Sapphos environmental inc.

August 25, 2008
Job Number: 1222-004
Kroc Community Center

Mr. John Tommy Rosas
Tongva Ancestral Territorial Tribal Nation
4712 Admiralty Way, Suite 172
Marina Del Rey, California 90292

SUBJECT: Native American Sacred Sites Records Search in Support of the Proposed Kroc Community Center

Dear Mr. Rosas:

Sapphos Environmental, Inc. hereby requests information regarding Native American sacred sites in support of the proposed Kroc Community Center (proposed project) environmental process.

On November 8, 2007, a records search of the Sacred Lands file was requested from the Native American Heritage Commission (NAHC). The NAHC response to the inquiry indicated that there are no known resources located "in the immediate project area".[1] The NAHC response identified seven Native American individuals and recommended that they be contacted for further information regarding the presence of cultural resources in the proposed project area. Your name was included on that list.

The proposed project area consists of up to 7 acres of development on a 19-acre site located in the City of Long Beach, County of Los Angeles, California. The proposed project area is partially located on a stormwater retention basin known as Hamilton Bowl / Chittick Field (Chittick Field) and is currently owned by the County of Los Angeles Flood Control District. The proposed project site is located on Chittick Field at 1900 Walnut Avenue, in the City of Long Beach, County of Los Angeles, California (Enclosure 1, *Proposed Project Location*). The 405 Freeway is roughly 1.45 miles north of the proposed project site. The 605 Freeway is approximately 4.7 miles to the east and the 710 Freeway is a little over 2 miles west of the proposed project site. The 19-acre property is bounded by East 20th Street, a small flood control area, and the City of Signal Hill to the north; an alley between Rose Avenue and Gardenia Avenue to the east; a small strip of commercial development to the south that faces Pacific Coast Highway; and Walnut Avenue to the west. The proposed project site appears on the U.S. Geological Survey 7.5-Minute Series Long Beach, California, Topographic Quadrangle.[2]

[1] Mr. Dave Singleton, Native American Heritage Commission. 8 November 2008. Fax/letter correspondence with Ms. Christina Poon, Sapphos Environmental, Inc., Pasadena, CA.

[2] U.S. Geological Survey. [1964] Photo Revised 1981. *7.5-Minute Series, Long Beach, California, Topographic Quadrangle*. Reston, VA.

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The proposed project would consist of a recreational facility that includes both indoor and outdoor components. Up to 7 acres of the Chittick Field site would be developed as the location of the proposed project, which would include a 170,536-square-foot three-building facility that would be located on the proposed site atop 346,762 square feet of raised building pads. The land located around and below the building pads would continue to function as a flood detention basin. Approximately 12 acres would continue to serve as a Flood Control Detention Basin for the City of Signal Hill, California. The pump station located at the southern end of the Chittick Field site would be expanded and would remain in operation. The Kroc Community Center and main entrance to the facility would be situated along the western side of Chittick Field off Walnut Avenue. A secondary access to the proposed project site would be located at Rose Avenue off Pacific Coast Highway. In addition, there will be an emergency-only access located on 19th Street that would also be used as a point of access to relieve traffic to and from the site during special events.

Thank you for your assistance. Sapphos Environmental, Inc. looks forward to receiving the results of this request for information regarding Native American sacred sites in the proposed project area.

If there are any questions or concerns, please feel free to contact Mr. Clarus Backes by phone at (626) 683-3547 or by e-mail at cbackes@sapphosenvironmental.com.

Sincerely,

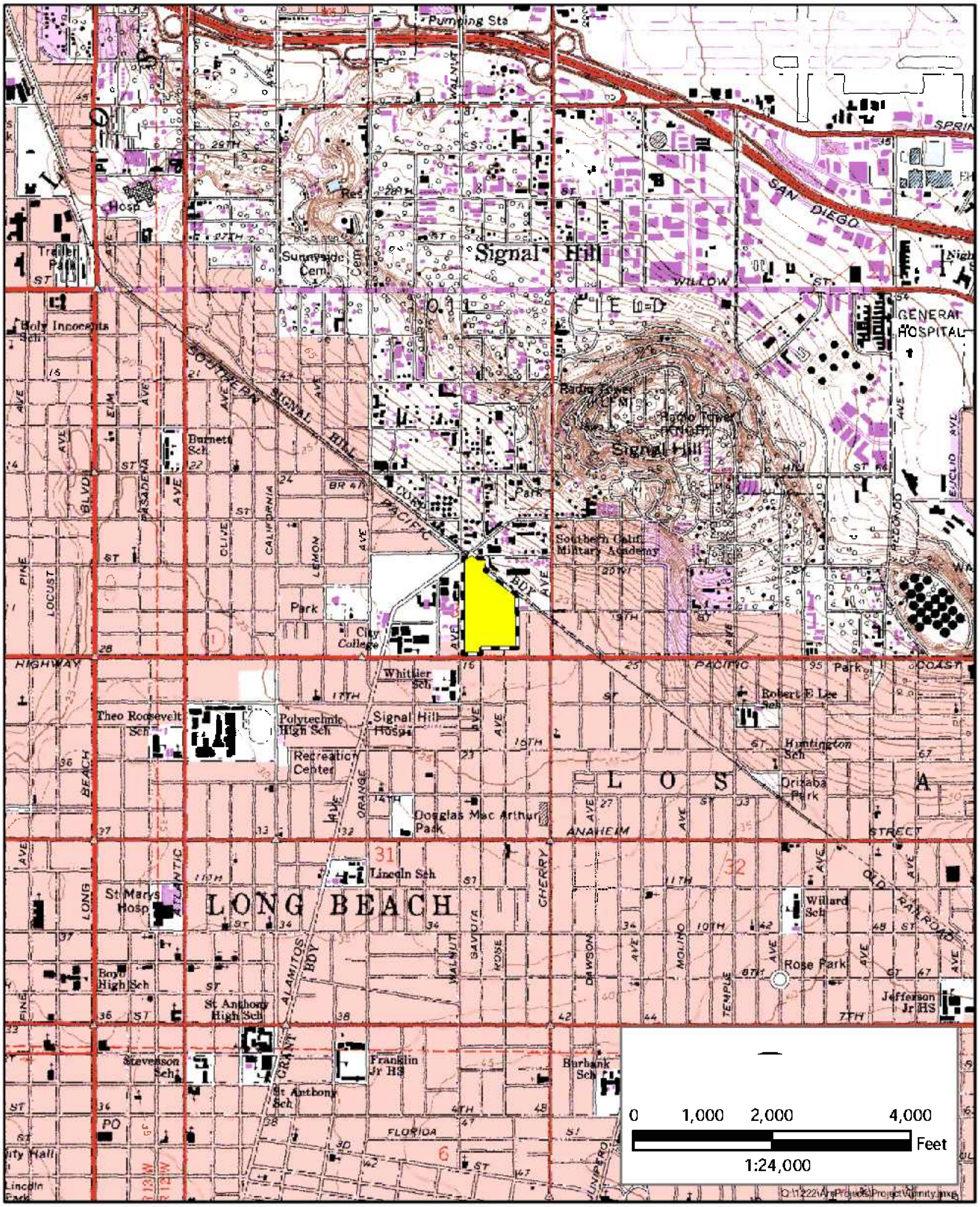
SAPPHOS ENVIRONMENTAL, INC.

Clarus Backes
Senior Cultural Resources Coordinator

Enclosure: 1. Proposed Project Location

LJH/cjb

ENCLOSURE 1
PROPOSED PROJECT LOCATION



Proposed Project

ENCLOSURE 1
Proposed Project Location

APPENDIX D

HUMAN HEALTH SCREENING EVALUATION

Human Health Screening Evaluation
Chittick Field
1900 Walnut Avenue
Long Beach, California

Kleinfelder Project Number 88819

Prepared for:

City of Long Beach
333 West Ocean Boulevard
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Prepared by:

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October 2, 2008

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1. INTRODUCTION

A Tier 1 human health screening evaluation (HHSE) of Chittick Field, located at 1900 Walnut Avenue, Long Beach, California, has been performed to address residual petroleum hydrocarbons in soil. The subject site is a flood control sump that is part of the City of Signal Hill's NPDES compliance program. Also, a petroleum refinery formerly occupied a portion of the northeast corner of the subject site. A recreation center of 151,000 square feet is proposed for the subject site. The HHSE is being performed to address this change in land use.

The Phase I and Phase II environmental site assessments performed in 2005 identified the flood control land use, former operation of a refinery, and the residual petroleum hydrocarbon constituents in soil samples as points of environmental concern (SCS Engineers 2005a, 2005b). The presence of metals and organochlorine pesticides was also documented in soil samples. The analytical data reported in the Phase II environmental site assessment (SCS Engineers 2005b) forms the basis of the Tier 1 (HHSE) described in this report.

The Tier 1 HHSE is comprised of the following tasks:

- Data evaluation – performed to identify the appropriate environmental site investigation data for evaluation in the HHSE.
- Exposure assessment – performed to identify affected environmental media (soil, groundwater, air, etc.), chemicals of potential concern, and exposure pathways by which humans could come into contact with chemicals of potential concern.
- Tier 1 screening evaluation – a comparison of chemical concentrations reported in the Phase II environmental site investigation to health-based regulatory standards. Chemicals present at concentrations less than the health-based regulatory standards are unlikely to pose a hazard to humans and generally do not warrant further investigation or remediation.

1.1. DATA EVALUATION

The HHSE is based on site investigation data provided in SCS Engineers (2005b). These data are limited to the analysis of soil samples collected from 18 locations at depths of up to 10 feet below ground surface (bgs), (Table 1-1). As noted in other documents prepared for the site, groundwater was not evaluated because exposures to groundwater at the subject site are not likely to occur under the expected future land use.

Table 1-1
Summary of Data Available for Risk Assessment

Sample ID	Location	Depth (feet, bgs)	Analysis
SB-1	Former ASTs	1, 5, 10	Lead only, 8015, 8260
SB-2	Former ASTs	5, 10	Lead only, 8015
SB-3	Former Refinery	5, 10	Lead only, 8015
SB-4	Former Refinery	5, 10	Lead only, 8015, 8260
SB-5	Former Refinery	5, 10	Lead only, 8015
SB-6	Former Refinery	5, 10	Lead only, 8015, 8260
SB-7	Ball Fields	1, 2.5, 5	6010B/7000/7471, 8015, 8081
SB-8	Ball Fields	1, 5	6010B/7000/7471, 8015
SB-9	Ball Fields	1, 2.5	6010B/7000/7471, 8015, 8081
SB-10	Ball Fields	1, 2.5	6010B/7000/7471, 8015, 8081
SB-11	Ball Fields	1	6010B/7000/7471, 8015
SB-12	Ball Fields	1, 2.5	6010B/7000/7471, 8015, 8081
SB-13	Ball Fields	1, 2.5	6010B/7000/7471, 8015
SB-14	Ball Fields	1, 2.5	6010B/7000/7471, 8015
MUK-1	“Muck” sample	NA	6010B/7000/7471, 8015
MUK-2	“Muck” sample	NA	6010B/7000/7471, 8015
MUK-3	“Muck” sample	NA	6010B/7000/7471, 8015
MUK-4	“Muck” sample	NA	6010B/7000/7471, 8015

2. EXPOSURE ASSESSMENT

The objective of the exposure assessment is to estimate the magnitude, frequency, duration, and pathways of potential exposures to the chemicals included in the risk assessment. Therefore, an exposure pathways analysis was prepared to predict the means by which a receptor may come into contact with these chemicals. The exposure assessment is based on the assumption that if exposure does not occur, then there is no hazard. Thus, certain exposure pathways can be eliminated from consideration in the risk assessment if such pathways are not complete (i.e., if a receptor is not likely to come into contact with a chemical by a given pathway).

A complete exposure pathway has five elements:

- A chemical source;
- A mechanism for chemical release;
- An environmental transport medium;
- An exposure point where a receptor can come into contact with the chemical; and
- A route of exposure.

An exposure pathway is complete (i.e., exposure can occur) if a receptor ingests or inhales a chemical, or if the chemical is absorbed through the skin. Exposure cannot occur (and, therefore, there is no risk) unless the exposure pathway is complete.

The exposure assessment consists of:

- Identification of Chemicals of Potential Concern – an evaluation of the available analytical data to identify chemicals that were detected in environmental media on the subject site and to which people may be exposed.

- Identification of Exposure Pathways – a discussion of the CSM describing the sources, release mechanisms, fate and transport mechanisms, exposure routes, and potential receptors.
- Estimation of Exposure Point Concentrations (EPCs) – a description of the method used to develop estimates of chemical concentrations in affected environmental media (e.g., soil, groundwater, air, etc.) to which potential receptors may be exposed.

2.1. IDENTIFICATION OF CHEMICALS OF CONCERN

A Phase I environmental site assessment was performed in 2005 (SCS Engineers 2005a). Two potential environmental concerns were identified in the Phase I report:

- Historically, the subject site has been a flood control sump and as such has received run-off from adjacent streets and miscellaneous trash materials. Run-off from streets was expected to include petroleum hydrocarbons and metals.
- A petroleum refinery formerly occupied a portion of the subject site in the northeast corner. Residual petroleum hydrocarbons and lead were assumed to potentially affect soil in this area, although with the removal of the refinery much of the affected soil was also assumed to have been removed.

A Phase II site investigation was performed on the subject site in 2005 to address the presence of residual chemicals in site soil based on the two identified former land uses: flood control sump and refinery. Soil samples from 14 locations and depths from ground surface to 10 feet below ground surface (bgs) were collected and analyzed for total petroleum hydrocarbons (TPH) by EPA Method 8015D(G), VOCs by EPA Method 8260B, metals by EPA Methods 6010B/7000/7471, and organochlorine pesticides by EPA Method 8081A.

Any chemical detected at least once in any sample was identified as a chemical of potential concern and was addressed in this health screening evaluation (Table 2-1).

Table 2-1
Chemicals of Potential Concern

TPH	VOCs	Metals	Organochlorine Pesticides
Gasoline-range (C4-C12 Diesel-range (C13-C22) Heavy hydrocarbon-range (C23-C40)	ND[a]	Arsenic Barium Cadmium Chromium Cobalt Copper Lead Mercury Nickel Vanadium Zinc	alpha-Chlordane gamma-Chlordane DDD DDE DDT Dieldrin Chlordane (total)

[a] ND, not detected

2.2. IDENTIFICATION OF EXPOSURE PATHWAYS

Exposure to the chemicals detected in soil samples from the subject site may occur by soil ingestion, dermal contact, or inhalation of fugitive dust. Humans may come into direct contact (ingestion or dermal contact) with surface and subsurface soil under a short-term construction-utility worker scenario (e.g., excavation for the building foundation and structure) or under a maintenance worker scenario (e.g., landscape maintenance) after the site is re-developed as a recreational center. Wind erosion also may transport particles of affected soil (dust) into the breathing zone where inhalation could occur.

Inhalation of vapors originating from subsurface soil may migrate to indoor or outdoor air. If vapors reach the breathing zone, then exposure may occur by inhalation. Inhalation of vapors in indoor and outdoor air was not addressed in this health screening evaluation, however, because VOCs were not detected in any of the four soil samples analyzed by EPA Method 8260B. Other chemicals detected in soil samples from the site are not considered to be volatile: metals and organochlorine pesticides.

Direct contact exposures to groundwater were not evaluated because water for domestic purposes or irrigation is supplied to the Kroc Center site by the Long Beach Water District (LBWD), which secures water from 26 active groundwater wells fed by rain and snowmelt in the San Gabriel Mountains. The LBWD also purchases water from the Metropolitan Water District of Southern California. The purchased water originates from Northern California and the Colorado River. Therefore, exposure pathways associated with groundwater have been omitted from this health risk assessment.

Table 2-2 outlines the potential human exposure pathways for the Kroc Center site health screening evaluation.

Table 2-2
Summary of Exposure Pathway Analysis

Source Medium	Exposure Pathway	Requires Further Evaluation?	Comments
Soil	Ingestion, dermal contact, dust inhalation	Yes	Construction workers may come into direct contact with affected soil during excavation and construction. Maintenance workers may come into direct contact during routine property maintenance. Accidental ingestion, inhalation of fugitive dust, or dermal contact with soil may occur during normal construction activities.
Groundwater	Ingestion, dermal contact	NO	Water will be supplied by the local water utility from sources unaffected by chemical releases at the subject site.
Soil Vapor	Inhalation	NO	Volatile organic compounds (VOCs) were not detected in soil samples collected from the subject site. Other detected chemicals are not volatile.

2.3. ESTIMATION OF EXPOSURE POINT CONCENTRATIONS

Exposure point concentrations are estimates of the chemical concentrations in a given environmental medium (e.g., soil, soil vapor, ambient air, groundwater) to which the identified receptor groups may be exposed. For the Tier 1 HHSE, the maximum concentration of each chemical of potential concern in soil was used for comparison to health-based regulatory standards. Based on the assumption that the maximum reported concentration is not likely to be exceeded if additional samples are collected and analyzed, use of the maximum concentration for comparison to the regulatory standards is a health-protective approach to addressing potential hazards that may be associated with the chemicals of potential concern.

The maximum concentrations of the chemicals of potential concern are presented and discussed in Section 3 of this report.

3. TIER 1 HUMAN HEALTH SCREENING EVALUATION

California Human Health Screening Levels (CHHSLs) were selected as the appropriate health-based regulatory standard for comparison to the maximum soil concentrations of the chemicals of potential concern. CHHSLs have been developed by the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) and are concentrations of a given chemical in soil or soil vapor that are expected to be without adverse health effects over a lifetime of exposure (OEHHA 2005). Chemicals present at concentrations less than a CHHSL generally do not warrant further investigation or remediation.

CHHSLs are available for each of the chemicals of potential concern identified for the Chittick Field site except petroleum hydrocarbons. Soil screening levels established by the Los Angeles Region of the California Water Quality Control Board were used as the health-based regulatory standard for screening concentrations of petroleum hydrocarbons (LARWQCB 1996). Because construction workers and maintenance workers were identified as potential receptors, and because future land use is expected to be urban recreational (not residential), the CHHSLs for commercial/industrial exposure were used for this HHSE (Table 3-1).

Table 3-1
Comparison of Maximum Soil Concentrations to Health-based Regulatory Standards

Chemical	Maximum Concentration[a] (mg/kg)	CHHSL (mg/kg)	Other Standards (mg/kg)
TPH-g	0.5	NA	100[b]
TPH-d	90.9	NA	100[b]
TPH-o	440	NA	1,000[b]
Arsenic	**8.75**	**0.24**	**NA**
Barium	491	63,000	NA
Cadmium	2.45	7.5	NA
Chromium	28.6	37[c]	NA
Cobalt	11.8	3,200	NA

Copper	228	38,400	NA
Lead	226	3,500	NA
Mercury	0.5	180	NA
Nickel	23.5	16,000	NA
Vanadium	51.5	6,700	NA
Zinc	264	100,000	NA
alpha-Chlordane	0.027	0.13	NA
gamma-Chlordane	0.033	1.7	NA
DDD	0.028	9	NA
DDE	0.018	6.3	NA
DDT	0.112	6.3	NA
Dieldrin	0.008	0.13	NA
Chlordane (total)	0.06	1.7	NA

TPH-g, gasoline-range hydrocarbons (C4-C12)
TPH-d, diesel-range hydrocarbons (C13-C22)
TPH-0, heavy hydrocarbon-range hydrocarbons (C23-C40)
CHHSL, California Human Health Screening Level for commercial/industrial exposure
[a] Maximum concentrations presented here are from the Phase II report (SCS Engineers 2005b)
[b] Los Angeles Regional Water Quality Control Board Soil Screening Level
[c] CHHSL for chromium is based on trivalent chromium
BOLD, indicates an exceedance of a Tier 1 screening level

Of the chemicals of potential concern, only arsenic was present at a maximum concentration that exceeded a health-based regulatory standard. All other chemicals of potential concern were present at concentrations that did not exceed a health-based regulatory standard and do not, therefore, pose a hazard that requires further investigation or remediation.

Because arsenic is naturally-occurring in California soil, the concentrations of arsenic in soil samples from the subject site were compared to natural background concentrations reported for Southern California. The Cal/EPA Department of Toxic Substances Control (DTSC) has developed estimates of background arsenic concentrations in Southern California (12 mg/kg) (DTSC 2005, 2008). Twelve soil samples from the Chittick Field site were analyzed for arsenic. All reported concentrations of arsenic were within this range of background concentrations. Therefore, the presence of arsenic in soil at the subject site is consistent with naturally-occurring levels of arsenic in the region and is not considered to pose a hazard that requires further investigation or remediation.

4. SUMMARY AND CONCLUSIONS

A Tier 1 HHSE was performed to address residual petroleum hydrocarbons, metals, and organochlorine pesticides detected in soil samples collected from the Chittick Field site. The maximum concentration of each chemical detected in at least one soil sample from the site was compared to an appropriate health-based regulatory standard to address the potential health hazards that may be associated with the residual chemicals. Only arsenic was present at a maximum concentration greater than a health-based regulatory standard; however, the range of arsenic concentrations measured was within the expected range for naturally-occurring background arsenic.

In conclusion, the residual chemicals of potential concern at the Chittick Field site do not pose a health hazard that requires further investigation or remediation.

5. REFERENCES

California Regional Water Quality Control Board, Los Angeles Region (LARWQCB). 1996. Interim Site Assessment and Cleanup Guidebook. May 1996.

DTSC, (2005), Final Report, Background Metals at Los Angeles Unified School Sites – Arsenic. State of California, Environmental Protection Agency, Department of Toxic Substances Control, Sacramento, California. June 6.

DTSC (2008), Determination of a Southern California Regional Background Arsenic Concentration in Soil. State of California, Environmental Protection Agency, Department of Toxic Substances Control, Sacramento, California.

SCS Engineers. 2005a. Phase I Environmental Site Assessment, 1601-1801 Pacific Coast Highway (APNS 7216-033-001, 004-010, 026, and 027) and 1986 Walnut Avenue (APN 7216-012-002), Long Beach, California 90806. Prepared for Long Beach Redevelopment Agency, Long Beach, California. Prepared by SCS Engineers, Long Beach, California. September.

SCS Engineers. 2005b. Phase II Investigation Report, Chittick Field, 1900 Walnut Avenue, Long Beach, California. city Attorney of the City of Long Beach, Long Beach, California. Prepared by SCS Engineers, Long Beach, California. October.

APPENDIX E
NOISE AND VIBRATION IMPACT REPORT

KROC COMMUNITY CENTER PROJECT
NOISE AND VIBRATION IMPACT REPORT

Prepared for

SAPPHOS ENVIRONMENTAL

Prepared by

TERRY A. HAYES ASSOCIATES LLC

November 2008

taha2007-107

KROC COMMUNITY CENTER PROJECT

NOISE AND VIBRATION IMPACT REPORT

Prepared for

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Pasadena, CA 91107

Prepared by

TERRY A. HAYES ASSOCIATES LLC
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Culver City, CA 90232

November 6, 2008

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1.0 SUMMARY OF FINDINGS

Terry A. Hayes Associates LLC completed a noise impact analysis for the proposed Kroc Community Center Project. Key findings are listed below.

- Construction noise levels would result in a significant impact at multiple noise-sensitive land uses without mitigation. Although Mitigation Measures **N1** through **N7** would reduce noise levels, the increase in ambient noise levels at nearby sensitive receptors would still exceed the 5-decibel (dBA) threshold. Therefore construction noise would result in a significant and unavoidable impact.

- Construction activity would generate vibration at levels up to 0.089 inches per second peak particle velocity (PPV) from heavy equipment, and up to 0.644 inches per second PPV from pile driving activity at the nearest buildings. Construction vibration levels would exceed the building threshold of 0.5 inches per second PPV without mitigation. Mitigation Measure **N10** would require the use of sonic pile driving equipment, and would reduce vibration impacts from pile driving activity to a less-than-significant impact.

- The greatest weekday project-related mobile noise increase would be 0.8 dBA CNEL and would occur along Alamitos Avenue between Walnut and Cherry Avenues. The roadway noise increase attributed to the proposed project would be less than the 3-dBA CNEL incremental threshold at all analyzed roadway segments. There would be no perceptible change in audible noise as a result of increased traffic.

- The greatest weekend project-related mobile noise increase would be 1.1 dBA CNEL and would occur along Alamitos Avenue between Walnut and Cherry Avenues. The roadway noise increase attributed to the proposed project would be less than the 3-dBA CNEL incremental threshold at all analyzed roadway segments. There would be no perceptible change in audible noise as a result of increased traffic.

- Outdoor recreational activity would result in a significant impact at noise-sensitive land uses without mitigation. Mitigation Measure **N8** would reduce the noise level increase to below the significance threshold, and the outdoor recreational activity would result in a less-than-significant noise impact.

- Parking activity would result in a significant impact at noise-sensitive land uses without mitigation. Mitigation Measure **N9** would reduce the noise increase to below the significance threshold, and parking activity would result in a less-than-significant noise impact.

- Non-vehicular noise (e.g. mechanical equipment) would not increase ambient noise levels by more than 5 dBA. This impact would be less than significant.

- The proposed project would not include any significant sources of ground-borne vibration. The ground-borne vibration operational impact would be less than significant.

- The proposed project would not significantly contribute to a cumulatively considerable noise or vibration impact.

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to evaluate the potential noise and vibration impacts of the proposed Kroc Community Center Project. Potential noise and vibration impacts are analyzed for construction and operation of the proposed project. Mitigation measures for noise and vibration are recommended, where necessary.

2.2 PROJECT DESCRIPTION

The Kroc Community Center Project would include a new recreational and community center located in the City of Long Beach. The proposed project would offer an array of social programs specifically designed to meet the needs of the neighboring community. The Kroc Community Center includes the construction of an approximately 170,536-square-foot, three- to four-story, three-building complex and outdoor recreation area. Specifically, the facility will include the following components:

Chapel/Auditorium Building. This two-story building would have a floor area of 12,455 square feet with a lobby, lecture hall/sanctuary, stage and backstage areas. The sanctuary will have a seating capacity of 450 persons.

Administration/Education Building. This four-story building would have a proposed floor area of 73,910 square feet, which includes a 3,100-square-foot day-care facility, approximately 11,400 square feet of administrative offices, a kitchen, classrooms, a library, a computer lab, an arts studio and multipurpose rooms.

Recreation Center. This two-story building would have a floor area of 84,171 square feet that includes a gymnasium, exercise rooms, classrooms, a weight room, locker rooms, a game room, and an indoor therapy pool.

Outdoor Recreation. This space includes a 50-meter pool, warm-up pool, and leisure pool with fountains, slides and children's area. Other site amenities, including a 10,000-square-foot amphitheater, as well as a soccer field, a playground, walking trails, an outdoor climbing wall, and a challenge course.

The project is proposed to be oriented towards Walnut Avenue with the following accesses: two on Walnut Avenue, one on Rose Avenue, and one emergency and special event access at the terminus of 19th Street. The proposed project would provide more than 1,100 on-site parking spaces in a two-level parking area and on a small surface lot. A portion of the project site would continue to function as a dry detention basin for the Cities of Long Beach and Signal Hill.

3.0 NOISE & VIBRATION

This section evaluates noise and vibration impacts associated with the implementation of the proposed project. The noise and vibration analysis in this section assesses the following: existing noise and vibration conditions at the project site and its vicinity, as well as short-term construction and long-term operational noise and vibration impacts. Mitigation measures for potentially significant impacts are recommended, where appropriate.

3.1 NOISE AND VIBRATION CHARACTERISTICS AND EFFECTS

3.1.1 Noise

Characteristics of Sound

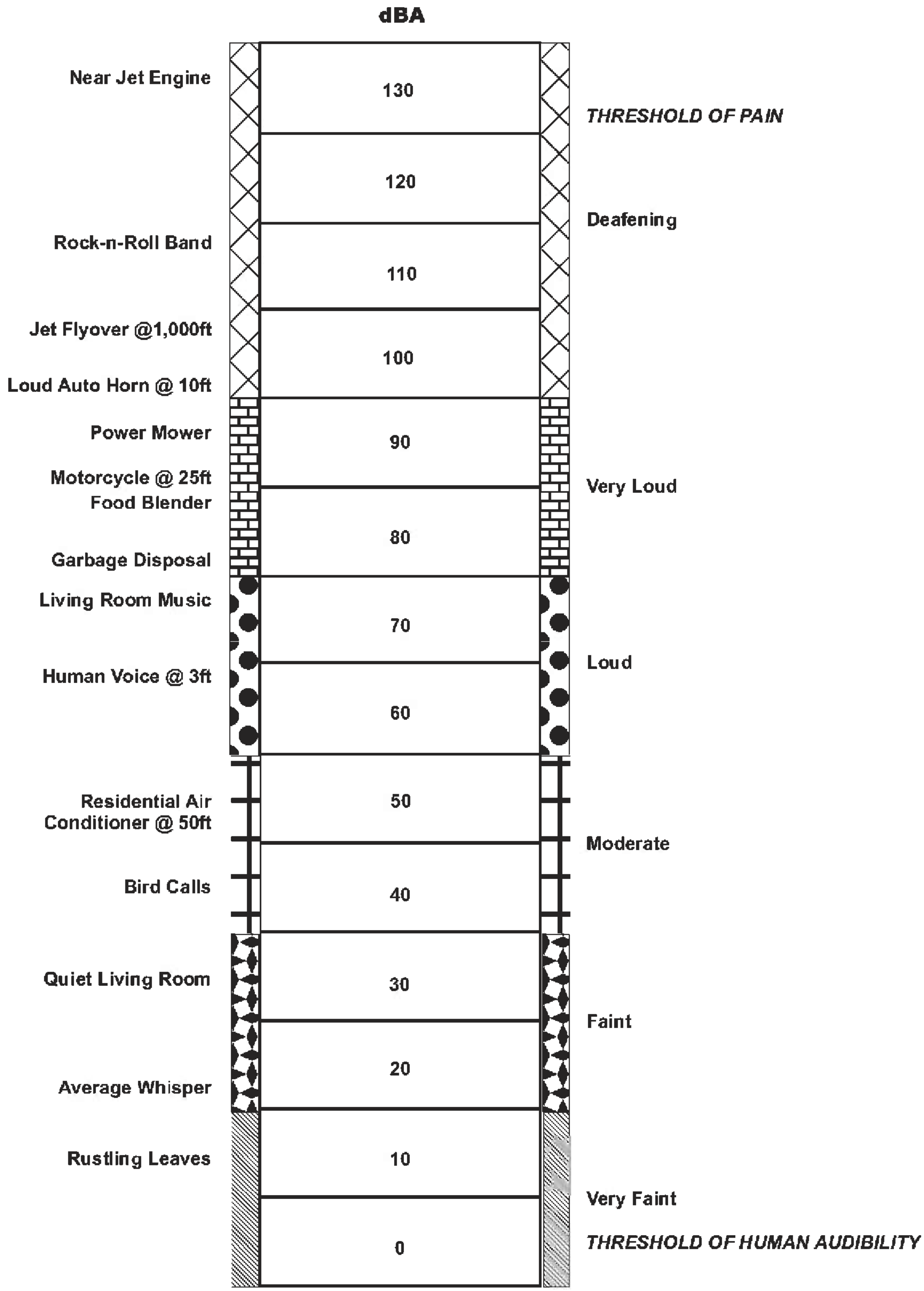
Sound is technically described in terms of the loudness (amplitude) and frequency (pitch) of the sound. The standard unit of measurement for sound is the decibel (dB). The human ear is not equally sensitive to sound at all frequencies. The "A-weighted scale," abbreviated dBA, reflects the normal hearing sensitivity range of the human ear. On this scale, the range of human hearing extends from approximately 3 to 140 dBA. **Figure 3-1** provides examples of A-weighted noise levels from common sounds.

Noise Definitions

This noise analysis discusses sound levels in terms of Community Noise Equivalent Level (CNEL) and Equivalent Noise Level (L_{eq}).

Community Noise Equivalent Level. CNEL is an average sound level during a 24-hour period. CNEL is a noise measurement scale, which accounts for noise source, distance, single event duration, single event occurrence, frequency, and time of day. Human reaction to sound between 7:00 p.m. and 10:00 p.m. is as if the sound were actually 5 dBA higher than if it occurred from 7:00 a.m. to 7:00 p.m. From 10:00 p.m. to 7:00 a.m., humans perceive sound as if it were 10 dBA higher due to the lower background level. Hence, the CNEL is obtained by adding an additional 5 dBA to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and 10 dBA to sound levels in the night before 7:00 a.m. and after 10:00 p.m. Because CNEL accounts for human sensitivity to sound, the CNEL 24-hour figure is always a higher number than the actual 24-hour average.

Equivalent Noise Level. L_{eq} is the average noise level on an energy basis for any specific time period. The L_{eq} for one hour is the energy average noise level during the hour. The average noise level is based on the energy content (acoustic energy) of the sound. L_{eq} can be thought of as the level of a continuous noise which has the same energy content as the fluctuating noise level. The equivalent noise level is expressed in units of dBA.



SOURCE: Cowan, James P., *Handbook of Environmental Acoustics*

FIGURE 3-1

A-WEIGHTED DECIBEL SCALE

Effects of Noise

Noise is generally defined as unwanted sound. The degree to which noise can impact the human environment range from levels that interfere with speech and sleep (annoyance and nuisance) to levels that cause adverse health effects (hearing loss and psychological effects). Human response to noise is subjective and can vary greatly from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise, the amount of background noise present before the intruding noise, and the nature of work or human activity that is exposed to the noise source.

Audible Noise Changes

Studies have shown that the smallest perceptible change in sound level for a person with normal hearing sensitivity is approximately 3 dBA. A change of at least 5 dBA would be noticeable and would likely evoke a community reaction. A 10-dBA increase is subjectively heard as a doubling in loudness and would cause a community response.

Noise levels decrease as the distance from the noise source to the receiver increases. Noise generated by a stationary noise source, or "point source," will decrease by approximately 6 dBA over hard surfaces and 7.5 dBA over soft surfaces for each doubling of the distance. For example, if a noise source produces a noise level of 89 dBA at a reference distance of 50 feet, then the noise level would be 83 dBA at a distance of 100 feet from the noise source, 77 dBA at a distance of 200 feet, and so on. Noise generated by a mobile source will decrease by approximately 3 dBA over hard surfaces and 4.5 dBA over soft surfaces for each doubling of the distance.

Generally, noise is most audible when traveling by direct line-of-sight.[1] Barriers, such as walls, berms, or buildings, that break the line-of-sight between the source and the receiver greatly reduce noise levels from the source since sound can only reach the receiver by bending over the top of the barrier (diffraction). Sound barriers can reduce sound levels by up to 20 dBA. However, if a barrier is not high or long enough to break the line-of-sight from the source to the receiver, its effectiveness is greatly reduced.

Applicable Regulations

The City of Long Beach Municipal Code (LBMC) has identified several policies on noise and acceptable noise levels.[2] These policies address unnecessary, excessive and annoying noise levels and sources, such as vehicles, construction, special sources (e.g., radios, musical instrument, animals, etc.), and stationary sources (e.g., heating and cooling systems, mechanical rooms, etc.). To implement these policies, the City adopted a Noise Ordinance, as discussed below.

The City of Long Beach has not adopted construction noise level standards. Instead, the City regulates construction noise by limiting activity by the hours identified in the LBMC. Section 8.80.202 defines the hours where construction activity may not take place:

[1]Line-of-sight is an unobstructed visual path between the noise source and the noise receptor.

[2]City of Long Beach Municipal Code, Chapter 8.80 – Noise, accessed September 2008.

- **Weekdays and federal holidays**. No person shall operate or permit the operation of any tools or equipment used for construction, alteration, repair, remodeling, drilling, demolition or any other related building activity which produce loud or unusual noise which annoys or disturbs a reasonable person of normal sensitivity between the hours of 7:00 p.m. and 7:00 am. the following day on weekdays, except for emergency work authorized by the building official. For purposes of this section, a federal holiday shall be considered a weekday.
- **Saturdays**. No person shall operate or permit the operation of any tools or equipment used for construction, alteration, repair, remodeling, drilling, demolition or any other related building activity which produce loud or unusual noise which annoys or disturbs a reasonable person of normal sensitivity between the hours of 7:00 p.m. on Friday and 9:00 a.m. on Saturday, and after 6:00 p.m. on Saturday, except for emergency work authorized by the building official.
- **Sundays**. No person shall operate or permit the operation of any tools or equipment used for construction, alteration, repair, remodeling, drilling, demolition or any other related building activity at any time on Sunday, except for emergency work authorized by the building official or except for work authorized by permit issued by the noise control officer.

The LBMC prohibits any unnecessary, excessive, or annoying noise in the City. Properties within the City are assigned a noise district based on their corresponding zoning district and uses. Predominantly residential districts are designated as Noise District One; predominately commercial districts are designated Noise District Two; and predominately manufacturing or industrial districts are designated as Noise Districts Three and Four; airports, freeways and waterways regulated by other agencies are designated Noise District Five. The LBMC also limits the amount of noise generated by uses during normal operation that may affect the surrounding areas. **Table 3-1** shows the allowable noise levels and corresponding times of day for each of the five identified noise zones. The project site itself lies within District One. Section 8.80.150 subsection (B) specifies that no person shall operate or cause to be operated any source of sound at any location within the incorporated limits of the City or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured from any other property, either incorporated or unincorporated, to exceed:

1. The noise standard for a land use district as specified in **Table 3-1** for a cumulative period of more than thirty minutes in any hour;
2. The noise standard plus five decibels for a cumulative period of more than fifteen minutes in any hour;
3. The noise standard plus ten decibels for a cumulative period of more than five minutes in any hour;
4. The noise standard plus fifteen decibels for a cumulative period of more than one minute in any hour; or
5. The noise standard plus twenty decibels or the maximum measured ambient, for any period of time.

TABLE 3-1: EXTERIOR NOISE STANDARDS						
Noise District	**Time Interval**	**Allowable L_{eq}**				
		Standard	**15 Mins/Hr**	**5 Mins/Hr**	**1 Min/Hr**	**Any Period**
One	10:00 p.m. to 7:00 a.m.	45 dBA	50 dBA	55 dBA	60 dBA	65 dBA
	7:00 a.m. to 10:00 p.m.	50 dBA	55 dBA	60 dBA	65 dBA	70 dBA
Two	10:00 p.m. to 7:00 a.m.	55 dBA	60 dBA	65 dBA	70 dBA	75 dBA
	7:00 a.m. to 10:00 p.m.	60 dBA	65 dBA	70 dBA	75 dBA	80 dBA
Three	Anytime	65 dBA	70 dBA	75 dBA	80 dBA	85 dBA
Four	Anytime	70 dBA	75 dBA	80 dBA	85 dBA	90 dBA
Five	*Regulated by Other Agencies or Laws*					
SOURCE: City of Long Beach Municipal Code, Section 8.80.160, accessed November 4, 2008.						

Subsection C of Section 8.80.150 states, "If the measured ambient level exceeds that permissible within any of the first four noise limit categories in subsection B (listed above) of this section, the allowable noise exposure standard shall be increased in five decibels increments in each category as appropriate to encompass or reflect the ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category in subsection B of this section, (listed above) the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level."

The LBMC also limits noise from mechanical equipment. Section 8.80.200 states that any motor, machinery, or pump shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance.

3.1.2 Vibration

Characteristics of Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. In contrast to noise, vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and heavy earth-moving equipment.

Vibration Definitions

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings and is usually measured in inches per second. The root mean square (RMS) amplitude is most frequently used to describe the efect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (Vdb) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration.[3]

[3]Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, May 2006.

Effects of Vibration

High levels of vibration may cause physical personal injury or damage to buildings. However, ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that may affect concentration or disturb sleep. In addition, high levels of ground-borne vibration may damage fragile buildings or interfere with equipment that is highly sensitive to ground-borne vibration (e.g., electron microscopes).

To counter the effects of ground-borne vibration, the Federal Railway Administration (FRA) has published guidance relative to vibration impacts. According to the FRA, fragile buildings can be exposed to ground-borne vibration levels of 0.5 inches per second PPV without experiencing structural damage.[4]

Perceptible Vibration Changes

In contrast to noise, ground-borne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 RMS or lower, well below the threshold of perception for humans which is around 65 RMS.[5] Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible.

Applicable Regulations

There are no adopted City standards for construction ground-borne vibration. For operational activity, Section 8.80.200 of the LBMC prohibits operating any device that creates vibration which is above the perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty feet (forty-six meters) from the source if on a public space or public right-of-way. The vibration perception threshold is defined as the minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such directed means as, but not limited to, sensation by touch or visual observation of moving objects.

3.2 EXISTING ENVIRONMENTAL SETTING

3.2.1 Existing Noise Environment

The existing noise environment of the project area is characterized by vehicular traffic and noises typical to a dense urban area. Vehicular traffic is the primary source of noise in the project vicinity.

Sound measurements were taken using a SoundPro DL Sound Level Meter between 8:00 a.m. and 10:30 a.m. on October 30, 2008 to determine existing ambient daytime noise levels in the project vicinity. These readings were used to establish existing ambient noise conditions and to provide a baseline for evaluating operational noise impacts. Noise monitoring locations are

[4]Federal Railway Administration, *High-Speed Ground Transportation Noise and Vibration Impact Assessment*, October 2005.

[5]Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, May 2006.

shown in **Figure 3-2**. As shown in **Table 3-2**, existing ambient sound levels range between 51.1 and 71.3 dBA L_{eq}.

TABLE 3-2: EXISTING NOISE LEVELS			
Key to Figure 3-2	**Noise Monitoring Location**	**Distance from Project Site (Feet)**	**Sound Level (dBA, L_{eq})**
1	Single-family residences adjacent and east of the project site	Adjacent	51.1
2	Long Beach City College	65	65.1
3	Single- and Multi-family residences south of the project site	175	71.3
4	Single-family residences adjacent and west of the project site	Adjacent	69.2 /a/
5	John G. Whittier Elementary School	310	67.1
6	Alvarado (Juan Bautista) Elementary School	520	55.4
7	Mary Butler Elementary School	530	67.8

/a/ Construction activity was occurring adjacent to this location during the noise monitoring period and this measurement is not utilized in the analysis.
SOURCE: TAHA, 2008.

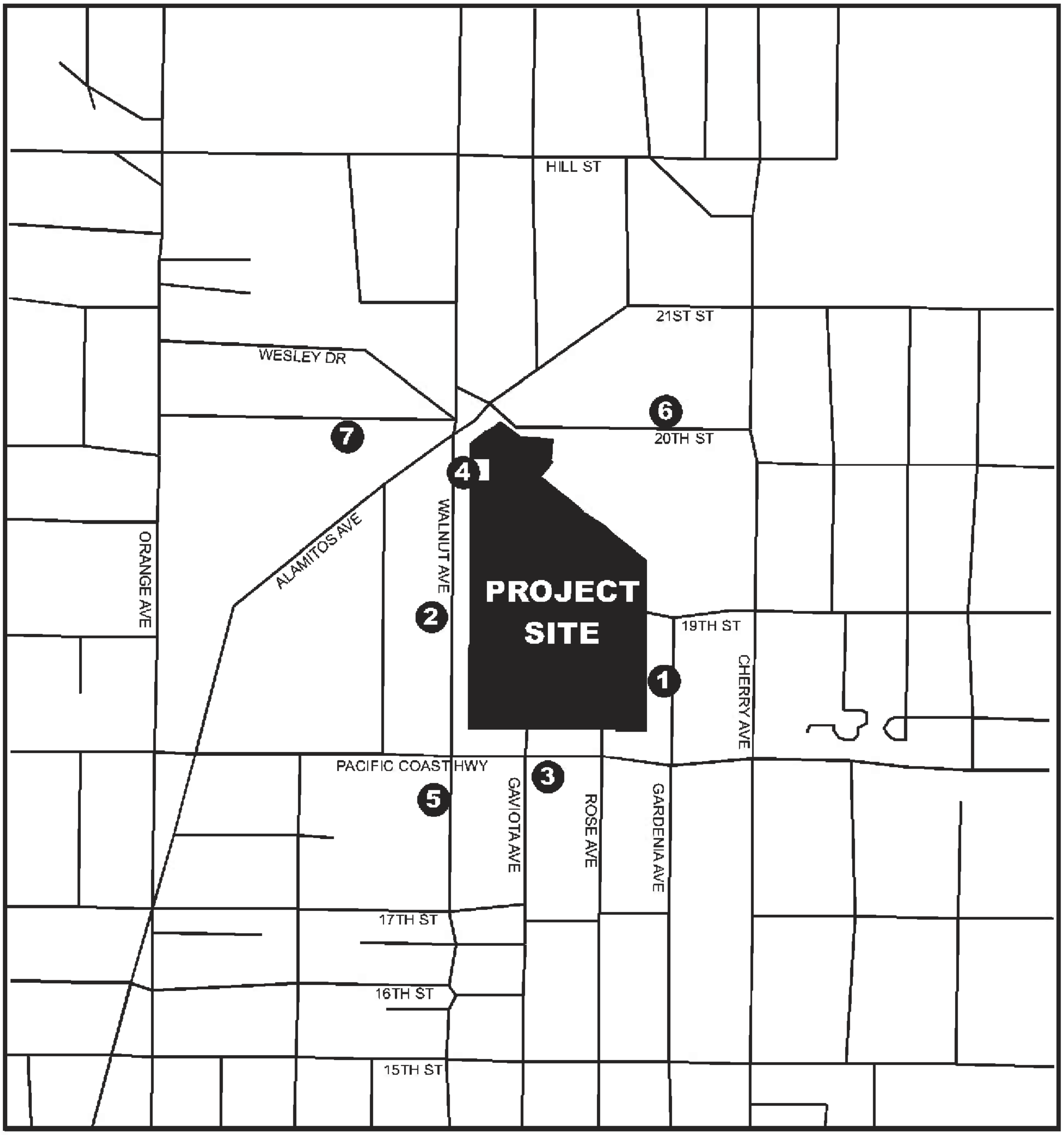
3.2.2 Existing Vibration Environment

Similar to the environmental setting for noise, the vibration environment is dominated by traffic from nearby roadways. Heavy trucks can generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions. Field observations indicated that heavy-duty truck travel is not unusually intense along the Pacific Coast Highway and Walnut Avenue. Vibration levels from adjacent roadways are not perceptible at the project site.

3.2.3 Sensitive Receptors

Noise- and vibration-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise- and vibration-sensitive and may warrant unique measures for protection from intruding noise. Sensitive receptors near the project site include the following:

- Single- and multi-family residences located adjacent and east of the project site
- Single-family residence located adjacent and west of the project site
- Multi-family residences located adjacent and south of the project site
- Long Beach City College located approximately 65 feet west of the project site
- Single-family residences located approximately 175 feet south of the project site



LEGEND:

Noise Monitoring Locations

1. Single-Family Residences
2. Long Beach Community College
3. Single- and Multi-Family Residences
4. Single-Family Residence
5. John G. Whittier Elementary School
6. Alvarado (Juan Bautista) Elementary School
7. Mary Butler Elementary School

SOURCE: TAHA, 2008.

FIGURE 3-2

NOISE MONITORING LOCATIONS

- Single-family residences located approximately 200 feet northwest of the project site
- John G. Whittier Elementary School located approximately 310 feet south of the project site
- Alvarado (Juan Bautista) Elementary School located approximately 520 feet northeast of the project site
- Mary Butler Elementary School located approximately 530 feet west of the project site

The above receptors represent the nearest residential and school land uses with the potential to be impacted by the proposed project. Additional single- and multi-family residences are located in the surrounding community, within one-quarter mile of the project site.

3.2.4 Vehicular Traffic

Vehicular traffic is the predominant noise source in the project vicinity. Using existing traffic volumes provided by the project traffic consultant and the Federal Highway Administration (FHWA) RD-77-108 noise calculation formulas, the CNEL was calculated for various roadway segments near the project site. Existing weekday and weekend mobile noise levels are shown in **Table 3-3**. As shown in **Table 3-3**, mobile noise levels in the project area range from 58.5 to 71.8 dBA CNEL. Modeled vehicle noise levels are typically lower than the noise measurements along similar roadway segments as modeled noise levels do not take into account additional noise sources (e.g., sirens and reflected noise).

TABLE 3-3: EXISTING ESTIMATED COMMUNITY NOISE EQUIVALENT LEVEL /a/

	Estimated CNEL dBA	
Roadway Segment	**Weekday**	**Weekend**
Walnut Avenue between Hill Street and 20th Street	60.9	59.6
Walnut Avenue between 20th Street and Pacific Coast Highway	62.6	60.2
Walnut Avenue south of Pacific Coast Highway	61.0	59.1
Cherry Avenue between 21st Street and Pacific Coast Highway	67.8	69.6
Alamitos Avenue between Walnut and Cherry Avenues	58.5	56.5
Pacific Coast Highway between Alamitos and Walnut Avenues	71.8	69.9
Pacific Coast Highway between Walnut and Rose Avenues	71.7	69.7
Pacific Coast Highway between Rose and Cherry Avenues	71.7	69.8
Pacific Coast Highway between Cherry and Temple Avenues	71.3	70.1

/a/ The predicted CNEL were calculated as peak hour L_{eq} and converted into CNEL using the California Department of Transportation Technical Noise Supplement (October 1998). The conversion involved making a correction for peak hour traffic volumes as a percentage of average daily traffic and a nighttime penalty correction. The peak hour traffic was assumed to be ten percent of the average daily traffic.
SOURCE: TAHA, 2008 (Appendix A).

3.3 METHODOLOGY AND SIGNIFICANCE CRITERIA

3.3.1 Methodology

The noise analysis considers construction, operational, and vibration sources. Construction noise levels are based on information obtained from the *L.A. CEQA Thresholds Guide.*[6] The noise level during the construction period at each receptor location was calculated by (1) making a distance adjustment to the construction source sound level and (2) logarithmically adding the adjusted construction noise source level to the ambient noise level. Operational noise levels were calculated based on information provided in the traffic study and stationary noise sources located on the project site (e.g., mechanical equipment). Vibration levels were estimated based on information provided by the FTA.[7]

3.3.2 Significance Criteria

The City of Long Beach has not adopted construction noise level standards. Instead, the City regulates construction noise by limiting activity to the hours identified in the LBMC. It is beneficial to have a quantitative threshold in order to identify potential impacts. A change of at least 5 dBA would be noticeable and would likely evoke a community reaction.

Construction Phase Significance Criteria

A significant construction noise impact would result if:

- Construction activity would occur outside of the hours permitted by the City's noise ordinance (i.e., outside of the hours of 7:00 a.m. and 7:00 p.m. on weekdays/holidays, 9:00 a.m. and 6:00 p.m. on Saturdays, or at any time on Sundays); and/or
- Construction activities would exceed existing ambient noise levels by 5 dBA or more at a noise-sensitive use.

Operational Phase Significance Criteria

A significant operational noise impact would result if:

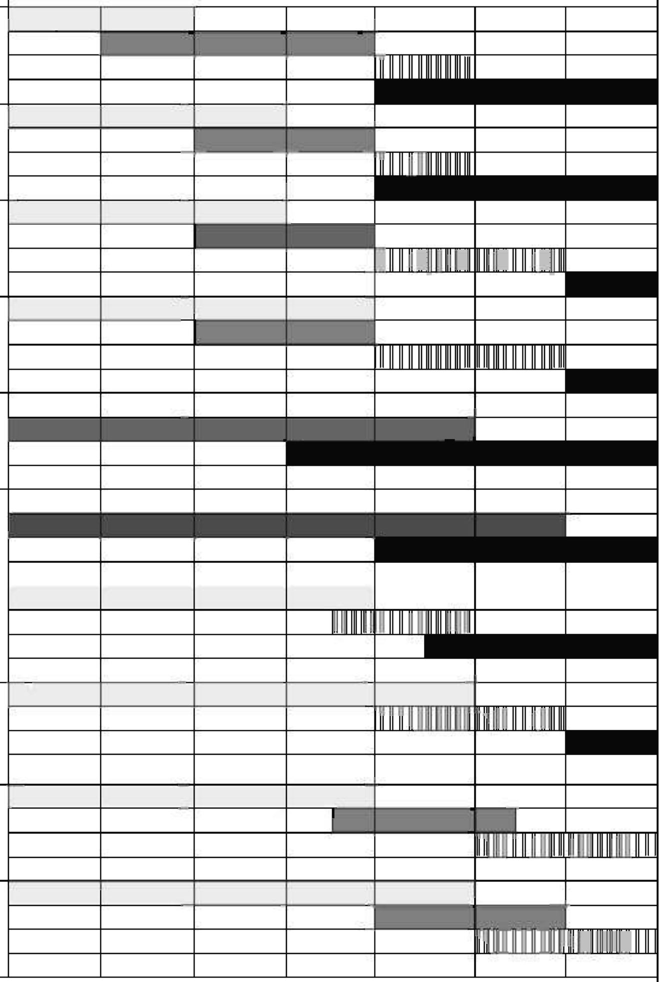
- The proposed project causes the ambient noise level measured at the property line of the affected uses to increase by 5 dBA or greater; and/or
- The proposed project causes the ambient noise level measured at the property line of the affected uses to increase by 3-dBA CNEL to or within the "normally unacceptable" or "clearly unacceptable" categories, as show in **Table 3-4**.

[6]City of Los Angeles, *L.A. CEQA Thresholds Guide*, 2006.

[7]Federal Transit Authority, *Transit Noise and Vibration Impact Assessment*, May 2006.

TABLE 3-4: LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS

Land Use Category	Community Noise Exposure (dBA, CNEL) 55 60 65 70 75 80
Residential - Low Density Single-Family, Duplex, Mobile Homes	
Residential - Multi-Family	
Transient Lodging - Motels Hotels	
Schools, Libraries, Churches, Hospitals, Nursing Homes	
Auditoriums, Concert Halls, Amphitheaters	
Sports Arena, Outdoor Spectator Sports	
Playgrounds, Neighborhood Parks	
Golf Courses, Riding Stables, Water Recreation, Cemeteries	
Office Buildings, Business Commercial and Professional	
Industrial, Manufacturing, Utilities, Agriculture	



Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air conditionally will normally suffice.

Normally Unacceptable - New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable - New construction or development should generally not be undertaken.

SOURCE: California Office of Noise Control, Department of Health Services.

Ground-borne Vibration Significance Criteria

There are no adopted State or City of Long Beach ground-borne vibration standards. Based on federal guidelines, the proposed project would result in a significant construction or operational vibration impact if:

- Construction activity would expose buildings to the FRA building damage threshold level of 0.5 inches per second PPV;
- Construction activity would occur outside of the hours permitted by the LBMC (i.e., outside of the hours of 7:00 a.m. and 7:00 p.m. on weekdays/holidays, 9:00 a.m. and 6:00 p.m. on Saturdays, or at any time on Sundays); and/or
- Operational activity generates perceptible vibration at or beyond the property boundary of the source in accordance with the LBMC.

3.4 ENVIRONMENTAL IMPACTS

3.4.1 Noise Impacts

Construction Phase Noise Impacts

Construction of the proposed project would result in temporary increases in ambient noise levels in the project area on an intermittent basis. The increase in noise would occur during the 29-month construction schedule. Noise levels would fluctuate depending on the construction phase, equipment type and duration of use, distance between the noise source and receptor, and presence or absence of noise attenuation barriers.

Construction activities typically require the use of numerous noise generating-equipment, such as jackhammers, pneumatic impact equipment, saws, and tractors. Typical noise levels from various types of equipment that may be used during construction are listed in **Table 3-5**. The table shows noise levels at distances of 50 and 100 feet from the construction noise source.

Whereas **Table 3-5** shows the noise level of each equipment, the noise levels shown in **Table 3-6** take into account the likelihood that more than one piece of construction equipment would be in operation at the same time and lists the typical overall noise levels that would be expected for each phase of construction. These noise levels are based on surveys conducted by the USEPA in the early 1970s. Since 1970, regulations have been enforced to improve noise generated by certain types of construction equipment to meet worker noise exposure standards. However, many older pieces of equipment are still in use. Thus, the construction phase noise levels indicated in **Table 3-6** represent worst-case conditions. As the table shows, the highest noise levels are expected to occur during the grading/excavation and finishing phases of construction. A typical piece of equipment is assumed to be active for 40 percent of the eight-hour workday (consistent with the USEPA studies of construction noise), generating a noise level of 89 dBA at a reference distance of 50 feet.

TABLE 3-5: MAXIMUM NOISE LEVELS OF COMMON CONSTRUCTION MACHINES		
	Noise Level (dBA) /a/	
Noise Source	**50 Feet**	**100 Feet**
Jackhammer	82	76
Steamroller	83	77
Street Paver	80	74
Backhoe	83	77
Street Compressor	67	61
Front-end Loader	79	73
Street Cleaner	70	64
Idling Haul Truck	72	66
Cement Mixer	72	66

/a/ Assumes a 6-dBA drop-off rate for noise generated by a "point source" and traveling over hard surfaces. Actual measured noise levels of the equipment listed in this table were taken at distances of ten and 30 feet from the noise source.
SOURCE: City of Los Angeles, *L.A. CEQA Thresholds Guide*, 2006; TAHA, 2008.

TABLE 3-6: OUTDOOR CONSTRUCTION NOISE LEVELS	
Construction Phase	**Noise Level At 50 Feet (dBA)**
Ground Clearing	84
Grading/Excavation	89
Foundations	78
Structural	85
Finishing	89

SOURCE: City of Los Angeles, *L.A. CEQA Thresholds Guide*, 2006.

The noise level during the construction period at each receptor location was calculated by (1) making a distance adjustment to the construction source sound level and (2) logarithmically adding the adjusted construction noise source level to the ambient noise level. The estimated construction noise levels at sensitive receptors are shown in **Table 3-7**. Construction noise levels would exceed the 5-dBA significance threshold at multiple receptors located near the project site. **Table 3-7** presents noise level for construction activity occurring at the closest point to the receptors. The project site is approximately 19 acres and the majority of construction activity would occur away from sensitive receptors. Nonetheless, the proposed project would result in a significant impact without of mitigation applied to perimeter and boundary areas.

TABLE 3-7: CONSTRUCTION NOISE IMPACT - UNMITIGATED					
Sensitive Receptor	**Distance (feet) /a/**	**Maximum Construction Noise Level (dBA) /b/**	**Existing Ambient (dBA, L_{eq}) /c/**	**New Ambient (dBA, L_{eq}) /d/**	**Increase /e/**
Single-family residences east of project	Adjacent	89.0	61.1	89.0	37.9
Single-family residence west of project	Adjacent	89.0	65.1	89.0	19.8
Multi-family residence south of the project	Adjacent	89.0	71.3	89.1	17.8
Long Beach Community College	65	86.7	65.1	86.8	21.7
John G. Whittier Elementary School	310	68.2	67.1	70.7	3.6
Alvarado (Juan Bautista) Elementary School	520	63.7	55.4	64.3	8.9
Mary Butler Elementary School	530	63.5	67.8	69.2	1.4

/a/ Distance of noise source from receptor.
/b/ Construction noise source's sound level at receptor location, with distance and building adjustment.
/c/ Pre-construction activity ambient sound level at receptor location.
/d/ New sound level at receptor location during the construction period, including noise from construction activity.
/e/ An incremental noise level increase of 5 dBA or more would result in a significant impact.
SOURCE: TAHA, 2008.

Construction Phase Noise Mitigation Measures

N1 All construction equipment shall be equipped with mufflers and other suitable noise attenuation devices.

N2 Grading and construction contractors shall use quieter equipment as opposed to noisier equipment (such as rubber-tired equipment rather than track equipment).

N3 A ten-foot sound attenuation blanket shall be installed along the eastern portion of the property line such that the line of sight is blocked from construction activity to the residential land uses. The blankets shall remain in place as long as construction activity utilizing heavy-duty equipment is located within 200 feet of the property line.

N4 A ten-foot sound attenuation blanket shall be installed along the northwestern portion of the property line such that the line of sight is blocked from construction activity to the single-family residence. The blankets shall remain in place as long as construction activity utilizing heavy-duty equipment is located within 130 feet of the property line.

N5 A ten-foot sound attenuation blanket shall be installed along the southern portion of the property line such that the line of sight is blocked from construction activity to the multi-family residence. The blankets shall remain in place as long as construction activity utilizing heavy-duty equipment is located within 100 feet of the property line.

N6 A ten-foot sound attenuation blanket shall be installed along the northern portion of the property line such that the line of sight is blocked from construction activity to the Alvarado Elementary School. The blankets shall remain in place as long as construction activity utilizing heavy-duty equipment is located within 50 feet of the property line.

N7 A "noise disturbance coordinator" shall be established. The disturbance coordinator shall be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and shall be required to implement reasonable measures such that the complaint is resolved. All signs posted at the construction site shall list the telephone number for the disturbance coordinator.

Impacts After Mitigation

Mitigation Measure **N1** would reduce noise levels by approximately 3 dBA. Mitigation Measures **N3** through **N6** would reduce noise levels by at least 10 dBA. The other construction mitigation measures (**N2** and **N7**) would assist in attenuating construction noise levels. **Table 3-8** shows mitigated construction noise levels. Mitigated construction noise levels would exceed the 5-dBA significance threshold at multiple receptors, and would result in a significant impact and unavoidable impact.

TABLE 3-8: CONSTRUCTION NOISE IMPACT - MITIGATED

Sensitive Receptor	Distance (feet) /a/	Maximum Construction Noise Level (dBA) /b/	Existing Ambient (dBA, L_{eq}) /c/	New Ambient (dBA, L_{eq}) /d/	Increase
Single-Family residences east of project	Adjacent	76.0	61.1	76.1	15.0
Single-family residence west of project	Adjacent	76.0	65.1	76.8	19.8
Multi-family residence south of the project	Adjacent	76.0	71.3	77.3	6.0
Long Beach Community College	65	83.7	65.1	83.8	18.7
John G. Whittier Elementary School	310	65.2	67.1	69.3	2.2
Alvarado (Juan Bautista) Elementary School	520	50.7	55.4	56.7	2.3
Mary Butler Elementary School	530	63.5	67.8	69.2	1.4

/a/ Distance of noise source from receptor.
/b/ Construction noise source's sound level at receptor location, with distance and building adjustment.
/c/ Pre-construction activity ambient sound level at receptor location.
/d/ New sound level at receptor location during the construction period, including noise from construction activity.
/e/ An incremental noise level increase of 5 dBA or more would result in a significant impact.
SOURCE: TAHA, 2008.

Operational Phase Noise Impacts

Vehicular Noise. According to the traffic report prepared by Linscott Law and Greenspan, Engineers, the proposed project would generate 3,770 weekday and 1,482 Saturday daily vehicle trips.[8] To determine off-site noise impacts, traffic was modeled under future year (2010) "no project" and "with project" conditions utilizing FHWA RD-77-108 noise calculation formulas. Weekday and weekend results of the analysis are summarized in **Tables 3-9** and **3-10**, respectively. The greatest weekday project-related noise increase would be 0.8 dBA CNEL and would occur along Alamitos Avenue between Walnut and Cherry Avenues. The greatest weekend project-related noise increase would be 1.1 dBA CNEL and would occur along Alamitos Avenue between Walnut and Cherry Avenues. Roadway noise levels attributed to the proposed project would increase by less than 3 dBA CNEL at all analyzed segments.

[8]Linscott Law & Greenspan, Engineers, *Draft Traffic Impact Analysis Kroc Community Center*, October 27, 2008.

TABLE 3-9: 2008 AND 2010 ESTIMATED COMMUNITY NOISE EQUIVALENT LEVEL - WEEKDAY/a/			
	Estimated dBA, CNEL		
Roadway Segment	**No Project (2010)**	**Project (2010)**	**Project Impact**
Walnut Avenue between Hill Street and 20th Street	61.1	61.7	0.6
Walnut Avenue between 20th Street and Pacific Coast Highway	62.7	63.3	0.6
Walnut Avenue south of Pacific Coast Highway	61.3	61.6	0.3
Cherry Avenue between 21st Street and Pacific Coast Highway	68.0	68.0	<0.1
Alamitos Avenue between Walnut and Cherry Avenues	58.6	59.4	0.8
Pacific Coast Highway between Alamitos and Walnut Avenues	72.0	72.2	0.2
Pacific Coast Highway between Walnut and Rose Avenues	71.9	72.0	0.1
Pacific Coast Highway between Rose and Cherry Avenues	71.9	72.0	0.1
Pacific Coast Highway between Cherry and Temple Avenues	71.6	71.6	<0.1

/a/ The predicted CNEL were calculated as peak hour L_{eq} and converted into CNEL using the California Department of Transportation *Technical Noise Supplement* (October 1998). The conversion involved making a correction for peak hour traffic volumes as a percentage of average daily traffic and a nighttime penalty correction. The peak hour traffic was assumed to be ten percent of the average daily traffic.
SOURCE: TAHA, 2008 (Appendix A).

TABLE 3-10: 2008 AND 2010 ESTIMATED COMMUNITY NOISE EQUIVALENT LEVEL - WEEKEND/a/			
	Estimated dBA, CNEL		
Roadway Segment	**No Project (2010)**	**Project (2010)**	**Project Impact**
Walnut Avenue between Hill Street and 20th Street	59.9	60.5	0.6
Walnut Avenue between 20th Street and Pacific Coast Highway	60.5	61.3	0.8
Walnut Avenue south of Pacific Coast Highway	59.6	59.9	0.3
Cherry Avenue between 21st Street and Pacific Coast Highway	69.9	69.9	<0.1
Alamitos Avenue between Walnut and Cherry Avenues	56.5	57.6	1.1
Pacific Coast Highway between Alamitos and Walnut Avenues	70.2	70.5	0.3
Pacific Coast Highway between Walnut and Rose Avenues	70.1	70.1	<0.1
Pacific Coast Highway between Rose and Cherry Avenues	70.1	70.2	0.1
Pacific Coast Highway between Cherry and Temple Avenues	70.4	70.5	0.1

/a/ The predicted CNEL were calculated as peak hour L_{eq} and converted into CNEL using the California Department of Transportation *Technical Noise Sup plement* (October 1998). The conversion involved making a correction for peak hour traffic volumes as a percentage of average daily traffic and a nighttime penalty correction. The peak hour traffic was assumed to be ten percent of the average daily traffic.
SOURCE: TAHA, 2008 (Appendix A).

Mobile noise generated by the proposed project would not cause the ambient noise level measured at the property line of the affected uses to increase by 3 dBA CNEL to or within the "normally unacceptable" or "clearly unacceptable" category (**Table 3-4**) or any 5-dBA or more increase in noise level. Therefore, the proposed project would result in a less-than-significant mobile noise impact.

Stationary Noise. Potential stationary noise sources related to the long-term operations of the proposed project include mechanical equipment. Mechanical equipment (e.g., HVAC equipment) typically generates noise levels of approximately 60 dBA at 50 feet. In addition, mechanical equipment would be screened from view as necessary to comply with Section 8.80.200 of the LBMC. Operation of mechanical equipment would not be anticipated to increase ambient noise levels by 5 dBA or more. Stationary noise would result in a less-than-significant impact.

Indoor Activity Noise. The project site would include a two-story auditorium (lecture hall/sanctuary, stage, lobby, etc.), a four-story administrative and educational building (offices, library, multi-purpose rooms, etc.), and a two-story recreation center (gymnasium, exercise rooms, etc.). Activities conducted within these buildings would be enclosed on all sides, and noise generated by these facilities would be inaudible at nearby sensitive receptors. Indoor activity noise would result in a less-than-significant impact.

Outdoor Activity Noise. The project site would include an outdoor recreation area with three pools (a 50-meter, warm-up, and leisure pool), an amphitheater, a soccer field, a playground, walking trails, outdoors climbing wall, and challenge course. Outdoor activities typically generate 73 dBA noise level 50 feet.[9] The closest sensitive receptors to outdoor activity areas include three residential land uses adjacent to the project site.

As shown in **Table 3-11**, the highest ambient noise increase due to outdoor activity noise would occur at the single- and multi-family residences along Gardenia Street, located approximately 15 feet east of the project boundary. The nearest outdoor activity noise would occur at the pool facility, approximately 250 feet from these residences. These residential uses would experience an 8.6-dBA increase in ambient noise from noise generated at the pool facilities. This would exceed the 5-dBA threshold for operational noise. All other nearby sensitive uses would experience ambient noise level increases below the 5-dBA threshold from outdoor activity noise. Outdoor activity noise would result in a significant impact without implementation of mitigation measures.

[9]James P. Cowan, *Handbook of Environmental Acoustics*, 1994.

TABLE 3-11: OUTDOOR ACTIVITY NOISE IMPACT

Sensitive Receptor	Distance (feet) /a/	Maximum Outdoor Activity Noise Level (dBA) /b/	Existing Ambient (dBA, L_{eq}) /c/	New Ambient (dBA, L_{eq}) /d/	Increase
Single- and multi-family residences along Gardenia Street, east of the project	250	59.0	51.1	59.7	8.6
Long Beach Community College	250	59.0	65.1	66.1	1.0
Single-family residence along Walnut Avenue, west of the project	320	56.9	65.1	65.7	0.6
Multi-family Residence along Pacific Coast Highway, south of the project	515	52.7	71.3	71.4	0.1

/a/ Distance from nearest outdoor activity noise source to receptor.
/b/ Outdoor activity noise source's sound level at receptor location, with distance and building adjustment.
/c/ Pre-construction activity ambient sound level at receptor location.
/d/ New sound level at receptor location during the operational period, including noise from nearest outdoor activity areas.
/e/ An incremental noise level increase of 5 dBA or more would result in a significant impact.
SOURCE: TAHA, 2008.

Parking Noise. The proposed project would include two parking facilities. A surface parking lot would be located on the west side of the project site along Walnut Avenue approximately 65 feet from Long Beach Community College. The two-level parking structure would be located on the southeast portion of the project site approximately 50 feet from single- and multi-family residential uses to the east, and 25 feet from the multi-family residential use to the south. Automobile parking activity typically generates a noise level of approximately 58.1 dBA L_{eq} at 50 feet (e.g., tire noise, engine runups and door slams).[10]

As shown in **Table 3-12**, the highest ambient noise increase due to parking activity noise would occur at the single- and multi-family residences along Gardenia Street, located approximately 15 feet east of the project boundary. The nearest parking activity noise would occur at the surface level of the parking structure, approximately 50 feet from these residential uses. These residential uses would experience an 7.8-dBA increase in ambient noise from noise generated at the parking structure. This would exceed the 5-dBA threshold for operational noise. All other nearby sensitive uses would experience ambient noise level increases below the 5-dBA threshold from parking activity noise. Parking activity noise would result in a significant impact without mitigation.

[10]The reference parking noise level is based on a series of noise measurements completed 50 feet from vehicles accessing a multi-level parking structure.

TABLE 3-12: PARKING ACTIVITY NOISE IMPACT

Sensitive Receptor	Distance (feet) /a/	Maximum Parking Noise Level (dBA) /b/	Existing Ambient (dBA, L_{eq}) /c/	New Ambient (dBA, L_{eq}) /d/	Increase
Multi-family residence along Pacific Coast Highway, south of the project	25	58.1	71.3	71.5	0.2
Single- and multi-family residences along Gardenia Street, east of the project	50	58.1	51.1	58.9	7.8
Long Beach Community College	65	55.8	65.1	65.6	0.5
Single-family residence along Walnut Avenue, west of the project	180	47.0	65.1	65.2	0.1

/a/ Distance from nearest parking activity noise source to receptor.
/b/ Parking activity noise source's sound level at receptor location, with distance and building adjustment.
/c/ Pre-construction activity ambient sound level at receptor location.
/d/ New sound level at receptor location during the operational period, including noise from nearest parking activity.
/e/ An incremental noise level increase of 5 dBA or more would result in a significant impact.
SOURCE: TAHA, 2008.

Loading Activity and Delivery Truck Noise. The proposed project would include one loading dock for delivery trucks located at the back of the administration and education building. Noise levels from medium-duty trucks accessing the project site would range from 71 to 79 dBA L_{eq} at 50 feet.[11] Back-up safety alarms would generate a single event noise level of approximately 79 dBA at 50 feet.[12]

The loading dock would be accessed from the surface parking level of the two-level parking structure. Delivery trucks would enter the project site along Rose Avenue, and would park in a loading dock at the back of the administration building. The loading dock would be enclosed on three sides by walls, and would be completely screened from the multi-family residence to the south, from Long Beach Community College to the west, and the single-family adjacent to the project site along Walnut Avenue. The loading would mainly service step vans (e.g., FedEx trucks) that do not have backup alarms. Trucks would back into the loading area such that unloading/loading would occur to the west with the truck facing east. Loading activity would not be audible at the residential uses located east of the project site, and loading activity would result in a less-than-significant impact.

Operational Phase Noise Mitigation Measures

N8 A six-foot solid wall shall be constructed along the eastern portion of the swimming pool such that the line of sight is blocked from the swimming pool to residential land uses.

N9 A six-foot solid wall shall be constructed along the eastern property line of the project site such that the line of sight is blocked from the parking lot to residential land uses.

[11]California Department of Transportation, *Technical Noise Supplement*, October 1998.

[12]The back-up safety alarm noise level was based on regulations set forth b the Occupational Safety and Health Administration.

Impacts After Mitigation

Mitigation Measure **N8** would reduce outdoor activity noise levels at the single- and multi-family residential uses to the east of the project site by approximately 5 dBA. With the implementation of this mitigation measure, these residential uses would experience a 4.7-dBA increase from outdoor activity. This level would not exceed the 5-dBA threshold for operation noise. Outdoor activity noise would result in a less-than-significant impact.

Mitigation Measure **N9** would reduce parking activity noise at the single- and multi-family residential uses to the east of the project site by approximately 5 dBA. With the implementation of this mitigation measure, these residential uses would experience a 4.1-dBA increase from parking activity. These levels would not exceed the 5-dBA threshold for operation noise. Parking activity and loading activity noise would result in a less-than-significant impact.

3.4.2 Ground-borne Vibration Impacts

Construction Phase Ground-borne Vibration Impacts

As shown in **Table 3-13**, use of heavy equipment (e.g., a large bulldozer) generates vibration levels of 0.089 inches per second PPV at a distance of 25 feet. The nearest residential structures to the project site would be approximately 25 feet from occasional heavy equipment activity and could experience vibration levels of 0.089 inches per second PPV. Vibration levels at these receptors would be perceptible but would not exceed the potential building damage threshold of 0.5 inches per second PPV.

The proposed project may require drilled or driven piles. Impact pile driving would generate a vibration level of 0.644 inches per second PPV at the multi-family residence to the south, which would exceed the potential building damage threshold of 0.5 inches per second PPV. The proposed project would result in a significant construction vibration impact without mitigation.

TABLE 3-13: VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment	PPV at 25 feet (Inches /Second) /a/
Pile Driving (Impact)	0.644
Pile Driving (Sonic)	0.170
Caisson Drilling	0.089
Large Bulldozer	0.089
Loaded Trucks	0.076

/a/ Fragile buildings can be exposed to ground-borne vibration levels of 0.5 inches per second PPV without experiencing structural damage.
SOURCE: Federal Transit Authority, *Transit Noise and Vibration Impact Assessment*, May 2006.

Construction Phase Ground-borne Vibration Mitigation Measures

N10 Should pile driving be required, the construction contractor shall utilize sonic pile driving in place of impact pile driving.

Impacts After Mitigation

Mitigation Measure **N10** would require that pile-driving activity be restricted to sonic pile driving during construction. A sonic pile driver would generate a vibration level of 0.17 inches per second PPV at a distance of 25 feet. The multi-family residence to the south would be exposed to vibration levels of 0.17 inches per second PPV, which would be perceptible but would not exceed the potential building damage threshold of 0.5 inches per second PPV. Construction vibration would result in a less-than-significant impact.

Operational Phase Ground-borne Vibration Impacts

The proposed project would not include significant stationary sources of ground-borne vibration, such as heavy equipment operations. The proposed recreational and community uses would not generate any perceptible vibration. In accordance with Section 8.80.200 of the LBMC, vibration related to operational activity would not be perceptible at or beyond the property boundary. Operational vibration would result in a less-than-significant impact.

Operational Phase Ground-borne Vibration Mitigation Measures

Operational ground-borne vibration impacts would be less than significant, and no mitigation measures are required.

Impacts After Mitigation

The project-related operational ground-borne vibration would result in a less-than-significant impact.

3.5 CUMULATIVE IMPACTS

When calculating future traffic impacts, the traffic consultant took 21 additional projects into consideration. Thus, the future traffic results without and with the proposed project already account for the cumulative impacts from these other projects. Since the noise impacts are generated directly from the traffic analysis results, the future without project and future with project noise impacts described in this report already reflect cumulative impacts.

Tables 3-14 and **3-15** present the cumulative increase in future traffic noise levels at intersections (i.e., 2008 "No Project "conditions plus proposed project traffic) for weekday and weekend conditions, respectively. The maximum cumulative weekday roadway noise increase would be 0.9 dBA CNEL and would occur along Alamitos Avenue between Walnut and Cherry Avenues. The maximum cumulative weekend roadway noise increase would be 1.1 dBA CNEL and would occur along two segments: Alamitos Avenue between Walnut and Cherry Avenues, and Walnut Avenue between 20th Street and Pacific Coast Highway. No analyzed intersection would experience a cumulative increase greater than 3 dBA CNEL. Mobile noise would result in a less-than-significant impact.

The predominant vibration source near the project site is heavy trucks traveling on the local roadways. Neither the proposed project nor related projects would substantially increase heavy-duty vehicle traffic near the project site. The proposed project would not add to a cumulative vibration impact.

TABLE 3-14: 2008 AND 2010 ESTIMATED CUMULATIVE COMMUNITY NOISE EQUIVALENT LEVEL - WEEKDAY/a/

Roadway Segment	Estimated dBA, CNEL		
	Existing (2008)	**Project (2010)**	**Cumulative Impact**
Walnut Avenue between Hill Street and 20th Street	60.9	61.7	0.8
Walnut Avenue between 20th Street and Pacific Coast Highway	62.6	63.3	0.7
Walnut Avenue south of Pacific Coast Highway	61.0	61.6	0.6
Cherry Avenue between 21st Street and Pacific Coast Highway	67.8	68.0	0.2
Alamitos Avenue between Walnut and Cherry Avenues	58.5	59.4	0.9
Pacific Coast Highway between Alamitos and Walnut Avenues	71.8	72.2	0.4
Pacific Coast Highway between Walnut and Rose Avenues	71.7	72.0	0.3
Pacific Coast Highway between Rose and Cherry Avenues	71.7	72.0	0.3
Pacific Coast Highway between Cherry and Temple Avenues	71.3	71.6	0.3

/a/ The predicted CNEL were calculated as peak hour L_{eq} and converted into CNEL using the California Department of Transportation *Technical Noise Supplement* (October 1998). The conversion involved making a correction for peak hour traffic volumes as a percentage of average daily traffic and a nighttime penalty correction. The peak hour traffic was assumed to be ten percent of the average daily traffic.
SOURCE: TAHA, 2008 (Appendix A).

TABLE 3-15: 2008 AND 2010 ESTIMATED CUMULATIVE COMMUNITY NOISE EQUIVALENT LEVEL - WEEKEND/a/

Roadway Segment	Estimated dBA, CNEL		
	Existing (2008)	**Project (2010)**	**Cumulative Impact**
Walnut Avenue between Hill Street and 20th Street	559.6	60.5	0.9
Walnut Avenue between 20th Street and Pacific Coast Highway	60.2	61.3	1.1
Walnut Avenue south of Pacific Coast Highway	59.1	59.9	0.8
Cherry Avenue between 21st Street and Pacific Coast Highway	69.6	69.9	0.3
Alamitos Avenue between Walnut and Cherry Avenues	56.5	57.6	1.1
Pacific Coast Highway between Alamitos and Walnut Avenues	69.9	70.5	0.6
Pacific Coast Highway between Walnut and Rose Avenues	69.7	70.1	0.4
Pacific Coast Highway between Rose and Cherry Avenues	69.8	70.2	0.4
Pacific Coast Highway between Cherry and Temple Avenues	70.1	70.5	0.4

/a/ The predicted CNEL were calculated as peak hour L_{eq} and converted into CNEL using the California Department of Transportation *Technical Noise Supplement* (October 1998). The conversion involved making a correction for peak hour traffic volumes as a percentage of average daily traffic and a nighttime penalty correction. The peak hour traffic was assumed to be ten percent of the average daily traffic.
SOURCE: TAHA, 2008 (Appendix A).

Appendix A

Mobile Noise

CNEL Noise Estimates - Based on AM Peak Hour

Existing 2008

ROAD SEGMENT	from:	to:	TOT. # VEH	EQUIVALENT LANE DISTANCE D1	D2	Eq Dis.	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft ROW CNEL (dBA)	75 ft ROW CNEL (dBA)	100 ft ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	408	6	18	10	91	370.8	6	24.5	3	12.2	25	40	25	40	25	40	55.8	55.6	58.8	60.9	59.4	58.3
Walnut Ave	20th St	Pacific Coast Hwy	700	6	18	10	91	637	6	42	3	21	25	40	25	40	25	40	58.1	58.0	61.1	63.3	61.8	60.7
Walnut Ave	Pacific Coast Hwy	17th Street	422	6	18	10	91	384	6	25.3	3	12.7	25	40	25	40	25	40	55.9	55.8	58.9	61.1	59.6	58.5
Cherry Ave	21st St	Pacific Coast Hwy	1232	18	64	34	91	1121	6	73.9	3	37	40	64	40	64	40	64	66.5	63.6	65.5	67.9	66.7	65.8
Alamitos	Walnut Ave	Cherry Ave	253	16	28	21	91	229.8	6	15.2	3	7.58	30	48	30	48	30	48	56.0	54.8	57.4	59.4	58.1	57.1
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	3395	6	66	20	92	3123	6	204	3	102	35	56	35	56	35	56	69.3	67.1	69.3	72.0	70.7	69.6
Pacific Coast Hwy	Walnut Ave	Rose Ave	3233	6	66	20	93	3007	6	194	3	97	35	56	35	56	35	56	69.1	66.9	69.1	71.8	70.5	69.4
Pacific Coast Hwy	Rose Ave	Cherry Ave	3256	6	66	20	91	2963	6	195	3	97.7	35	56	35	56	35	56	69.0	66.9	69.1	71.8	70.5	69.4
Pacific Coast Hwy	Cherry Ave	Temple Ave	2975	6	66	20	91	2707	6	179	3	89.3	35	56	35	56	35	56	68.6	66.5	68.8	71.4	70.1	69.1

Future Without Project 2010

ROAD SEGMENT	from:	to:	TOT # VEH.	EQUIVALENT LANE DISTANCE D1	D2	Eq Dis.	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft ROW CNEL (dBA)	75 ft ROW CNEL (dBA)	100 ft ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	429	6	18	10	91	389.9	6	25.7	3	12.9	25	40	25	40	25	40	56.0	55.9	59.0	61.1	59.6	58.5
Walnut Ave	20th St	Pacific Coast Hwy	727	6	18	10	91	661.6	6	43.6	3	21.8	25	40	25	40	25	40	58.3	58.1	61.3	63.4	61.9	60.8
Walnut Ave	Pacific Coast Hwy	17th Street	452	6	18	10	91	411.3	6	27.1	3	13.6	25	40	25	40	25	40	56.2	56.1	59.2	61.4	59.9	58.8
Cherry Ave	21st St	Pacific Coast Hwy	1288	18	64	34	91	1172	6	77.3	3	38.6	40	64	40	64	40	64	66.7	63.8	65.6	68.0	66.9	66.0
Alamitos	Walnut Ave	Cherry Ave	258	16	28	21	91	234.8	6	15.5	3	7.74	30	48	30	48	30	48	56.1	54.9	57.5	59.5	58.2	57.2
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	3536	6	66	20	92	3253	6	212	3	106	35	56	35	56	35	56	69.4	67.3	69.5	72.2	70.8	69.8
Pacific Coast Hwy	Walnut Ave	Rose Ave	3373	6	66	20	93	3136	6	202	3	101	35	56	35	56	35	56	69.3	67.1	69.3	72.0	70.6	69.6
Pacific Coast Hwy	Rose Ave	Cherry Ave	3396	6	66	20	91	3090	6	204	3	102	35	56	35	56	35	56	69.2	67.1	69.3	72.0	70.6	69.6
Pacific Coast Hwy	Cherry Ave	Temple Ave	3119	6	66	20	91	2838	6	187	3	93.6	35	56	35	56	35	56	68.8	66.8	69.0	71.6	70.3	69.3

Future With Project 2010

ROAD SEGMENT	from:	to:	TOT. # VEH	EQUIVALENT LANE DISTANCE D1	D2	Eq Dis.	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft ROW CNEL (dBA)	75 ft ROW CNEL (dBA)	100 ft ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	489	6	18	10	91	444.5	6	29.3	3	14.7	25	40	25	40	25	40	56.6	56.4	59.6	61.7	60.2	59.1
Walnut Ave	20th St	Pacific Coast Hwy	817	6	18	10	91	743.5	6	49	3	24.5	25	40	25	40	25	40	58.8	58.7	61.8	64.0	62.4	61.3
Walnut Ave	Pacific Coast Hwy	17th Street	482	6	18	10	91	438.6	6	28.9	3	14.5	25	40	25	40	25	40	56.5	56.4	59.5	61.7	60.2	59.0
Cherry Ave	21st St	Pacific Coast Hwy	1288	18	64	34	91	1172	6	77.3	3	38.6	40	64	40	64	40	64	66.7	63.8	65.6	68.0	66.9	66.0
Alamitos	Walnut Ave	Cherry Ave	303	16	28	21	91	275.7	6	18.2	3	9.09	30	48	30	48	30	48	56.8	55.6	58.2	60.2	58.9	57.9
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	3626	6	66	20	92	3335	6	218	3	109	35	56	35	56	35	56	69.5	67.4	69.6	72.3	70.9	69.9
Pacific Coast Hwy	Walnut Ave	Rose Ave	3418	6	66	20	93	3178	6	205	3	103	35	56	35	56	35	56	69.3	67.2	69.4	72.0	70.7	69.7
Pacific Coast Hwy	Rose Ave	Cherry Ave	3461	6	66	20	91	3149	6	208	3	104	35	56	35	56	35	56	69.3	67.2	69.4	72.1	70.7	69.7
Pacific Coast Hwy	Cherry Ave	Temple Ave	3164	6	66	20	91	2879	6	190	3	94.9	35	56	35	56	35	56	68.9	66.8	69.0	71.7	70.3	69.3

CNEL Noise Estimates - Based on PM Peak Hour

Existing 2008

ROAD SEGMENT	from:	to:	TOT. # VEH.	EQUIVALENT LANE DISTANCE D1	D2	Eq. Dis.	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft. ROW CNEL (dBA)	75 ft. ROW CNEL (dBA)	100 ft. ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	535	6	18	10	91	486.9	6	32.1	3	16.1	25	40	25	40	25	40	57.0	56.8	60.0	62.1	60.6	59.5
Walnut Ave	20th St	Pacific Coast Hwy	599	6	18	10	91	545.1	6	35.9	3	18	25	40	25	40	25	40	57.5	57.3	60.4	62.6	61.1	60.0
Walnut Ave	Pacific Coast Hwy	17th Street	385	6	18	10	91	350.4	6	23.1	3	11.6	25	40	25	40	25	40	55.5	55.4	58.5	60.7	59.2	58.1
Cherry Ave	21st St	Pacific Coast Hwy	1202	18	64	34	91	1094	6	72.1	3	36.1	40	64	40	64	40	64	66.4	63.5	65.3	67.7	66.6	65.7
Alamitos	Walnut Ave	Cherry Ave	206	16	28	21	91	187	6	12.3	3	6.17	30	48	30	48	30	48	55.1	53.9	56.5	58.5	57.2	56.2
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	3311	6	66	20	92	3046	6	199	3	99.3	35	56	35	56	35	56	69.1	67.0	69.2	71.9	70.6	69.5
Pacific Coast Hwy	Walnut Ave	Rose Ave	3205	6	66	20	93	2980	6	192	3	96.1	35	56	35	56	35	56	69.1	66.9	69.1	71.8	70.4	69.4
Pacific Coast Hwy	Rose Ave	Cherry Ave	3207	6	66	20	91	2918	6	192	3	96.2	35	56	35	56	35	56	69.0	66.9	69.1	71.7	70.4	69.4
Pacific Coast Hwy	Cherry Ave	Temple Ave	3265	6	66	20	91	2971	6	196	3	97.9	35	56	35	56	35	56	69.0	67.0	69.2	71.8	70.5	69.5

Future Without Project 2010

ROAD SEGMENT	from:	to:	TOT # VEH.	EQUIVALENT LANE DISTANCE D1	D2	Eq. Dis	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft ROW CNEL (dBA)	75 ft ROW CNEL (dBA)	100 ft ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	560	6	18	10	91	509.1	6	33.6	3	16.8	25	40	25	40	25	40	57.2	57.0	60.1	62.3	60.8	59.7
Walnut Ave	20th St	Pacific Coast Hwy	625	6	18	10	91	568.8	6	37.5	3	18.8	25	40	25	40	25	40	57.6	57.5	60.6	62.8	61.3	60.2
Walnut Ave	Pacific Coast Hwy	17th Street	415	6	18	10	91	377.7	6	24.9	3	12.5	25	40	25	40	25	40	55.9	55.7	58.9	61.0	59.5	58.4
Cherry Ave	21st St	Pacific Coast Hwy	1607	18	64	34	91	1462	6	96.4	3	48.2	40	64	40	64	40	64	67.6	64.8	66.6	69.0	67.9	67.0
Alamitos	Walnut Ave	Cherry Ave	210	16	28	21	91	190.6	6	12.6	3	6.29	30	48	30	48	30	48	55.2	54.0	56.6	58.6	57.3	56.3
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	3478	6	66	20	92	3200	6	209	3	104	35	56	35	56	35	56	69.4	67.2	69.4	72.1	70.8	69.7
Pacific Coast Hwy	Walnut Ave	Rose Ave	3372	6	66	20	93	3135	6	202	3	101	35	56	35	56	35	56	69.3	67.1	69.3	72.0	70.6	69.6
Pacific Coast Hwy	Rose Ave	Cherry Ave	3373	6	66	20	91	3069	6	202	3	101	35	56	35	56	35	56	69.2	67.1	69.3	71.9	70.6	69.6
Pacific Coast Hwy	Cherry Ave	Temple Ave	3449	6	66	20	91	3139	6	207	3	103	35	56	35	56	35	56	69.3	67.2	69.4	72.0	70.7	69.7

Future With Project 2010

ROAD SEGMENT	from:	to:	TOT. # VEH.	EQUIVALENT LANE DISTANCE D1	D2	Eq. Dis	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft. ROW CNEL (dBA)	75 ft. ROW CNEL (dBA)	100 ft. ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	621	6	18	10	91	564.7	6	37.2	3	18.6	25	40	25	40	25	40	57.6	57.5	60.6	62.8	61.3	60.1
Walnut Ave	20th St	Pacific Coast Hwy	716	6	18	10	91	651.1	6	42.9	3	21.5	25	40	25	40	25	40	58.2	58.1	61.2	63.4	61.9	60.8
Walnut Ave	Pacific Coast Hwy	17th Street	446	6	18	10	91	405.9	6	26.8	3	13.4	25	40	25	40	25	40	56.2	56.0	59.2	61.3	59.8	58.7
Cherry Ave	21st St	Pacific Coast Hwy	1607	18	64	34	91	1462	6	96.4	3	48.2	40	64	40	64	40	64	67.6	64.8	66.6	69.0	67.9	67.0
Alamitos	Walnut Ave	Cherry Ave	255	16	28	21	91	232.1	6	15.3	3	7.65	30	48	30	48	30	48	56.0	54.8	57.5	59.5	58.2	57.2
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	3569	6	66	20	92	3283	6	214	3	107	35	56	35	56	35	56	69.5	67.3	69.5	72.2	70.9	69.9
Pacific Coast Hwy	Walnut Ave	Rose Ave	3417	6	66	20	93	3177	6	205	3	102	35	56	35	56	35	56	69.3	67.1	69.4	72.0	70.7	69.7
Pacific Coast Hwy	Rose Ave	Cherry Ave	3449	6	66	20	91	3139	6	207	3	103	35	56	35	56	35	56	69.3	67.2	69.4	72.0	70.7	69.7
Pacific Coast Hwy	Cherry Ave	Temple Ave	3495	6	66	20	91	3180	6	210	3	105	35	56	35	56	35	56	69.3	67.2	69.4	72.1	70.8	69.8

CNEL Noise Estimates - Based on Weekend MIDDAY Peak Hour

Existing 2008

ROAD SEGMENT	from:	to:	TOT. # VEH	EQUIVALENT LANE DISTANCE D1	D2	Eq Dis.	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft ROW CNEL (dBA)	75 ft ROW CNEL (dBA)	100 ft ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	306	6	18	10	91	278.5	6	18.4	3	9.18	25	40	25	40	25	40	54.5	54.4	57.5	59.7	58.2	57.1
Walnut Ave	20th St	Pacific Coast Hwy	351	6	18	10	91	319	6	21	3	10.5	25	40	25	40	25	40	55.1	55.0	58.1	60.3	58.8	57.7
Walnut Ave	Pacific Coast Hwy	17th Street	271	6	18	10	91	246.6	6	16.3	3	8.13	25	40	25	40	25	40	54.0	53.9	57.0	59.2	57.7	56.5
Cherry Ave	21st St	Pacific Coast Hwy	1876	18	64	34	91	1707	6	113	3	56.3	40	64	40	64	40	64	68.3	65.5	67.3	69.7	68.5	67.6
Alamitos	Walnut Ave	Cherry Ave	131	16	28	21	91	118.8	6	7.83	3	3.92	30	48	30	48	30	48	53.1	51.9	54.6	56.6	55.3	54.3
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	2118	6	66	20	92	1949	6	127	3	63.5	35	56	35	56	35	56	67.2	65.1	67.3	69.9	68.6	67.6
Pacific Coast Hwy	Walnut Ave	Rose Ave	2038	6	66	20	93	1895	6	122	3	61.1	35	56	35	56	35	56	67.1	64.9	67.1	69.8	68.5	67.4
Pacific Coast Hwy	Rose Ave	Cherry Ave	2087	6	66	20	91	1899	6	125	3	62.6	35	56	35	56	35	56	67.1	65.0	67.2	69.9	68.5	67.5
Pacific Coast Hwy	Cherry Ave	Temple Ave	2214	6	66	20	91	2014	6	133	3	66.4	35	56	35	56	35	56	67.3	65.3	67.5	70.1	68.8	67.8

Future Without Project 2010

ROAD SEGMENT	from:	to:	TOT # VEH.	EQUIVALENT LANE DISTANCE D1	D2	Eq Dis.	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft ROW CNEL (dBA)	75 ft ROW CNEL (dBA)	100 ft ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	326	6	18	10	91	296.7	6	19.6	3	9.78	25	40	25	40	25	40	54.8	54.7	57.8	60.0	58.5	57.3
Walnut Ave	20th St	Pacific Coast Hwy	373	6	18	10	91	339	6	22.4	3	11.2	25	40	25	40	25	40	55.4	55.2	58.4	60.5	59.0	57.9
Walnut Ave	Pacific Coast Hwy	17th Street	302	6	18	10	91	274.8	6	18.1	3	9.06	25	40	25	40	25	40	54.5	54.3	57.5	59.6	58.1	57.0
Cherry Ave	21st St	Pacific Coast Hwy	1977	18	64	34	91	1799	6	119	3	59.3	40	64	40	64	40	64	68.5	65.7	67.5	69.9	68.8	67.9
Alamitos	Walnut Ave	Cherry Ave	131	16	28	21	91	118.8	6	7.83	3	3.92	30	48	30	48	30	48	53.1	51.9	54.6	56.6	55.3	54.3
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	2271	6	66	20	92	2089	6	136	3	68.1	35	56	35	56	35	56	67.5	65.4	67.6	70.2	68.9	67.9
Pacific Coast Hwy	Walnut Ave	Rose Ave	2192	6	66	20	93	2039	6	132	3	65.8	35	56	35	56	35	56	67.4	65.2	67.4	70.1	68.8	67.8
Pacific Coast Hwy	Rose Ave	Cherry Ave	2242	6	66	20	91	2040	6	134	3	67.2	35	56	35	56	35	56	67.4	65.3	67.5	70.2	68.8	67.8
Pacific Coast Hwy	Cherry Ave	Temple Ave	2386	6	66	20	91	2171	6	143	3	71.6	35	56	35	56	35	56	67.7	65.6	67.8	70.4	69.1	68.1

Future With Project 2010

ROAD SEGMENT	from:	to:	TOT. # VEH	EQUIVALENT LANE DISTANCE D1	D2	Eq Dis.	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	50 ft ROW CNEL (dBA)	75 ft ROW CNEL (dBA)	100 ft ROW CNEL (dBA)
Walnut Ave	Hill St	20th St	374	6	18	10	91	339.9	6	22.4	3	11.2	25	40	25	40	25	40	55.4	55.3	58.4	60.6	59.0	57.9
Walnut Ave	20th St	Pacific Coast Hwy	444	6	18	10	91	404	6	26.6	3	13.3	25	40	25	40	25	40	56.2	56.0	59.1	61.3	59.8	58.7
Walnut Ave	Pacific Coast Hwy	17th Street	326	6	18	10	91	296.7	6	19.6	3	9.78	25	40	25	40	25	40	54.8	54.7	57.8	60.0	58.5	57.3
Cherry Ave	21st St	Pacific Coast Hwy	1977	18	64	34	91	1799	6	119	3	59.3	40	64	40	64	40	64	68.5	65.7	67.5	69.9	68.8	67.9
Alamitos	Walnut Ave	Cherry Ave	167	16	28	21	91	151.5	6	9.99	3	5	30	48	30	48	30	48	54.2	53.0	55.6	57.6	56.3	55.3
Pacific Coast Hwy	Alamitos Ave	Walnut Ave	2466	6	66	20	92	2268	6	148	3	74	35	56	35	56	35	56	67.9	65.7	67.9	70.6	69.3	68.3
Pacific Coast Hwy	Walnut Ave	Rose Ave	2228	6	66	20	93	2072	6	134	3	66.8	35	56	35	56	35	56	67.5	65.3	67.5	70.2	68.8	67.8
Pacific Coast Hwy	Rose Ave	Cherry Ave	2302	6	66	20	91	2094	6	138	3	69	35	56	35	56	35	56	67.5	65.4	67.6	70.3	69.0	67.9
Pacific Coast Hwy	Cherry Ave	Temple Ave	2422	6	66	20	91	2204	6	145	3	72.7	35	56	35	56	35	56	67.7	65.7	67.9	70.5	69.2	68.2

APPENDIX F
TRAFFIC IMPACT ANALYSIS

LINSCOTT LAW & GREENSPAN
engineers

TRAFFIC IMPACT ANALYSIS

KROC COMMUNITY CENTER

Long Beach, California
January 30, 2009

Prepared for:

SAPPHOS ENVIRONMENTAL, INC.
430 North Halstead Street
Pasadena, California 91107

And

THE CITY OF LONG BEACH
Department of Development Services
333 West Ocean Boulevard
Long Beach, California 90802

LLG Ref. 2-07-2945

Prepared by:
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And
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Pasadena
Costa Mesa
San Diego
Las Vegas

January 30, 2009

Ms. Eimon Raoof
Sapphos Environmental, Inc.
430 North Halstead Street
Pasadena, California 91107

LLG Reference: 2.07.2945.1

Subject: **Traffic Impact Analysis for KROC Community Center
Long Beach, California**

Dear Ms. Raoof:

As requested, Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit this Traffic Impact Analysis for the proposed KROC Community Center project. The Project site is a 19±-acre parcel of land located on Chittick Field, at 1900 Walnut Avenue in the City of Long Beach, California and is generally located north of Pacific Coast Highway and east of Walnut Avenue. The proposed Kroc Community Center includes the construction of an approximately 170,536 square-foot (SF), three to four story, three-building complex and an outdoor recreation area that will include the following components:

- *Chapel/Auditorium Building*: This two-story building has a proposed floor area of 12,455 SF with a lobby, lecture hall/sanctuary, stage and backstage areas. The sanctuary will have a seating capacity of 450 persons.
- *Administration/Education Building*: This four-story building has a proposed floor area of 73,910 SF, which includes a 3,100 SF day-care facility, approximately 11,400 SF of administrative offices, a kitchen, classrooms, library, computer lab, arts studio and multipurpose rooms.
- *Recreation Center*: This two-story building has a proposed floor area of 84,171 SF that includes a gymnasium, exercise rooms, classrooms, weight room, locker rooms, game room, and indoor therapy pool.
- *Outdoor Recreation*: This space includes a 50-meter pool, warm-up pool, and leisure pool with fountains, slides and children's area. Other site amenities, including a 10,000 SF amphitheater, soccer field, playground, walking trails, outdoors climbing wall, and challenge course.

The Project is expected to be completed by the Year 2010. A total of 1,139 parking spaces are expected to be provided on-site via a two-story parking structure and surface spaces.

LINSCOTT
LAW &
GREENSPAN
engineers

This traffic analysis summarizes the trip generation potential for the proposed Project, develops an estimated project traffic distribution pattern, and assigns the project-related trips to the roadway system within the project vicinity. The traffic analysis evaluates the relative traffic impacts of the proposed Project at twelve (12) study intersections and three (3) Project Driveways within a near-term cumulative traffic setting (2010) during the weekday AM peak hour and PM peak hour and weekend (Saturday) peak hour.

We appreciate the opportunity to prepare this analysis. A summary of findings and conclusions can be found on pages 41 through 43 of this report. Should you have any questions or comments regarding the findings and recommendations within this report, please contact our office at (714) 641-1587.

Sincerely,

Linscott, Law & Greenspan, Engineers

Richard E. Barretto, P.E.
Principal

cc. File

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TRAFFIC IMPACT ANALYSIS
KROC COMMUNITY CENTER
Long Beach, California
January 30, 2009

1.0 INTRODUCTION

This Traffic Impact Analysis report addresses the potential traffic impacts and circulation needs associated with the development of the Kroc Community Center (hereinafter referred to as Project). The project site is a 19±-acre parcel of land located on Chittick Field, at 1900 Walnut Avenue in the City of Long Beach, California. The project site is generally located north of Pacific Coast Highway and east of Walnut Avenue.

This report documents the findings and recommendations of a traffic impact analysis conducted by Linscott, Law & Greenspan, Engineers (LLG) to determine the potential impacts associated with the proposed Project.

1.1 Scope of Work

The traffic analysis evaluates the existing operating conditions at twelve (12) key intersections within the project vicinity, estimates the trip generation potential of the proposed Project, and forecasts future operating conditions without and with the project. Where necessary, intersection improvements/mitigation measures are identified.

This traffic report satisfies the traffic impact requirements of the City of Long Beach and is consistent with the requirements and procedures outlined in the current *Congestion Management Program (CMP) for Los Angeles County* The Scope of Work for this report has been developed in coordination with City of Long Beach staff.

The project site has been visited and an inventory of adjacent area roadways and intersections was performed. Existing peak hour traffic information has been collected at twelve (12) key study locations on a "typical" weekday and weekend for use in the preparation of intersection level of service calculations. Information concerning cumulative projects (planned and/or approved) in the vicinity of the project has been researched at the City of Long Beach and at the City of Signal Hill. Based on our research, there are twelve (12) related projects in the City of Long Beach and nine (9) related projects in the City of Signal Hill. These twenty-one (21) planned and/or approved related projects were considered in the cumulative traffic analysis for this project.

This traffic report analyzes existing and future weekday AM peak hour and PM peak hour traffic conditions for a near-term (Year 2010) traffic setting upon opening of the proposed Project. Existing and future weekend (Saturday) peak hour traffic conditions have also been evaluated. Peak hour traffic forecasts for the Year 2010 horizon year have been projected by increasing existing traffic volumes by an annual growth rate of 1.0% per year and adding traffic volumes generated by twenty-one (21) related projects.

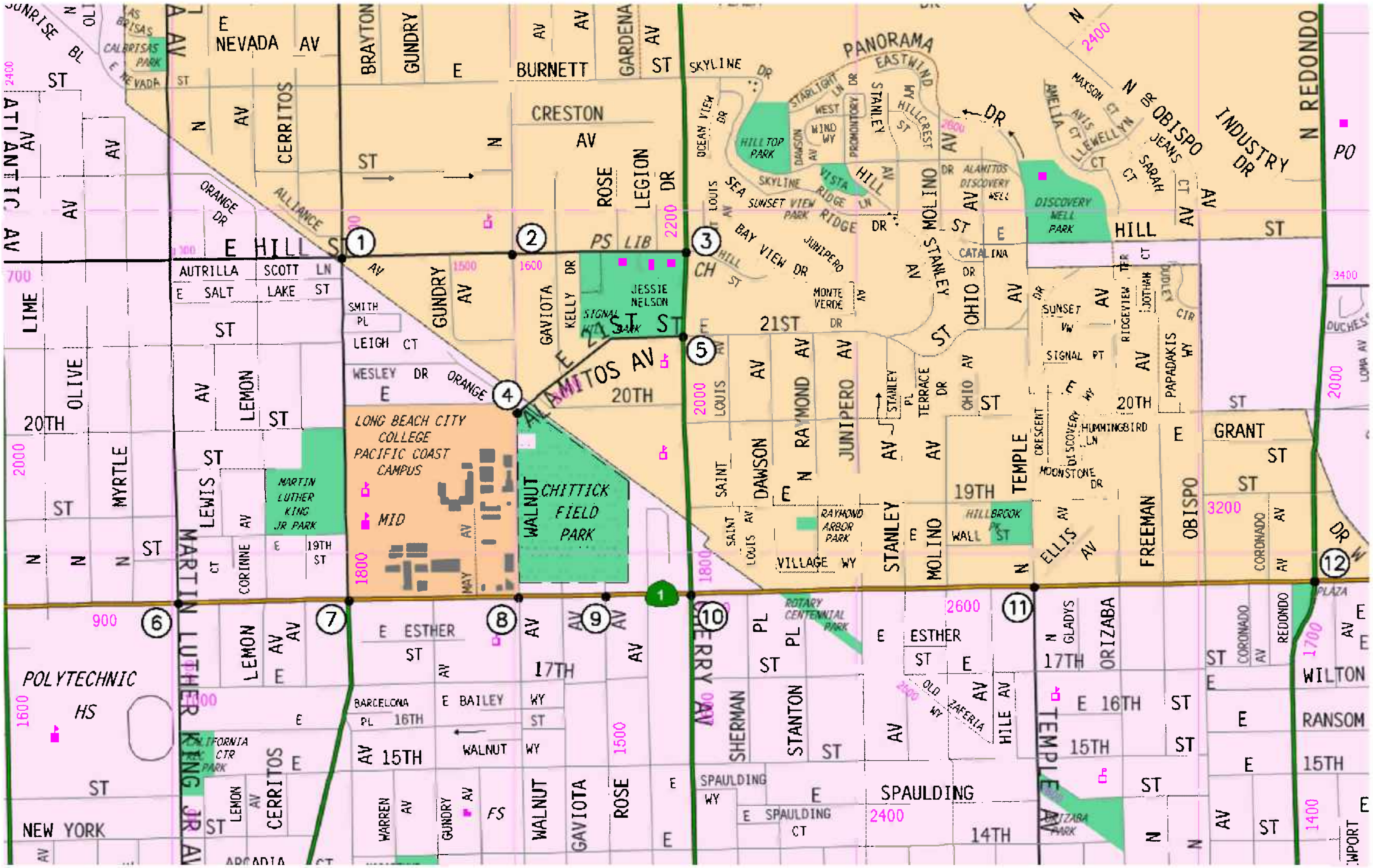
1.2 Study Area

The City of Long Beach Public Works Department staff has identified twelve (12) key study intersections for evaluation. The twelve (12) intersections listed below provide local access to the study area and define the extent of the boundaries for this traffic impact investigation.

1. Orange Avenue at Hill Street (Long Beach/Signal Hill)
2. Walnut Avenue at Hill Street (Signal Hill)
3. Cherry Avenue at Hill Street (Signal Hill)
4. Walnut Avenue at E.20th /Alamitos Avenue (Long Beach/Signal Hill)
5. Cherry Avenue at 21st Street (Signal Hill)
6. Martin Luther King Jr. Avenue at Pacific Coast Highway (Long Beach)
7. Orange Avenue/Alamitos Avenue at Pacific Coast Highway (Long Beach)
8. Walnut Avenue at Pacific Coast Highway (Long Beach)
9. Rose Avenue at Pacific Coast Highway (Long Beach)
10. Cherry Avenue at Pacific Coast Highway (Long Beach)
11. Temple Avenue at Pacific Coast Highway (Long Beach/Signal Hill)
12. Redondo Avenue at Pacific Coast Highway (Long Beach/Signal Hill)

Figure 1-1 presents a Vicinity Map, which illustrates the general location of the project and depicts the study locations and surrounding street system. The Volume-Capacity (V/C) and Level of Service (LOS) investigations at these key locations were used to evaluate the potential traffic-related impacts associated with area growth, cumulative projects and the proposed Project. When necessary, this report recommends intersection improvements that may be required to accommodate future traffic volumes and restore/maintain an acceptable Level of Service, and/or mitigates the impact of the project. Included in this traffic study report are:

- Existing traffic counts,
- Estimated project traffic generation/distribution/assignment,
- Estimated cumulative project traffic generation/distribution/assignment,
- AM peak hour, PM peak hour, and Saturday midday peak hour capacity analyses for existing conditions (Year 2008),
- AM peak hour, PM peak hour, and Saturday midday peak hour capacity analyses for future (Year 2010) conditions without and with project traffic,
- Project-Specific improvements,
- Site Access and Internal Circulation Evaluation, and
- Congestion Management Program Compliance Assessment.



SOURCE: THOMAS BROS.

KEY

(#) = STUDY INTERSECTION

= PROJECT SITE

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 1–1

VICINITY MAP

KROC COMMUNITY CENTER, LONG BEACH

2.0 PROJECT DESCRIPTION

The proposed Kroc Community Center project involves the reformation of up to 19 acres of land designated by the Salvation Army, through a grant from the Kroc Foundation, for the location of a new recreational and community center to foster and serve the recreational needs of the local community. The Kroc Community Center would offer an array of social programs specifically designed to meet the needs of the neighboring community.

Figure 2-1 presents the proposed site plan for the Project provided by Sapphos Environmental Inc. and prepared by Herry International, Inc. As shown, the Kroc Community Center includes the construction of an approximately 170,536 square-foot (SF), three to four story, three-building complex and an outdoor recreation area. Specifically, the facility will include the following four components:

- *Chapel/Auditorium Building*: This two-story building has a proposed floor area of 12,455 SF with a lobby, lecture hall/sanctuary, stage and backstage areas. The sanctuary will have a seating capacity of 450 persons.

- *Administration/Education Building*: This four-story building has a proposed floor area of 73,910 SF, which includes a 3,100 SF day-care facility, approximately 11,400 SF of administrative offices, a kitchen, classrooms, library, computer lab, arts studio and multipurpose rooms.

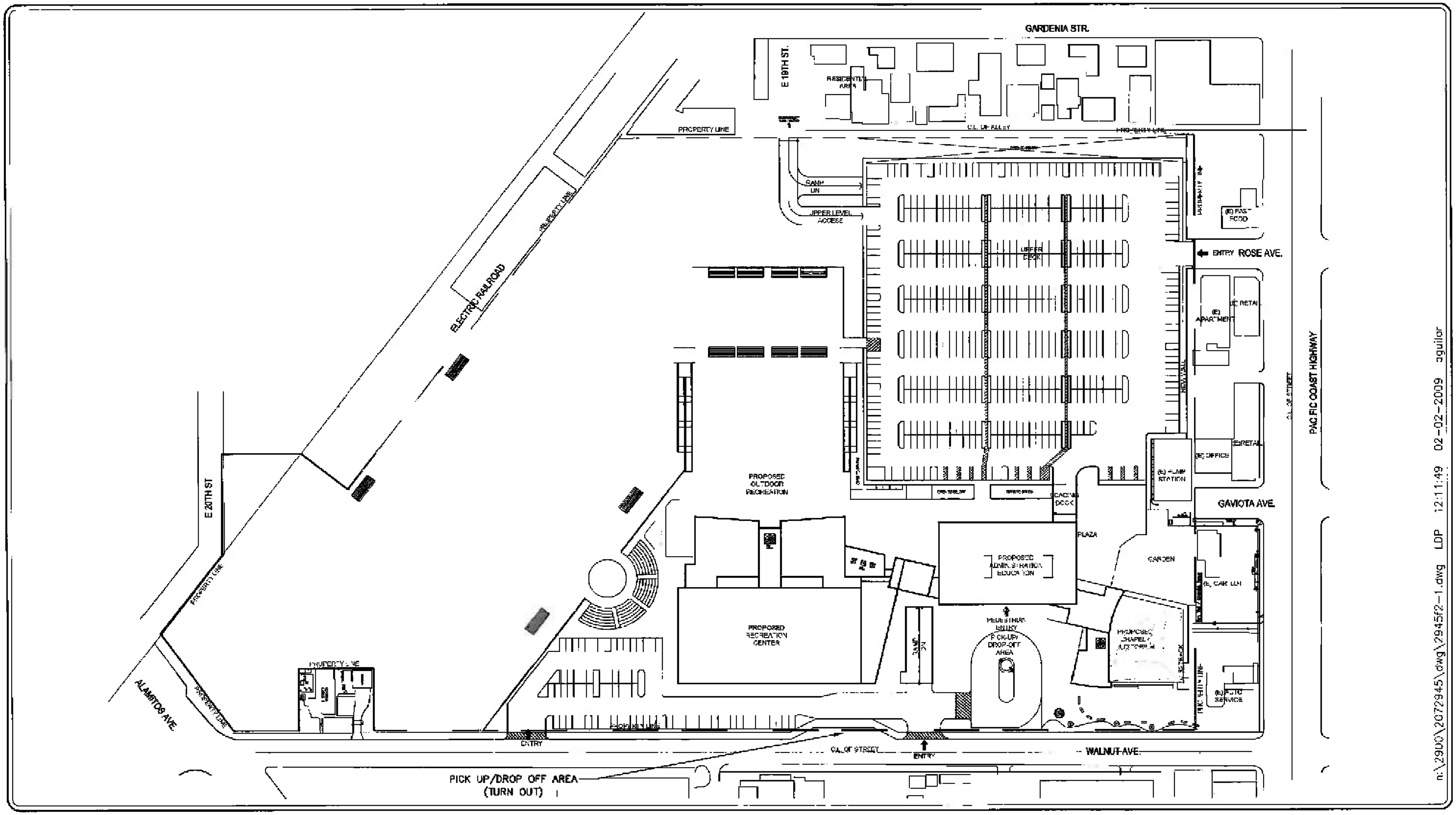
- *Recreation Center* : This two-story building has a proposed floor area of 84,171 SF that includes a gymnasium, exercise rooms, classrooms, weight room, locker rooms, game room, and indoor therapy pool.
- *Outdoor Recreation*: This space includes a 50-meter pool, warm-up pool, and leisure pool with fountains, slides and children's area. Other site amenities, including a 10,000 SF amphitheater, soccer field, playground, walking trails, outdoors climbing wall, and challenge course.

The Project is expected to be completed by the Year 2010. A total of 1,139 parking spaces are expected to be provided on-site via a two-story parking structure and surface spaces.

It is our understanding that an analysis of the proposed Project site has determined the site to be a highly suitable location for the proposed Project since the surrounding area is underserved, the site is large enough to accommodate the proposed development, the proximity to pedestrian traffic, public transportation, and neighborhood institutions is good, and current recreational facilities in the surrounding neighborhood lack the capacity to fulfill the recreational needs of the community.

2.1 Site Access

Primary access to the Kroc Community Center parking structure will be provided via the intersection of Pacific Coast Highway/Rose Avenue (i.e. the terminus of Rose Avenue), while access to the main entrance of the facility would be provided via two full access unsignalized driveways located along Walnut Avenue. Emergency access only will be provided at the terminus of East 19th Street via a gated entry/exit point.



SOURCE: HEERY INTERNATIONAL

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 2–1

PROPOSED SITE PLAN

KROC COMMUNITY CENTER, LONG BEACH

3.0 EXISTING CONDITIONS

3.1 Street Network

Regional access to the project site is provide by Pacific Coast Highway (SR-1), which is located immediately south of the project. Other key roadways in the local area network include Hill Street, 20th Street, Alamitos Avenue, 21st Street, Martin Luther King Jr. Avenue, Orange Avenue, Walnut Avenue, Cherry Avenue, Temple Avenue, and Redondo Avenue. The following discussion provides a brief synopsis of these key area streets. The descriptions are based on an inventory of existing roadway conditions.

Pacific Coast Highway (SR-1) is a six-lane, divided roadway providing three travel lanes in each direction, which borders the project site to the south. This roadway has an east/west alignment in the study area. On-street parking is permitted along the majority of this roadway. The posted speed limit on Pacific Coast Highway is 35 miles per hour (mph). Traffic signals exists at the study intersections of Pacific Coast Highway/Martin Luther King Jr. Avenue, Pacific Coast Highway/Alamitos Avenue-Orange Avenue, Pacific Coast Highway/Walnut Avenue, Pacific Coast Highway/Cherry Avenue, Pacific Coast Highway/Temple Avenue, and Pacific Coast Highway/Redondo Avenue. Please note that Pacific Coast Highway is the only arterial street in the study area that is on the Los Angeles County CMP roadway system.

Hill Street is an east/west arterial located north of the project site. It is a two-lane undivided roadway that provides one travel lane in each direction. Curbside parking is generally permitted on Hill Street. The posted speed limit on Hill Street is 30 mph.

20th Street is an east/west arterial located north of the project site. It is a two-lane undivided roadway that provides one travel lane in each direction. Curbside parking is generally permitted on 20th Street. The posted speed limit on 20th Street is 25 mph.

Alamitos Avenue/21st Street is an east/west arterial located north of the project site. It is a two-lane undivided roadway that provides one travel lane in each direction. Curbside parking is generally permitted on Alamitos Avenue/21st Street. The posted speed limit is 30 mph on Alamitos Avenue and 25 mph on 21st Street.

Martin Luther King Jr. Avenue is a north/south arterial that is located west of the project site. It is a two-lane undivided roadway that provides one travel lane in each direction. Curbside parking is generally permitted on Martin Luther King Jr. Avenue. The posted speed limit on Martin Luther King Jr. Avenue is 30 mph.

Alamitos Avenue/Orange Avenue is a north/south arterial that is located west of the project site. It is a two-lane undivided roadway that provides one travel lane in each direction. Stop signs are posted on Orange Avenue at 20th Street. Curbside parking is generally permitted on Alamitos Avenue/Orange Avenue. The posted speed limit on Alamitos Avenue/Orange Avenue is 25 mph.

Walnut Avenue is a north/south arterial that borders the project site to the west. It is a two-lane undivided roadway that provides one travel lane in each direction. Stop signs are posted on Walnut Avenue at Hill Street, and on Walnut at 20th Street/Alamitos Avenue. Curbside parking is generally permitted on Walnut Avenue. The posted speed limit on Walnut Avenue is 25 mph.

Cherry Avenue is a north/south arterial that is located east of the project site. It is a four-lane divided roadway that provides two travel lanes in each direction north of Alamitos Avenue and a two-lane, divided roadway providing one travel lane in each direction south of Alamitos Avenue. Curbside parking is generally not permitted on Cherry Avenue north of Alamitos Avenue, however curbside parking by permit only is permitted south of Alamitos Avenue. The posted speed limit on Cherry Avenue is 40 mph.

Temple Avenue is a north/south arterial that is located east of the project site. It is a two-lane divided roadway that provides one travel lane in each direction. Curbside parking is generally permitted on Temple Avenue.

Redondo Avenue is a north/south arterial that is located east of the project site. It is a four-lane divided roadway that provides two travel lanes in each direction. Curbside parking is generally permitted on Redondo Avenue. The posted speed limit on Redondo Avenue is 40 mph.

Figure 3-1 presents an inventory of the existing roadway conditions for the arterials and intersections evaluated in this report. The number of travel lanes and intersection controls for the key area intersections are identified.

3.2 Existing Public Transit

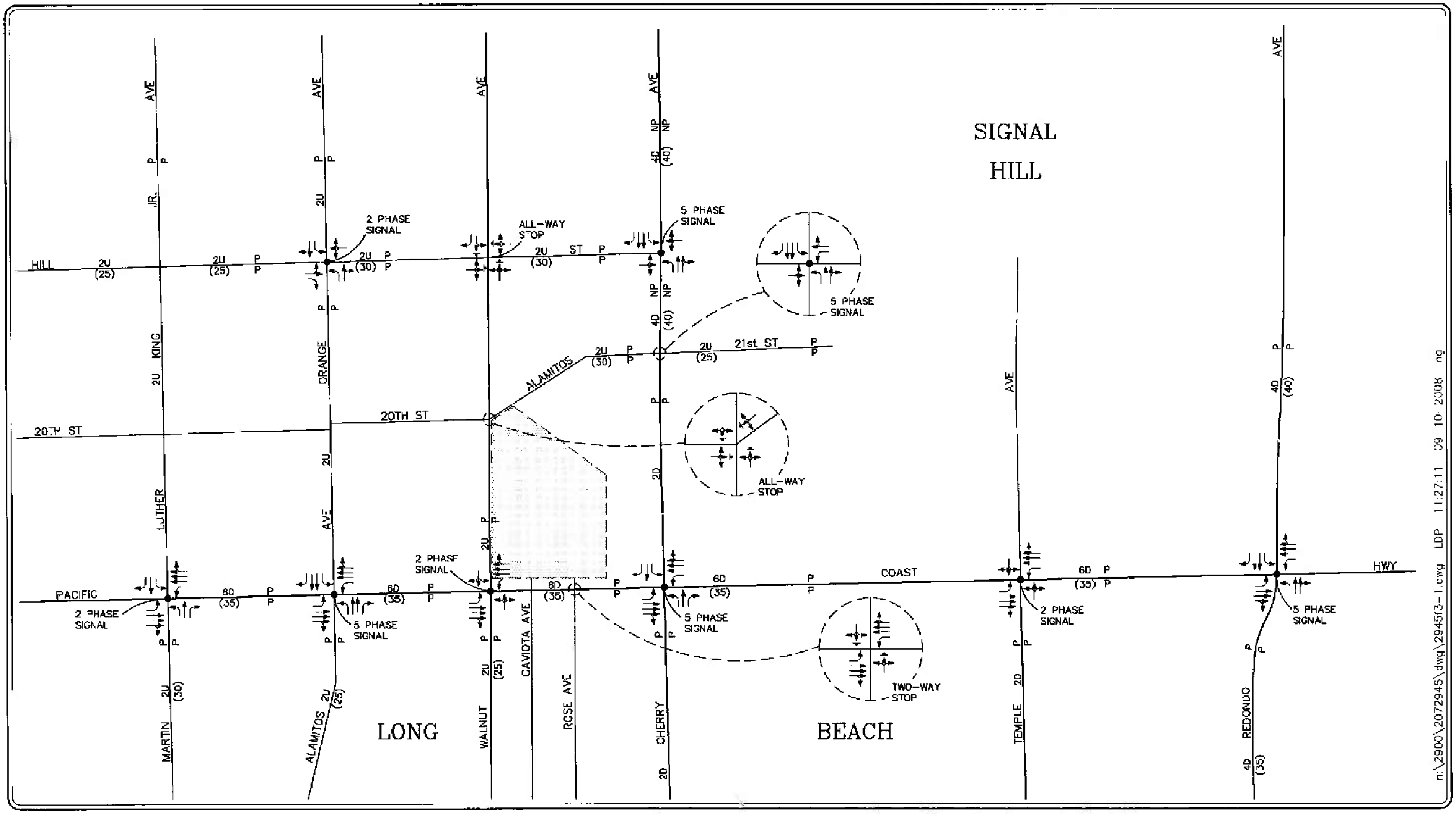
Long Beach Transit (LBT) provides public transit services in the vicinity of the proposed Project. In the vicinity of the Project, LBT Route No. 7 currently serves Orange Avenue, LBT Route No. 21, 22 and 23 currently serves Cherry Avenue, LBT Route No. 131 currently serves Redondo Avenue, and LBT Route Nos. 171, 172, 173 and 174 currently serves Pacific Coast Highway. A brief description of the transit services is as follows:

Route 7:

- The route extends from the downtown Long Beach Transit Mall Station to Orange Avenue at Rosecrans Avenue.
- The route traverses the study area on Orange Avenue and operates throughout the day, Monday through Sunday.
- During the weekday AM and PM peak hour, in the eastbound/westbound and northbound/southbound directions, Route 7 provides headways of 3 buses in each direction. During the Saturday weekend peak hour, in the eastbound/westbound and northbound/southbound directions, Route 7 provides headways of 2 buses in each direction.

Route 21, 22 and 23:

- Routes 21, 22 and 23 provide services from the downtown Long Beach Transit Mall Station to Downey Avenue at Alondra Boulevard.



LINSCOTT LAW & GREENSPAN engineers

NO SCALE

KEY

- ← = APPROACH LANE ASSIGNMENT
- ● = TRAFFIC SIGNAL, ⊕ = STOP SIGN
- P = PARKING, NP = NO PARKING
- U = UNDIVIDED, D = DIVIDED
- 2 = NUMBER OF TRAVEL LANES
- (XX) = POSTED SPEED LIMIT (MPH)
- ▭ = PROJECT SITE

FIGURE 3–1

EXISTING ROADWAY CONDITIONS AND INTERSECTION CONTROLS

KROC COMMERICAL CENTER, LONG BEACH

- Routes 21 and 22 traverse the study area on Cherry Avenue and operate throughout the day, Monday through Sunday. Route 23 only provides bus service between the hours of 9:00 PM and 12:00 AM on weekdays and Saturdays.
- During the weekday AM and PM peak hour, in the eastbound/westbound and northbound/southbound directions, Routes 21 and 22 provide headways of 2 buses in each direction. During the Saturday weekend peak hour, in the eastbound/westbound and northbound/southbound directions, Route 21 and 22 provide headways of 2 buses in each direction.

Route 131:

- The route extends from Electric Avenue at Main in Seal Beach to the Wardlow Station in Long Beach.
- The route traverses the study area on Redondo Avenue and operates throughout the day, Monday through Sunday.
- During the weekday AM and PM peak hour, in the eastbound/westbound and northbound/southbound directions, Route 131 provides headways of 2 buses in each direction. During the Saturday weekend peak hour, in the eastbound/westbound and northbound/southbound directions, Route 131 provides headways of 1 bus in each direction.

Route 171:

- The route extends from CSULB Technology Park and the City of Seal Beach.
- The route traverses the study area on Pacific Coast Highway and operates throughout the day, Monday through Friday. Route 171 does not operate on Saturdays or Sundays.
- During the weekday AM peak hour, in the eastbound and westbound directions, Route 171 provides headways of 2 buses in each direction. During the PM peak hour, in the eastbound and westbound directions, Route 171 provides headways of 2 buses in each direction.
- Route 171 has bus stops located within direct proximity of the project site on Pacific Coast Highway on the northwest and southeast corners of Walnut Avenue/Pacific Coast Highway and Rose Avenue/Pacific Coast Highway.

Routes 172, 173 and 174:

- Routes 172, 173 and 174 provide service between the downtown Long Beach Transit Mall Station and Norwalk Metro Green Line Metro Station.
- Within the study area, Routes 172, 173 and 174 traverse the study area on Pacific Coast Highway. Routes 172 and 173 operate throughout the day, Monday through Sunday. On weekdays, Route 174 northbound only provides bus service between the hours of 10:00 PM and 12:50 AM, and southbound only provides bus service from 5:42 AM to 6:05 AM and from 12:05 AM to 12:25 AM. On Saturdays, Route 174 northbound only provides bus service between the hours of 10:35 PM and 12:52 AM, and southbound only provides bus service from 5:37 AM to 7:00 AM and from 11:02 AM to 12:25 AM
- During the AM, PM and Saturday peak hour, in the northbound and southbound directions, Routes 172 and 173 provides headways of 2 buses in each direction.

- Routes Nos. 172, 173 and 174 have bus stops located within direct proximity of the project site on Pacific Coast Highway on the northwest and southeast corners of Walnut Avenue/Pacific Coast Highway and Rose Avenue/Pacific Coast Highway.

3.3 Existing Area Traffic Volumes

Manual vehicular turning movement counts were conducted at the key study locations during the weekday morning peak commuter period, weekday evening peak commuter period and Saturday peak period to determine the existing AM peak hour, PM peak hour, and Saturday midday peak hour traffic volumes. Traffic counts at the study intersections were conducted in January 2008 and August 2008 by National Data and Surveying Services.

Figures 3-2, 3-3, and ***3-4*** depict the existing weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour traffic volumes at the key study intersections, respectively. ***Appendix A*** contains the detailed manual turning movement count sheets for the key study intersections evaluated in this report.

3.4 Existing Intersection Conditions

Existing AM and PM peak hour operating conditions for the key study intersections were evaluated using the *Intersection Capacity Utilization (ICU) Methodology* for signalized intersections and the methodology outlined in Chapter 17 of the *Highway Capacity Manual 2000 (HCM 2000)* for unsignalized intersections. It should be noted that the methodology outlined in Chapter 16 of the *Highway Capacity Manual 2000 (HCM 2000)* for signalized intersections was utilized for the Caltrans Analysis.

3.4.1 *Intersection Capacity Utilization (ICU) Method of Analysis (Signalized Intersections)*

In conformance with the City of Long Beach requirements, existing AM, PM and Saturday midday peak hour operating conditions for the key signalized study intersections were evaluated using the Intersection Capacity Utilization (ICU) method. The ICU technique is intended for signalized intersection analysis and estimates the volume to capacity (V/C) relationship for an intersection based on the individual V/C ratios for key conflicting traffic movements. The ICU numerical value represents the percent signal (green) time, and thus capacity, required by existing and/or future traffic The ICU value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance. The ICU value is the sum of the critical volume to capacity ratios at an intersection; it is not intended to be indicative of each individual turning movement's LOS.

The six qualitative categories of Level of Service have been defined along with the corresponding ICU value range and are shown in ***Table 3-1***. According to City of Long Beach criteria, LOS D is the minimum acceptable condition that should be maintained during the peak commute hours, or the current LOS if the existing LOS is worse than LOS D (i.e. LOS E of F). Per LA County CMP requirements, the ICU calculations use a lane capacity of 1,600 vehicles per hour (vph) for left-turn, through, and right-turn lanes, and dual left turn capacity of 2,880 vph. Clearance intervals are based on the number of phases in the intersection and whether the left turning movements are all fully protected or whether some of them are permitted with other left-turn movements being protected. ***Table 3-2*** shows the clearance intervals used in the analysis of the key study intersections within the City of Long Beach.

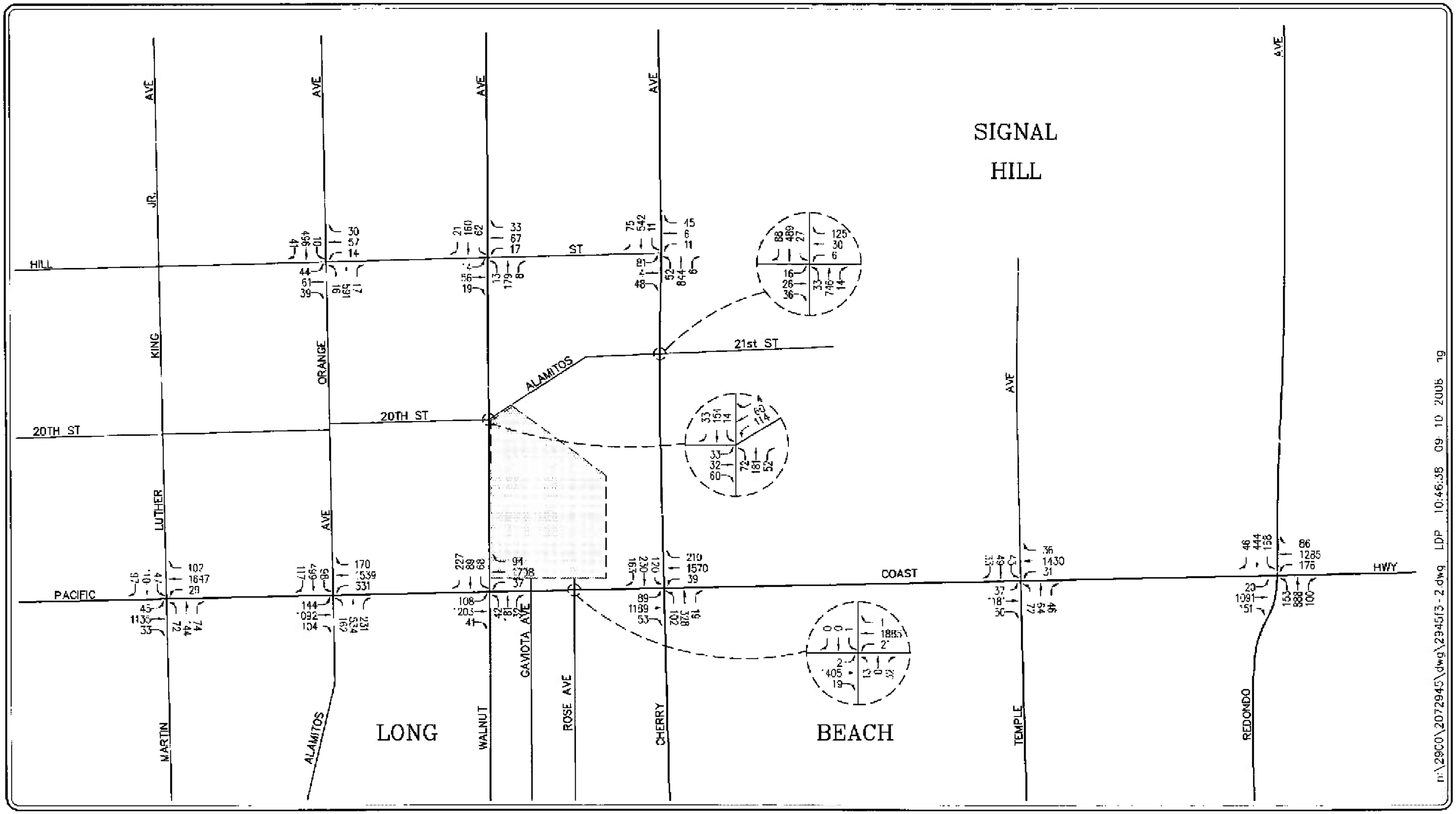


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FIGURE 3–2

EXISTING AM PEAK HOUR TRAFFIC VOLUMES
KROC COMMERICAL CENTER, LONG BEACH

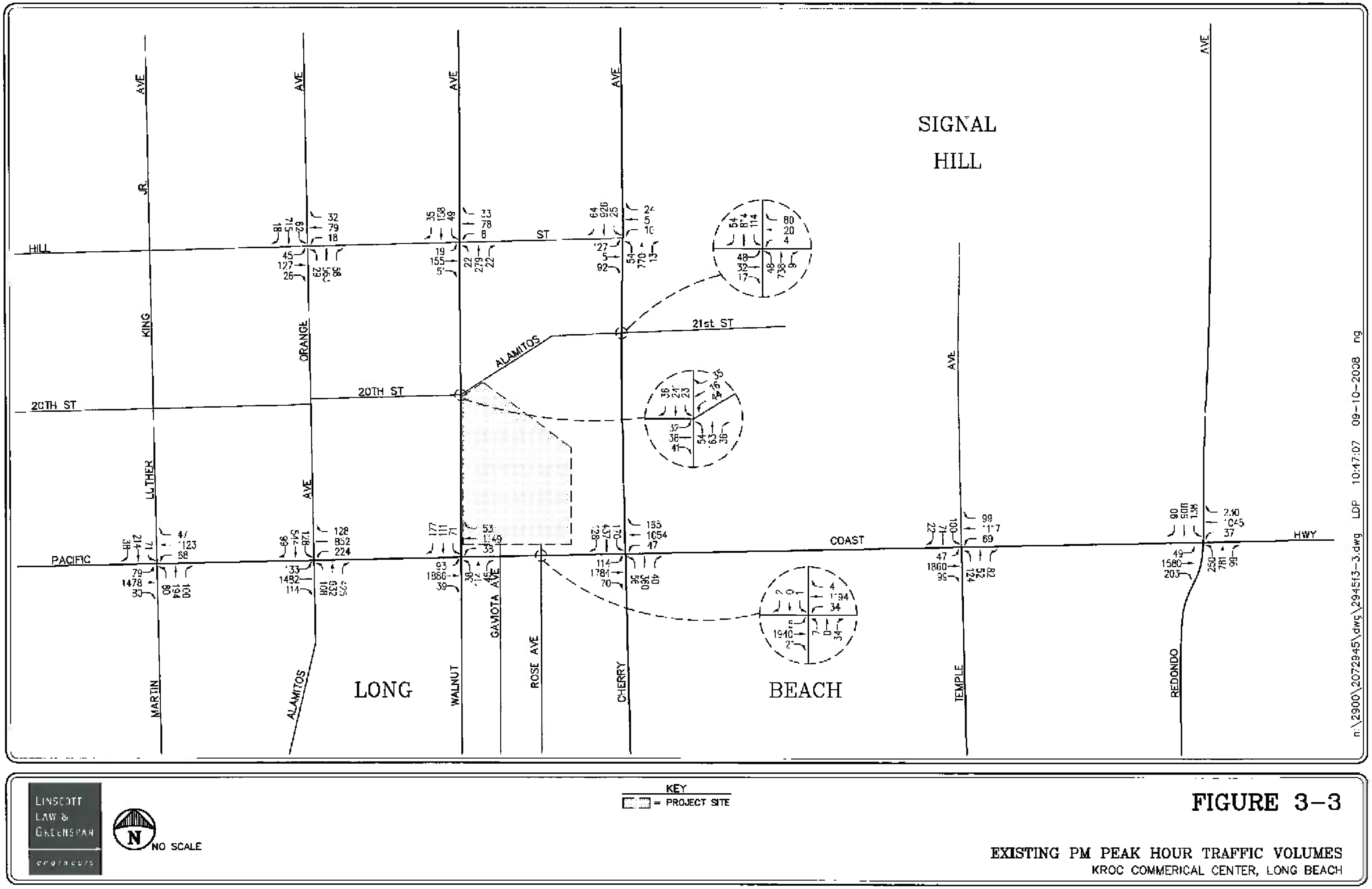


FIGURE 3-3

EXISTING PM PEAK HOUR TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH

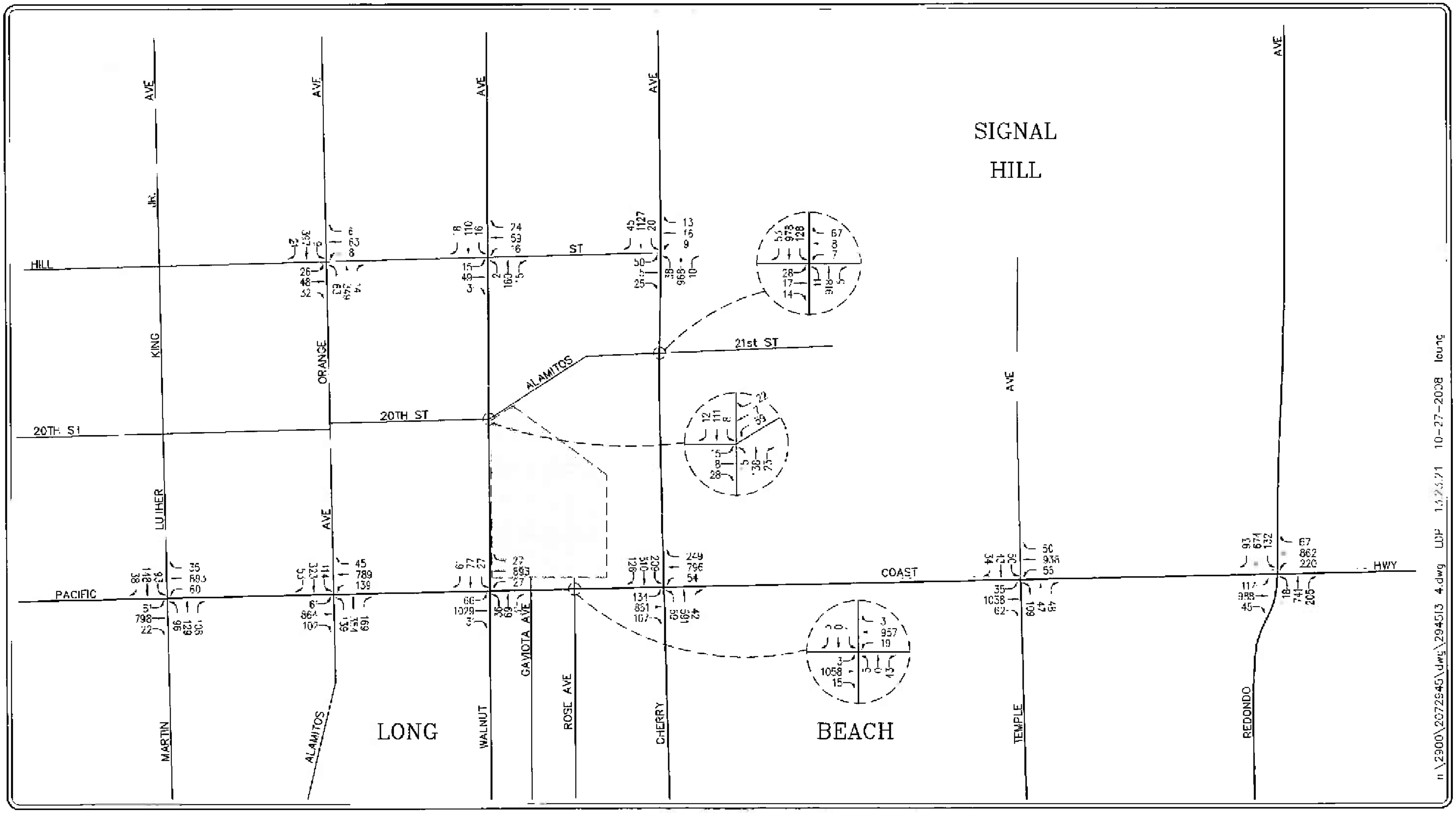


FIGURE 3-4

EXISTING SATURDAY MIDDAY PEAK HOUR TRAFFIC VOLUMES
KROC COMMERICAL CENTER, LONG BEACH

TABLE 3-1

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (ICU METHODOLOGY)[1]

Level of Service (LOS)	Intersection Capacity Utilization Value (V/C)	Level of Service Description
A	≤ 0.600	EXCELLENT. No vehicle waits longer than one red light, and no approach phase is fully used.
B	0.601 – 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.000	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.000	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Potentially very long delays with continuously increasing queue lengths.

[1] Source: *Transportation Research Board Circular 212 – Interim Materials on Highway Capacity.*

TABLE 3-2
CITY OF LONG BEACH CLEARANCE INTERVALS[2]

Number of Signal Phases	Left-turn Phasing Type	Clearance Interval (percent)
2	Permitted	10%
3	Protected and Permitted	12%
3	Fully Protected	15%
4	Protected and Permitted	14%
4	Fully Protected	18%

2 Source: *City of Long Beach Guidelines for Signalized Intersection Analysis, 2004.*

3.4.2 *Highway Capacity Manual (HCM) Method of Analysis (Unsignalized Intersections)*

The 2000 HCM unsignalized methodology for stop-controlled intersections was utilized for the analysis of the unsignalized intersections. This methodology estimates the average control delay for each of the subject movements and determines the level of service for each movement. For all-way stop controlled intersections, the overall average control delay measured in seconds per vehicle, and level of service is calculated for the entire intersection. For one-way and two-way stop-controlled (minor street stop-controlled) intersections, this methodology estimates the worst side street delay, measured in seconds per vehicle and determines the level of service for that approach.

The HCM control delay value translates to a Level of Service (LOS) estimate, which is a relative measure of the intersection performance. The six qualitative categories of Level of Service have been defined along with the corresponding HCM control delay value range, as shown in ***Table 3-3***.

3.4.3 *Highway Capacity Manual (HCM) Method of Analysis (Signalized Intersections)*

Per Caltrans requirements, the signalized intersections that are under the jurisdiction of Caltrans (i.e. Pacific Coast Highway) were also analyzed using the HCM signalized methodology. Based on the HCM operations method of analysis, level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometries, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during ideal conditions: in the absence of traffic control, in the absence of geometric delay, in the absence of any incidents, and when there are no other vehicles on the road.

In Chapter 16 of the HCM, only the portion of total delay attributed to the control facility is quantified. This delay is called *control delay.* Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle. The six qualitative categories of Level of Service that have been defined along with the corresponding HCM control delay value range for signalized intersections are shown in ***Table 3-4***.

TABLE 3-3

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS)	Highway Capacity Manual Delay Value (sec/veh)	Level of Service Description
A	≤ 10.0	Little or no delay
B	> 10.0 and ≤ 15.0	Short traffic delays
C	> 15.0 and ≤ 25.0	Average traffic delays
D	> 25.0 and ≤ 35.0	Long traffic delays
E	> 35.0 and ≤ 50.0	Very long traffic delays
F	> 50.0	Severe congestion

TABLE 3-4

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (HCM)[3]

Level of Service (LOS)	Control Delay Per Vehicle (seconds/vehicle)	Level of Service Description
A	≤ 10.0	This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10.0 and ≤ 20.0	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	> 20.0 and ≤ 35.0	Average traffic delays. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	> 35.0 and ≤ 55.0	Long traffic delays At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55.0 and ≤ 80.0	Very long traffic delays This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high *v/c* ratios. Individual cycle failures are frequent occurrences.
F	≥ 80.0	Severe congestion This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

[3] Source: *Highway Capacity Manual 2000*. Chapter 16 (Signalized Intersections).

3.5 Existing Level of Service Results

Table 3-5 summarizes the existing peak hour service level calculations for the key study intersections during the weekday peak hours and weekend peak hour based on existing traffic volumes and current street geometrics. Review of Table 3-5 indicates that based on the ICU or HCM method of analysis and the City's LOS criteria, three of the key study intersections currently operate at an unacceptable LOS during the weekday AM peak hour, weekday PM peak hour, and/or Saturday peak hour. The remaining key study intersections currently operate at acceptable LOS D or better during the weekday AM peak hour, weekday PM peak hour and Saturday peak hour. The intersections operating at an adverse level of service are:

	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
Key Intersection	ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM	LOS
9. Rose Ave at Pacific Coast Highway	241.1 s/v	F	96.6 s/v	F	--	--
10. Cherry Ave at Pacific Coast Highway	--	--	--	--	0.922	E
12. Redondo Ave at Pacific Coast Highway	0.933	E	0.984	E	--	--

It should be noted that it is not uncommon that unsignalized public street intersections that have direct access to regional/major arterials, such as Pacific Coast Highway, operate at an unacceptable LOS due to the limited gaps in traffic and the high volume of traffic that utilizes these streets as commuter routes.

Appendix B presents the peak hour ICU/LOS and/or HCM/LOS calculation worksheets for the key study intersections.

TABLE 3-5
EXISTING PEAK HOUR LEVELS OF SERVICE[4]

Key Intersections		Time Period	Control Type	ICU/HCM Delay Value	LOS
1.	Orange Avenue at Hill Street	AM	2∅ Traffic Signal	0.552	A
		PM		0.684	B
		Saturday		0.448	A
2.	Walnut Avenue at Hill Street	AM	All-Way Stop	9.6 s/v	A
		PM		11.6 s/v	B
		Saturday		8.6 s/v	A
3.	Cherry Avenue at Hill Street	AM	5∅ Traffic Signal	0.506	A
		PM		0.613	B
		Saturday		0.576	A
4.	Walnut Avenue at East 20th Street/Alamitos Avenue	AM	All-Way Stop	10.5 s/v	B
		PM		10.0 s/v	B
		Saturday		8.2 s/v	A
5.	Cherry Avenue at 21st Street	AM	5∅ Traffic Signal	0.472	A
		PM		0.488	A
		Saturday		0.535	A
6.	Martin Luther King Jr. Ave. at Pacific Coast Highway	AM	2∅ Traffic Signal	0.611	B
		PM		0.652	B
		Saturday		0.484	A
7.	Orange/Alamitos Avenue at Pacific Coast Highway	AM	5∅ Traffic Signal	0.863	D
		PM		0.869	D
		Saturday		0.626	B
8.	Walnut Avenue at Pacific Coast Highway	AM	2∅ Traffic Signal	0.783	C
		PM		0.749	C
		Saturday		0.441	A

Notes:
Bold ICU/LOS and HCM/LOS values indicate adverse service levels based on City LOS standards.
s/v = seconds per vehicle (delay).

[4] *Appendix B* contains the ICU/LOS and HCM/LOS worksheets for key study intersections.

TABLE 3-5 (CONTINUED)
EXISTING PEAK HOUR LEVELS OF SERVICE[5]

Key Intersections		Time Period	Control Type	ICU/HCM Delay Value	LOS
9.	Rose Avenue at Pacific Coast Highway	AM	Two-Way Stop	**241.1 s/v**	**F**
		PM		**96.6 s/v**	**F**
		Saturday		18.2 s/v	C
10.	Cherry Avenue at Pacific Coast Highway	AM	5∅ Traffic Signal	0.827	D
		PM		0.866	D
		Saturday		**0.922**	**E**
11.	Temple Avenue at Pacific Coast Highway	AM	2∅ Traffic Signal	0.542	A
		PM		0.712	C
		Saturday		0.492	A
12.	Redondo Avenue at Pacific Coast Highway	AM	5∅ Traffic Signal	**0.933**	**E**
		PM		**0.984**	**E**
		Saturday		0.882	D

Notes:
Bold ICU/LOS and HCM/LOS values indicate adverse service levels based on City LOS standards.
s/v = seconds per vehicle (delay).

5 *Appendix B* contains the ICU/LOS and HCM/LOS worksheets for key study intersections.

4.0 TRAFFIC FORECASTING METHODOLOGY

In order to estimate the traffic impact characteristics of the proposed Project, a multi-step process has been utilized. The first step is traffic generation, which estimates the total arriving and departing traffic on a peak hour and daily basis. The traffic generation potential is forecast by applying the appropriate vehicle trip generation equations or rates to the project development tabulation.

The second step of the forecasting process is traffic distribution, which identifies the origins and destinations of inbound and outbound project traffic. These origins and destinations are typically based on demographics and existing/expected future travel patterns in the study area.

The third step is traffic assignment, which involves the allocation of project traffic to study area streets and intersections. Traffic assignment is typically based on minimization of travel time, which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds. Traffic distribution patterns are indicated by general percentage orientation, while traffic assignment allocates specific volume forecasts to individual roadway links and intersection turning movements throughout the study area.

With the forecasting process complete and project traffic assignments developed, the impact of the project is isolated by comparing operational (LOS) conditions at selected key intersections using expected future traffic volumes with and without forecast project traffic. The need for site-specific and/or cumulative local area traffic improvements can then be evaluated.

5.0 PROJECT TRAFFIC CHARACTERISTICS

5.1 Project Traffic Generation

Traffic generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Generation equations and/or rates used in the traffic forecasting procedure are found in the Seventh Edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE) [Washington D.C., 2003].

Table 5-1 summarizes the trip generation rates used in forecasting the vehicular trips generated by the proposed Project and presents the forecast daily and peak hour project traffic volumes for a "typical" weekday and Saturday As coordinated with City staff, the trip generation potential of the different components of the proposed Project was forecast using ITE Land Use Code 495: Recreational Community Center rates, ITE Land Use 560: Church rates, ITE Land Use 565 Day Care Center rates, and ITE Land Use 710: General Office Building rates.

Review of *Table 5-1* indicates that the proposed Project is forecast to generate 3,770 daily trips, with 299 trips (184 inbound, 115 outbound) produced in the AM peak hour and 302 trips (95 inbound, 207 outbound) produced in the PM peak hour on a "typical" weekday On a "Saturday", the proposed Project is forecast to generate 1,482 daily trips, with 238 trips (127 inbound, 111 outbound) produced during the weekend (Saturday) midday peak hour.

It should be noted that although a portion of the visitors to the proposed Project would be expected to walk or arrive by alternative modes of travel, including bus and bicycle, no adjustment to the Project's trip generation potential (i.e. mode shift adjustment) was made to provide a conservative analysis.

TABLE 5-1
PROJECT TRAFFIC GENERATION FORECAST[6]

ITE Land Use / Project Description	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Daily	Saturday Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total		Enter	Exit	Total
Generation Factors:											
▪ 495: Recreation Community Center (TE/1000 SF)	22.88	0.99	0.63	1.62	0.48	1.16	1.64	9.10	0.63	0.65	1.28
▪ 560: Church (TE/1000 SF)	9.11	0.39	0.33	0.72	0.34	0.32	0.66	10.37	2.51	1.03	3.54
▪ 565: Day Care Center (TE/1000 SF)	79.26	6.78	6.01	12.79	6.19	6.99	13.18	6.21	1.07	0.63	1.70
▪ 710: General Office Building (TE/1000 SF)	11.01	1.36	0.19	1.55	0.25	1.24	1.49	2.37	0.22	0.19	0.41
Generation Forecast:											
Chapel / Performing Arts Building											
▪ 560: Church (12,455 SF)	113	5	4	9	4	4	8	129	31	13	44
Administration/Education Building											
▪ 495: Rec Comm Ctr (59,410 SF)	1,359	59	37	96	29	69	98	541	37	39	76
▪ 565: Day Care Center (3,100 SF)	246	21	19	40	19	22	41	19	3	2	5
▪ 710: General Office (11,400 SF)	126	16	2	18	3	14	17	27	3	2	5
Recreation Building											
▪ 495: Recreation Community Center (84,171 SF)	1,926	83	53	136	40	98	138	766	53	55	108
Total Project Trip Generation Potential	**3,770**	**184**	**115**	**299**	**95**	**207**	**302**	**1,482**	**127**	**111**	**238**

6 Source: *Trip Generation*, 7th Edition, Institute of Transportation Engineers (ITE) [Washington, D.C. (2003)].

5.2 Project Traffic Distribution and Assignment

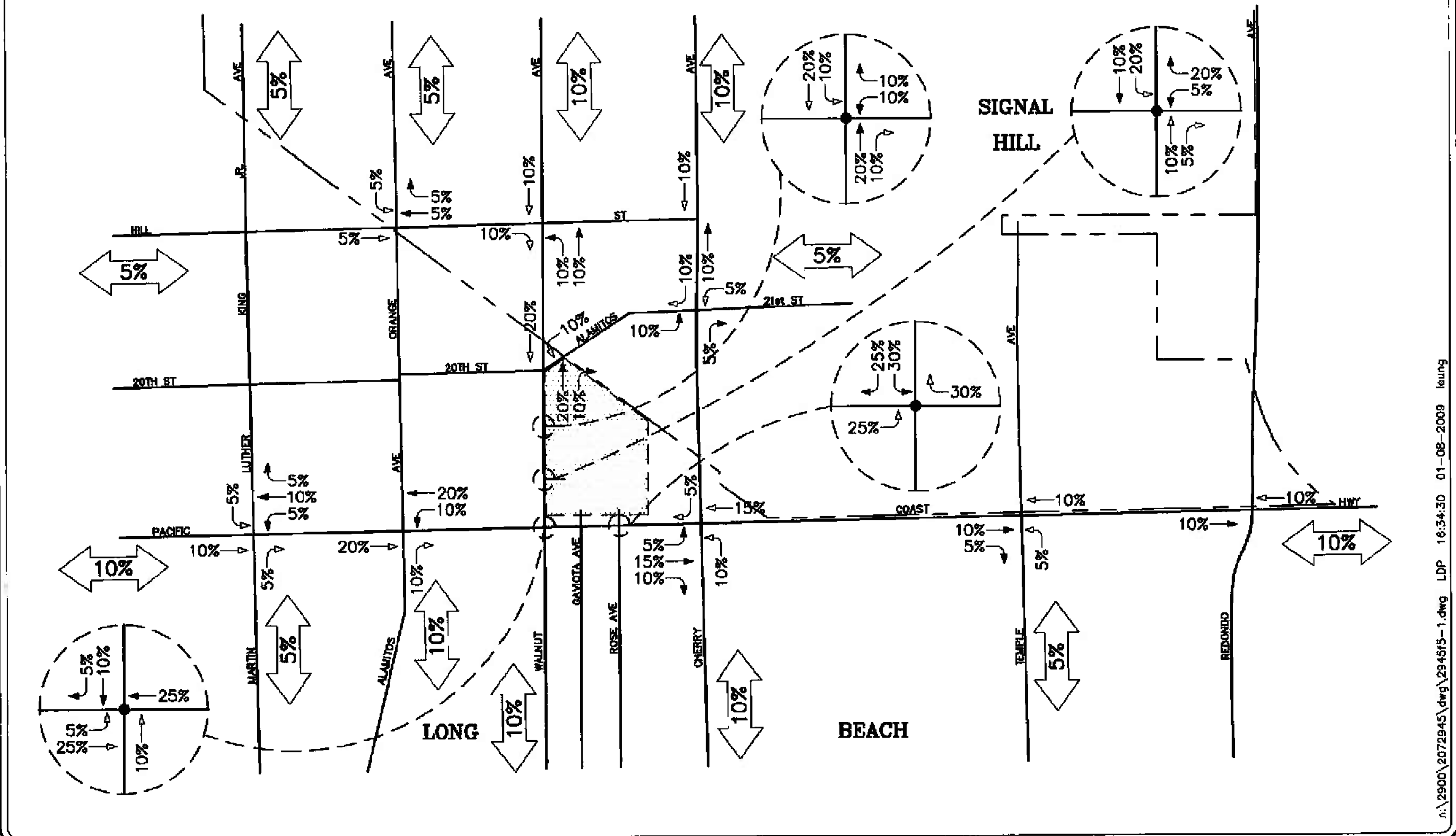
The general, directional traffic distribution pattern for the proposed Project is summarized in ***Table 5-2*** and is graphically presented in ***Figure 5-1***. Project traffic volumes entering and exiting the project site have been distributed and assigned to the adjacent street system based upon the following considerations:

- the site's proximity to major traffic carriers (i.e. Pacific Coast Highway),
- expected localized traffic flow patterns based on adjacent street channelization and presence of traffic signals and turn restrictions at the study intersections,
- existing intersection traffic volumes,
- ingress/egress availability at the project site from Pacific Coast Highway and Walnut Avenue, and
- input from City staff.

The anticipated AM, PM, and Saturday midday peak hour project traffic volumes associated with the proposed Project are presented in ***Figures 5-2, 5-3*** and ***5-4***, respectively. Please note that the traffic volume assignments presented in *Figures 5-2, 5-3,* and *5-4* reflect the traffic distribution characteristics illustrated in *Figure 5-1* and the project traffic generation forecast presented in *Table 5-1.*

TABLE 5-2
PROJECT DIRECTIONAL DISTRIBUTION PATTERN

Distribution Percentage	Orientation
5%	To/from the north on Martin Luther King Jr. Avenue
5%	To/from the north on Orange/Alamitos Avenue
10%	To/from the north on Walnut Avenue
10%	To/from the north on Cherry Avenue
5%	To/from the south on Martin Luther King Jr. Avenue
10%	To/from the south on Orange/Alamitos Avenue
10%	To/from the south on Walnut Avenue
10%	To/from the south on Cherry Avenue
5%	To/from the south on Temple Avenue
10%	To/from the east on Pacific Coast Highway
5%	To/from the east on Alamitos/21st Street
10%	To/from the west on Pacific Coast Highway
5%	To/from the west on Hill Street
100%	**Total**



KEY
- = PROJECT SITE
- = INBOUND PERCENTAGE
- = OUTBOUND PERCENTAGE

NO SCALE

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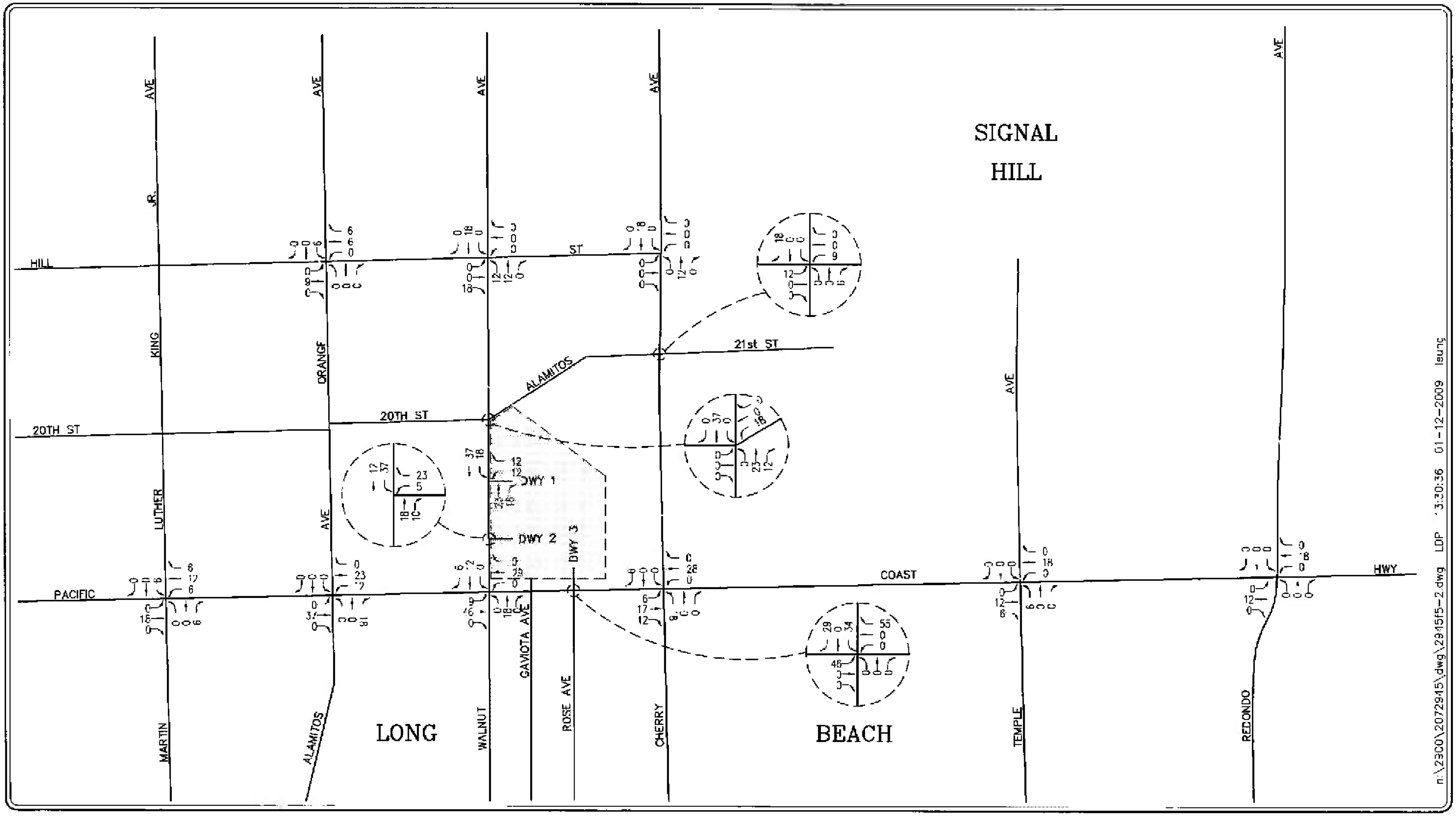
FIGURE 5–1

PROJECT TRAFFIC DISTRIBUTION PATTERN

KROC COMMUNITY CENTER, LONG BEACH



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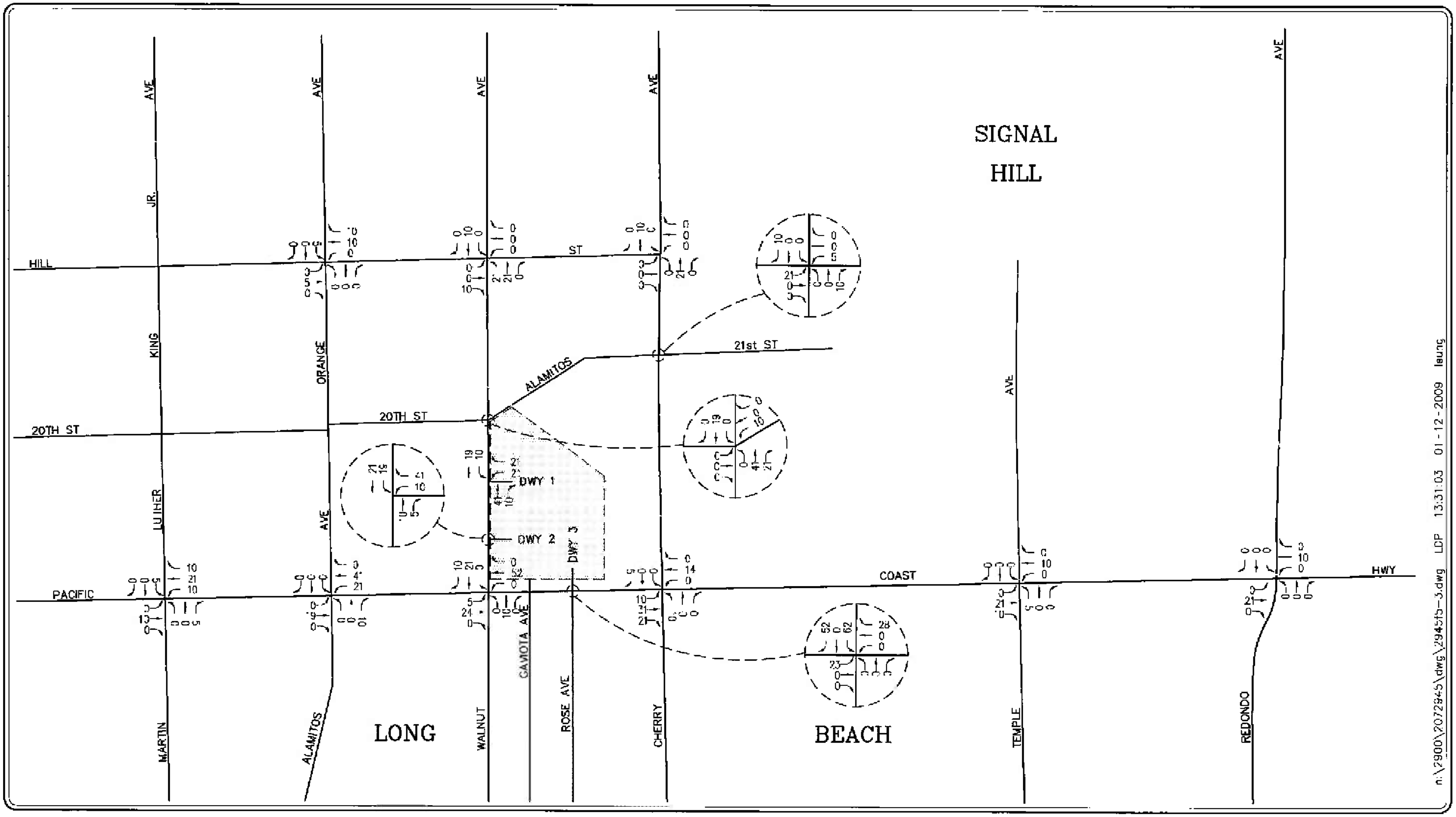
NO SCALE

KEY
= PROJECT SITE

FIGURE 5–2

AM PEAK HOUR PROJECT TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH



KEY
= PROJECT SITE

NO SCALE

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FIGURE 5–3

PM PEAK HOUR PROJECT TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH

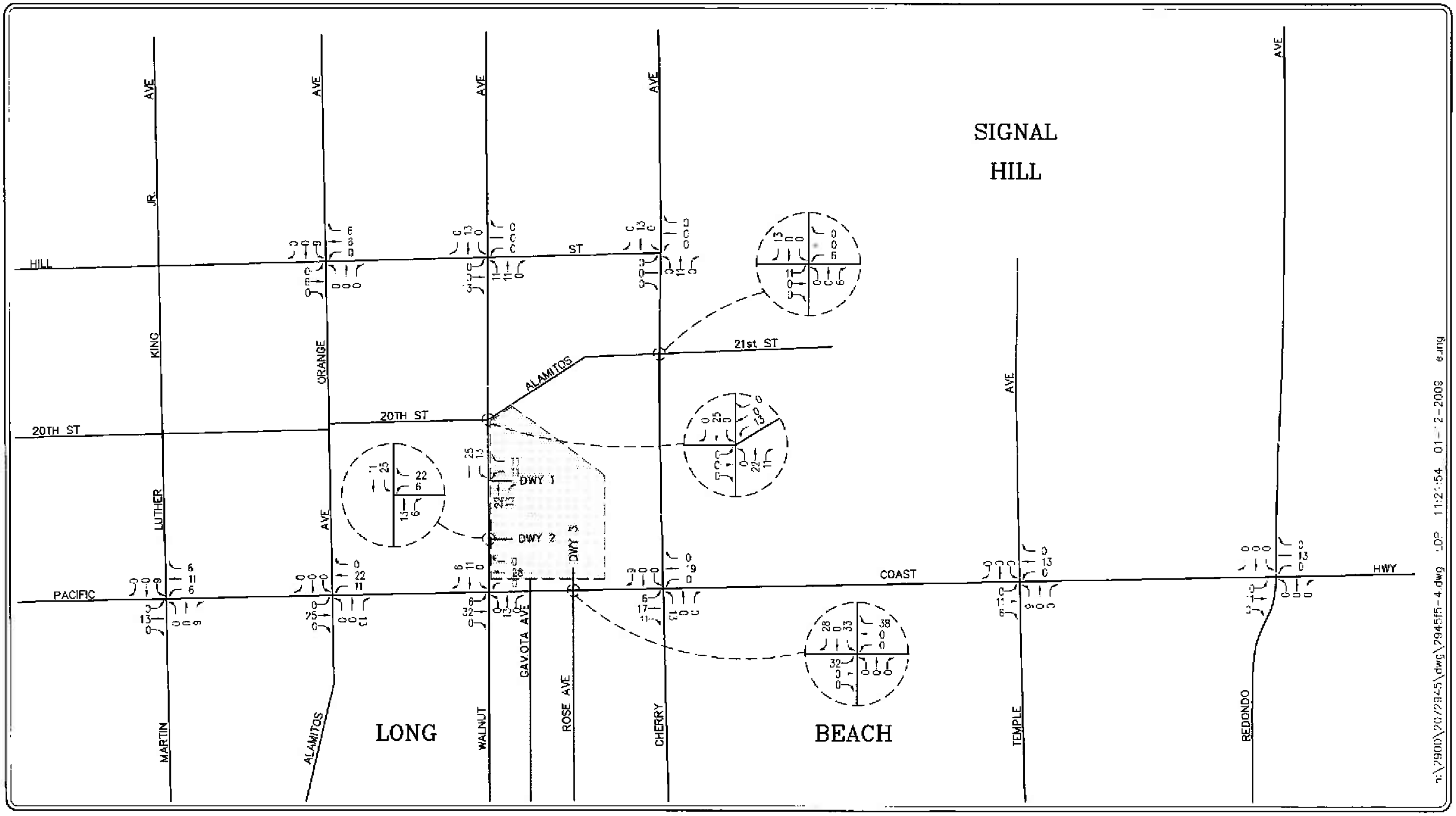


FIGURE 5–4

SATURDAY MIDDAY PEAK HOUR PROJECT TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH

6.0 FUTURE TRAFFIC CONDITIONS

6.1 Ambient Traffic Growth

Horizon year, background traffic growth estimates have been calculated using an ambient growth factor. The ambient traffic growth factor is intended to include unknown and future related projects in the study area, as well as account for regular growth in traffic volumes due to the development of projects outside the study area. The future growth in traffic volumes has been calculated at one percent (1%) per year. Applied to existing Year 2008 traffic volumes results in a two percent (2%) increase growth in existing volumes to horizon year 2010.

6.2 Related Projects Traffic Characteristics

In order to make a realistic estimate of future on-street conditions prior to implementation of the proposed Project, the status of other known development projects (related projects) in the area has been researched. With this information, the potential impact of the proposed Project can be evaluated within the context of the cumulative impact of all ongoing development. Based on our research, there are twenty-one (21) related projects within a two-mile radius of the project that are located in the City of Long Beach and Signal Hill. These projects have either been built, but not yet fully occupied, or are being processed for approval. These twenty-one (21) related projects have been included as part of the cumulative background setting.

Table 6-1 provides the location and a brief description for each of the twenty-one (21) related projects. ***Figure 6-1*** graphically illustrates the location of the related projects. These related projects are expected to generate vehicular traffic, which may affect the operating conditions of the key study intersections.

Table 6-2 presents the development totals and resultant trip generation for the related projects. As shown in *Table 6-2*, the related projects are expected to generate a combined total of 26,354 daily trips on a "typical" weekday, with 1,467 trips (588 inbound and 879 outbound) forecast during the AM peak hour and 2,153 trips (1,158 inbound and 995 outbound) during the PM peak hour.

On a typical weekend day (Saturday), the related projects are expected to generate a combined total of 27,138 daily trips with 2,666 trips (1,365 inbound and 1,301 outbound) forecast during the Saturday midday peak hour.

6.3 Year 2010 Traffic Volumes

Figures 6-2, 6-3 and ***6-4*** present future weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour background traffic volumes at the key study intersections for the Year 2010. Please note that the background traffic volumes represent the accumulation of existing traffic, ambient growth traffic, and related projects traffic.

Figures 6-5, 6-6 and ***6-7*** illustrate Year 2010 forecast weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour traffic volumes with the inclusion of the trips generated by the proposed Project.

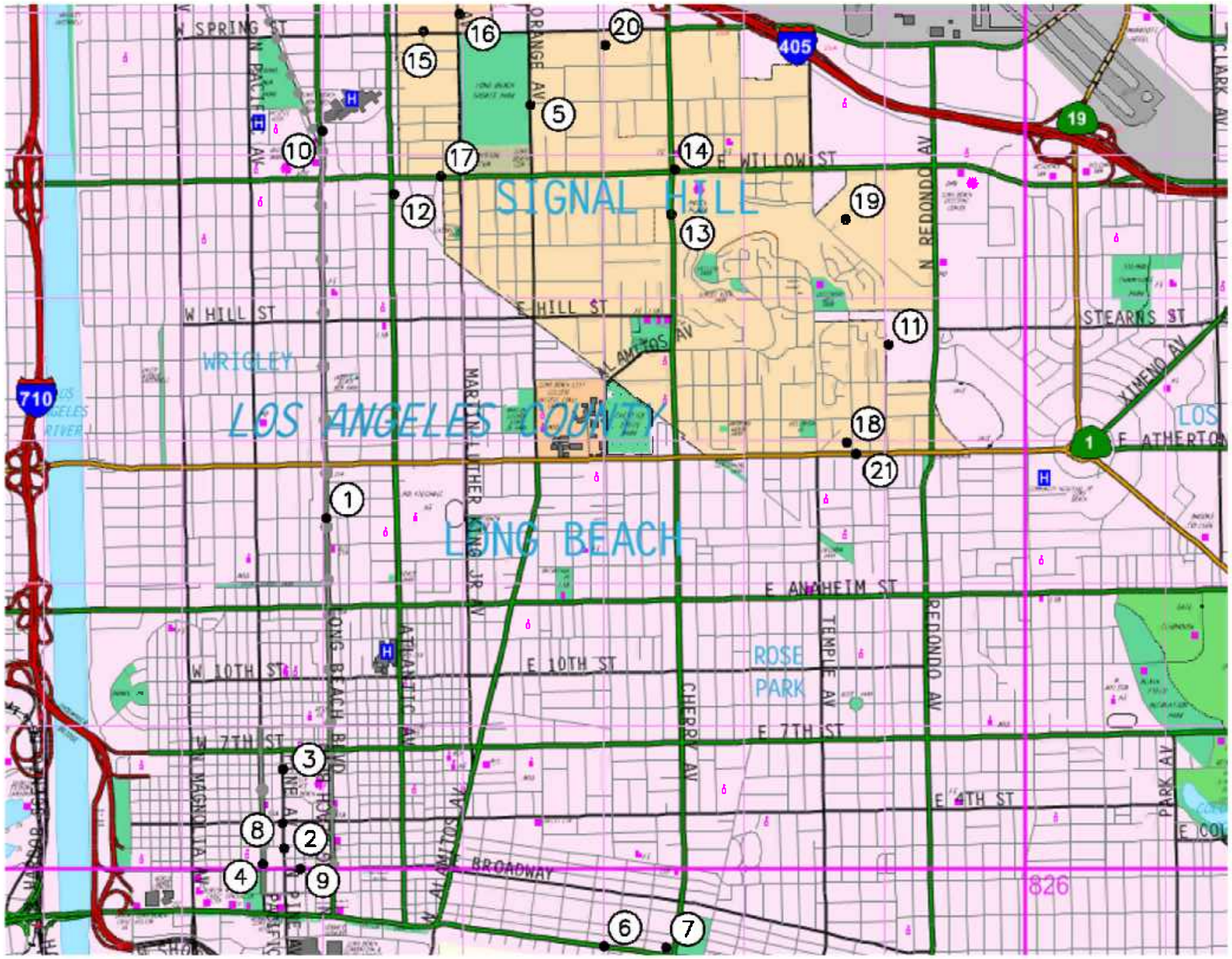
TABLE 6-1
LOCATION AND DESCRIPTION OF RELATED PROJECTS[7]

No.	Location/Address	Description
City of Long Beach		
1.	1598 Long Beach Boulevard	64 DU apartments and 15,000 SF commercial
2.	301 Pine Avenue	375 DU apartments and 26,000 SF commercial
3.	604 Pine Avenue	542 DU apartments and 9,000 SF commercial
4.	210 W. 3rd Street	96 DU apartments and 11,200 SF commercial
5.	2801 Orange Avenue	55.5 acres multi-purpose recreation center
6.	1628-1724 Ocean Boulevard	51 DU condominiums and 47 hotel rooms
7.	2010 Ocean Boulevard	56 DU condominiums
8.	433 Pine Avenue	18 DU apartments and 15,000 SF of commercial
9.	201 The Promenade	165 hotel rooms
10.	2702 Long Beach Boulevard	105,800 SF hospital expansion
11.	2080 Obispo Avenue	106 DU single family
12.	2555 Atlantic Avenue	66 DU apartments
City of Signal Hill		
13.	2499 Cherry Avenue	13,969 SF supermarket
14.	2615 Cherry Avenue	3,590 SF walk-in bank
15.	801 E. Spring Street	2,425 SF fast-food restaurant with drive thru
16.	3075 California Avenue	11,190 SF specialty retail
17.	845 E. Willow Street	19,400 SF medical office building
18.	1835-1899 Orizaba Avenue	81 DU condominiums
19.	2445 Palm Drive	27,866 SF office building
20.	2950 Walnut Avenue	20,492 SF new car sales
21.	Orizaba and Pacific Coast Highway	54 DU condominiums

7 Source: City of Long Beach Quarterly Major Projects List, dated September 2008 and the City of Signal Hill Project Status Report List, dated July 15, 2008.

KEY

1. 1598 LONG BEACH BOULEVARD
2. 301 PINE AVENUE
3. 604 PINE AVENUE
4. 210 W. 3RD STREET
5. 2801 ORANGE AVENUE
6. 1628–1724 OCEAN BOULEVARD
7. 2010 OCEAN BOULEVARD
8. 433 PINE AVENUE
9. 201 THE PROMENADE
10. 2702 LONG BEACH BOULEVARD
11. 2080 OBISPO AVENUE
12. 2555 ATLANTIC AVENUE
13. 2499 CHERRY AVENUE
14. 2615 CHERRY AVENUE
15. 801 E. SPRING STREET
16. 3075 CALIFORNIA AVENUE
17. 845 E. WILLOW STREET
18. 1835–1899 ORIZABA AVENUE
19. 2445 PALM DRIVE
20. 2950 WALNUT AVENUE
21. ORIZABA AVENUE AND PACIFIC COAST HIGHWAY



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NO SCALE

SOURCE: THOMAS BROS.

KEY

(#) = RELATED PROJECT

= PROJECT SITE

FIGURE 6–1

LOCATION OF RELATED PROJECTS

KROC COMMUNITY CENTER, LONG BEACH

TABLE 6-2
RELATED PROJECTS TRAFFIC GENERATION FORECAST[8]

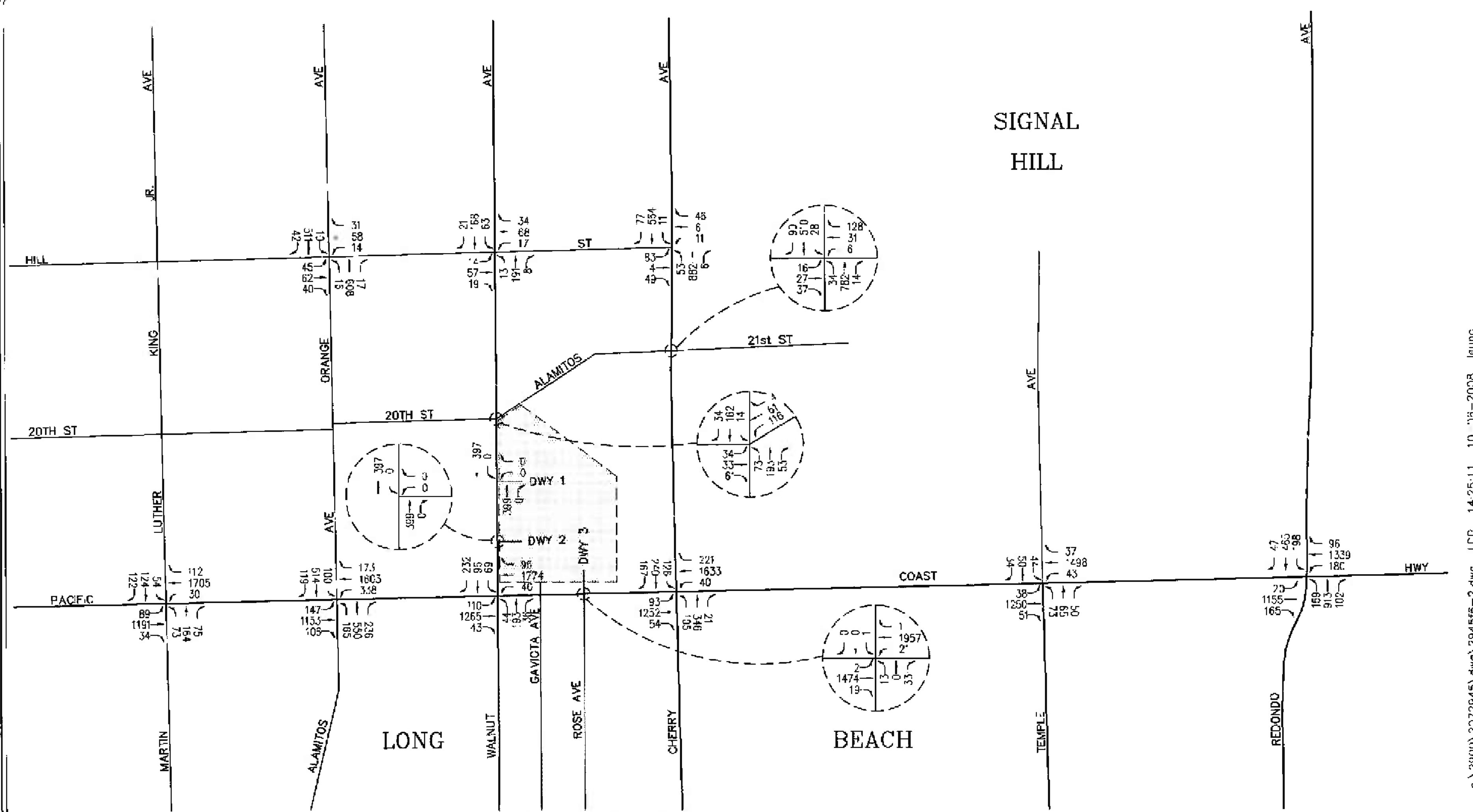
No. / Related Projects Description	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Daily	Saturday Peak Hour		
		In	Out	Total	In	Out	Total		In	Out	Total
City of Long Beach											
1. 1598 Long Beach Boulevard	1,010	14	31	45	44	33	77	1,084	45	44	89
2. 301 Pine Avenue	3,524	52	163	215	181	117	298	3,565	148	143	291
3. 604 Pine Avenue	3,989	59	226	285	228	131	359	3,868	158	157	315
4. 210 W. 3rd Street	1,062	16	42	58	49	33	82	1,117	46	45	91
5. 2801 Orange Avenue	5,016	54	53	107	160	160	320	5,417	340	340	680
6. 1628-1724 Ocean Boulevard	683	20	29	49	33	22	55	674	32	26	58
7. 2010 Ocean Boulevard	328	4	21	25	20	10	30	318	14	12	26
8. 433 Pine Avenue	701	10	12	22	25	23	48	790	34	31	65
9. 201 The Promenade	1,348	56	36	92	51	46	97	1,351	66	53	119
10. 2702 Long Beach Boulevard	1,859	85	42	127	41	84	125	1,241	120	120	240
11. 2080 Obispo Avenue	1,014	20	59	79	68	39	107	1,071	54	46	100
12. 2555 Atlantic Avenue	444	7	27	34	26	15	41	422	17	17	34
City of Long Beach Related Project Trip Generation Potential	**20,978**	**397**	**741**	**1,138**	**926**	**713**	**1,639**	**20,918**	**1,074**	**1,034**	**2,108**

8 Source: *Trip Generation*, 7th Edition, Institute of Transportation Engineers (ITE) [Washington, D.C. (2003)].

TABLE 6-2 (CONTINUED)
RELATED PROJECTS TRAFFIC GENERATION FORECAST[9]

No. / Related Projects Description	Weekday Daily	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Daily	Saturday Peak Hour		
		In	Out	Total	In	Out	Total		In	Out	Total
City of Signal Hill											
13. 2499 Cherry Avenue	1,285	28	18	46	48	47	95	2,481	77	74	151
14. 2615 Cherry Avenue	562	7	8	15	59	60	119	49	9	8	17
15. 801 E. Spring Street	601	33	32	65	22	20	42	1,751	73	70	143
16. 3075 California Avenue	446	6	4	10	9	11	20	503	21	20	41
17. 845 E. Willow Street	701	38	10	48	19	53	72	174	40	30	70
18. 1835-1899 Orizaba Avenue	475	6	30	36	28	14	42	459	20	18	38
19. 2445 Palm Drive	307	38	5	43	7	35	42	66	6	5	11
20. 2950 Walnut Avenue	683	31	11	42	21	33	54	431	31	30	61
21. Orizaba and Pacific Coast Highway	316	4	20	24	19	9	28	306	14	12	26
City of Signal Hill Related Project Trip Generation Potential	**5,376**	**191**	**138**	**329**	**232**	**282**	**514**	**6,220**	**291**	**267**	**558**
Total Related Projects Trip Generation Potential	**26,354**	**588**	**879**	**1,467**	**1,158**	**995**	**2,153**	**27,138**	**1,365**	**1,301**	**2,666**

9 Source: *Trip Generation*, 7th Edition, Institute of Transportation Engineers (ITE) [Washington, D.C. (2003)]



LINSCOTT LAW & GREENSPAN engineers

NO SCALE

KEY
= PROJECT SITE

FIGURE 6–2

YEAR 2010 AM PEAK HOUR BACKGROUND TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH

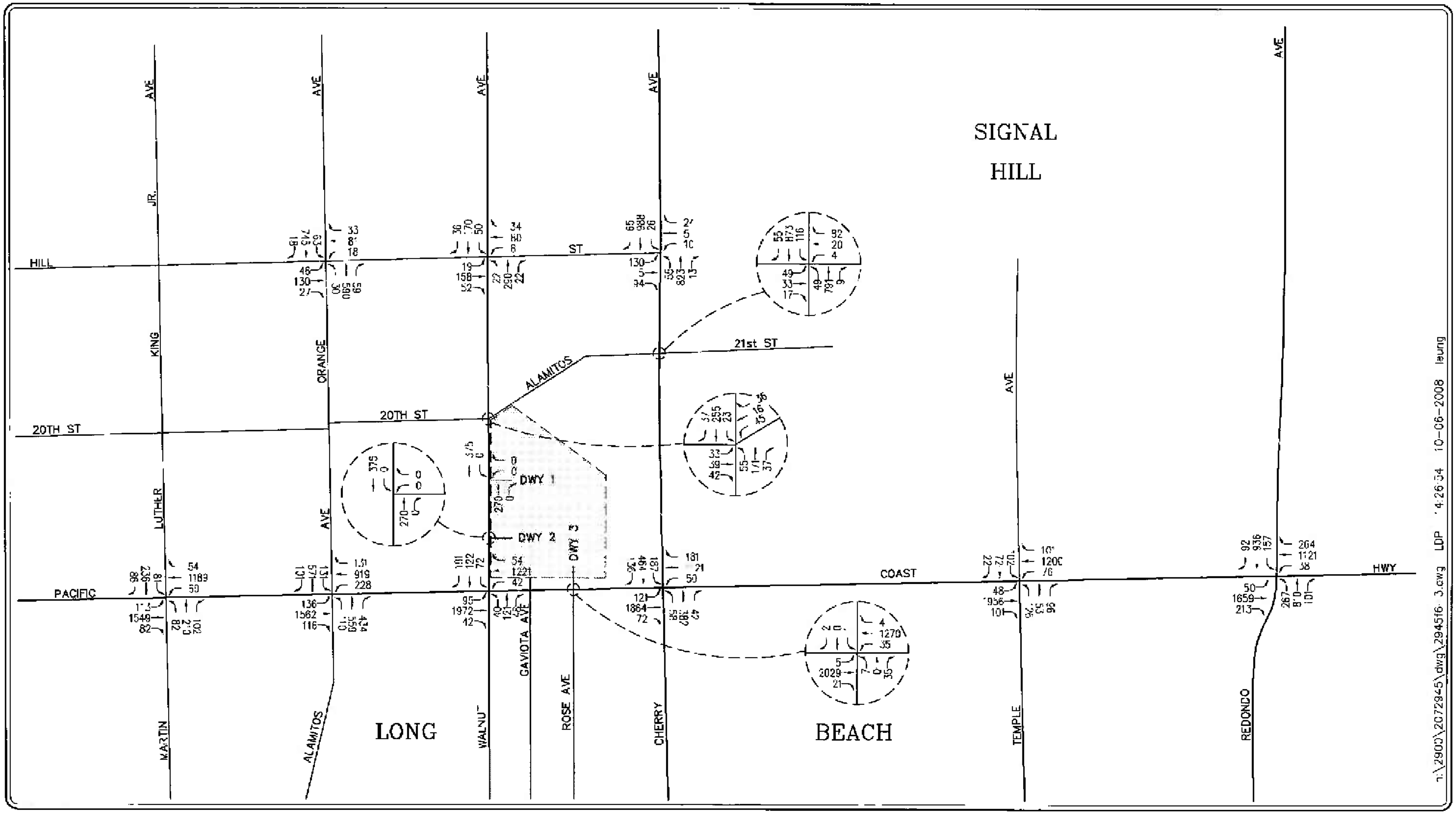


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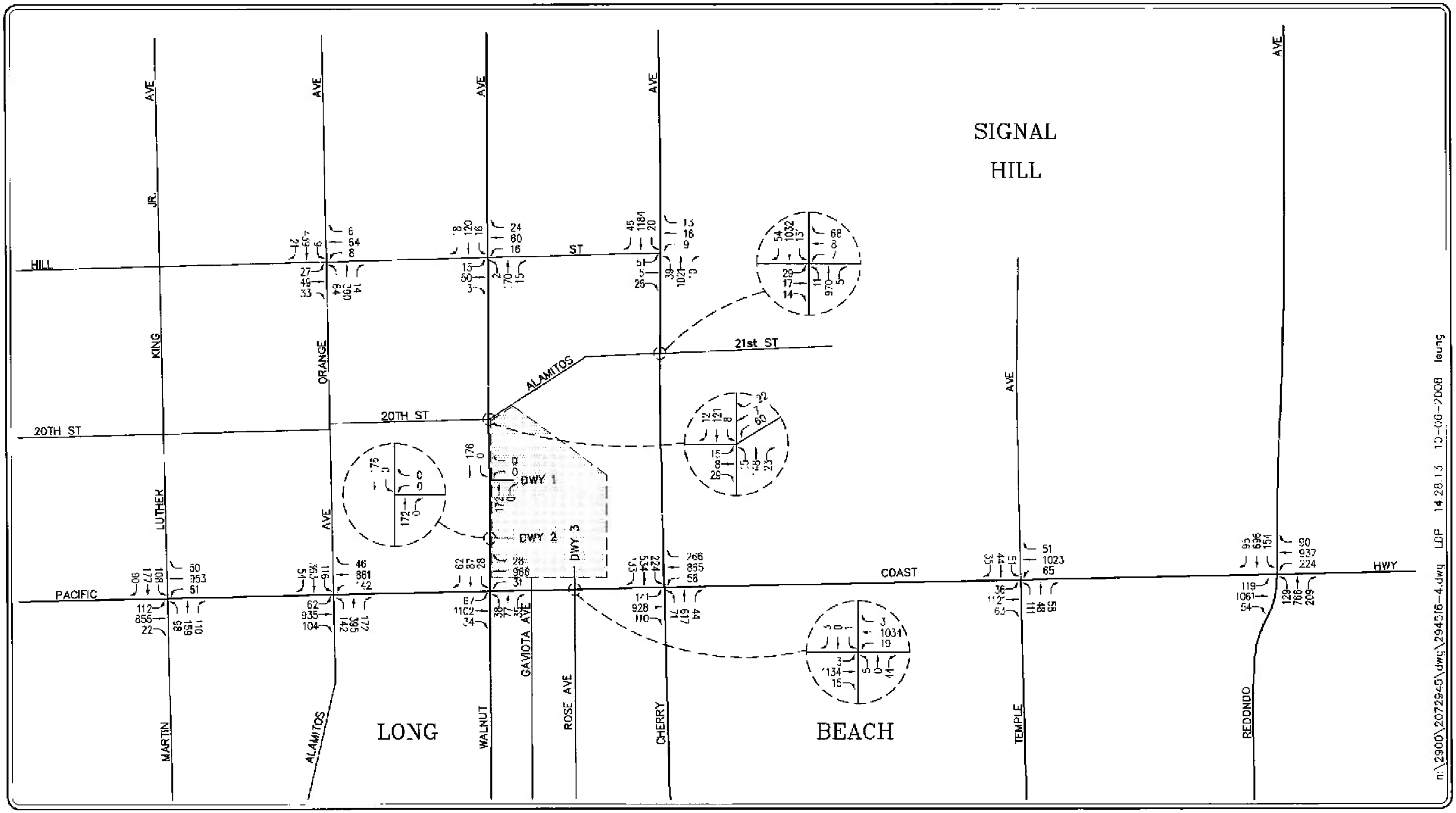
FIGURE 6–3

YEAR 2010 PM PEAK HOUR BACKGROUND TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH



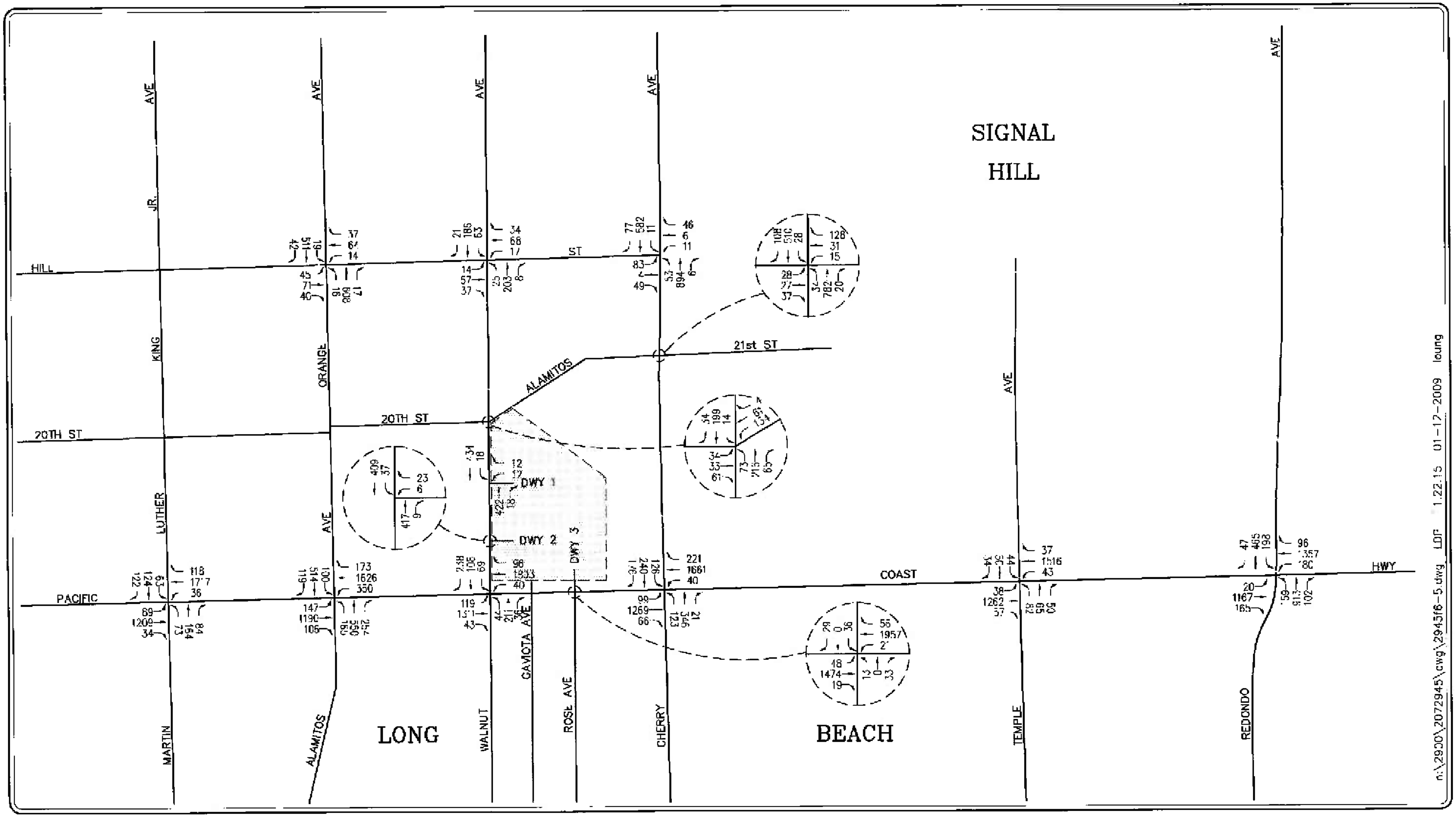
KEY
= PROJECT SITE

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

FIGURE 6–4

YEAR 2010 SATURADAY MIDDAY PEAK HOUR BACKGROUND TRAFFIC VOLUMES
KROC COMMERICAL CENTER, LONG BEACH



KEY
▭ = PROJECT SITE

LINSCOTT LAW & GREENSPAN engineers

NO SCALE

FIGURE 6–5

YEAR 2010 AM PEAK HOUR BACKGROUND PLUS PROJECT TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH

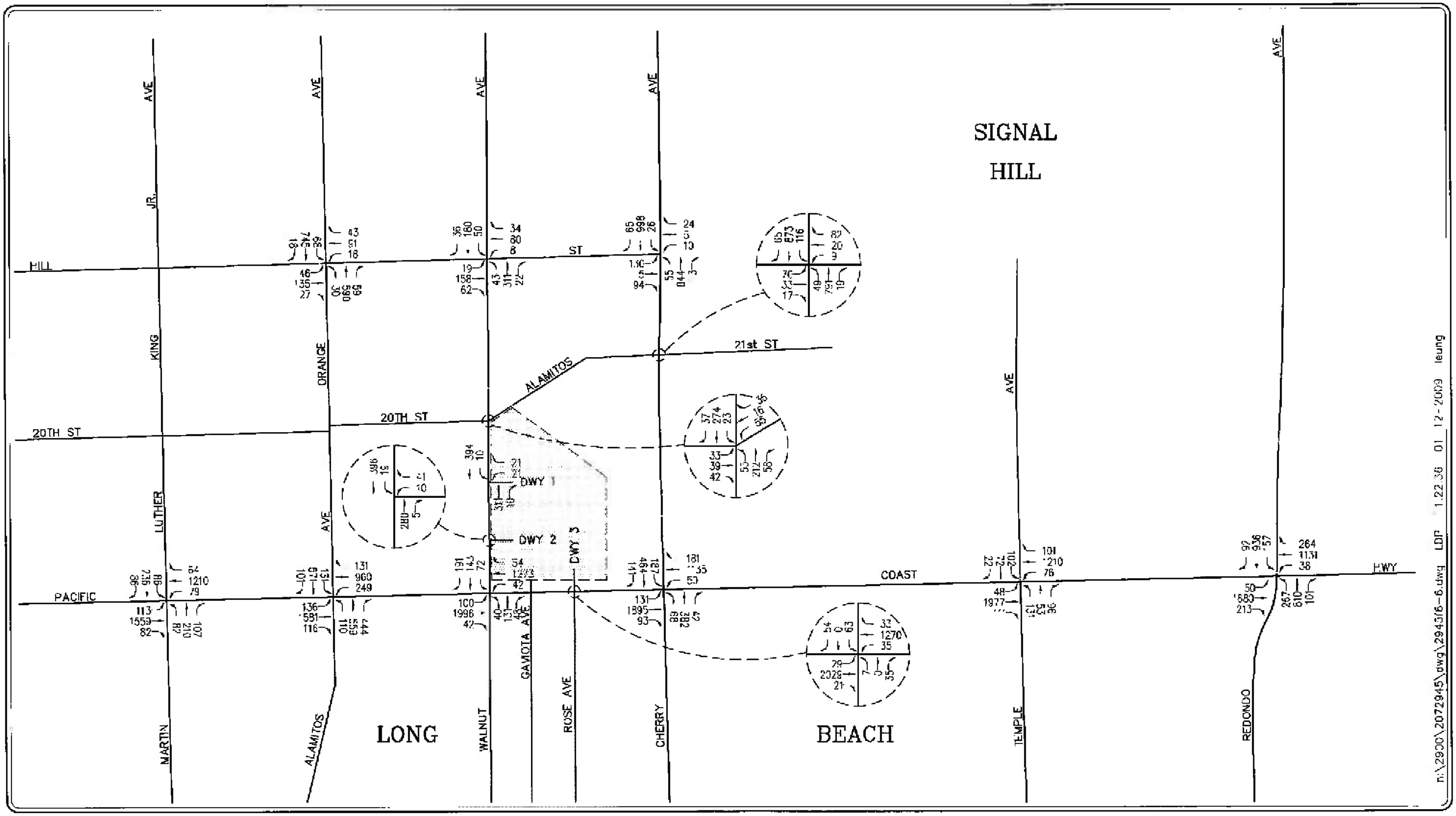
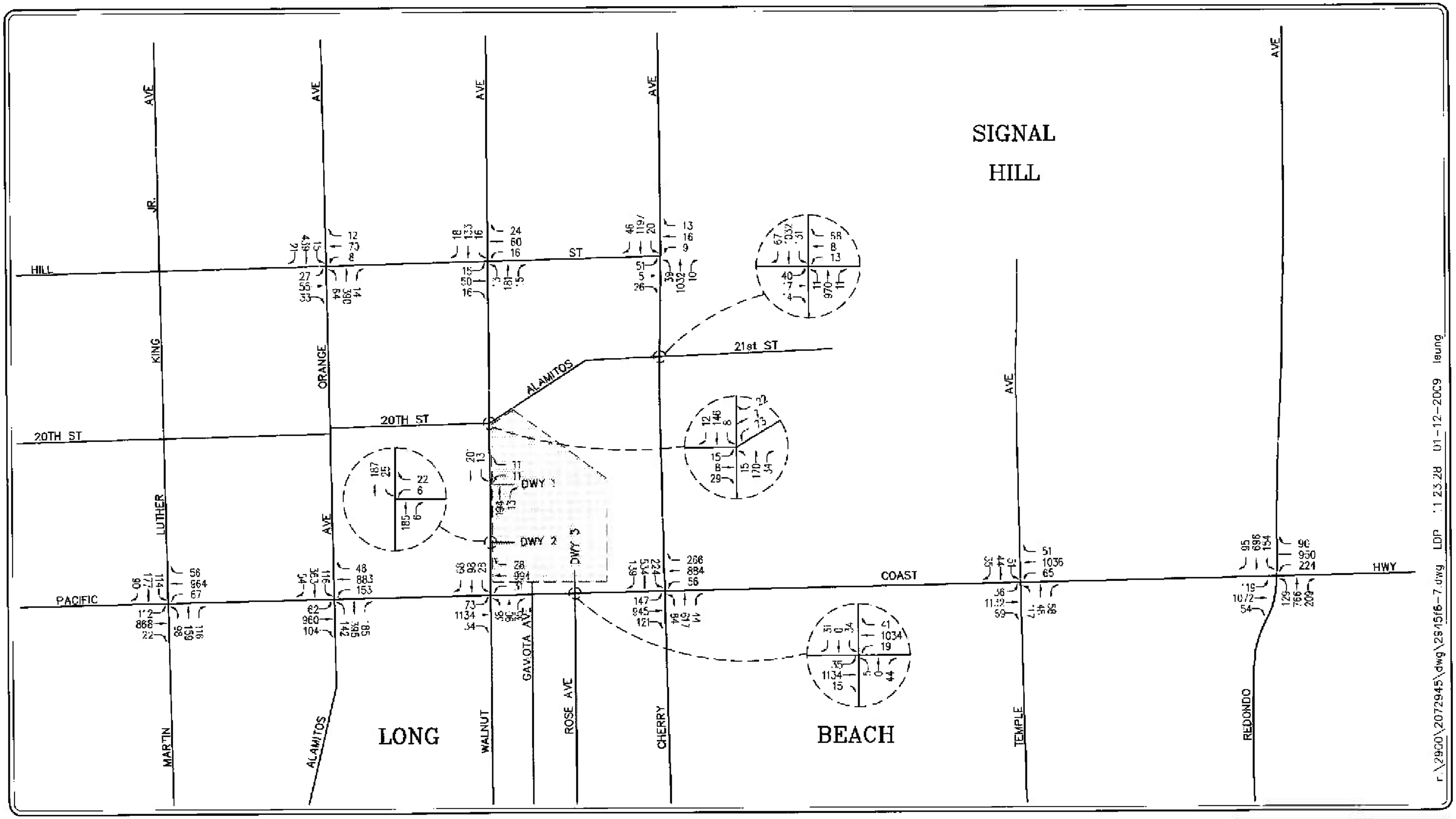


FIGURE 6–6

YEAR 2010 PM PEAK HOUR BACKGROUND PLUS PROJECT TRAFFIC VOLUMES

KROC COMMERICAL CENTER, LONG BEACH



LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

KEY
= PROJECT SITE

FIGURE 6–7

YEAR 2010 SATURDAY MIDDAY PEAK HOUR BACKGROUND PLUS PROJECT TRAFFIC VOLUMES

KROC COMMERCIAL CENTER, LONG BEACH

7.0 TRAFFIC IMPACT ANALYSIS METHODOLOGY

7.1 Impact Criteria and Thresholds

The relative impact of the added Project traffic volumes generated by the proposed Project during the weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour was evaluated based on analysis of future operating conditions at the key study intersections, without, then with, the proposed Project. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-capacity relationships and service level characteristics at each study intersection. The significance of the potential impacts of the project at each key intersection was then evaluated using the City's LOS standards and traffic impact criteria defined below.

7.1.1 *LOS Standards and Impact Criteria:*

Within the City of Long Beach and the City of Signal Hill, impacts to local and regional transportation systems are considered significant if:

- An unacceptable peak hour Level of Service (LOS) (i.e. LOS E or F) at any of the key intersections is projected. The City of Long Beach considers LOS D (ICU = 0.801 - 0.900) to be the minimum acceptable LOS for all intersections. For the City of Long Beach, the current LOS, if worse than LOS D (i.e. LOS E or F), should also be maintained; and

- The project increases traffic demand at the study intersection by 2% of capacity (ICU increase ≥ 0.020), causing or worsening LOS E or F (ICU > 0.901). At unsignalized intersections, a "significant" adverse traffic impact is defined as a project that: adds 2% of more traffic delay (seconds per vehicle) at an intersection operating LOS E or F

7.2 Traffic Impact Analysis Scenarios

The following scenarios are those for which volume/capacity calculations have been performed at the key intersections for near-term (Year 2010) traffic conditions for a typical weekday and weekend (Saturday) day:

A. Existing Conditions
B. Existing plus Ambient Growth plus Cumulative Projects
C. Traffic in (B) plus proposed Project
D. Traffic in (C) plus Mitigation (as required)

8.0 PEAK HOUR INTERSECTION CAPACITY ANALYSIS

8.1 Year 2010 Traffic Conditions

Table 8-1 summarizes the peak hour Level of Service results at the key study intersections for the 2010 horizon year. The first column (1) of ICU/LOS and HCM/LOS values in *Table 8-1* presents a summary of existing weekday AM, weekday PM, and Saturday peak hour traffic conditions (which were also presented in *Table 3-5*). The second column (2) lists future Year 2010 background traffic conditions (existing plus ambient growth traffic plus related projects traffic) based on existing intersection geometry, but without any traffic generated by the proposed Project. The third column (3) presents future forecast traffic conditions with the addition of traffic generated by the proposed Project. The fourth column (4) shows the increase in ICU or HCM value due to the added peak hour project trips and indicates whether the traffic associated with the project will have a significant impact based on the LOS standards and the significance impact criteria defined in this report. The fifth column (5) presents the intersection operating conditions based on the total anticipated near-term (Year 2010) traffic volumes with planned and/or recommended intersection improvements.

8.1.1 *Year 2010 Future Background Traffic Conditions*

An analysis of future (Year 2010) background traffic conditions indicates that two key study intersections are forecast to operate at adverse levels of service in the Year 2010. These intersections, reported below, are expected to operate at unacceptable LOS E or F during the weekday AM, weekday PM, and/or Saturday midday peak hour.

	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
Key Intersection	ICU/HCM	LOS	ICU/HCM	LOS	ICU/HCM	LOS
9. Rose Ave at Pacific Coast Highway	289.6 s/v	F	132.7 s/v	F	--	--
12. Redondo Ave at Pacific Coast Highway	0.979	E	1.024	F	0.923	E

The remaining ten (10) key study intersections are expected to operate at acceptable service levels (LOS D or better) during the weekday AM, weekday PM, and Saturday midday peak hours in the Year 2010.

It should be noted that it is not uncommon that unsignalized public street intersections and/or driveways that have direct access to regional/major arterials, such as Pacific Coast Highway, operate at an unacceptable LOS due to the limited gaps in traffic and the high volume of traffic that utilizes these streets as commuter routes.

TABLE 8-1
YEAR 2010 INTERSECTION CAPACITY ANALYSIS SUMMARY[10]

Key Intersections	Time Period	(1) Existing Traffic Conditions		(2) Year 2010 Background Traffic Conditions		(3) Year 2010 Plus Project Traffic Conditions		(4) Project Significant Impact[11]		(5) Year 2010 With Recommended Improvements	
		ICU / Delay	LOS	ICU / Delay	LOS	ICU / Delay	LOS	Change in ICU/ Delay	Yes/No	ICU / Delay	LOS
1. Orange Avenue at Hill Street	AM	0.552	A	0.564	A	0.576	A	0.012	N	--	--
	PM	0.684	B	0.706	C	0.709	C	0.003	N	--	--
	Saturday	0.448	A	0.477	A	0.484	A	0.007	N	--	--
2. Walnut Avenue at Hill Street	AM	9.6 s/v	A	9.8 s/v	A	10.2 s/v	B	0.4 s/v	N	--	--
	PM	11.6 s/v	B	12.0 s/v	B	13.1 s/v	B	1.1 s/v	N	--	--
	Saturday	8.6 s/v	A	8.7 s/v	A	8.9 s/v	A	0.2 s/v	N	--	--
3. Cherry Avenue at Hill Street	AM	0.506	A	0.520	A	0.523	A	0.003	N	--	--
	PM	0.613	B	0.636	B	0.639	B	0.003	N	--	--
	Saturday	0.576	A	0.595	A	0.599	A	0.004	N	--	--
4. Walnut Avenue at East 20th Street/ Alamitos Ave.	AM	10.5 s/v	B	0.412	A[12]	0.445	A	0.033	N	--	--
	PM	10.0 s/v	A	0.368	A[12]	0.380	A	0.012	N	--	--
	Saturday	8.2 s/v	A	0.272	A[12]	0.301	A	0.029	N	--	--
5. Cherry Avenue at 21st Street	AM	0.472	A	0.486	A	0.488	A	0.002	N	--	--
	PM	0.488	A	0.508	A	0.527	A	0.019	N	--	--
	Saturday	0.535	A	0.555	A	0.561	A	0.006	N	--	--

Notes: **Bold ICU/LOS and HCM/LOS values** indicate adverse service levels based on City LOS standards.
s/v = seconds per vehicle (delay).

10 *Appendix B* contains the ICU/LOS and HCM/LOS worksheets.

11 A significant project impact is defined as a 0.020 or greater increase in ICU value of a signalized intersection or a 2% or more increase in delay at an unsignalized location where the final LOS is E or F.

12 Represents anticipated operation conditions with implementation of planned intersection realignment and signalization improvements by the City of Long Beach. Improvements are assumed to be completed by Year 2010 and incorporated in the cumulative 2010 background traffic setting.

TABLE 8-1 (CONTINUED)
YEAR 2010 INTERSECTION CAPACITY ANALYSIS SUMMARY[13]

Key Intersections	Time Period	(1) Existing Traffic Conditions		(2) Year 2010 Background Traffic Conditions		(3) Year 2010 Plus Project Traffic Conditions		(4) Project Significant Impact[14]		(5) Year 2010 With Recommended Improvements	
		ICU / Delay	LOS	ICU / Delay	LOS	ICU / Delay	LOS	Change in ICU/ Delay	Yes/No	ICU / Delay	LOS
6. Martin Luther King Jr. Ave at Pacific Coast Highway	AM	0.611	B	0.672	B	0.680	B	0.008	N	--	--
	PM	0.652	B	0.682	B	0.690	B	0.008	N	--	--
	Saturday	0.484	A	0.551	A	0.555	A	0.004	N	--	--
7. Orange Avenue at Pacific Coast Highway	AM	0.863	D	0.887	D	**0.903**	**E**	0.016	N	--	--
	PM	0.869	D	0.900	D	**0.917**	**E**	0.017	N	--	--
	Saturday	0.626	B	0.657	B	0.670	B	0.013	N	--	--
8. Walnut Avenue at Pacific Coast Highway	AM	0.783	C	0.807	D	0.829	D	0.022	N	--	--
	PM	0.749	C	0.780	C	0.805	D	0.025	N	--	--
	Saturday	0.441	A	0.467	A	0.483	A	0.016	N	--	--
9. Rose Avenue at Pacific Coast Highway	AM	**241.1 s/v**	**F**	**289.6 s/v**	**F**	**1,717.9 s/v**	**F**	**1,428.3 s/v**	**Y**	0.590	A[15]
	PM	**96.6 s/v**	**F**	**132.7 s/v**	**F**	**956.6 s/v**	**F**	**823.9 s/v**	**Y**	0.622	B[15]
	Saturday	18.2 s/v	C	20.1 s/v	C	**64.7 s/v**	**F**	**44.6 s/v**	**Y**	0.392	A[15]
10. Cherry Avenue at Pacific Coast Highway	AM	0.827	D	0.758	C[16]	0.768	C	0.010	N	--	--
	PM	0.866	D	0.804	D[16]	0.815	D	0.011	N	--	--
	Saturday	**0.922**	**E**	0.791	C[16]	0.799	C	0.008	N	--	--

Notes: **Bold ICU/LOS and HCM/LOS** values indicate adverse service levels based on City LOS standards.
s/v = seconds per vehicle (delay).

13 *Appendix B* contains the ICU/LOS and HCM/LOS worksheets.

14 A significant project impact is defined as a 0.020 or greater increase in ICU value of a signalized intersection or a 2% or more increase in delay at an unsignalized location where the final LOS is E or F.

15 Represents anticipated LOS with installation of a traffic signal at the intersections of Rose Avenue at Pacific Coast Highway to facilitate access to the Project site.

16 Represents anticipated operation conditions with implementation of planned intersection and signalization improvements by the City of Signal Hill/City of Long Beach. Improvements are assumed to be completed by Year 2010 and incorporated in the cumulative 2010 background traffic setting.

TABLE 8-1 (CONTINUED)
YEAR 2010 INTERSECTION CAPACITY ANALYSIS SUMMARY[17]

Key Intersections	Time Period	(1) Existing Traffic Conditions		(2) Year 2010 Background Traffic Conditions		(3) Year 2010 Plus Project Traffic Conditions		(4) Project Significant Impact[18]		(5) Year 2010 With Recommended Improvements	
		ICU / Delay	LOS	ICU / Delay	LOS	ICU / Delay	LOS	Change in ICU/ Delay	Yes/No	ICU / Delay	LOS
11. Temple Avenue at Pacific Coast Highway	AM	0.542	A	0.562	A	0.571	A	0.009	N	--	--
	PM	0.712	C	0.749	C	0.758	C	0.009	N	--	--
	Saturday	0.492	A	0.524	A	0.530	A	0.006	N	--	--
12. Redondo Avenue at Pacific Coast Highway	AM	**0.933**	**E**	**0.979**	**E**	**0.982**	**E**	0.003	N	--	--
	PM	**0.984**	**E**	**1.024**	**F**	**1.028**	**F**	0.004	N	--	--
	Saturday	0.882	D	**0.923**	**E**	**0.926**	**E**	0.003	N	--	--

Notes: **Bold ICU/LOS and HCM/LOS values** indicate adverse service levels based on City LOS standards.
s/v = seconds per vehicle (delay).

17 *Appendix B* contains the ICU/LOS and HCM/LOS worksheets.

18 A significant project impact is defined as a 0.020 or greater increase in ICU value of a signalized intersection or a 2% or more increase in delay at an unsignalized location where the final LOS is E or F.

8.1.2 *Year 2010 Future Traffic Conditions Plus Project*

Review of Columns 3 and 4 of *Table 8-1* indicate that traffic associated with the proposed Project will have a significant (cumulative) traffic impact at one of the twelve key study intersections when compared to the LOS standards and the significant traffic impact criteria defined in this report.

The intersection of Rose Avenue at Pacific Coast Highway is forecast to operate at unacceptable LOS F during the weekday AM peak hour, weekday PM peak hour and Saturday peak hour in the Year 2010 with project traffic. It should be noted that it is not uncommon that unsignalized public street intersections and/or driveways that have direct access to regional/major arterials, such as Pacific Coast Highway, operate at an unacceptable LOS due to the limited gaps in traffic and the high volume of traffic that utilizes these streets as commuter routes.

However, as shown in Column 5 of *Table 8-1*, the implementation of recommended improvements at the impacted intersection of Rose Avenue/Pacific Coast Highway completely offsets the impact of the proposed Project. The impacted intersection is forecast to operate at an acceptable LOS during the weekday AM, weekday PM and Saturday peak hours with the installation of recommended improvements.

Although the intersections of Orange Avenue at Pacific Coast Highway and Redondo Avenue at Pacific Coast Highway are forecast to operate at LOS E or LOS F during the weekday AM, weekday PM, and/or Saturday midday peak hour, the proposed Project is expected to add less than 0.020 to the ICU value and hence will not have a significant impact. As discussed earlier, a significant Project impact occurs when the Project increases traffic demand at a signalized study intersection by 2% of capacity (ICU $\geq$ 0.020), or a 2% change in delay at unsignalized intersections where the final LOS is E or F.

The remaining nine (9) key study intersections are forecast to continue to operate at an acceptable LOS with the addition of project generated traffic in the Year 2010.

8.2 Traffic Signal Warrant Analysis

8.2.1 *California MUTCD Policy/Criteria*

Per the City's direction, the level of service analysis at the unsignalized intersections of Walnut Avenue at Hill Street, Rose Avenue at Pacific Coast Highway, Walnut Avenue at North Driveway and Walnut Avenue at South Driveway is supplemented with an assessment of the need for signalization of these two key study intersections and two project driveways. This assessment is made on the basis of signal warrant criteria adopted by Caltrans. For this study, the need for signalization is assessed on the basis of the peak-hour traffic signal warrant, Warrant #3, described in the *California Manual on Uniform Traffic Control Devices (MUTCD).*

Warrant #3 has two parts. 1) Part A evaluates peak hour vehicle delay for traffic on the minor street approach with the highest delay and 2) Part B evaluates peak-hour traffic volumes on the major and minor streets. This method provides an indication of whether peak-hour traffic conditions or peak-hour traffic volume levels are, or would be, sufficient to justify installation of a traffic signal.

The decision to install a traffic signal should not be based purely on the warrants alone. Instead, the installation of a signal should be considered and further analysis performed when one or more of the warrants is met. Additionally, engineering judgment is exercised on a case-by-case basis to evaluate the effect a traffic signal will have on certain types of accidents and traffic conditions at the subject intersection as well as at adjacent intersections.

8.2.2 *Traffic Signal Warrant Results*

The results of the peak-hour traffic signal warrant analysis for Year 2010 Future Background Plus Project Traffic Conditions for Walnut Avenue at Hill Street, Rose Avenue at Pacific Coast Highway, Walnut Avenue at North Driveway and Walnut Avenue at South Driveway are summarized on ***Table 8-2***

Review of *Table 8-2* indicates that forecast traffic volume conditions at Rose Avenue and Pacific Coast Highway would exceed the volume thresholds of Warrant #3, Part A and Part B primarily because of added project traffic volumes on the southbound approach of the study intersection, and thus satisfies the traffic signal warrant. As shown in *Table 8-1,* Rose Avenue at Pacific Coast Highway is forecast to operate at acceptable service levels during the weekday AM and PM peak hours and the Saturday mid-day peak hour with the installation of a traffic signal at this location. ***Appendix C*** contains the traffic signal warrant worksheets.

TABLE 8-2

TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY[19]

	Key Intersections	Time Period	Year 2010 Future Background Traffic Plus Project	
			Part A of Warrant 3 Satisfied?	Part B of Warrant 3 Satisfied?
2.	Walnut Avenue at Hill Street	AM	NA	No
		PM	NA	No
		Saturday	NA	No
9.	Rose Avenue/DWY #1 at Pacific Coast Highway	AM	No	No
		PM	**Yes**	**Yes**
		Saturday	No	No
13.	Walnut Avenue at Project DWY #2	AM	No	No
		PM	No	No
		Saturday	No	No
14.	Walnut Avenue at Project DWY #3	AM	No	No
		PM	No	No
		Saturday	No	No

Note:
NA = All-Way Stop Control (Part A of Warrant 3 is not applicable)

19 Signal warrant checks based on Warrant 3, Part A - Peak-Hour Delay Warrant and Part B Peak-Hour Volume Warrant as contained in the California MUTCD.

9.0 SITE ACCESS AND INTERNAL CIRCULATION EVALUATION

9.1 Site Access

Access to the project site will be provided via the intersection of Pacific Coast Highway/Rose Avenue (i.e. the terminus of Rose Avenue) and two full access unsignalized driveways located along Walnut Avenue. Emergency access only will be provided at the terminus of East 19th Street via a gated entry/exit point. Based on future traffic projections and results of the intersection analyses, the three proposed Project access points are forecast to operate at LOS A or B during the weekday AM and PM peak hours and Saturday midday peak hour for Year 2010 traffic conditions. ***Table 9-1*** summarizes the intersection operations at the three Project driveways for Year 2010 traffic conditions at completion and full occupancy of the proposed Project. The operations analysis for the Project driveways is based on the *Highway Capacity Manual 2000* (HCM 2000) methodology for unsignalized intersections and ICU method.

As such, Project access will be adequate. Motorists entering and exiting the Project site will be able to do so comfortably, safely, and without undue congestion.

9.2 Internal Circulation

The on-site circulation layout of the proposed Project, on an overall basis, is adequate. Curb return radii appear adequate for small service/delivery (Fedex, UPS) trucks, and trash trucks. However, prior to finalization of the project site plan, it is recommended that turning templates (ASSHTO SU-30, WB-50 and fire trucks) be utilized to confirm that all vehicles can properly access and circulate through the site and that all internal drive aisle widths, project driveway widths, and parking stall widths satisfy the City's minimum requirements.

TABLE 9-1
PEAK HOUR PROJECT DRIVEWAY LEVEL OF SERVICE SUMMARY[20]

Project Driveway	Time Period	Intersection Control	(1) Year 2010 Future Background Traffic Plus Project		(2) Year 2010 With Recommended Improvements	
			Delay	**LOS**	**ICU**	**LOS**
1. Rose Avenue/DWY #1 at Pacific Coast Highway	AM	Two - Way Stop	**1,717.9 s/v**	**F**	0.590	A[21]
	PM		**956.6 s/v**	**F**	0.622	B[21]
	Saturday		**64.7 s/v**	**F**	0.392	A[21]
2. Walnut Avenue at Project DWY #2	AM	One – Way Stop	14.3 s/v	B	--	--
	PM		12.7 s/v	B	--	--
	Saturday		10.4 s/v	B	--	--
3. Walnut Avenue at Project DWY #3	AM	One – Way Stop	12.4 s/v	B	-	--
	PM		11.1 s/v	B		--
	Saturday		9.8 s/v	A	--	--

Notes:

- LOS – Level of Service, please refer to *Table 3-2* for the LOS definitions.
- s/v = seconds per vehicle (delay).

20 *Appendix B* contains HCM/LOS calculation worksheets for the Project driveways.

21 Represents anticipated LOS with installation of a traffic signal at the intersections of Rose Avenue at Pacific Coast Highway to facilitate access to the Project site.

10.0 AREA-WIDE TRAFFIC IMPROVEMENTS

For those intersections where projected traffic volumes are expected to result in unacceptable operating conditions, this report recommends (identifies) improvement measures that change the intersection geometry to increase capacity. These capacity improvements involve roadway widening, re-striping to reconfigure (add lanes) to specific approaches of a key intersection and/or peak hour turn restrictions. The identified improvements are expected to.

- mitigate the impact of existing traffic, project traffic and future non-project (ambient traffic growth and cumulative project) traffic, and
- improve Levels of Service to an acceptable range and/or to pre-project conditions.

10.1 Planned Improvements

Based on research at the City of Long Beach and City of Signal Hill, the following planned improvements have been identified and are included in Year 2010 conditions.

- **Walnut Avenue at Alamitos Avenue/East 20th Street:** Realign the east leg of Alamitos Avenue/East 20th Street though the intersection with Walnut Avenue and install traffic signal.

- **Cherry Avenue at Pacific Coast Highway:** Widen and restripe Cherry Avenue to provide second southbound through lane and a second northbound through lane. Modify traffic signal accordingly.

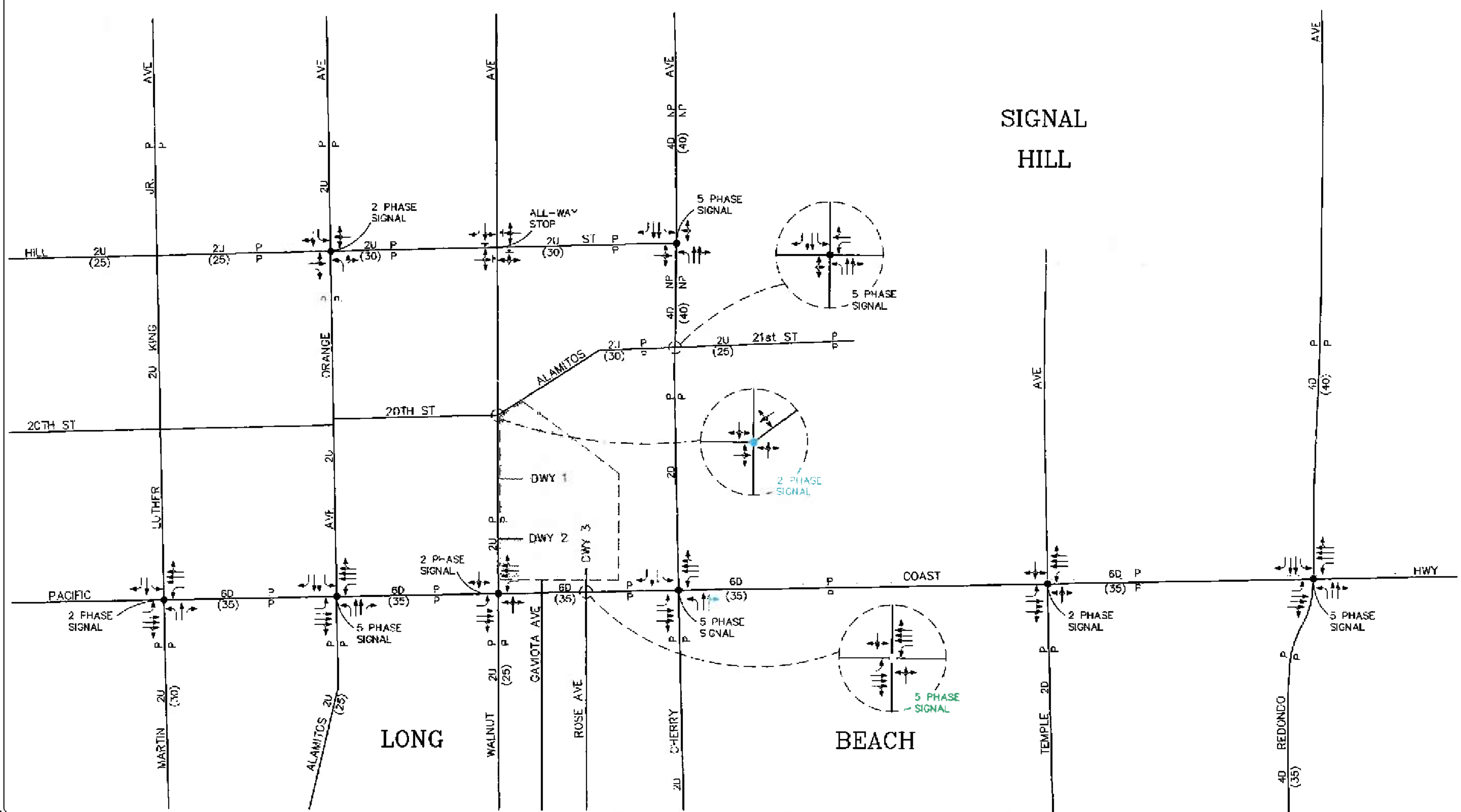
10.2 Recommended Project-Specific Improvements

The results of the level of service analysis indicate that the proposed Project will have a significant (cumulative) traffic impact at one of the study intersections. However, the implementation of the following improvements will mitigate the traffic impacts of the proposed Project and ensure adequate access is provided for the Project:

- **Rose Avenue /Project Driveway No. 1 at Pacific Coast Highway:** Install a five phase traffic signal, and associated signing and striping modifications, inclusive of crosswalks. The installation of a traffic signal at Rose Avenue and Pacific Coast Highway, and associated signing and striping modifications, is subject to the approval of the City of Long Beach and/or the State of California Department of Transportation (CALTRANS).

As there are no significant impacts at the remaining study intersections, no traffic mitigation measures are required or recommended.

Figure 10-1 presents the planned and/or recommended intersection improvements for the lane geometry and intersection controls that were assumed for the Year 2010 background traffic conditions, without and with Project traffic.



KEY

= APPROACH LANE ASSIGNMENT	P = PARKING, NP = NO PARKING
= RECOMMENDED IMPROVEMENTS	U = UNDIVIDED, D = DIVIDED
= PLANNED IMPROVEMENTS	2 = NUMBER OF TRAVEL LANES
= TRAFFIC SIGNAL, ▼ STOP SIGN	(XX) = POSTED SPEED LIMIT (MPH)
= PLANNED TRAFFIC SIGNAL	= PROJECT SITE

green ● = Recommended Traffic Signal

NO SCALE

LINSCOTT LAW & GREENSPAN engineers

FIGURE 10-1

YEAR 2010 RECOMMENDED IMPROVEMENTS
KROC COMMERICAL CENTER, LONG BEACH

11.0 STATE OF CALIFORNIA (CALTRANS) METHODOLOGY

11.1 Highway Capacity Manual (HCM) Method Of Analysis (Signalized Intersections)

In conformance with the State of California Department of Transportation (Caltrans) requirements, existing and projected weekday AM peak hour, weekday PM hour, and Saturday midday peak hour operating conditions at the seven state-controlled study intersections within the study area have been evaluated using the *Highway Capacity Manual 2000* (HCM2000 for signalized intersections) operations method of analysis and the methodology outlined in Chapter 17 of the *Highway Capacity Manual 2000* (HCM2000) for unsignalized intersections. See *Section 3.4* for a detailed description of the HCM Methodology

Caltrans "endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities"; it does not require that LOS "D" (shall) be maintained. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS." Since the intersections within the Caltrans right-of-way are under the jurisdiction of the City of Long Beach, the City is the lead agency and the City's level of service standard should be used. Therefore, intersection impacts at all intersections located within the City of Long Beach will be determined based upon the City's level of service standards and impact criteria.

11.2 HCM/LOS Intersection Capacity Analysis Results

Table 11-1 summarizes the peak hour level of service results at the seven state-controlled study intersections within the study area based on the HCM/LOS method of analysis. The first column (1) of HCM/LOS values in *Table 11-1* presents a summary of existing traffic conditions. The second column (2) presents Year 2010 background traffic conditions based on existing intersection geometry, but without any project generated traffic. The third column (3) presents future forecast traffic conditions with the addition of Project traffic and the fourth column (4) indicates the anticipated level of service with previously identified recommended improvements.

11.2.1 *Year 2010 Background Traffic Conditions*

An analysis of future (Year 2010) background traffic conditions indicates that one of the seven state-controlled study intersections is forecast to operate at an unacceptable service level during the weekday AM and PM peak hours. The intersection of Rose Avenue/Pacific Coast Highway is forecast to operate at unacceptable LOS F during the weekday AM and PM peak hours. The remaining six state-controlled study intersections on Pacific Coast Highway are expected to continue to operate at acceptable service levels (i.e., LOS D or better) during the weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour for Year 2010 background traffic conditions.

Table 11-1
Year 2010 Intersection Capacity Analysis Summary
HCM/LOS Method of Analysis for State Facilities

Key Intersections	Time Period	(1) Existing Traffic Conditions		(2) Year 2010 Background Traffic Conditions		(3) Year 2010 Plus Project Traffic Conditions		(4) Year 2010 With Recommended Improvements	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
6. Martin Luther King Jr. Ave at Pacific Coast Highway	AM	12.0 s/v	B	12.3 s/v	B	12.3 s/v	A	--	--
	PM	12.4 s/v	B	12.8 s/v	B	12.8 s/v	B	--	--
	Saturday	12.1 s/v	B	12.6 s/v	B	12.9 s/v	B	--	--
7. Orange Ave at Pacific Coast Highway	AM	26.1 s/v	C	26.6 s/v	C	27.0 s/v	C	--	--
	PM	24.6 s/v	C	25.2 s/v	C	25.8 s/v	C	--	--
	Saturday	21.1 s/v	C	21.3 s/v	C	21.6 s/v	C	--	--
8. Walnut Avenue at Pacific Coast Highway	AM	14.7 s/v	B	14.9 s/v	B	15.4 s/v	B	--	--
	PM	13.6 s/v	B	13.9 s/v	B	14.8 s/v	B	--	--
	Saturday	10.7 s/v	B	10.9 s/v	B	11.2 s/v	B	--	--
9. Rose Avenue at Pacific Coast Highway	AM	**241.1 s/v**	**F**	**289.6 s/v**	**F**	**1,717.9 s/v**	F	3.7 s/v	A[22]
	PM	**96.6 s/v**	**F**	**132.7 s/v**	**F**	**956.6 s/v**	F	5.3 s/v	A[22]
	Saturday	18.2 s/v	C	20.1 s/v	C	**64.7 s/v**	F	5.5 s/v	A[22]

Notes:
Bold HCM/LOS values indicate adverse service levels based on City LOS standards.
s/v = seconds per vehicle.

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22 Represents anticipated LOS with installation of a traffic signal at the intersections of Rose Avenue at Pacific Coast Highway to facilitate access to the Project site.

Table 11-1 (Continued)
Year 2010 Intersection Capacity Analysis Summary
HCM/LOS Method of Analysis for State Facilities

Key Intersections	Time Period	(1) Existing Traffic Conditions		(2) Year 2010 Background Traffic Conditions		(3) Year 2010 Plus Project Traffic Conditions		(4) Year 2010 With Recommended Improvements	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
10. Cherry Avenue at Pacific Coast Highway	AM	22.6 s/v	C	22.9 s/v	C[23]	23.8 s/v	C	--	--
	PM	25.1 s/v	C	24.8 s/v	C	25.0 s/v	C	--	--
	Saturday	28.6 s/v	C	24.6 s/v	C	24.1 s/v	C	--	--
11. Temple Avenue at Pacific Coast Highway	AM	10.6 s/v	B	10.6 s/v	B	10.9 s/v	B	--	--
	PM	12.1 s/v	B	12.4 s/v	B	12.4 s/v	B	--	--
	Saturday	11.6 s/v	B	11.6 s/v	B	13.1 s/v	B	--	--
12. Redondo Avenue at Pacific Coast Highway	AM	24.8 s/v	C	25.4 s/v	C	25.5 s/v	C	--	--
	PM	23.4 s/v	C	24.1 s/v	C	24.1 s/v	C	--	--
	Saturday	25.4 s/v	C	25.8 s/v	C	30.3 s/v	C	--	--

Notes:
Bold HCM/LOS values indicate adverse service levels based on City LOS standards.
s/v = seconds per vehicle.

23 Represents anticipated operation conditions with implementation of planned intersection and signalization improvements by the City of Signal Hill/City of Long Beach. Improvements are assumed to be completed by Year 2010 and incorporated in the cumulative 2010 background traffic setting.

11.2.2 *Year 2010 With Project Traffic Conditions*

Review of Column 3 of *Table 11-1* indicates that one of the seven state-controlled study intersections are forecast to continue to operate at an unacceptable service level during the weekday AM peak hour, weekday PM peak hour and Saturday midday peak hour with the addition of project traffic. The intersection of Rose Avenue/Pacific Coast Highway is forecast to operate at unacceptable LOS F during the weekday AM peak hour, weekday PM peak hour and Saturday midday peak hour.

However, as shown in Column 4 of *Table 11-1*, the implementation of previously identified recommended improvements at the intersection of Rose Avenue/Pacific Coast Highway results in acceptable levels of service (see *Section 10.2 – Recommended Project-Specific Improvements)*. The remaining six state-controlled study intersections on Pacific Coast Highway are expected to continue to operate at acceptable service levels (i.e., LOS D or better) during the weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour in the Year 2010 with project traffic. *Appendix D* contains the HCM/LOS calculations for the seven state-controlled study intersections for the weekday AM peak hour, weekday PM peak hour, and Saturday midday peak hour.

12.0 CONGESTION MANAGEMENT PROGRAM COMPLIANCE ASSESSMENT

The Congestion Management Program (CMP) was created statewide as a result of Proposition 111 and has been implemented locally by the Los Angeles County Metropolitan Transportation Authority (LACMTA). The CMP for Los Angeles County requires that the traffic impact of individual development projects of potential regional significance be analyzed. A specific system of arterial roadways plus all freeways comprise the CMP system.

12.1 Traffic Impact Review

As required by the *2004 Congestion Management Program for Los Angeles County*, a review has been made of designated monitoring locations on the CMP highway system for potential impact analysis. Per CMP TIA criteria, the geographic area examined in the TIA must include the following, at a minimum, all CMP arterial monitoring intersections, including freeway on and off-ramp intersections, where the project will add 50 or more trips during either the weekday AM peak hour or weekday PM peak hour.

12.1.1 *Intersections*

The following CMP intersection monitoring is a part of the key study intersections analyzed in this report.

CMP Station	Int. No.	Location
37	8	Pacific Coast Highway at Alamitos Avenue

As summarized in *Table 8-1*, this CMP intersection is expected to operate at acceptable levels of service during the weekday AM, peak hour, weekday PM peak hour, and Saturday midday peak hour in the Year 2010 without and with the proposed Project.

12.2 Transit Impact Review

As required by the current *Congestion Management Program for Los Angeles County*, a review has been made of the CMP transit service. As previously discussed, a number of transit services exist in the project area, necessitating the following transit impact review. The project trip generation, as shown in *Table 5-1*, was adjusted by values set forth in the CMP (i.e., person trips equal 1.4 times vehicle trips, and transit trips equal 3.5 percent of the total person trips) to estimate project-related transit trip generation. Pursuant to the CMP guidelines, the proposed project is forecasted to generate 15 transit trips (9 inbound and 6 outbound) during the AM peak hour and 15 transit trips (5 inbound and 10 outbound) during the PM peak hour. Over a 24-hour period the proposed project is forecasted to generate 185 daily weekday transits.

It is anticipated that the existing transit service in the project area would be able to accommodate the project generated transit trips. Long Beach Transit (LBT) Routes Nos. 7, 21, 22, 23, 131, 171, 172, 173 and 174 currently serve the project site and the surrounding vicinity. Therefore, given the number of transit trips generated by the project and the existing transit routes in the project vicinity, it is concluded that the existing public transit system would not be significantly impacted by the proposed Project.

13.0 SUMMARY OF FINDINGS AND CONCLUSIONS

- ***Project Description*** – The proposed Kroc Community Center project involves the reformation of up to 19 acres of land designated by the Salvation Army, through a grant from the Kroc Foundation, for the location of a new recreational and community center to foster and serve the recreational needs of the local community. The Kroc Community Center would offer an array of social programs specifically designed to meet the needs of the neighboring community. The Kroc Community Center includes the construction of an approximately 170,536 square-foot (SF), three to four story, three-building complex and an outdoor recreation area. Specifically, the facility will include the following four components:

    - ❑ Chapel/Auditorium Building: This two-story building has a proposed floor area of 12,455 SF with a lobby, lecture hall/sanctuary, stage and backstage areas. The sanctuary will have a seating capacity of 450 persons.
    - ❑ Administration/Education Building: This four-story building has a proposed floor are of 73,910 SF, which includes a 3,100 SF day-care, approximately 11,400 SF of administrative offices, a kitchen, classrooms, library, computer lab, arts studio, multipurpose rooms and administrative offices.
    - ❑ Recreation Center : This two-story building has a proposed floor area of 84,171 SF that includes a gymnasium, exercise rooms, classrooms, weight room, locker rooms, game room, and indoor therapy pool.
    - ❑ Outdoor Recreation: This space includes a 50-meter pool, warm-up pool, and leisure pool with fountains, slides and children's area. Other site amenities, including a 10,000 SF amphitheater, soccer field, playground, walking trails, outdoors climbing wall, and challenge course.

- ***Study Scope*** – The following intersections were selected for detailed peak hour level of service analyses under Existing (Year 2008) Traffic Conditions, Year 2010 Background Traffic Conditions and Year 2010 Future Background plus Project Traffic Conditions:

    1. Orange Avenue at Hill Street (Signal)
    2. Walnut Avenue at Hill Street (All-Way Stop Control)
    3. Cherry Avenue at Hill Street (Signal)
    4. Walnut Avenue at East 20th Street (All-Way Stop Control)
    5. Cherry Avenue at 21st Street (Signal)
    6. Martin Luther King Jr. Avenue at Pacific Coast Highway (Signal)
    7. Orange Avenue/Alamitos Avenue at Pacific Coast Highway (Signal)
    8. Walnut Avenue at Pacific Coast Highway (Signal)
    9. Rose Avenue at Pacific Coast Highway (Two-Way Stop Control)
    10. Cherry Avenue at Pacific Coast Highway (Signal)
    11. Temple Avenue at Pacific Coast Highway (Signal)
    12. Redondo Avenue at Pacific Coast Highway (Signal)

The analysis is focused on assessing potential traffic impacts during the morning and evening commute peak hours (between 7:00-9:00 AM, and 4:00-6:00 PM) on a typical weekday and during midday commute peak hours (between 10:00-2:00 PM) on a typical (Saturday) weekend.

- ***Level of Service (LOS) Standards and Significant Impact Criteria*** - Impacts to local and regional transportation systems are considered significant if:
  - An unacceptable peak hour Level of Service (LOS) (i.e. LOS E or F) at any of the key intersections is projected. The City of Long Beach (as well as City of Signal Hill) considers LOS D (ICU = 0.801 - 0.900) to be the minimum acceptable LOS for all intersections. For the City of Long Beach, the current LOS, if worse than LOS D (i.e. LOS E or F), should also be maintained; and
  - The project increases traffic demand at the study intersection by 2% of capacity (ICU increase ≥ 0.020), causing or worsening LOS E or F (ICU > 0.901). At unsignalized intersections, a "significant" adverse traffic impact is defined as a project that adds 2% or more to traffic delay (seconds per vehicle) at an intersection operating LOS E or F.

- ***Existing Traffic Conditions*** – Three of key study intersections currently operate at an unacceptable service level during the AM, PM, and Saturday midday peak hour based on City of Long Beach LOS standards. The intersections of Pacific Coast Highway at Rose Avenue, Cherry Avenue and Redondo Avenue currently operate at LOS E or F during the weekday AM, PM, and/or Saturday midday peak hours, while the remaining key intersections operate at LOS D or better.

- ***Project Trip Generation*** – On a "typical" weekday, the proposed Project is forecast to generate 3,770 daily trips, with 299 trips (184 inbound, 115 outbound) produced in the AM peak hour and 302 trips (95 inbound, 207 outbound) produced in the PM peak hour. On a "typical" weekend, the proposed Project is forecast to generate 1,482 daily trips, with 238 trips (127 inbound, 111 outbound) produced in the Saturday midday peak hour.

- ***Related Projects Trip Generation*** – Twenty-one (21) related projects were considered as part of the cumulative traffic analysis. On a typical weekday, the twenty-one related projects are expected to generate a combined total of 26,354 daily trips , with 1,467 trips (588 inbound and 879 outbound) forecast during the AM peak hour and 2,153 trips (1,158 inbound and 995 outbound) during the PM peak hour On a typical weekend day (Saturday), the related projects are expected to generate a combined total of 27,138 daily trips with 2,666 trips (1,365 inbound and 1,301 outbound) forecast during the Saturday midday peak hour.

- ***Year 2010 Future Background Traffic Conditions*** – An analysis of future (Year 2010) background traffic conditions indicates that the intersections of Pacific Coast Highway at Rose Avenue, Cherry Avenue and Redondo Avenue are forecast to continue to operate at LOS E or F during the weekday AM, PM, and/or Saturday midday peak hours, while the remaining key intersections are forecast to continue to operate at LOS D or better.

- ***Year 2010 Future Traffic Conditions Plus Project*** – An analysis of future (Year 2010) background traffic conditions with the inclusion of the project indicate that traffic associated with the proposed Project will cumulatively impact one intersection, Rose Avenue at Pacific Coast Highway when compared to the LOS standards and the significant traffic impact criteria defined in this report. However, recommended project improvements at this location will offset the traffic impact of the Project.

- ***Site Access and Internal Circulation Evaluation*** – Site access and the on-site circulation layout of the proposed Project, on an overall basis, appear adequate. However, prior to finalization of the project site plan, it is recommended that turning templates (ASSHTO SU-30, WB-50 and fire trucks) be utilized to confirm that all vehicles can properly access and circulate through the site and that all internal drive aisle widths, project driveway widths, and parking stall widths satisfy the City's minimum requirements.

- ***Project-Specific Improvements*** To mitigate the Project's traffic impacts and ensure adequate access to the project site is provided and conflicts to through traffic on Pacific Coast Highway are minimized, the following mitigation measures are recommended:

- ❑ Rose Avenue /Project Driveway No. 1 at Pacific Coast Highway: Install a five phase traffic signal, and associated signing and striping modifications, inclusive of crosswalks. The installation of a traffic signal at Rose Avenue and Pacific Coast Highway, and associated signing and striping modifications, is subject to the approval of the City of Long Beach and/or the State of California Department of Transportation (CALTRANS).

- ***CMP Compliance Assessment:*** The proposed Project will not impact any intersection on the Los Angeles County Congestion Management Program roadway network. No significant transportation impacts are expected to occur on the Los Angeles County Congestion Management Program transit system due to the development and full occupancy of the proposed Project.