	14.6	55.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	33.7	20.5	41.0	6.7	33.8	15.9	45.6
Max Q Clear Time (g_c+I1), s	7.5	22.0	22.5	37.8	8.5	33.6	10.2	12.5
Green Ext Time (p_c), s	0.0	4.2	0.0	2.3	0.0	0.2	0.1	3.5

Intersection Summary	
HCM 6th Ctrl Delay	52.3
HCM 6th LOS	D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	26	18	698	1406	15
Future Volume (veh/h)	17	26	18	698	1406	15
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	28	20	759	1528	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	28	43	340	2912	2952	31
Arrive On Green	0.04	0.04	0.82	0.82	0.82	0.82
Sat Flow, veh/h	636	989	335	3647	3696	38
Grp Volume(v), veh/h	47	0	20	759	753	791
Grp Sat Flow(s),veh/h/ln	1661	0	335	1777	1777	1864
Q Serve(g_s), s	1.8	0.0	1.3	3.2	8.7	8.8
Cycle Q Clear(g_c), s	1.8	0.0	10.1	3.2	8.7	8.8
Prop In Lane	0.38	0.60	1.00			0.02
Lane Grp Cap(c), veh/h	73	0	340	2912	1456	1527
V/C Ratio(X)	0.65	0.00	0.06	0.26	0.52	0.52
Avail Cap(c_a), veh/h	684	0	340	2912	1456	1527
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	0.0	3.4	1.4	1.9	1.9
Incr Delay (d2), s/veh	9.2	0.0	0.3	0.2	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.1	0.3	0.7	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.2	0.0	3.8	1.6	2.2	2.2
LnGrp LOS	D	A	A	A	A	A
Approach Vol, veh/h	47			779	1544	
Approach Delay, s/veh	40.2			1.6	2.2	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		58.4		7.4		58.4
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		53.9		27.1		53.9
Max Q Clear Time (g_c+I1), s		12.1		3.8		10.8
Green Ext Time (p_c), s		6.9		0.1		16.7

Intersection Summary			
HCM 6th Ctrl Delay			2.8
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	2235	19	49	1146	13	6	0	23	0	0	8
Future Vol, veh/h	18	2235	19	49	1146	13	6	0	23	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	95	-	40	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	2429	21	53	1246	14	7	0	25	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1260	0	0	2450	0	0	3084	3846	1225	2364	3842	623
Stage 1	-	-	-	-	-	-	2480	2480	-	1352	1352	-
Stage 2	-	-	-	-	-	-	604	1366	-	1012	2490	-
Critical Hdwy	5.34	-	-	5.34	-	-	6.44	6.54	7.14	6.44	6.54	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.34	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	3.12	-	-	3.82	4.02	3.92	3.82	4.02	3.92
Pot Cap-1 Maneuver	293	-	-	73	-	-	13	4	146	37	4	368
Stage 1	-	-	-	-	-	-	17	58	-	113	217	-
Stage 2	-	-	-	-	-	-	412	213	-	231	58	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	293	-	-	73	-	-	~ 5	1	146	12	1	368
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 5	1	-	12	1	-
Stage 1	-	-	-	-	-	-	16	54	-	105	59	-
Stage 2	-	-	-	-	-	-	110	58	-	178	54	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	5.5	$ 647.6	15
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	21	293	-	-	73	-	-	368
HCM Lane V/C Ratio	1.501	0.067	-	-	0.73	-	-	0.024
HCM Control Delay (s)	$ 647.6	18.2	-	-	134.5	-	-	15
HCM Lane LOS	F	C	-	-	F	-	-	C
HCM 95th %tile Q(veh)	4.2	0.2	-	-	3.4	-	-	0.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
2: Del Amo Blvd & Long Beach Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	296	1600	355	141	741	163	290	878	155	177	722	125
Future Volume (veh/h)	296	1600	355	141	741	163	290	878	155	177	722	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	322	1739	386	153	805	177	315	954	168	192	785	136
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	380	1769	549	171	1461	453	272	1129	503	222	1028	458
Arrive On Green	0.11	0.35	0.35	0.05	0.29	0.29	0.15	0.32	0.32	0.12	0.29	0.29
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	322	1739	386	153	805	177	315	954	168	192	785	136
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	10.2	37.5	23.4	4.9	14.9	10.0	17.0	27.8	9.0	11.8	22.4	7.4
Cycle Q Clear(g_c), s	10.2	37.5	23.4	4.9	14.9	10.0	17.0	27.8	9.0	11.8	22.4	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	380	1769	549	171	1461	453	272	1129	503	222	1028	458
V/C Ratio(X)	0.85	0.98	0.70	0.89	0.55	0.39	1.16	0.85	0.33	0.87	0.76	0.30
Avail Cap(c_a), veh/h	389	1769	549	171	1461	453	272	1330	593	263	1311	585
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.6	36.0	31.4	52.5	33.6	31.9	47.1	35.4	28.9	47.7	36.0	30.7
Incr Delay (d2), s/veh	15.7	17.8	7.4	40.3	1.5	2.5	103.5	4.6	0.4	22.0	2.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	17.7	9.8	3.0	6.2	4.1	15.2	12.4	3.4	6.5	9.8	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.3	53.8	38.7	92.9	35.1	34.4	150.5	39.9	29.3	69.8	38.1	31.1
LnGrp LOS	E	D	D	F	D	C	F	D	C	E	D	C
Approach Vol, veh/h		2447			1135			1437			1113	
Approach Delay, s/veh		52.8			42.8			62.9			42.7	
Approach LOS		D			D			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	43.0	21.5	36.6	16.7	36.3	18.3	39.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	38.5	17.0	41.0	12.5	31.5	16.4	41.6				
Max Q Clear Time (g_c+I1), s	6.9	39.5	19.0	24.4	12.2	16.9	13.8	29.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	5.3	0.0	5.1	0.1	5.5				
Intersection Summary												
HCM 6th Ctrl Delay			51.5									
HCM 6th LOS			D									

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	18	39	1285	1063	16
Future Volume (veh/h)	16	18	39	1285	1063	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1870	1870	1870
Adj Flow Rate, veh/h	17	20	42	1397	1155	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	29	34	465	2930	2956	43
Arrive On Green	0.04	0.04	0.82	0.82	0.82	0.82
Sat Flow, veh/h	749	881	479	3647	3678	53
Grp Volume(v), veh/h	38	0	42	1397	572	600
Grp Sat Flow(s),veh/h/ln	1674	0	479	1777	1777	1861
Q Serve(g_s), s	1.5	0.0	1.6	7.4	5.5	5.5
Cycle Q Clear(g_c), s	1.5	0.0	7.1	7.4	5.5	5.5
Prop In Lane	0.45	0.53	1.00			0.03
Lane Grp Cap(c), veh/h	64	0	465	2930	1465	1534
V/C Ratio(X)	0.60	0.00	0.09	0.48	0.39	0.39
Avail Cap(c_a), veh/h	690	0	465	2930	1465	1534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	0.0	2.4	1.7	1.5	1.5
Incr Delay (d2), s/veh	8.6	0.0	0.4	0.6	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.1	0.6	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.6	0.0	2.8	2.2	1.7	1.7
LnGrp LOS	D	A	A	A	A	A
Approach Vol, veh/h	38			1439	1172	
Approach Delay, s/veh	39.6			2.2	1.7	
Approach LOS	D			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		58.5		7.0		58.5
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		54.0		27.0		54.0
Max Q Clear Time (g_c+I1), s		9.4		3.5		7.5
Green Ext Time (p_c), s		16.6		0.1		10.5
Intersection Summary						
HCM 6th Ctrl Delay			2.5			
HCM 6th LOS			A			

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	166	657	284	160	1347	138	298	464	61	122	1078	290
v/c Ratio	0.85	0.48	0.47	0.70	0.96	0.26	0.95	0.32	0.09	0.64	0.91	0.45
Control Delay	90.5	38.3	10.2	71.0	58.1	7.0	88.2	25.4	1.8	65.9	49.5	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.5	38.3	10.2	71.0	58.1	7.0	88.2	25.4	1.8	65.9	49.5	14.6
Queue Length 50th (ft)	67	157	26	63	377	1	231	127	0	91	413	66
Queue Length 95th (ft)	#130	198	102	#110	#478	50	#407	175	11	154	#536	146
Internal Link Dist (ft)		870			702			406			729	
Turn Bay Length (ft)	225		100	145		100	205		60	190		
Base Capacity (vph)	196	1358	598	230	1410	536	315	1437	699	235	1219	656
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.48	0.47	0.70	0.96	0.26	0.95	0.32	0.09	0.52	0.88	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	46	20	737	1501
v/c Ratio	0.26	0.08	0.24	0.49
Control Delay	20.1	2.9	1.9	3.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.1	2.9	1.9	3.0
Queue Length 50th (ft)	7	1	31	87
Queue Length 95th (ft)	35	7	54	147
Internal Link Dist (ft)	416		729	235
Turn Bay Length (ft)		145		
Base Capacity (vph)	654	250	3047	3041
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.07	0.08	0.24	0.49

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	291	1697	368	151	777	175	297	927	166	189	771	129
v/c Ratio	1.07	1.05	0.62	0.96	0.54	0.32	1.15	0.73	0.27	0.82	0.64	0.21
Control Delay	127.5	78.1	27.3	119.7	38.0	12.1	148.7	38.1	13.5	77.7	36.2	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.5	78.1	27.3	119.7	38.0	12.1	148.7	38.1	13.5	77.7	36.2	5.5
Queue Length 50th (ft)	~128	~526	157	61	186	26	~271	331	37	143	263	0
Queue Length 95th (ft)	#220	#623	264	#130	230	84	#448	410	90	#256	331	42
Internal Link Dist (ft)		870			702			406			729	
Turn Bay Length (ft)	225		100	145		100	205		60	190		
Base Capacity (vph)	271	1610	590	157	1440	540	258	1263	626	246	1209	625
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	1.05	0.62	0.96	0.54	0.32	1.15	0.73	0.27	0.77	0.64	0.21

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	37	41	1353	1143
v/c Ratio	0.22	0.10	0.42	0.36
Control Delay	21.4	2.3	2.1	1.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	2.3	2.1	1.8
Queue Length 50th (ft)	7	0	0	0
Queue Length 95th (ft)	32	10	120	92
Internal Link Dist (ft)	416		729	235
Turn Bay Length (ft)		145		
Base Capacity (vph)	647	409	3207	3202
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.06	0.10	0.42	0.36

Intersection Summary

Queues
2: Del Amo Blvd & Long Beach Blvd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	171	668	292	162	1371	140	303	473	62	124	1108	300
v/c Ratio	0.89	0.47	0.47	0.83	0.95	0.26	1.00	0.33	0.09	0.64	0.93	0.47
Control Delay	97.9	36.8	9.5	88.1	57.2	7.1	101.3	26.0	1.9	66.1	51.7	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	97.9	36.8	9.5	88.1	57.2	7.1	101.3	26.0	1.9	66.1	51.7	16.5
Queue Length 50th (ft)	69	157	25	65	383	2	~238	132	0	93	430	79
Queue Length 95th (ft)	#136	197	100	#126	#483	51	#424	181	12	155	#562	162
Internal Link Dist (ft)		870			702			406			729	
Turn Bay Length (ft)	225		100	145		100	205		60	190		
Base Capacity (vph)	192	1435	625	195	1439	545	303	1418	691	235	1215	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.47	0.47	0.83	0.95	0.26	1.00	0.33	0.09	0.53	0.91	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	46	20	750	1536
v/c Ratio	0.26	0.08	0.25	0.51
Control Delay	20.1	3.0	2.0	3.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.1	3.0	2.0	3.1
Queue Length 50th (ft)	7	1	32	91
Queue Length 95th (ft)	35	7	55	153
Internal Link Dist (ft)	416		729	235
Turn Bay Length (ft)		145		
Base Capacity (vph)	654	239	3047	3041
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.07	0.08	0.25	0.51

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	301	1729	376	153	796	177	305	954	168	192	785	136
v/c Ratio	0.96	1.02	0.61	0.93	0.54	0.32	1.13	0.83	0.28	0.81	0.72	0.23
Control Delay	93.3	65.9	26.3	109.0	36.8	11.4	137.8	42.7	8.5	73.9	39.2	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.3	65.9	26.3	109.0	36.8	11.4	137.8	42.7	8.5	73.9	39.2	5.7
Queue Length 50th (ft)	120	~534	160	61	191	23	~278	345	16	143	269	0
Queue Length 95th (ft)	#216	#642	274	#132	239	82	#463	427	66	#259	337	43
Internal Link Dist (ft)		870			702			406			729	
Turn Bay Length (ft)	225		100	145		100	205		60	190		
Base Capacity (vph)	315	1693	614	165	1470	554	271	1290	663	262	1271	655
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	1.02	0.61	0.93	0.54	0.32	1.13	0.74	0.25	0.73	0.62	0.21

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	37	42	1387	1163
v/c Ratio	0.22	0.11	0.43	0.36
Control Delay	21.4	2.3	2.1	1.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	2.3	2.1	1.8
Queue Length 50th (ft)	7	0	0	0
Queue Length 95th (ft)	32	11	124	94
Internal Link Dist (ft)	416		729	235
Turn Bay Length (ft)		145		
Base Capacity (vph)	647	399	3207	3202
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.06	0.11	0.43	0.36

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	188	677	301	162	1379	140	312	473	62	124	1108	300
v/c Ratio	0.98	0.47	0.48	0.83	0.96	0.26	1.03	0.33	0.09	0.64	0.93	0.47
Control Delay	116.4	36.9	9.8	88.1	58.1	7.1	108.0	26.0	1.9	66.1	51.7	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.4	36.9	9.8	88.1	58.1	7.1	108.0	26.0	1.9	66.1	51.7	16.7
Queue Length 50th (ft)	76	159	28	65	386	2	~259	132	0	93	430	81
Queue Length 95th (ft)	#153	199	105	#126	#488	51	#440	181	12	155	#562	163
Internal Link Dist (ft)		870			702			406			729	
Turn Bay Length (ft)	225		100	145		100	205		60	190		
Base Capacity (vph)	192	1435	628	195	1439	545	303	1418	691	235	1215	646
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.47	0.48	0.83	0.96	0.26	1.03	0.33	0.09	0.53	0.91	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	46	20	759	1544
v/c Ratio	0.26	0.08	0.25	0.51
Control Delay	20.1	3.0	2.0	3.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.1	3.0	2.0	3.1
Queue Length 50th (ft)	7	1	32	92
Queue Length 95th (ft)	35	7	56	155
Internal Link Dist (ft)	416		729	235
Turn Bay Length (ft)		145		
Base Capacity (vph)	654	237	3047	3041
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.07	0.08	0.25	0.51

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	322	1739	386	153	805	177	315	954	168	192	785	136
v/c Ratio	0.86	1.01	0.62	0.93	0.57	0.33	1.21	0.83	0.28	0.82	0.72	0.23
Control Delay	74.2	62.4	26.2	111.0	38.4	11.8	165.6	43.5	8.6	76.5	39.3	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.2	62.4	26.2	111.0	38.4	11.8	165.6	43.5	8.6	76.5	39.3	5.6
Queue Length 50th (ft)	128	~533	165	61	198	24	~303	348	17	145	271	0
Queue Length 95th (ft)	#214	#640	280	#132	246	84	#491	430	66	#266	340	44
Internal Link Dist (ft)		870			702			406			729	
Turn Bay Length (ft)	225		100	145		100	205		60	190		
Base Capacity (vph)	373	1725	625	164	1415	538	261	1281	659	252	1262	652
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	1.01	0.62	0.93	0.57	0.33	1.21	0.74	0.25	0.76	0.62	0.21

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	37	42	1397	1172
v/c Ratio	0.22	0.11	0.44	0.37
Control Delay	21.4	2.4	2.1	1.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	2.4	2.1	1.8
Queue Length 50th (ft)	7	0	0	0
Queue Length 95th (ft)	32	11	125	95
Internal Link Dist (ft)	416		729	235
Turn Bay Length (ft)		145		
Base Capacity (vph)	647	395	3207	3202
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.06	0.11	0.44	0.37

Intersection Summary

APPENDIX F

DRIVE-THROUGH QUEUING DATA

Prepared by National Data & Surveying Services

Queue Movement Study

Project#: 21-020035-001
Location: 76 Car Wash Drive Thru at 4294 University Pkwy
City: San Bernardino, CA
Day: Saturday
Date: 2/6/2021

Interval	Drive Thru Lane Queue	Remarks
1:39:40 PM	1	
1:40:34 PM	0	
1:42:08 PM	1	
1:42:24 PM	2	
1:42:49 PM	1	
1:43:34 PM	2	
1:44:00 PM	1	
1:45:27 PM	0	
1:46:05 PM	1	
1:47:11 PM	2	
1:47:18 PM	3	
1:47:59 PM	2	
1:48:11 PM	3	
1:48:53 PM	2	
1:49:59 PM	1	
1:51:06 PM	0	
1:57:43 PM	1	
1:58:32 PM	2	
1:58:35 PM	1	
TOTAL	*782*	

Attachment I

5005 Long Beach Boulevard Project

Air Quality and Greenhouse Gas Study

prepared for

A & S Engineering
28405 Sand Canyon Road, Suite B
Canyon Country, California 91387
Contact: Ahmad Ghaderi

prepared by

Rincon Consultants, Inc.
250 East 1st Street, Suite 1400
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June 2021

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1 Project Description and Impact Summary

1.1 Introduction

This study analyzes the potential air quality and greenhouse gas (GHG) impacts of the proposed 5005 Long Beach Boulevard project (herein referred to as “proposed project” or “project”) in Long Beach, California. Rincon Consultants, Inc. (Rincon) prepared this study under contract to A & S Engineering for the City of Long Beach to use in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to analyze the project’s air quality and GHG impacts related to both temporary construction activity and long-term operation of the project. The conclusions of this study are summarized in Table 1, followed by the Regulatory Compliance Measures (RCMs) required for the project.

Table 1 Summary of Impacts

Impact Statement	Proposed Project’s Level of Significance	Applicable RCMs
Air Quality		
Conflict with or obstruct implementation of the applicable air quality plan?	Less than significant impact	None
Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?	Less than significant impact	RCM-1 and RCM-3 through RCM-5
Expose sensitive receptors to substantial pollutant concentrations?	Less than significant impact	None
Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	Less than significant impact	RCM-2
Greenhouse Gas Emissions		
Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?	Less than significant impact	None
Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?	Less than significant impact	None

Regulatory Compliance Measures

RCMs are existing requirements and reasonably anticipated standard conditions that are based on local, State, or federal regulations and laws that are frequently required independently of CEQA review and serve to offset or prevent specific impacts. RCMs are not included as mitigation measures in the environmental clearance document because the project is required to comply with RCMs through State and local regulations.

RCM-1 Demolition, Grading, and Construction Activities: Compliance with Provisions of SCAQMD Rule 403

The project shall comply with all applicable standards of the Southern California Air Quality Management District (SCAQMD), including the following provisions of Rule 403:

- All unpaved demolition and construction areas shall be wetted at least twice daily during excavation and construction, and temporary dust covers shall be used to reduce dust emissions and meet SCAQMD Rule 403. Wetting could reduce fugitive dust by as much as 50 percent.
- The construction area shall be kept sufficiently dampened to control dust caused by grading and hauling, and at all times provide reasonable control of dust caused by wind.
- All clearing, earth moving, or excavation activities shall be discontinued during periods of high winds (i.e., greater than 15 mph), in order to prevent excessive amounts of dust.
- All dirt/soil shall be secured by trimming, watering, or other appropriate means to prevent spillage and dust.
- All dirt/soil materials transported off-site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- General contractors shall maintain and operate construction equipment to minimize exhaust emissions.
- Trucks having no current hauling activity shall not idle but be turned off.

RCM-2 Odors: Compliance with Provisions of SCAQMD Rule 402

The project shall comply with the following provision of SCAQMD Rule 402: a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

RCM-3 Engine Idling

In accordance with Section 2485 of Title 13 of the California Code of Regulations, the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds) during construction shall be limited to five minutes at any location.

RCM-4 Emission Standards

In accordance with Section 93115 of Title 17 of the California Code of Regulations, operation of any stationary, diesel-fueled, compression-ignition engines shall meet specified fuel and fuel additive requirements and emission standards.

RCM-5 Architectural Coatings: Compliance with SCAQMD Rule 1113

The project shall comply with SCAQMD Rule 1113 limiting the volatile organic compound (VOC) content of architectural coatings.

1.2 Project Summary

Project Location

The 0.46-acre project site (Assessor Parcel Number [APN] 7132-028-019) is located in the City of Long Beach at 5005 Long Beach Boulevard (see Figure 1 and Figure 2). The project site is zoned Community Commercial Automobile-Oriented (CCA) with a General Plan Land Use designation of Neighborhood Serving Center or Corridor Moderate Density (NSC-L) within the Long Beach 2040 Plan Area. The project site is currently an existing food mart and gas station with a parking lot area.

See Figure 1 and Figure 2 for the project site location in a regional context and local context, respectively.

The surrounding area is a mixture of commercial and residential uses. Interstate 710 (I-710) is located approximately 0.6 mile west of the project site. The properties to the north are zoned CCA and consists of Dooley Elementary School. The property to the west is a dine in restaurant also zoned CCA. Residences are located further to the west, at an approximate distance of 400 feet from the project site and are zoned Multi-Family Residential/Townhouse (R-3-T). Commercial properties to the south across Del Amo Boulevard are zoned CCA and are developed with one-gas station and food mart. Single-family residences to the south across Del Amo Boulevard are zoned R-3-T. The properties to the east are zoned Community R-3-N Commercial (CCN) and are developed with mixed retail. Del Amo Gardens retirement home is located approximately 450 feet east of the project site and is zoned Moderate-density Multiple Residential (R-4-R).

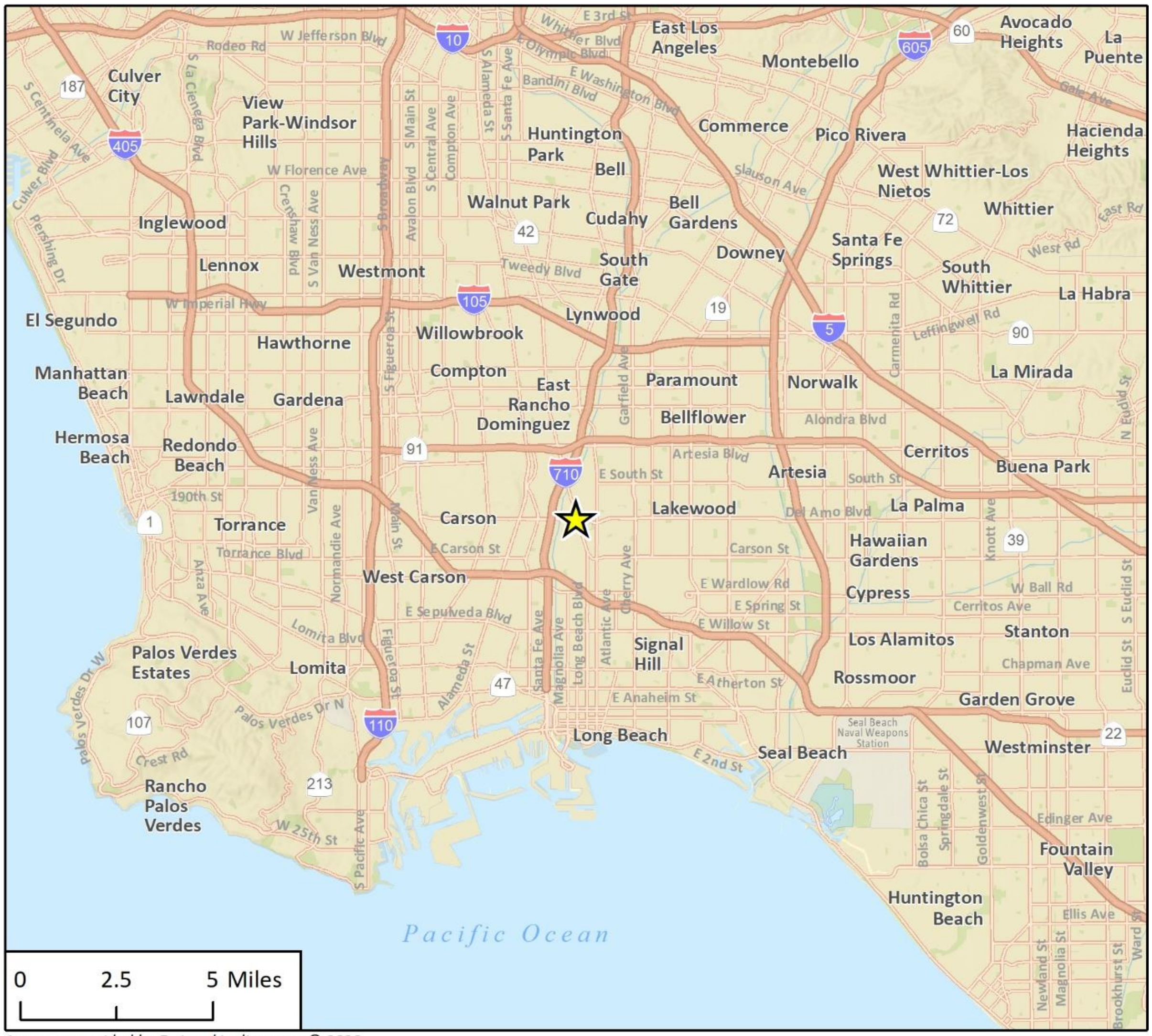
Project Description

The project site is located at 5005 Long Beach Boulevard in the City of Long Beach, near the Long Beach Boulevard and Del Amo Boulevard intersection. The project includes a Conditional Use Permit to construct and operate a new 3,058-square-foot detached self-service automated car wash (2,000-square-foot care wash tunnel and 1,058 square feet of equipment rooms and office space) and 15 vacuum parking spaces to an existing food mart and gas station along the north property line (see Figure 3). The project would not use emergency back-up generators. The express car wash would use a conveyer system to move multiple vehicles at once. The queue line for the car wash would be able to handle eight vehicles.

Construction

For the purposes of this analysis, project construction is assumed to commence in September 2021. Construction activities are assumed to occur five days a week.

Figure 1 Regional Location Map



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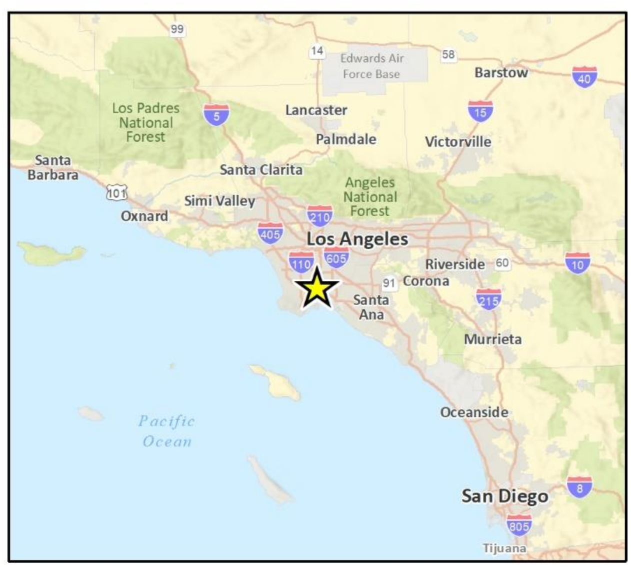
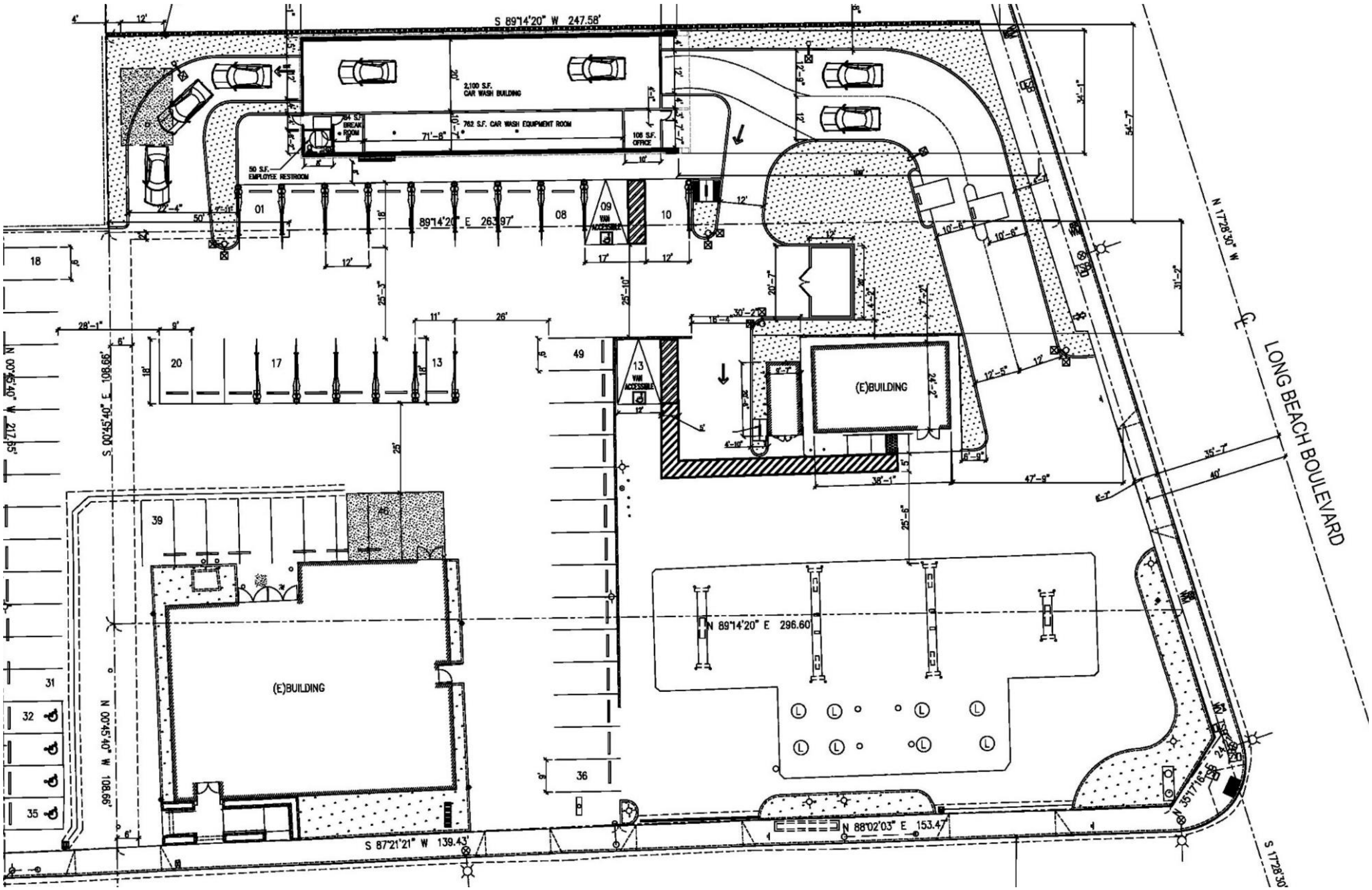


Fig 1 Regional Location

Figure 2 Project Site Location

Imagery provided by Microsoft Bing and its licensors © 2020.

Figure 3 Site Plan



2 Air Quality

2.1 Environmental and Regulatory Setting

Local Climate and Meteorology

The project site is in the South Coast Air Basin (SCAB), which is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The regional climate in the SCAB is semi-arid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. The air quality in the SCAB is primarily influenced by meteorology and a wide range of emission sources, such as dense population centers, substantial vehicular traffic, and industry.

Air pollutant emissions in the SCAB are generated primarily by stationary and mobile sources. Stationary sources can be divided into two major subcategories: point and area sources. Point sources occur at a specific location and are often identified by an exhaust vent or stack. Examples include boilers or combustion equipment that produce electricity or generate heat. Area sources are widely distributed and include such sources as residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and some consumer products. Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and are classified as either on-road or off-road. On-road sources may be legally operated on roadways and highways. Off-road sources include aircraft, ships, trains, and self-propelled construction equipment. Air pollutants can also be generated by the natural environment, such as when high winds suspend fine dust particles.

Figure 4 shows the typical wind direction in the Long Beach area. As shown in the figure, the primary wind direction is from the northwest, as evidenced by the purple tails of the wind speed (15 to 20 miles per hour) from the northwest. This indicates that the wind would, on average, blow pollutants away from the car wash to the southeast away from Dooley Elementary School.

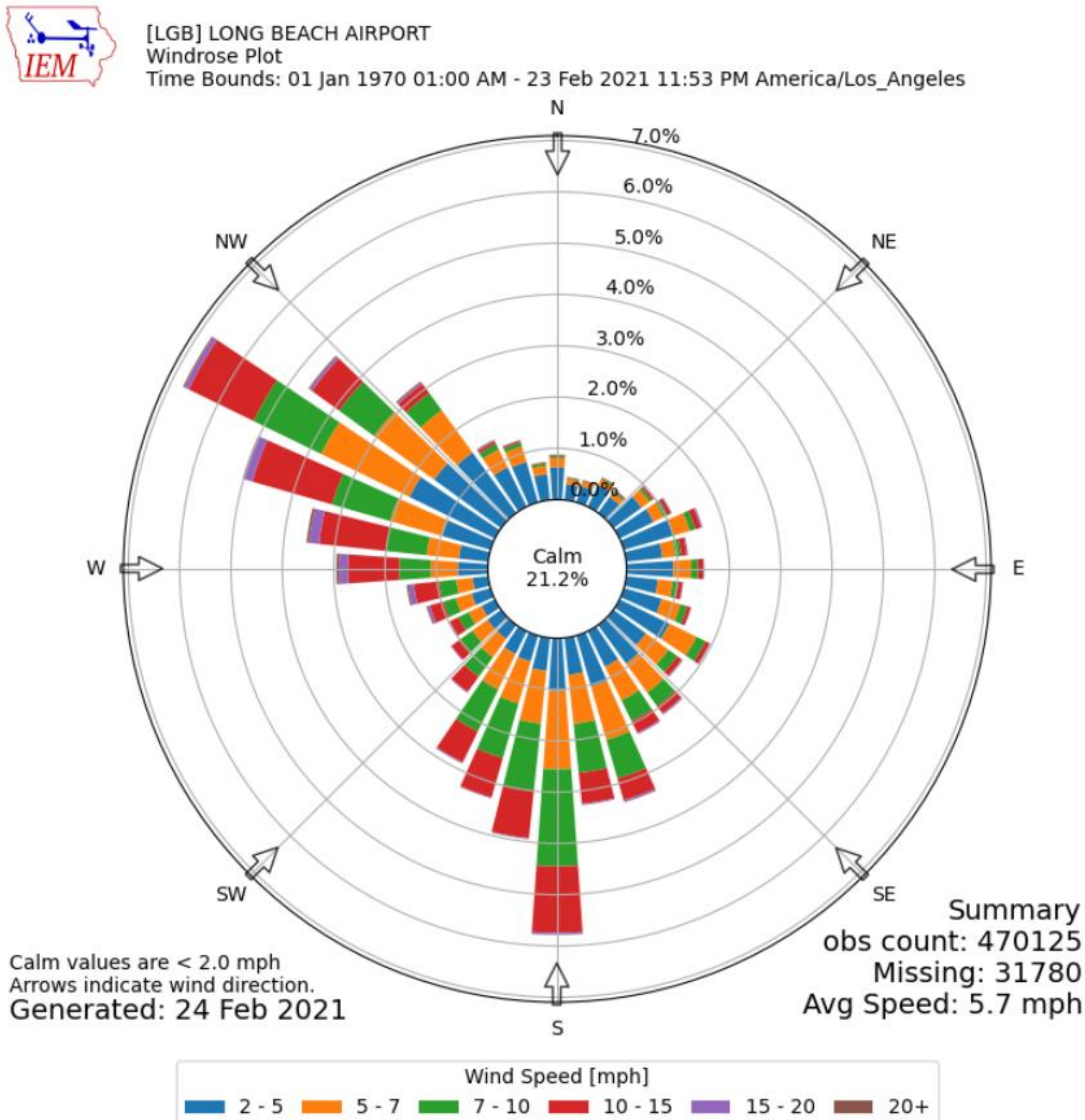


Figure 4. Long Beach Airport Windrose Plot.
Source: Iowa Environmental Mesonet 2021

Air Quality Regulation

Federal and California Clean Air Acts

The federal and state governments have established ambient air quality standards for the protection of public health. The United States Environmental Protection Agency (USEPA) is the federal agency designated to administer air quality regulation, while the California Air Resources Board (CARB) is the state equivalent within the California Environmental Protection Agency (CalEPA). County-level air districts provide local management of air quality. CARB has established air quality standards and is responsible for the control of mobile emission sources, while the local air districts are responsible for enforcing standards and regulating stationary sources. CARB has established 15 air basins statewide, including the SCAB.

The USEPA has set primary national ambient air quality standards (NAAQS) for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter with diameters of up to ten microns (PM_{10}) and up to 2.5 microns ($PM_{2.5}$), and lead. Primary standards are those levels of air quality deemed necessary, with an adequate margin of safety, to protect public health. In addition, California has established health-based ambient air quality standards (known as the California ambient air quality standards [CAAQS]) for these and other pollutants, some of which are more stringent than the federal standards. Table 2 lists the current federal and state standards for regulated pollutants.

Table 2 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standards
Ozone	1-Hour	–	0.09 ppm
	8-Hour	0.070 ppm	0.070 ppm
CO	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
NO_2	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
SO_2	Annual	.030 ppm	–
	24-Hour	0.14 ppm	0.04 ppm
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	–	20 $\mu g/m^3$
	24-Hour	150 $\mu g/m^3$	50 $\mu g/m^3$
$PM_{2.5}$	Annual	12 $\mu g/m^3$	12 $\mu g/m^3$
	24-Hour	35 $\mu g/m^3$	–
Lead	30-Day Average	–	1.5 $\mu g/m^3$
	3-Month Average	0.15 $\mu g/m^3$	–
Visibility Reducing Particles	8-Hour	–	Extinction of 0.23 per kilometer
Sulfates	24-Hour	–	25 $\mu g/m^3$
Hydrogen Sulfide	1-Hour	–	0.03 ppm (42 $\mu g/m^3$)
Vinyl Chloride	24-Hour	–	0.01 ppm (26 $\mu g/m^3$)

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

Source: CARB 2016

SCAQMD is the designated air quality control agency in the SCAB, which is a non-attainment area for the federal standards for ozone and $PM_{2.5}$ and the state standards for ozone, PM_{10}, and $PM_{2.5}$. The Los Angeles County portion of the SCAB is also designated non-attainment for lead (SCAQMD 2016). The SCAB is designated unclassifiable or in attainment for all other federal and state standards.

Safer Affordable Fuel-Efficient Vehicles Rule

On September 27, 2019, the USEPA and the National Highway Safety Administration published the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program. The Part One Rule revokes California's authority to set its own GHG emissions standards and zero-emission vehicle mandates in California. To account for the effects of the Part One Rule, CARB released off-model adjustment factors on November 20, 2019 to adjust criteria air pollutant emissions outputs from the EMFAC model. These off-model adjustment factors are to be applied by multiplying the emissions calculated for light- and medium-duty vehicles by the adjustment factor. With the incorporation of these adjustment factors, operational emissions generated by light-duty automobiles, light-duty trucks, and medium-duty trucks associated with project-related vehicle trips at the year 2021, would be approximately 0.01 percent greater for ROG, 0.09 percent greater for particulate matter, 0.02 percent greater for NO_X, and 0.05 percent greater for CO. These increases would have a negligible impact on overall operational emissions generated by the project and would not alter the significance of the project's operational emissions as discussed further below.

Air Pollutants of Primary Concern

Primary criteria pollutants are emitted directly from a source (e.g., vehicle tailpipe, an exhaust stack of a factory, etc.) into the atmosphere. Primary criteria pollutants include CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2, and lead. Ozone is considered a secondary criteria pollutant because it is created by atmospheric chemical and photochemical reactions between reactive organic gases (ROG) and nitrogen oxides (NO_X). The following subsections describe the characteristics, sources, and health and atmospheric effects of critical air contaminants.

Ozone

Ozone is produced by a photochemical reaction (triggered by sunlight) between NO_X and ROG.[1] Nitrogen oxides are formed during the combustion of fuels, while ROG are formed during combustion and evaporation of organic solvents. Because ozone requires sunlight to form, it usually occurs in substantial concentrations between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Carbon Monoxide

Carbon monoxide is a local pollutant that is found in high concentrations only near fuel combustion equipment and other sources of CO. The primary source of CO, a colorless, odorless, poisonous gas, is automobile traffic. Therefore, elevated concentrations are usually only found near areas of high traffic volumes. Carbon monoxide's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulty in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

[1] CARB defines VOC and ROG similarly as, "any compound of carbon excluding CO, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate," with the exception that VOC are compounds that participate in atmospheric photochemical reactions (CARB 2009). For the purposes of this analysis, ROG and VOC are considered comparable in terms of mass emissions and the term ROG is used in this report.). SCAQMD uses the term VOC to denote organic precursors.

Nitrogen Dioxide

Nitrogen dioxide is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. Nitrogen dioxide is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Nitrogen dioxide absorbs blue light, gives a reddish-brown cast to the atmosphere, and reduces visibility. It can also contribute to the formation of ozone/smog and acid rain.

Sulfur Dioxide

Sulfur dioxide is a colorless, pungent, irritating gas formed primarily by the combustion of sulfur-containing fossil fuels. When SO_2 oxidizes in the atmosphere, it forms sulfur trioxide. Collectively, these pollutants are referred to as sulfur oxides (SO_X). In humid atmospheres, SO_2 can also form sulfuric acid mist, which can eventually react to produce sulfate particulates that can inhibit visibility. Combustion of high sulfur-content fuels is the major source of SO_2, while chemical plants, sulfur recovery plants, and metal processing are minor contributors. At sufficiently high concentrations, SO_2 irritates the upper respiratory tract. At lower concentrations, when in conjunction with particulates, SO_2 appears to do still greater harm by injuring lung tissues. This compound also constricts the breathing passages, especially in people with asthma and people involved in moderate to heavy exercise. Sulfur dioxide causes respiratory irritation, including wheezing, shortness of breath, and coughing. Long-term SO_2 exposure has been associated with increased risk of mortality from respiratory or cardiovascular disease. Sulfur oxides, in combination with moisture and oxygen, can yellow leaves on plants, dissolve marble, and eat away iron and steel.

Suspended Particulates

Atmospheric particulate matter is comprised of finely divided solids and liquids such as dust, soot, aerosols, fumes, and mists. The particulates that are of particular concern are PM_{10} (small particulate matter that measures no more than 10 microns in diameter) and $PM_{2.5}$ (fine particulate matter that measures no more than 2.5 microns in diameter). The characteristics, sources, and potential health effects associated with PM_{10} and $PM_{2.5}$ can be different. Major man-made sources of PM_{10} are agricultural operations, industrial processes, combustion of fossil fuels, construction, demolition operations, and entrainment of road dust into the atmosphere. Natural sources include windblown dust, wildfire smoke, and sea spray salt. The finer $PM_{2.5}$ particulates are generally associated with combustion processes as well as formation in the atmosphere as a secondary pollutant through chemical reactions. $PM_{2.5}$ is more likely to penetrate deeply into the lungs and poses a serious health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine particulate matter that is inhaled into the lungs remains there, which can cause permanent lung damage. These materials can damage health by interfering with the body’s mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

Lead

Lead is a metal found naturally in the environment, as well as in manufacturing products. Lead occurs in the atmosphere as particulate matter. The major sources of lead emissions historically have been mobile and industrial sources. In the early 1970s, the USEPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The USEPA completed the ban prohibiting the use of leaded gasoline in highway vehicles in December 1995. As a result of the USEPA's regulatory efforts to remove lead from gasoline, atmospheric lead concentrations have declined substantially over the past several decades. The most dramatic reductions in lead emissions occurred prior to 1990 due to the removal of lead from gasoline sold for most highway vehicles. Lead emissions were further reduced substantially between 1990 and 2008, with reductions occurring in the metals industries in part due to national emissions standards for hazardous air pollutants (USEPA 2013). As a result of phasing out leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in the air are generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers. Lead may cause a range of health effects, including anemia, kidney disease, and neuromuscular and neurological dysfunction (in severe cases). The proposed project does not include any stationary sources of lead emissions. Therefore, implementation of the project would not result in substantial emissions of lead, and this pollutant is not discussed further in this analysis.

Toxic Air Contaminants

Toxic air contaminants (TACs) are a diverse group of air pollutants that may cause or contribute to an increase in deaths or serious illness or that may pose a present or potential hazard to human health. TACs include both organic and inorganic chemical substances that may be emitted from a variety of common sources, including gasoline stations, motor vehicles, dry cleaners, industrial operations, painting operations, and research and teaching facilities. One of the main sources of TACs in California is diesel engines that emit exhaust containing solid material known as diesel particulate matter (DPM; CARB 2011). TACs are different than the criteria pollutants previously discussed because ambient air quality standards have not been established for TACs. TACs occurring at extremely low levels may still cause health effects, and it is typically difficult to identify levels of exposure that do not produce adverse health effects. TAC impacts are described by carcinogenic risk and by chronic (i.e., of long duration) and acute (i.e., severe but of short duration) adverse effects on human health.

Current Air Quality

The project site is located within the 90th percentile or top 10 percent for the most pollution burdened, as outlined in Map LU-6 of the City's updated Land Use Element (City of Long Beach 2019a). This map is derived from the California Office of Environmental Health Hazard Assessment's Cal EnviroScreen which uses environmental, health, and socioeconomic information to assess the pollution burden and vulnerability of populations by census tract.

The SCAQMD operates a network of air quality monitoring stations throughout the SCAB. The purpose of the monitoring stations is to measure ambient concentrations of pollutants and to determine whether ambient air quality meets the NAAQS and CAAQS. The monitoring station closest to the project is the Long Beach - Route 710 Near Road station located at the off and on-ramp of Interstate 710 onto Long Beach Boulevard, approximately 1.1 miles west of the project site. This station reports monitoring data for NO_2 and $PM_{2.5}$, but not ozone and PM_{10}. Therefore, ozone and PM_{10} concentrations were obtained from the next closest station with available data, which is the Long Beach – 2425 Webster Street Station monitoring station located approximately 3.5 miles southwest of the project site. Table 3 indicates the number of days that the NAAQS and CAAQS has been exceeded at these stations in each of the last three years. The data indicate that the state PM_{10} standards were exceeded each year from 2017 to 2019 and federal standards were exceeded in 2019, and the federal $PM_{2.5}$ was exceeded in 2017 and 2019. No other state or federal standards were exceeded at this monitoring station.

Table 3 Ambient Air Quality at the Nearest Monitoring Stations

Pollutant	2017	2018	2019
Ozone (ppm), Eight-Hour Average[1]	0.068	0.063	0.064
Number of days of state exceedances (>0.070 ppm)	0	0	0
Number of days of federal exceedances (>0.070 ppm)	0	0	0
Ozone (ppm), Worst Hour[1]	0.082	0.074	0.075
Number of days of state exceedances (>0.09 ppm)	0	0	0
Nitrogen Dioxide (ppm), Worst Hour[2]	0.116	0.0903	0.0977
Number of days of state exceedances (>0.18 ppm)	0	0	0
Particulate Matter <10 microns (μg/m^3), Worst 24 Hours[1]	79.0	84.0	155.8
Number of days of state exceedances (>50 μg/m^3)	10	4	4
Number of days of federal exceedances (>150 μg/m^3)	0	0	1
Particulate Matter <2.5 microns (μg/m^3), Worst 24 Hours[2]	85.4	103.8	36.7
Number of days of federal exceedances (>35 μg/m^3)	8	9	1

[1] Data obtained from the Long Beach – 2425 Webster Street.

[2] Data obtained from the Long Beach – Route 710 Near Road

Source: CARB 2020a

Air Quality Management Plan

Under state law, the SCAQMD is required to prepare a plan for air quality improvement for pollutants for which its jurisdiction is in non-compliance. The SCAQMD updates the plan every three years. Each iteration of the SCAQMD's Air Quality Management Plan (AQMP) is an update of the previous plan and has a 20-year horizon. The latest AQMP, the 2016 AQMP, was adopted on March 3, 2017. It incorporates new scientific data and notable regulatory actions that have occurred since adoption of the 2012 AQMP, including the approval of the new federal eight-hour ozone standard of 0.070 ppm that was finalized in 2015. The Final 2016 AQMP addresses several state and federal planning requirements and incorporates new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and meteorological air quality models. The Southern California Association of Governments' (SCAG) projections for socio-economic data (e.g., population, housing, employment by industry) and transportation activities from the 2016 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) are integrated into the 2016 AQMP. The 2016 AQMP builds upon the approaches taken in the 2012 AQMP for the attainment of federal PM and ozone standards and highlights the significant amount of reductions to be achieved. It emphasizes the need for interagency planning to identify additional strategies to achieve reductions within the timeframes allowed under the federal Clean Air Act, especially in the area of mobile sources. The 2016 AQMP also includes a discussion of emerging issues and opportunities, such as fugitive toxic particulate emissions, zero-emission mobile source control strategies, and the interacting dynamics among climate, energy, and air pollution. The 2016 AQMP also demonstrates strategies for attainment of the new federal eight-hour ozone standard and vehicle miles travelled emissions offsets, pursuant to recent USEPA requirements (SCAQMD 2017).

Sensitive Receptors

Ambient air quality standards have been established to represent the levels of air quality considered sufficient, with a margin of safety, to protect public health and welfare. They are designed to protect that segment of the public most susceptible to respiratory distress, such as children under 14; the elderly over 65; people engaged in strenuous work or exercise; and people with cardiovascular and chronic respiratory diseases. Therefore, the majority of sensitive receptor locations are schools, hospitals, and residences. Sensitive receptors in the project vicinity include Dooley Elementary School located immediately north of the project site as well as single family residences located across Del Amo Boulevard, approximated 120 feet south of the project site.

2.2 Impact Analysis

This air quality analysis conforms to the methodologies recommended in the SCAQMD's *CEQA Air Quality Handbook* (1993) and supplemental guidance provided by the SCAQMD, including recommended thresholds for emissions associated with both construction and operation of the project (SCAQMD 2015).

Methodology

The project's construction and operational emissions were estimated using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. CalEEMod uses project-specific information, including the project's land uses, square footages for different uses (e.g., automobile care center, parking lot), and location, to estimate a project's construction and operational emissions.

Construction Emissions

Construction emissions modeled include emissions generated by construction equipment used on-site and emissions generated by vehicle trips associated with construction, such as worker and vendor trips. Emissions were modeled assuming construction of a 3,058 square-feet car wash and 15 parking spaces. Construction phases involved in the construction process are assumed to include site preparation, grading, building construction, paving, and architectural coating. For the purposes of this analysis, the start of construction was assumed to begin in September 2021.

No import or export of soil would be required as it would be balanced on site. Material export would include exporting the removed existing asphalt, which would occur over an approximate 0.46 acre. The existing asphalt surface was estimated to be 4 inches thick with a mass of 145 pounds per cubic foot (National Asphalt Pavement Association, n.d.), resulting in the export of 485 tons of debris. The site preparation phase default in CalEEMod was extended to one week from one day to account for export of debris.

Other details such as construction schedule (outside of the site preparation phase) and equipment use were based on CalEEMod defaults. Architectural coating phase was assumed to start halfway into building construction to account for coating as segments of the building are constructed. In addition, as detailed in Section 1, *Project Description and Impact Summary*, it was assumed that project construction would comply with all applicable regulatory standards, including SCAQMD Rule 403 (RCM-1 Fugitive Dust), SCAQMD Rule 402 (RCM-2 Odor Compliance), Section 2485 of Title 13 of the California Code of Regulations (RCM-3 Engine Idling), Section 93115 of Title 17 of the California Code of Regulations (RCM-4 Emission Standards) and Rule 1113 (RCM-5 Architectural Coatings).

Operational Emissions

CalEEMod does not contain a land use directly correlated to a car wash use; the project's car wash was attributed to the "Automobile Care Center" land use subtype, with mobile, energy, and water use modified for the unique characteristics of a car wash, as described below and in Section 3.2. Operational sources of criteria pollutant emissions include mobile source emissions (i.e., vehicle emissions), energy emissions, and area source emissions.

ENERGY SOURCES

Emissions from energy use include electricity and natural gas use. The emissions factors for natural gas combustion are based on USEPA's AP-42 (*Compilation of Air Pollutant Emissions Factors*) and California Climate Action Registry (CCAR) General Reporting Protocol (CCAR 2009). Electricity emissions only apply to GHG emissions (as the energy is generated off-site and therefore may not be relevant for local and regional air quality conditions) and are calculated by multiplying the energy use times the carbon intensity of the utility district per kilowatt hour (CAPCOA 2017). The default electricity consumption values in CalEEMod include the CEC-sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies. CalEEMod currently incorporates California's 2016 Title 24 building energy efficiency standards.

Data from professional car wash industry surveys and reports were used to estimate the energy requirements for the proposed car wash. The annual number of vehicles that would be washed for the project was estimated based on a 2015 industry survey, which reported an average of approximately 80,000 vehicles per year for exterior-only automated conveyor car washes (Professional Car Washing 2017). The energy requirements for the car wash were estimated using car wash industry survey cost averages of $0.50 per vehicle for electricity and $0.12 per vehicle for natural gas (Professional Car Washing 2014). The cost of $0.50 for electricity was converted to 4.69 kilowatt hours (kwh) per vehicle for electricity based on an average cost of $0.1066 per kwh for commercial customers in the U.S. in 2017 (U.S. Energy Information Administration [USEIA] 2018a) for a total annual electricity use of 375,200 kwh per year. The cost of $0.12 for natural gas was converted to 15.79 kilo-British Thermal Units (kBtu) per vehicle for natural gas based average cost of $7.88 per 1,000 cubic feet[2] for commercial customers in the U.S. in 2017 (USEIA 2018b) for a total annual natural gas use of 1,263,200 kBtu per year.

AREA SOURCES

Emissions associated with area sources, including consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from CARB, USEPA, and emission factor values provided by the local air district (CAPCOA 2017).

[2] For natural gas, 1,000 cubic feet = 1,037 kBtu

MOBILE SOURCES

Mobile source emissions consist of emissions generated by customers to the project site and vehicles using the car wash. According to the project's Traffic Impact Analysis (Kimley Horn 2021), the project would generate 738 trips per day.

ON-SITE EXHAUST EMISSIONS

Criteria pollutant emissions of CO, PM_{10}, $PM_{2.5}$, SO_2, and the ozone precursors ROG and NO_X, would occur from vehicles using the project site. Emissions from the vehicles of customers who utilize the car wash, including the queue, are running exhaust emissions, which occur as the user slowly moves through the car wash. Running exhaust emissions occur after the engine is warmed up and the emissions control system in the vehicle have reached full operating temperature. As the vehicles would be in operation the entire time while in queue or in the car wash (i.e., no engine start up or shut off), only emissions associated with a running engine are calculated.

Emission factors used to calculate running exhaust emissions were obtained from the California Air Resources Board's (CARB's) EMission FACtor 2017 database software (EMFAC2017). EMFAC2017 produces emissions factors for each mode of engine operations specific to various vehicle classes and emissions control technologies for a range of vehicle speeds, soak times, variable start times, and ambient temperatures. Inputs in EMFAC2017 included calendar year, the air district, vehicle model year, fuel types, and speeds. The flowing parameters were used to develop the emission factors:

Calendar Year: 2020
Air District: SCAQMD
Vehicle Model Years: All years aggregated
Fuel Type: All
Speeds: 5 miles per hour (mph) (the lowest speed available)

The vehicles would be idling for a portion of their time in the queue and while going through the car wash; therefore, idle time emissions for light-duty vehicles is incorporated into the running exhaust emissions by multiplying the emission factors by five per the EMFAC2017 Guidance manual.

The emission factors for the EMFAC2017 vehicle passenger vehicle categories (LDA, LDT1, LDT2, and MDV) were weighted according to the vehicle miles traveled (VMT) for each vehicle category, and after weighting were averaged to obtain one emission factor per pollutant. Emission factors are provided in grams per mile. Although vehicles would only travel approximately 350 feet through the queue and car wash at the project site, the emissions factors used were the most conservative, i.e. all vehicles are modeled at idle for the entire period. Emissions of air quality pollutants in this analysis are compared to the regional thresholds and LSTs.

According to the project applicant, it would take each vehicle approximately five minutes to use the car wash. Since the car wash can move multiple vehicles through at once, according to the project applicant the maximum queuing and carwash process time for a vehicle would be in the range of 6-10 minutes. For the calculations, it was conservatively assumed that each vehicle would be running on site for 10 minutes. According to the project's Traffic Impact Analysis (Kimley Horn 2021), the project would generate 738 trips per day. Therefore, it was assumed that 369 vehicles would pass through the car wash per day.

These exhaust emission factors were added to the CalEEMod emissions results to demonstrate the project's total emissions.

Significance Thresholds

To determine whether a project would result in a significant impact to air quality, Appendix G of the CEQA Guidelines requires consideration of whether a project would:

1. Conflict with or obstruct implementation of the applicable air quality plan
2. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard
3. Expose sensitive receptors to substantial pollutant concentrations
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people

Regional Significance Thresholds

The SCAQMD recommends quantitative regional significance thresholds for temporary construction activities and long-term project operation in the SCAB, shown in Table 4.

Table 4 SCAQMD Regional Significance Thresholds

Construction Thresholds	Operational Thresholds
75 pounds per day of VOC	55 pounds per day of VOC
100 pounds per day of NO_X	55 pounds per day of NO_X
550 pounds per day of CO	550 pounds per day of CO
150 pounds per day of SO_X	150 pounds per day of SO_X
150 pounds per day of PM_{10}	150 pounds per day of PM_{10}
55 pounds per day of $PM_{2.5}$	55 pounds per day of $PM_{2.5}$

Source: SCAQMD 2019

Localized Significance Thresholds

In addition to the above regional thresholds, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4), which was prepared to update the *CEQA Air Quality Handbook* (1993). LSTs were devised in response to concern regarding exposure of individuals to criteria pollutants in local communities and have been developed for NO_X, CO, PM_{10}, and $PM_{2.5}$. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or State ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), distance to the sensitive receptor, and project size. By taking into consideration ambient concentrations in each SRA, LSTs are able to account for the existing conditions of an area – if an area is more polluted than others, it will have stricter LSTs. The LST values in SRA-4, where the project is located, are some of the strictest in the entire SCAQMD region. For example, for the gradual conversion of NO_X to NO_2 during construction or operation on a 1-acre site, the limits are the 2nd strictest out of 38 SRAs, only behind SRA-12 (South Central LA County). SRA-4 also has the lowest possible thresholds of one pound per day for PM_{10} and $PM_{2.5}$.

LSTs have been developed for emissions generated in construction areas up to five acres in size. However, LSTs only apply to emissions in a fixed stationary location and are not applicable to mobile sources, such as cars on a roadway (SCAQMD 2008). As such, LSTs are typically applied only to construction emissions because the majority of operational emissions are associated with project-generated vehicle trips.

The SCAQMD provides LST lookup tables for project sites that measure one, two, or five acres. Operation of the car wash would occur on an area less than one acre in size; therefore, this analysis utilizes the one-acre LSTs. LSTs are provided for receptors at 82 to 1,640 feet from the project disturbance boundary to the sensitive receptors. Operational activity of the car wash and queue line would occur approximately 25 feet to 100 feet from the school to the north. According to the SCAQMD's publication, *Final LST Methodology*, projects with boundaries located closer than 82 feet to the nearest receptor should use the LSTs for receptors located at 82 feet. Therefore, the analysis below uses the LST values for 82 feet. In addition, as stated above, the project is in SRA-4 (South Coastal LA County). LSTs for operation in SRA-4 on a 1-acre site with a receptor 82 feet away are shown in Table 5.

Table 5 SCAQMD LSTs (SRA-4)

	Allowable Emissions for a 1-acre Site in SRA 4 for a Receptor 82 Feet Away (lbs/day)	
Pollutant	**Construction**	**Operation**
Gradual conversion of NO_X to NO_2	57	57
CO	585	585
PM_{10}	4	1
$PM_{2.5}$	3	1

Source: SCAQMD 2009

Project Impacts

Threshold 1	Would the project conflict with or obstruct implementation of the applicable air quality plan? **LESS THAN SIGNIFICANT**

A project may be inconsistent with the AQMP if it would generate population, housing, or employment growth exceeding the forecasts used in the development of the AQMP. The 2016 AQMP relies on local general plans and the demographic forecasts contained in the SCAG 2016 RTP/SCS in its own projections for managing air quality in the SCAB. As such, projects that propose development that is consistent with the growth anticipated by SCAG's growth projections and/or the General Plan would not conflict with the SCAQMD AQMP. In the event that a project would propose development that is less dense than anticipated by the growth projections, the project would likewise be consistent with the AQMP.

The employment growth forecasts in SCAG's 2016 RTP/SCS for the City estimate that the total number of jobs would increase from 153,200 in 2012 to 181,700 in 2040, for an increase of 28,500 jobs. The minor increase in employment anticipated from a car wash (i.e., several employees) would be within the SCAG's projected 2040 employment increase of 2,500 jobs and the project would not cause employment in the City to exceed official regional employment projections.

In addition, the AQMP provides strategies and measures to reach attainment with the thresholds for 8-hour and 1-hour ozone and $PM_{2.5}$. As shown in Table 6 and Table 7 below, the project would not generate criteria pollutant emissions that would exceed SCAQMD thresholds for ozone precursors

(ROG and NO_X) and $PM_{2.5}$. Since the project's employment would be within SCAG 2016 forecasts, the project would be consistent with the AQMP and impacts would be less than significant.

Threshold 2	Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard? **LESS THAN SIGNIFICANT**

Construction Impacts

Table 6 summarizes the estimated maximum daily emissions of pollutants associated with construction of the proposed project. As shown below, VOC, NO_X, CO, SO_2, PM_{10}, and $PM_{2.5}$ emissions would not exceed SCAQMD regional thresholds or LSTs. Because air pollutant emissions generated by project construction would not exceed SCAQMD's regional significance thresholds or LSTs, project construction would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment, and impacts would be less than significant.

Table 6 Project Construction Emissions

	Maximum Emissions (lbs./day)					
Year	**VOC**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Maximum Daily Emissions	6	10	8	<1	<1	<1
SCAQMD Regional Thresholds	75	100	550	150	150	55
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**
Maximum Daily On-site Emissions	6	8	8	<1	<1	<1
SCAQMD Localized Significance Thresholds (LSTs)	N/A	57	585	N/A	4	3
Threshold Exceeded?	**N/A**	**No**	**No**	**N/A**	**No**	**No**

Notes: All emissions modeling was completed using CalEEMod. See Appendix A for modeling results. Some numbers may not add up due to rounding. Emission data is pulled from "mitigated" results, which account for compliance with regulatory compliance measures. Emissions presented are the highest of the winter and summer modeled emissions. Maximum on-site emissions are the highest emissions that would occur on the project site from on-site sources such as heavy construction equipment and architectural coatings and excludes off-site emissions from sources such as construction worker vehicle trips and haul truck trips.

Operational Impacts

REGIONAL EMISSIONS

Table 7 summarizes the project's area, energy, and mobile operational emissions by emission source, as well as the project's on-site exhaust emissions with a 10-minute maximum trip and with 369 vehicles per day through the car wash, compared to regional standards. The majority of project-related operational emissions would result from vehicle trips to and from the site. As shown in Table 7, operational criteria pollutant emissions would not exceed SCAQMD regional thresholds for criteria pollutants. Therefore, the project would not contribute substantially to an existing or projected regional air quality violation, and impacts would be less than significant.

Table 7 Project Operational Emissions - Regional

	Maximum Daily Emissions (lbs./day)					
Emission Source	**VOC**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Area	<1	<1	<1	<1	<1	<1
Energy	<1	<1	<1	<1	<1	<1
Mobile	<1	4	8	<1	2	<1
On-site Exhaust	<1	<1	<1	<1	<1	<1
Total Project Emissions - Regional	**1**	**5**	**8**	**<1**	**2**	**<1**
SCAQMD Regional Thresholds	55	55	550	150	150	55
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Notes: Area, energy, and mobile emissions modeling was completed using CalEEMod; see Appendix A for modeling results. On-site exhaust emission calculations are included in Appendix B. Some numbers may not add up due to rounding. Emission data is pulled from “mitigated” results that include compliance with regulatory compliance measures. Emissions presented are the highest of the winter and summer modeled emissions.

LOCAL EMISSIONS

LSTs only apply to emissions in a fixed stationary location and are not applicable to mobile sources, such as cars on a roadway (SCAQMD 2008). Therefore, the project’s local operational emissions without off-site mobile emissions are shown in Table 8, which summarizes the project’s area and energy operational emissions, as well as the project’s on-site exhaust emissions with a 10-minute maximum trip and with 369 vehicles per day through the car wash. As shown in Table 8, operational criteria pollutant emissions would be well below the SCAQMD local thresholds for criteria pollutants. As a further example of the negligible emissions from the project’s operational use compared to SCAQMD LSTs, it would take approximately 375,000 vehicles using the car wash per day to result in PM_{10} criteria pollutant emissions that would exceed the SCAQMD LSTs for SRA-4. These emissions are so low compared to operational LSTs because these thresholds are developed to capture the most important contributors to local air quality concerns, such as warehouse uses with a substantial amount of heavy trucks in use or industrial point sources. Land uses such as a car wash that only have light-duty vehicle use result in negligible emissions as modern light-duty vehicles are relatively efficient in terms of the local criteria pollutants they generate compared to industrial sources or heavy-duty trucks.

Table 8 Project Operational Emissions - Local

	Maximum Daily Emissions (lbs./day)					
Emission Source	**VOC**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Area	0.0711	0.00002	0.00185	0	0.00001	0.00001
Energy	0.0357	0.3242	0.2724	0.00195	0.0246	0.0246
On-site Exhaust	0.010	0.012	0.162	0.001	0.001	0.001
Total Project Emissions - Local	**0.1168**	**0.33622**	**0.43625**	**0.00295**	**0.02561**	**0.02561**
SCAQMD Localized Significance Thresholds (LSTs)	N/A	57	585	N/A	1	1
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Notes: Area and energy emissions modeling was completed using CalEEMod; see Appendix A for modeling results. On-site exhaust emission calculations are included in Appendix B. Some numbers may not add up due to rounding. Emission data is pulled from "mitigated" results that include compliance with regulatory compliance measures. Emissions presented are the highest of the winter and summer modeled emissions.

Further reducing localized pollutants frorm the project site to nearby land uses (e.g., Dooley Elementary School) would be the nine-foot cinderblock wall at the northern property boundary. As this wall would be located at a higher height than the exhaust of any vehicle that would use the car wash, it would have the effect of blocking some pollutants that may be emitted by the project's users. In addition, as shown in Figure 4, the typical and strongest wind direction in the project area is from the northwest, which would typically blow pollutants away from the adjacent school and towards the southeast. Students at Dooley Elementary School using the playground facilities to the north of the project site would face much greater exposure from vehicles on Long Beach Boulevard, which contains tens of thousands of vehicles per day and is only separated from the playground by a chain-link fence, not a block wall like the project site.

Given the aforementioned, the project would not contribute substantially to an existing or projected local air quality violation, and would not have a substantial localized impact to nearby sensitive receptors (e.g., Dooley Elementary School) from criteria pollutant emissions. Impacts would be less than significant.

Cumulative Impacts

The cumulative context for air quality is regional. The SCAB is designated a nonattainment area for the federal and state one-hour and eight-hour ozone standards, the state PM_{10} standards, the federal 24-hour PM2.5 standard, and the federal and state annual $PM_{2.5}$ standard. SCAB is in attainment of all other federal and state standards. The project would contribute particulate matter and the ozone precursors ROG and NO_X to the area during construction and operation. As described above, regional emissions during construction would not violate an air quality standard or contribute substantially to an existing or projected air quality violation; and would be less than significant. With respect to localized impacts, the consideration of cumulative construction particulate matter impacts is limited to cases when projects constructed simultaneously are within a few hundred yards of each other because of: (1) the combination of the short range (distance) of particulate dispersion (especially when compared to gaseous pollutants); and (2) the SCAQMD's required dust control measures which further limit particulate dispersion from a project site.

Therefore, with the implementation of dust control measures, the unlikelihood that construction would occur within a few hundred yards of major off-site construction, and compliance with SCAQMD regional construction emission thresholds, the project would not contribute a cumulatively considerable amount of pollutants from construction emissions.

Threshold 3	Would the project expose sensitive receptors to substantial pollutant concentrations? **LESS THAN SIGNIFICANT**

Localized Carbon Monoxide Hotspot Impact

A CO hotspot is a localized concentration of CO that is above a CO ambient air quality standard. Localized CO hotspots can occur at intersections with heavy peak hour traffic. Specifically, hotspots can be created at intersections where traffic levels are sufficiently high such that the local CO concentration exceeds the federal one-hour standard of 35.0 parts per million (ppm) or the federal and state eight-hour standard of 9.0 ppm (CARB 2016).

The entire SCAB is in conformance with state and federal CO standards, and most air quality monitoring stations no longer report CO levels. No stations within the vicinity of the project site have monitored CO in the last eight years. In 2012, the Long Beach – 2425 Webster Street station detected an eight-hour maximum CO concentration of 2.6 ppm, which is substantially below the state and federal standard of 9.0 ppm (CARB 2020a). As shown in Table 6, maximum daily CO emissions generated by project construction would be 8 pounds, and maximum on-site emissions generated by project construction would be 8 pounds, which would not exceed SCAQMD's regional threshold (550 pounds per day) or LST (585 pounds per day) for CO. Likewise, as shown in Table 7, project operations from area, energy, and mobile emissions sources combined would result a net increase in maximum daily CO emissions of approximately 7 pounds. Both the SCAQMD's regional thresholds and LSTs are designed to be protective of public health. Based on the low background level of CO in the project area, ever-improving vehicle emissions standards for new cars in accordance with state and federal regulations, and the project's low level of operational CO emissions, the project would not create new CO hotspots. Therefore, the proposed project would not expose sensitive receptors to substantial CO concentrations, and localized air quality impacts related to CO hot spots would be less than significant.

Toxic Air Contaminants (TACs)

CONSTRUCTION IMPACTS

Construction-related activities would result in short-term, project-generated emissions of diesel particulate matter (DPM) exhaust emissions from off-road, heavy-duty diesel equipment for site preparation grading, building construction, and other construction activities. DPM was identified as a toxic air contaminant (TAC) by CARB in 1998. The potential cancer risk from the inhalation of DPM (discussed in the following paragraphs) outweighs the potential non-cancer health impacts (CARB 2017a).

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction of the proposed project would occur over approximately five years. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the OEHHA, health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period (assumed to be the approximate time that a person spends in a household). OEHHA recommends this risk be bracketed with 9-year and 70-year exposure periods. Health risk assessments should be limited to the period/duration of activities associated with the project.

The maximum $PM_{2.5}$ emissions, which is used to represent DPM emissions for this analysis, would occur during site preparation and grading activities. While site preparation and grading emissions represent the worst-case condition, such activities would only occur for approximately two weeks, less than two percent, one percent, and 0.2 percent of the typical health risk calculation period of 9 years, 30 years, and 70 years, respectively. $PM_{2.5}$ emissions would decrease for the remaining construction period because construction activities such as building construction and paving would require less construction equipment. Therefore, given the aforementioned, DPM generated by project construction is not expected to create conditions where the probability that the Maximally Exposed Individual would contract cancer is greater than 10 in one million or to generate ground-level concentrations of noncarcinogenic TACs that exceed a Hazard Index greater than one for the Maximally Exposed Individual. This impact would be less than significant.

OPERATIONAL IMPACTS

Sources of operational TAC's include, but are not limited to, land uses such as freeways and high-volume roadways, truck distribution centers, ports, rail yards, refineries, chrome plating facilities, dry cleaners using perchloroethylene, and gasoline dispensing facilities. Project operation does not involve any of these uses; therefore, it is not considered a source of TACs. Therefore, impacts would be less than significant.

Threshold 4 Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? **LESS THAN SIGNIFICANT**

For construction activities, odors would be short-term in nature and are subject to SCAQMD Rule 402 *Nuisance* (CARB 2018a). Construction activities would be temporary and transitory and associated odors would cease upon construction completion. Accordingly, the proposed project would not create objectionable odors affecting a substantial number of people during construction, and short-term impacts would be less than significant.

Common sources of operational odor complaints include sewage treatment plants, landfills, recycling facilities, and agricultural uses. The proposed project would not include these uses as the proposed project entails basic car wash uses that do not typically emit odors. Solid waste generated by the proposed on-site uses would be collected by a contracted waste hauler, ensuring that any odors resulting from on-site waste would be managed and collected in a manner to prevent the proliferation of odors. Operational odor impacts would be less than significant.

3 Greenhouse Gas Emissions

3.1 Background

This section analyzes GHG emissions associated with the project and potential impacts related to climate change.

Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period of time. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate is continuously changing, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed acceleration in the rate of warming during the past 150 years. Per the United Nations Intergovernmental Panel on Climate Change (IPCC), the understanding of anthropogenic warming and cooling influences on climate has led to a high confidence (95 percent or greater chance) that the global average net effect of human activities has been the dominant cause of warming since the mid-20th century (IPCC 2014).

Gases that absorb and re-emit infrared radiation in the atmosphere are called greenhouse gases (GHGs). The gases that are widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere, and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

GHGs are emitted by both natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Man-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF_6 (USEPA 2020). Different types of GHGs have varying global warming potentials (GWPs). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as "carbon dioxide equivalent" (CO_2e), and is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane CH_4 has a GWP of 25, meaning its global warming effect is 25 times greater than carbon dioxide on a molecule per molecule basis (IPCC 2007).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat trapping effect of GHGs, Earth's surface would be about 34° C cooler (CalEPA 2006).

However, emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

Greenhouse Gas Emissions Inventory

Worldwide anthropogenic emissions of GHGs were approximately 46,000 million metric tons (MMT, or gigatonne) CO_2e in 2010 (IPCC 2014). CO_2 emissions from fossil fuel combustion and industrial processes contributed about 65 percent of total emissions in 2010. Of anthropogenic GHGs, CO_2 was the most abundant, accounting for 76 percent of total 2010 emissions. Methane emissions accounted for 16 percent of the 2010 total, while N_2O and fluorinated gases accounted for 6 percent and 2 percent respectively (IPCC 2014).

Total United States (U.S.) GHG emissions were 6,676.6 MMT CO_2e in 2018. Since 1990, total U.S. emissions have increased by an average annual rate of 0.13 percent for a total increase of 3.7 percent since 1990. Emissions increased by 2.9 percent from 2017 to 2018. The increase from 2017 to 2018 was primarily the result of increased fossil fuel combustion due to several factors, including increased energy use from greater heating and cooling needs due to a colder winter and hotter summer in 2018 as compared to 2017. In 2018, the industrial and transportation end-use sectors accounted for 29 percent and 28 percent, respectively, of GHG emissions while the residential and commercial end-use sectors each accounted for 16 percent of GHG emissions with electricity emissions distributed among the various sectors (USEPA 2020).

Based on the CARB's California Greenhouse Gas Inventory for 2000-2017, California produced 424.1 MMT CO_2e in 2017. The major source of GHG emissions in California is transportation, contributing 41 percent of the state's total GHG emissions. The industrial sector is the second largest source, contributing 24 percent of the state's GHG emissions, while electric power accounts for approximately 15 percent (CARB 2019a). California emissions are due in part to its large size and large population compared to other states. However, a factor that reduces California's per capita fuel use and GHG emissions, as compared to other states, is its relatively mild climate. In 2016, the State of California achieved its 2020 GHG emission reduction target as emissions fell below 431 MMT CO_2e (CARB 2019a). The annual 2030 statewide target emissions level is 260 MMT CO_2e (CARB 2017b).

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources though potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Each of the past three decades has been warmer than all the previous decades in the instrumental record, and the five warmest years in the 1880-2019 record have all occurred since 2015 with nine of the 10 warmest years occurring since 2005. The observed global mean surface temperature in 2019 was approximately 0.95°C (1.71 degrees Fahrenheit) higher than the average global mean surface temperature over the period from 1880 to 2019 (National Oceanic and Atmospheric Administration 2019). Furthermore, several independently analyzed data records of global and regional Land-Surface Air Temperature (LSAT) obtained from station observations are in agreement that LSAT as well as sea surface temperatures have increased. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition to these findings, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades (IPCC 2014 and 2018).

According to *California's Fourth Climate Change Assessment*, statewide temperatures from 1986 to 2016 were approximately 1 to 2 degrees Fahrenheit (°F) higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include loss in water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years (State of California 2018). While there is growing scientific consensus about the possible effects of climate change at a global and statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. In addition to statewide projections, *California's Fourth Climate Change Assessment* includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state as well as regionally-specific climate change case studies (State of California 2018). Below is a summary of some of the potential effects that could be experienced in California as a result of climate change.

Air Quality

Higher temperatures, which are conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. As temperatures have increased in recent years, the area burned by wildfires throughout the state has increased, and wildfires have been occurring at higher elevations in the Sierra Nevada Mountains (State of California 2018). If higher temperatures continue to be accompanied by an increase in the incidence and extent of large wildfires, air quality would worsen. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thereby ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (California Natural Resources Agency 2009).

In the Los Angeles region, changes in meteorological conditions under climate change will affect future air quality. Regional stagnation conditions may occur more often in the future, which would increase pollutant concentrations (State of California 2018b). Hotter future temperatures will act to increase surface ozone concentrations both due to chemistry producing more ozone and higher rates of biogenic emissions, while increases of water vapor also influence chemistry by increasing ozone production in already polluted areas. Changes in ozone may increase in the future however, changes in particulate matter are less certain. Projected changes by 2050 are generally not statistically significant (State of California 2018b).

Water Supply

Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Year-to-year variability in statewide precipitation levels has increased since 1980, meaning that wet and dry precipitation extremes have become more common (California Department of Water Resources 2018). This uncertainty regarding future precipitation trends complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. However, the average early spring snowpack in the western United States, including the Sierra Nevada Mountains, decreased by about 10 percent during the last century. During the same period, sea level rose over 5.9 inches along the central and southern California coast (State of California 2018). The Sierra snowpack provides the majority of California's water supply by accumulating snow during the state's wet winters and releasing it slowly during the state's dry springs and summers. A warmer climate is predicted to reduce the fraction of precipitation falling as snow and result in less snowfall at lower elevations, thereby reducing the total snowpack (DWR 2008; State of California 2018). The State of California projects that average spring snowpack in the Sierra Nevada and other mountain catchments in central and northern California will decline by approximately 66 percent from its historical average by 2050 (State of California 2018).

Like the rest of the state, the Greater Los Angeles region is expected to face a challenging combination of decreased water supply and increased water demand (State of California 2018b). Greater interannual variability of rainfall and sharp decreases in snowpack will create surface water limitations for the region. Although the effect of climate change on average precipitation in the region is still unclear, more frequent occurrences of extreme events like the 2011-2016 drought could substantially decrease groundwater recharge, which is essential for the sustainability of agriculture in the region since the vast majority of water used in agriculture in the region is groundwater from local wells. Furthermore, higher temperatures mean that dry years will more quickly develop into severe drought conditions.

Hydrology and Sea Level Rise

Climate change could potentially affect the intensity and frequency of storms and flooding. Furthermore, climate change has the potential to induce substantial sea level rise in the coming century (State of California 2018). The rising sea level increases the likelihood and risk of flooding. The rate of increase of global mean sea levels over the 2001-2010 decade, as observed by satellites, ocean buoys and land gauges, was approximately 3.2 mm per year, which is double the observed 20^{th} century trend of 1.6 mm per year. As a result, global mean sea levels averaged over the last decade were about 8 inches higher than those of 1880 (World Meteorological Organization 2013). Sea levels are rising faster now than in the previous two millennia, and the rise is expected to accelerate, even with robust GHG emission control measures. The most recent IPCC report predicts a mean sea-level rise of 10 to 37 inches by 2100 (IPCC 2018). A rise in sea levels could completely erode 31 to 67 percent of southern California beaches, result in flooding of approximately 370 miles of coastal highways during 100-year storm events, jeopardize California's water supply due to salt water intrusion, and induce groundwater flooding and/or exposure of buried infrastructure (State of California 2018). In addition, increased CO_2 emissions can cause oceans to acidify due to the carbonic acid it forms. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

As discussed above, climate change could potentially affect the amount of snowfall, rainfall, and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. In the Greater Los Angeles region, despite small changes in average precipitation, dry and wet extremes are both expected to increase (State of California 2018b). By the late 21^{st} century, the wettest day of the year is expected to increase across most of the region. Increased frequency and severity of atmospheric river events are also projected to occur for this region.

Agriculture

California has a $50 billion annual agricultural industry that produces over a third of the country's vegetables and two-thirds of the country's fruits and nuts (California Department of Food and Agriculture 2019). Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, certain regions of agricultural production could experience water shortages of up to 16 percent; water demand could increase as hotter conditions lead to the loss of soil moisture; crop-yield could be threatened by water-induced stress and extreme heat waves; and plants may be susceptible to new and changing pest and disease outbreaks (State of California 2018). In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (California Climate Change Center 2006). More frequent droughts could substantially decrease groundwater recharge and therefore adversely affect agricultural operations that use groundwater from local wells (State of California 2018b). This could contribute to higher food prices and shortages.

Ecosystems and Wildlife

Climate change and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists project that the annual average maximum daily temperatures in California could rise by 4.4 to 5.8°F in the next 50 years and by 5.6 to 8.8°F in the next century (State of California 2018a). Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals related to: (1) timing of ecological events; (2) geographic distribution and range; (3) species' composition and the incidence of nonnative species within communities; and (4) ecosystem processes, such as carbon cycling and storage (Parmesan 2006; State of California 2018). Increases in wildfire would further remove sensitive habitat; increased severity in droughts would potentially starve plants and animals of water; and sea level rise will affect sensitive coastal ecosystems.

Regulatory Setting

The following regulations address both climate change and GHG emissions.

Federal Regulations

FEDERAL CLEAN AIR ACT

The U.S. Supreme Court in *Massachusetts et al. v. Environmental Protection Agency et al*. ([2007] 549 U.S. 497) held that the USEPA has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act. The USEPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines and requires annual reporting of emissions. In 2012, the USEPA issued a Final Rule that establishes the GHG permitting thresholds that determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

In *Utility Air Regulatory Group v. Environmental Protection Agency* (134 Supreme Court 2427 [2014]), the U.S. Supreme Court held the USEPA may not treat GHGs as an air pollutant for purposes of determining whether a source can be considered a major source required to obtain a PSD or

Title V permit. The Court also held that PSD permits otherwise required based on emissions of other pollutants may continue to require limitations on GHG emissions based on the application of Best Available Control Technology.

SAFER AFFORDABLE FUEL-EFFICIENT VEHICLES RULE

On September 27, 2019, the USEPA and the National Highway Safety Administration published the SAFE Vehicles Rule Part One: One National Program. The Part One Rule revokes California's authority to set its own GHG emissions standards and zero-emission vehicle mandates in California. To account for the effects of the Part One Rule, CARB released off-model adjustment factors on November 20, 2019 to adjust criteria air pollutant emissions outputs from the EMFAC model. The Final SAFE Rule (i.e., Part Two) then relaxed federal GHG emissions and Corporate Average Fuel Economy (CAFE) standards to increase in stringency at only about 1.5 percent per year from model year 2020 levels over model years 2021– 2026 (CARB 2020b). The previously established emission standards and related fuel economy standards would have achieved about four percent per year improvements through model year 2025. Therefore, CARB has prepared off-model CO_2 emissions adjustment factors for both the EMFAC2014 and EMFAC2017 models to account for the impact of the SAFE Vehicles Rule (CARB 2020c). With the incorporation of these adjustment factors, operational emission factors for CO_2 generated by light-duty automobiles, light-duty trucks, and medium-duty trucks associated with project-related vehicle trips may increase by approximately one percent (in 2020) up to as much as 17 percent (in 2050) compared to non-adjusted estimates. These increases would not alter the significance of the operational GHG emissions from development facilitated by the project as discussed further below.

California Regulations

CARB is responsible for the coordination and oversight of state and local air pollution control programs in California. California has numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006 (ASSEMBLY BILL 32 AND SENATE BILL 32)

The "California Global Warming Solutions Act of 2006," Assembly Bill (AB) 32, outlines California's major legislative initiative for reducing GHG emissions. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main state strategies for reducing GHG emissions to meet the 2020 target. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and 2020 target of 431 MMT CO_2e. On December 11, 2008, CARB approved the Climate Change Scoping Plan, which included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other sectors (CARB 2008). Many of the GHG emission reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard and Cap-and-Trade) have been adopted since the plan's approval.

CARB approved the 2013 Scoping Plan Update in May 2014. The update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the state's longer term GHG reduction strategies with other state policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use (CARB 2014).

On September 8, 2016, the governor signed Senate Bill (SB) 32 into law, extending the California Global Warming Solutions Act of 2006 by requiring the state to further reduce GHG emissions to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, and implementation of recently adopted policies and legislation, such as SB 1383 (detailed below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six metric tons (MT) of CO_2e by 2030 and two MT CO_2e by 2050 (CARB 2017b). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, sub-regional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017b).

SENATE BILL 375

SB 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing the CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO's Regional Transportation Plan. Qualified projects consistent with an approved SCS or Alternative Planning Strategy (categorized as "transit priority projects") would receive incentives to streamline CEQA processing.

On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. SCAG was assigned targets of an 8 percent reduction in GHGs from transportation sources by 2020 and a 19 percent reduction in GHGs from transportation sources by 2035. In the SCAG region, SB 375 also provides the option for the coordinated development of sub regional plans by the sub regional councils of governments and the county transportation commissions to meet SB 375 requirements.

SENATE BILL 1383

Adopted in September 2016, SB 1383 requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. SB 1383 requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

SB 1383 also requires the California Department of Resources Recycling and Recovery (CalRecycle) in consultation with the CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

SENATE BILL 100

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the state's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 44 percent by 2024, 60 percent by 2030, and 100 percent by 2045.

EXECUTIVE ORDER B-55-18

On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the requirements of SB 97, the California Natural Resources Agency has adopted amendments to the CEQA Guidelines for determining the effects and feasible mitigation of GHG emissions. The adopted CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. To date, a variety of air districts have adopted quantitative significance thresholds for GHGs.

Regional and Local Regulations

2020-2045 REGIONAL TRANSPORTATION PLAN/SUSTAINABLE COMMUNITIES STRATEGY

On May 7, 2020, SCAG's Regional Council adopted the 2020-2045 RTP/SCS (titled Connect SoCal) for federal transportation conformity purposes and considered approval of the full plan and for all other purposes within 120 days of this date. Following initial adoption, SCAG formally adopted the 2020-2045 RTP/SCS on September 3, 2020 to provide a roadmap for sensible ways to expand transportation options, improve air quality and bolster Southern California's long-term economic viability. The 2020-2045 RTP/SCS builds upon the progress made through implementation of the 2016-2040 RTP/SCS and includes ten goals focused on promoting economic prosperity, improving mobility, protecting the environment, and supporting healthy/complete communities. The SCS implementation strategies include focusing growth near destinations and mobility options, promoting diverse housing choices, leveraging technology innovations, and supporting implementation of sustainability policies. The SCS establishes a land use vision of center-focused placemaking, concentrating growth in and near Priority Growth Areas, transferring of development rights, urban greening, creating greenbelts and community separators, and implementing regional advance mitigation (SCAG 2020b).

City of Long Beach Sustainable City Action Plan

The City of Long Beach's Sustainable City Action Plan (SCAP) was adopted in February 2010 (Long Beach 2010). The SCAP is intended to guide operational, policy, and financial decisions to create a more sustainable Long Beach. The SCAP includes initiatives, goals, and actions that will move Long Beach toward becoming a sustainable city. These goals and actions included in the SCAP relate to the following:

- Buildings & Neighborhoods
- Urban Nature
- Energy
- Waste Reduction
- Green Economy and Lifestyle
- Water
- Transportation

City of Long Beach Climate Action and Adaptation Plan

In 2017, the City of Long Beach began development of a Climate Action and Adaptation Plan (CAAP). The city released a draft plan in 2019, which has not yet been finalized (City of Long Beach 2019b). The CAAP aims to reduce communitywide GHG emissions, and help the city adapt to future climate change impacts. As part of the CAAP, the City conducted a communitywide GHG inventory to identify its baseline emissions footprint and is developing business-as-usual forecasts of emissions based on anticipated growth in population, employment, housing, and other factors in the community. In the next stages of the project, the City will establish GHG reduction targets and define local actions to achieve those targets. The CAAP will provide a framework for creating or updating policies, programs, practices, and incentives for Long Beach residents and businesses to reduce the City's GHG footprint and ensure the community and physical assets are better protected from the impacts of climate change. The policies, programs, practices, and incentives included in the CAAP will relate to the following:

- Public Health
- Parks and Open Space
- Water Supply
- Transportation
- Housing & Neighborhoods
- Energy
- Coastal Resources
- Wastewater/Stormwater

3.2 Impact Analysis

Significance Thresholds

Based on Appendix G of the CEQA Guidelines, impacts related to GHG emissions from the project would be significant if the project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

Individual projects do not generate enough GHG emissions to substantially influence climate change. However, physical changes caused by a project can contribute incrementally to cumulative effects that may be significant, even if individual changes resulting from a project are limited. The issue of climate change typically involves an analysis of whether a project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15064[h][1]).

To determine a project-specific threshold, guidance on GHG significance thresholds in the region from SCAQMD, the air district in which the project site is located, was used. The SCAQMD's GHG CEQA Significance Threshold Working Group considered a tiered approach to determine the significance of residential and commercial projects. The draft tiered approach is outlined in meeting minutes dated September 29, 2010 (SCAQMD 2010):

- **Tier 1.** If the project is exempt from further environmental analysis under existing statutory or categorical exemptions, there is a presumption of less than significant impacts with respect to climate change. If not, then the Tier 2 threshold should be considered.
- **Tier 2.** Consists of determining whether the project is consistent with a GHG reduction plan that may be part of a local general plan, for example. The concept embodied in this tier is equivalent to the existing concept of consistency in CEQA Guidelines Section 15064(h)(3), 15125(d) or 15152(a). Under this Tier, if the proposed project is consistent with the qualifying local GHG reduction plan, it is not significant for GHG emissions. If there is not an adopted plan, then a Tier 3 approach would be appropriate.
- **Tier 3.** Establishes a screening significance threshold level to determine significance. The Working Group has provided a recommendation of 3,000 MT CO_2e per year for commercial projects.
- **Tier 4.** Establishes a service population threshold to determine significance. The Working Group has provided a recommendation of 4.8 MT CO_2e per year for land use projects.

Tier 1 would not apply to the project as it is not exempt from environmental analysis. For Tier 2, while the City's CAAP is currently in draft form, it has not adopted a qualified GHG reduction plan at the time of this analysis. Therefore, for a project-specific threshold, the City of Long Beach has selected SCAQMD's 3,000 MT CO_2e per year threshold for commercial projects as the applicable project-specific threshold, in accordance with Tier 3. The SCAQMD's 3,000 MT CO2e per year threshold is frequently used by jurisdictions across Southern California to determine GHG emissions impacts from commercial projects.

Methodology

Calculations of CO_2, CH_4, and N_2O emissions are provided to estimate the proposed project's potential GHG emissions. Calculations are based on the methodologies discussed in the CAPCOA (2008) *CEQA and Climate Change* white paper and guidance from CARB. GHG emissions associated with the proposed project were calculated using CalEEMod version 2016.3.2 (see Appendix B for CalEEMod results).

Construction Emissions

Construction emissions were modeled in accordance with the methodology outlined in Section 2.2, *Methodology*, under Section 2, *Air Quality*. Complete results from CalEEMod and assumptions can be viewed in Appendix B. In accordance with SCAQMD's recommendation, GHG emissions from construction of the proposed project were amortized over a 30-year period and added to annual operational emissions to determine the project's total annual GHG emissions. Construction emissions are consistent for the project.

Operational Emissions

In CalEEMod, operational sources for area, energy, and mobile sources were modeled in accordance with the methodology outlined in Section 2.2, *Methodology*, under Section 2, *Air Quality*. As mentioned in Section 2.2, CalEEMod does not contain a land use directly correlated to a car wash use; the project's car wash was attributed to the "Automobile Care Center" land use subtype, with water use modified for the unique characteristics of a car wash, as described below

WASTE SOURCES

GHG emissions from waste generation were also calculated in CalEEMod and are based on the IPCC's methods for quantifying GHG emissions from solid waste using the degradable organic content of waste (CAPCOA 2017). Waste disposal rates by land use and overall composition of municipal solid waste in California was primarily based on data provided by the California Department of Resources Recycling and Recovery (CalRecycle).

WATER AND WASTEWATER SOURCES

GHG emissions from water and wastewater usage calculated in CalEEMod were based on the default electricity intensity from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for northern and southern California. A 20 percent reduction in indoor potable water use was incorporated in the model in accordance with CALGreen standards.

Data from professional car wash industry surveys and reports were used to estimate the water requirements for the proposed car wash. The annual number of vehicles washed for the project was estimated based on a 2015 industry survey which reported an average of approximately 80,000 vehicles per year for exterior-only automated conveyor car washes (Professional Car Washing 2017). According to a report on water conservation from the International Carwash Association, typical freshwater use for a friction type of conveyor car wash without water reclamation is 65.8 gallons per vehicle (International Carwash Association 2000). AB 2230, signed by the Governor in 2012, requires that any conveyor car wash installed after 2013 reuse a minimum of 60 percent of the water previously used in the wash or rinse cycles. Therefore, the proposed car wash would reclaim at least 39.5 gallons per vehicle for a total water use of 26.3 gallon per vehicle. Based on 80,000 vehicles washed per year, the estimated water use for the proposed car wash would be 2,104,000 gallons per year.

NITROUS OXIDE EMISSIONS

Because CalEEMod does not calculate N_2O emissions from mobile sources, N_2O emissions were quantified using guidance from CARB and the EMFAC2017 Emissions Inventory for the Los Angeles County region for the project's operational year (2021) using the EMFAC2011 categories (CARB 2019a and 2019b; see Appendix A for calculations).

Impact Analysis

Threshold 1	Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment? **LESS THAN SIGNIFICANT**

GHG Emissions Quantification

CONSTRUCTION EMISSIONS

As shown in Table 9, construction activity for the project would generate an estimated 62 MT of CO_2e. When amortized over a 30-year period, construction of the project would generate approximately 2 MT of CO_2e per year.

Table 9 Estimated Construction Greenhouse Gas Emissions

Construction Year	Annual Emissions MT CO_2e
2021	62
Amortized over 30 years	2

Notes: See Appendix A for modeling results. Some numbers may not add up precisely due to rounding considerations.

OPERATIONAL AND TOTAL PROJECT EMISSIONS

Table 10 combines the construction and operational GHG emissions associated with development of the project. As shown, annual emissions from the proposed project would be approximately 651 MT of CO_2e. These emissions would not exceed SCAQMD's 3,000 MT per year threshold. Therefore, impacts from GHG emissions would be less than significant.

Table 10 Estimated Annual Greenhouse Gas Emissions

Emission Source	Annual Emissions MT CO_2e
Construction	2
Operational	
Area	<0.1
Energy	183
Mobile	455
Solid Waste	6
Water	8
Net Total	**651**
SCAQMD Threshold	3,000
Exceeds Threshold?	**No**

Notes: Emissions modeling was completed using CalEEMod, except for N_2O mobile emissions (see Section 3.1 for methodology). See Appendix A for modeling results and N_2O emissions calculations. Some numbers may not add up precisely due to rounding considerations.

Threshold 2	Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs? **LESS THAN SIGNIFICANT**

Consistency with Applicable Plans and Policies

STATE POLICIES

There are numerous State plans, policies, and regulations adopted to reduce GHG emissions. The principal state plan and policy is AB 32, the California Global Warming Solutions Act of 2006, and the follow up, SB 32. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020 and the goal of SB 32 is to reduce GHG emissions to 40 percent below 1990 levels by 2030. Pursuant to the SB 32 goal, the 2017 Scoping Plan was created to outline goals and measures for the State to achieve the reductions. The 2017 Scoping Plan's goals include reducing fossil fuel use and energy demand and maximizing recycling and diversion from landfills. The project would comply with the latest Title 24 Green Building Code and Building Efficiency Energy Standards and the AB 341 waste diversion goal of 75 percent. Therefore, the project is consistent with the applicable GHG reduction strategies in the 2017 Scoping Plan.

2020-2045 RTP/SCS

According to the 2020-2045 RTP/SCS, the updated targets for the SCAG region are eight percent below 2005 per capita emission levels by 2020 (this value is unchanged from the previous 2020 CARB target) and 19 percent below 2005 per capita emissions levels by 2035. The revised 2035 target is higher than the previous CARB target of 13 percent for the SCAG region. The 2020-2045 RTP/SCS includes implementation strategies for focusing growth near destinations and mobility options, promoting diverse housing choices, leveraging technology innovations, supporting implementation of sustainability policies, and promoting a green region. Further specific actions to reduce greenhouse gas emissions under the 2020-2045 RTP/SCS include designing transportation options that reduce the reliance on solo car trips, promoting low emission technologies such as electric vehicles and ride sharing, supporting statewide greenhouse gas emissions legislation, and pursuing funding opportunities to support local sustainable development projects that reduce GHG emissions. In general, a car wash use is planned to satisfy existing vehicle transportation demand and is inherently not oriented for sustainable transportation uses such as transit or rail. The car wash would be used by electric vehicles in a similar fashion to gasoline vehicles. Therefore, sustainable transportation initiatives would not apply to the project.

LOCAL POLICIES

The overarching goal of the City's SCAP and CAAP are to increase sustainability and reduce GHG emissions within the City. The project would comply with the latest Title 24 Green Building Code and Building Efficiency Energy Standards and the AB 341 waste diversion goal of 75 percent. This would be consistent with the overarching goals of the City's SCAP and CAAP.

SUMMARY

Given the above considerations regarding SCAG's 2020 RTP/SCS, the City's SCAP and CAAP, the 2017 Scoping Plan, and additional state requirements, the project is consistent with State and local policies for reducing GHG emissions, and no impacts would occur.

4 Conclusions and Recommendations

As detailed above, neither construction nor operation of the project would result in significant air quality or GHG emissions impacts. The project would be required to comply with the following RCMs, which were assumed in the modeling and analysis because the project is required to comply with them through state and local regulations.

Regulatory Compliance Measures

RCM-1 Demolition, Grading, and Construction Activities: Compliance with provisions of SCAQMD Rule 403.

The project shall comply with all applicable standards of the SCAQMD, including the following provisions of Rule 403:

- All unpaved demolition and construction areas shall be wetted at least twice daily during excavation and construction, and temporary dust covers shall be used to reduce dust emissions and meet SCAQMD Rule 403. Wetting could reduce fugitive dust by as much as 50 percent.
- The construction area shall be kept sufficiently dampened to control dust caused by grading and hauling, and at all times provide reasonable control of dust caused by wind.
- All clearing, earth moving, or excavation activities shall be discontinued during periods of high winds (i.e., greater than 15 miles per hour), so as to prevent excessive amounts of dust.
- All dirt/soil shall be secured by trimming, watering, or other appropriate means to prevent spillage and dust.
- All dirt/soil materials transported off-site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions.
- Trucks having no current hauling activity shall not idle but be turned off.

RCM-2 Odors: Compliance with Provisions of SCAQMD Rule 402

The project shall comply with the following provision of SCAQMD Rule 402: a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

RCM-3 Engine Idling

In accordance with Section 2485 of Title 13 of the California Code of Regulations, the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds) during construction shall be limited to five minutes at any location.

RCM-4 Emission Standards

In accordance with Section 93115 of Title 17 of the California Code of Regulations, operation of any stationary, diesel-fueled, compression-ignition engines shall meet specified fuel and fuel additive requirements and emission standards.

RCM-5 Architectural Coatings: Compliance with SCAQMD Rule 1113

The project shall comply with SCAQMD Rule 1113 limiting the volatile organic compound (VOC) content of architectural coatings.

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Appendix A

CalEEMod Output Files

20-10163 Long Beach Car Wash Project

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	15.00	Space	0.13	6,000.00	0
Automobile Care Center	3.06	1000sqft	0.07	3,058.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	9			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - sf obtained from client
Parking lot - 15 spaces from staff report. SF is CalEEMod default

Construction Phase - Site prep extended to one week to account for asphalt demo

Trips and VMT -

Grading - Ton of debris estimated from amount of asphalt to be removed

Vehicle Trips - Trip rated based on applicant estimate for cars per day (300 vehicles or 600 round trips)

Energy Use - car wash specific electricity and natural gas inputs

Water And Wastewater - car wash specific water usage

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	1.00	5.00
tblEnergyUse	NT24E	5.75	117.25
tblEnergyUse	NT24NG	4.45	394.75
tblEnergyUse	T24E	2.25	0.00
tblEnergyUse	T24NG	13.65	0.00
tblGrading	MaterialExported	0.00	485.00
tblLandUse	LandUseSquareFeet	3,060.00	3,058.00
tblVehicleTrips	ST_TR	23.72	242.00
tblVehicleTrips	SU_TR	11.88	242.00
tblVehicleTrips	WD_TR	23.72	242.00
tblWater	IndoorWaterUseRate	287,888.19	0.00
tblWater	OutdoorWaterUseRate	176,447.60	2,104,000.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.8427	10.2929	7.9077	0.0175	0.8645	0.4481	1.2727	0.4434	0.4122	0.8328	0.0000	1,775.9951	1,775.9951	0.3616	0.0000	1,785.0354
2022	6.2121	7.1268	7.5972	0.0131	0.2012	0.3724	0.4987	0.0534	0.3426	0.3563	0.0000	1,215.5611	1,215.5611	0.3597	0.0000	1,223.2171
Maximum	**6.2121**	**10.2929**	**7.9077**	**0.0175**	**0.8645**	**0.4481**	**1.2727**	**0.4434**	**0.4122**	**0.8328**	**0.0000**	**1,775.9951**	**1,775.9951**	**0.3616**	**0.0000**	**1,785.0354**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.8427	10.2929	7.9077	0.0175	0.4662	0.4481	0.8587	0.2158	0.4122	0.6052	0.0000	1,775.9951	1,775.9951	0.3616	0.0000	1,785.0354
2022	6.2121	7.1268	7.5972	0.0131	0.2012	0.3724	0.4987	0.0534	0.3426	0.3563	0.0000	1,215.5611	1,215.5611	0.3597	0.0000	1,223.2171
Maximum	**6.2121**	**10.2929**	**7.9077**	**0.0175**	**0.4662**	**0.4481**	**0.8587**	**0.2158**	**0.4122**	**0.6052**	**0.0000**	**1,775.9951**	**1,775.9951**	**0.3616**	**0.0000**	**1,785.0354**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**37.38**	**0.00**	**23.37**	**45.81**	**0.00**	**19.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0711	2.0000e-005	1.8500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.9500e-003	3.9500e-003	1.0000e-005		4.2100e-003
Energy	0.0357	0.3242	0.2724	1.9500e-003		0.0246	0.0246		0.0246	0.0246		389.0880	389.0880	7.4600e-003	7.1300e-003	391.4002
Mobile	0.9030	4.3859	8.1292	0.0265	2.1093	0.0224	2.1317	0.5644	0.0209	0.5852		2,699.0146	2,699.0146	0.1591		2,702.9922
Total	**1.0098**	**4.7102**	**8.4035**	**0.0284**	**2.1093**	**0.0470**	**2.1563**	**0.5644**	**0.0455**	**0.6099**		**3,088.1065**	**3,088.1065**	**0.1666**	**7.1300e-003**	**3,094.3966**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0711	2.0000e-005	1.8500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.9500e-003	3.9500e-003	1.0000e-005		4.2100e-003
Energy	0.0357	0.3242	0.2724	1.9500e-003		0.0246	0.0246		0.0246	0.0246		389.0880	389.0880	7.4600e-003	7.1300e-003	391.4002
Mobile	0.9030	4.3859	8.1292	0.0265	2.1093	0.0224	2.1317	0.5644	0.0209	0.5852		2,699.0146	2,699.0146	0.1591		2,702.9922
Total	**1.0098**	**4.7102**	**8.4035**	**0.0284**	**2.1093**	**0.0470**	**2.1563**	**0.5644**	**0.0455**	**0.6099**		**3,088.1065**	**3,088.1065**	**0.1666**	**7.1300e-003**	**3,094.3966**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2021	9/7/2021	5	5	
2	Grading	Grading	9/8/2021	9/9/2021	5	2	
3	Building Construction	Building Construction	9/10/2021	1/27/2022	5	100	
4	Paving	Paving	1/28/2022	2/3/2022	5	5	
5	Architectural Coating	Architectural Coating	2/4/2022	2/10/2022	5	5	

Acres of Grading (Site Preparation Phase): 2.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.13

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 4,587; Non-Residential Outdoor: 1,529; Striped Parking Area: 360 (Architectural Coating – sqft)

OffRoad Equipment

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

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	5.00	0.00	48.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	4.00	1.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5389	0.0000	0.5389	0.0586	0.0000	0.0586			0.0000			0.0000
Off-Road	0.6403	7.8204	4.0274	9.7300e-003		0.2995	0.2995		0.2755	0.2755		942.5842	942.5842	0.3049		950.2055
Total	**0.6403**	**7.8204**	**4.0274**	**9.7300e-003**	**0.5389**	**0.2995**	**0.8384**	**0.0586**	**0.2755**	**0.3341**		**942.5842**	**942.5842**	**0.3049**		**950.2055**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0716	2.4576	0.5519	7.2200e-003	0.1678	7.6400e-003	0.1754	0.0460	7.3100e-003	0.0533		781.6275	781.6275	0.0554		783.0118
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0231	0.0150	0.1693	5.2000e-004	0.0559	4.1000e-004	0.0563	0.0148	3.8000e-004	0.0152		51.7834	51.7834	1.3900e-003		51.8181
Total	**0.0947**	**2.4726**	**0.7212**	**7.7400e-003**	**0.2236**	**8.0500e-003**	**0.2317**	**0.0608**	**7.6900e-003**	**0.0685**		**833.4109**	**833.4109**	**0.0568**		**834.8299**

3.2 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2425	0.0000	0.2425	0.0264	0.0000	0.0264			0.0000			0.0000
Off-Road	0.6403	7.8204	4.0274	9.7300e-003		0.2995	0.2995		0.2755	0.2755	0.0000	942.5842	942.5842	0.3049		950.2055
Total	**0.6403**	**7.8204**	**4.0274**	**9.7300e-003**	**0.2425**	**0.2995**	**0.5420**	**0.0264**	**0.2755**	**0.3019**	**0.0000**	**942.5842**	**942.5842**	**0.3049**		**950.2055**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0716	2.4576	0.5519	7.2200e-003	0.1678	7.6400e-003	0.1754	0.0460	7.3100e-003	0.0533		781.6275	781.6275	0.0554		783.0118
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0231	0.0150	0.1693	5.2000e-004	0.0559	4.1000e-004	0.0563	0.0148	3.8000e-004	0.0152		51.7834	51.7834	1.3900e-003		51.8181
Total	**0.0947**	**2.4726**	**0.7212**	**7.7400e-003**	**0.2236**	**8.0500e-003**	**0.2317**	**0.0608**	**7.6900e-003**	**0.0685**		**833.4109**	**833.4109**	**0.0568**		**834.8299**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886		1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.7528**	**0.4073**	**1.1601**	**0.4138**	**0.3886**	**0.8024**		**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0461	0.0300	0.3385	1.0400e-003	0.1118	8.2000e-004	0.1126	0.0296	7.6000e-004	0.0304		103.5668	103.5668	2.7800e-003		103.6362
Total	**0.0461**	**0.0300**	**0.3385**	**1.0400e-003**	**0.1118**	**8.2000e-004**	**0.1126**	**0.0296**	**7.6000e-004**	**0.0304**		**103.5668**	**103.5668**	**2.7800e-003**		**103.6362**

3.3 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3387	0.0000	0.3387	0.1862	0.0000	0.1862			0.0000			0.0000
Off-Road	0.7965	7.2530	7.5691	0.0120		0.4073	0.4073		0.3886	0.3886	0.0000	1,147.4338	1,147.4338	0.2138		1,152.7797
Total	**0.7965**	**7.2530**	**7.5691**	**0.0120**	**0.3387**	**0.4073**	**0.7461**	**0.1862**	**0.3886**	**0.5748**	**0.0000**	**1,147.4338**	**1,147.4338**	**0.2138**		**1,152.7797**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0461	0.0300	0.3385	1.0400e-003	0.1118	8.2000e-004	0.1126	0.0296	7.6000e-004	0.0304		103.5668	103.5668	2.7800e-003		103.6362
Total	**0.0461**	**0.0300**	**0.3385**	**1.0400e-003**	**0.1118**	**8.2000e-004**	**0.1126**	**0.0296**	**7.6000e-004**	**0.0304**		**103.5668**	**103.5668**	**2.7800e-003**		**103.6362**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7750	7.9850	7.2637	0.0114		0.4475	0.4475		0.4117	0.4117		1,103.2158	1,103.2158	0.3568		1,112.1358
Total	**0.7750**	**7.9850**	**7.2637**	**0.0114**		**0.4475**	**0.4475**		**0.4117**	**0.4117**		**1,103.2158**	**1,103.2158**	**0.3568**		**1,112.1358**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.9300e-003	0.0951	0.0253	2.5000e-004	6.4000e-003	2.0000e-004	6.6000e-003	1.8400e-003	1.9000e-004	2.0300e-003		26.4550	26.4550	1.7700e-003		26.4993
Worker	0.0185	0.0120	0.1354	4.2000e-004	0.0447	3.3000e-004	0.0450	0.0119	3.0000e-004	0.0122		41.4267	41.4267	1.1100e-003		41.4545
Total	**0.0214**	**0.1071**	**0.1608**	**6.7000e-004**	**0.0511**	**5.3000e-004**	**0.0516**	**0.0137**	**4.9000e-004**	**0.0142**		**67.8817**	**67.8817**	**2.8800e-003**		**67.9537**

3.4 Building Construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7750	7.9850	7.2637	0.0114		0.4475	0.4475		0.4117	0.4117	0.0000	1,103.2158	1,103.2158	0.3568		1,112.1358
Total	**0.7750**	**7.9850**	**7.2637**	**0.0114**		**0.4475**	**0.4475**		**0.4117**	**0.4117**	**0.0000**	**1,103.2158**	**1,103.2158**	**0.3568**		**1,112.1358**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.9300e-003	0.0951	0.0253	2.5000e-004	6.4000e-003	2.0000e-004	6.6000e-003	1.8400e-003	1.9000e-004	2.0300e-003		26.4550	26.4550	1.7700e-003		26.4993
Worker	0.0185	0.0120	0.1354	4.2000e-004	0.0447	3.3000e-004	0.0450	0.0119	3.0000e-004	0.0122		41.4267	41.4267	1.1100e-003		41.4545
Total	**0.0214**	**0.1071**	**0.1608**	**6.7000e-004**	**0.0511**	**5.3000e-004**	**0.0516**	**0.0137**	**4.9000e-004**	**0.0142**		**67.8817**	**67.8817**	**2.8800e-003**		**67.9537**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6863	7.0258	7.1527	0.0114		0.3719	0.3719		0.3422	0.3422		1,103.939 3	1,103.939 3	0.3570		1,112.865 2
Total	**0.6863**	**7.0258**	**7.1527**	**0.0114**		**0.3719**	**0.3719**		**0.3422**	**0.3422**		**1,103.939 3**	**1,103.939 3**	**0.3570**		**1,112.865 2**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.7500e-003	0.0902	0.0240	2.5000e-004	6.4000e-003	1.7000e-004	6.5700e-003	1.8400e-003	1.6000e-004	2.0100e-003		26.2194	26.2194	1.7000e-003		26.2620
Worker	0.0174	0.0108	0.1250	4.0000e-004	0.0447	3.2000e-004	0.0450	0.0119	2.9000e-004	0.0122		39.9415	39.9415	1.0000e-003		39.9665
Total	**0.0201**	**0.1010**	**0.1489**	**6.5000e-004**	**0.0511**	**4.9000e-004**	**0.0516**	**0.0137**	**4.5000e-004**	**0.0142**		**66.1609**	**66.1609**	**2.7000e-003**		**66.2285**

3.4 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6863	7.0258	7.1527	0.0114		0.3719	0.3719		0.3422	0.3422	0.0000	1,103.939 3	1,103.939 3	0.3570		1,112.865 2
Total	**0.6863**	**7.0258**	**7.1527**	**0.0114**		**0.3719**	**0.3719**		**0.3422**	**0.3422**	**0.0000**	**1,103.939 3**	**1,103.939 3**	**0.3570**		**1,112.865 2**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.7500e-003	0.0902	0.0240	2.5000e-004	6.4000e-003	1.7000e-004	6.5700e-003	1.8400e-003	1.6000e-004	2.0100e-003		26.2194	26.2194	1.7000e-003		26.2620
Worker	0.0174	0.0108	0.1250	4.0000e-004	0.0447	3.2000e-004	0.0450	0.0119	2.9000e-004	0.0122		39.9415	39.9415	1.0000e-003		39.9665
Total	**0.0201**	**0.1010**	**0.1489**	**6.5000e-004**	**0.0511**	**4.9000e-004**	**0.0516**	**0.0137**	**4.5000e-004**	**0.0142**		**66.1609**	**66.1609**	**2.7000e-003**		**66.2285**

3.5 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6469	5.9174	7.0348	0.0113		0.2961	0.2961		0.2758	0.2758		1,035.824 6	1,035.824 6	0.3017		1,043.367 7
Paving	0.0681					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7150**	**5.9174**	**7.0348**	**0.0113**		**0.2961**	**0.2961**		**0.2758**	**0.2758**		**1,035.824 6**	**1,035.824 6**	**0.3017**		**1,043.367 7**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0781	0.0487	0.5625	1.8000e-003	0.2012	1.4400e-003	0.2026	0.0534	1.3200e-003	0.0547		179.7366	179.7366	4.5100e-003		179.8494
Total	**0.0781**	**0.0487**	**0.5625**	**1.8000e-003**	**0.2012**	**1.4400e-003**	**0.2026**	**0.0534**	**1.3200e-003**	**0.0547**		**179.7366**	**179.7366**	**4.5100e-003**		**179.8494**

3.5 Paving - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6469	5.9174	7.0348	0.0113		0.2961	0.2961		0.2758	0.2758	0.0000	1,035.8246	1,035.8246	0.3017		1,043.3677
Paving	0.0681					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7150**	**5.9174**	**7.0348**	**0.0113**		**0.2961**	**0.2961**		**0.2758**	**0.2758**	**0.0000**	**1,035.8246**	**1,035.8246**	**0.3017**		**1,043.3677**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0781	0.0487	0.5625	1.8000e-003	0.2012	1.4400e-003	0.2026	0.0534	1.3200e-003	0.0547		179.7366	179.7366	4.5100e-003		179.8494
Total	**0.0781**	**0.0487**	**0.5625**	**1.8000e-003**	**0.2012**	**1.4400e-003**	**0.2026**	**0.0534**	**1.3200e-003**	**0.0547**		**179.7366**	**179.7366**	**4.5100e-003**		**179.8494**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	6.0033					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**6.2078**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.3400e-003	2.7100e-003	0.0313	1.0000e-004	0.0112	8.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0400e-003		9.9854	9.9854	2.5000e-004		9.9916
Total	**4.3400e-003**	**2.7100e-003**	**0.0313**	**1.0000e-004**	**0.0112**	**8.0000e-005**	**0.0113**	**2.9600e-003**	**7.0000e-005**	**3.0400e-003**		**9.9854**	**9.9854**	**2.5000e-004**		**9.9916**

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Archit. Coating	6.0033					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**6.2078**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.3400e-003	2.7100e-003	0.0313	1.0000e-004	0.0112	8.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0400e-003		9.9854	9.9854	2.5000e-004		9.9916
Total	**4.3400e-003**	**2.7100e-003**	**0.0313**	**1.0000e-004**	**0.0112**	**8.0000e-005**	**0.0113**	**2.9600e-003**	**7.0000e-005**	**3.0400e-003**		**9.9854**	**9.9854**	**2.5000e-004**		**9.9916**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9030	4.3859	8.1292	0.0265	2.1093	0.0224	2.1317	0.5644	0.0209	0.5852		2,699.0146	2,699.0146	0.1591		2,702.9922
Unmitigated	0.9030	4.3859	8.1292	0.0265	2.1093	0.0224	2.1317	0.5644	0.0209	0.5852		2,699.0146	2,699.0146	0.1591		2,702.9922

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	740.52	740.52	740.52	991,965	991,965
Parking Lot	0.00	0.00	0.00		
Total	740.52	740.52	740.52	991,965	991,965

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	16.60	8.40	6.90	33.00	48.00	19.00	21	51	28
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Parking Lot	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0357	0.3242	0.2724	1.9500e-003		0.0246	0.0246		0.0246	0.0246		389.0880	389.0880	7.4600e-003	7.1300e-003	391.4002
NaturalGas Unmitigated	0.0357	0.3242	0.2724	1.9500e-003		0.0246	0.0246		0.0246	0.0246		389.0880	389.0880	7.4600e-003	7.1300e-003	391.4002

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Automobile Care Center	3307.25	0.0357	0.3242	0.2724	1.9500e-003		0.0246	0.0246		0.0246	0.0246		389.0880	389.0880	7.4600e-003	7.1300e-003	391.4002
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0357**	**0.3242**	**0.2724**	**1.9500e-003**		**0.0246**	**0.0246**		**0.0246**	**0.0246**		**389.0880**	**389.0880**	**7.4600e-003**	**7.1300e-003**	**391.4002**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Automobile Care Center	3.30725	0.0357	0.3242	0.2724	1.9500e-003		0.0246	0.0246		0.0246	0.0246		389.0880	389.0880	7.4600e-003	7.1300e-003	391.4002
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0357**	**0.3242**	**0.2724**	**1.9500e-003**		**0.0246**	**0.0246**		**0.0246**	**0.0246**		**389.0880**	**389.0880**	**7.4600e-003**	**7.1300e-003**	**391.4002**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0711	2.0000e-005	1.8500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.9500e-003	3.9500e-003	1.0000e-005		4.2100e-003
Unmitigated	0.0711	2.0000e-005	1.8500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.9500e-003	3.9500e-003	1.0000e-005		4.2100e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	8.2200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.7000e-004	2.0000e-005	1.8500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.9500e-003	3.9500e-003	1.0000e-005		4.2100e-003
Total	**0.0711**	**2.0000e-005**	**1.8500e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**3.9500e-003**	**3.9500e-003**	**1.0000e-005**		**4.2100e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	8.2200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0627					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.7000e-004	2.0000e-005	1.8500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005		3.9500e-003	3.9500e-003	1.0000e-005		4.2100e-003
Total	**0.0711**	**2.0000e-005**	**1.8500e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**3.9500e-003**	**3.9500e-003**	**1.0000e-005**		**4.2100e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

20-10163 Long Beach Car Wash Project

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	15.00	Space	0.13	6,000.00	0
Automobile Care Center	3.06	1000sqft	0.07	3,058.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	9			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - sf obtained from client
Parking lot - 15 spaces from staff report. SF is CalEEMod default

Construction Phase - Site prep extended to one week to account for asphalt demo

Trips and VMT -

Grading - Ton of debris estimated from amount of asphalt to be removed

Vehicle Trips - Trip rated based on applicant estimate for cars per day (300 vehicles or 600 round trips)

Energy Use - car wash specific electricity and natural gas inputs

Water And Wastewater - car wash specific water usage

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	1.00	5.00
tblEnergyUse	NT24E	5.75	117.25
tblEnergyUse	NT24NG	4.45	394.75
tblEnergyUse	T24E	2.25	0.00
tblEnergyUse	T24NG	13.65	0.00
tblGrading	MaterialExported	0.00	485.00
tblLandUse	LandUseSquareFeet	3,060.00	3,058.00
tblVehicleTrips	ST_TR	23.72	242.00
tblVehicleTrips	SU_TR	11.88	242.00
tblVehicleTrips	WD_TR	23.72	242.00
tblWater	IndoorWaterUseRate	287,888.19	0.00
tblWater	OutdoorWaterUseRate	176,447.60	2,104,000.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0348	0.3609	0.3205	5.5000e-004	4.7900e-003	0.0193	0.0241	1.2800e-003	0.0178	0.0191	0.0000	48.2560	48.2560	0.0142	0.0000	48.6117
2022	0.0242	0.0862	0.0930	1.5000e-004	1.0000e-003	4.4900e-003	5.4800e-003	2.7000e-004	4.1500e-003	4.4200e-003	0.0000	13.5193	13.5193	3.8400e-003	0.0000	13.6152
Maximum	**0.0348**	**0.3609**	**0.3205**	**5.5000e-004**	**4.7900e-003**	**0.0193**	**0.0241**	**1.2800e-003**	**0.0178**	**0.0191**	**0.0000**	**48.2560**	**48.2560**	**0.0142**	**0.0000**	**48.6117**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0348	0.3609	0.3205	5.5000e-004	3.6400e-003	0.0193	0.0230	9.8000e-004	0.0178	0.0188	0.0000	48.2559	48.2559	0.0142	0.0000	48.6116
2022	0.0242	0.0862	0.0930	1.5000e-004	1.0000e-003	4.4900e-003	5.4800e-003	2.7000e-004	4.1500e-003	4.4200e-003	0.0000	13.5192	13.5192	3.8400e-003	0.0000	13.6152
Maximum	**0.0348**	**0.3609**	**0.3205**	**5.5000e-004**	**3.6400e-003**	**0.0193**	**0.0230**	**9.8000e-004**	**0.0178**	**0.0188**	**0.0000**	**48.2559**	**48.2559**	**0.0142**	**0.0000**	**48.6116**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**19.86**	**0.00**	**3.92**	**19.35**	**0.00**	**1.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**9-1-2021**	**11-30-2021**	0.2936	0.2936
2	**12-1-2021**	**2-28-2022**	0.2099	0.2099
		Highest	0.2936	0.2936

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0130	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Energy	6.5100e-003	0.0592	0.0497	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003	0.0000	182.3493	182.3493	6.1000e-003	2.1900e-003	183.1540
Mobile	0.1593	0.8121	1.4842	4.9000e-003	0.3769	4.0400e-003	0.3810	0.1010	3.7700e-003	0.1048	0.0000	453.8737	453.8737	0.0258	0.0000	454.5180
Waste						0.0000	0.0000		0.0000	0.0000	2.3730	0.0000	2.3730	0.1402	0.0000	5.8789
Water						0.0000	0.0000		0.0000	0.0000	0.0000	7.4479	7.4479	3.1000e-004	6.0000e-005	7.4746
Total	**0.1788**	**0.8713**	**1.5342**	**5.2600e-003**	**0.3769**	**8.5400e-003**	**0.3855**	**0.1010**	**8.2700e-003**	**0.1093**	**2.3730**	**643.6713**	**646.0443**	**0.1724**	**2.2500e-003**	**651.0260**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0130	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Energy	6.5100e-003	0.0592	0.0497	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003	0.0000	182.3493	182.3493	6.1000e-003	2.1900e-003	183.1540
Mobile	0.1593	0.8121	1.4842	4.9000e-003	0.3769	4.0400e-003	0.3810	0.1010	3.7700e-003	0.1048	0.0000	453.8737	453.8737	0.0258	0.0000	454.5180
Waste						0.0000	0.0000		0.0000	0.0000	2.3730	0.0000	2.3730	0.1402	0.0000	5.8789
Water						0.0000	0.0000		0.0000	0.0000	0.0000	7.4479	7.4479	3.1000e-004	6.0000e-005	7.4746
Total	**0.1788**	**0.8713**	**1.5342**	**5.2600e-003**	**0.3769**	**8.5400e-003**	**0.3855**	**0.1010**	**8.2700e-003**	**0.1093**	**2.3730**	**643.6713**	**646.0443**	**0.1724**	**2.2500e-003**	**651.0260**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2021	9/7/2021	5	5	
2	Grading	Grading	9/8/2021	9/9/2021	5	2	
3	Building Construction	Building Construction	9/10/2021	1/27/2022	5	100	
4	Paving	Paving	1/28/2022	2/3/2022	5	5	
5	Architectural Coating	Architectural Coating	2/4/2022	2/10/2022	5	5	

Acres of Grading (Site Preparation Phase): 2.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.13

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 4,587; Non-Residential Outdoor: 1,529; Striped Parking Area: 360 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

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

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	5.00	0.00	48.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	4.00	1.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.3500e-003	0.0000	1.3500e-003	1.5000e-004	0.0000	1.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6000e-003	0.0196	0.0101	2.0000e-005		7.5000e-004	7.5000e-004		6.9000e-004	6.9000e-004	0.0000	2.1377	2.1377	6.9000e-004	0.0000	2.1550
Total	**1.6000e-003**	**0.0196**	**0.0101**	**2.0000e-005**	**1.3500e-003**	**7.5000e-004**	**2.1000e-003**	**1.5000e-004**	**6.9000e-004**	**8.4000e-004**	**0.0000**	**2.1377**	**2.1377**	**6.9000e-004**	**0.0000**	**2.1550**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.8000e-004	6.2500e-003	1.3300e-003	2.0000e-005	4.1000e-004	2.0000e-005	4.3000e-004	1.1000e-004	2.0000e-005	1.3000e-004	0.0000	1.7921	1.7921	1.2000e-004	0.0000	1.7952
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	4.4000e-004	0.0000	1.4000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1195	0.1195	0.0000	0.0000	0.1195
Total	**2.3000e-004**	**6.2900e-003**	**1.7700e-003**	**2.0000e-005**	**5.5000e-004**	**2.0000e-005**	**5.7000e-004**	**1.5000e-004**	**2.0000e-005**	**1.7000e-004**	**0.0000**	**1.9115**	**1.9115**	**1.2000e-004**	**0.0000**	**1.9147**

3.2 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.1000e-004	0.0000	6.1000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6000e-003	0.0196	0.0101	2.0000e-005		7.5000e-004	7.5000e-004		6.9000e-004	6.9000e-004	0.0000	2.1377	2.1377	6.9000e-004	0.0000	2.1550
Total	**1.6000e-003**	**0.0196**	**0.0101**	**2.0000e-005**	**6.1000e-004**	**7.5000e-004**	**1.3600e-003**	**7.0000e-005**	**6.9000e-004**	**7.6000e-004**	**0.0000**	**2.1377**	**2.1377**	**6.9000e-004**	**0.0000**	**2.1550**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.8000e-004	6.2500e-003	1.3300e-003	2.0000e-005	4.1000e-004	2.0000e-005	4.3000e-004	1.1000e-004	2.0000e-005	1.3000e-004	0.0000	1.7921	1.7921	1.2000e-004	0.0000	1.7952
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	4.4000e-004	0.0000	1.4000e-004	0.0000	1.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1195	0.1195	0.0000	0.0000	0.1195
Total	**2.3000e-004**	**6.2900e-003**	**1.7700e-003**	**2.0000e-005**	**5.5000e-004**	**2.0000e-005**	**5.7000e-004**	**1.5000e-004**	**2.0000e-005**	**1.7000e-004**	**0.0000**	**1.9115**	**1.9115**	**1.2000e-004**	**0.0000**	**1.9147**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.5000e-004	0.0000	7.5000e-004	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0000e-004	7.2500e-003	7.5700e-003	1.0000e-005		4.1000e-004	4.1000e-004		3.9000e-004	3.9000e-004	0.0000	1.0409	1.0409	1.9000e-004	0.0000	1.0458
Total	**8.0000e-004**	**7.2500e-003**	**7.5700e-003**	**1.0000e-005**	**7.5000e-004**	**4.1000e-004**	**1.1600e-003**	**4.1000e-004**	**3.9000e-004**	**8.0000e-004**	**0.0000**	**1.0409**	**1.0409**	**1.9000e-004**	**0.0000**	**1.0458**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.5000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0956	0.0956	0.0000	0.0000	0.0956
Total	**4.0000e-005**	**3.0000e-005**	**3.5000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0956**	**0.0956**	**0.0000**	**0.0000**	**0.0956**

3.3 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.4000e-004	0.0000	3.4000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0000e-004	7.2500e-003	7.5700e-003	1.0000e-005		4.1000e-004	4.1000e-004		3.9000e-004	3.9000e-004	0.0000	1.0409	1.0409	1.9000e-004	0.0000	1.0458
Total	**8.0000e-004**	**7.2500e-003**	**7.5700e-003**	**1.0000e-005**	**3.4000e-004**	**4.1000e-004**	**7.5000e-004**	**1.9000e-004**	**3.9000e-004**	**5.8000e-004**	**0.0000**	**1.0409**	**1.0409**	**1.9000e-004**	**0.0000**	**1.0458**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.5000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0956	0.0956	0.0000	0.0000	0.0956
Total	**4.0000e-005**	**3.0000e-005**	**3.5000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0956**	**0.0956**	**0.0000**	**0.0000**	**0.0956**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0314	0.3234	0.2942	4.6000e-004		0.0181	0.0181		0.0167	0.0167	0.0000	40.5332	40.5332	0.0131	0.0000	40.8610
Total	**0.0314**	**0.3234**	**0.2942**	**4.6000e-004**		**0.0181**	**0.0181**		**0.0167**	**0.0167**	**0.0000**	**40.5332**	**40.5332**	**0.0131**	**0.0000**	**40.8610**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2000e-004	3.9200e-003	9.7000e-004	1.0000e-005	2.6000e-004	1.0000e-005	2.6000e-004	7.0000e-005	1.0000e-005	8.0000e-005	0.0000	0.9888	0.9888	6.0000e-005	0.0000	0.9904
Worker	6.8000e-004	5.0000e-004	5.6500e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.7900e-003	4.7000e-004	1.0000e-005	4.8000e-004	0.0000	1.5482	1.5482	4.0000e-005	0.0000	1.5492
Total	**8.0000e-004**	**4.4200e-003**	**6.6200e-003**	**3.0000e-005**	**2.0400e-003**	**2.0000e-005**	**2.0500e-003**	**5.4000e-004**	**2.0000e-005**	**5.6000e-004**	**0.0000**	**2.5370**	**2.5370**	**1.0000e-004**	**0.0000**	**2.5396**

3.4 Building Construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0314	0.3234	0.2942	4.6000e-004		0.0181	0.0181		0.0167	0.0167	0.0000	40.5332	40.5332	0.0131	0.0000	40.8609
Total	**0.0314**	**0.3234**	**0.2942**	**4.6000e-004**		**0.0181**	**0.0181**		**0.0167**	**0.0167**	**0.0000**	**40.5332**	**40.5332**	**0.0131**	**0.0000**	**40.8609**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2000e-004	3.9200e-003	9.7000e-004	1.0000e-005	2.6000e-004	1.0000e-005	2.6000e-004	7.0000e-005	1.0000e-005	8.0000e-005	0.0000	0.9888	0.9888	6.0000e-005	0.0000	0.9904
Worker	6.8000e-004	5.0000e-004	5.6500e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.7900e-003	4.7000e-004	1.0000e-005	4.8000e-004	0.0000	1.5482	1.5482	4.0000e-005	0.0000	1.5492
Total	**8.0000e-004**	**4.4200e-003**	**6.6200e-003**	**3.0000e-005**	**2.0400e-003**	**2.0000e-005**	**2.0500e-003**	**5.4000e-004**	**2.0000e-005**	**5.6000e-004**	**0.0000**	**2.5370**	**2.5370**	**1.0000e-004**	**0.0000**	**2.5396**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5200e-003	0.0667	0.0680	1.1000e-004		3.5300e-003	3.5300e-003		3.2500e-003	3.2500e-003	0.0000	9.5140	9.5140	3.0800e-003	0.0000	9.5910
Total	**6.5200e-003**	**0.0667**	**0.0680**	**1.1000e-004**		**3.5300e-003**	**3.5300e-003**		**3.2500e-003**	**3.2500e-003**	**0.0000**	**9.5140**	**9.5140**	**3.0800e-003**	**0.0000**	**9.5910**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	8.7000e-004	2.2000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2299	0.2299	1.0000e-005	0.0000	0.2303
Worker	1.5000e-004	1.1000e-004	1.2200e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3501	0.3501	1.0000e-005	0.0000	0.3504
Total	**1.8000e-004**	**9.8000e-004**	**1.4400e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.5800**	**0.5800**	**2.0000e-005**	**0.0000**	**0.5806**

3.4 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5200e-003	0.0667	0.0680	1.1000e-004		3.5300e-003	3.5300e-003		3.2500e-003	3.2500e-003	0.0000	9.5140	9.5140	3.0800e-003	0.0000	9.5909
Total	**6.5200e-003**	**0.0667**	**0.0680**	**1.1000e-004**		**3.5300e-003**	**3.5300e-003**		**3.2500e-003**	**3.2500e-003**	**0.0000**	**9.5140**	**9.5140**	**3.0800e-003**	**0.0000**	**9.5909**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	8.7000e-004	2.2000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2299	0.2299	1.0000e-005	0.0000	0.2303
Worker	1.5000e-004	1.1000e-004	1.2200e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3501	0.3501	1.0000e-005	0.0000	0.3504
Total	**1.8000e-004**	**9.8000e-004**	**1.4400e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.5800**	**0.5800**	**2.0000e-005**	**0.0000**	**0.5806**

3.5 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6200e-003	0.0148	0.0176	3.0000e-005		7.4000e-004	7.4000e-004		6.9000e-004	6.9000e-004	0.0000	2.3492	2.3492	6.8000e-004	0.0000	2.3663
Paving	1.7000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7900e-003**	**0.0148**	**0.0176**	**3.0000e-005**		**7.4000e-004**	**7.4000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**2.3492**	**2.3492**	**6.8000e-004**	**0.0000**	**2.3663**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-004	1.3000e-004	1.4500e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4146	0.4146	1.0000e-005	0.0000	0.4149
Total	**1.8000e-004**	**1.3000e-004**	**1.4500e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4146**	**0.4146**	**1.0000e-005**	**0.0000**	**0.4149**

3.5 Paving - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6200e-003	0.0148	0.0176	3.0000e-005		7.4000e-004	7.4000e-004		6.9000e-004	6.9000e-004	0.0000	2.3492	2.3492	6.8000e-004	0.0000	2.3663
Paving	1.7000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7900e-003**	**0.0148**	**0.0176**	**3.0000e-005**		**7.4000e-004**	**7.4000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**2.3492**	**2.3492**	**6.8000e-004**	**0.0000**	**2.3663**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8000e-004	1.3000e-004	1.4500e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4146	0.4146	1.0000e-005	0.0000	0.4149
Total	**1.8000e-004**	**1.3000e-004**	**1.4500e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4146**	**0.4146**	**1.0000e-005**	**0.0000**	**0.4149**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0150					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1000e-004	3.5200e-003	4.5300e-003	1.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004	0.0000	0.6383	0.6383	4.0000e-005	0.0000	0.6394
Total	**0.0155**	**3.5200e-003**	**4.5300e-003**	**1.0000e-005**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**	**0.0000**	**0.6383**	**0.6383**	**4.0000e-005**	**0.0000**	**0.6394**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	8.0000e-005	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0230	0.0230	0.0000	0.0000	0.0231
Total	**1.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0230**	**0.0230**	**0.0000**	**0.0000**	**0.0231**

3.6 Architectural Coating - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0150					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1000e-004	3.5200e-003	4.5300e-003	1.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004	0.0000	0.6383	0.6383	4.0000e-005	0.0000	0.6394
Total	**0.0155**	**3.5200e-003**	**4.5300e-003**	**1.0000e-005**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**	**0.0000**	**0.6383**	**0.6383**	**4.0000e-005**	**0.0000**	**0.6394**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	8.0000e-005	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0230	0.0230	0.0000	0.0000	0.0231
Total	**1.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0230**	**0.0230**	**0.0000**	**0.0000**	**0.0231**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.1593	0.8121	1.4842	4.9000e-003	0.3769	4.0400e-003	0.3810	0.1010	3.7700e-003	0.1048	0.0000	453.8737	453.8737	0.0258	0.0000	454.5180
Unmitigated	0.1593	0.8121	1.4842	4.9000e-003	0.3769	4.0400e-003	0.3810	0.1010	3.7700e-003	0.1048	0.0000	453.8737	453.8737	0.0258	0.0000	454.5180

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	740.52	740.52	740.52	991,965	991,965
Parking Lot	0.00	0.00	0.00		
Total	740.52	740.52	740.52	991,965	991,965

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	16.60	8.40	6.90	33.00	48.00	19.00	21	51	28
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Parking Lot	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	117.9314	117.9314	4.8700e-003	1.0100e-003	118.3534
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	117.9314	117.9314	4.8700e-003	1.0100e-003	118.3534
NaturalGas Mitigated	6.5100e-003	0.0592	0.0497	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003	0.0000	64.4179	64.4179	1.2300e-003	1.1800e-003	64.8007
NaturalGas Unmitigated	6.5100e-003	0.0592	0.0497	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003	0.0000	64.4179	64.4179	1.2300e-003	1.1800e-003	64.8007

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	1.20715e+006	6.5100e-003	0.0592	0.0497	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003	0.0000	64.4179	64.4179	1.2300e-003	1.1800e-003	64.8007
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**6.5100e-003**	**0.0592**	**0.0497**	**3.6000e-004**		**4.5000e-003**	**4.5000e-003**		**4.5000e-003**	**4.5000e-003**	**0.0000**	**64.4179**	**64.4179**	**1.2300e-003**	**1.1800e-003**	**64.8007**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	1.20715e+006	6.5100e-003	0.0592	0.0497	3.6000e-004		4.5000e-003	4.5000e-003		4.5000e-003	4.5000e-003	0.0000	64.4179	64.4179	1.2300e-003	1.1800e-003	64.8007
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**6.5100e-003**	**0.0592**	**0.0497**	**3.6000e-004**		**4.5000e-003**	**4.5000e-003**		**4.5000e-003**	**4.5000e-003**	**0.0000**	**64.4179**	**64.4179**	**1.2300e-003**	**1.1800e-003**	**64.8007**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	368030	117.2623	4.8400e-003	1.0000e-003	117.6819
Parking Lot	2100	0.6691	3.0000e-005	1.0000e-005	0.6715
Total		**117.9314**	**4.8700e-003**	**1.0100e-003**	**118.3534**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	368030	117.2623	4.8400e-003	1.0000e-003	117.6819
Parking Lot	2100	0.6691	3.0000e-005	1.0000e-005	0.6715
Total		**117.9314**	**4.8700e-003**	**1.0100e-003**	**118.3534**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0130	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Unmitigated	0.0130	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.5000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0114					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Total	**0.0130**	**0.0000**	**2.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.5000e-004**	**4.5000e-004**	**0.0000**	**0.0000**	**4.8000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.5000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0114					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Total	**0.0130**	**0.0000**	**2.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.5000e-004**	**4.5000e-004**	**0.0000**	**0.0000**	**4.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	7.4479	3.1000e-004	6.0000e-005	7.4746
Unmitigated	7.4479	3.1000e-004	6.0000e-005	7.4746

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 2.104	7.4479	3.1000e-004	6.0000e-005	7.4746
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**7.4479**	**3.1000e-004**	**6.0000e-005**	**7.4746**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 2.104	7.4479	3.1000e-004	6.0000e-005	7.4746
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**7.4479**	**3.1000e-004**	**6.0000e-005**	**7.4746**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.3730	0.1402	0.0000	5.8789
Unmitigated	2.3730	0.1402	0.0000	5.8789

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	11.69	2.3730	0.1402	0.0000	5.8789
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**2.3730**	**0.1402**	**0.0000**	**5.8789**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	11.69	2.3730	0.1402	0.0000	5.8789
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**2.3730**	**0.1402**	**0.0000**	**5.8789**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

On-site Exhaust Emissions Calculations

Car Wash Calculations

Time in Queue (Min)	10.00
Time in Queue (Hr)	0.167
gram to lbs	0.00220462
Miles traveled	5

Pollutant	grams/mile-vehicle	Per Vehicle (lbs/hour)	Per vehicle (lbs/vehicle trip)	369 vehicles (pounds per day)
ROG	0.015	0.00017	0.00003	**0.010**
NOX	0.018	0.00020	0.00003	**0.012**
CO	0.238	0.00263	0.00044	**0.162**
SOX	0.001	0.00001	0.00000	**0.001**
PM10	0.001	0.00002	0.00000	**0.001**
PM2.5	0.001	0.00001	0.00000	**0.001**

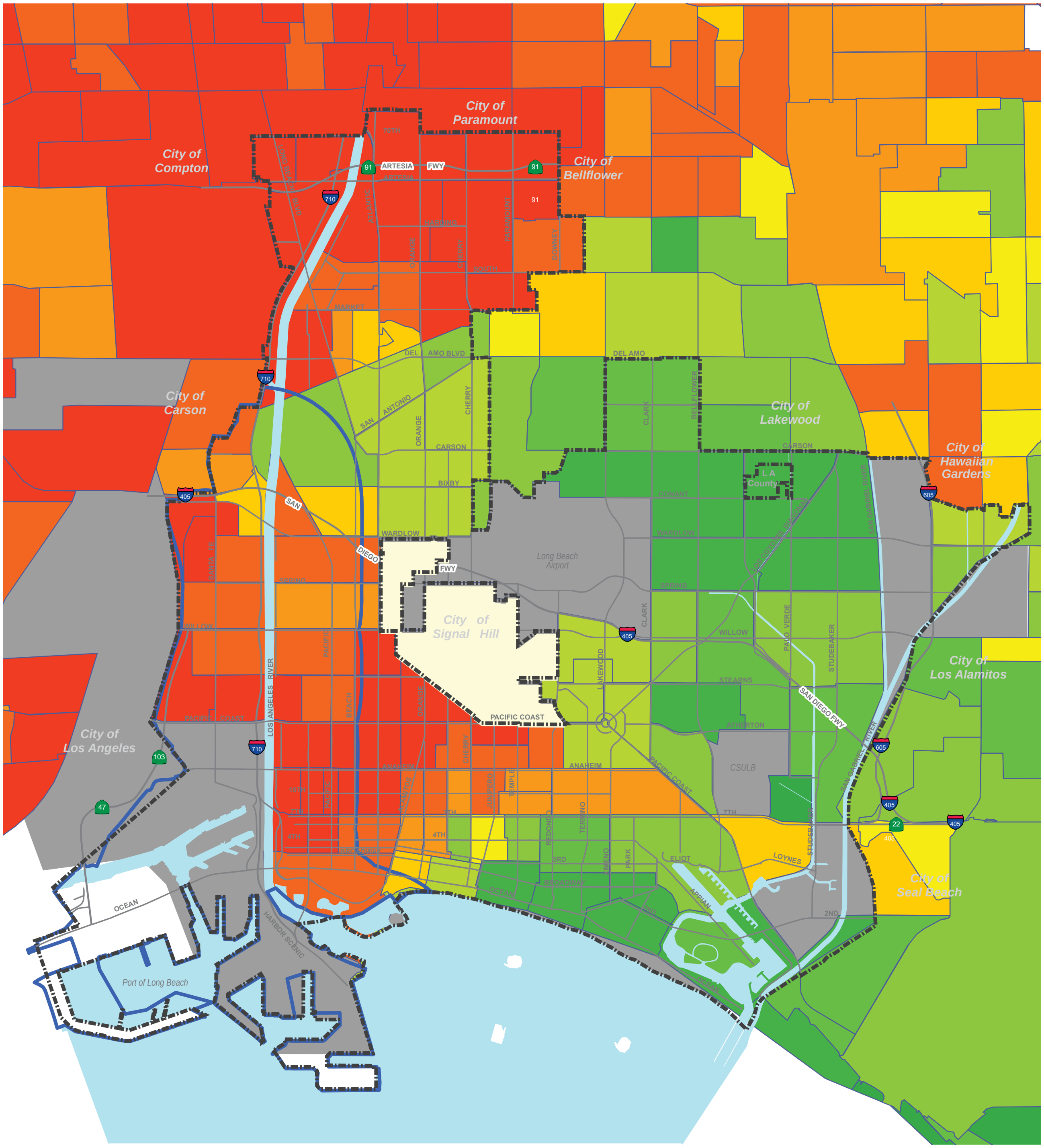
Car Wash Calculations

Time in Queue (Min)	10.00
Time in Queue (Hr)	0.167
gram to lbs	0.00220462
Miles traveled	5

Pollutant	grams/mile-vehicle	Per Vehicle (lbs/hour)	Per vehicle (lbs/vehicle trip)	Vehicle Emissions (pounds per day)
ROG	0.015	0.00017	0.00003	**10.349**
NOX	0.018	0.00020	0.00003	**12.426**
CO	0.238	0.00263	0.00044	**164.297**
SOX	0.001	0.00001	0.00000	**0.642**
PM10	0.001	0.00002	0.00000	**1.003**
PM2.5	0.001	0.00001	0.00000	**0.923**

Number of Vehicles	375000

Map LU-6
Impacted Communities



Legend

CalEnviroScreen 3.0 Scores by Census Tract (Deciles)

- 91 - 100 % (Highest Score)
- 81 - 90%
- 71 - 80%
- 61 - 70%
- 51 - 60%
- 41 - 50%
- 31 - 40%
- 21 - 30%
- 11 - 20%
- 0 - 10% (Lowest Score)
- High pollution, low population
- Port Impact Zone 1a

0 0.25 0.5 1 Mile

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How to protect school children from the neurodevelopmental harms of air pollution by interventions in the school environment in the urban context

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ABSTRACT

Recently, there has been a flurry of publications assessing the effect of air pollution on neurodevelopment. Here we present a summary of the results obtained within the BRain dEvelopment and Air polluTion ultrafine particles in scHool childrEn (BREATHE) Project, which aimed to evaluate the effects of the exposure to traffic related air pollutants in schoolchildren in Barcelona. To this end, we comprehensively characterised air quality in 39 urban schools from Barcelona and identified the main determinants of children's increased exposure. We propose a series of measures to be implemented to improve air quality in schools within the urban context and, consequently, minimise the negative effects on children's neurodevelopment that we found to be associated with the exposure to air pollution. We also aimed to list some of the actions pushed by governments and the society (including school managers, parents, and children) that have been taking place around Europe for promoting better high quality in the school and its surroundings.

1. Introduction

Over 80% of world's population lives in urban areas that have higher levels of air pollution than the guidelines set by the WHO (2006). Particulate air pollution is the main environmental contributor to the global burden of disease and is one of the top preventable causes of disease over time (Cohen et al., 2017). Air pollution effects on the respiratory (such as asthma and reduced lung function) and cardiovascular system are well established but, because of the inadequacy of the available evidence, the potential effects of air pollution on brain development (and cognitive decline) have not been considered to date when estimating the burden associated with air pollution (Cohen et al., 2017). Pioneering studies on brain tissue from autopsies in dogs and children living in highly polluted areas of Mexico City showed inflammation in several brain areas (Calderón-Garcidueñas et al., 2008) and this work led to a long series of experiments in mice exposed to fine, ultrafine, and diesel particles (Costa et al., 2014). In mice, the central nervous system could be a direct or indirect target (via the olfactory or lung pathway, respectively) of particles that elicit a neuroinflammatory response in various brain regions. In humans, exposure to air pollution in utero is associated with increased risk of neurodevelopmental delay and autism (Lam et al., 2016).

Children are particularly vulnerable to environmental exposures since they are still under development. Moreover, due to their physiological (e.g. high breathing rates) and behavioural distinctions (e.g. high physical activity), children may receive higher doses of air pollutants than adults. As they spend long time in a shared location such as the school, it is important to ensure a good air quality in this environment for the benefit of the children and public health. Schools are a setting where children are aimed to expand their knowledge and manage behavioural responses, among other skills. Therefore, a proper characterisation of air pollutants in the schools and their associated health effects on cognition are needed to identify and target preventive actions to minimise the impact of air pollution.

BREATHE (BRain dEvelopment and Air polluTion ultrafine particles in scHool childrEn) is the largest epidemiological study in the general population assessing whether exposure of children to traffic related air pollutants (TRAPs) in schools adversely affects cognitive development (Sunyer et al., 2015) of urban children. The key strengths of BREATHE were the direct assessment of exposure in school classrooms and the school playgrounds, the study of cognitive function trajectories using repeated exams and the inclusion of neuroimaging. Here, we briefly

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Table 1
List of all BREATHE publications summarised in this article a by main topic.

Topic	References	Main findings
Air quality in school: levels, sources, pollutant infiltration, and greenness	Amato et al. (2014)	Identification of 7 outdoor and 2 children-activity-related $PM_{2.5}$ sources at schools.
	Dadvand et al. (2015b)	A reduction of indoor and outdoor air pollution was associated with greenness within and around schools.
	Minguillón et al. (2015)	The sands from playgrounds are fine enough to be resuspended and increase PM concentrations.
	Moreno et al. (2014)	Air quality in schools has notable spatial and temporal variations. High concentrations of traffic-carbon and metal PM into the classroom.
	Reche et al. (2015)	Indoor and outdoor BC levels depend on the distance to traffic.
	Reche et al. (2014)	Schools near traffic showed 40% higher indoor and outdoor UFP concentrations. High indoor UFP contributions from cooking, cleaning, and surface chemistry reactions mediated by O_3.
	Rivas et al. (2015)	High infiltration of air pollutants, with maximum infiltration observed for BC and Cd.
	Rivas et al. (2014)	School concentrations of BC, NO_2, UFP and, partially, $PM_{2.5}$ where the influenced by traffic emissions. Intermediate levels between UB and traffic stations were observed in schools.
Children's personal exposure	Nieuwenhuijsen et al. (2015)	The correlation between modelled (LUR) and measured personal black carbon levels was generally good, except for commuting times.
	Rivas et al. (2016)	School contributes to 37% of children's daily dose. Commuting periods have the highest dose:time intensity.
Aerosol instrumentation	Viana et al. (2015)	Good performance of three portable monitors for BC, UFP, and PM mass concentrations when compared with reference stationary monitors.
Air pollution and cognitive development	Alvarez-Pedrerol et al. (2017)	Exposure to $PM_{2.5}$ and BC during commuting by foot was associated with a reduced growth of working memory
	Basagaña et al. (2016)	From 9 different $PM_{2.5}$ sources, traffic was the only one associated with a reduction in cognitive development.
	Forns et al. (2016)	TRAPs at school were associated with increased behavioural problems and noise with more ADHD symptoms.
	Sunyer et al. (2015)	Children attending schools with higher TRAPs had a reduced improvement in cognitive development.
	Sunyer et al. (2017)	Short-term exposures to TRAPs were negatively associated with attention.
Gene-environment interactions	Alemany et al. (2016)	Involvement of the *PID1* gene, mTOR signalling and Alzheimer disease-amyloid secretase pathways in attention functions.
	Alemany et al. (2018)	For *APOE ε4* allele carriers, TRAPs were associated with higher behaviour problems and smaller reductions in inattentiveness, while no or weak associations were observed in *APOE ε4* noncarriers.
Air pollution and brain (MRI)	Mortamais et al. (2017)	Exposure to PAHs is associated with reduction in the caudate nucleus volume. No significant associations between PAH and ADHD symptoms.
	Pujol et al. (2016)	TRAPs were associated with brain changes of a functional nature, with no evident effect on brain anatomy, structure, or membrane metabolites.
Greenness and cognitive development	Dadvand et al. (2015a)	There was a beneficial association between exposure to green spaces in school and cognitive development, partly mediated by a reduction in exposure to air pollution.
Greenness and brain (MRI)	Dadvand et al. (2018)	Lifelong exposure to greenness was positively associated with grey and white matter volume in different regions of the brain.

MRI: Magnetic Resonance Imaging; BC: Black Carbon; UFP: ultrafine particles; PM: Particulate Matter; LUR: Land use Regression Models; TRAPs: Traffic-related air pollutants.

summarise the findings of the subprojects across the BREATHE Project (listed in Table 1) with the aim to discuss potential interventions at urban schools to lessen the negative effects of air pollution on children's neurodevelopment.

2. Data collected

Participants were recruited through cluster sampling by first selecting 39 schools in Barcelona (Catalonia, Spain) and then inviting all students without special needs in grades 2 through 4 (7–10 years of age) to participate (Sunyer et al., 2015). Most of the participants lived in Barcelona city, with some of them residing in suburban areas from the Barcelona Metropolitan Area. Participating children ($n = 2897$) from the 39 high and low TRAPs schools, paired by socio-economic status, were tested via a series of four computerized tests from January 2012 to March 2013 to evaluate working memory development, executive attention, impulsivity, and selective attention (Sunyer et al., 2015). Behavioural problems (Strengths and Difficulties Questionnaire) were reported by parents. Teachers reported Attention Deficit and Hyperactivity Disorder (ADHD) symptoms of each child using the ADHD Criteria of Diagnostic and Statistical Manual of Mental Disorders, fourth edition (ADHD-DSM-IV) list. From teacher ratings, we classified the children as having ADHD if 6 or more symptoms were present (López-Vicente et al., 2016). MRI (T2, flair, spectroscopy, and DTI) and fMRI (resting, visual and audition stimuli) were conducted in 265 children (Pujol et al., 2016). To assess gene-environment interaction, DNA samples were obtained from saliva samples from 2492 children, from which a subset of 1778 was selected for Genome Wide Association study (GWAs) (Alemany et al., 2016). A similar protocol to assess working memory and attention was applied to the 9-year follow-up of the INMA -Infancia y Medio Ambiente (Environment and Childhood) - birth cohort children (Gascon et al., 2017) to replicate the results in the near future.

Air pollution (nitrogen dioxide (NO_2; Gradko dosimeters), ultrafine particle number (UFP; DiSCmini, Matter Aerosol), Black Carbon (BC; MicroAethAE51, Aethlabs), and particulate matter (PM) $\leq 0.25\,\mu m$ (quasi-ultrafines), 0.25 to $2.5\,\mu m$ (accumulation mode), 2.5 to $10\,\mu m$ (coarse mode; all the previous fractions with a Sioutas Personal Cascade Impactor), $\leq 2.5\,\mu m$ ($PM_{2.5}$; with a MCV high volume sampler)) was measured during two one-week campaigns simultaneously inside the classroom and on the playground in each school pair during 2012 (Rivas et al., 2014). A total of 1092 PM filters were collected and more than 50 inorganic and organic compounds and elements were analysed (including organic carbon (OC), elemental carbon (EC), Al_2O_3, Ca, Sr, Fe, Mg, Cu, Sb, Sn, As, Co, Pb, Cr, and Polycyclic Aromatic Hydrocarbons (PAHs)). The same pollutants were also monitored in a reference urban background station in Barcelona (UB-PR). Note that for UFP, instruments with different size range were used and therefore the

Table 2
$PM_{2.5}$, NO_2, BC, UFP, and PAH concentrations for school hours (except for NO_2, which is for 24 h) of the 39 schools (indoor and outdoor), and the urban reference station of UB-PR. Modified from Rivas et al. (2014) and Mortamais et al. (2017).

	School classroom			School playground			Urban background (UB – PR)		
	Mean (SD)	Median	Range	Mean (SD)	Median	Range	Mean	Median	Range
$PM_{2.5}$ ($\mu g\,m^{-3}$)	37 (13)	33	13–84	29 (20)	23	10–111	17 (7)	15	10–38
NO_2 ($\mu g\,m^{-3}$)	30 (12)	30	5–69	47 (17)	46	14–98	41 (15)	38	23–97
BC ($\mu g\,m^{-3}$)	1.3 (0.6)	1.2	0.4–2.7	1.4 (0.6)	1.2	0.4–2.6	1.3 (0.6)	1.2	0.6–2.7
UFP ($10^3\,cm^{-3}$)	16 (7)	15	4–31	23 (10)	21	10–56	15 (5)	13	6–33
Total PAHs ($ng\,m^{-3}$)*	1.71 (1.11)	1.49	0.48–5.22	1.46 (0.70)	1.22	0.60–3.24	NA	NA	NA
B[*a*]P ($ng\,m^{-3}$)*	0.11 (0.07)	0.10	0.02–0.43	0.10 (0.06)	0.09	0.02–0.30	NA	NA	NA

B[*a*]P: Benzo[*a*]pyrene; NA: Not available.
* Data for 35 schools.

number concentrations are not directly comparable between schools and UB-PR. The performance of online instruments was positively assessed by Viana et al. (2015). Traffic noise in the classroom and traffic intensity at school entrance was directly measured (Forns et al., 2016). Residential air pollution exposure was modelled using Land Use Regression (LUR) Models (Wang et al., 2013). In addition, we carried out personal measurements of BC during 48 h in a subsample of 45 children, who were carrying a belt bag with a MicroAeth AE51 and a GPS for tracking location. Personal measurements allow for a more accurate determination of the exposure, but it requires an intensive fieldwork and the instruments may become a burden for the participants.

3. Effects of traffic air pollution at school on neurodevelopment in the BREATHE project

Overall, school air is relevant for a healthy brain development. Children attending schools with higher TRAPs (largely diesel pollutants such as elemental carbon (EC) and UFP), had a smaller improvement with age in cognitive development in all measured cognitive functions. For instance, children attending schools with high pollution levels had a 7.4% (95% confidence interval (CI) [5.6%–8.8%]) 1-year improvement in working memory versus an improvement of 11.5% (95% CI [8.9%–12.5%]) in children in low pollution levels (Sunyer et al., 2015). Similarly, TRAPs were associated with more frequent behavioural problems (Forns et al., 2016). As an example, an interquartile range increase (IQR) of indoor EC (IQR = 1.01 $\mu g\,m^{-3}$) was associated with an adjusted mean ratio of 1.07 (95% CI [1.01, 1.12]) with similar results for outdoor EC and outdoor NO_2. Results did not change when adjusted for noise. From the different sources identified for fine particles, only those generated from traffic showed an association with cognitive development (Basagaña et al., 2016). An IQR increase (3.8 $\mu g\,m^{-3}$) in indoor traffic-related $PM_{2.5}$ was associated with reductions in cognitive growth equivalent to 30% (95% CI [6%, 54%]) of the annual change in working memory. EC and NO_2, which are traffic tracers, were associated with lower functional integration and segregation in key brain networks using neuroimaging which indicates slower brain maturation (Pujol et al., 2016), and total PAHs and Benzo[*a*]pyrene (B[*a*]P) were associated with a decrease in the caudate nucleus volume (CNV). For instance, an IQR increase in outdoor (0.067 $ng\,m^{-3}$) and indoor (0.076 $ng\,m^{-3}$) B[*a*]P concentration was significantly linked to a decrease in CNV (mm^3) ($\beta = -150.6$, 95% CI [−259.1, −42.1], and $\beta = -122.4$, 95% CI [−232.9, −11.8], respectively; Mortamais et al., 2017). These chronic relationships were independent of the acute effects, though the short-term exposures to TRAPs (the day before) were also associated with daily fluctuations in attention (e.g., an IQR increase of ambient NO_2 was associated with the responses being 14.8 ms slower (95% CI [11.2, 18.4]); Sunyer et al., 2017). Furthermore, noise inside the classroom is related to ADHD symptoms, but the effects of TRAPs were independent of noise (Forns et al., 2016; Sunyer et al., 2017). The associations between TRAPs and neurobehavioral outcomes were modified by the *APOE ε4* allele, with those children that were carriers of the *APOE ε4* allele showing the associations, while non carriers showed weak or no associations (Alemany et al., 2018).

In addition, we proved that green space is beneficial for brain maturation (function and structure) (Dadvand et al., 2015a; Dadvand et al., 2018). For instance, we observed an improvement in the annual change in working memory associated with greenness within school boundaries (9.8, 95% CI [5.2, 14.0]). Furthermore, the exposure to $PM_{2.5}$ and BC from the commutes to schools by foot was also associated with a cognitive impairment since an IQR range increase in $PM_{2.5}$ and BC concentrations during children's commute decreased the annual growth of working memory by 5.4 (95% CI [−10.2, −0.6]) and 4.6 (95% CI [−9.0, −0.1]) points, respectively (other transport modes could not be evaluated; Alvarez-Pedrerol et al., 2017). The evidence gathered from the BREATHE project on the associations between the exposure to air pollutants in schools and impaired neurodevelopment calls for measures to abate TRAPs concentrations at schools to endorse the protection of child brain maturation.

4. Air quality at BREATHE schools

4.1. Characteristics of air quality at schools

4.1.1. Concentrations of air pollutants and infiltration of outdoor pollution

For all schools, average school-hours daily concentrations in indoor (and outdoor) school's environment ranged between 13 and 84 (10 − 111) $\mu g\,m^{-3}$ for $PM_{2.5}$, 6–69 (14–98) $\mu g\,m^{-3}$ for NO_2 (24 h averages), 0.4–2.7 (0.4–2.6) $\mu g\,m^{-3}$ for BC, 4–31 (10–56)·$10^3\,cm^3$ for UFP, and 0.48–5.22 (0.60–3.235) $ng\,m^{-3}$ for total PAHs (Table 2; Rivas et al., 2014, Mortamais et al., 2017). The range of concentrations and variability for BC, NO_2 and UFP measured in the 39 schools was higher outdoors, due to the higher influence of emission sources and meteorological factors in the outdoor environments. On the contrary, although traffic is an important source of PAHs, we observed higher concentrations of PAHs indoors, probably due to the preservation of these components in the absence of sunlight, since their transformations are driven by photochemistry (data not published). Average concentrations in the school playgrounds were generally higher than in the urban background station of UB-PR: 29 and 17 $\mu g\,m^{-3}$ of $PM_{2.5}$; 47 and 41 $\mu g\,m^{-3}$ of NO_2; 1.4 and 1.3 $\mu g\,m^{-3}$ for BC, and 24 and 15·$10^3\,cm^3$ of UFP; school playground and UB-PR, respectively (Table 2).

Concentrations of BC, NO_2, and UFP in schools generally showed an increasing gradient towards the city centre, following the traffic density in the city and pointing to the high contribution of the traffic source (Fig. 1). Consequently, schools in areas with higher vehicle intensities showed 30–35% higher BC levels. Outdoor BC concentrations at schools was significantly correlated with the percentage area used for the road

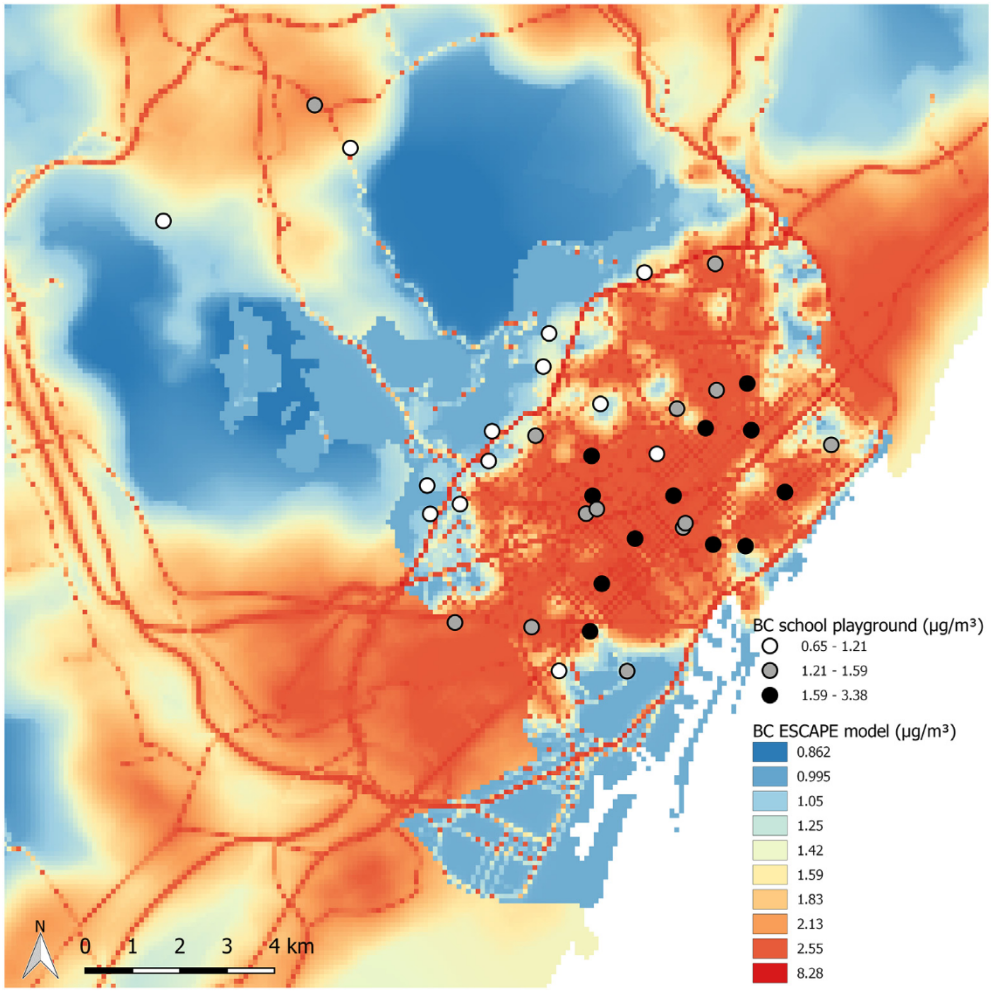

Fig. 1. Map of Barcelona and the schools by tertiles of annual Black Carbon (BC) concentration average. The background of the map is coloured according to modelled BC for Barcelona within the ESCAPE Project (Eeftens et al., 2012).

network in each district ($R^2 = 0.61$) (Reche et al., 2015). Higher indoor than outdoor BC levels were recorded at some schools when the indoor sampling location was relatively closer to a main road. These two facts indicate the strong dependency of the BC levels on the distance to traffic.

On the other hand, important school local sources affecting $PM_{2.5}$ concentrations prevent $PM_{2.5}$ from being a good indicator of traffic emissions in schools (Amato et al., 2014; Rivas et al., 2014). It is important to highlight that these local sources were also responsible for the bulk $PM_{2.5}$ concentrations in the schools being much higher (nearly double) than the typical concentrations recorded in the urban background of Barcelona (Rivas et al., 2014).

Different indoor-to-outdoor concentration patterns were observed for the different pollutants. On average, concentrations on the playgrounds were 1.6 times higher than indoors for NO_2 and 1.5 times higher for UFP, while BC concentrations were similar in both environments. $PM_{2.5}$ had 1.6 times higher concentration indoors because OC (the most important contributor to indoor $PM_{2.5}$), Ca, and Sr were importantly generated indoors. NO_2 showed a similar infiltration in the warm and cold seasons (50% and 56%, respectively), thus independently of the windows opening or closing (Rivas et al., 2015). Indoor-to-outdoor correlations showed low R^2 and infiltration factors for UFP because of indoor particle sources (which was indicated by high intercepts in the linear regressions). However, indoor levels of UFP were still influenced by outdoor levels as well as by average ambient temperatures (Reche et al., 2014).

4.1.2. *Sources of air pollution*

A source apportionment analysis by Positive Matrix Factorization (PMF) allowed the identification of eight factors or sources (*mineral*, *traffic*, *road dust*, *secondary sulphate and organics*, *secondary nitrate*, *sea spray*, *heavy oil combustion*, *metallurgy*) which corresponded to well-known sources of PM in the study area, plus a ninth factor named *organic/textile/chalk* which was observed for the first time (Amato et al., 2014).

The *organic/textile/chalk* source was the largest source in classrooms, contributing to 45% of indoor $PM_{2.5}$ ($16.0\,\mu g\,m^{-3}$). It was characterized by OC (from cotton fibres, skin flakes, etc.), and Ca and Sr (from blackboard chalk) (Moreno et al., 2014; Rivas et al., 2014). Other studies in schools also reported very high concentrations of OC (Braniš and Šafránek, 2011; Fromme et al., 2008) as well as Ca and Sr from chalk use (Chithra and Shiva Nagendra, 2013; Dorizas et al., 2015; Fromme et al., 2008). In playgrounds, this source was still significant (16% on average; $5.3\,\mu g\,m^{-3}$), while on the contrary the contribution in the urban background station was below 1%. Therefore, this source is mostly a school-specific indoor source, characteristic of a crowded environment with an intensive use of chalkboards.

The *mineral* factor was strongly dependent on the type of playground (high concentrations for sandy playgrounds - $16\,\mu g\,m^{-3}$ outdoors - and lower for the paved ones - $2.5\,\mu g\,m^{-3}$) and showed unusually high levels of mineral matter in $PM_{2.5}$. Children's activity in sandy playgrounds may result in the grinding of mineral particles into smaller sizes, which then becomes a concern for air quality due to dust resuspension in the $PM_{2.5}$ fraction (H.Valido et al., 2018). The mineralogy determines the particle size distribution: a higher content of quartz implies a coarser size distribution. Therefore, the selection of sands with minerals of coarser size may diminish the potential impact on emissions due to resuspension. In classrooms, the highest concentrations of *mineral* were observed during the cold season, because of the accumulation of these particles due to closed windows and more indoor activities (favouring a continuous resuspension of deposited indoor particles). Other studies around the world have also observed high $PM_{2.5}$ or mineral concentrations in schools, due the high number of pupils and their high physical activity levels, which raises resuspension (Almeida et al., 2011; Blondeau et al., 2005; Chithra and Shiva Nagendra, 2013). The type of window seemed to be importantly associated with higher indoor levels of mineral components (such as Al_2O_3, Fe, Mg) and components with a very high contribution from indoor sources (OC, Ca, Sr) in those schools with aluminium or PVC windows (Rivas et al., 2015). Therefore, the presence of a more insulating window (such as the Al/PVC framed instead of wood framed) would be an important barrier for the dispersion of mineral components, which might keep resuspended in such a crowed indoor environment. Much lower *mineral* contributions were found in the urban background of Barcelona city (0.6 $\mu g\,m^{-3}$) than in schools, also indicating that this is mainly a local source at schools. Thus, *mineral* and *organic/textile/chalk* sources were responsible for the very high bulk $PM_{2.5}$ concentrations in the indoor environment (37 $\mu g\,m^{-3}$) and for almost doubling concentrations in playgrounds (29 $\mu g\,m^{-3}$) than in UB-PR (17 $\mu g\,m^{-3}$).

Motor exhaust emissions (OC, EC) and metals from brake wear (Cu, Sb, Sn and Fe) were the main components of the *traffic* factor (Amato et al., 2014). Contributions from *traffic* emissions were quite similar at the three studied environments, although a higher influence of this source is observed at schools than in the urban background: classrooms (4.8 $\mu g\,m^{-3}$), playgrounds (5.5 $\mu g\,m^{-3}$) and urban background air quality monitoring station (4.1 $\mu g\,m^{-3}$). Regarding the high concentrations of the *traffic* source indoors, BC (a traffic tracer) showed one of the highest infiltration of all $PM_{2.5}$ components, with the 92% of indoor BC coming from the outside during the warm season and 75% during the cold one (Rivas et al., 2015). This very high infiltration for BC was also observed in homes in Winsor (Canada; MacNeill et al., 2012). These results point out the necessity to locate future schools far away from trafficked streets.

Many trace elements had low or no correlation with BC (traffic tracer) and Al_2O_3 (tracer of mineral elements), which indicates a source other than traffic or crustal emissions, such as the *heavy oil combustion* (mostly from shipping emissions, with an average contribution of 0.6 and 0.7 $\mu g\,m^{-3}$ in the classroom and in the playground, respectively) and the *metallurgy* (1.0 and 1.2 $\mu g\,m^{-3}$, classroom and playground, respectively) factors identified by PMF. On the other hand, some elements such as As, Co, and Pb were quite correlated with mineral matter, suggesting that mineral matter could be polluted by dry and wet deposition of these pollutants on the playground and retained by absorption on crustal elements (Minguillón et al., 2015). Moreover, some of the trace metals were affected by significant indoor sources in a number of schools (Rivas et al., 2015). Cr should be highlighted, since it had higher levels indoors in both seasons. Further research is required in order to identify indoor sources of Cr and other trace metals, some of which are especially relevant due to their toxicity.

Besides the influence of traffic emissions, real-time measurements of UFP evidenced the contribution from cooking activities. Moreover, significant increases in indoor UFP concentrations (up to three times higher than outdoors) were observed after school hours, probably due to cleaning activities (Reche et al., 2014) that enhance the secondary particle formation by reaction between infiltrated O_3 and gaseous emissions from the cleaning products (cleaning product choice is also important; Singer et al., 2006). Cleaning activities were also identified as a significant source of UFP in schools in Brisbane (Australia; Mazaheri et al., 2016). Other O_3-reactive chemicals present in surfaces and materials, such as wood furniture and paints, can also lead to the formation of UFP (Weschler, 2006). Furthermore, midday increases of between 15 and 70% of the UFP concentrations in school playgrounds was also partly attributed to new particle formation by photochemical processes that took place all year round but with higher intensity during spring and summer, when the solar radiations is highest. Generally, indoor UFP number concentrations were lower than outdoors, and to some degree, explained by outdoor UFP concentrations as evidenced by multivariate linear regression (Reche et al., 2014).

4.1.3. The effect of vegetation (greenness) on school air quality

Schools having more vegetation (higher greenness levels) within school boundaries and the surroundings consistently showed lower indoor and outdoor concentrations of NO_2, UFP, BC, and the $PM_{2.5}$ contribution from the traffic source (from PMF), all of them being traffic-related air pollutants (TRAPS) (Dadvand et al., 2015b). Those schools with higher number of trees around them had a stronger reduction of TRAPs concentrations. It is still not clear if this is due to a trapping effect of the vegetation or to the lower emission in areas with lower space proportion dedicated to traffic as reported by Reche et al. (2015). The reduction of the indoor concentrations was partly mediated by the reduction of concentrations on the playgrounds.

4.2. Personal BC measurements in schoolchildren

Hourly BC concentrations were higher and the range was wider in personal measurements than in schools owing to peak concentration events that took place mainly during commuting time. Children spent 6% of their time on commuting but received 20% of their daily BC dose, due to co-occurrence with road traffic rush hours and the proximity to the source. In fact, the geometric mean of personal BC concentrations were significantly higher during commuting time (2.0 $\mu g\,m^{-3}$) than during periods when children were in the classroom (1.2 $\mu g\,m^{-3}$) or in the school playground (1.0 $\mu g\,m^{-3}$). This is in accordance with Buonanno et al. (2013), where the highest dose intensity was also found during commuting time in children's personal measurements from Cassino (Italy). As an average, children received 37% of their daily-integrated BC dose at school (21% in the classrooms and 16% in the playgrounds). Indoor environments (classroom and home) were responsible for the 56% BC dose. The relationship between personal monitoring and fixed stations at schools (indoor and outdoor) and in UB-PR was also evaluated (Rivas et al., 2016). Exposure could be significantly different, even between children attending the same school, as a result of the different time-activity patterns of each child and this variability could not be taken into account only with the fixed stations. We also evaluated the relationship between modelled home and school BC estimates and personal BC exposure levels in different microenvironments (home, school, and commute) obtaining a generally good correlation, with the exception of commuting times (Nieuwenhuijsen et al., 2015).

5. Actions to demand better air quality in schools

In the last few years, there has been a boost of actions to demand or to promote a reduction of air pollution levels in the school surroundings which have started within the society, organisations, and at local/regional authorities. For instance, at a national level, the French Government has recently published a Program of measures for the improvement of indoor air quality with some actions targeting schools. The Program focuses on the reduction of indoor emissions (from cleaning products, furniture and other surfaces) but also in the protection against outdoor air pollution and promoting awareness within the school community (French Ministry of Ecological and Inclusive Transition, 2018).

At a municipal level, many localities have started to plan or introduce measures to improve air quality in the school surroundings. London is a good example, with one of the most ambitious plans to improve air quality. Besides introducing the world's first Ultra-Low Emission Zone (ULEZ) from 8 April 2019 in Central London, the Mayor of London announced that 50 primary schools located in areas exceeding legal limits of NO_2 will be assessed to identify key interventions to reduce the exposure of the children while running a pollution awareness-raising education program at each school (Mayor of London, 2017). In Spain, many cities (e.g. Barcelona, Sabadell, Granada, Zaragoza) have include specific measures to protect schools in their Program for the Improvement of Air Quality. In regions or cities where air pollution reaches extremely high levels, such as Delhi and Beijing, local and regional authorities have cancelled classes during pollution peaks to prevent the children from commuting in such a toxic air (Kausar, 2017).

Moreover, schools and communities around schools (e.g. families, teachers, school managers) are getting involved into activities to promote clean air and to make students and their parents aware of the threat of the exposure to high levels of air pollutants. For instance, in London, there is a campaign for banning parents driving their children to school, as a way to reduce emissions around schools and to promote active and public modes of transport (Taylor, 2018). In Belgium, a group of parents who wish to live in healthier cities have started an action named Filter-Café-Filtré (filter-café-filtré.be) and is calling other parents from around the country to organise street closings at the entrance of their children's school every Friday morning before the start of the school while have a coffee together in a road empty of cars.

In a direct link with the results from the BREATHE project, besides direct communications with the City Council of Barcelona, BREATHE researchers have been approach by different schools' actors (e.g. teachers, students) to ask for recommendation to improve school air quality, ask for collaboration on new air quality measurements and the assessment of the improvement by some measures taken. Moreover, there are also local and regional civil movements for better air quality that have been working bringing attention on the importance of reducing air pollution at schools. For instance, some of the BREATHE researchers have participated in the project *Enlaira't* (http://www.enlairat.org) that the Plataforma per la Qualitat del Aire in Barelona has carried out in secondary schools in which the students think about air pollution and how to improve air quality in their city.

6. Recommendations to improve air quality in schools

The previous results allow the suggestion of measures and recommendations that could be of interest for urban planners and public policymakers, as well as for school managers and families. All or some of these measures should be effective in urban areas around the world where traffic is a significant source of air pollution, although different measures might be needed depending on local sources or school characteristics of specific regions. The efficiency of these measures in reducing air pollutants in schools needs to be quantified as, to the knowledge of the authors, there are yet no studies assessing the effect of these interventions. The most important recommendations from this list are summarised in Table 3.

- Since the exposure to traffic-related pollutants depends on distance to road traffic, future schools should be located away from trafficked roads.
- Road traffic density should be lessened around existing schools to diminish children's exposure to air pollutants, especially if schools are surrounded by canyon streets. Avoid congestion caused by bottlenecks (e.g. at the entrance or exits from a major road/highway) around the school.
- The classrooms where children spend most of their time should not be facing the busiest road, but facing an interior patio or the calmest street around the school.
- When traffic cannot be controlled, air intake for classroom ventilation should take either filtered air or fresh air from farthest away from the road traffic, both at the maximum possible height and maximum horizontal distance.
- In areas affected by high O_3 concentrations, if mechanical ventilation is turned on from April to September (when O_3 concentrations are the highest), O_3 traps should be installed on the system.
- High levels of textile, chalk and organic particles measured in $PM_{2.5}$ are due to high children density. Therefore, ventilation is advised, but only in cases when the classroom is not directly oriented to a major road. If the latter is the case, ventilation should be done during few minutes when children are not present in the classroom and avoiding traffic peak hour.
- Greening the school may help to abate exposure. Increasing the green and pedestrian spaces in the surrounding area would result in diminishing the proportion of the area used by cars and consequently would yield to lower levels of pollution.
- When selecting species for greening the schools low VOC and pollen emitting species should be selected.
- Parents and children should avoid major roads (in terms of traffic density) for commuting to and from school. Walking in the most exterior part of the pavement (furthest away from traffic) should be advised.
- Pedestrian school pathways should be implemented and designed to go through low traffic streets or at a distance to the kerbside of roads, in order to increase security and minimise children's exposure to air pollutants.
- The use of public instead of private transport for commuting would lead to the reduction of the number of cars around the school and consequently emissions would be abated.
- Periodic replacement of sand from the playgrounds (every one or two years) is advised because atmospheric scavenging of pollutants results in the accumulation of those on the playground sand. Also children activity on the playground results in the size of the mineral dust becoming finer over time which affects $PM_{2.5}$ levels.
- Sands with low clay and high feldspar or quartz content should be used in schools with sand-filled playgrounds to avoid producing fine $PM_{2.5}$. However, the emissions of $PM_{2.5}$ from the sands need to be

Table 3
Summary of the most important recommendations ordered by ease of implementation.

Recommendation	Target:	To be implemented by:
Raise awareness within and outside the school community of impacts on children's and public health of air pollution and spread measures to reduce the use of private cars	TRAPs and other pollutants	School managers, teachers, students, parents
Promote active travel or public transport to commute to school	TRAPs	School managers, teachers, students, parents, transport planners
Clean the classrooms after school hours (opening the windows) and select a 'green' cleaning product	VOCs and UFP	School managers, cleaning staff
Reduce traffic in school surroundings, increase greening	TRAPs	Urban designers, transport planners
Clean and replace sand from the playgrounds periodically	Mineral and traffic pollutants	School managers
Move schools or classrooms away from traffic.	Traffic emissions	School managers, urban designers

studied.

- Construction materials, paints, and furniture with a low VOC emission profile should be used to build or remodel schools to avoid high exposure to VOCs such as formaldehyde and to reduce the effect of the VOCs-O_3 reactions that may result in indoor air quality deterioration.
- Cleaning activities might help to reduce mineral matter resuspension in the indoor environments. However, since the cleaning products that are usually employed might react with O_3 to form new particles (in the range of UFP and carbonyl VOCs), cleaning works are recommended to be carried out in the afternoon after school hours (while having the windows open) to avoid children being exposed to additional concentrations of UFP.
- For ensuring better indoor air quality we also recommend the use of cleaning products with low proportion of ozone reactive constituents (e.g. use of pine oil-based instead of orange oil-based cleaning products; Singer et al., 2006) or more sustainable cleaning options (e.g. 'green' products, vinegar and baking soda).
- Raising awareness of the health impacts of air pollution in the school community (children and their parents, teachers, etc.). Monitors could be placed in school to get the students and parents involved and become an active agent of change by choosing and encouraging others to avoid using the private car when other options for commuting are available.

Our recommendations as well as the measures included in the different programs mentioned are in line with the EPA Best Practices for Reducing Near-Road Pollution Exposure at Schools (US-EPA, 2015).

It is obvious that there exists concern about the detrimental effects that air pollution may pose to schoolchildren. Hence scientists, teachers, parents, and other civil society stakeholders are raising concern, promoting, and demanding changes in the current mobility patterns based on an extensive use of private motorised vehicles in order to protect the health of children and, consequently, that of all the population. We believe that these recommendations are a useful starting point to ensure a better health of children.

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Attachment L

CBRE

COMMERCIAL REAL ESTATE SERVICES

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May 17, 2021

Paul Dadgar
29501 Canwood Street, Suite 200
Agoura Hills CA 91301

Re: Proposed Bliss Car Wash - NWC Del Amo Blvd & Long Beach Blvd.

Dear Paul:

On behalf of our retail team at CBRE, we represent several large national, regional, and local tenants who have reviewed the above referenced site and based on our evaluation we believe that a Bliss Car Wash represents the highest & best use for the project site, as other users are unlikely to occupy the site. Our recommendation is based on several factors including, but not limited to, the fact that the property is anchored by a service station on the northwest corner of Del Amo & Long Beach Blvd., which limits the number of suitable retail tenants who can coexist with the existing service station use. Additionally, the subject site is situated on a well trafficked corridor, but the intersection lacks the necessary synergy from daily needs retail and restaurants typically mandated by most national credit tenants. Alternatively, Bliss Car Wash is a local-serving, destination-type use that has a natural synergy with other auto-related uses, including and particularly service stations.

You also enquired about multi-family residential as a possible development option for the subject site, but we understand from our experience with other developers that the recent significant increase in the cost of construction materials—particularly lumber—has made multi-family impracticable, based on the projected market rents in the immediate trade area.

As you know, our team has over 25 years of Commercial Retail Lease and Sales experience with over $1B in Gross Lease/Sale Value Consideration. Our proven in-market knowledge, financial expertise, and store placement success uniquely positions us to assist our retail and Landlord clients through the entire real estate process. Additionally, CBRE is headquartered in Los Angeles, CA and is the world's largest real estate services provider, with 2020 revenue of $23.9 billion. We have more than 100,000 employees (excluding affiliates), and serve real estate owners, investors, and occupiers through more than 450+ offices worldwide. CBRE has been included in the Fortune 500 since 2008, ranking #128 in 2020—the highest-ranked commercial real estate services firm on the list.

Should you have any further questions, please do not hesitate to contact us.

Respectively yours,

CBRE, Inc.

Jamie K. Brooks
First Vice President

Car Washes/Service Stations and Descriptions Within Approx. 2 Miles of Project Site

	LONG BEACH & DEL AMO	Address	Distance	CAR WASH	COMMENTS ON CAR WASH	GAS STATION?	CAR WASH (TOTAL)	Express
	76 ROCKET	2002 E Del Amo Blvd, LB	1.58	1 IN BAY AUTOMATIC	POOR	Y	1	
	CHEVRON ROCKET	1990 E Del Amo Blvd, Long Beach, CA 90807	1.54	1 IN BAY AUTOMATIC	POOR	Y	2	
	WARDLOW & ATLANTIC							
	BIXBY KNOWLES CW	577 E Wardlow Rd, Long Beach, CA 90807	1.99				3	
	ANDRES CAR WASH	500 E Wardlow Rd, Long Beach, CA 90807	2.01				4	
	ATLANTIC & E HARDING ST							
	MOM'S COIN WASH	6142 Atlantic Ave, Long Beach, CA 90805	1.43	5 BAY SS W/COIN VACS	POOR		5	
	ATLANTIC & 67 STREET / 91 FW							
	EXPRESS CAR WASH-ES		2.06	60 FT EXPRESS CW	FAIR	Y	6	1
	LONG BEACH & GORDON							
	ARCO AMPM	6001 Long Beach Blvd, Long Beach, CA 90805	1.33	1 IN BAY AUTOMATIC W COIN VACS	FAIR	Y	7	
	LONG BEACH & 52 STREET							
	76 ROCKET	5170 Long Beach Blvd, Long Beach, CA 90805	0.19	SS BAYS * COIN VACS		Y	8	
						5	**8**	**1**

TOTAL CAR WASH (approx. 2 mi.)	8	(Majority in fair to poor condition)
TOTAL Non-Express	5	(Only two automatic)
TOTAL Express (Bliss' type)	1	(Type proposed by Bliss)
TOTAL Gas & Car Wash Combo (2 mi.)	4	

MAY
REALTY ADVISORS

May 17, 2021

Mr. Paul Dadgar
BLISS CAR WASH LLC
Canwood Street Suite 200
Agoura Hills, CA 91301

Re: 5005 Long Beach Blvd. Long Beach, CA

Dear Paul,

I have reviewed the above referenced property as it pertains to a multi-family development site. A multi-family development is not marketable for the following reasons:

1. Locating next to a gas station is not desirable for the residents, the developer or lenders.

2. The economics do not work for multi-family. The site is too small for surface parking.

3. The rents do not support podium parking or new development given the increase in construction costs and market rents 20-30% lower than they need to be support new construction.

The above information is based upon my 30 years in commercial real estate in Southern California and conversations with multi-family developers and architects.

Sincerely,

Matthew M. May

President

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